NATIONAL WOMEN'S HEALTH

2021

Pūrongo Haumanu ā tau

Annual Clinical Report

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Contents

List of tables

Chapter 6

Chapter 7

List of figures

Chapter 3

Chapter 4

Chapter 5

Chapter 6

Chapter 8

Chapter 9

ŪPOKO 1

Whakarāpopoto ā te Kaiwhakahaere

CHAPTER 1

Executive Summary

Foreword

Tēnā Kōtou Katoa

The 2021 year was another challenge for Aotearoa, Te Toka Tumai, and Women's Health, with the ongoing pressure from Covid-19 and our high vacancy rate, especially in midwifery, exacerbated by the high levels of unplanned leave due to the effects of the virus on our staff and their whānau.

Despite all the difficulties we look back with pride on what we managed to achieve. The service we provide has been affected by the staffing situation but overall we have provided to whānau a safe, quality service. We have valued the feedback we have received from whānau and, when the service has not met their expectations, we have worked to identify what went wrong and what improvements we needed to make.

As we continue to serve the whānau of Auckland central and high needs women from across the motu, the complexity of women birthing at Te Toka Tumai continues to rise. An increase in BMI overall and an increase in age whānau are birthing contribute to the increase in inductions and Caesareans at our unit, both reaching 40% in 2021. The increasing BMI of our women also increases the mahi for our LMC and core midwifery colleagues. Alongside this the private obstetricians whose whanua birth, using our services, are supporting an increasing number of women choosing to birth by Caesarean section.

Last year we commented on the unexpectedly high rates of perinatal and maternal mortality and hypoxic ischaemic encephalopathy. We are pleased to report that these have returned to levels consistent with pre 2020. Nevertheless, we continue to closely monitor these key maternity outcomes.

We have had an increase in preterm birth over the past two years, up to levels seen 10 years ago. This may be associated with the Covid pandemic and/or with the increase in complexities. We value the relationship we have with the neonatal services as we work together to achieve the best outcomes possible for preterm babies. To this end, in November 2021, we opened Whitinga Ora Pēpi (Transition to Wellness) in Ward 96. We look forward to reporting on the activities of this much awaited unit, which provides transitional care for pēpi and whānau of late preterm babies prior to discharge home.

The general gynaecology team have made significant progress in ensuring access to service is equitable across all our population groups. The team have embedded improvements and for the past two years have reported a post-surgical complication rate of 6%, which is half the rate seen back in 2018. The most important contributor to this has been a reduction in readmissions, most likely following introduction of a surgical bundle and of a nurse-led follow-up clinic for women who have had hysterectomy or laparotomy. Sadly, again due to covid 19, our waiting times for first specialist assessment and for surgical treatment have lengthened.

Our colposcopy service continues to deliver against cQUIP standards, and to audit outcomes in the face of changes to the National Cervical Screening Program. Most significant is a change to follow up after treatment. While it is important women are informed that they may need to return after treatment for colposcopy after an abnormal six-month smear, almost all treatments were successful and very few women required further treatment.

The Gynaecologic Oncology Service performed less well against standards for time to review and treatment in 2021, probably related to delays in investigations and whānau reluctance to attend clinic due to Covid-19. However, the service achieved important improvements with an increase in laparoscopic surgery in endometrial cancer leading to improved outcomes for women with high BMI, and an increase in neo-adjuvant chemotherapy for ovarian cancer reducing the need for bowel resection and interval debulking surgery.

Early medical abortion continues to rise with a commensurate decrease in surgical abortion, although this creates challenges to providing post abortion contraception. Reconfiguration of the Auckland abortion services is planned to address inequity of access for women living in Waitematā and Counties Manukau.

Our fertility unit, Fertility Plus, were also hampered in their work by Covid in 2021, recording a slightly lower number of started IVF cycles. However, they continue to work at a high level of quality, with all reported process and outcome indices in excess of ANZARD benchmarks while maintaining their commitment to single embryo transfer (99%) and thus reporting low multiple pregnancy rates (0.8% in 2021).

The Women's Service covers a wide range of complex services for whānau locally, regionally and nationally. This requires highly skilled and experienced staff, across the disciplines. We have such a team.

I offer my sincere thanks to all staff who work in our service, and acknowledge the strong and cooperative relationships with the University of Auckland, Liggins Institute and Auckland University of Technology with whom we share staff. Never before have we faced the level of adversity we have experienced over the last year, but never before have we seen such unwavering commitment from all staff groups. It is due to this commitment that our service has been able to deliver all the services outlined in this annual report.

As the health reforms approach we go into 2022 optimistic for the future. We look forward to using the opportunities afforded by the reforms to strengthen our partnership with Iwi to meet our obligations under Te Tiriti and to progress our mission of achieving equitable access to services and health outcomes for all the whānau we service.

Finally, I would like to acknowledge the mahi of the Women's Health Intelligence team, who have again produced a quality report of the unit's activities, in the face of challenges due to redeployment to support our hospital Covid response, staffing, and the introduction of new clinical information systems for inpatient gynaecology and maternity.

Julie Patterson

Director, Women's Health,

Te Toka Tumai|Auckland

6462
mothers birthed at National Women's

6553
babies born at National Women's

73.9%
exclusive breastfeeding rate

39.7%
mothers started birth with an induction of labour

11.5%
NICU admission rate

Mode of Birth 2021

47.4% Spontaneous vertex

40.6% Caesarean section

11.5% Operative vaginal

0.5% Breech

1.1 Data tables: Summary statistics

Table 1.1: Mother and baby numbers: NWH 2021

Total number of mothers birthing at NWH	6426
Mothers birthing before arrival (BBA)	36
Total number of mothers	6462
Total number of babies born at NWH	6517
Babies born before arrival (BBA)	36
Total number of babies	6553

BBA = Baby born before arrival and is defined as those pēpi who were born at home or en route to hospital where the intention was to be born in a hospital.

Table 1.2: Contribution of multiple births to mother and baby numbers: NWH 2021

	Mothers	Babies
NWH births		
Singletons	6335	6335
Twins	89	178
Triplets	2	4
BBA		
Singletons	36	36
Totals (including BBA)	6462	6553

Table 1.3: Mode of onset of birth NWH 2021

	Birthing Mothers	
	n=	6462
	n	%
Spontaneous onset of labour	2372	36.7
Iatrogenic onset of birth	4090	63.3
CS Elective	1272	19.7
Emergency CS before onset labour	250	3.9
Induction of labour	2568	39.7

Table 1.4: Mode of birth by parity NWH 2021

	Birthing Mothers		Nullipara		Multipara	
	n=	6462	n=	3204	n=	3258
	n	%	n	%	n	%
Spontaneous Vertex Birth	3064	47.4	1216	38.0	1848	56.7
Vaginal Breech Birth	31	0.5	17	0.5	14	0.4
Operative Vaginal Birth	744	11.5	630	19.7	114	3.5
Forceps	299	4.6	246	7.7	53	1.6
Ventouse	445	6.9	384	12.0	61	1.9
Caesarean Section	2623	40.6	1341	41.9	1282	39.3
CS Elective	1272	19.7	349	10.9	923	28.3
CS Emergency	1351	20.9	992	31.0	359	11.0

Table 1.5: Neonatal outcomes among pēpi born at NWH in 2021

	Babies born	
	n=	6553
	n	%
Sex		
Male	3315	50.59
Female	3235	49.37
Indeterminate	1	0.02
Unknown	2	0.03
Preterm birth		
20-27 weeks	103	1.6
28-31 weeks	97	1.5
32-36 weeks	470	7.2
Term birth		
37-41 weeks	5862	89.5
≥42 weeks	21	0.3
SGA (by Customised Birthweight Centile)		
Preterm	209	3.2
Term	655	10.0
	Live births	
	n=	**6499**
	n	**%**
Apgar at 5 min <7		
Preterm	75	1.2
Term	88	1.4
Admission to NICU		
Preterm	380	5.8
Term	372	5.7
	Live births excluding admissions to NICU and Starship	
	N=	**5385**
	n	**%**
Infant Feeding at Discharge from NWH facility*		
Exclusive breastfeeding	3978	73.9
Fully breastfeeding	278	5.2
Partial breastfeeding	1004	18.6
Artificial feeding	125	2.3

*Missing one infant feeding method at discharge

Table 1.6: Perinatal related mortality NWH 2021

	Live births	Rate	
	n=6499	per 1000	
Fetal deaths (Still birth & TOPs)	54	8.3	/1000 births
Early neonatal death	29	4.5	/1000 live births
Late neonatal death	9	1.4	/1000 live births
Neonatal death	38	5.8	/1000 live births
Perinatal deaths (fetal & early neonatal)	83	12.8	/1000 births
Perinatal related deaths (fetal & all neonatal)	92	14.2	/1000 births

Table 1.7: Maternal postpartum outcomes NWH 2021

	Birthing mothers		
	N	n	%
PPH ≥1000mls	6462	707	10.9
Spontaneous vaginal birth	3095	231	7.5
Instrumental vaginal birth	744	98	13.2
Caesarean section	2623	378	14.4
Episiotomy among vaginal births	3839	1212	31.6
Third/fourth degree tears among vaginal births	3839	138	3.6
Postpartum blood transfusions	6462	211	3.3

Table 1.8: Numbers of mothers and pēpi 2009-2021

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	N	N	N	N	N	N	N	N	N	N	N	N	N
Mothers	7735	7709	7523	7695	7223	7400	6933	7241	6846	6481	6660	6212	6462
Pēpi	7897	7866	7690	7863	7377	7551	7074	7368	6974	6597	6762	6310	6553

Table 1.9: Mode of birth NWH 1998-2021

Year	Total births	Spontaneous vertex birth		Vaginal breech		Operative vaginal		Caesarean section	
	N	n	%	n	%	n	%	n	%
1998	7492	4645	62	75	1	922	12.3	1850	24.7
1999	7501	4635	61.8	83	1.1	945	12.6	1838	24.5
2000	7827	4650	59.4	87	1.1	1010	12.9	2080	26.6
2002	7775	4327	55.7	66	0.8	1081	13.9	2301	29.6
2003	7611	4269	56.1	58	0.8	1065	14	2219	29.1
2004	7491	4073	54.4	54	0.7	1171	15.6	2193	29.3
2005	7194	3845	53.4	54	0.7	1022	14.2	2273	31.6
2006	7212	3815	52.9	51	0.7	956	13.3	2390	33.1
2007	7695	4212	54.7	70	0.9	975	12.6	1428	31.7
2008	7589	4218	55.5	62	0.8	937	12.3	2372	31.3
2009	7735	4313	55.8	61	0.8	947	12.3	2414	31.2
2010	7709	4217	54.7	59	0.8	942	12.2	2491	32.3
2011	7523	4183	55.6	60	0.8	832	11.1	2448	32.5
2012	7695	4173	54.2	45	0.6	907	11.8	2570	33.4
2013	7223	3828	53	56	0.8	833	11.5	2506	34.7
2014	7400	3928	53.1	64	0.9	849	11.5	2559	34.6
2015	6933	3556	51.3	38	0.5	871	12.6	2468	35.6
2016	7241	3658	50.5	50	0.7	925	12.8	2608	36
2017	6846	3123	45.6	35	0.5	979	14.3	2709	39.6
2018	6481	2998	46.3	36	0.6	915	14.1	2532	39.1
2019	6660	3195	48	44	0.7	850	12.8	2571	38.6
2020	6212	3091	49.8	40	0.6	725	11.7	2356	37.9
2021	6462	3064	47.4	31	0.5	744	11.5	2623	40.6

Table 1.10: Term births (pēpi) by gestation NWH 2009-2021

Gestation	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
37 weeks	638	630	626	616	608	643	591	675	605	599	583	540	538
38 weeks	1565	1546	1539	1536	1550	1595	1501	1677	1527	1488	1501	1389	1396
39 weeks	1965	1983	2078	2172	2055	2078	1989	2109	2103	1935	2131	1944	2137
40 weeks	1813	1810	1664	1744	1575	1585	1540	1489	1459	1348	1331	1229	1285
41 weeks	992	977	864	877	754	818	702	690	601	566	541	508	506
≥42 weeks	150	133	132	98	61	73	60	48	47	40	29	37	21
Total	7123	7079	6903	7043	6603	6792	6383	6688	6342	5976	6116	5615	5883

ŪPOKO 2

Nga Ratonga

CHAPTER 2

Our Services

VISION and STRATEGIC GOALS

Leadership, excellence and equitable Women's Health service provision through empowerment and partnership.

- Ensuring our models of care are based on best available evidence, are developed in collaboration with whānau and interdisciplinary teams; and lead to equitable and high quality outcomes for all.
- To embed within the service a culture which ensures we meet our obligations under Te Tiriti o Waitangi for all service development, clinical governance, service provision, auditing and monitoring.
- To identify, acknowledge, highlight and eradicate racism and ensure care is delivered sensitively in a culturally and gender appropriate manner in a safe and welcoming environment.
- To collaborate regionally and nationally to ensure service commissioning is designed around the needs of whānau and ensures funding for all levels of care including tertiary and quaternary care is appropriate and supports optimal care pathways delivered in the appropriate setting, right context and by the right people.
- To enable all women accessing our maternity service to be able to access services appropriate to their level of need in an equitable way. This includes ensuring that well wāhine are given the opportunity to birth in a midwifery led unit.
- To grow a culture of clinical governance across the services, including investigation of critical events and complaints which includes broad practitioner, cultural and consumer representation and ownership and functions with a focus on maintaining a Just and Learning Culture at all times.
- To critically evaluate the care we provide, to ensure it is evidence based and that our outcomes benchmark well against internal and external quality maternity and gynecological measures and standards. This includes actively working to reduce under and over delivery to optimize outcomes and reduce variation in practice.
- To maintain and further develop our nationally leading career pathways and educative environment along with specialty clinical services; and to continue our strong focus on midwifery, maternity and gynecology research in collaboration and partnership with our University colleagues; particularly the University of Auckland and the Auckland University of Technology so as to encourage and support a culture of innovation, lifelong learning and research within the service.
- To empower our staff by creating a positive culture and supportive working environment, built on our shared values' goals and accountabilities. Ensuring that time and resources are appropriately allocated to support the growth, development and wellbeing of our workforce.
- To ensure we are actively participating in the creation of future workforce planning, capacity planning and sourcing of sufficient skilled staff to deliver our goals and be part of the national workforce solution.
- To work collaboratively across the organisation to achieve financial and service delivery goals, ensuring that access to women's health services is timely, equitable and prioritised by need. Always with an equity lens applied during prioritisation.
- To ensure students accessing our service for education experience a welcoming, supportive and collaborative learning environment which meets their educational, cultural and clinical development needs.

2.1 Women's Health Leadership and Structure for 2021

The Women's Health Service Leadership Structure aligns with our overall clinical governance structure across the directorate.

The Leadership team

Julie Patterson
Director of Women's Health

Deborah Pittam
Director of Midwifery

Steve Harris
General Manager Women's Health

Dr Orna McGinn
Women's Health Service Director of Primary Care

Claudine Hutchings
Allied Health Social Work Professional Leader

Vaughn Woods
Human Resources Manager

Martin McEvoy
Finance Manager

2.2 Women's Health Service Clinical Directors

Dr Jenny McDougall
Secondary Maternity (& Acute) Services

Dr Jason Waugh
Regional Maternity Services

Dr Cindy Farquhar
Secondary Gynaecological (& Elective) Services

Dr Lois Eva
Regional Gynaecologic Oncology Services

Dr Gillian Gibson
Regional Gynaecology Day Services

Midwifery, nursing and operational leadership

Raffaela Slight
Midwifery Unit Manager

Angela Harvey
Midwifery Unit Manager

Lucy Pemberton
Operations Manager

2.3 Service Provision

2.3.1 Maternity services

NWH provides national and regional services, as well as primary, secondary and tertiary maternity services to whānau who reside in the ADHB region and to whānau who reside outside the region who have been referred to the High Risk service.

National Services

Maternal

- Management of major maternal cardiac disease – pregnant wāhine who are likely to require bypass or valve surgery during pregnancy, or who require cardiac monitoring in labour. NWH also cares for wāhine with cardiac disease who reside in the Pacific Islands.
- Management of wāhine with major liver disease in pregnancy

Fetal/Neonatal

- In utero fetal blood transfusions. NWH has a relationship in place to obtain irradiated blood from the National Blood service.
- Management of fetal cardiac anomalies.
- Management of fetal abnormalities that will require admission to Starship Hospital following birth.
- National service for fetoscopic selective laser photocoagulation of fetal vessels in twin to twin transfusion syndrome (TTTS).
- Fetal reduction including selective reduction in multiple pregnancies requiring cord occlusion or interstitial laser.
- Other complex fetal procedures including fetal shunting.
- Postnatal midwifery care of mothers whose pēpi are under the care of Starship Hospital.

Regional Services

Maternal

- Care of those wāhine living in the Waitematā DHB area with Type 1 or 2 diabetes, GDM with poor control, diabetes complications and/or co-morbidities. Pre-pregnancy counselling for high risk wāhine.
- Care for pregnant women with HIV infection from CMDHB and Waitematā DHB. With the rollout of the "National HIV screening in pregnancy" programme, these caseloads have increased but absolute numbers remain small.

Fetal/Neonatal

- Diagnosis of major fetal abnormalities with management plan for ongoing care in local DHB. If this is not possible due to the severity of the abnormality, care remains with Auckland DHB.

2.3.2 Wards and clinics in the maternity service

The following wards and clinics make up the maternity service.

Labour and Birthing Suite

- NWH Labour and Birthing Suite is a 16 bed unit including a 2 bed Complex Care Area (MCCA) providing care for high risk obstetric cases.
- One to one midwifery care is provided for wāhine in labour. Pain relief options include the use of warm water (shower or birth pool), entonox, morphine, and epidural anaesthesia. NWH also provides facilities for wāhine wanting a water-birth.
- Care is provided to wāhine by a multidisciplinary team of midwives, including midwives specialised in high risk obstetrics, obstetricians, anaesthetists, obstetric physicians, self-employed Lead Maternity Carers (LMCs), hospital aides and ward clerks. To ensure midwives maintain their competency in intrapartum care provision, midwives are encouraged to rotate through the antenatal/postnatal wards to Labour and Birthing Suite and the community service.
- Labour and birth care is provided by Labour and Birthing Suite (Core) midwives to wāhine whose LMC is the Community Midwifery Clinic service or the High Risk Maternity and Diabetic Service, to wāhine under the care of private obstetricians who do not have a self-employed midwife contracted to provide midwifery care, and to wāhine transferred to NWH secondary and tertiary services. Care is available to mothers under self-employed midwifery care when their midwife needs relief.
- The Labour and Birthing Suite midwives liaise closely with self-employed LMCs.

Maternity Complex Care Area (MCCA)

- The MCCA contains two beds with extra monitoring equipment located within Labour and Birthing Suite. It managed 137 admissions in 2021, a decrease from 163 admissions in 2020. MCCA provides care for obstetric high risk cases when one to one midwifery care is clinically indicated. The majority of admissions are for PPH, preeclampsia, sepsis and wāhine requiring cardiac monitoring. The midwifery and nursing staff in this unit work hard to maintain a strong focus on the woman's experience to ensure healthy mother and baby bonding and to encourage breastfeeding.

Women's Assessment Unit (WAU)

- This service is open 24 hours a day, 7 days a week and provides acute care for wāhine experiencing pregnancy and gynaecologic complications.
- Inductions of labour are booked through WAU and inductions commenced in this unit. Wāhine are transferred to Labour and Birthing Suite in established labour.
- WAU provides a service for wāhine from 20 weeks gestation requiring second trimester termination of pregnancy and for wāhine who have experienced an intrauterine death.
- Day Assessment Unit (DAU) is a service provided from within WAU, providing appointment based care for wāhine with complex pregnancies. DAU has four chairs for simultaneous care of up to four wāhine. Most common referral reasons are hypertensive disorders, small for gestational age pēpi and post term assessment.
- An external cephalic version (ECV) clinic is provided at the DAU twice weekly.

Antenatal and Postnatal Wards

- There are 53 antenatal and postnatal beds (with the ability to flex up to 63 beds) at NWH for wāhine and pēpi requiring secondary and tertiary care. All primary births, where the mother and baby are well, are transferred to Birthcare Auckland, who holds the contract to provide these services.

High Risk Medical Service (including Diabetes Service)

- The High Risk Medical, Fetal Medicine, and Diabetes services are provided from the Maternity Outpatients Department located on level 9 in the support building at Auckland City Hospital (ACH)'s Grafton site. This facility is also used by Newborn Services, the Child Development Unit and the Anaesthetic Service.
- The High Risk Medical and Diabetes services provide antenatal and postnatal visits in the clinic at ACH and postnatal midwifery community visits to patients at home (medical clinic only) and at Starship Hospital. Two ADHB pool cars assist this service.

Community Services

Community maternity clinics are held at Greenlane Clinical Centre (GCC), along with antenatal clinics in various General Practice facilities in the ADHB catchment area. Community midwifery clinics and postnatal home visits provide continuity of midwifery care during the antenatal and postnatal period with labour and birth midwifery services provided by core midwives in Labour and Birthing Suite. At times of midwifery shortages self employed LMCs may provide the postnatal care.

Obstetric care

- Clinics staffed by ADHB obstetricians are held five times a week at GCC seeing wāhine under community midwifery care and reviewing secondary referrals from private LMCs.
- Clinics staffed by obstetric physicians are held two times per week.

Walk in Centre

The midwifery-led Walk in Centre acts as a first point of contact for wāhine via email, phone or in-person. The Walk in Centre is responsible for the triage of referrals for wāhine needing an LMC or an in person or virtual secondary consultation. Referrals come from both ADHB and community referrers such as GPs and self-employed midwives. The centre also acts as a resource for midwives and GPs, fielding numerous requests for advice. Virtual appointments with an obstetrician are completed for wāhine who are postdates with a low risk pregnancy or where a face to face consultation is not required.

Aranga Tētēkura social care

The Aranga Tētēkura interprofessional team provides a midwifery-led fortnightly advisory forum for midwives, maternal mental health staff, and NWH social workers to plan and coordinate clinical and social care for wāhine with high social complexities. Some wāhine are likely to need the services of statutory child protection services or other community services such as CADS, adding a further layer of complexity. The increased coordination of service could result in outcomes such as fewer traumatic uplifts of newborn pēpi from the hospital; increased numbers of pēpi remaining in their parents' care with intensive social service support in place at the time of birth; increased numbers of pēpi being placed in kin care without the disruption to attachment inherent in protracted foster placements and reduced interdisciplinary and interagency conflict.

PBAC (Positive Birth after Caesarean) Clinic

The PBAC clinic was started in February 2011 to promote informed decision making and patient satisfaction. Wāhine who have had a caesarean are encouraged to attend this obstetric/midwifery clinic in the first half of their next pregnancy to discuss the options for their next birth. Wāhine can be referred by their LMC, via the maternity Walk-in Centre at NWH or can refer themselves. Most wāhine attend the clinic twice during their pregnancy and obtain the remainder of their care from their usual LMC.

Te Manawa o Hine Kaiwhakawhānau Māori

Te Manawa o Hine offer a midwifery service that embraces Te Āo Māori, guided by foundations of mātāpono (tikanga) Māori. These include Atuatanga (spirituality), Kaitiakitanga (guardianship), Rangatiratanga (autonomy), Whānaungatanga (relationships) and Manaakitanga (supports). The values of Tika (correct) and Pono (true and honest) are maintained at all times.

They are a by Māori, for Māori team of new graduate and experienced Māori midwives. They are supported by a leadership team with a quality and equity lens and strategic intent for providing midwifery led continuity and complex cares. The aim is to improve access and engagement by enabling wāhine and whānau led maternity care.

2.3.3 Gynaecology service

The gynaecology department is represented by the following services.

Secondary Gynaecology

The general gynaecology service provides care to wāhine residing within the ADHB catchment of Central Auckland (population - approximately 500,000). The service is comprised of:

- Ward 97 (inpatient ward) at Auckland City Hospital
- Women's Assessment Unit (WAU) at ACH for acute gynaecology.
- Outpatient clinics at Greenlane Clinical Centre.

Gynaecologic Oncology

NWH has the largest Gynaecologic Cancer Centre in New Zealand. The NWH Gynaecologic oncology service offers comprehensive cancer care for wāhine with gynaecological malignancies, and hosts a weekly supra-regional Multi-Disciplinary Meeting (MDM) with video conferencing links to the eight referring DHBs.

Regional Gynaecology Day Service

- The first trimester termination of pregnancy service is an Auckland regional service offered at Epsom Day Unit, Greenlane Clinical Centre.
- The second trimester termination of pregnancy service is provided from ward 97 or Women's Assessment Unit at Auckland City Hospital.

Wards and Clinics in the Gynaecology Service

Inpatient Services – Ward 97, Auckland City Hospital

Ward 97 is a 22 bed ward providing care for wāhine with acute gynaecology problems, gynaecologic oncology and wāhine requiring breast surgery. Ward 97 also provides care to wāhine with other medical conditions or complications resulting from early pregnancy, fertility treatment or abortion.

Radiology assisted procedures, such as fibroid embolisation, management of AV malformation, and image guided biopsy are part of the gynaecology caseload.

In preparation for a major surgery wāhine can be admitted to Ward 97 for administration of preoperative iron or blood transfusion.

Gynaecology has access to the Level 8 High Dependency Unit (HDU) and the Critical Care Unit for those wāhine that require a more intensive level of care and monitoring.

Women's Assessment Unit (WAU)

WAU is located on Level 9, ACH. It is open 24 hours a day, 7 days a week and cares for acute admissions for gynaecology and obstetrics. Admissions either come from Adult Emergency Department, from the community or from Greenlane outpatient clinics.

Outpatient clinics

The gynaecologic outpatient clinics are held at GCC:

- General gynaecology (i.e. menstrual disorders, pelvic floor dysfunction, sterilisation)
- Hormone replacement therapy and family planning
- Endometriosis and pelvic pain
- Colposcopy
- Urogynaecology
- Gynaecologic Oncology
- Pre admissions clinic
- Abnormal uterine bleeding clinic (AUB) and hysteroscopy
- Female multidisciplinary clinic
- Rapid Access Clinic (RAC)

Early Pregnancy Assessment Unit (EPAU)

EPAU is a nurse-led outpatient service, based at GCC for wāhine referred for the management of miscarriage and early pregnancy complications such as ectopic and molar pregnancy. Wāhine requiring surgical management of miscarriage have their procedure at the Greenlane Surgical Unit also based at GCC.

Fertility Plus

Fertility Plus offers a range of secondary and tertiary reproductive endocrinology, infertility and sub-fertility services to the wāhine of the Northern Region. Fertility Plus is one of three public providers in the Auckland region. Private investigation and treatment is also available. Fertility Plus is accredited by the Reproductive Technologies Accreditation Committee (RTAC).

Publicly funded fertility treatment is available to wāhine under 40 years of age, who are non-smokers and have a BMI under 32. If couples do not meet the criteria for publicly funded treatment, private treatment is available.

Fertility Plus also offers a Recurrent Pregnancy Loss Clinic. This is a nurse led clinic which aims to establish underlying reasons for a couple experiencing recurrent pregnancy loss.

2.3.4 Newborn Service

The Newborn Service located on the 9th Floor of Auckland City Hospital (ACH) provides neonatal care for premature and sick newborns and their families/whānau.

National, Regional and District Services

The Newborn Service is contracted to provide:

- Level 3: neonatal intensive care to Northland, Central Auckland, and West and North Auckland areas – 18 cots (tertiary service).
- Level 2: neonatal high dependency care to Central Auckland area – 22 cots (secondary service). Pēpi whose parents are domiciled in the Waitematā DHB area are transferred back to North Shore Hospital or Waitakere Hospital to complete their secondary care closer to home. Pēpi whose parents are domiciled in Northland area are transferred back to Whangarei Hospital when stable, to complete their neonatal care closer to home.
- A regional service for pēpi requiring laser treatment for retinopathy of prematurity from Northland, Central Auckland and West and North Auckland areas (tertiary service).
- A national service for pēpi diagnosed antenatally with congenital cardiac lesions which would require input in the newborn period from Paediatric Cardiology services (quaternary service).

The Newborn Service also provides intensive care to pēpi from other New Zealand DHBs, particularly if their units are at capacity. Inter-regional transfers may also occur for cardiology and surgical services or for complex metabolic diseases, and in cases where there is a need for access to paediatric subspecialty services.

The Newborn Support Services include:

- Neonatal Homecare Service
- Child Development Unit
- Newborn Outpatient Follow-up Service
- Specialist Lactation Service
- Neonatal Emergency Transport

There is a close relationship with tertiary services at Starship Hospital, with approximately 10% of neonates being transferred from NICU to Starship Hospital each year for ongoing medical care (general paediatrics,

respiratory paediatrics, paediatric metabolic and neurology services) and surgical care (paediatric cardiac, general surgery and gastroenterology services).

University Links

There are close research links with the University of Auckland School of Medicine, particularly the Departments of Obstetrics and Gynaecology, Paediatrics and Child Health, and the Liggins Institute. Senior medical staff, University medical staff and the neonatal fellows are involved in clinical research and audit.

There continues to be an arrangement between the Newborn Service and Auckland University of Technology for the Neonatal Nursing Programme. These courses attract students locally and nationally.

2.4 Women's Health Workforce

Women's Health Directorate workforce is made up of a large number of diverse professional roles which provide care to both gynaecology and maternity patients. In addition to the NWH employed workforce, self-employed LMCs (both midwives and obstetricians) provide care for a significant proportion of our maternity population.

2.4.1 Maternity services

Self-employed Lead Maternity Carer (LMC) services

The provision of maternity care in New Zealand is funded by the Ministry of Health, which sets policy, through 20 District Health Boards (DHBs). In 1996 significant changes to the way that maternity care was funded, and therefore provided, were outlined in Section 88 of the Public Health and Disability Act. The Section 88 notice requires all wāhine to have a Lead Maternity Carer (LMC), who is chosen by the wahine and has responsibility for ensuring provision of maternity services throughout her pregnancy and postpartum period. Maternity services, apart from services provided by private obstetricians, are free.

LMCs are required to obtain access agreements with any maternity facility where they intend to provide care. To ensure the wahine receives continuity of care all LMCs are required to have back up arrangements with another self-employed practitioner who the wahine has met. A range of LMC models of care are available in New Zealand. At NWH the following models are available:

- Self-employed midwife. These midwives generally provide continuity of care in the antenatal, intrapartum and postnatal period. Antenatal visits are usually provided through a midwifery clinic in the community and postnatal visits are provided in the wahine's home. If the wahine's pregnancy and or labour become complicated then the midwife and wahine can refer to a private obstetrician or NWH secondary services to provide care.
- General Practitioner (GP). Antenatal care is based in the GP's rooms. Midwifery care intrapartum and in the postnatal period for wāhine who choose a GP LMC is provided by either a hospital midwife or a self-employed midwife. If the wahine's pregnancy and or labour become complicated then the GP and wahine can refer to a private obstetrician or NWH secondary services to provide care. There is now only one GP providing LMC care at NWH.
- Private Obstetrician. Private obstetricians provide antenatal care in their rooms. Midwifery care when wāhine go into labour and postnatal care can be provided by the hospital or a self-employed midwife.

As shown in the report, LMCs provide primary care for approximately 75% of total births at NWH. Currently 130 self-employed Midwives and 30 Private Obstetricians hold access agreements with the service.

2.5 Funding of Maternity Services

2.5.1 Self-employed LMC Maternity Services

Funding for maternity services is complex and underwent significant changes in 2007. Funding for primary maternity care from self-employed midwives, general practitioners and private obstetricians comes directly from the Ministry of Health and is claimed via Section 88. It is module based, with first, second and third trimester, labour and birth, and postnatal modules, and is a fixed payment per wahine per module.

2.5.2 DHB delivered services

DHB provided maternity care, gynaecologic care and neonatal care, both outpatient and inpatient care, is funded by the DHB using Vote Health, population based funding models. Outpatient maternity clinics, whether based at Greenlane Clinical Centre or Auckland City Hospital, are funded through purchase unit codes (PUCs), the value of which are determined nationally by the Ministry of Health. The payment associated with each PUC for an outpatient visit is dependent on the type of visit and who is providing the care e.g. midwife, obstetrician or physician. Midwifery home visits are also funded via PUCs. Inpatient care is funded on case mix, which looks at the diagnostic related group (DRG) and adjusts for complexity to calculate a Weighted Inlier Equivalent Separation (WIES). WIES has a standardised value, which is adjusted annually, and the WIES weight multiplied by the WIES value gives the funding associated with each unit of inpatient care.

2.5.3 Out of area funding

In New Zealand, wāhine can choose where they wish to birth their pēpi if it is a primary birth. The funding for the care provided by self-employed LMCs follows the wahine.

However, funding for care provided by the DHB remains associated with the DHB of residence. Agreements between DHBs determine how funding is transferred between DHBs for care provided to wāhine and pēpi who receive care out of area.

2.6 Birthcare Auckland

Birthcare Auckland is a primary maternity unit providing birthing facilities for wāhine who choose to birth there. It also holds a contract with ADHB to provide postnatal facilities to well wāhine and pēpi born at NWH. This is funded under a contractual arrangement with ADHB Funding and Planning.

ŪPOKO 3
Kounga

CHAPTER 3
Quality

3.1 Women's Health Directorate Priorities

1

TE TIRITI O WAITANGI IN ACTION

- Maternity care service development is intentionally co-designed with tangata whenua and delivered within a partnership model of care.
- A workforce representative of our treaty partnership and who are developing Te Tiriti o Waitangi and cultural competency.
- Women's health service facilities environments will reflect bicultural Aotearoa.
- Cultural support services are available and accessible as required for staff and whānau.
- Creation of a culturally appropratie primary birthing area

2

ELIMINATE INEQUITY

- Reduce unwarranted interventions and so focus resources on patients with greatest clinical need.
- Improved access to acute scans and Ferrinject infusions delivered in the community
- All women will have equitable access to care within WHS with prioritisation of access enabled for those least likely to present early for care or to experience barriers to access for care.
- Equitable outcomes accross all services
- Every woman will have access to timely and culturally appropriate care at every point of access to women's health services
- Primary birthing will be enabled in a specific primary environment designed to be appropriate for Māori and Pacific clients for those women able to access primary birthing at ADHB but unable to access birthcare services

3

PEOPLE, PATIENTS, AND WHĀNAU AT THE CENTER

- Findings from women's feedback are used to develop and embed quality improvements across WHS.
- Strengthened governance framework within WHS.
- Continuity of Midwifery care is promoted throughout the service and Māori, Pacific and Inidan Whānau are able to access culturally and clinically appropriate services in a timely way
- Create shared areas where staff can eat and socialise during breaks

4

DIGITAL TRANSFORMATION

- Te Manawa o Hine will have implemented MMPO system, which will integrate fully with Badgernet Global.
- Gynae-Oncology MDM referral process will be digitalisation.
- The Maternity Clinical Information System-Badgernet Global will be implemented within the financial year, throughout maternity services.
- All staff are competent and confident in the safe use of Badgernet Global

5

RESILIENT SERVICES

- Wāhine who experience late preterm birth will have access to a transitional care space where wāhine and pēpi can stay together
- A sustainable public second trimester surgical abortion service is Established and available closer to home.
- Effective, documented, embedded escalation pathways to manage acute surges of demand for secondary maternity services.
- There is a regionally agreed approach to provision of secondary maternity care (not just secondary but inpatient services), including geographical boundaries and LMC access agreements that promote consistent and equitable access to secondary services across the region, resulting in "The Right Care in the Right Place at the Right Time"
- The review of services and workflows for Labour & Birthing Unit and Women's Assessment Unit are complete and required transformation completed
- Access for women via Women's Assessment Unit to discharge or bed is fast tracked and women no longer are left waiting in corridors.
- LMC midwives working within Te Toka Tumai are supported to provide services within this region

6

FINANCIAL SUSTAINABILITY

- Aim to breakeven and make service improvements

7

QUALITY, SAFETY AND RISK

- Effective , proactive WHS Governance system, including review of the incident review processes
- Review of leadership roles within Governance structure.
- Completion of the review and updating of clinical guidelines

3.2 Women's Health Clinical Excellence Groups

Maternity Clinical Governance Group

The purpose of this group is to oversee, guide and monitor a quality framework model which ensures Te Toka Tumai remains accountable for continually improving the quality of their services.

This group is chaired by the Director of Midwifery and has a diverse membership including midwifery (both employed and community based) Obstetricians (both employed avnd in private practice), Primary Birthing Centre representative, consumer representatives, NZCOM representatives, Newborn Services, and Planning & Funding. Additional people may be invited when required. In 2020 there were four meetings held with a combination of face-to-face and Zoom.

Gynaecology Governance Group

This group is chaired by the lead Gynaecology Service Clinical Director and has responsibility for matters of quality and safety across general gynecology, urogynaecology, fertility, abortion services and gynaecological oncology.

Level 4 Clinical Governance Groups

Specific groups are focused around particular clinical service areas (such as Labour and Birth, MFM, Diabetes, Pregnancy and Parenting, SUDI) with membership relevant to the area of focus.

Research Governance Group

This group works in collaboration with the ADHB research office to:

- Support a culture of research excellence in all aspects of women's health, including neonatology, at NWH
- Enable research at NWH
- Promote integration of research into the clinical service
- Provide a safe research environment for staff and wāhine
- Coordinate research to avoid duplication and burden on staff and wāhine

3.3 The Maternity Quality and Safety Programme

Sue Cole

The New Zealand Maternity Quality and Safety Programme (MQSP) is a national programme established in 2011 by the Ministry of Health (MoH).

The following feed in to the MoH to provide recommendations for the MQSP programme.

- The National Maternity Monitoring group (NMMG)
- Perinatal and Maternal Mortality Review Committee (PMMRC)
- The Neonatal Encephalopathy Taskforce.

In 2021, again despite the constraints of COVID-19 in Auckland, a number of national and local recommendations were implemented:

Maternal Sepsis bundle: This includes a Screening and Action tool, Sepsis treatment boxes and an ADHB Maternal Sepsis guideline.

Introduction and embedding of a Maternal Sepsis Screening and Action tool for all pregnant women.

Lactate testing on i-Stat machines

Change to using the i-Stat machines for the measuring of repeat blood lactate levels for Newborns who are identified as at risk of Severe Intrapartum Fetal compromise on the Newborn Early Warning score.

MEWS charts at Birthcare Auckland

A separate MEWs chart was developed and implemented for women receiving postnatal care at Birthcare Auckland.

Pathways developed for the discharge of postnatal woman from ACH inpatient areas.

Detailed pathways were developed and socialized to ensure that all women who birthed at ACH on discharge from the inpatient areas received postnatal care individualised to their needs.

Whitinga Ora Pēpi

This unit was opened late 2021 o privde care for late preterm pēpi and whānau.

3.3.1 Performance against NZ Maternity Clinical Indicators

The maternity clinical indicators are part of the MQSP. The Ministry of Health uses the National Maternity Dataset, MAT, which is compiled from LMC early pregnancy data and hospital discharge outcome data to produce indicator data for each DHB and facility and for NZ. There are 20 indicators in the clinical indicator report as listed in Table 3.1 (the full report is available at https://minhealthnz.shinyapps.io/maternity-clinical-indicator-trends/).

Table 3.1 includes the indicator rates for NWH for 2018 and 2019 compared to rates for all NZ secondary and tertiary facilities in 2019. Unfortunately delay in the availability of the national maternity dataset delays the indicator report. The 2019 indicators were released by the Ministry of Health in May 2022.

The indicators where NWH is significantly outside average national rates and which are cause for concern are shaded in the table.

Table 3.1: New Zealand Maternity Clinical Indicators 2019 (NWH and NZ Facility rates for all secondary and tertiary facilities)

Indicator		NWH 2018 %	NWH 2019 %	NZ 2019 %	Comment
1	Registration with a LMC in the first trimester of pregnancy	76.9	76.9	72.8	No Concern
2	Standard primiparae who have a spontaneous vaginal birth	50.2	49.5	56.3	Concern
3	Standard primiparae who undergo an instrumental birth	23	25.2	21.2	Concern
4	Standard primiparae who undergo Caesarean section	26.7	25.2	22.2	Concern
5	Standard primiparae who undergo induction of labour	14.5	14.7	9.8	Concern
6	Standard primiparae with an intact lower genital tract (no 1st- to 4th-degree tear or episiotomy)	6.5	4.8	16.1	Concern
7	Standard primiparae undergoing episiotomy and no 3rd or 4th degree perineal tear	45.6	49	32.4	Concern
8	Standard primiparae sustaining a 3rd or 4th degree perineal tear and no episiotomy	2.6	4	4.4	No concern
9	Standard primiparae undergoing episiotomy and sustaining a 3rd or 4th degree tear	3.3	2.3	2.5	No concern
10	Women having a general anaesthetic for caesarean section	6.2	6.4	9	No concern
11	Women requiring a blood transfusion with caesarean section	3	2.2	3.1	No concern
12	Women requiring a blood transfusion with vaginal birth	2.4	2.2	2.4	No concern
13	Diagnosis of eclampsia at birth admission	0.05	0.02	0.03	No concern
14	Women having a peripartum hysterectomy	0.12	0.02	0.06	No concern
15	Women admitted to ICU and requiring ventilation during the pregnancy or postnatal period	0.06	0.05	0.03	No concern
16	Maternal tobacco use during postnatal period	1.6	1.6	8	Excellent
17	Preterm birth	8.6	8.7	8.7	No concern
18	Small babies at term (37 - 42 weeks' gestation)	4.1	3.8	3.5	No concern
19	Small babies at term born at 40 – 42 weeks' gestation	21.8	20.2	26.3	Excellent
20	Babies born at ≥37 weeks' gestation requiring respiratory support	3.2	3.6	2.8	Concern

3.3.2 MQSP Work Streams 2021

In 2017, SOMANZ published a national guideline for the investigation and management of sepsis in pregnancy. This clinical guideline was developed to address the issue of sepsis in the peri-partum period with a guide for clinical practice and improved patient outcome.

A combined obstetric and anaesthetic working group developed an ADHB Sepsis guideline applicable throughout pregnancy in consultation with Infection Control and a pharmacy specialist.

The "**Maternal Sepsis Screening and Action Tool**" was developed for ADHB use based on similar tools developed by the UK Sepsis Trust and Sepsis Trust NZ. The screening tool was developed to work with the MEWS (Maternity Early Warning Score) chart already in use at ADHB.

To assist staff working in the clinical areas, "Sepsis Boxes", containing all the supplies required for the Sepsis Six Pathway, were prepared. The supplies for each of the six actions were put into individual labelled bags. Examples of the contents of the bags include:

- ADMINISTER OXYGEN BAG: includes oxygen mask, tubing and nasal prongs
- TAKE BLOOD CULTURES BAG: includes blood culture bottles, syringes, needles and other equipment to take the samples.

Quick reference cards were developed and distributed at the initial staff education sessions. Staff education is now embedded in annual education sessions for midwifery and nursing staff, and is provided by the Midwifery educators.

To raise awareness among postnatal women of the signs and symptoms of sepsis, a sticker was developed that is attached to the baby well child books of babies that birth at the hospital.

Sepsis (mate whakatāoke) in pregnant women or new mothers is serious

At first, it can feel like 'flu', 'gastro' or a chest infection.

Call an ambulance straight away if you develop one or more of the following:

Slurred speech or confused or very sleepy
Extreme shivering or muscle pain
Passing no urine (pee/mimi) for a day
Severe breathlessness or fast breathing
It feels like you're going to die
Skin is bluish, mottled, pale or abnormally cold to touch

Sepsis sticker attached to Well Child books at ACH.

The maternal sepsis bundles were introduced over a two-week period which included quick sharp education sessions to all staff at ward handovers and at medical staff education sessions.

On-going education for medical staff needs to occur to embed the change of antibiotic cover recommended for the treatment of maternal sepsis.

3.3.3 Lactate testing on i-stat machines

Following on from the introduction of the NOC/NEWS charts in 2020, there was a need to be able to undertake repeat lactate levels for babies identified as being at risk of severe intrapartum fetal compromise that had been admitted to the postnatal ward. These babies require a repeat blood lactate level at 3-4 hours of age and a previous practice of taking babies to the NICU to have the sample taken and processed was not sustainable due to the increase in the number of babies being identified that needed a repeat lactate test.

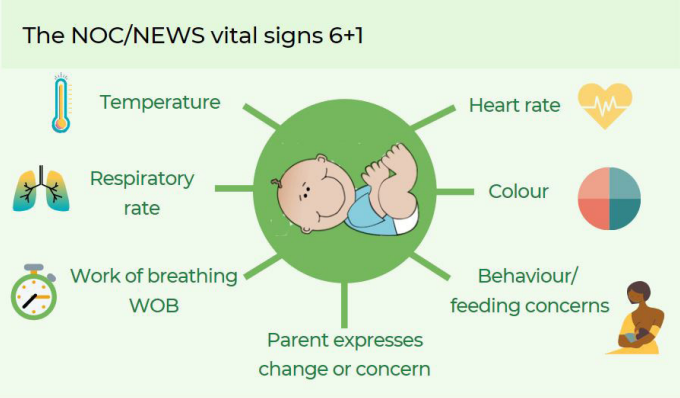
The i-stat machines that also had been introduced in 2020 were able to be used to obtain a lactate result by using a different cartridge, meaning the testing could be performed on the inpatient ward without separating the mother and baby and adding additional work to the NICU staff.

Some additional training was required for ward staff to be able to use the i-stat machines for lactate testing.

3.3.4 Maternity Early Warning Score (MEWS)

In 2018 the MEWS was implemented at ACH for all maternity and postpartum women. It is now business as usual. Monitoring of the MEWS now sits with the MoH.

Discussion with Auckland Birthcare (ABC) about the MEWS chart led to rolling out the chart in their facility for women that transfer there from ACH as well as the women birthing at ABC. Birthcare has a separate MEWS chart that has its own escalation plan. To assist in continuity of care, the last set of vital signs taken at ACH are also written on an ABC MEWS chart and sent to ABC with the woman as part of the discharge process.



3.3.5 Pathways developed for the discharge of postnatal woman from ACH inpatient areas.

Detailed pathways were developed and socialized to ensure that all women who birthed at ACH on discharge from the inpatient areas received postnatal care individualised to their needs. There are a number of factors to take into account:

- What address will the woman discharge to: is it in the ADHB area or in another DHB's area?
- Does the woman need to remain on site at ACH due to her baby requiring on-going care in NICU, PICU or Starship?
- Is the LMC during pregnancy going to continue with the postnatal care?
- Has there been a change of LMC to an ADHB team that does not provide postnatal care?
- Does the woman require her first home postnatal visit in the weekend or on a public holiday?
- Does the midwife providing postnatal care have an access agreement with ADHB so they will receive an electronic discharge summary?

A **three point contact plan** was made to ensure the postnatal midwife providing care is informed of the woman and baby's discharge. This meant there would be a:

- Verbal handover to the postnatal midwife by a ward staff member.
- A copy of the postnatal discharge summary would be scanned and emailed to the midwife or midwifery team providing the postnatal care as well as a copy given to the woman.
- For all discharges to a DHB midwifery group, on a daily basis the ward receptionist scans and emails a list of the previous days' postnatal discharges for that group.

The Charge midwives of the inpatient areas have been responsible to implement the new pathways in their areas.

This process has led to another project, to ensure that the demographic information ADHB collects from women at each presentation is complete, correct and updated in the ADHB electronic patient management system. This project is currently underway.

3.3.6 LARC (long acting reversible contraception) project

Helen Roberts

Project beginnings

The LARC (long acting reversible contraceptives) project is a National Maternity Monitoring Group (NMMG) priority. LARCs are the most effective contraceptive method and so have the potential to decrease unintended pregnancy. We provided the first report from the LARC Project in 2020. This is the second LARC report.

Discussing and offering contraception in the antenatal and postnatal period

One of the first tasks of the LARC project was to write the **Contraception after Delivery** guideline and this was published on the ADHB website in 2018.

One of the key principles of the guideline is that staff involved with the care of women in pregnancy should provide the opportunity to discuss contraception in the antenatal period and clearly document the woman's decision. During 2021 there were 6,462 births and 4,242 contraceptive discussions during the antenatal period, an increase of 1000 discussions from the previous year for a similar number of births.

This discussion may take place a few times during the antenatal period. The ADHB Healthware maternity record had a designated place on the risk sheet to document the woman's choice. The risk sheet is viewable in the front sheet in Healthware. As soon as the woman's record was opened it was clear to staff on the postnatal ward. However there was no increase in the number of women who had a decision documented. In 2020 only 17% of births had a decision documented in the risk sheet and in 2021 this was similar at 17.8 %. The actual number of inpatient postnatal contraceptive procedures before discharge decreased to 251 in 2021, compared to 300 in 2020.

The ADHB guideline also states that services should ensure that there are appropriately trained clinicians able to provide contraceptive methods to women before they are discharged. There is ongoing training for midwives for Jadelle insertion however if the woman's choice has not been documented she may not receive contraception.

Another Auckland DHB has found that 59% of women made a contraceptive plan immediately after birth.[1] This hospital employs specific staff for contraceptive discussion in the postnatal wards and it may be worthwhile considering employment of similar staff at ADHB.

[1] Wimsett, J., Sadler, L., Tutty, S., Tutty, E., Oyston, C. (2022). Pregnancy planning and barriers to accessing postnatal contraception in New Zealand. Contraception. https://doi.org/10.1016/j.contraception.2022.02.007

Community clinics for the LARC project

The LARC pilot clinic began on 14 Feb 2019 based at Glen Innes Health Centre. The goal of this clinic was to provide free long acting reversible contraceptives to women living in the Tamaki area, specifically targeting women below 25 years of age, and Māori and Pacific women. We now have 4 clinics led by nurses trained in Jadelle and IUD insertion. The training is consistent with the ADHB Jadelle and IUD insertion guidelines. These clinics are free for women. The total number of women seen at all the clinics in 2021 was 1,336; a small increase compared to 1,073 seen in 2020. More women were seen in the central Greenlane clinical centre clinic as this clinic stayed open when the community clinics were closed during Covid.

The number of LARC insertions per clinic as shown on the graph below:

Figure 3.1: Number of LARC insertions per clinic in 2021

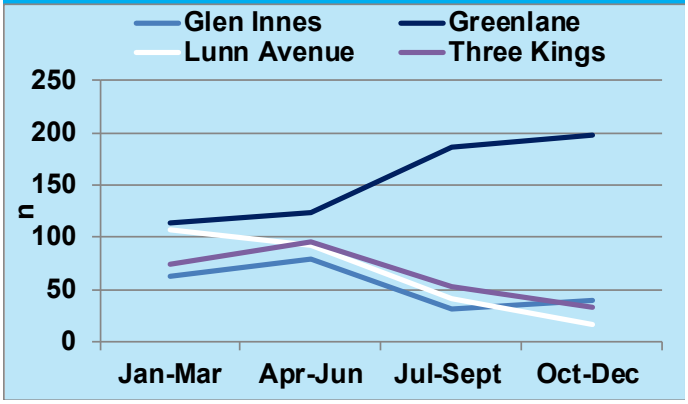


Table 3.2: Number of LARC insertions per clinic in 2021

	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Glen Innes	63	80	31	40
Greenlane	114	123	187	198
Lunn Avenue	108	92	42	17
Three Kings	74	96	53	33
Total	**359**	**391**	**313**	**288**

GP and nurse LARC training through the MOH funded Family Planning initiative

Ten clinicians have been trained in LARC insertion during 2021. This number was less than expected due to the training clinics being closed for 4 months due to Covid with GPs unable to be released for training purposes.

Conclusions

The overall numbers of LARC insertions in the free clinics are slowly increasing. However the numbers of women seen during 2021 is less than expected possibly due to access issues with the community clinic closures during Covid. International and ADHB guidelines recommend antenatal discussion of contraception and offering the chosen method before discharge. Recent research in Auckland showed that a third of women who did not have a conversation during or immediately after birth would have welcomed one.[1]

We need to prioritise increasing discussion of contraception in the antenatal period. In addition, the provision of dedicated staff for postnatal contraception before discharge is likely to be beneficial for women.

Whitinga ora pēpi
Babies transitioning to wellness

3.3.7 Whitinga Ora Pēpi - babies transitioning to wellness

Raffaela Slight

This name was gifted to our unit by Dame Naida Glavish.

It is a transitional care area for our late preterm infants and our NICU graduates where as a whānau they are supported to transition home with their pēpi.
Essentially this unit is to keep whānau together to support them to transition to home in a safe and confident way.

This is a joint venture between Starship Children's Health and National Women's Health. There are 8 bed spaces where nurses, midwives, and the wider health care team work together to care and support these whānau.

Whitinga Ora Pēpi is located at the end of ward 96 with close proximity to NICU. Some of our equipment was supported with funding from the Starship Foundation.

The unit opened at the end of 2021 with a blessing from our Kaumatua Thomas Hauraki.

The need for this unit had been identified for quite some time and it is proving to be a great unit. Feedback from whānau and staff is generally positive.

The admission criteria are:

From birth

- ≥ 35 weeks' gestation, clinically stable or Small for Gestational Age (SGA)
- ≥ 1800 grams (if baby is <1800gms i.e. SGA then admission can be considered with SMO approval, please document in clinical records)
- Not requiring respiratory support or IV fluids

From NICU

- ≥ 32 weeks' gestation born and currently ≥ 35 weeks' gestation, clinically stable 'feeder and grower' or SGA
- ≥ 1800 grams (if baby is <1800gms i.e. SGA then admission can be considered with SMO approval, please document in clinical records)
- Not requiring respiratory support or IV fluids
- Additional whānau support required to establish safe discharge (as identified by clinical team)

3.4 Quality and Safety Programme Updates

3.4.1 Māori Community Midwives – Te Manawa o Hine

Annmarie Taiapa-Johnson

Whakapapa

In 2018, a proposal was presented to the Women's Health Directorate.

In 2019, the service design was presented by the then Women's Health leadership team to Dame Rangimarie Naida Glavich, Chief Advisor Tikanga, Joanne Gibbs, Director of Provider Services and Margaret Dotchin Chief Nursing Officer who approved the design.

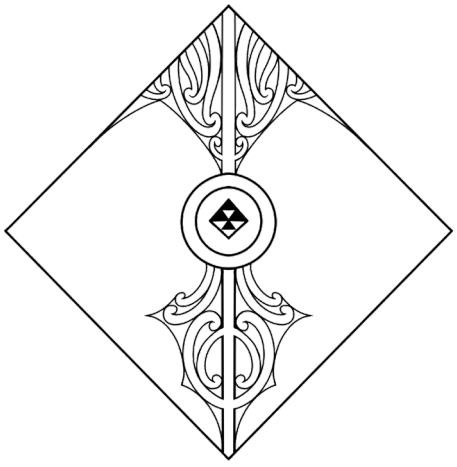
Kaupapa korero presented

- To provide access to and delivery of specifically targeted and designed midwifery care to Whānau Māori to achieve equity and encourage the achievement of best health outcomes
- Development of the Māori midwifery workforce – recruitment, retention and professional development of Māori midwives.
- Deliberate and intentional development of Māori midwifery capacity and capability.
- The creation and promotion of additional options for career development for Māori midwives.
- Development of a sustainable Māori midwifery service model of care which provided a contribution to ADHB strategy to achieve health equity.

Te Paerangi Guiding Value and Vision

Ki te tiaki pai te wāhine, ka ora te whānau
Quality care for women enables whānau to flourish.

Te Manawa o Hine is a kaiwhakawhānau Māori rōpū dedicated to reducing inequities for wāhine and whānau Māori, by enabling Tino Rangatiratanga (autonomy), Mana motuhake (self-control) and Ōritetanga (equality) as a commitment to Te Tiriti o Waitangi and the Auckland DHB strategic plan and values.



Our kaupapa

We offer a midwifery service that embraces Te Āo Māori, guided by foundations of mātāpono (tikanga) Māori, Atuatanga (spirituality), Kaitiakitanga (Guardianship), Rangatiratanga (Autonomy), Whānaungatanga (Relationships), Manaakitanga (Supports). The Values of Tika (correct) and Pono (true and honest) are maintained at all times.

We are a by Māori for Māori team of new graduate and experienced Māori midwives.

We are supported by a leadership team with a quality and equity lens and strategic intent for providing midwifery led continuity and complex cares.

We offer use of Māori birthing taonga, like, muka, kawakawa, pounamu, īpu whenua, hapu wananga, mirimiri, rongoa and wahakura, matauranga, wananga.

Our aim is to improve access and engagement by enabling wāhine and whānau led maternity care.

Ō tatou ingoā (Our name)

- Manawa is the pathway via the Hotiki, the moko (tattoo) on the forehead of wāhine. Hotiki is the connection to Ātua.
- We acknowledge Ātua wāhine and in particular Hine Te Iwaiwa, the spiritual guardian of childbirth, weaving and lunar phases. She is also involved in rituals of ngutū moko (lips tattoo) prior to marriage and tapu (sacred) rituals.
- She is the daughter of Tane & Hinerauamoa
- Our name is the embodiment and acknowledgment of Hine Te Iwaiwa and is representative of the connection midwives make with the wāhine (and whānau) in our care.

3.4.2 Aranga Tētēkura, Maternal Wellbeing and Child Protection Advisory Service

Adrienne Bell, Tamsin Miles

Our role

The role of the Aranga Tētēkura Maternal Wellbeing and Child Protection Advisory Service (previously known as Wahine Ora) is to encourage and facilitate collaboration towards best outcomes for wāhine, pēpi and whānau with complex clinical, social and cultural needs throughout their maternity care experience. We aim to do this by integrating an interprofessional and multi-agency approach to maternity care, holistic wellbeing and child protection amongst our whanau and communities. The philosophy of this service is to appropriately identify and coordinate maternity and social care for wāhine and their whānau who are experiencing social complexities impacting on the wellbeing and safety of themselves and their babies.

Referrals to the forum are predominantly from midwives but are also received from other DHBs, social work teams, obstetricians, well child providers and the police. The Aranga Tētēkura forum provides sound, culturally responsive and individualised maternity and social care for wāhine, during their pregnancy and postnatal period. This supports the best possible outcomes for wāhine, pēpi and their whānau, reflecting the principles of Te Whare Tapa Wha.

Relationships are encouraged between agencies to ensure effective communication and collaboration that supports positive outcomes that aim to keep wāhine and their tamariki at the centre of the service. Over the years, several reviews have indicated that professional agencies must learn how to best share information, create opportunities to do so and encourage collaboration.

The Aranga Tētēkura forum is held weekly at the Greenlane site and attended by a core group of representatives from a selection of services (senior Midwives from ADHB Community and Te Manawa o Hine, Women's Health Social Work, Aronui Ora, SHINE, CADS/PPS, Oranga Tamariki Liaison) who collectively bring a wealth of knowledge and experience. The strength of the core group is visable through developing an understanding of each service group and a growing appreciation for the function of each.

Key professionals are invited for each individual wāhine, and together her concerns and needs are appropriately assessed, plans are made and followed up. The forum holds risk associated with social complexities together in a way that aims to maximise whānau ora, minimise Oranga Tamariki intervention, and provides support for the professionals involved in care, not least the Lead Maternity Carer.

From January 2021, a new co-ordinator's role with a senior social-worker and senior midwife working in a partnership model began. This has brought a wider knowledge base to the forum and the caseload over the last year has increased significantly. During 2020, Aranga Tētēkura received 82 referrals which increased to 171 referrals in 2021. The number of times a wahine is presented at the forum is determined by the level of need. In 2021, 79 referrals had 1 or 2 reviews and 85 wahine were presented on 3 or more occasions.

The referrals received by the forum often indicated concurrent presenting factors. These include, but are not limited to; family harm, substance use, mental health and child protection concerns. The data showed family harm and substance use were the most common issues experienced by the wahine hapu who were being referred to the Aranga Tētēkura forum.

3.4.3 Women's Health Family Violence Intervention Programme

Kathy Lowe

Routine enquiry for family violence has been mandatory in Women's Health since 2005.

So how are we doing?

Figure 3.2: Maternity clinics intimate partner violence routine enquiry (July - Dec 2021)

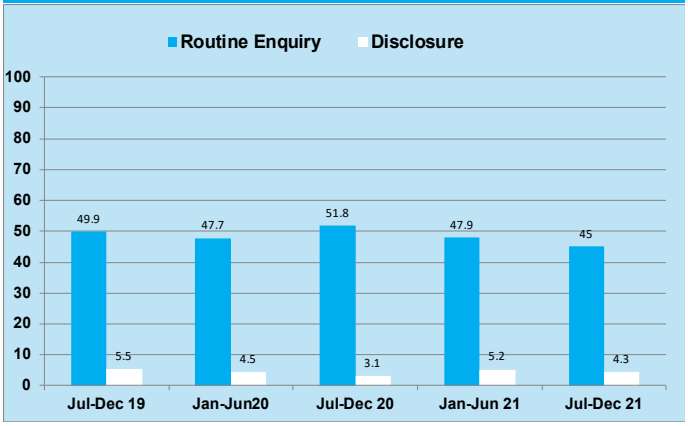
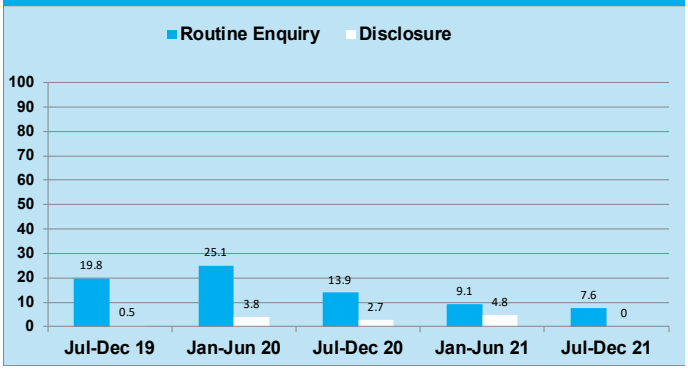


Figure 3.3: Postnatal wards maternity intimate partner violence disclosure (July 2019 - Dec 2021)



This data excludes Ward 97 (gynaecology) who achieved higher than average audit scores.

The gold standard is 80% of all eligible women being asked about family violence. If this was the case, we would expect a disclosure rate of 5%.

Presently, 45% of women in maternity clinic are asked about family violence and only 7.6% of women in the wards.

Family violence routine enquiry data were obtained from the Healthware database. Women's Health maternity clinics and wards and WAU are separated due to the difference in the way data is collected. For the wards there has been a steady decline in the number of patients who are being asked about family violence.

Women's Health staff have had low numbers attending family violence training for many years now. We surmise that this is one of the reasons for the low routine enquiry rate, although the same is not true for maternity clinics.

So is not asking about family violence causing a problem? It is well recognised that asking about family violence is an intervention in itself, even if a woman doesn't disclose. Not asking may be giving the message that we don't care or don't place importance on safety in our relationships and how this can affect our health. Non-maleficence (do no harm) is one of our ethical principles. When we don't ask about family violence, we are potentially causing more harm.

We need to work together on increasing the rates of routine enquiry for family violence in 2022.

3.4.4 Safe Sleep

Denise West

The purpose of the safe sleep programme is to reduce the incidence of SUDI in the Te Toka Tumai domicile. The network of SUDI prevention champions includes primary and tertiary settings within maternity, new born, and child health services across the central Auckland region. Bi-monthly meetings provide networks to ensure clear safe sleep messaging, and safe sleep modelling are aligned with the **Northern Region Safe Sleep Policy (NRSSP) 2019-2020** and our national governance Hāpai Te Hauora recommendations.

The SUDI prevention champions support the sustained access to safe sleep devices to families in need (according to established criteria), managed by the SUDI prevention program coordinator, Denise West, who was appointed to this role in December 2020.

It is mandatory for staff to do their safe sleep online training via Hāpai Te Hauora website which is now available via **Ko Awatea Learn**.

On average 20-30 safe sleep devices are distributed per month along with the P.E.P.E message. To ensure sustainability, whānau are encouraged to return pēpi pods for reuse.

Wahakura availability varies due to weather conditions that affect harvest; wahakura are also proven to be very labour intensive. Currently we are sourcing our wahakura from Hawkes Bay.

Wahakura

With the NZ Health Strategy we welcome the new refresh and design of the National SUDI Prevention Programme (NSPP) that is being co-designed by Māori and Pasifika whānau and health leaders. We look forward to its integration into the community where messaging can reach Māori hapū mama and their whānau.

Ideally integration of the new design into the community is achieved by weaving wānanga on the marae, something our DHB would like to be part of. This will enable safe sleep messages around smoking, breastfeeding and safe sleep practices to be shared.

We look forward to celebrating Safe Sleep Day in December 2022 with our local weavers at Te Toka Tumai. We hope it will be diverse reaching all cultures with the P.E.P.E message.

Safe sleep for P.E.P.E.	
Place	Place baby in their own baby bed in thesame room as their parent or caregiver.
Eliminate	Eliminate smoking in pregnancy and protect baby with a smokefree whānau, whare and waka.
Position	Position baby flat on their back to sleep - face clear of bedding.
Encourage	Encourage and support breastfeeding and gentle handling of baby

3.4.5 Pregnancy and Parenting Programme

Leah Broughton-Couch

Pregnancy & Parenting education continued its delivery into the community, responding and adapting to the ongoing challenges of living and working with Covid-19. The Pregnancy & Parenting team now have a rhythm as they respond to the needs of the community they serve. Registration and attendance improved on the previous year.

Our purpose

The purpose of the programme is to provide fully funded information, education and support to pregnant women and expectant fathers/partners, parents of new babies including adoptive parents and, where appropriate, their whānau, to meet their pregnancy and early parenting information, education and social support needs.

Our objectives

The Service objectives are to:

Provide parents with pregnancy and early parenting information, education and support to help prepare them for pregnancy, childbirth and parenthood, and for making informed choices.

Provide opportunities to share their experiences and form new social networks with other expectant parents.

Increase access to pregnancy and parenting education for high need groups, progressing to 30% of these population groups accessing pregnancy and parenting education, while maintaining 30% coverage for the total Auckland resident birthing population.

Our community

The Programme is available for all, with a focus on first time parents domiciled in the Auckland District Health Board (ADHB) boundary. Particular emphasis is on meeting the needs of pregnant women/whānau with high needs. This includes young/teenage parents, Māori, Pasifika, Asian, parents with limited health literacy, and other women with identified needs.

Access to the programme is via self-referral or referral from a registered health professional or other allied health, education, or social service professionals. An online electronic process is available for community courses with a confirmation receipt for all online bookings. A follow-up email confirming course details and a reminder text closer to the class date is also provided.

Our education

A variety of strategies are engaged to provide education. The menu of classes include early pregnancy and advanced pregnancy, with add-on classes including Calmbirth and antenatal breastfeeding classes. Classes are held midweek and weekends via in-person classes (when Covid permits) and online classes.

The Service continues to work with Ngāti Whātua Ōrākei Whai Maia as an important community partner, referring wāhine Māori into the unique Kaupapa Māori Weaving Waiora Wānanga. Education sessions are also provided for new migrant/refugee groups as required by provider organisations.

Opportunistic education continues to be provided at Greenlane Clinical Centre and in-patient education at Auckland City Hospital. This allows successful engagement with many women who may not otherwise receive pregnancy and parenting education.

Home visits are also offered for women, and whānau/family/support people, who meet the criteria.

Referrals during 2021 were lower and were often conducted online. The private Pregnancy & Parenting facebook page now has 2,400 members comprising those who have attended classes or engaged with ADHB educators in other forums. Online chats four to five times per month focus on a mix of topics and are proving very popular.

Calmbirth, a childbirth education programme focusing on labour and birth, was piloted in 2020 and continued in 2021 to gather data to support the programme. The programme combines the physiology of birth with the psychology of birth and provides useful tools for couples to prepare for labour and birth with confidence.

What we did in 2021

For the period 1 January to 31 December 2021 a total of 84 courses were offered (16 Early Pregnancy Classes, and 68 Advanced Pregnancy Classes). A total of 1,136 registrations were received – 250 for Early Pregnancy, and 886 for Advanced Pregnancy. Of those total registrations, 90% attended the Early Pregnancy and 85.2% attended the Advanced Pregnancy Classes. Ninety-two per cent (92%) of those attending courses were first time parents.

Classes remain ethnically diverse. By ethnicity, Asian and Indian registrations combined continue to represent the majority of all registrations (54%) with NZ European/Other European sitting at 42%. Unsurprisingly, Māori and Pasifika engagement in ADHB community courses is very low. However, of those Māori/Pasifika women who do register for an ADHB community course, 75% attend. Opportunistic education provides good opportunities to engage with these and other priority groups. Importantly, of those ADHB domiciled women seen opportunistically, almost 70% fall within the priority groups. Of particular interest is the number of young/teen parents (71) engaging with the Service via opportunistic education.

In 2022, the Programme will continue to focus on reaching and meaningfully engaging high priority population groups and to innovate to expand the reach of the programme.

3.5 Lactation and Breastfeeding Service

Tracey Senior

The Lactation Consultant Service provides expert lactation support for staff and whanau experiencing complex breastfeeding problems both in hospital and in the community as well as facilitating the initial and ongoing Baby-friendly Hospital Initiative (BFHI) education for all maternity staff.

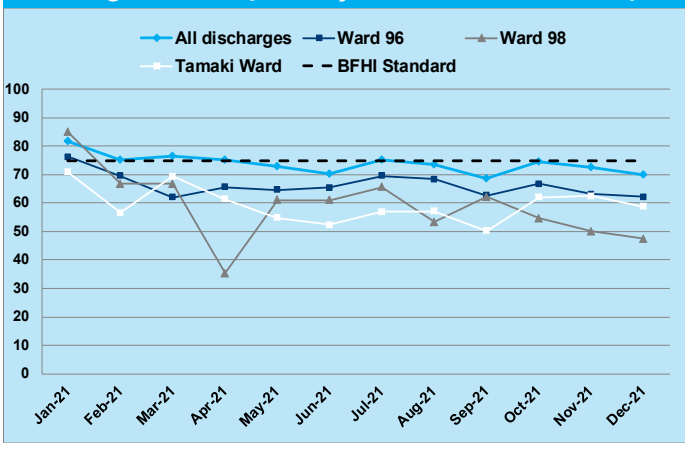
The Baby-friendly Hospital Initiative (BFHI) was launched in 1991 by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) (6), in response to the 1990 Innocenti Declaration on the promotion, protection and support of breastfeeding and aims to provide health facilities with a framework for addressing practices which have a negative impact on breastfeeding.

To achieve NZ BFHI accreditation, health facilities must demonstrate a rate of at least 75% exclusive breastfeeding among whānau at discharge, adherence to the International Code of Marketing Breast-milk Substitutes and successful implementation of the Ten Steps to Successful Breastfeeding.

In Aotearoa, Te Tiriti o Waitangi is also an integral part of BFHI with evidence of how a service responds to the needs of Māori as an essential part of accreditation.

National Women's Health successfully achieved BFHI accreditation in April 2018 for the 4th time. Assessment for BFHI Accreditation in April 2022 was postponed due to the COVID 19 pandemic. NZBA has temporarily moved to undertaking most audit interviews virtually and will do the observational audits at a later date.

Figure 3.4: Exclusive breastfeeding rates on discharge at NWH (January 2021 - December 2021)



Currently in NZ the COVID pandemic and midwifery shortages are likely contributing to falling rates of exclusive breastfeeding. Maintaining the BFHI standard of 75% exclusive breastfeeding on discharge every month has not been achieved by NWH for 6 of the 12 months of 2021. Exclusive rates at discharge have trended downward including for Māori. This is a common theme and most notably in 2021, 4 out of 6 tertiary services are tracking <75% exclusive breastfeeding on discharge.

NZBA has released a limited accreditation pathway and if all criteria/standards are met except for the 75% exclusive breastfeeding rate at discharge, either at the initial audit or after a 6 to 12-month remedial period, a service would be given a limited accreditation valid for 3 years. The service is to have a meaningful and measurable plan in place for increasing breastfeeding rates with the focus on Step 6, "Avoid giving breastfed new-borns any food or fluids other than breastmilk, unless clinically indicated."

The contributing factors to declining exclusive breastfeeding rates are believed to be linked to staffing shortages with high patient loads on the postnatal wards. More whanau with complicated medical issues and co-morbidities, and high rates of LSCS increase the acuity for staff on postnatal wards. It's challenging for staff to provide quality and timely breastfeeding support alongside ensuring safe care.

Staffing shortages have contributed to an increased use and employment of registered nurses within maternity services. Nursing staff knowledge has been impacted by limited breastfeeding education due to COVID restrictions. Loss of institutional memory and a high turnover of staff and leadership, has affected the continuity and consistency of the service's delivery of Baby Friendly care to whānau. Family/visitor restrictions have impacted support for māma and pēpi. Whānau are leaving hospital quicker which further impacts breastfeeding support.

The Lactation Consultant (LC) team

The Community Lactation service had to move to virtual appointments over lock down which has also impacted on the breastfeeding support whanau receive. They continue to be a small team of two and are limited to providing support to whanau for only 6 weeks. Counties Manukau Health provide a breastfeeding support service "Te Rito Ora" that provides support for any breastfeeding dyad with no age limit, and Turuki Health care provide antenatal breastfeeding education and postnatal support for breastfeeding mothers. NWH need to provide ongoing support to breastfeeding whanau regardless of the age of their pēpi if we are to support whanau to breastfeed for longer. Antenatal breastfeeding classes for whānau (introduced July 2020) are still very popular and ongoing.

Breastfeeding clinic at ADHB Grafton site

Planning commenced late 2021 to start a breastfeeding clinic with provision for TABBY (Tongue Assessment tool for tongue-tie in Breastfed Babies) breastfeeding assessment and Frenotomy on a Thursday morning in level 9 outpatient's clinic. One lactation consultant and neonatologist will provide assessment and breastfeeding support pre and post Frenotomy. Some of our Midwife Lactation consultants will also undergo training in 2022 to perform simple Frenotomy. This service will be evaluated early 2022.

To conclude, we need to continue to aim high and to continue to work together in these challenging times to implement "The 10 Steps to Successful Breastfeeding", and uphold "THE CODE" to the highest standards as the evidenced based way to increase breastfeeding rates for all whānau.

3.6 Newborn Metabolic Screening

Sue Cole

Work continues in this area but since the National Screening Unit has reduced the eligible time of screening from 48 hours to 24 hours, more babies are having their screening completed at the place of birth leading to a reduction in missed screening charts being received from the community.

3.7 Adverse Events

Adverse events are events with negative reactions or results that are unintended, unexpected or unplanned, as defined by the Health Quality & Safety Commission (HQSC). In practice this is most often understood as an event which results in harm or has the potential to result in harm to a consumer.

A review is undertaken following an adverse event related to a patient of Auckland District Health Board (DHB)| Te Toka Tumai and is part of Auckland DHB's ongoing commitment to improve and protect the health and safety of patients and the public. The principles of Just Culture are applied when conducting reviews. Both Auckland DHB as an organisation and its people are held accountable while focusing on risk, systems design, human behaviour, and patient safety. Patients, family and whānau are now actively engaged in major incident reviews demonstrating a commitment to transparency and open dialogue.

Adverse events are rated with a Severity Assessment Score. The SAC score (1 = most severe) is a numerical rating which defines the severity of an adverse event and as a consequence the required level of reporting and review to be undertaken for the event. The 2018/2019 Maternity SAC examples were used as a guide.

The Women's Health Service conducted reviews of SAC 3 and 4 events, and select SAC 1 and 2 events, using rapid multidisciplinary panels for the services within the directorate. The remainder of the SAC 1 and 2 event reviews were led by the Clinical Quality & Safety Service with a focus on the systems and processes of healthcare.

In 2021, the Womens' Health Service reported fewer SAC 1 events compared 2020 (13 vs 17) and fewer SAC 2 events (8 vs 11). Increasing focus is being placed on refining review processes and continued implementation of recommendations.

Complaints

The complaints to Women Health Services are reviewed weekly by the senior directorate leadership team to enable timely and effective coordination and management.

In 2021 there were 123 complaints, including 17 complaints to the Health and Disability Commissioner.

The three top areas for complaints were 'Communication', 'Care/Treatment', and 'Attitude/Courtesy' in 2021.

Compliments

In 2021 there were approximately 21 compliments received by email. There was no categorisation of compliments in 2020 or 2021 due to work being done in transferring compliment capture and categorisation into a different process.

Table 3.3: SAC scoring and patient incidents reported across NWH services 2021

	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Total
SAC 4 - Minimal	24	17	25	31	21	23	18	20	19	14	21	26	259
SAC 4 - Minor	18	14	21	29	24	17	15	17	13	9	12	10	199
SAC 3 - Moderate	6	4	6	7	8	5	7	5	7	3	6	5	69
SAC 2 - Major	1	0	0	1	1	0	2	1	0	0	0	2	8
SAC 1 - Severe	2	3	0	0	3	2	0	0	2	1	0	0	13
Total	51	38	52	68	57	47	42	43	41	27	39	43	548

3.7.1 Perinatal Mortality Review

The NWH Perinatal Mortality meetings are held monthly, are multidisciplinary, and are regarded as valuable educational opportunities due to the open discussion following each case. Time does not allow for discussion of all cases of perinatal mortality, however, and those discussed are chosen for educational or special interest. From these meetings educational points raised are circulated to the wider Women's Health community.

3.7.2 Rapid Multidisciplinary Panel Review Process (RaMP) – Maternity

Lynn Sadler

3.7.1 The Rapid Multidisciplinary Panel (RaMP) review process is described in detail in the guideline located on Hippo. In summary, RaMP is a process for reviewing events within maternity services which do not fall under Sentinel Event review or individual practice review within Auckland District Health Board (Auckland DHB). The aim of the review process is to review events efficiently and effectively, using a multidisciplinary process, to identify system failures and inform quality improvement.

RaMP reviewers meet fortnightly for 1-1.5 hours and review one case of perinatal or maternal morbidity or mortality.

In 2021, 24 reviews were completed by, on average, 14 members (range 8 to 22), including, on average, five obstetricians, five midwives, one anaesthetist, and one neonatal paediatrician. Nursing, obstetric medicine, quality, and other disciplines attended less often or as required.

The reason for review was most commonly hypoxic ischaemic encephalopathy or perinatal mortality. At time of writing this summary, feedback to the service had been provided on 17 of the 24 2021 reviews.

3.7.3 Gynaecology Rapid Multidisciplinary Panel (GRAMP)

Cindy Farquhar

The Gynaecology Rapid Multidisciplinary Panel (GRAMP) is a multidisciplinary team, which reviews gynaecology adverse outcomes in order to support best clinical practice and inform quality improvement. In 2021, the panel met eight times and reviewed a total of 35 gynaecology cases with adverse events which include adverse intraoperative events, complications in the postoperative period, wāhine who need to return to theatre and wāhine who are readmitted. A summary is written by one of the medical staff involved in the case and then all medical staff may come to the GRAMP meeting to discuss the case. Contributory factors and potential avoidability are discussed and recorded.

Common themes from cases reviewed in 2021	
Staff failing to recognise that observations were abnormal	Staff failing to escalate concerns when observations became abnormal
Lack of recognition of complexity of clinical cases	Lack of policy for routine postoperative blood tests

Common clinical themes	
Dehiscence	Ectopic pregnancy
Severe sepsis	Bowel injury

3.8 Investing in the Workforce

3.8.1 Midwifery Education Team

The midwifery education team strives to provide a high standard of educational opportunities for ADHB core midwives and community midwives, registered nurses in maternity, Lead Maternity Care Midwives (LMCs) and Auckland Birthcare midwives as well as supporting the multidisciplinary education opportunities for our medical teams and colleagues at other Auckland Regional DHBs.

The midwifery education team has continued to deliver an extensive midwifery education program in 2021. Auckland entered severe restrictions in mid-August 2021 as it began fighting a Delta outbreak. These restrictions were lifted mid-December. This impacted how we could deliver education in a way that we had never previously encountered, therefore requiring innovation to keep the momentum for education. In the face of these challenges, the education team facilitated the delivery of approximately 580 episodes of education across the women's health service. Audiences consisted of registered midwives (core and Lead Maternity Care midwives, Birthcare midwives) medical officers and registered nurses. During the times of regional restrictions, we also opened some of our study days to allow other regional DHBs to attend, extending our values of Manaaki and Tūhono.

Midwifery education also has an extensive outreach network – providing education across the ADHB and partner organisations extending to; Managed Isolation and Quarantine (MIQ), Hospital in the Home (HiTH), Neonatal Intensive Care (NICU), Emergency Department, Post-Anaesthetic Care Unit (PACU), Auckland University and Auckland University of Technology (AUT) midwifery and nursing students, both undergraduate and post-graduate. The team also delivers a new graduate program and a new to service study program and have implemented the maternity emergencies for registered nurses. Furthermore, we have significant presence across the service providing midwifery care to women and whānau and supporting our midwives and nurses clinically, during a difficult year with Covid-19. The education team are guided by ADHB core values in all that we do, as well as the philosophy that investing in education inspires and empowers midwives and nurses to realise potential in our highly skilled and unique professions. Te tino o mātou— Us at our best.

Midwifery education is also involved in/ contributes to:

- Midwifery Practice Development
- Audit and Effectiveness
- Clinical Governance
- Management Responsibilities
- Rapid Multidisciplinary Panel (RaMP) reviews
- The review and/or development of maternity guidelines and policies.
- Local coordination of the MERAS Quality and Leadership Programme (QLP) for midwives.
- Projects undertaken as part of our Maternity Quality and Safety Programme (MQSP)
- Supporting midwives to undertake leadership projects to meet practice and service needs.

3.8.2 Clinical Coaching and Return to Practice

Clinical coaching here at Te Toka Tumai has been embedded to support our new starter and existing staff to navigate the clinical floor within maternity services. Thus ultimately giving our whānau the best care possible. The complex tertiary care provision environment at ADHB can be both exciting and overwhelming for new to service practitioners, and this support is critical to their ability to quickly and efficiently become an integral part of the care team and feel safe and secure in their roles.

We have four Midwife clinical coaches who orientate and guide our midwives and nurses. This ranges from the newest starters to our experienced staff that need a clinical task to be supported or to trouble shoot issues as they arise. Our clinical coaches also orientate our rotating midwives to new areas and keep checking in to ensure things are going as smoothly as possible for them. Two of our clinical coaches have been supported financially by the ministry to enable us as a DHB to support return to midwifery candidates to meet council requirements. This is a critical component to our midwifery pipeline work aimed to promote the regrowth of the midwifery profession which has struggled to maintain the necessary numbers to meet service demand in recent years.

Our clinical coaches are approved by council to take on the mentoring role for both our return to midwifery midwives; as well as our overseas trained midwives enabling them to meet their NZ midwifery council overseas competency programme requirements.

Covid-19 and staffing challenges have meant that the clinical coaches have had to support the clinical environment regularly throughout the last year and they have done that alongside meeting all requirements for support for our graduate midwives, nurses and midwives transitioning into new areas or new to ADHB. This has been an invaluable service.

Every day they incorporate the values we expect including Haere mai- Welcome, Maanaki –Respect, Tūhono -Together, and Angamua-Aim High, at Te Toka Tumai in what is sometimes a very challenging environment.

Reporting and Deliverables

Within the current national climate of midwifery shortages we are currently holding our own here at Te Toka Tumai. As seen in the below graph we are currently trending up with our midwifery workforce recruitment. Figure 3.5 shows peak months when our graduates commence employment here (April-Jun 2019, April-Jun 2020 and Jan-April 2021). What this graph however does not show that we are approximately 50 FTE of midwives short within the 24/7 maternity service. The current issues of pay equity, mandatory vaccination and the cost of living in Tamaki Makaurau are just some of the factors that hinder midwifery workforce retention. It is worth noting that within our community and high risk specialty areas of midwifery the vacancy is negligible. We constantly struggle to safely staff an inpatient/acute maternity service with an adequate number of midwives to be able to care for whānau accessing our services.

a) Currently we have one Return to Practice (RTP) midwife accessing our education and coaching services here at Te Toka Tumai.

(b) We have successfully returned one midwife to practice following a >10 year hiatus. This was completed with guidance from the midwifery council and supported by our coaching team and education department.

c) We currently have seven NZ new graduate midwives and two Australian new graduate midwives who will be with us from December 2021 until May 2022. The gap of starts is due to the flow on effect of Covid 19 and interruption for clinical practice meaning that as a cohort these student midwives were unable to sit a state certified exam at the same time. All nine new graduates have a named clinical coach attached to them for support and guidance during their first year of practice. We also have a Senior Pacifica Charge Midwife who liaises and offers support to the Pacifica new graduates and our Associate Director of midwifery for Māori health and equity is a liaison and support for our Māori new graduates and those students on our scholarship programme.

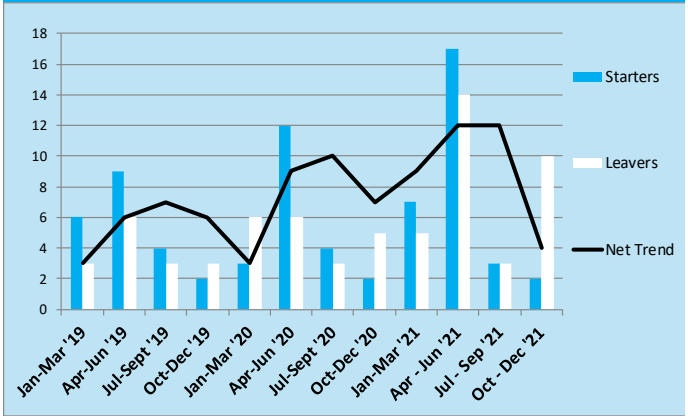
d) Our clinical coaches are valued members of our senior midwifery leaders' workforce and meet regularly to plan orientation and support for our midwifery workforce. The clinical coaches feed into our leadership team by attending monthly meetings. Our clinical coaches have a primary role in the overseas midwifery certification requirements and also have a number of overseas midwives who they are mentoring through their overseas competency programmes. We currently have a large contingent of twelve overseas midwives that we have recruited in the past year. Our clinical coaches are providing the mentoring and reporting for all of these midwives. They work with NZ

> "I had so much to learn coming as a midwife from the United States. Our systems are so different and there were so many things that were new to me. I never could have done it without the support of everyone at Auckland Hospital, especially the clinical coaches. They were extremely understanding of the fact that I had practiced very differently and that I had a lot to learn. Judy and Laura were amazingly kind and patient with me. They made me feel so welcome and so supported, and made themselves available to me for extra support and guidance. I don't think I would have been able to do it without them.
>
> I really recommend Auckland Hospital to anyone coming to work in New Zealand from overseas. It's an amazing and supportive community, and they know what it's like to work with people who have trained all over the world. I have learned so much and feel like I've really been able to develop my midwifery skills here."
>
> - Hannah Kasper, midwife

> "Having a clinical coach in the first two weeks of my orientation was truly invaluable. It made the entire adjustment period stress-free, allowing me to find my own rhythm in each new work environment."
>
> - Jo Weisbach, new graduate midwife

midwifery council to ensure that the overseas competency requirements are completed for these midwives. As each midwife is recruited to Te Toka Tumai the clinical coaches are involved in the planning of their orientation and welcome to our service. The clinical coaches report back on coaching needs of our midwifery workforce and also liaise with our maternity nurses on their needs in relation to practicing within maternity in Aotearoa NZ. The clinical coaches also support the clinical floor as due to significant midwifery vacancy and sickness they have been utilised as and where needed. The clinical coaches are flexible and adaptable within the service and are an integral part of our team. As a collective they plan and support the education team when needed and provide clinical education to our existing staff when needs are highlighted.

Figure 3.5: Core Midwife Cumulative Net Position 2019-2021



3.8.3 Midwifery Students & Maternity Care Assistants

Early in the Covid-19 outbreak in 2020 we worked to develop a Maternity Care Assistant (MCA) position description and started the process of employing student midwives into these roles. This was to support the expected staff shortages and also to support the students with paid work outside their university study. While things stabilised for a while and we didn't implement at that time; we decided to offer these positions in 2021. We have employed a number of midwifery students in their third and fourth year of training into these positions and have had fantastic feedback both from the staff they are working with and the whānau for whom they provide care. MERAS incorporated this role within their MECA recently which has enabled them to be employed more easily and offered some national consistency about these support roles. This is a great opportunity to enable students paid work within an environment they may well work after graduation, provide additional alongside support to whānau and to support midwives and nurses working in the maternity unit.

3.8.4 Midwifery Education Delivery in 2021

- Midwifery Emergency Skills Refresher (MESR) – 10 study days delivered in 2021 – 190 participants
- Fetal Surveillance Study Day : 1 study day delivered– 21 participants
- CTG Interactive Workshops : 4 workshops delivered – 27 participants
- Maternity Emergencies for Nurses: 3 study days delivered – 26 participants
- Pre-eclampsia Refresher for Community Midwives: 1 study day delivered – 10 participants
- Immunisation Study Day for Midwives: 1 study day delivered – 26 participants
- Neonatal Transitional Care Unit: Study day for Clinical Midwife Specialists- 1 study day delivered – 7 participants
- Respect Workshop- 4 study days delivered: 36 participants
- PROMPT- 2 days delivered: 56 participants
- Engaging with Māori: 3 study days delivered – 67 participants
- Spinning Babies: 3 workshops delivered – 16 participants
- Culture in Practice Wānanga: 2 study days delivered – 29 participants
- New Graduate Study Day: 2 study days delivered – 18 participants
- Baby Study Day: 1 study day delivered – 17 participants
- Supporting Physiological Birth: 1 study day delivered – 11 participants
- Newborn Life Support: 3 study days delivered – 21 participants
- GAP/GROW workshops 3 study days delivered – 21 participants

3.9 Trainee Intern Audits

The School of Population Health and the Department of Obstetrics and Gynaecology at the University of Auckland together run a program to teach year 6 medical students to undertake audit for quality improvement. This involves students selecting a project and completing part of the RANZCOG audit cycle during their four week attachment in Obstetrics and Gynaecology. At the end of their attachment the audit is presented to the department.

In 2021, two gynaecology and eight maternity audits were completed. The reports from these audits can all be accessed by staff on the internal website at https://adhb.hanz.health.nz/site/women/SitePages/Quality%20and%20Audit.aspx

A brief summary of the topics, findings and recommendations of these audits is provided in Table 3.4.

Table 3.4: Year 6 Medical student/trainee intern audit topics, key findings, and recommendations 2021

Audit Title	Standard, Findings, and Recommendations
Service Area: Maternal antenatal	
Are the VBAC guidelines being followed for Positive Birth After Caesarean Clinic referrals?	**Standard**: (1) 95% of para 1 women with previous caesarean should be seen in a consultation with a specialist obstetrician at either the Positive Birth after Caesarean (PBAC) Clinic or the General Maternity Clinic during their pregnancy. (2) Of those referrals, 70% of para 1 women with previous caesarean should be referred within 20 weeks gestation and seen in PBAC clinic within 25 weeks gestation. **Findings**: Of the 130 auditable records included, only 40% were referred at less than 20 weeks gestation and seen in clinic by 20-25 weeks, with significant inter-ethnicity differences. 97% of women were seen in clinic at some point in their gestation, with 100% of those referred being seen. 43% of women were seen in PBAC clinic within 25 weeks gestation including late referrals; 61% of women seen in the antenatal clinic were seen within 25 weeks. Only 43 of 125 referrals (34%) used the designated PBAC referral form. **Recommendations**: We recommend specific documentation of triage reasoning to help identify the reasons women referred on time were not seen between 20-25 weeks. Ensure PBAC form is readily available to all midwives and that they are aware of its use for referral past 25 weeks. We recommend surveying community and independent midwives in ADHB asking for feedback about why they may refer women to PBAC later on in the pregnancy than recommended. We recommend an audit of VBAC women on a larger scale with a focus on identifying whether there is a significant difference in outcomes based on the ethnicity of the patients within the service.
Induction of labour for suspicion of SGA	**Standard:** 90% of pregnant women who undergo Induction for Labour (IOL) with SGA (small-for-gestational age) as the primary indication, should give birth to a baby that is SGA (defined as under the 10th customised centile). **Findings:** 53% of women who underwent IOL with SGA as the primary indication gave birth to a baby that was under the 10th customised birth weight centile (SGA). Those of Maori (75%) and Indian (74%) ethnicity have the highest rates of SGA births when induced because of SGA. However, those of Asian (46%), NZ European (46%) and Pacific Island (23%) ethnicity have significantly lower rates. When looking at other variables, those that have a BMI under 20 (67%) or over 25 (62%) have higher rates of SGA births when induced for SGA compared to those with a BMI between 20 – 25 (42%). Furthermore, women whose LMC was a private obstetrician (36%) or National Women's Midwife (41%) had lower rates of SGA births compared to those with Independent Midwives (65%). Overall, these rates of SGA births among women who are induced for SGA falls well below the 90% standard set. **Recommendations:** - Clarification of SGA definitions: ensure that a consistent definition is used by clinicians and midwives in hospital, in private and in the community. This may be done via seminars, pamphlets or grand rounds etc. - Updating the SGA definitions within the ADHB guidelines: although the guideline has been updated, the old guideline with discordant definitions is more easily found through a search. For this reason, ensuring the most recent guidelines are updated, easy to access and not misleading may help. - Establish a universal understanding and agreement regarding the terms used for coding SGA and other growth abnormalities (such as fetal growth restriction).

Audit Title	Standard, Findings, and Recommendations
Preconception HbA1c monitoring in birthing people with a pre-existing diagnosis of Type 2 Diabetes Mellitus who birth at National Women's Health	**Standard**: 50% of birthing people with a pre-existing diagnosis of Type 2 diabetes mellitus (T2DM) have their HbA1c measured within 90 days prior to their last menstrual period (LMP). The standard was set at 50% consistent with rates of planned pregnancy in Aotearoa. **Findings**: 48% of all patients accessed this care which is consistent with the 50% audit standard. Cultural inequities and access barriers: Māori patients were less able to access preconceptual HbA1c monitoring with 37% meeting the standard, as werePacific peoples (38%) compared with 67% among European, Indian (65%), Other Asian (53%) and Middle Eastern/Latin American/African (43%) although numbers were small among most groups. Suboptimal HbA1c measures: Overall pre- conceptual and booking HbA1c levels were high. The pre-conceptual and booking means were 64 and 62mmol/mol respectively, well above targets. Significance for service provision: Health Pathways recommends all women with T2DM are seen by a diabetic specialist pre-conceptually. Despite this, only 22% of women in this cohort accessed these services. **Recommendations:** An evidence-based clinical guideline for the pre-conceptual optimisation of T2DM seems the necessary first step in improving rates. This must be established together with Māori and Pacific health providers and primary care physicians to ensure it is culturally responsive and acceptable to all. Wide education and dissemination of this guideline amongst providers and patients must then be a priority.
Service Area: Maternal intrapartum	
Decision-to-Delivery Interval of Category 1 and Category 2 Emergency Caesarean Sections	**Standard:** (1) 100% of category 1 and category 2 emergency caesareans with identified theatre capacity issues will meet the decision-to-delivery interval (DDI) of 30 minutes (Category 1) and 75 minutes (Category 2) (RANZCOG 2019, NICE guidelines 2019). (2) Median DDI for category 1 and 2 caesarean sections with identified capacity issues are equal to the median DDI of caesareans at Auckland City Hospital where no inadequacy/capacity issues were noted. **Findings**: (1) DDI: 40% of category 1 sections had a DDI of 30 minutes or less and 56% of category 2 caesarean sections had a DDI of 75 minutes or less. Therefore, in category 1 or 2 caesarean section where capacity issues were identified, 28 cases (52%) met their respective DDI standards. Stages of DDI: the longest time period for both category 1 and 2 caesareans was the time from decision to theatre arrival (category 1 mean = 20.2 minutes; category 2 mean = 59.7 minutes). Reasons for delay: of the category 1 and 2 sections that met the standard, 66% had "called 2nd team/level 8" as the most commonly selected reason for delay. This was similar in delayed cases (62% of cases). (2) The median DDIs for category 1 and 2 caesarean sections at Auckland City Hospital with no capacity issues were 25 minutes and 67 minutes respectively. The median DDIs for our sample of category 1 and 2 caesarean sections with identified capacity issues were 37 minutes and 72 minutes respectively. As the DDIs for both categories of caesarean sections were greater than the standard, this standard was not met. **Recommendations**: Audit of category 1 and 2 emergency caesarean section documentation of booking forms, clinical notes and intraoperative notes, as poor documentation was a recurring theme in our audit. Checklist added to booking form documenting common issues for delay. This would allow for uniform documentation and collective team understanding of what impacted the DDI. Additional emergency obstetric theatre 24 hours a day - RCOG recommends that delivery units with birth rates over 4000 per year require 2 operating theatres. Staffing - middle grade specialists/anaesthetists in addition to those on call in the case of multiple emergency caesareans (limited due to resources). Reducing demand for category 2 caesareans e.g. exploring maternal choices in the antenatal period regarding mode of delivery e.g. TOL over elective caesareans. Simulated emergency caesarean sections with all staff members to ensure greater adaptability and efficiency.
Service Area: Maternity Postnatal	
Are women admitted to DCCM or CVICU given follow up with the opportunity to debrief?	**Standard**: 100% of women who are admitted to DCCM or CVICU during or shortly after their delivery admission should be given follow-up with the opportunity to debrief with an obstetric senior medical officer (SMO) or a relevant SMO within 3 months. **Findings**: The follow-up rate for maternity patients who were admitted to DCCM or CVICU was 30% in 2019-2020. Those who had an RCP discharge completed were more likely to get a follow up appointment than those with no RCP discharge (35% vs 25%). **Recommendations**: 1. Set standards: 100% of all maternity patients admitted to DCCM or CVICU should have an RCP discharge summary with a letter sent to GP regarding admission AND offer all follow-up with obstetrics SMO or relevant SMO within 3 months of discharge 2. Clinical lead to keep an account of all maternity patients admitted to DCCM or CVICU 3. Future audit looking into DNA for clinics with better routes of access e.g. providing taxi chits, under COVID-19 precaution allowing a support person for compassionate grounds, outreach clinics in other DHBs, potential virtual follow-ups where appropriate 4. Research into reasons behind ethnic disparities and user-experience of maternity patients in DCCM/CVICU.

Audit Title	Standard, Findings, and Recommendations
Red Blood Cell Transfusions Post Caesarean Section at National Women's Hospital	**Standard**: 100% of women receiving RBC transfusion after a C-section will have one of: Pre-transfusion Haemoglobin (Hb) <70 g/L, Pre-transfusion Hb 70-100g/L documented signs and symptoms consistent with anemia, Estimated blood loss (EBL) >1500ml, Uncontrolled bleeding or shock, Fibrinogen <2 g/L **Findings**: Our audit has revealed that RBC transfusions post C-section are largely appropriate at National Women's Hospital for 2020. Of 52 women who received a post-op RBC transfusion, there was only one transfusion that occurred with an Hb concentration of >100g/l, and only two transfusions that occurred with an Hb <70g/L. According to our proposed standard, two of the total cases received inappropriate transfusions. There were no documented symptoms in these women. The decisions to transfuse were made prospectively based on higher thresholds of pre-transfusion Hb levels than recommended. **Recommendations**: Education session within the department regarding appropriate transfusion indications and documentation to familiarise staff at all levels with the guidelines and recommendations available. Teaching should also involve the importance of better documentation and discussing adverse consequences from transfusions and scarcity of blood products to prevent overprescribing. Including a standardised form to be included in clinical notes that necessitates stating the indication for transfusion, pre-transfusion Hb level and EBL. There is no local ADHB guideline regarding blood transfusions for anaemia post C-section. Implementation of a local guideline with a flow chart to indicate when a transfusion is indicated may be useful to guide best practice.
Service Area: Maternity Neonatal	
Consent and Indication for Formula Feeding	**Standard**: Auckland District Health Board (ADHB) policy on artificial and supplementary feeding states: - The benefits of breast feeding and health risks of artificial feeding should be discussed with all women and whānau to enable informed decision making, before formula is given. This implies consent is required for 100% of infants. - Parents requesting supplementary feeds without clinical indication will be advised to read and sign a consent form (Consent for Formula). - All infants (100%) requiring food/drink other than breastmilk will have written documentation in their clinical record of the reasons why it is required. **Findings**: Of 130 neonates who received formula on ward 96 NWH: 70 (54%) had documented consent, either on the 'Consent for Formula' form or in the Clinical notes. 53 (41%) were consented using the 'Consent for Formula' form with parental signature gained. 107 (82%) had a documented indication for formula feeding. 53 (41%) were documented on the 'Rooming in Record' form. Of 59 infants with no clinical indication (maternal request or nil indication documented) for formula: 30 (51%) had consent documented. 24 (41%) had read and signed a consent form. **Recommendations**: Place the Consent for formula form onto the back of the Rooming in record form. This will increase the accessibility of the consent form. Other interventions could include further education, especially of the healthcare assistants on ward 96, to orient them to the Baby Friendly Hospital Initiative. Nurses/midwives on the ward already get thorough education on the BFHI, however as HCAs frequently answer call bells, this could help improve compliance.
Vitamin K Administration and Documentation	**Standard**: ADHB Newborn Services Clinical Guidelines - which are inline and consistent with the RANZCOG guidelines. All newborn infants should receive vitamin K prophylaxis. The recommended doses are: An IM injection of 1mg (0.1mL) at birth IM is the preferred route due to reliability of administration and level compliance. Preterm babies <1000g should receive 0.5mg IM at birth. If consent is gained for oral but not IM, the recommended dose is three 2mg (0.2mL) oral doses at birth, at time of newborn screen and in the fourth week. Informed consent: Parents should receive written information during the antenatal period about the importance of vitamin K prophylaxis as well as what options (IM or oral) are available. Verbal consent is necessary for vitamin K administration and should be documented clearly in the infant's personal health record (i.e. Newborn record at ADHB) Hospitals should have written protocols for medical and nursing staff to administer prophylactic vitamin K to infants. It should be routine practice to document the date, dose and method of administration in the Newborn record. **Findings**: 99% of neonates were documented to receive/decline vitamin K (1 undocumented). Of these, 82% had parental consent documented. 58% were documented to receive information regarding vitamin K. It is unclear whether the 1 case that declined vitamin K was given information about vitamin K and its benefits. 97% of vitamin K documentation included a prescriber's signature. 100% of drug dose and drug route were documented. Only 52 out of 99 charts (53%) were complete for all documentation sections, excluding checked section as it is not a requirement for midwives. **Recommendations:** Recommend amending vitamin K section on Newborn Report to ensure there is no repetitive documentation (dates) and allow for documentation of oral administration.

Service Area: General Gynaecology	
Assess the rate of significant complications following an outpatient hysteroscopy at the RAC clinic	**Standard**: Complications of hysteroscopies are not common, the main serious complications we are concerned with are perforation, haemorrhage and infection. A Dutch audit in 2000 cited a 0.13% incidence rate in diagnostic hysteroscopy and 0.76% in operative hysteroscopy. A French study found a 0.61% rate of haemorrhage out of 2116 recorded office hysteroscopies. A prospective study by Agostini et al demonstrated that the total proportion of patients developing an infection post hysteroscopy was 1.5% whereas a survey carried out by Aydeniz et al found a rate of <0.01%. Other single center audits assessing incidence of uterine perforation have found rates of 1.61%. For the purposes of this study, we are going to set a benchmark of <1% incidence rate of significant complications including infection, bleeding, perforation. We believe that the literature proves this is an attainable benchmark. **Findings**: From the RAC clinic we sourced 324 NHIs for women who had presented between Dec-2018 to Dec-2019. Of these patients, 123 had outpatient hysteroscopies. Going into the project we expected a low complication rate due to the literature, which is why it was decided to include known risk factors such as BMI and tubal disease to assess possible correlations. Overall there was a 0.8% rate of severe complication with one episode of PV bleeding requiring admission post-outpatient hysteroscopy. **Recommendations**: None.
Midstream Urine Tests Prior to Urodynamic Studies	**Standard**: 100% of women should have negative mid-stream urine tests (MSU) prior to urodynamic studies as active infection invalidates abnormal findings. No formal ADHB Clinical Guidelines could be found with regard to needing a negative MSU prior to urodynamic studies, however it is well established in urodynamic literature that deferral is recommended in the presence of active infection. Upon discussion with the urogynaecology department at ADHB, preference is for a MSU to be performed within approximately 2 weeks prior to urodynamic studies. Patients are sent lab forms from the hospital with this information included. **Findings**: Of the 100 patients in the sample, 43 had an MSU recorded on EClair within the 3 weeks prior to their urodynamic study, and 57 did not. 32 had an MSU within 7 days prior to their appointment, 9 between 8-14 days prior, and 2 between 15-21 days prior. On average, from those who had an MSU, the MSU was done 6 days prior to the urodynamic study, with peak occurrence at 2 days prior (7 of 43 on 2 days prior). **Recommendations**: In conclusion, a concurrent urinary tract infection will alter the quality of the investigation, and urine dipstick and post-urodynamic MSUs are inadequate substitutes. In order for the ADHB Urogynaecology Department to increase the validity of urodynamic studies, quality improvement needs to focus on increasing pre-urodynamic adherence to MSU's.

ŪPOKO 4
Tatauranga Wāhine Hapū

CHAPTER 4
Maternal Demography

Commentator
Dr Lynn Sadler

ŪPOKO 4

Tatauranga Wāhine Hapū

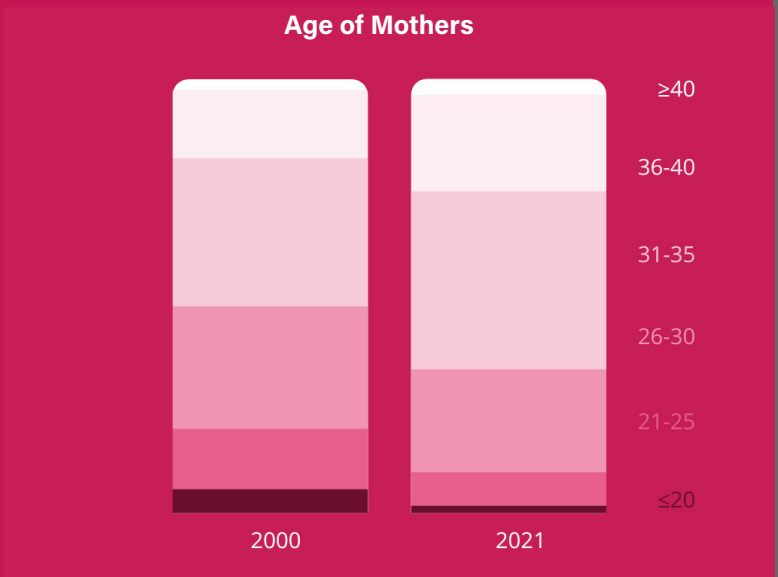
CHAPTER 4

Maternal Demography

Summary

There have been considerable changes in the demography of mothers birthing at Auckland City Hospital (ACH) over the years;

- The number of women birthing at the hospital has been steady in the past four years, and was 6462 in 2021.
- The number of women birthing at ACH who live in ADHB area is slowly reducing. Most women birthing at NWH live in Auckland, Waitematā or Counties Manukau DHB areas.
- Smoking rates continue to decline, although Māori and Pacifica wāhine need more support with this modifiable risk factor.
- In the 1990s, the majority of women were having their second or later baby when they birthed at ACH. In the 2000s, 50% of wahine are having their first baby and 50% second or later babies. This varies by ethnicity (35% of Māori and Pacific mothers were birthing their first baby at NWH in 2021 compared to 53% of European, 51% of Other Asian women and 60% of Indian mothers).
- The proportion of women overall birthing between 31 and 40 years of age continues to rise with births to younger and older than the 30s decade steady or declining.



4.1 Maternal domicile

In 2021, 66.1% of wāhine giving birth at NWH were wāhine who lived in the Auckland DHB area. This proportion has dropped significantly from 70.7% in 2006. The increase in births to non-ADHB residents is comprised of an increase in births at NWH of Counties Manukau residents. There has been no change in the proportion of births to Waitematā residents. Consistently about 2% of births are to mothers from DHBs outside of the three Auckland region DHBs. Some of the mothers who lived outside Auckland DHB area and birthed at NWH required tertiary services, but others have made a personal choice to birth at NWH.

4.2 Maternal age, parity, and ethnicity

The proportion of women overall birthing between 31 and 40 years of age continues to rise with births to younger and older women than the 30s decade steady or declining. There has been a steady decline in births among women aged under 25 since 1991. The median age of mothers birthing at NWH in 2021 was 33 (mean 32.3) in 2021. Median age varied by ethnicity (Māori 28 years, Pacific 29 years, Indian 32 years, Other Asian 33 years, MELAA 33 years, and European 33 years). The median age of a woman having her first baby at NWH in 2021 was 31 years (34 years for second or later babies).

Figure 4.1: Maternal age distribution among wāhine birthing at NWH 1991-2021

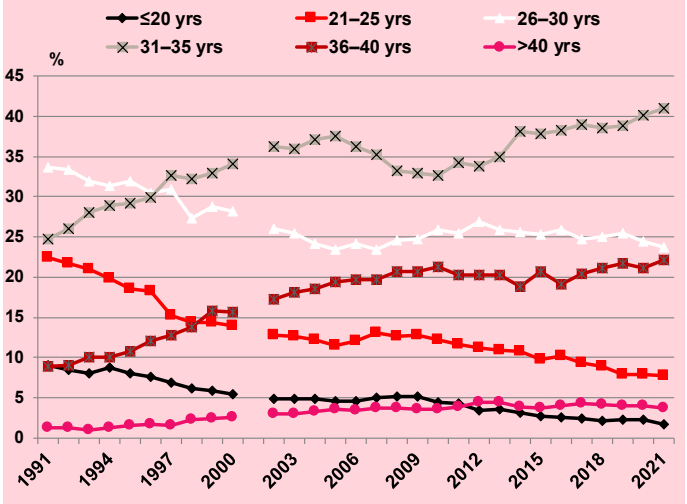
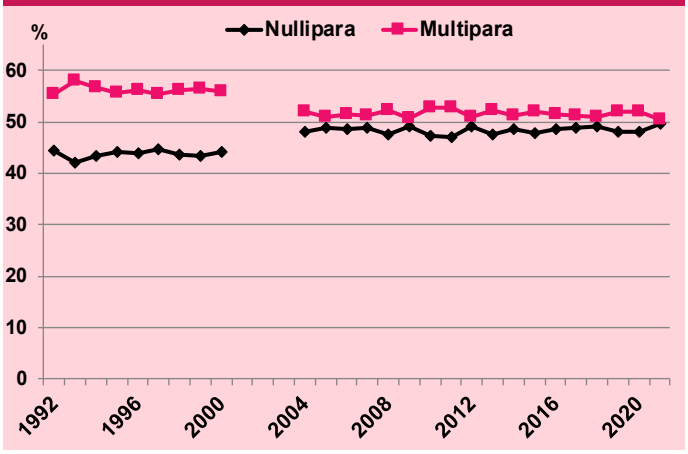


Figure 4.2: Parity distribution among wāhine birthing at NWH 1992-2021



In 2021, of all women birthing, equal numbers were having their first as having later babies.

Figure 4.3: Maternal parity by age NWH 2021

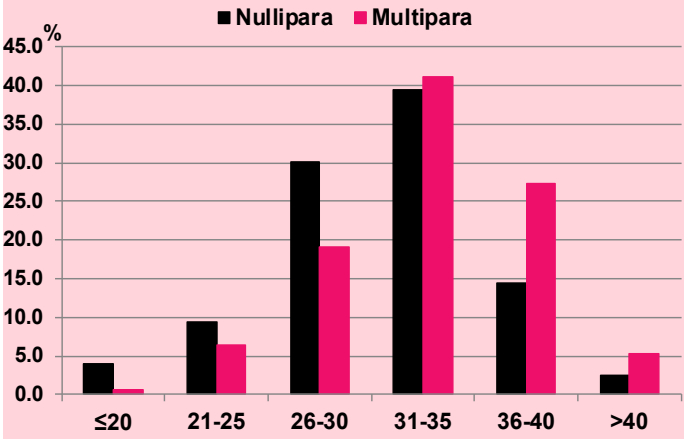


Table 4.1: Prioritised ethnicity of wāhine giving birth at NWH 2021

	Birthing mothers 2021	
	n=	6462
	n	%
Māori	550	8.5
New Zealand European	1793	27.7
Samoan	254	3.9
Tongan	220	3.4
Cook Island Māori	82	1.3
Niuean	54	0.8
Fijian	58	0.9
Other Pacific Peoples	18	0.3
Tokelauan	4	0.1
Chinese	789	12.2
Indian	804	12.4
Other Asian	403	6.2
Southeast Asian	317	4.9
Asian NFD	22	0.3
European NFD	81	1.3
Other European	682	10.6
Middle Eastern	115	1.8
African	77	1.2
Latin American	110	1.7
Other Ethnicity	29	0.4

Prioritised ethnicity is used to represent self-identified ethnicity in this report as is usual in health statistics (Ministry of Health. 2017. HISO 10001:2017 Ethnicity Data Protocols. Wellington: Ministry of Health). This means that when more than one ethnicity is identified, ethnicity is assigned according to the following hierarchy: Māori, Pacific peoples, Indian, Other Asian, MELAA (Middle Eastern, Latin American or African), Other, European. Indian ethnic groups are reported separately from Other Asian ethnicities because of disadvantage experienced by Indian whānau in perinatal outcomes.

In 2021, of mothers giving birth at NWH, and reporting prioritised ethnicity, 550 (8.5%) identified as Māori, 690 (10.7%) Pacific peoples, 804 (12.4%) Indian, 1531 (23.7%) Other Asian, 302 (4.7%) MELAA (Middle Eastern, Latin American, and African), 1793 (27.7%) NZ European and 763 (11.8%) Other European.

Figure 4.4: Ethnicity of mothers giving birth at NWH 2006-2021

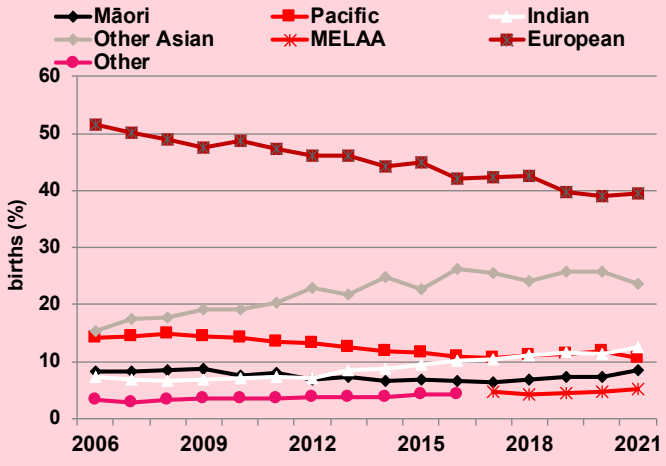


Figure 4.5: Maternal age by maternal ethnicity NWH 2021

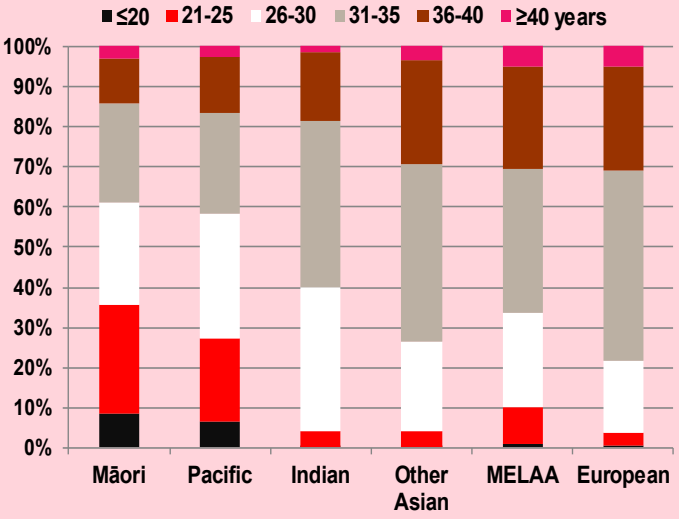
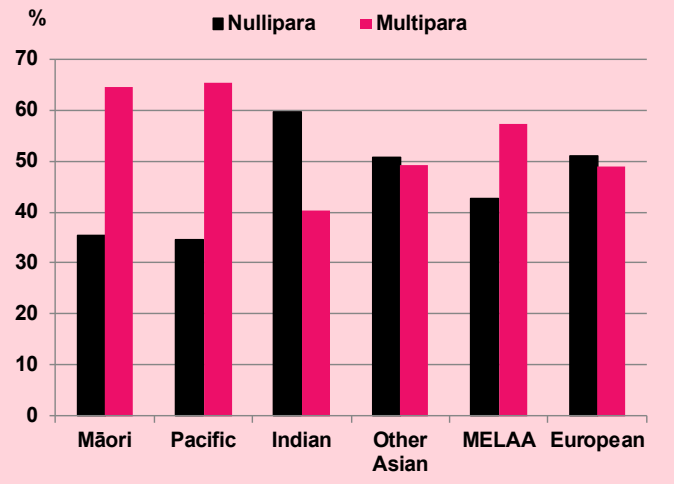


Figure 4.6: Parity distribution by maternal ethnicity NWH 2021



4.3 Smoking

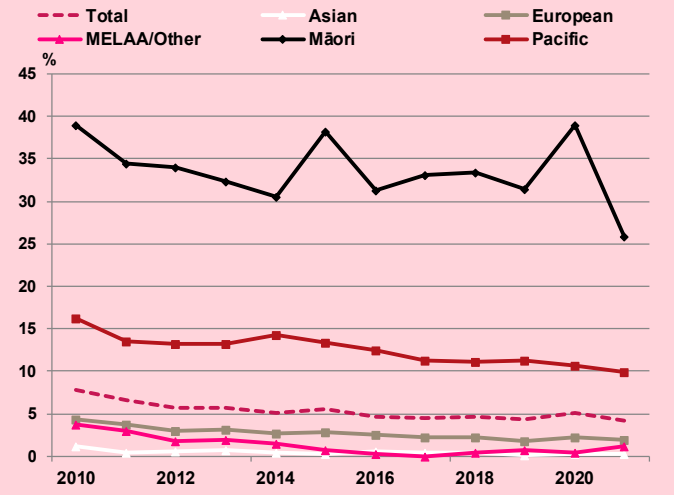
Among wāhine birthing at NWH in 2021, 4.2% reported smoking at booking and 3.3% at birth.

Table 4.2: Smoking status of women at booking and at birth NWH 2021

Smoking Status	Smoking at booking		Smoking at birth	
	n= 6462		n= 6462	
	n	%	n	%
Yes	273	4.2	214	3.3
No	6189	95.8	6248	96.7

Consistent with national figures, Māori hapu wāhine are among those most in need of support for smoking cessation. There has been a reduction in smoking rates over time (2010-2021) across all ethnicities. Wāhine under 26 years old, wāhine living in areas of high socioeconomic deprivation, and Māori and Pacific wāhine have significantly higher smoking rates than the NWH population overall.

Figure 4.7: Smoking at booking trends (2010-2021) by ethnicity



There are increasing smoking rates with increasing deprivation quintile (Figure 4.8) and higher smoking rates among younger women (Figure 4.9). Almost eighty percent of all smoking mothers at NWH at booking in 2021 identified as Māori or Pacific peoples, although mothers of these ethnicities made up only 19% of the birthing population. These data help to identify the populations who require support with this important modifiable risk factor.

Figure 4.8: Smoking rates at booking by deprivation quintile and maternal ethnicity NWH 2021

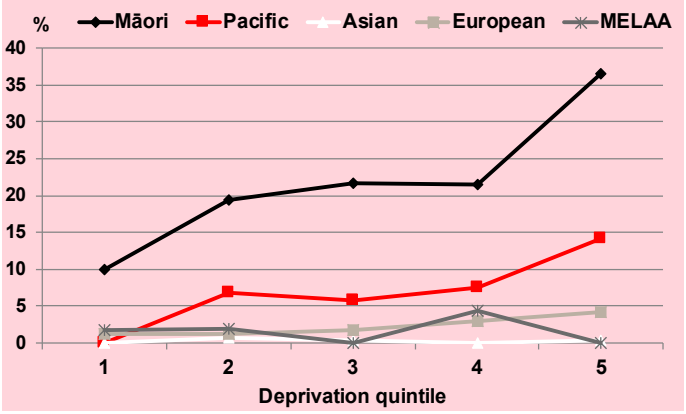
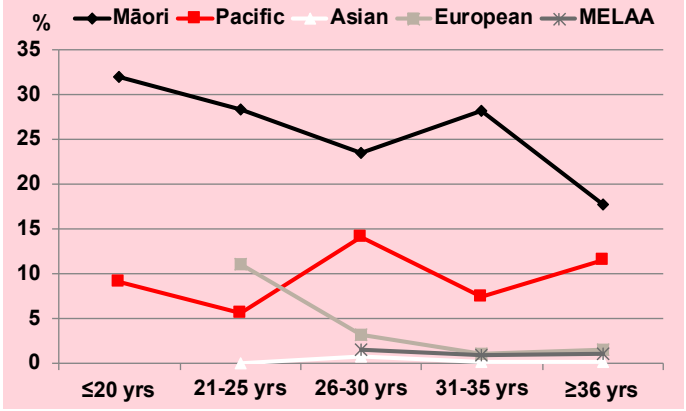


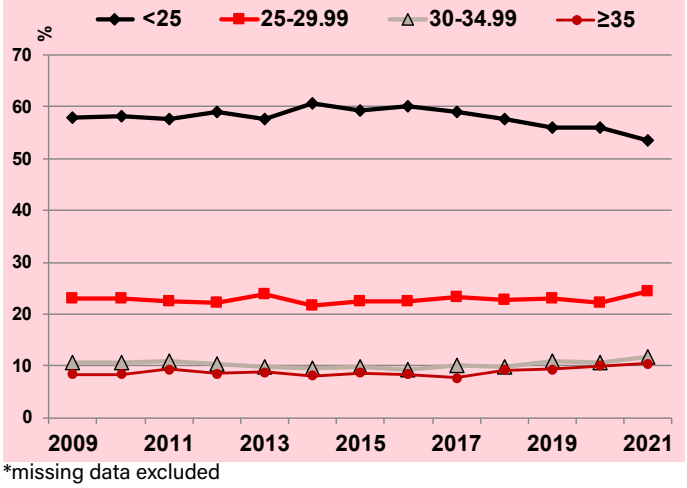
Figure 4.9: Smoking rates at booking by age and ethnicity NWH 2021



4.4 Body Mass Index (BMI)

In 2021, forty-six percent of the maternity population birthing at NWH were overweight or obese (BMI ≥25), with 10.4% morbidly obese (BMI ≥35).

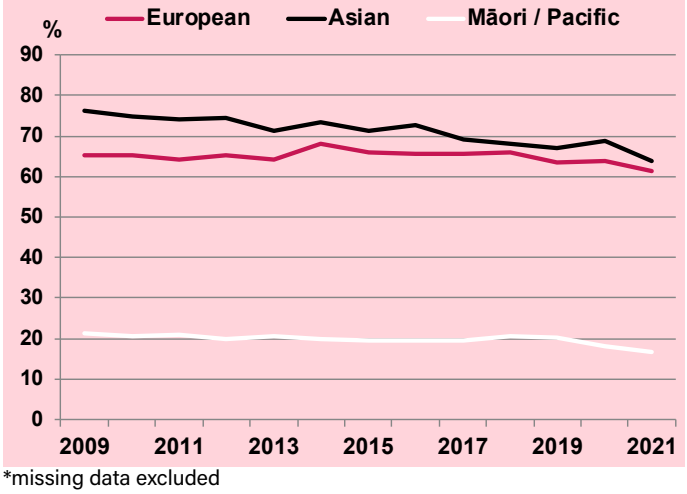
Figure 4.10: BMI* over time NWH 2009-2021



*missing data excluded

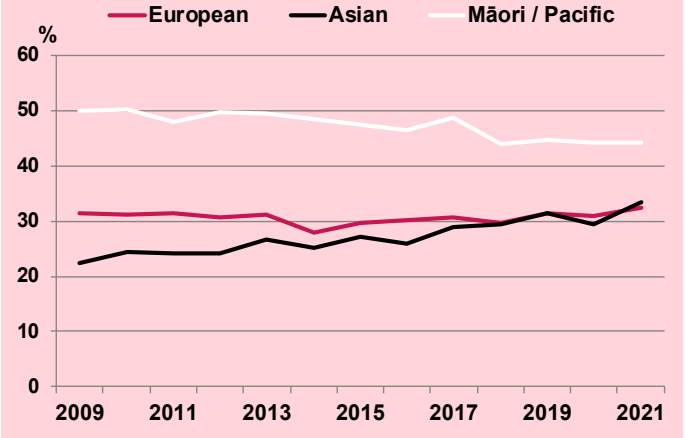
From 2009 to 2021 (Figure 4.10), there has been a significant increase in the proportion of mothers birthing at NWH with BMI above "normal" (≥25). Since 2009 there has been a significant change in the ethnic demography of the population. Figure 4.11 - Figure 4.13 show a small reduction in BMI <25 across all ethnic groupings and an increase in BMI 25-34 in women of Asian ethnicities and an increase in BMI ≥35 in women of Māori and Pacifica ethnicities.

Figure 4.11: BMI <25 by ethnic groupings NWH 2009-2021*



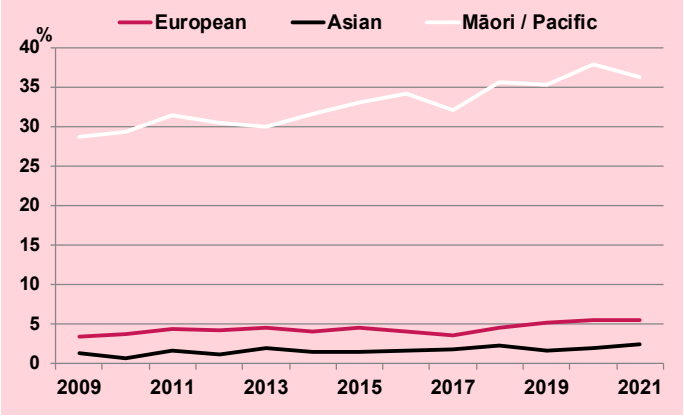
*missing data excluded

Figure 4.12: BMI 25-34 by ethnic groupings NWH 2009-2021*



*missing data and MELAA excluded

Figure 4.13: BMI ≥35 by ethnic groupings NWH 2009-2021



*missing data and MELAA excluded

Figure 4.14: Overweight/obese (BMI ≥25) by ethnicity and deprivation quintile NWH 2016-2021

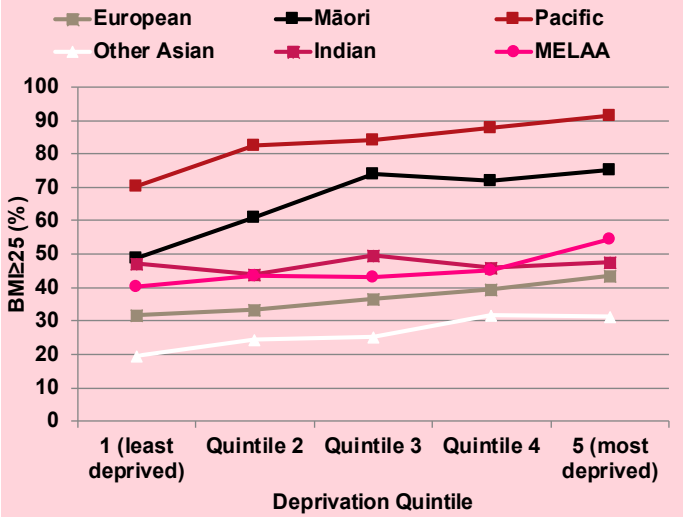
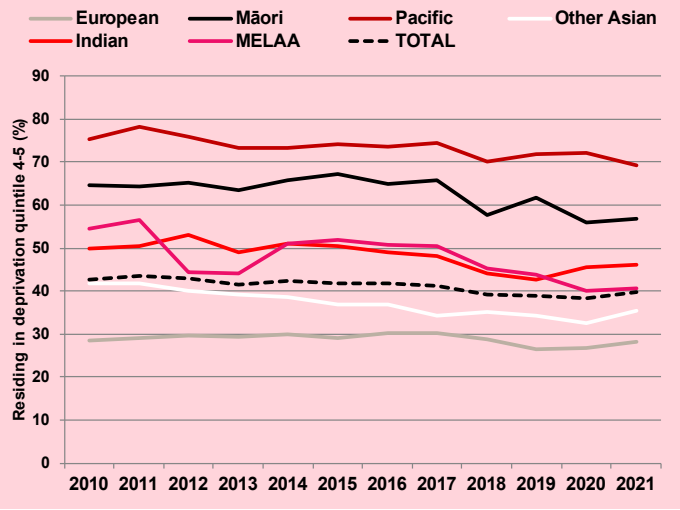


Figure 18 shows the increase in the rate of overweight/obesity with increasing socio-economic deprivation within ethnic groupings (note this is not evident among women of Indian ethnicity). It also shows that ethnicity is a stronger predictor of obesity than socioeconomic status. Analyses of BMI and maternity outcomes can be found in 5.7 Body Mass Index (BMI).

4.5 Socio-economic status

Socio-economic status is measured by deprivation score (most recent year related to 2018 Census data) within Census area units. The decile score has been compressed to quintiles in the figures. Quintile 1 includes the least deprived two deciles and quintile 5 the most deprived two deciles. Figure 4.15 shows the significant difference in the proportion of mothers living in the most socioeconomically deprived areas (Census area centile scores 6-10) by ethnicity. There has been a significant reduction in women living in the most deprived two quintiles over time in all ethnic groupings, but the differences between ethnicities remain and are not diminished over time.

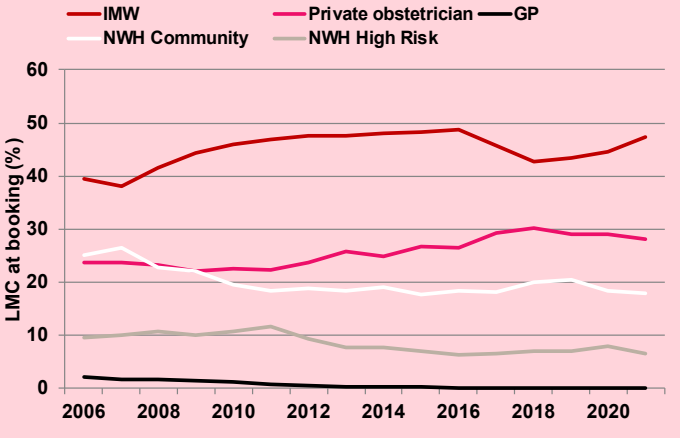
Figure 4.15: Deprivation (quintile 4-5) by ethnicity over time 2010-2021



4.6 Lead Maternity Carer (LMC) at birth

The data given throughout this report for LMC relate to LMC at birth. LMC at birth is reported because the hospital does not collect data on the first LMC for all wāhine. Collection of these data would require a common database used by LMCs and hospital facilities. In 2021, 47.3% (up from 44.6% in 2020) of wāhine birthing at NWH were registered with a self-employed midwife at birth, 28.1% with a private obstetrician, 18.0% with the NWH Community maternity service, and 5.4% with NWH specialist medical and diabetes clinic services. Overall 75.4% of wāhine who gave birth at NWH in 2021 were under the care of a self-employed LMC compared to 65% in 2006.

Figure 4.16: LMC at birth among mothers birthing at NWH 2006-2021



Of the wāhine booked under the care of a private obstetrician in 2021, 849 (46.8%) were non-ADHB residents. This compares to 1002 (32.8%) of women under self-employed midwifery LMC care, 170 (48.4%) wāhine solely under the care of diabetes and medical clinics, 119 (10.3%) wāhine under the NWH Community clinic, and 33.9% of wāhine birthing at NWH overall.

The proportion of independent midwifery LMCs as caregivers has increased in the past 3 years (Figure 4.16). Only two women in 2021 had a GP as their LMC at birth. Because of small numbers, these women have been included with independent midwifery throughout the report. Forty-two wāhine were not registered for antenatal care in 2021 (compared to 36 in 2020, 58 in 2019 and 38 in 2018).

Figure 4.17 and Figure 4.18 show mothers birthing at NWH and LMC at birth among ADHB and non-ADHB residents over time. These figures show that there has been a reduction over time in wāhine resident in ADHB area birthing at NWH, and stable numbers of wāhine residing outside ADHB birthing at NWH.

Figure 4.17: ADHB resident births and LMC for ADHB resident wāhine birthing at NWH 2006-2021

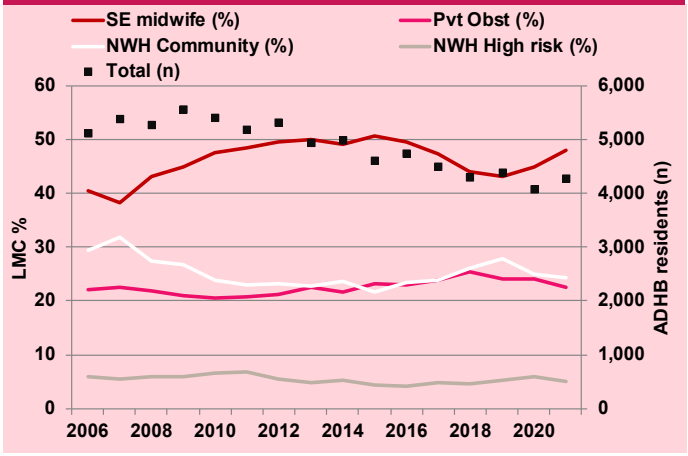


Figure 4.18: Number of births and LMC for wāhine residing outside ADHB and birthing at NWH 2006-2021

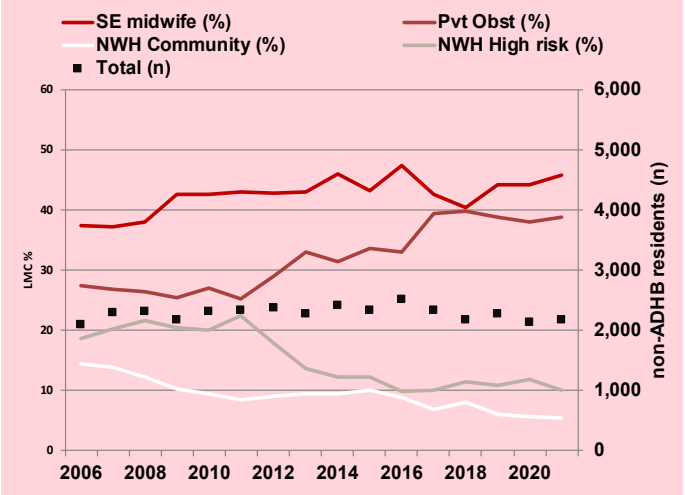


Figure 4.19: LMC at birth and Maternal age NWH 2021

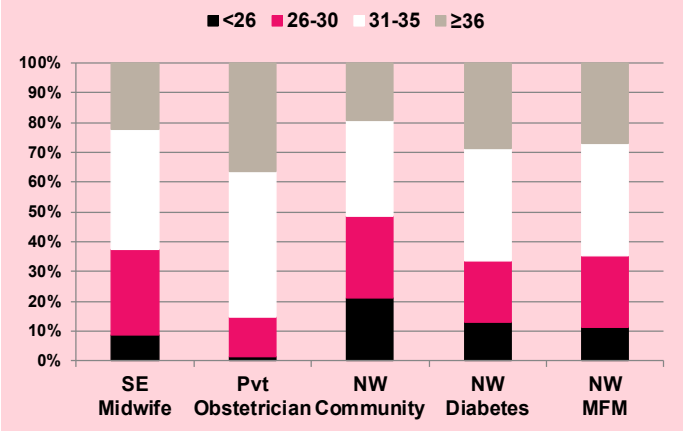


Figure 4.20: LMC at birth and maternal ethnicity NWH 2021

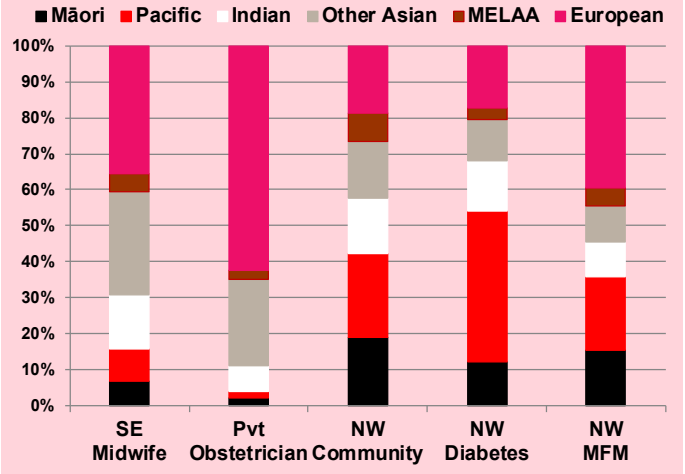
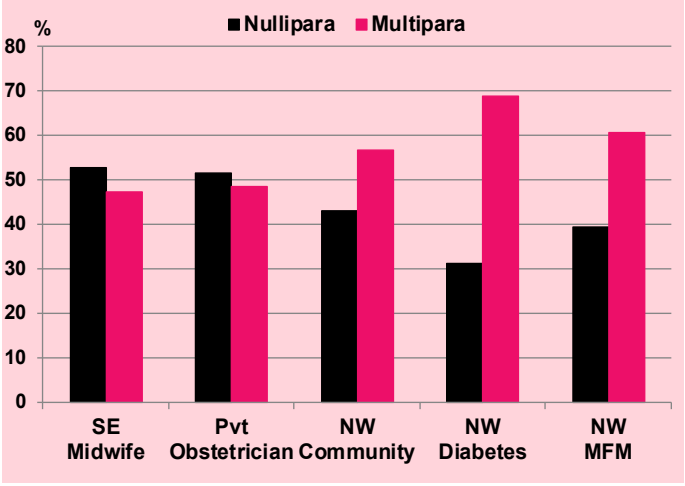


Figure 4.21: LMC at birth and parity NWH 2021



4.7 Standard primipara

A standard primiparous mother is defined at NWH as a wahine with no prior birth at 20 or more weeks gestation, aged 20-34 years at birth, with a singleton pregnancy, cephalic presentation, gestation 37-41 weeks at birth, with a normally grown pēpe (customised birthweight centile ≥10th), without medical disease (cardiac disease, renal disease, mental health disorder, SLE, HIV infection, CVA/ TIA, diabetes or hypertension), gestational diabetes, pregnancy associated hypertensive disease, or antepartum haemorrhage. This differs from the definition used by the Ministry of Health in the NZ Maternity Clinical Indicators report, which can be found in Table 3.1. The objective of reporting outcomes for this tightly defined sub-group is to permit comparisons of similar risk profile wāhine between individual caregivers and with other institutions. In 2021, 34% of primiparous wāhine were defined as standard by the NWH definition. Mode of birth at term for standard primipara by LMC is presented in Figure 6.13.

4.7.1 Data tables: Maternal demography

Table 4.3: DHB of domicile of mothers giving birth at NWH 2014-2021

DHB	2014		2015		2016		2017		2018		2019		2020		2021	
	N=7400		N=6933		N=7241		N=6846		N=6481		N=6660		N=6212		N= 6462	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Auckland	4979	67.3	4587	66.2	4723	65.2	4496	65.7	4293	66.2	4373	65.7	4059	65.3	4274	66.1
Waitematā	1070	14.5	996	14.4	1107	15.3	998	14.6	974	15	970	14.6	945	15.2	917	14.2
Counties Manukau	1208	16.3	1177	17	1253	17.3	1187	17.3	1073	16.6	1145	17.2	1088	17.5	1111	17.2
Northland	38	0.5	40	0.6	41	0.6	27	0.4	28	0.4	45	0.7	31	0.5	37	0.6
Other North Island	76	1	99	1.4	70	1	104	1.5	78	1.2	90	1.4	75	1.2	85	1.3
South Island	15	0.2	18	0.3	29	0.4	20	0.3	22	0.3	26	0.4	12	0.2	23	0.4
Overseas/ unknown	14	0.2	16	0.2	18	0.2	14	0.2	13	0.2	11	0.2	2	0.03	15	0.2

Table 4.4: Maternal age distribution NWH 2000-2021

	N	<20 yrs		21-25 yrs		26-30 yrs		31-35 yrs		36-40 yrs		>40 yrs	
		n	%	n	%	n	%	n	%	n	%	n	%
2000	7827	431	5.5	1091	13.9	2204	28.2	2670	34.1	1232	15.7	199	2.5
2002	7775	376	4.8	998	12.8	2018	26	2816	36.2	1335	17.2	232	3
2003	7611	372	4.9	959	12.6	1933	25.4	2738	36	1380	18.1	229	3
2004	7491	357	4.8	913	12.2	1809	24.1	2781	37.1	1384	18.5	247	3.3
2005	7194	330	4.6	828	11.5	1685	23.4	2702	37.6	1395	19.4	254	3.5
2006	7212	323	4.5	869	12	1735	24.1	2619	36.3	1421	19.7	245	3.4
2007	7695	386	5	1005	13.1	1798	23.4	2710	35.2	1514	19.7	282	3.7
2008	7589	394	5.2	963	12.7	1863	24.5	2519	33.2	1570	20.7	280	3.7
2009	7735	400	5.2	992	12.8	1916	24.8	2552	33	1600	20.7	275	3.6
2010	7709	335	4.3	943	12.2	1998	25.9	2516	32.6	1644	21.3	273	3.5
2011	7523	325	4.3	878	11.6	1918	25.4	2576	34.2	1534	20.3	292	3.9
2012	7695	267	3.5	862	11.2	2065	26.8	2606	33.8	1555	20.2	340	4.4
2013	7223	254	3.5	790	10.9	1874	25.9	2525	35	1463	20.3	317	4.3
2014	7400	227	3.1	783	10.6	1891	25.6	2824	38.2	1390	18.8	285	3.9
2015	6933	187	2.7	677	9.8	1756	25.3	2623	37.8	1435	20.7	255	3.7
2016	7241	185	2.6	736	10.2	1877	25.9	2773	38.3	1381	19.1	289	4
2017	6846	162	2.4	637	9.3	1692	24.7	2669	39	1395	20.4	291	4.3
2018	6481	137	2.1	578	8.9	1622	25	2499	38.6	1372	21.2	273	4.2
2019	6660	148	2.2	527	7.9	1689	25.4	2585	38.8	1447	21.7	264	4
2020	6212	137	2.2	493	7.9	1516	24.4	2500	40.2	1317	21.2	249	4
2021	6462	111	1.7	496	7.7	1530	23.7	2648	41.0	1435	22.2	242	3.7

Table 4.5: Maternal age and parity NWH 2021

	Total		≤20 yrs		21-25 yrs		26-30 yrs		31-35 yrs		36-40 yrs		>40 yrs	
	n=	6462	n=	111	n=	496	n=	1530	n=	2648	n=	1435	n=	242
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Nullipara	3204	49.6	85	76.6	296	59.7	948	62.0	1320	49.8	473	33.0	82	33.9
Multipara	3258	50.4	26	23.4	200	40.3	582	38.0	1328	50.2	962	67.0	160	66.1

Table 4.6: Time trends in nulliparity and multiparity NWH 2010-2021

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Number of births	7709	7523	7695	7223	7400	6933	7241	6846	6481	6660	6212	6462
Nullipara	3650	3539	3778	3441	3604	3321	3517	3343	3183	3202	2981	3204
%	47.3	47	49.1	47.6	48.7	47.9	48.6	48.8	49.1	48.1	48	49.6
Multipara	4059	3984	3917	3782	3796	3612	3724	3503	3298	3458	3231	3258
%	52.7	52.9	50.9	52.4	51.3	52.1	51.4	51.2	50.9	51.9	52	50.4

Table 4.7: Maternal prioritised ethnicity and age NWH 2021

	Total	Māori		Pacific		Indian		Other Asian		MELAA		European	
Age	**N**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Total	6462	550	8.5	690	10.7	804	12.4	1531	23.7	302	4.7	2556	39.6
≤20	111	47	42.3	44	39.6	1	0.9	3	2.7	3	2.7	11	9.9
21-25	496	148	29.8	145	29.2	31	6.3	61	12.3	28	5.6	82	16.5
26-30	1530	141	9.2	214	14.0	290	19.0	343	22.4	70	4.6	463	30.3
31-35	2648	135	5.1	174	6.6	332	12.5	674	25.5	109	4.1	1215	45.9
36-40	1435	63	4.4	94	6.6	140	9.8	396	27.6	77	5.4	658	45.9
>40	242	16	6.6	19	7.9	10	4.1	54	22.3	15	6.2	127	52.5

Table 4.8: Prioritised Maternal ethnicity and parity NWH 2021

	Total	European		Māori		Pacific		Other Asian		Indian		Other European		MELAA		European	
		n=	**1793**	**n=**	**550**	**n=**	**690**	**n=**	**1531**	**n=**	**804**	**n=**	**763**	**n=**	**302**	**n=**	**2556**
	N	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Nullipara	3204	928	51.8	195	35.5	239	34.6	777	50.8	479	59.6	437	57.3	129	42.7	1365	53%
Multipara	3258	865	48.2	355	64.5	451	65.4	754	49.2	325	40.4	326	42.7	173	57.3	1191	47%

Table 4.9: Smoking and socio economic deprivation (NZ Dep2018) NWH 2021

Deprivation decile	**Total**	**Smoking at booking**	
	6462	**n=**	**273**
	N	**n**	**%**
1	494	7	1.4
2	714	7	1.0
3	760	11	1.4
4	584	22	3.8
5	564	19	3.4
6	767	22	2.9
7	598	20	3.3
8	543	29	5.3
9	793	51	6.4
10	630	84	13.3
Overseas resident	15	1	6.7

Table 4.10: Prioritised ethnicity of wāhine birthing at NWH 2014-2021

	2014		2015		2016		2017		2018		2019		2020		2021	
	N=7400		N=6933		N=7241		N=6846		N=6481		N=6660		N=6212		n= 6462	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Māori	483	6.5	469	6.8	477	6.6	435	6.4	443	6.8	477	7.2	454	7.3	550	8.5
Indian	643	8.7	660	9.5	735	10.2	703	10.3	727	11.2	769	11.5	705	11.3	804	12.4
Chinese	1146	15.5	906	13.1	1189	16.4	1032	15.1	857	13.2	1013	15.2	849	13.7	789	12.2
Other Asian	696	9.4	675	9.7	717	9.9	711	10.4	701	10.8	708	10.6	748	12	742	11.5
Samoan	298	4	289	4.2	286	3.9	274	4	267	4.1	291	4.4	275	4.4	254	3.9
Tongan	304	4.1	271	3.9	251	3.5	248	3.6	234	3.6	241	3.6	232	3.7	220	3.4
Cook Island	117	1.6	98	1.4	86	1.2	88	1.3	75	1.2	88	1.3	86	1.4	82	1.3
Niuean	76	1	58	0.8	69	1	45	0.7	64	1	56	0.8	60	1	54	0.8
Fijian	60	0.8	57	0.8	50	0.7	54	0.8	54	0.8	49	0.7	48	0.8	58	0.9
Other Pacific	23	0.3	32	0.5	39	0.5	24	0.4	29	0.4	34	0.5	25	0.4	22	0.3
NZ European	2421	32.7	2291	33	2196	30.3	2106	30.8	1958	30.2	1923	28.9	1736	27.9	1793	27.7
Other European	852	11.5	827	11.9	842	11.6	799	11.6	803	12.4	710	10.7	687	11.1	763	11.8
MELAA							327	4.8	269	4.2	301	4.5	307	4.9	302	4.7
Other /not stated	281	3.8	300	4.3	304	4.2	0		0		0		18	0.3	29	0.4

Table 4.11: Smoking status at booking by prioritised ethnicity and maternal age NWH 2021

		Smoking at booking		Smoking at delivery	
	N	n	%	n	%
Total	6462	273	4.2	214	3.3
Ethnicity					
Māori	550	142	25.8	122	22.2
Pacific	690	68	9.9	52	7.5
Indian	804	3	0.4	1	0.1
Other Asian	1531	5	0.3	2	0.1
MELAA/ Other	331	4	1.2	1	0.3
European	2556	51	2.0	36	1.4
Age					
≤20	111	21	18.9	20	18.0
21-25	496	60	12.1	44	8.9
26-30	1530	84	5.5	67	4.4
31-35	2648	67	2.5	54	2.0
≥36	1677	41	2.4	29	1.7

Figure 4.22: Characteristics of standard primipara NWH 2021

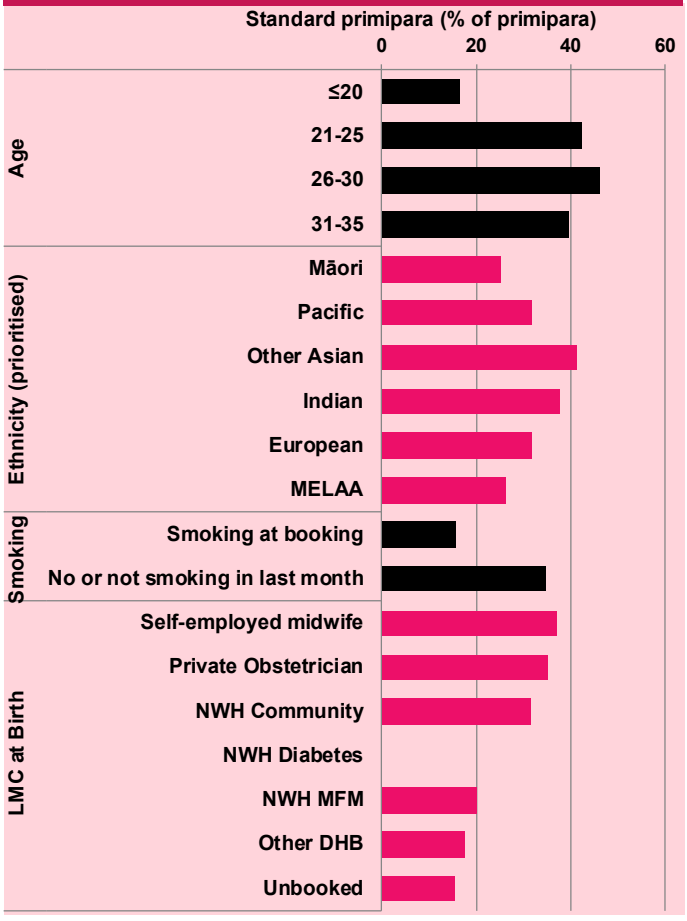


Table 4.12: Smoking status at booking by LMC at birth NWH 2021

	Self-employed Midwife		Private Obstetrician		NW Community		NW Diabetes		NW MFM		Other DHB		Unbooked	
	n=	3054	n=	1816	n=	1161	n=	122	n=	229	n=	38	n=	42
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Smoking at booking	67	2.2	8	0.4	149	12.8	10	8.2	22	9.6	3	7.9	14	33.3
Not smoking	2987	97.8	1808	99.6	1012	87.2	112	91.8	207	90.4	35	92.1	28	66.7

Table 4.13: BMI ≥25 by deprivation quintile and prioritised maternal ethnicity NWH 2021

Ethnicities	Total			Dep Quintile 1			Dep Quintile 2		
	N	n	%	N	n	%	N	n	%
All	6462	2961	45.8	1208	407	33.7	1344	540	40.2
Māori	550	382	69.5	50	26	52.0	77	51	66.2
Pacific	690	617	89.4	33	23	69.7	74	68	91.9
Indian	804	410	51.0	65	35	53.8	147	73	49.7
Other Asian	1531	426	27.8	300	56	18.7	364	96	26.4
MELAA	302	157	52.0	55	23	41.8	53	28	52.8
European*	2556	969	37.9	700	244	34.9	624	224	35.9
Ethnicities	**Dep Quintile 3**			**Dep Quintile 4**			**Dep Quintile 5**		
	N	n	%	N	n	%	N	n	%
All	1331	598	44.9	1141	553	48.5	1423	858	60.3
Māori	111	84	75.7	107	74	69.2	205	147	71.7
Pacific	103	87	84.5	161	143	88.8	317	294	92.7
Indian	220	115	52.3	157	74	47.1	214	113	52.8
Other Asian	319	94	29.5	255	70	27.5	288	108	37.5
MELAA	71	32	45.1	45	28	62.2	78	46	59.0
European*	501	186	37.1	414	164	39.6	310	150	48.4

*Includes NZ European and Other European
29 Ethnicities are Other NFD and have not been included in this table.
15 unknown quintile excluded.

Table 4.14: Deprivation Quintile (NZ Dep2018) by prioritised maternal ethnicity NWH 2021

Deprivation Quintile	Māori		Pacific		Other Asian		Indian		MELAA		NZ European		Other European	
	n=	550	n=	690	n=	1531	n=	804	n=	302	n=	1793	n=	763
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1 (Least deprived)	50	9.1	33	4.8	300	19.6	65	8.1	55	18.2	497	27.7	203	26.6
2	77	14.0	74	10.7	364	23.8	147	18.3	53	17.5	443	24.7	181	23.7
3	111	20.2	103	14.9	319	20.8	220	27.4	71	23.5	346	19.3	155	20.3
4	107	19.5	161	23.3	255	16.7	157	19.5	45	14.9	298	16.6	116	15.2
5	205	37.3	317	45.9	288	18.8	214	26.6	78	25.8	206	11.5	104	13.6
Unknown			2	0.3	5	0.3	1	0.1			3	0.2	4	0.5

Table 4.15: Deprivation Quintile (NZ Dep2018) and maternal age (years at birth) NWH 2021

Deprivation Quintile	<=20		21-25		26-30		31-35		36-40		>40	
	n=	111	n=	496	n=	1530	n=	2648	n=	1435	n=	242
	n	%	n	%	n	%	n	%	n	%	n	%
1 (least)	6	5.4	50	10.1	204	13.3	545	20.6	346	24.1	57	23.6
2	4	3.6	68	13.7	318	20.8	598	22.6	305	21.3	51	21.1
3	24	21.6	90	18.1	320	20.9	566	21.4	278	19.4	53	21.9
4	23	20.7	119	24.0	293	19.2	427	16.1	241	16.8	38	15.7
5 (most)	54	48.6	169	34.1	390	25.5	506	19.1	264	18.4	40	16.5
Unknown					5	0.3	6	0.2	1	0.1	3	1.2

Table 4.16: LMC at birth NWH 2014-2021

	2014		2015		2016		2017		2018		2019		2020		2021	
	n=7400		n=6933		n=7241		n=6846		N=6481		n=6660		n=6212		N=6462	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Self-employed midwife	3561	48.1	3341	48.2	3533	48.8	3132	45.7	2769	42.7	2891	43.4	2769	44.6	3054	47.3
Private Obstetrician	1843	24.9	1854	26.7	1919	26.5	2004	29.3	1958	30.2	1933	29	1799	29	1816	28.1
General Practitioner	20	0.3	16	0.2	11	0.2	11	0.2	7	0.1	4	0.1	7	0.1	*	*
NWH Community	1408	19	1234	17.8	1326	18.3	1242	18.1	1294	20	1357	20.4	1139	18.3	1161	18.0
NWH Diabetes	214	2.9	151	2.2	128	1.8	126	1.8	132	2	142	2.1	181	2.9	122	1.9
NWH MFM	281	3.8	276	4	255	3.5	278	4.1	248	3.8	248	3.7	237	3.8	229	3.5
Other DHB	36	0.5	32	0.5	29	0.4	18	0.3	35	0.5	27	0.4	44	0.7	38	0.6
Unbooked	37	0.5	29	0.4	40	0.6	35	0.5	38	0.6	58	0.9	36	0.6	42	0.6

*Self-employed midwife includes two women booked with GP

Table 4.17: LMC at birth and maternal age (years at birth) NWH 2021

	Total	≤20		21-25		26-30		31-35		36-40		>40	
	N	n	%	n	%	n	%	n	%	n	%	n	%
Total	6462	111	1.7	496	7.7	1530	23.7	2648	41.0	1435	22.2	242	3.7
Self-employed Midwife	3054	41	1.3	226	7.4	875	28.7	1232	40.3	608	19.9	72	2.4
Private Obstetrician	1816	0	0.0	23	1.3	242	13.3	888	48.9	564	31.1	99	5.5
NW Community	1161	53	4.6	190	16.4	320	27.6	372	32.0	183	15.8	43	3.7
NW Diabetes	122	2	1.6	14	11.5	25	20.5	46	37.7	26	21.3	9	7.4
NW Medical	229	6	2.6	20	8.7	55	24.0	86	37.6	46	20.1	16	7.0
Other DHB	38	5	13.2	10	26.3	9	23.7	9	23.7	4	10.5	1	2.6
Unbooked	42	4	9.5	13	31.0	4	9.5	15	35.7	4	9.5	2	4.8

Table 4.18: LMC at birth and prioritised maternal ethnicity NWH 2021

	Total	NZ European		Māori		Pacific		Other Asian		Indian		Other European		MELAA	
	N	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Total	6462	1793	27.7	550	8.5	690	10.7	1531	23.7	804	12.4	763	11.8	302	4.7
Self-employed Midwife	3054	722	23.6	206	6.7	277	9.1	872	28.6	456	14.9	361	11.8	147	4.8
Private Obstetrician	1816	853	47.0	40	2.2	28	1.5	436	24.0	131	7.2	275	15.1	46	2.5
NW Community	1161	115	9.9	219	18.9	271	23.3	182	15.7	175	15.1	100	8.6	93	8.0
NW Diabetes	122	18	14.8	15	12.3	51	41.8	14	11.5	17	13.9	3	2.5	4	3.3
NW Medical	229	70	30.6	35	15.3	46	20.1	23	10.0	22	9.6	20	8.7	11	4.8
Other DHB	38	9	23.7	15	39.5	7	18.4	3	7.9	3	7.9	1	2.6	0	0.0
Unbooked	42	6	14.3	20	47.6	10	23.8	1	2.4	0	0.0	3	7.1	1	2.4

Table 4.19: LMC at birth and parity NWH 2021

	Total	Nullipara		Standard primipara		Multipara		Multipara previous CS	
	N	n	%	n	%	n	%	n	%
Total	6462	3204	49.6	1100	17.0	3258	50.4	1179	18.2
Self-employed midwife	3054	1609	52.7	593	19.4	1445	47.3	373	12.2
Private Obstetrician	1816	936	51.5	326	18.0	880	48.5	444	24.4
NWH Community	1161	501	43.2	158	13.6	660	56.8	275	23.7
NWH Diabetes	122	38	31.1	0	0.0	84	68.9	33	27.0
NWH MFM	229	90	39.3	18	7.9	139	60.7	47	20.5
Other DHB	38	17	44.7	3	7.9	21	55.3	4	10.5
Unbooked	42	13	31.0	2	4.8	29	69.0	3	7.1

Table 4.20: Deprivation decile (NZ Dep2018) by LMC NWH 2021

	Self-employed midwife		Private obstetrician		NW community		NW diabetes		NW medical		Other DHB		Unbooked	
	n=	3054	n=	1816	n=	1161	n=	122	n=	229	n=	38	n=	42
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1	196	6.4	246	13.5	28	2.4	6	4.9	15	6.6	2	5.3	1	2.4
2	297	9.7	318	17.5	70	6.0	6	4.9	22	9.6	1	2.6	0	0.0
3	353	11.6	311	17.1	64	5.5	6	4.9	17	7.4	7	18.4	2	4.8
4	271	8.9	196	10.8	87	7.5	8	6.6	16	7.0	1	2.6	5	11.9
5	276	9.0	163	9.0	88	7.6	5	4.1	26	11.4	5	13.2	1	2.4
6	393	12.9	162	8.9	167	14.4	14	11.5	26	11.4	0	0.0	5	11.9
7	323	10.6	121	6.7	108	9.3	20	16.4	23	10.0	1	2.6	2	4.8
8	266	8.7	120	6.6	120	10.3	16	13.1	12	5.2	3	7.9	6	14.3
9	398	13.0	116	6.4	210	18.1	20	16.4	31	13.5	8	21.1	10	23.8
10	275	9.0	58	3.2	217	18.7	21	17.2	40	17.5	10	26.3	9	21.4
Unknown	6	0.2	5	0.3	2	0.2	0	0.0	1	0.4	0	0.0	1	2.4

Table 4.21: Demographic characteristics of standard and non-standard primipara NWH 2021

	Total primipara	Standard primipara		Non-standard primipara	
	N	n	%	n	%
Total	3204	1100	34.3	2104	65.7
Age					
≤20	85	14	16.5	71	83.5
21-25	296	125	42.2	171	57.8
26-30	948	437	46.1	511	53.9
31-35	1320	524	39.7	796	60.3
36-40	473	0	0.0	473	100.0
>40	82	0	0.0	82	100.0
Ethnicity (prioritised)					
Māori	195	49	25.1	146	74.9
Pacific	239	76	31.8	163	68.2
Indian	479	181	37.8	298	62.2
Other Asian	777	321	41.3	456	58.7
European	1365	432	31.6	933	68.4
MELAA	129	34	26.4	95	73.6
Other/not stated	20	7	35.0	13	65.0
LMC at birth					
Self-employed Midwife	1609	593	36.9	1016	63.1
Private Obstetrician	936	326	34.8	610	65.2
NW Community	501	158	31.5	343	68.5
NW Diabetes	38	0	0.0	38	100.0
NW MFM	90	18	20.0	72	80.0
Other DHB	17	3	17.6	14	82.4
Smoking at booking					
Yes	71	11	15.5	60	84.5
No or not smoking in last month	3133	1089	34.8	2044	65.2

ŪPOKO 5

Poauautanga Haputanga

CHAPTER 5

Antenatal Complications

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ŪPOKO 5

Poauautanga Haputanga

CHAPTER 5

Antenatal Complications

5.1 Preterm birth

Dr Katie Groom

Preterm birth is defined as birth prior to 37 completed weeks. From 2004-2018, iatrogenic preterm birth was defined as induction of labour (including induction for preterm premature rupture of membranes (PPROM)), elective Caesarean section and emergency Caesarean section before the onset of labour. Iatrogenic birth also includes induction of labour following an intrauterine death or as part of a termination of pregnancy. In 2019, spontaneous preterm birth was amended to include preterm birth after PPROM even if induced. Termination of pregnancy has been excluded from some analyses even though induced.

Key Findings

In 2021:

- 597 wāhine (9.2%) birthing at NWH birthed their pēpe before 37 weeks, 180 (2.8%) of these before 32 weeks.
- Following a fall in the overall preterm birth rate 2014-2018, rates are rising again and now similar to those seen 10 years ago.
- Rates of spontaneous and iatrogenic preterm birth are similar (4.8% and 4.4% respectively).
- Rates of preterm birth continue to differ significantly by ethnicity. European (and Indian, Asian and MELAA) women have significant advantage over wāhine Māori with half the rate of preterm birth (8.5% for European women and 17.1% for wāhine Māori). This is due to high rates of both spontaneous (10.4%) and iatrogenic (6.7%) preterm birth for wāhine Māori. Pacifica women also have less advantage with higher rates of preterm birth (10.9%) predominantly driven by higher rates of iatrogenic preterm birth (5.7% for Pacifica women compared with 4.3% for European women).
- Differences in rates of preterm birth for Māori whānau but not Pacifica whānau persisted when reviewing data for residents of ADHB area only. This difference is driven by spontaneous preterm birth with the wāhine Māori rate of spontaneous preterm birth at 8.1% and for European women only 3.1%.
- Under 5% of women giving birth at NWH are now smokers at booking. These women had an almost two and half fold higher chance of preterm birth (21.6%) compared with non-smokers (8.8%) and this related to both spontaneous and iatrogenic birth (13.0% and 8.6%). Smoking cessation will have major impact on this group of women but less impact on overall rates due to the relatively low incidence of smoking in pregnancy in the ADHB area. Alternative strategies to reduce spontaneous preterm birth must be considered.
- Seven pēpi were born alive at 23 weeks, only one (14%) of these pēpi survived the perinatal period (to 28 days). Due to low numbers, the rate for 2021 should not be considered in isolation. Tracking of 23 week survival rates should be reviewed over 3-5 year cycles or collectively with 24 week survival rates. In 2021, 12 of 20 (60%) pēpi born alive at 23-24 weeks survived the perinatal period, this rate of survival is similar to other level three units within the Australian and New Zealand Newborn Network (ANZNN).

Comments

It is disappointing to see a trend back upwards in the rates of preterm birth. Work is required to explore the risk factors and associations for preterm birth that may have existed for those wāhine who had a spontaneous preterm birth and most importantly to explore the differences by ethnicity and identify areas where this risk can be modified. Several projects around preterm birth were identified in the NWH's Maternity Quality and Safety Plan (MQSP) for 2018-2020; however, it is unclear whether these projects have been completed, reported on, or any action plan for local change in practice made.

A national knowledge translation project – Taonga Tuku Iho, Knowledge Translation for Equity in Preterm Birth Care and Outcomes in Aotearoa, funded by the Ministry of Health/Health Research Council Maternity Services Research Programme is currently underway. This includes a wide stakeholder group of healthcare professionals, consumers, researchers and policy-makers seeking to develop a national best practice guide for preterm birth and the tools and resources required for its effective implementation including measurement of impact through national datasets and audit tools. The leadership group of this project includes members of ADHB staff, although not DHB funded or supported for the project. The project provides a unique opportunity for NWH to become actively engaged in a national initiative with a key aim of achieving equity in preterm birth care and outcomes.

Figure 5.1: Spontaneous preterm birth by ethnicity among mothers birthing at NWH 2006-2021

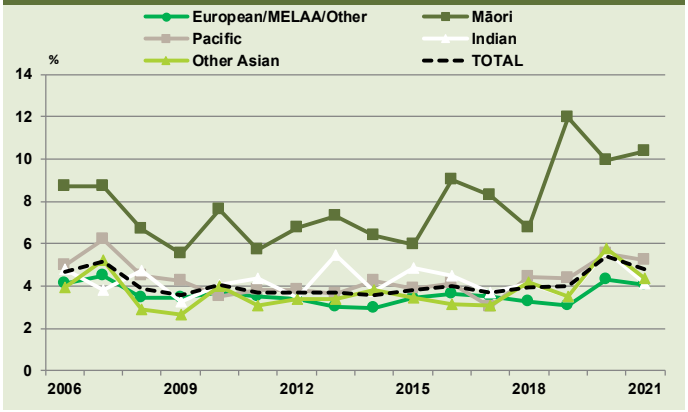


Figure 5.2: Spontaneous preterm birth among ADHB residents by ethnicity NWH 2006-2021

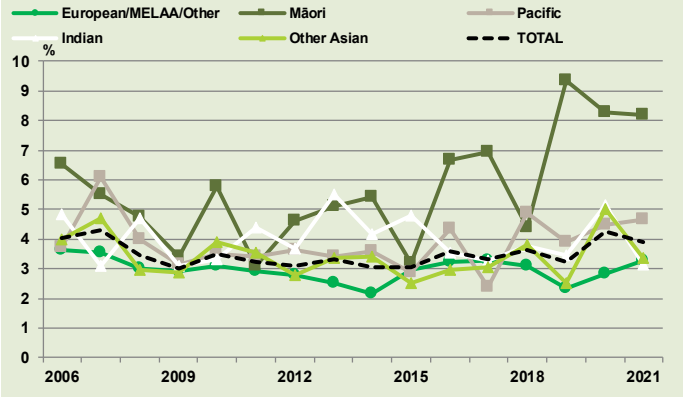


Figure 5.3: Iatrogenic preterm birth (excl TOP) by ethnicity at NWH 2006-2021

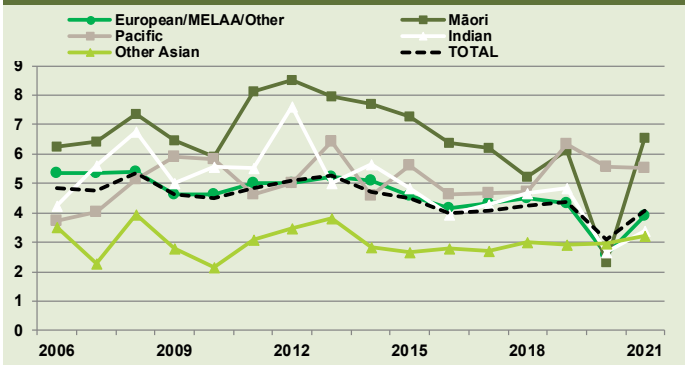
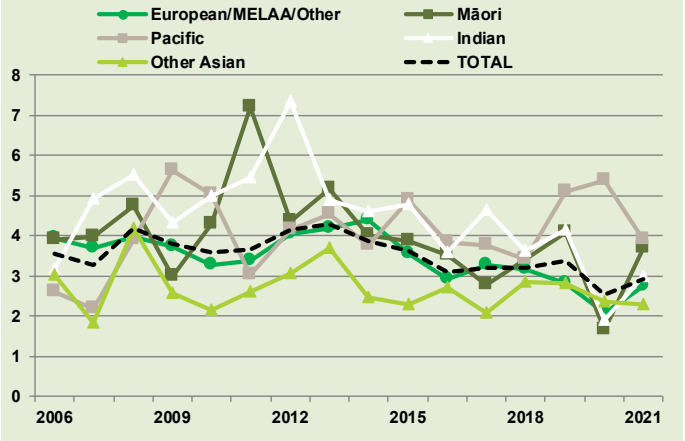


Figure 5.4: Iatrogenic preterm birth (excl TOP) among ADHB residents by ethnicity NWH 2006-2021



5.1.1 Data Tables: Preterm Birth

Table 5.1: Rates of total, spontaneous and iatrogenic preterm birth NWH 2011-2021

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total birthing wāhine	7523	7695	7223	7400	6933	7241	6846	6481	6660	6212	6462
Wāhine birthing preterm (<37) total	684	709	673	647	592	597	542	547	578	588	597
Incidence %	9.1	9.2	9.3	8.7	8.5	8.2	7.9	8.4	8.7	9.5	9.2
Wāhine birthing <32 weeks	190	203	185	185	168	172	144	169	182	197	180
Incidence %	2.5	2.6	2.6	2.5	2.4	2.4	2.1	2.6	2.7	3.2	2.8
Spontaneous and iatrogenic preterm birth											
Spontaneous 32-36 weeks	200	194	193	187	179	205	176	171	180	219	224
Incidence %	2.7	2.5	2.7	2.5	2.6	2.8	2.6	2.6	2.7	3.5	3.5
Spontaneous <32 weeks	79	90	72	79	84	84	76	83	88	115	87
Incidence %	1.1	1.2	1	1.1	1.2	1.2	1.1	1.3	1.3	1.9	1.3
Iatrogenic 32-36 weeks	294	312	295	275	245	220	222	207	216	172	193
Incidence %	3.9	4.1	4.1	3.7	3.5	3	3.2	3.2	3.2	2.8	3.0
Iatrogenic <32 weeks	111	113	113	106	84	88	68	86	94	82	93
Incidence %	1.5	1.5	1.6	1.4	1.2	1.2	1	1.3	1.4	1.3	1.4
Total preterm pēpi	787	820	774	759	691	680	632	621	646	658	670
Total pēpi 32-36 weeks	573	592	568	554	505	481	465	439	450	441	470
Total pēpi <32 weeks	214	228	206	205	186	199	167	182	196	217	200

Table 5.2: Perinatal outcome of preterm pēpi by gestation at birth NWH 2021

Gestation	Births	Fetal deaths	Live births	Live born	Neonatal Death	% of live births surviving ≥ 28 days
(wks)	N	n	n	%	n	%
20	10	10	0	0	0	0
21	8	6	2	25	2	0
22	6	3	3	50	3	0
23	11	4	7	64	6	14
24	17	4	13	76	2	85
25	18	5	13	72	4	69
26	8	2	6	75	0	100
27	25	4	21	84	0	100
28	25	3	22	88	1	95
29	17	0	17	100	1	94
30	20	2	18	90	1	94
31	35	0	35	100	0	100
32	38	3	35	92	1	97
33	38	3	35	92	1	97
34	51	1	50	98	1	98
35	98	1	97	99	2	98
36	244	0	244	100	4	98
Totals	669	51	618	92	29	95

Table 5.3: Preterm birth and maternal demographic characteristics NWH 2021

	Total	Total preterm birth		Iatrogenic preterm		Spontaneous preterm	
	N	n	%	n	%	n	%
Total	**6462**	**597**	**9.2**	**286**	**4.4**	**311**	**4.8**
Age (yrs)							
≤20	111	20	18.0	8	7.2	12	10.8
21-25	496	72	14.5	30	6.0	42	8.5
26-30	1530	128	8.4	51	3.3	77	5.0
31-35	2648	211	8.0	108	4.1	103	3.9
36-40	1435	129	9.0	64	4.5	65	4.5
>40	242	37	15.3	25	10.3	12	5.0
Ethnicity							
Māori	550	94	17.1	37	6.7	57	10.4
Pacific	690	75	10.9	39	5.7	36	5.2
Indian	804	67	8.3	34	4.2	33	4.1
Other Asian	1531	119	7.8	52	3.4	67	4.4
MELAA	302	23	7.6	29	9.6	12	4.0
European	2556	217	8.5	111	4.3	106	4.1
Other/not stated	29	2	6.9	2	6.9	0	0.0
Parity							
Nulliparous	3204	286	8.9	132	4.1	154	4.8
Multiparous	3258	311	9.5	154	4.7	157	4.8
Plurality							
Singleton	6371	525	8.2	232	3.6	293	4.6
Twins	89	71	79.8	54	60.7	17	19.1
Triplets	2	1	50.0	0	0.0	1	50.0
Smoking at booking							
Yes	273	54	19.8	22	8.1	32	11.7
No or not in past month	6189	543	8.8	264	4.3	279	4.5
BMI							
<18.5	178	16	9.0	4	2.2	12	6.7
18.5-24.99	3254	234	7.2	105	3.2	129	4.0
25-29.99	1553	153	9.9	80	5.2	73	4.7
30-34.99	751	91	12.1	44	5.9	47	6.3
35-39.99	362	45	12.4	28	7.7	17	4.7
≥40	303	37	12.2	24	7.9	13	4.3
Missing	61	21	34.4	1	1.6	20	32.8
Deprivation quintile (NZ dep 2013)							
1	1208	99	8.2	45	3.7	54	4.5
2	1344	114	8.5	57	4.2	57	4.2
3	1331	129	9.7	56	4.2	73	5.5
4	1141	86	7.5	41	3.6	45	3.9
5	1423	165	11.6	85	6.0	80	5.6
Missing	15	4	26.7	2	13.3	2	13.3

5.2 Small and large for gestational age pēpi

Dr Audrey Long

Customised birthweight centiles, which adjust size at birth for gestation, pēpe sex, maternal ethnicity, height, booking weight, and parity, are used to define size at birth in the maternity service at NWH.

SGA (Small for gestational age) is defined as birthweight <10th customised centile. Customised centiles define 10% of the "normal" population as SGA with the consequence that rates of SGA in a complex population like NWH are >10% (13.7% in 2020, 13.2% in 2021).

LGA (large for gestational age) is defined as birthweight >90th customised centile. (8.8% in 2020, 9.0% in 2021).

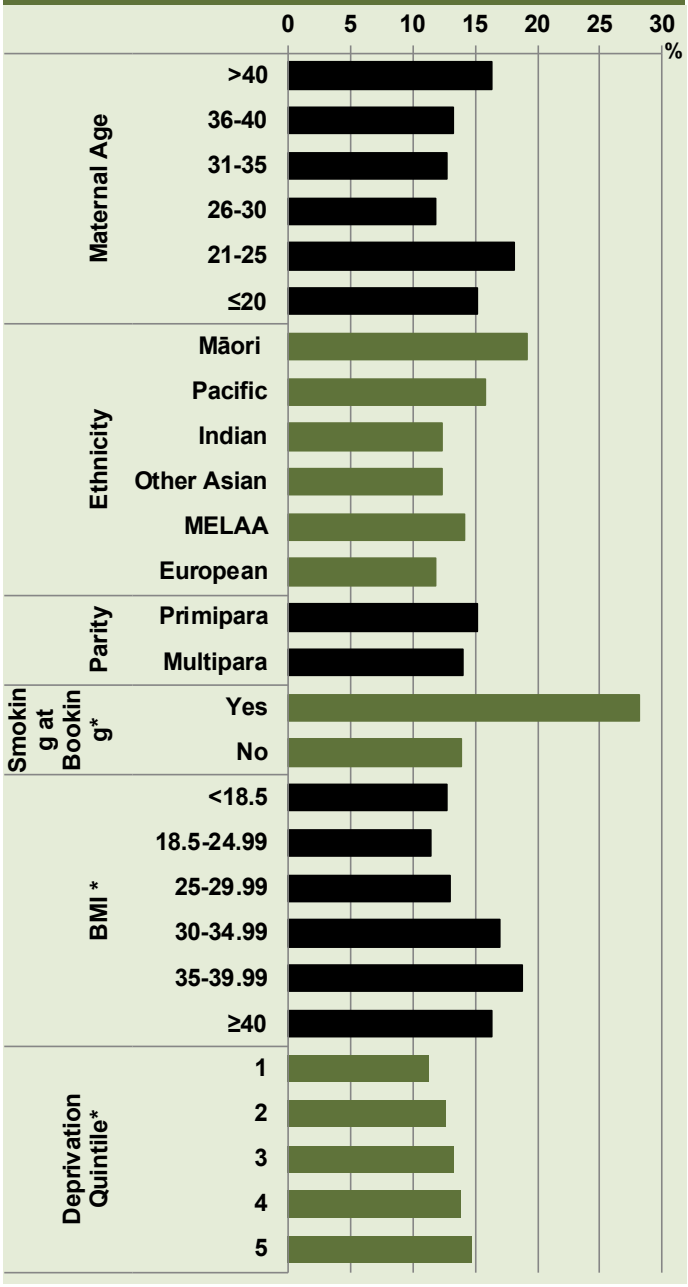
Rates of SGA and LGA pēpi are essentially unchanged from previous years.

A customised centile was not calculated among perinatal deaths if gestation at stillbirth was before 20 weeks, unknown, or more than one week prior to birth (n=12 pēpi in 2021).

Key Findings

- SGA is associated with both young and advanced maternal age, Māori and Pacific ethnicity, smoking, high BMI, and socioeconomic deprivation. These factors are not necessarily causative and are associated with each other.
- Smoking doubles the rate of SGA; and this can be prevented by supporting women to stop smoking, offering NRT (nicotine replacement therapy) and referral to Smokefree services.
- SGA is associated with increased stillbirth rates, and increased iatrogenic preterm birth.
- SGA is associated with increased admission to NICU and longer stays in NICU.
- There has been a statistically significant reduction in perinatal related mortality rate among SGA non-anomalous singleton pēpi born from 26 weeks gestation between 2008 and 2021 (chi square test for trend p=0.009) (Figure 33). Over the same time period there has been no change in perinatal mortality in AGA pēpi.
- Strategies to prevent SGA in a future pregnancy include modifying risk factors, such as smoking and weight reduction. Low dose aspirin should be prescribed from 12 weeks until at least 36 weeks (starting prior to 20 weeks).

Figure 5.5: Rates of SGA (customised) by demographic characteristics NWH 2021



*Missing data have been excluded

Table 5.4: Birthweight and gestation at birth among SGA, LGA and appropriately grown (AGA) babies excluding congenital abnormalities NWH 2021

	Customised Birthweight<10th%(SGA)		Customised Birthweight≥10th% & ≤90th%(AGA)		Customised Birthweight>90th%(LGA)	
	n	%	n	%	n	%
Total	849		5075		582	
Median birth weight(IQR) (g)	2665(2347-2905)		3380(3100-3660)		4065(3825-4340)	
Gestation at birth						
Term	654	77.0	4684	92.3	537	92.3
Preterm	195	23.0	391	7.7	45	7.7
Preterm <32 wks	65	7.7	102	2.2	8	1.4
Median gestation (IQR) weeks	**38(37-39)**		**39(38-40)**		**39(38-39)**	

SGA = small for gestational age, AGA = appropriate for gestational age, LGA = large for gestational age

Figure 5.6: Outcomes among SGA, LGA and AGA babies born preterm NWH 2021 (excluding congenital abnormalities)

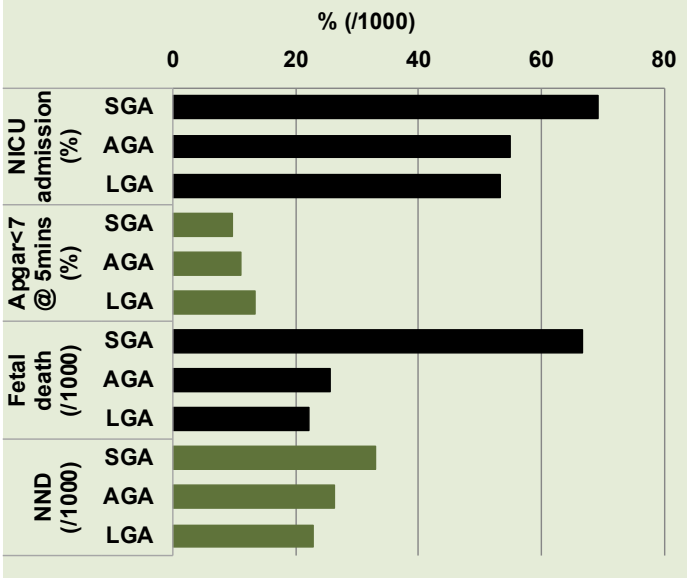


Figure 5.8: Outcomes among SGA, LGA and AGA babies born at term NWH 2021 (excluding congenital abnormalities)

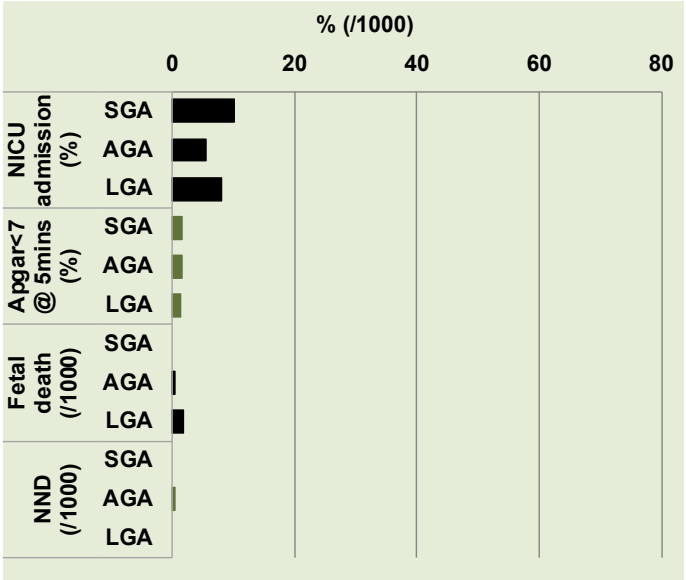
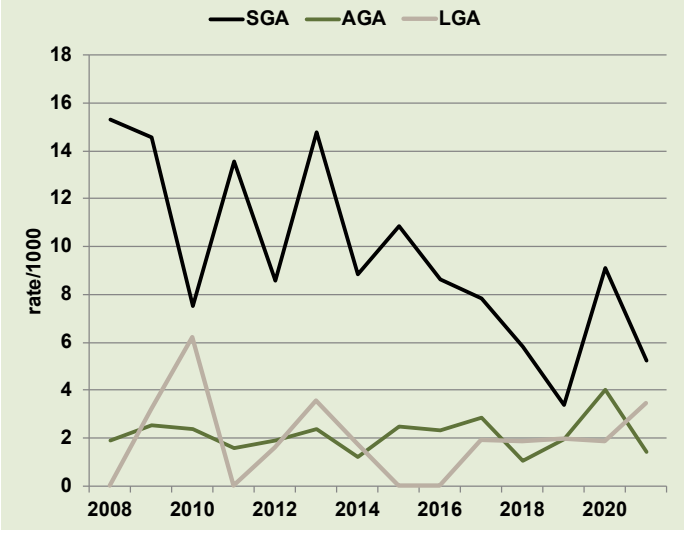


Figure 5.7: Perinatal related mortality rate (/1000 births) among SGA, AGA, and LGA singleton non-anomalous babies born at ≥26 weeks 2008-2021



5.2.1 Data Tables: Small and large for gestational age pēpi

Table 5.5: Rates of SGA and LGA as defined by customised birthweight centiles by demographic characteristics NWH 2021

	Total Babies	Customised Birthweight<10th%(SGA)		Customised Birthweight ≥10th% & ≤90th%(AGA)		Customised Birthweight>90th%(LGA)	
	N	n	%	n	%	n	%
Total	**6543**	**864**	**13.2**	**5090**	**77.8**	**589**	**9.0**
Maternal Age (yrs)							
≤20	112	17	15.2	88	78.6	7	6.3
21-25	503	91	18.1	373	74.2	39	7.8
26-30	1545	182	11.8	1236	80.0	127	8.2
31-35	2686	341	12.7	2082	77.5	263	9.8
36-40	1453	193	13.3	1130	77.8	130	8.9
>40	244	40	16.4	181	74.2	23	9.4
Ethnicity							
Māori	559	107	19.1	407	72.8	45	8.1
Pacific	696	110	15.8	514	73.9	72	10.3
Indian	809	100	12.4	628	77.6	81	10.0
Other Asian	1548	192	12.4	1227	79.3	129	8.3
MELAA	303	43	14.2	235	77.6	25	8.3
European	2598	307	11.8	2055	79.1	236	9.1
Parity							
Multipara	3302	428	13.0	2551	77.3	323	9.8
Primipara	3241	436	13.5	2539	78.3	266	8.2
Smoking at booking							
Currently smoking	277	78	28.2	186	67.1	13	4.7
Not smoking	6266	786	12.5	4904	78.3	576	9.2
BMI							
<18.5	180	23	12.8	143	79.4	14	7.8
18.5-24.99	3287	375	11.4	2618	79.6	294	8.9
25-29.99	1580	205	13.0	1228	77.7	147	9.3
30-34.99	765	130	17.0	573	74.9	62	8.1
35-39.99	364	69	19.0	257	70.6	38	10.4
≥40	305	50	16.4	223	73.1	32	10.5
Missing	62	12	19.4	48	77.4	2	3.2
Plurality							
Singleton	6365	796	12.5	4985	78.3	584	9.2
Multiple	178	68	38.2	105	59.0	5	2.8

Table 5.6: Onset of birth and neonatal outcomes among SGA, LGA and AGA pēpi born preterm NWH 2021 (excluding congenital abnormalities)

	Customised Birthweight<10th%(SGA)		Customised Birthweight ≥10th% & ≤90th%(AGA)		Customised Birthweight>90th%(LGA)	
	n= 195		n= 391		n= 45	
	n	%	n	%	n	%
Onset of birth						
Spontaneous preterm	52	26.7	242	61.9	28	62.2
Iatrogenic preterm	143	73.3	149	38.1	17	37.8
NICU admission						
Any stay	135	69.2	215	55.0	24	53.3
≥2 days in NICU	131	67.2	192	49.1	19	42.2
Apgar at 5 mins < 7	19	9.7	43	11.0	6	13.3
Fetal death (n/1000)	13	66.7	10	25.6	1	22.2
Neonatal death (n/1000 live births)	6	33.0	10	26.2	1	22.7

Table 5.7: Onset of birth and neonatal outcomes among SGA, LGA and AGA pēpi born at term NWH 2021 (excluding congenital abnormalities)

	Customised Birthweight<10th%(SGA)		Customised Birthweight ≥10th% & ≤90th%(AGA)		Customised Birthweight>90th%(LGA)	
	n= 654		n= 4684		n= 537	
	n	%	n	%	n	%
Onset of birth						
Spontaneous labour	178	27.2	1809	38.6	143	26.6
Induced labour	360	55.0	1911	40.8	211	39.3
Elective and Prelabour Emergency CS	116	17.7	964	20.6	183	34.1
NICU admission						
Any stay	66	10.1	259	5.5	43	8.0
≥2 days in NICU	43	6.6	131	2.8	26	4.8
Apgar at 5 mins < 7	10	1.5	69	1.5	7	1.3
Fetal death (n/1000)	0	0.0	2	0.4	1	1.9

5.3 Multiple Pregnancy

Dr Monique Stein

This section describes the characteristics and outcomes of mothers who gave birth to twins and triplets at NWH during 2021, and the outcomes of their pēpi. Our database does not yet enable us to differentiate between twins based on chorionicity and amnionicity.

Key Findings

- There has been a negative trend in the proportion of twin pregnancies birthed at NWH from 2010 (2.0%) to 2021 (1.4%).
- Perinatal mortality rate among pēpi in multiple pregnancies was five times that among singleton pēpi in 2021 (1:15 compared to 1:80).
- The main reasons for excess perinatal mortality were complications occurring in monochorionic twin pregnancies (Of the 9 pregnancies with a perinatal death, 8 were MCMA/MCDA twin pregnancies. Most of the deaths were related to twin to twin transfusion syndrome, cord entanglement or twin reverse arterial perfusion sequence).
- To some extent the differences in mortality rate reflect differences in reporting a case as a perinatal death. Four of the demised fetuses had a gestational age under 20 weeks, but were reported as a perinatal death because they were delivered after 20 weeks (7 babies died under 24 weeks).
- The rate of perinatal mortality has varied a great deal over the last 10 years and this probably reflects the small absolute numbers. There has been no significant change in perinatal mortality among twin pēpi born at NWH from 2010 to 2021.
- 77% of all women with multiple pregnancies were delivered by caesarean section. This percentage has remained stable over the past 10 years. The rate of caesarean section in spontaneous labour, or following induction of labour was 44%.
- The rate of preterm birth is high. 36% of babies from multiple pregnancies are born before 35 completed weeks of gestation, and 20% of twins are born at term. All MCDA twins are born prior to 37 weeks, because in uncomplicated MCDA twin pregnancies the recommended time for delivery is 36 weeks. The high preterm birth rate is the main reason for the high rate of NICU admission for ≥2 days. This rate is over five times higher in twins compared to singletons (42.7 vs 7.4%).

Figure 5.9: Twin perinatal mortality rate (per 1000 twin pēpe) NWH 1997-2021 with 95% confidence intervals

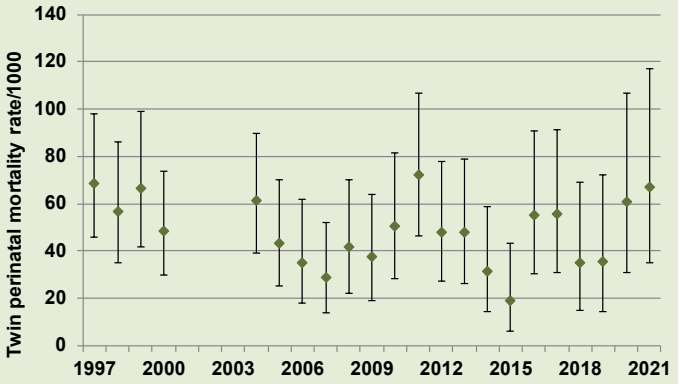


Figure 5.10: Caesarean section rate among twin births (2004-2021)

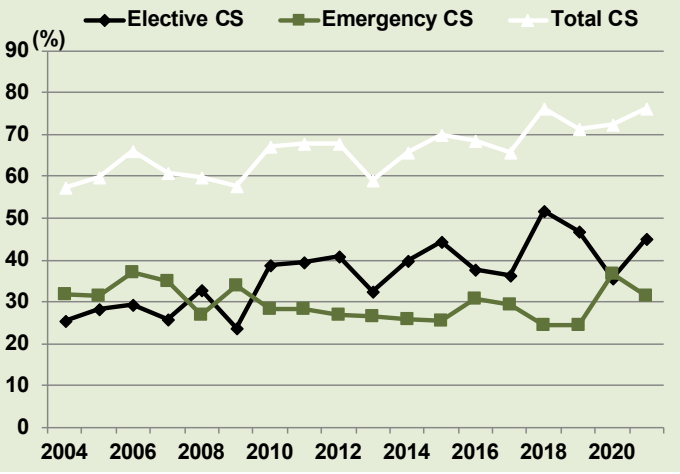


Table 5.8: Mode of onset of birth among twin pregnancies (mothers) by gestation at birth NWH 2021

	Preterm births		Term births	
	N= 71		N= 18	
	n	%	n	%
Mode of onset of birth				
CS elective	32	45.1	8	44.4
CS emergency before labour	13	18.3	0	0.0
Induction of labour	11	15.5	9	50.0
Sponaneous labour	15	21.1	1	5.6

Table 5.9: Perinatal-related deaths in twin pregnancies by gestation at birth NWH 2021

	Twin pregnancies			
	One twin died		Both twins died	
	n= 6		n= 6	
Gestation at birth (weeks)	n	Outcome	n	Outcome
20 – 23			4	2FD, 2ENND
24 – 27	2	2FD	2	2FD
28 – 31	2	2ENND		
32 – 36	2	2FD		
37 – 40	0			

FD=Fetal death; ENND=Early neonatal death; LNND=Late neonatal death. Table reflects timing of birth of demised baby rather than estimated time of death (estimated time of death in utero in brackets).

5.3.1 Data tables: Multiple pregnancy

Table 5.10: Multiple pregnancy rates NWH 2010-2021

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total number of multiple pregnancies	153	163	162	151	147	137	127	127	115	100	94	91
Incidence %	2	2.2	2.1	2.1	2	1.9	1.8	1.9	1.8	1.5	1.5	1.4
Number of twin pregnancies	149	159	156	147	143	133	127	126	114	98	90	89
Number of triplet pregnancies	4	4	6	4	4	4	0	1	1	2	4	2

Table 5.11: Fetal/neonatal outcomes of multiple pregnancies NWH 2010-2021

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total number of pēpe born in a multiple pregnancy	310	330	330	305	298	278	254	255	231	202	192	182
Incidence %	3.9	4.3	4.2	4.1	4	3.9	3.4	3.7	3.5	3	3	2.8
Number of multiple pregnancies where one or more pēpe died	13	17	11	10	8	5	13	12	8	6	10	9
Incidence % (no. of multiple pregnancies where a pēpe died/ number of multiple pregnancies)	8.5	10.4	6.8	6.6	5.4	3.6	10.2	9.4	7	6	10.6	9.8
Number of pēpe who died in a multiple pregnancy	16	26	18	16	10	6	15	16	11	7	13	12
Total number of pēpe born in a twin pregnancy	298	318	312	293	286	266	254	252	228	196	180	178
Twin perinatal deaths (<7 days)	15	23	15	14	9	5	14	14	8	7	11	12
Twin perinatal mortality rate*	50.3	72.3	48.1	47.8	31.5	18.8	55.1	55.6	35.1	35.7	61.1	67

*Perinatal twin deaths (<7 days)/1000 twin pēpe born

Table 5.12: Mode of birth among twin pregnancies NWH 2014-2021

	2014		2015		2016		2017		2018		2019		2020		2021	
	N=143		N=133		N=127		N=126		N=114		N=98		N=90		N= 89	
	N	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
SVB/vaginal breech both twins	36	25	34	26	33	26	31	25	17	15	22	22	22	24	18	20
SVB 1st twin, operative vaginal 2nd twin	5	3	2	2	2	2	1	1	1	1	1	1	1	1	0	0
Operative vaginal 1st twin, SVB 2nd twin	4	3	1	1	4	3	4	3	3	3	4	4	0		0	0
Operative vaginal birth both twins	4	3	2	2	3	2	7	6	6	5	1	1	2	2	2	2
SVB 1st twin, Caesarean section 2nd twin	3	2	2	2	2	2	2	2	2	2	2	2	0		1	1
Operative vaginal birth 1st twin, Caesarean section 2nd twin	0		1	1	0		0		0		1	1	0		1	1
CS elective both twins	57	40	59	44	48	38	46	37	59	52	46	47	32	36	40	45
CS emergency both twins	34	24	32	24	37	29	35	28	26	23	21	21	33	37	27	30

SVB = spontaneous vaginal birth
CS = caesarean section

Table 5.13: Fetal/newborn outcomes of live born singleton and twin babies NWH 2021

	Singleton babies			Twin babies		
	Total Singletons			Total Twins		
	N	n	%	N	n	%
Admission to NICU ≥2 days	6324	470	7.4%	171	73	42.7%
≤34 weeks	221	207	93.7%	54	51	94.4%
35-36	261	63	24.1%	80	21	26.3%
≥37 weeks	5842	200	3.4%	37	1	2.7%
Apgar<7 at 5 minutes	6324	152	2.4%	171	10	5.8%

5.4 Diabetes

Dr Stephanie Cox

The data in this section relate to wāhine with a diagnosis of pre-existing diabetes (Type 1 and 2), diabetes diagnosed for the first time in pregnancy and gestational diabetes, who birthed from 20 weeks' at NWH in 2021.

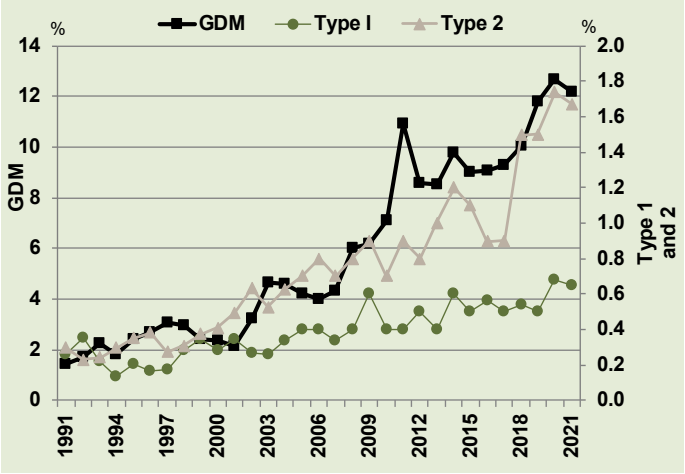
Key Findings

- Rates of GDM and type 2 diabetes continue to rise, reflecting increasing rates of type 2 diabetes in the community. Rates of type 1 diabetes have also been slowly increasing over the past 20-30 years. This may relate to increasing incidence of type 1 diabetes and/or women with type 1 diabetes having more pregnancies than in the past.
- Pacific and Māori wāhine remain under-represented in their rates of GDM.
- There has been a significant increase in Type 2 diabetes among wāhine birthing at NWH from 2006 to 2021. During 2020, the increase predominantly relates to an increase in Pacific wāhine.
- Rates of GDM and type 2 diabetes increase significantly with maternal age and BMI. At NWH, approximately 25% of wāhine over the age of 40 years, 30% of wāhine with BMI of 35-39.9kg/m2, and 36% of wāhine with BMI ≥40kg/m2 have GDM or type 2 diabetes.
- In wāhine with GDM, the LSCS rate has increased slightly after being stable for the past 3 years. The elective CS rate remains comparable to wāhine without diabetes. Rates of preeclampsia, preterm birth and admission to NICU, are similar to wāhine without diabetes.
- Pregnancy outcomes, for wāhine with type 1 and type 2 diabetes are similar to the past few years. They have significantly higher rates of LSCS, preeclampsia, preterm birth and NICU admissions than wāhine without diabetes, reflecting the higher risk nature of their condition, despite treatment. Wāhine with type 1 diabetes have the highest rate of LGA infants and wāhine with type 2 diabetes have the highest rate of SGA infants.
- Perinatal loss rates are similar to other years. Details are included within the report below. Several losses related to suboptimal engagement with the Maternity Diabetes Service.

Other comments

- We are currently awaiting publication of the GEMS trial, which has compared different glucose thresholds to diagnose GDM by 75g OGTT. These results will inform New Zealand whether we should consider reducing our diagnostic threshold for GDM to the IADPSG/WHO criteria or to continue with our current 2 hour threshold for diagnosis, but reduce our fasting threshold and add a 1 hour threshold. A reduction in fasting threshold will increase the rates of GDM especially in Māori and Pacific wāhine, and reduce the inequity in their diagnostic rates (currently lower than expected, based on their rates of type 2 diabetes), as they are more likely than other ethnic groups to be diagnosed with GDM on their fasting glucose result.
- The COVID pandemic impacted on both availability and uptake of diabetes screening. During Level 4 lockdown, we adopted the NZSSD* national recommendations for increased use of home glucose monitoring, to decrease laboratory visits for OGTTs. We also adapted our initial group teaching sessions into a Zoom format, which has proven popular and increased accessibility. We will therefore continue to offer this option going forwards.
- We are continuing to examine ways to improve access to care for our wāhine Māori as well as for other wāhine who struggle to engage with our service.

Figure 5.11: Prevalence of diabetes (% of all inborn and BBA births) NWH 1991-2021



*NZSSD = New Zealand society for the Study of Diabetes

5.4.1 Demographic characteristics of wāhine with diabetes NWH 2021

Figure 5.12: Incidence of diabetes by ethnic group NWH 2021

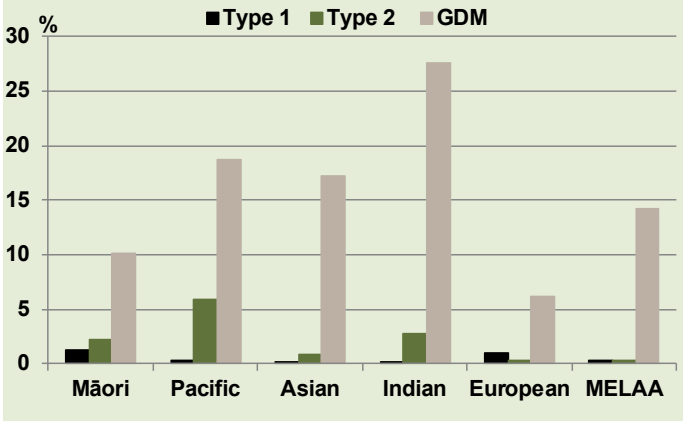


Figure 5.15: Incidence of diabetes by maternal BMI NWH 2021

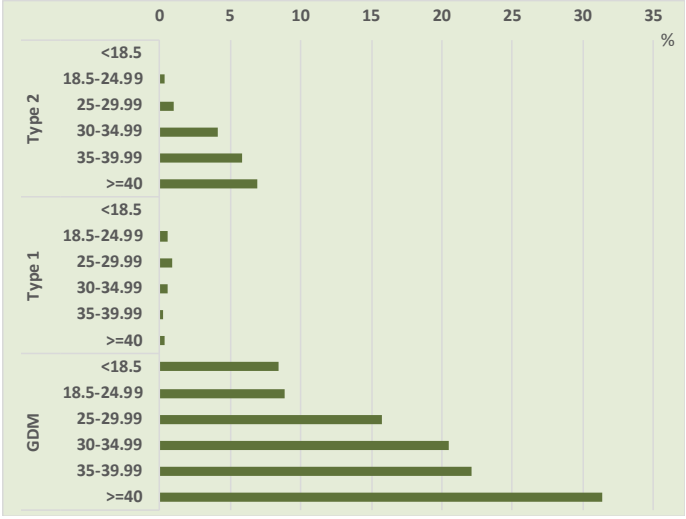
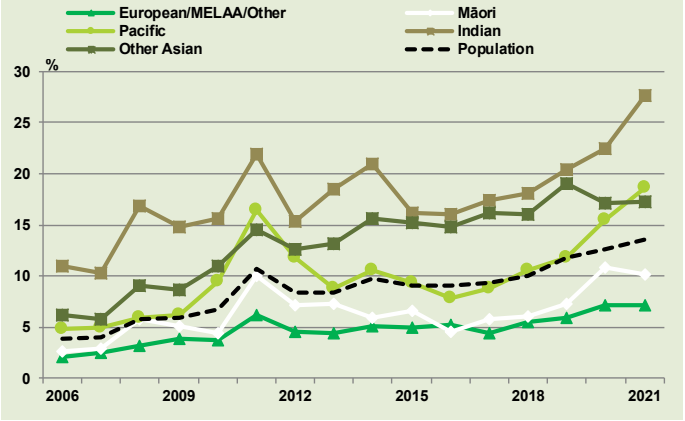


Figure 5.13: Annual trends in rate of Gestational Diabetes by ethnicity grouping and overall NWH 2006-2021



5.4.2 Maternal interventions and outcomes of pregnancies complicated by diabetes

Figure 5.16: Mode of birth among women with GDM NWH 1999-2021

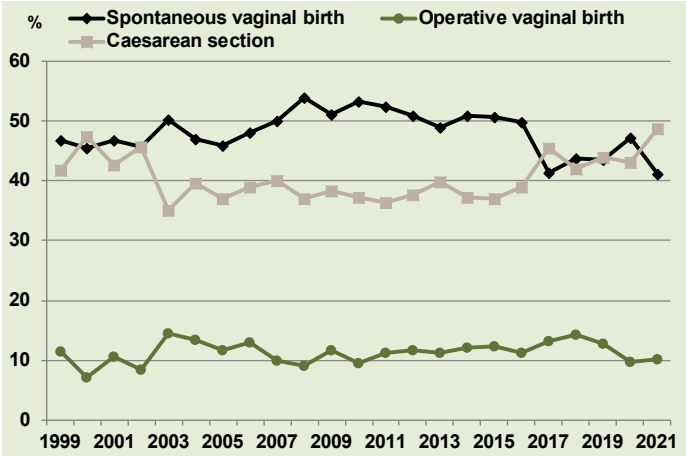


Figure 5.14: Annual trends in rate of Type 2 Diabetes by ethnicity grouping and overall NWH 2006-2021

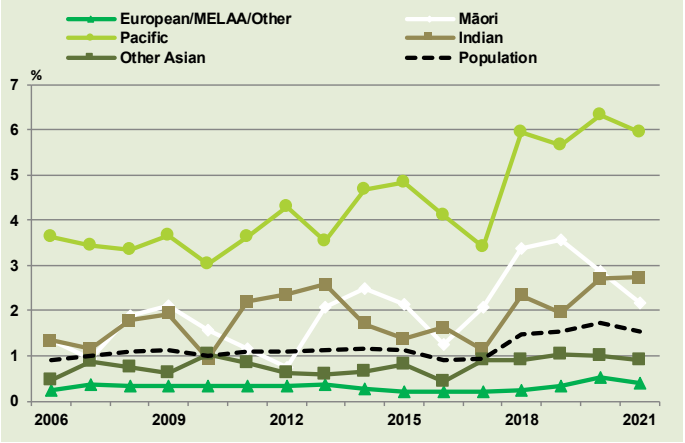


Figure 5.17: Mode of birth among women with GDM NWH 1999-2021

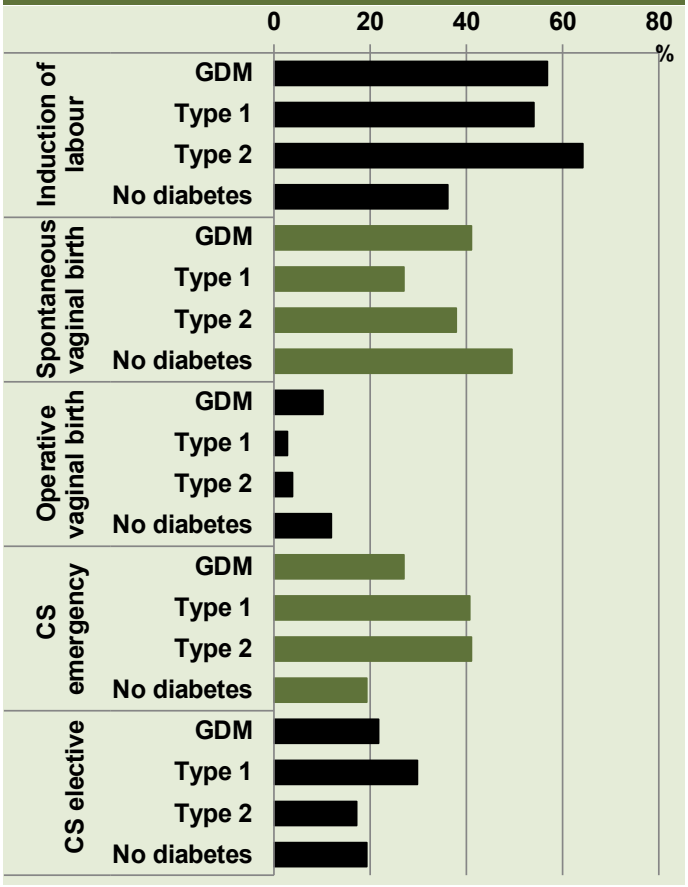
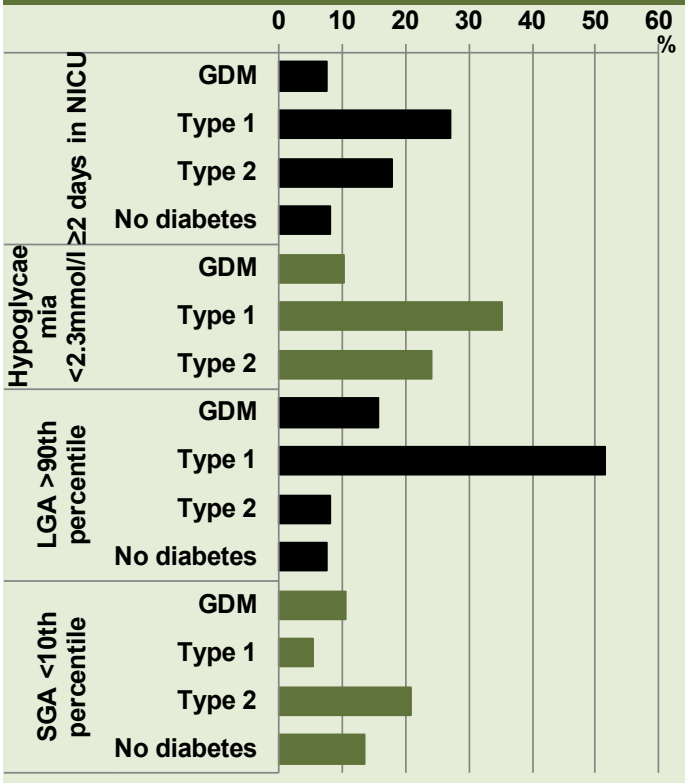


Figure 5.18: Neonatal outcomes among women with GDM NWH 1999-2021



5.4.3 Perinatal Losses

There were 7 perinatal losses among women with diabetes in pregnancy in 2021, 6 early neonatal deaths and 1 TOP at 21 weeks.

Only 1 of the early neonatal losses was potentially attributable to Diabetes, in a baby with severe congenital heart disease, born to a mother with pre-existing Type 1 Diabetes, who died shortly after birth. That these cases continue to occur emphasizes the importance of pre-pregnancy counseling and preparation for women with pre-existing diabetes. This relies on general practice and general diabetes services to counsel wāhine with diabetes on the importance of planned pregnancy and tight glycaemic control during organogenesis, referral to specialist services for pre-pregnancy counseling and optimization, and the availability of these services. While we offer specialist pre-pregnancy services at ADHB, many DHBs around the country do not, and this particular patient was transferred to ADHB at a late gestation having had diabetes care before and during pregnancy in a different DHB.

Of the other 5 early neonatal losses, 2 were of babies with lethal genetic conditions not related to diabetes, with a further infant with a suspected genetic syndrome awaiting laboratory confirmation. 2 were of babies with major congenital heart disease in women with GDM, one of whom developed GDM after the diagnosis of CHD, and one of whom had a background of mild pre-diabetes.

There was 1 TOP at 21 weeks for severe spina bifida in a wāhine with gestational diabetes on a background of pre-diabetes.

5.4.4 Data Tables: Diabetes

Table 5.14: Wāhine with diabetes birthing at NWH at or beyond 20 weeks gestation 2009-2021

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Type I	47	30	33	40	29	42	34	41	33	35	31	42	37
Type 2	71	55	70	64	69	86	78	65	65	96	104	108	100
GDM	480	545	821	662	613	725	626	655	637	651	794	787	878

Table 5.15: Perinatal related deaths (2009 – 2021) among births complicated by diabetes

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total number of perinatal related losses	4	10	5	10	6	9	6	8	9	13	9	9	7
Perinatal related loss rate /1000	7	16	5	13	16	11	8	10	12	16	10	9	7

Table 5.16: Demographic characteristics of wāhine with diabetes NWH 2021

	N	Type 1		Type 2		GDM		No Diabetes	
		n= 37		n= 100		n= 878		n= 5447	
		n	%	n	%	n	%	n	%
Age (yrs)									
≤20	111	0	0.0	2	1.8	5	4.5	104	93.7
21-25	496	7	1.4	9	1.8	42	8.5	438	88.3
26-30	1530	7	0.5	16	1.0	193	12.6	1314	85.9
31-35	2648	14	0.5	34	1.3	354	13.4	2246	84.8
36-40	1435	8	0.6	31	2.2	244	17.0	1152	80.3
41+	242	1	0.4	8	3.3	40	16.5	193	79.8
Ethnicity									
Māori	550	7	1.3	12	2.2	56	10.2	475	86.4
Pacific	690	2	0.3	41	5.9	129	18.7	518	75.1
Asian	1531	1	0.1	14	0.9	264	17.2	1252	81.8
Indian	804	1	0.1	22	2.7	222	27.6	559	69.5
European	2556	25	1.0	10	0.4	158	6.2	2363	92.4
MELAA	302	1	0.3	1	0.3	43	14.2	257	85.1
Other/not stated	29	0	0.0	0	0.0	6	20.7	23	79.3
BMI									
<18.5	178	0	0.0	0	0.0	15	8.4	163	91.6
18.5-24.99	3254	17	0.5	12	0.4	289	8.9	2936	90.2
25-29.99	1553	14	0.9	15	1.0	244	15.7	1280	82.4
30-34.99	751	4	0.5	31	4.1	154	20.5	562	74.8
35-39.99	362	1	0.3	21	5.8	80	22.1	260	71.8
≥40	303	1	0.3	21	6.9	95	31.4	186	61.4
Missing	61	0	0.0	0	0.0	1	1.6	60	98.4
Smoking									
Smoking at booking	273	3	1.1	7	2.6	27	9.9	236	86.4
Not currently smoking	6189	34	0.5	93	1.5	851	13.8	5211	84.2

Table 5.17: DHB of domicile of wāhine with diabetes birthing at NWH 2021									
DHB	N	Type 1		Type 2		GDM		No Diabetes	
		n= 37		n= 100		n= 878		n= 5447	
		n	%	n	%	n	%	n	%
Auckland	4274	6	0.1	44	1.0	585	13.7	3639	85.1
Waitematā	917	21	2.3	43	4.7	107	11.7	746	81.4
Counties Manukau	1111	4	0.4	9	0.8	168	15.1	930	83.7
Other	160	6	3.8	4	2.5	18	11.3	132	82.5

Table 5.18: Maternal outcome among wāhine with diabetes NWH 2021									
	Type 1		Type 2		GDM		No diabetes		
	n= 37		n= 100		n= 878		n= 5447		
	n	%	n	%	n	%	n	%	
Pre-eclampsia*	1	2.7	17	17.0	34	3.9	193	3.5	
Induction of labour	20	54.1	64	64.0	497	56.6	1962	36.0	
Mode of Birth									
Spontaneous vaginal birth	10	27.0	38	38.0	361	41.1	2686	49.3	
Ventouse	1	2.7	3	3.0	59	6.7	382	7.0	
Forceps	0	0.0	1	1.0	30	3.4	268	4.9	
CS emergency	15	40.5	41	41.0	236	26.9	1059	19.4	
CS elective	11	29.7	17	17.0	192	21.9	1052	19.3	
Gestation at birth									
<32 weeks	0	0.0	4	4.0	17	1.9	159	2.9	
<37 weeks	12	32.4	14	14.0	86	9.8	485	8.9	
PPH ≥ 500mls	22	59.5	52	52.0	404	46.0	1917	35.2	
PPH ≥1000 mls	11	29.7	19	19.0	121	13.8	577	10.6	
Postpartum transfusion	3	8.1	7	7.0	33	3.8	177	3.2	

*Include pre-eclampsia and pre-eclampsia super-imposed on chronic hypertension

Table 5.19: Rates of postnatal glucose tolerance testing (GTT/HbA1c) among wāhine with GDM NWH 2013-2021

	2013		2014		2015		2016		2017		2018		2019		2020		2021	
	N=613		N=725		N=626		N=655		N=637		N=651		N=784		N=787		N=878	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Postnatal GTT/ HbA1c	328	54	361	50	286	46	375	57	400	63	368	57	466	59	438	56	385	44
No post-natal GTT/HbA1c	285	46	364	50	340	54	280	43	237	37	283	43	318	41	349	44	493	56

Table 5.20: Neonatal outcomes among babies of women with diabetes NWH 2021

	Type 1		Type2		GDM		No diabetes	
	n= 37		n= 100		n= 889		n= 5527	
	n	%	n	%	n	%	n	%
Birthweight (Median(IQR)	3510(2805-3862)		3193(2824-3533)		3205(2900-3530)		3345(2980-3690)	
<1500g	0	0.0	4	4.0	16	1.8	169	3.1
<2500g	4	10.8	14	14.0	68	7.6	475	8.6
SGA <10th percentile	2	5.4	21	21.0	95	10.7	746	13.5
LGA >90th percentile	18	48.6	8	8.0	139	15.6	424	7.7
Admission to NICU								
Any admission	16	43.2	24	24.0	83	9.3	629	11.4
≥2 days in NICU	10	27.0	18	18.0	67	7.5	451	8.2
Hypoglycaemia < 2.3 mmol/l	13	35.1	24	24.0	91	10.2	0	0.0
Hypoglycaemia 2.3 - 2.6 mmol/l	6	16.2	11	11.0	143	16.1	1	0.0
IV Dextrose	10	27.0	11	11.0	35	3.9	0	0.0
Perinatal related losses (/1000)	1	27.0	1	10.0	5	5.6	85	15.4

5.5 Antepartum Haemorrhage

Dr Meghan Hill

Antepartum haemorrhage has been defined here to include vaginal bleeding from any cause at or beyond 20 weeks gestation, during pregnancy and labour, and includes placenta praevia without bleeding. While bleeding before 20 weeks is also important we do not routinely collect these data.

Data cleaning includes reconciling antenatal summary data, intrapartum complication data, risk sheet data, and indications for induction and operative birth. Data were also reconciled with discharge coding data.

Key findings

- The incidence of antepartum haemorrhage has remained stable over the past 5 years at approximately 6% of pregnancies.
- There is an overall trend towards an increase in the rate of antepartum haemorrhage since 2006. This may indicate a true increase in the incidence over time due to increasing comorbidities in pregnancy or alternatively may reflect better reporting.
- Placental abruption and to a lesser extent placenta previa represent major risk factors for preterm birth, NICU admission and perinatal death.
- Placental abruption had the strongest association with perinatal death at 125/1000 pregnancies.
- Women who were diagnosed with placenta previa or placental abruption were highly likely to have a caesarean, with a large percentage requiring an emergency caesarean. Transfusions were also 5-6x more likely in women with praevia or abruption as compared to women who did not experience an APH.

Table 5.21: Antepartum haemorrhage incidence NWH 2016-2021

	2016	2017	2018	2019	2020	2021
Total APH	445	533	480	500	458	490
Incidence %	6.1	7.8	7.4	7.5	7.4	7.6
Proven abruption	44	38*	43*	51*	38*	40*
Proven placenta praevia	69	50	68	50	59	68
APH (uncertain origin)	332	445	369	399	361	382

*Women who had both placenta praevia and placenta abruption are represented under abruption only

Figure 5.19: Antepartum haemorrhage (abruption and unspecified) incidence by ethnicity NWH 2006-2021

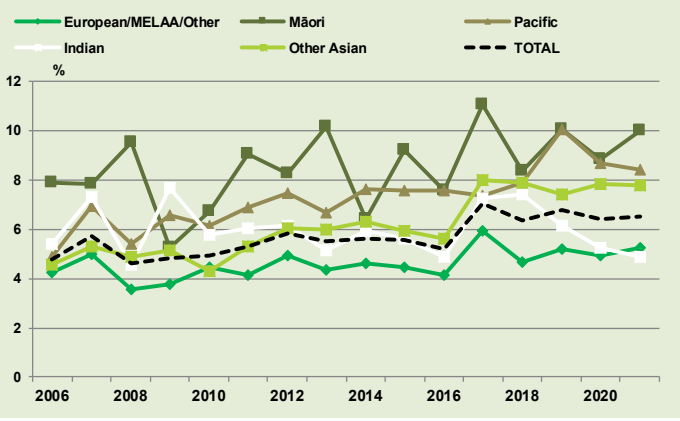


Figure 5.20: Neonatal outcomes among pregnancies complicated by antepartum haemorrhage NWH 2021

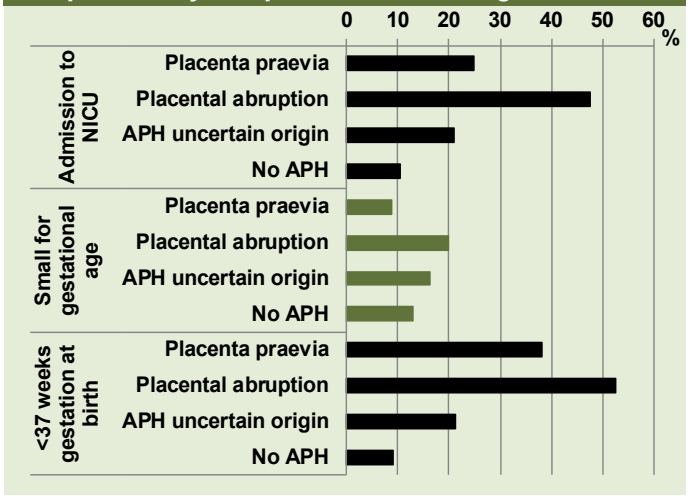
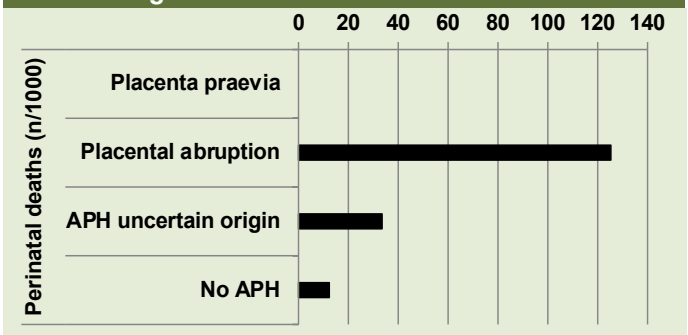


Figure 5.21: Perinatal related deaths (n/1000) among pregnancies complicated by antepartum haemorrhage NWH 2021



5.5.1 Data tables: Antepartum haemorrhage

Table 5.22: Antepartum haemorrhage incidence NWH 2008-2021

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total APH	424	438	438	455	511	460	469	456	445	533	480	500	458	490
Incidence %	5.6	5.7	5.7	6	6.6	6.4	6.3	6.6	6.1	7.8	7.4	7.5	7.4	7.6
Proven abruption	36	39	50	54	47	50	37	35	44	38*	43*	51*	38*	40*
Proven placenta praevia	73	66	58	60	63	66	54	69	69	50	68	50	59	68
APH (uncertain origin)	315	333	330	341	401	344	378	352	332	445	369	399	361	382

*Women who had both placenta praevia and placenta abruption are represented under abruption only

Table 5.23: Maternal outcomes of pregnancies complicated by antepartum haemorrhage NWH 2021

	Placenta praevia		Placental abruption		APH uncertain		No APH	
	n= 68		n= 40		n= 382		n= 5972	
	n	%	n	%	n	%	n	%
Mode of birth								
Spontaneous vaginal	3	4.41	12	30.0	180	47.1	2900	48.6
Operative vaginal	0	0.00	4	10.0	45	11.8	695	11.6
CS elective	47	69.1	3	7.5	62	16.2	1160	19.4
CS emergency	18	26.5	21	52.5	95	24.9	1217	20.4
Maternal transfusion	12	17.6	6	15.0	25	6.5	177	3.0

Table 5.24: Fetal/Neonatal outcomes of pregnancies complicated by antepartum haemorrhage NWH 2021

	Placenta praevia		Placental abruption		APH uncertain origin		No APH	
	n= 68		n= 40		n= 388		n= 6057	
	n	%	n	%	n	%	n	%
Gestation at birth								
<37 weeks	26	38.2	21	52.5	82	21.1	541	8.9
<32 weeks	8	11.8	14	35.0	36	9.3	142	2.3
Birthweight								
Median(IQR)	3090 (2610-3515)		2438 (1375-3140)		3140 (2660-3550)		3340 (2990-3680)	
<2500g	16	23.5	20	50.0	73	18.8	452	7.5
<1500g	3	4.4	12	30.0	36	9.3	138	2.3
Small for gestation age	6	8.8	8	20.0	63	16.2	787	13.0
Perinatal deaths (n/1000)	0	0.0	5	125.0	13	33.5	73	12.1
Admission to NICU	17	25.0	19	47.5	81	20.9	635	10.5
≥2 days in NICU	16	23.5	16	40.0	62	16.0	452	7.5

*Women who had both placenta praevia and placental abruption are represented under abruption only

Table 5.25: Characteristics of pregnancies complicated by antepartum haemorrhage NWH 2021

		Placenta praevia		Placental abruption*		APH uncertain origin		No APH	
		n=	68	n=	40	n=	382	n=	5972
	Total	n	%	n	%	n	%	n	%
Ethnicity									
Māori	550	2	0.4	8	1.5	47	8.5	493	89.6
Pacific	690	8	1.2	7	1.0	51	7.4	624	90.4
Asian	1531	20	1.3	7	0.5	112	7.3	1392	90.9
Indian	804	12	1.5	2	0.2	37	4.6	753	93.7
MELAA	302	2	0.7	0	0.0	22	7.3	278	92.1
European	2556	24	0.9	16	0.6	111	4.3	2405	94.1
Other/not stated	29	0	0.0	0	0.0	2	6.9	27	93.1
Maternal age (yrs)									
≤20	111	2	1.8	0	0.0	12	10.8	97	87.4
21-25	496	2	0.4	5	1.0	32	6.5	457	92.1
26-30	1530	13	0.8	5	0.3	101	6.6	1411	92.2
31-35	2648	25	0.9	12	0.5	140	5.3	2471	93.3
36-40	1435	20	1.4	17	1.2	87	6.1	1311	91.4
>40	242	6	2.5	1	0.4	10	4.1	225	93.0
Parity									
Nulliparous	3204	34	1.1	17	0.5	194	6.1	2959	92.4
Multip previous CS	1179	15	1.3	12	1.0	66	5.6	1086	92.1
Mullip no previous CS	2079	19	0.9	11	0.5	122	5.9	1927	92.7
Mutiple pregnancy									
Multiple	91	0	0.0	0	0.0	6	6.6	85	93.4
Singleton	6371	68	1.1	40	0.6	376	5.9	5887	92.4
Smoking status at booking									
Currently smoking	273	0	0.0	3	1.1	23	8.4	247	90.5
Not currently smoking	6189	68	1.1	37	0.6	359	5.8	5725	92.5
BMI									
<18.5	178	2	1.1	0	0.0	10	5.6	166	93.3
18.5-24.99	3254	32	1.0	19	0.6	188	5.8	3015	92.7
25-29.99	1553	21	1.4	11	0.7	81	5.2	1440	92.7
30-34.99	751	7	0.9	3	0.4	48	6.4	693	92.3
35-39.99	362	3	0.8	3	0.8	29	8.0	327	90.3
≥40	303	2	0.7	3	1.0	18	5.9	280	92.4
Missing	61	1	1.6	1	1.6	8	13.1	51	83.6
Hypertensive disease									
Gestational hypertension	252	3	1.2	2	0.8	14	5.6	233	92.5
Chronic hypertension	117	3	2.6	1	0.9	11	9.4	102	87.2
Chronic hypertension with superimposed preeclampsia	28	0	0.0	0	0.0	1	3.6	27	96.4
Preeclampsia	217	2	0.9	3	1.4	15	6.9	197	90.8
Nil	5848	60	1.0	34	0.6	341	5.8	5413	92.6

*Women who had both placenta praevia and placental abruption are represented under abruption only
MELAA = Middle Eastern, Latin American, or African

5.6 Hypertensive Disease

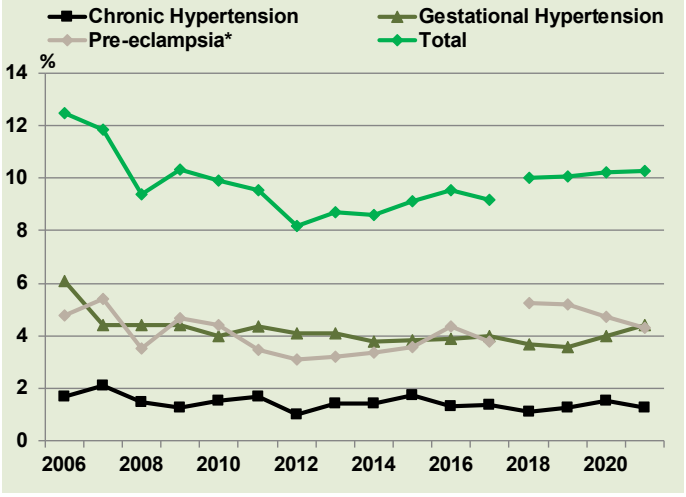
In 2018 the definition of preeclampsia in pregnancy was updated based on a revised statement from the International Society for the Study of Hypertension in Pregnancy (ISSHP).

For new definitions please see Appendix 3 - Definitions. Checking hypertension data involves reconciling data from booking history, the risk sheet, indication for induction and operative birth, reason for admission to the ward or to the Maternity Complex Care Unit, data collected at the time of birth, and ICD10 coded data.

Key Findings

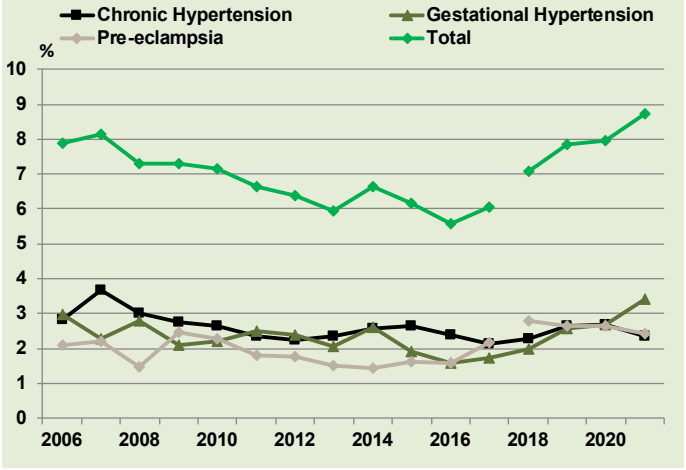
- A diagnosis of hypertension in pregnancy was made in 9.5% of women birthing at NWH in 2021 (10.3% among nulliparous and 8.7% among multiparous women)
- The rate of hypertensive disease in pregnancy overall has increased among multiparous women but remained unchanged among nulliparous women since the definition change in 2018
- Both chronic and pregnancy induced hypertension are less common among European and Asian women compared to Māori and Pacific women. The difference in pregnancy-induced hypertension is consistent over time suggesting there may be inequity in provision of preventive treatment to Māori and Pacific women
- There are no statistically significant differences in preterm birth, SGA, and admission to NICU by ethnicity among birthing parents with pre-eclampsia at NWH; however perinatal mortality among babies of non-Pacific non-Māori mothers was lower than that for both Māori and Pacific, again suggesting that there may be inequity in access to, or provision of, care.

Figure 5.22: Rate of hypertensive disease in nulliparous women NWH 2006-2021



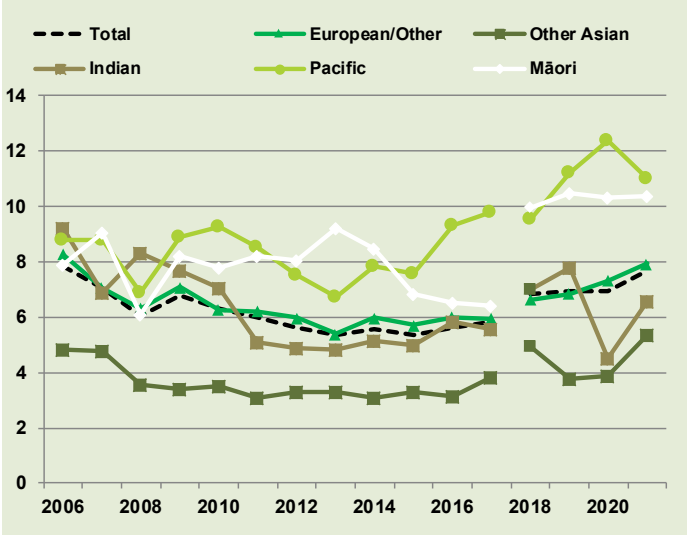
*preeclampsia includes eclampsia and superimposed pre-eclampsia
The rates of preeclampsia and total hypertensive disease have been disconnected in 2018 because of a change in definition of preeclampsia

Figure 5.23: Rate of hypertensive disease in multiparous women NWH 2006-2021



*preeclampsia includes eclampsia and superimposed pre-eclampsia
The rates of preeclampsia and total hypertensive disease have been disconnected in 2018 because of a change in definition of preeclampsia

Figure 5.24: Rate of pregnancy induced hypertension by ethnic grouping NWH 2006-2021



*The rates of total hypertensive disease have been disconnected in 2018 due to a change in definition of preeclampsia

Figure 5.25: Rate of chronic hypertension in pregnancy by ethnic grouping NWH 2006-2021

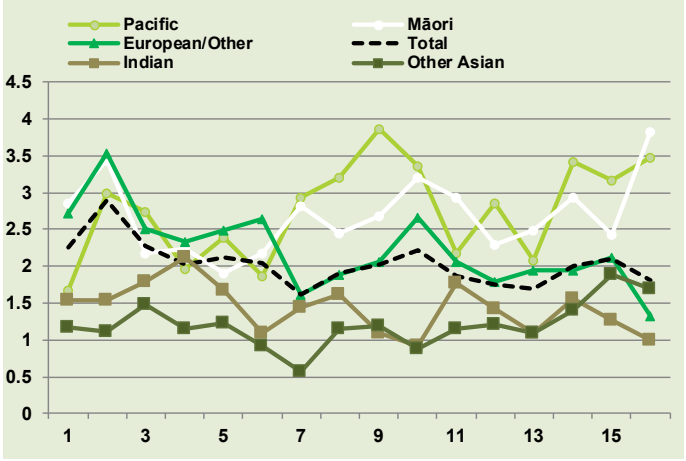
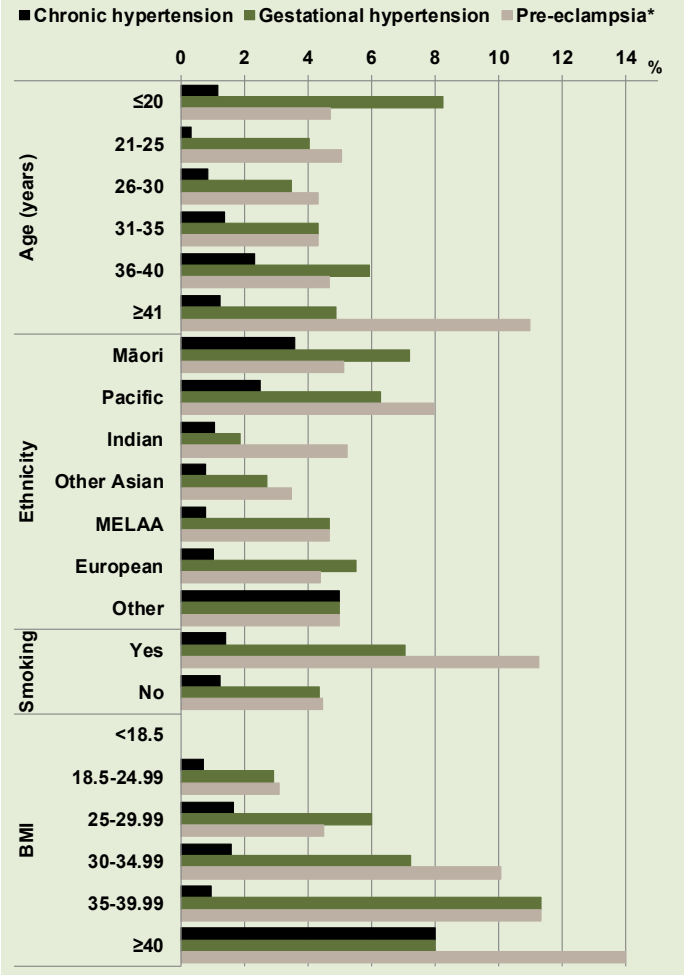


Table 5.26: Hypertensive disease in pregnancy by parity NWH 2021

	All wāhine		Nullipara		Multipara	
	n= 6462		n= 3204		n= 3258	
	n	%	n	%	n	%
Any hypertensive disease	614	9.5	329	10.3	285	8.7
Gestational hypertension	252	3.9	141	4.4	111	3.4
Chronic hypertension	117	1.8	40	1.2	77	2.4
Superimposed pre-eclampsia	28	0.4	10	0.3	18	0.6
Pre-eclampsia	217	3.4	138	4.3	79	2.4

Figure 5.27: Rates of hypertensive disease by demographic characteristics among nulliparous women NWH 2021



*preeclampsia includes super-imposed preeclampsia and eclampsia

Figure 5.28: Rates of hypertensive disease by demographic characteristics among multiparous women NWH 2021

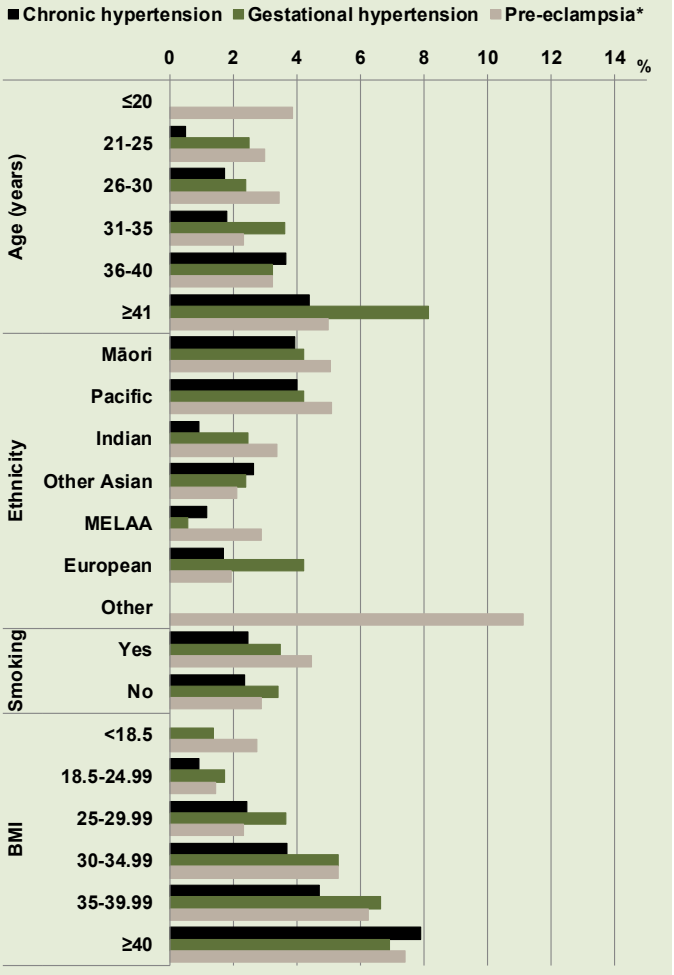
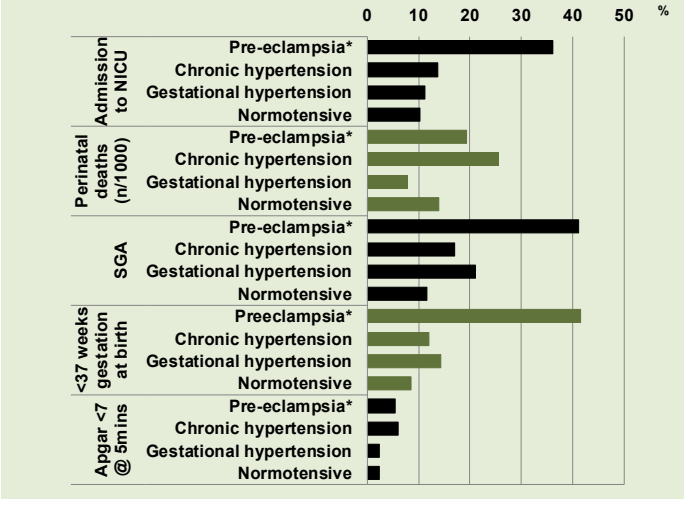
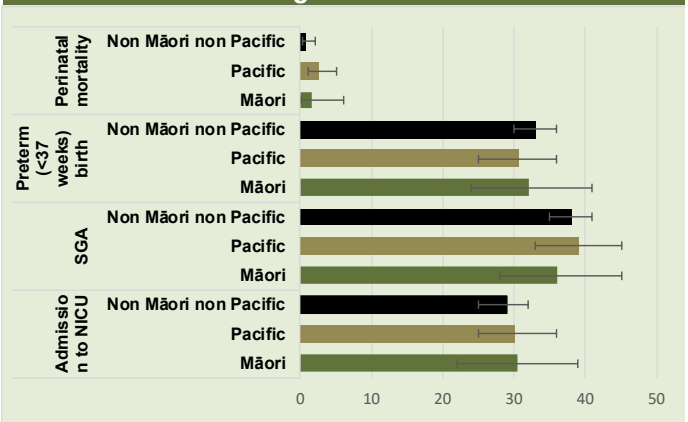


Figure 5.26: Perinatal outcomes and hypertensive disease in babies NWH 2021



*preeclampsia includes superimposed preeclampsia and eclampsia

Figure 5.29: Perinatal outcomes among pēpi of Māori mothers with pre-eclampsia birthing at NWH and who reside in ADHB region 2012-2021



5.6.1 Data tables: Hypertensive disease

Table 5.27: Demographic characteristics of nulliparous wāhine with hypertensive disease NWH 2021

	Total	Gestational hypertension		Chronic hypertension		Superimposed preeclampsia		Preeclampsia		Normotensive	
	3204	n=	141	n=	40	n=	10	n=	138	n=	2875
	N	n	%	n	%	n	%	n	%	n	%
Ethnicity (Prioritised)											
Māori	195	14	7.2	7	3.6	1	0.5	9	4.6	164	84.1
Pacific	239	15	6.3	6	2.5	2	0.8	17	7.1	199	83.3
Asian	777	21	2.7	6	0.8	1	0.1	26	3.3	723	93.1
Indian	479	9	1.9	5	1.0	2	0.4	23	4.8	440	91.9
MELAA	129	6	4.7	1	0.8	0	0.0	6	4.7	116	89.9
European	1365	75	5.5	14	1.0	4	0.3	56	4.1	1216	89.1
Other/not stated	20	1	5.0	1	5.0	0	0.0	1	5.0	17	85.0
Maternal age											
≤20	85	7	8.2	1	1.2	0	0.0	4	4.7	73	85.9
21-25	296	12	4.1	1	0.3	1	0.3	14	4.7	268	90.5
26-30	948	33	3.5	8	0.8	2	0.2	39	4.1	866	91.4
31-35	1320	57	4.3	18	1.4	3	0.2	54	4.1	1188	90.0
36-40	473	28	5.9	11	2.3	4	0.8	18	3.8	412	87.1
≥40	82	4	4.9	1	1.2	0	0.0	9	11.0	68	82.9
Smoking											
Yes	71	5	7.0	1	1.4	1	1.4	7	9.9	57	80.3
Not currently smoking	3133	136	4.3	39	1.2	9	0.3	131	4.2	2818	89.9
BMI											
<18.5	105	0	0.0	0	0.0	0	0.0	0	0.0	105	100.0
18.5-24.99	1815	53	2.9	13	0.7	0	0.0	56	3.1	1693	93.3
25-29.99	732	44	6.0	12	1.6	2	0.3	31	4.2	643	87.8
30-34.99	318	23	7.2	5	1.6	5	1.6	27	8.5	258	81.1
35-39.99	106	12	11.3	2	1.9	1	0.9	11	10.4	80	75.5
≥40	100	8	8.0	8	8.0	2	2.0	12	12.0	70	70.0
Missing	28	1	3.6	0	0.0	0	0.0	1	3.6	26	92.9

Table 5.28: Demographic characteristics of multiparous wāhine with hypertensive disease NWH 2021

	Total	Gestational hypertension		Chronic hypertension		Superimposed preeclampsia		Preeclampsia		Normotensive	
	3258	n=	111	n=	77	n=	18	n=	79	n=	2973
	N	n	%	n	%	n	%	n	%	n	%
Ethnicity (Prioritised)											
Māori	355	15	4.2	14	3.9	8	2.3	10	2.8	308	86.8
Pacific	451	19	4.2	18	4.0	6	1.3	17	3.8	391	86.7
Asian	754	18	2.4	20	2.7	1	0.1	15	2.0	700	92.8
Indian	325	8	2.5	3	0.9	0	0.0	11	3.4	303	93.2
MELAA	173	1	0.6	2	1.2	1	0.6	4	2.3	165	95.4
European	1191	50	4.2	20	1.7	2	0.2	21	1.8	1098	92.2
Other/not stated	9	0	0.0	0	0.0	0	0.0	1	11.1	8	88.9
Maternal Age (years)											
≤20	26	0	0.0	0	0.0	0	0.0	1	3.8	25	96.2
21-25	200	5	2.5	1	0.5	1	0.5	5	2.5	188	94.0
26-30	582	14	2.4	10	1.7	3	0.5	17	2.9	538	92.4
31-35	1328	48	3.6	24	1.8	4	0.3	27	2.0	1225	92.2
36-40	962	31	3.2	35	3.6	5	0.5	26	2.7	865	89.9
Smoking											
Yes	202	7	3.5	5	2.5	3	1.5	6	3.0	181	89.6
Not currently smoking	3056	104	3.4	72	2.4	15	0.5	73	2.4	2792	91.4
BMI											
<18.5	73	1	1.4	0	0.0	0	0.0	2	2.7	70	95.9
18.5-24.99	1439	25	1.7	13	0.9	4	0.3	17	1.2	1380	95.9
25-29.99	821	30	3.7	20	2.4	1	0.1	18	2.2	752	91.6
30-34.99	433	23	5.3	16	3.7	6	1.4	17	3.9	371	85.7
35-39.99	256	17	6.6	12	4.7	3	1.2	13	5.1	211	82.4
≥40	203	14	6.9	16	7.9	4	2.0	11	5.4	158	77.8
Missing	33	1	3.0	0	0.0	0	0.0	1	3.0	31	93.9

Table 5.29: Onset and mode of birth among wāhine with hypertensive disease NWH 2021

	Gestational hypertension		Chronic hypertension		Superimposed pre-eclampsia		Pre-eclampsia		Normotensive	
	n=	252	n=	117	n=	28	n=	217	n=	5848
	n	%	n	%	n	%	n	%	n	%
Spontaneous onset of labour	35	13.9	14	12.0	2	7.1	16	7.4	2305	39.4
Induced labour	158	62.7	62	53.0	8	28.6	117	53.9	2223	38.0
CS emergency before onset of labour	12	4.8	8	6.8	10	35.7	53	24.4	167	2.9
CS elective	47	18.7	33	28.2	8	28.6	31	14.3	1153	19.7
Mode of birth										
Spontaneous vaginal	100	39.7	42	35.9	5	17.9	69	31.8	2879	49.2
Operative vaginal	23	9.1	8	6.8	1	3.6	19	8.8	693	11.9
CS elective	47	18.7	33	28.2	8	28.6	31	14.3	1153	19.7
CS emergency	82	32.5	34	29.1	14	50.0	98	45.2	1123	19.2
Epidural	152	60.3	67	57.3	15	53.6	102	47.0	3009	51.5
General anaesthetic	4	1.6	6	5.1	3	10.7	14	6.5	159	2.7

Table 5.30: Perinatal outcomes and hypertensive disease (babies) NWH 2021

	Gestational hypertension		Chronic hypertension		Superimposed pre-eclampsia		Pre-eclampsia		Normotensive	
	n=	257	n=	117	n=	29	n=	229	n=	5920
	n	%	n	%	n	%	n	%	n	%
Gestation at birth										
<37 weeks	37	14.4	14	12.0	16	55.2	91	39.7	511	8.6
<32 weeks	4	1.6	7	6.0	10	34.5	23	10.0	156	2.6
SGA	54	21.0	20	17.1	16	55.2	90	39.3	683	11.5
NICU Admission	29	11.3	16	13.7	14	48.3	79	34.5	614	10.4
≥2 days in NICU	23	8.9	14	12.0	14	48.3	64	27.9	431	7.3
Apgar <7 at 5 minutes	6	2.3	7	6.0	2	6.9	12	5.2	136	2.3
Perinatal deaths (n/1000)	2	7.8	3	25.6	1	34.5	4	17.5	82	13.9

5.7 Body Mass Index (BMI)

Dr Astrid Budden

BMI is calculated as weight (kg) divided by height (m) squared. Weight used for this calculation is the first recorded weight in pregnancy. Out of range heights and weights are checked for accuracy.

Key Findings

- There has been a statistically significant increase in BMI since 2014, with a significant increase in BMI≥25 and ≥35 (p<0.0001 score test for trend)
- There has been a significant increase in BMI among Māori and Pacific, Asian, and European wāhine (see Chapter 4).
- Higher rates of obesity are seen in younger pregnant wāhine at NWH, although the association between age and obesity is due to the associations between both ethnicity and socioeconomic status and BMI (see Chapter 4).
- Overweight and obese wāhine are more likely to be under primary care of core hospital midwifery teams (i.e. NWH Community midwifery, diabetes and MFM teams) than self-employed midwives or private obstetricians.
- Rates of hypertensive disease in pregnancy and diabetes increase progressively with increasing BMI.
- After both vaginal and Caesarean birth, rates of postpartum haemorrhage increase with increasing BMI.

Figure 5.30: Distribution of BMI by maternal age NWH 2021

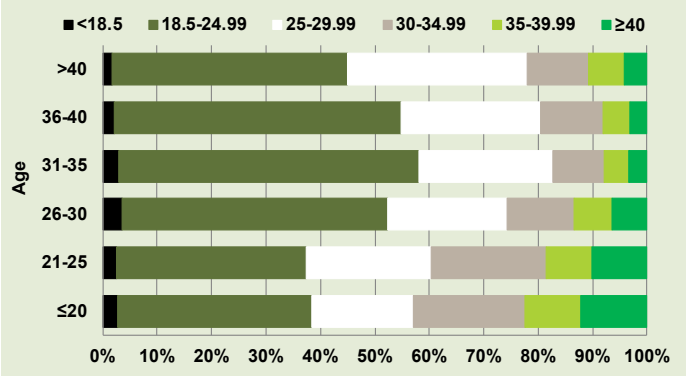


Figure 5.31: Distribution of BMI by LMC at birth NWH 2021

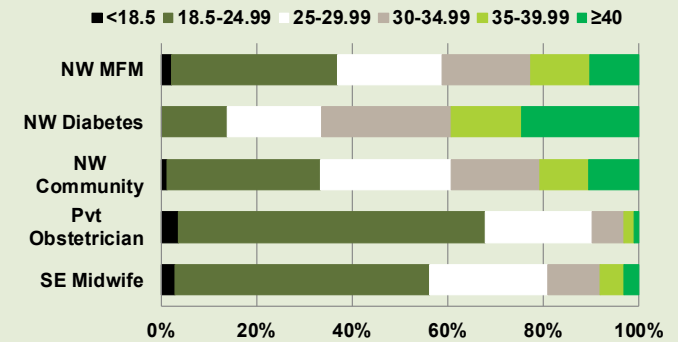


Figure 5.32: Hypertensive disease rates by maternal BMI NWH 2021

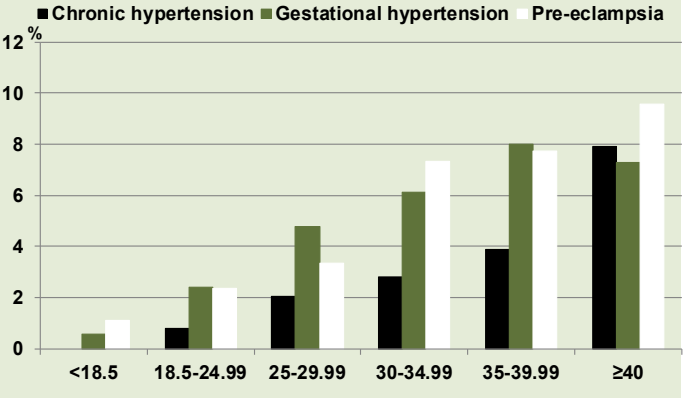
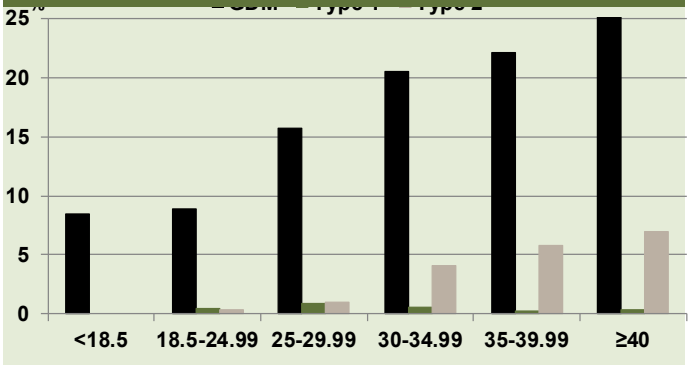


Figure 5.33: Diabetes rates by maternal BMI NWH 2021



5.7.1 Data tables: Body Mass Index

Table 5.31: Maternal BMI using WHO categories NWH 2014-2021

	2014		2015		2016		2017		2018		2019		2020		2021	
	N=7400		N=6933		N=7241		N=6846		N=6481		N=6660		N=6212		N= 6462	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
<18.5	313	4.2	249	3.6	283	3.9	257	3.8	239	3.7	228	3.4	201	3.2	178	2.8
18.5-24.99	4106	55.5	3791	55.5	4005	55.3	3723	54.4	3496	53.9	3509	52.7	3277	52.8	3254	50.4
25-29.99	1565	21.1	1528	22.4	1601	22.1	1578	23	1469	22.7	1522	22.9	1376	22.2	1553	24.0
30-34.99	696	9.4	671	9.8	663	9.2	690	10.1	628	9.7	723	10.9	650	10.5	751	11.6
35-39.99	357	4.8	332	4.9	358	4.9	317	4.6	357	5.5	351	5.3	332	5.3	362	5.6
≥40	234	3.2	258	3.8	238	3.3	207	3	238	3.7	264	4	291	4.7	303	4.7
Missing	129	1.7	104	1.5	93	1.3	74	1.1	54	0.8	63	0.9	85	1.4	61	0.9

Table 5.32: LMC at birth and BMI NWH 2021

LMC	Total	<18.5		18.5-24.99		25-29.99		30-34.99		35-39.99		>=40		Missing	
	6462	n= 178		n= 3254		n= 1553		n= 751		n= 362		n= 303		n= 61	
	n	n	%	n	%	n	%	n	%	n	%	n	%	n	%
SE Midwife	3054	89	2.9	1612	52.8	750	24.6	329	10.8	152	5.0	96	3.1	26	0.9
Pvt Obstetrician	1816	68	3.7	1163	64.0	404	22.2	121	6.7	38	2.1	20	1.1	2	0.1
NW Community	1161	15	1.3	368	31.7	315	27.1	213	18.3	118	10.2	122	10.5	10	0.3
NW Diabetes	122	0	0.0	17	13.9	24	19.7	33	27.0	18	14.8	30	24.6	0	0.0
NW MFM	229	5	2.2	78	34.1	49	21.4	42	18.3	28	12.2	23	10.0	4	0.1
Other DHB	38	1	2.6	10	26.3	7	18.4	8	21.1	4	10.5	7	18.4	1	0.0
Unbooked	42	0	0.0	6	14.3	4	9.5	5	11.9	4	9.5	5	11.9	18	0.6

Table 5.33: Demographic characteristics and BMI NWH 2021

	Total	<18.5		18.5-24.99		25-29.99		30-34.99		35-39.99		≥40		Missing	
	6462	n=	178	n=	3254	n=	1553	n=	751	n=	362	n=	303	n=	61
	N	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Ethnicity															
Māori	550	6	1.1	135	24.5	131	23.8	129	23.5	68	12.4	54	9.8	27	4.9
Pacific	690	2	0.3	66	9.6	121	17.5	168	24.3	154	22.3	174	25.2	5	0.7
Asian	1531	81	5.3	1016	66.4	305	19.9	103	6.7	15	1.0	3	0.2	8	0.5
Indian	804	23	2.9	368	45.8	277	34.5	95	11.8	30	3.7	8	1.0	3	0.4
MELAA	302	7	2.3	137	45.4	95	31.5	46	15.2	8	2.6	8	2.6	1	0.3
European	2556	58	2.3	1512	59.2	621	24.3	208	8.1	85	3.3	55	2.2	17	0.7
Other /not stated	29	1	3.4	20	69.0	3	10.3	2	6.9	2	6.9	1	3.4	0	0.0
Age (yrs)															
≤20	111	3	2.7	38	34.2	20	18.0	22	19.8	11	9.9	13	11.7	4	3.6
21-25	496	12	2.4	168	33.9	111	22.4	102	20.6	40	8.1	49	9.9	14	2.8
26-30	1530	53	3.5	742	48.5	334	21.8	187	12.2	106	6.9	97	6.3	11	0.7
31-35	2648	76	2.9	1447	54.6	642	24.2	250	9.4	116	4.4	90	3.4	27	1.0
36-40	1435	30	2.1	755	52.6	367	25.6	163	11.4	73	5.1	44	3.1	3	0.2
>40	242	4	1.7	104	43.0	79	32.6	27	11.2	16	6.6	10	4.1	2	0.8
Parity															
Nullipara	3204	105	3.3	1815	56.6	732	22.8	318	9.9	106	3.3	100	3.1	28	0.9
Multipara	3258	73	2.2	1439	44.2	821	25.2	433	13.3	256	7.9	203	6.2	33	1.0
Smoking status at booking															
Smoking	273	4	1.5	61	22.3	66	24.2	64	23.4	36	13.2	27	9.9	15	5.5
Not currently at booking	6189	174	2.8	3193	51.6	1487	24.0	687	11.1	326	5.3	276	4.5	46	0.7

Table 5.34: Pregnancy complications and BMI NWH 2021

	BMI<18.5		BMI 18.5-24.99		BMI 25-29.99		BMI 30-34.99		BMI 35-39.99		BMI ≥40		Missing	
	n= 178		n= 3254		n= 1553		n= 751		n= 362		n= 303		n= 61	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Diabetes														
GDM	15	8.4	289	8.9	244	15.7	154	20.5	80	22.1	95	31.4	1	1.6
Type 1	0.0	0.0	17	0.5	14	0.9	4	0.5	1	0.3	1	0.3	0	0.0
Type 2	0.0	0.0	12	0.4	15	1.0	31	4.1	21	5.8	21	6.9	0	0.0
Non diabetes	163	91.6	2936	90.2	1280	82.4	562	74.8	260	71.8	186	61.4	60	98.4
Hypertension														
Chronic hypertension	0	0.0	26	0.8	32	2.1	21	2.8	14	3.9	24	7.9	0	0.0
Gestational hypertension	1	0.6	78	2.4	74	4.8	46	6.1	29	8.0	22	7.3	2	3.3
Pre-eclampsia	2	1.1	73	2.2	49	3.2	44	5.9	24	6.6	23	7.6	2	3.3
Superimposed pre-eclampsia	0	0.0	4	0.1	3	0.2	11	1.5	4	1.1	6	2.0	0	0.0
Nil	175	98.3	3073	94.4	1395	89.8	629	83.8	291	80.4	228	75.2	57	93.4

Table 5.35: Postpartum haemorrhage rates by BMI among spontaneous vaginal births NWH 2021

	Total		BMI<18.5		BMI 18.5-24.99		BMI 25-29.99		BMI 30-34.99		BMI 35-39.99		BMI ≥40		Missing	
	n= 3095		n= 90		n= 1555		n= 691		n= 352		n= 206		n= 148		n= 53	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
PPH≥1000mls	235	7.6	4	4.4	89	5.7	56	8.1	34	9.7	27	13.1	24	16.2	1	1.9
PPH≥1500mls	101	3.3	3	3.3	35	2.3	26	3.8	10	2.8	12	5.8	15	10.1	0	0.0

Table 5.36: Postpartum haemorrhage rates by BMI among caesarean sections NWH 2021

	Total		BMI<18.5		BMI 18.5-24.99		BMI 25-29.99		BMI 30-34.99		BMI 35-39.99		BMI ≥40		Missing	
	n= 2623		n= 51		n= 1225		n= 714		n= 346		n= 135		n= 149		n 3	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
PPH≥1000mls	392	14.9	6	11.8	157	12.8	104	14.6	59	17.1	29	21.5	37	24.8	1	33.3
PPH≥1500mls	126	4.8	3	5.9	47	3.8	33	4.6	18	5.2	11	8.1	14	9.4	0	0.0

Table 5.37: Maternal interventions and birth outcomes among nulliparous women by BMI NWH 2021

	Total		BMI<18.5		BMI 18.5-24.99		BMI 25-29.99		BMI 30-34.99		BMI 35-39.99		BMI ≥40		Missing	
	n=	3204	n=	105	n=	1815	n=	732	n=	318	n=	106	n=	100	n=	28
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Onset of birth																
Spontaneous labour	1189	37.1	39	37.1	601	33.1	269	36.7	133	41.8	73	68.9	44	44.0	30	107.1
Induced labour	1024	32.0	24	22.9	384	21.2	247	33.7	149	46.9	117	110.4	101	101.0	2	7.1
Emergency CS before labour	122	3.8	1	1.0	31	1.7	40	5.5	25	7.9	16	15.1	8	8.0	1	3.6
Elective CS	923	28.8	9	8.6	423	23.3	265	36.2	126	39.6	50	47.2	50	50.0	0	0.0
Mode of birth																
Spontaneous vaginal birth	1233	38.5	38	36.2	705	38.8	266	36.3	121	38.1	44	41.5	38	38.0	21	75.0
Operative vaginal	630	19.7	33	31.4	409	22.5	124	16.9	41	12.9	16	15.1	2	2.0	5	17.9
Elective CS	349	10.9	15	14.3	203	11.2	76	10.4	33	10.4	14	13.2	8	8.0	0	0.0
Emergency CS before labour	653	20.4	12	11.4	342	18.8	169	23.1	77	24.2	18	17.0	33	33.0	2	7.1
Emergency CS in labour	339	10.6	7	6.7	156	8.6	97	13.3	46	14.5	14	13.2	19	19.0	0	0.0

Table 5.38: Maternal interventions and birth outcomes among multiparous women by BMI NWH 2021

	Total		BMI<18.5		BMI 18.5-24.99		BMI 25-29.99		BMI 30-34.99		BMI 35-39.99		BMI ≥40		Missing	
	n=	3258	n=	73	n=	1439	n=	821	n=	433	n=	256	n=	203	n=	33
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Onset of birth																
Spontaneous labour	1189	36.5	39	53.4	601	41.8	269	32.8	133	30.7	73	28.5	44	21.7	30	90.9
Induced labour	1024	31.4	24	32.9	384	26.7	247	30.1	149	34.4	117	45.7	101	49.8	2	6.1
Emergency CS before labour	122	3.7	1	1.4	31	2.2	40	4.9	25	5.8	16	6.3	8	3.9	1	3.0
Elective CS	923	28.3	9	12.3	423	29.4	265	32.3	126	29.1	50	19.5	50	24.6	0	0.0
Mode of birth																
Spontaneous vaginal birth	1862	57.2	52	71.2	850	59.1	425	51.8	231	53.3	162	63.3	110	54.2	32	97.0
Operative vaginal	114	3.5	4	5.5	65	4.5	24	2.9	12	2.8	5	2.0	4	2.0	0	0.0
Elective CS	923	28.3	9	12.3	423	29.4	265	32.3	126	29.1	50	19.5	50	24.6	0	0.0
Emergency CS before labour	172	5.3	7	9.6	62	4.3	47	5.7	30	6.9	14	5.5	12	5.9	0	0.0
Emergency CS in labour	187	5.7	1	1.4	39	2.7	60	7.3	34	7.9	25	9.8	27	13.3	1	3.0

Table 5.39: Neonatal outcome and BMI NWH 2021

	Total		BMI<18.5		BMI 18.5-24.99		BMI 25-29.99		BMI 30-34.99		BMI 35-39.99		BMI ≥40		Missing	
	N=	6553	n=	181	n=	3289	n=	1581	n=	765	n=	368	n=	306	n=	63
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Preterm	670	10.2	19	10.5	262	8.0	172	10.9	104	13.6	50	13.6	40	13.1	23	36.5
Iatrogenic preterm	411	6.3	6	3.3	158	4.8	112	7.1	63	8.2	38	10.3	32	10.5	2	3.2
Spontaneous preterm	259	4.0	13	7.2	104	3.2	60	3.8	41	5.4	12	3.3	8	2.6	21	33.3
Term	5883	89.8	162	89.5	3027	92.0	1409	89.1	661	86.4	318	86.4	266	86.9	40	63.5
Iatrogenic term	3752	57.3	81	44.8	1799	54.7	956	60.5	468	61.2	231	62.8	212	69.3	5	7.9
Spontaneous term	2131	32.5	81	44.8	1228	37.3	453	28.7	193	25.2	87	23.6	54	17.6	35	55.6
SGA	864	13.2	23	12.7	375	11.4	205	13.0	130	17.0	69	18.8	50	16.3	12	19.0
≥2 days in NICU	546	8.3	15	8.3	188	5.7	155	9.8	102	13.3	38	10.3	33	10.8	15	23.8
Perinatal death (n/1000)	92	14.0	2	11.0	42	12.8	14	8.9	13	17.0	11	29.9	7	22.9	3	47.6

ŪPOKO 6

Te Whānautanga

CHAPTER 6

Labour and Birth

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ŪPOKO 6
Te Whānautanga

CHAPTER 6
Labour and Birth

This chapter includes data on labour and birth interventions and outcomes, including onset of labour and mode of birth. Tables pertaining to this chapter can be found at the end of each section.

6.1 Onset of Birth

Dr Jenny McDougall

Key Findings

- Iatrogenic birth remains high in 2021 – 36% of term births started with spontaneous labour.
- Induction of labour remains a significant pathway to caesarean section in our hospital (14% in 2021, **Figure 6.2**).
- Planned caesarean birth rates have stabilized to 19.6 % of term births, similar to 2020 (**Figure 6.2**).
- It is pleasing to see that the spontaneous vaginal birth rate (76%) continues to rise after spontaneous onset of labour at term. Also emergency CS after spontaneous labour has fallen to the lowest in 6 years at 7.4% (**Figure 6.4**). However, after induced onset of labour, the caesarean rate has been rising for the past 4 years (**Figure 6.3**).
- The distribution curve (**Figure 6.7**) of gestation at term birth remains shifted towards early term (≤39 weeks) for all groups. For the High Risk teams (Diabetes, Medical, transfers, and unbooked), most term births occur around 38 weeks, whereas for the other groups, most occur around 39 weeks. Private obstetricians have a higher proportion of their births ≤39 weeks compared to self-employed midwives and National Women's Community LMCs.

Figure 6.1: Onset of Birth at term (37-42 weeks) 2006-2021

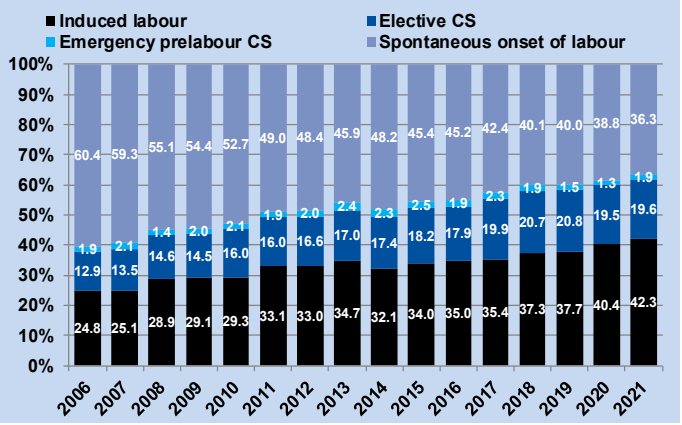


Figure 6.2: Pathways to mode of birth at term 2006-2021

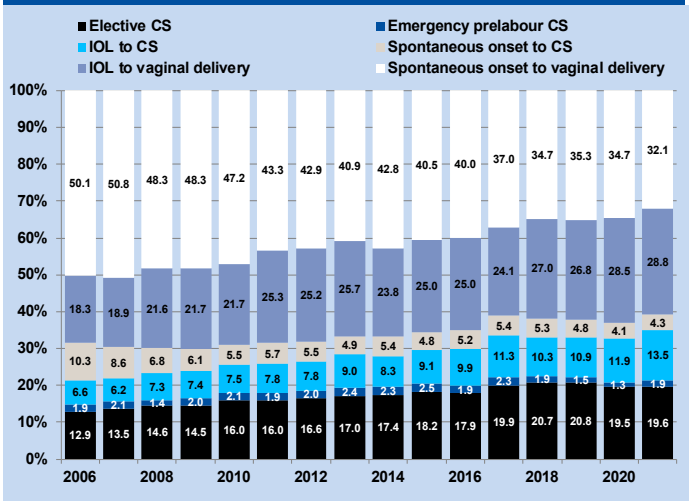


Figure 6.3: Mode of birth following induced onset of labour at term 2006-2021

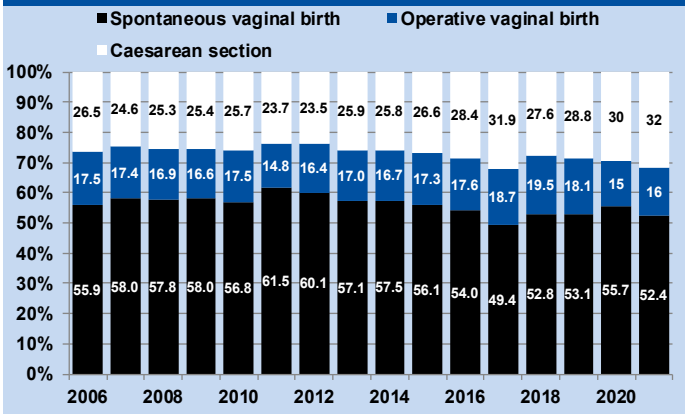


Figure 6.4: Mode of birth following spontaneous labour at term 2006-2021

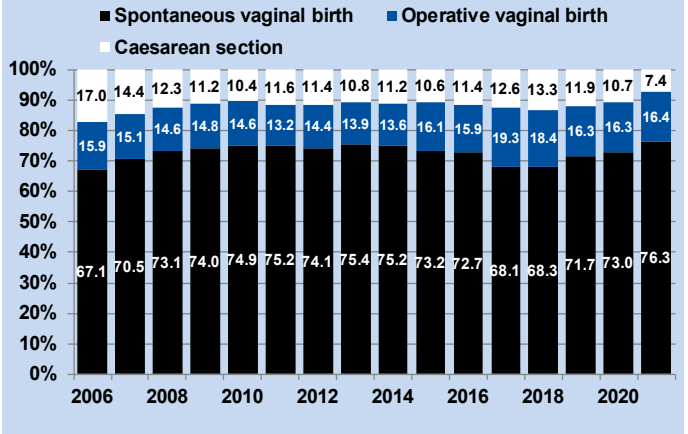


Figure 6.5: Pathways to birth by gestation and parity NWH 2021

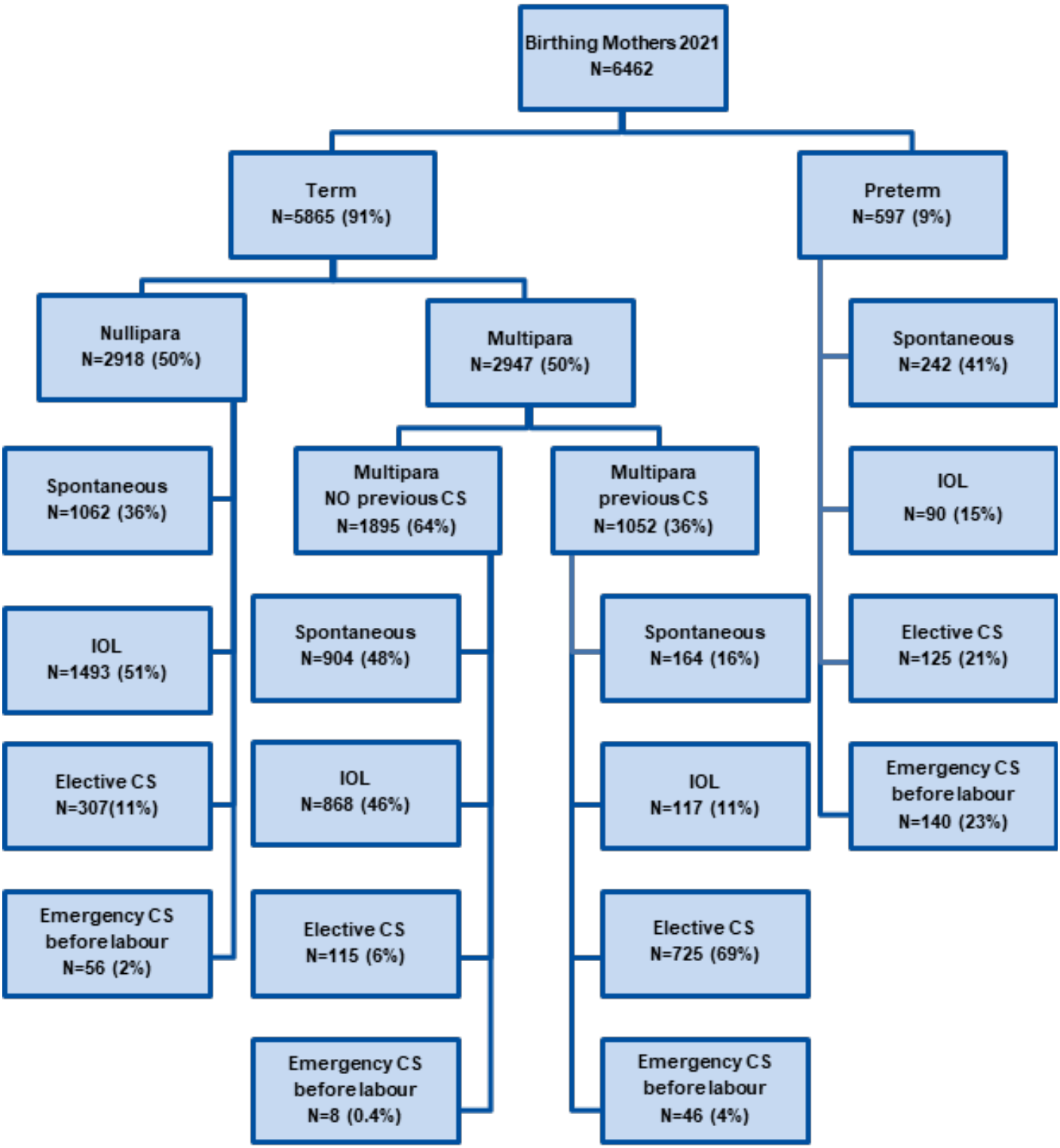
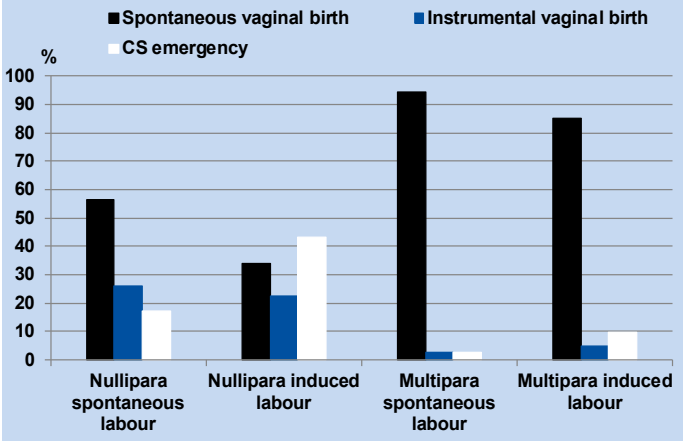


Figure 6.6: Mode of birth among intended vaginal births at term by parity and onset of labour (excludes previous CS) NWH 2021



6.1.1 Gestation at Birth

The distribution of gestation at birth overall shows an apparent shift from 38 to 39 weeks in 2021. (Figure 6.7).

Figure 6.7: Distribution of gestation at birth among pēpi born NWH 2006-2021

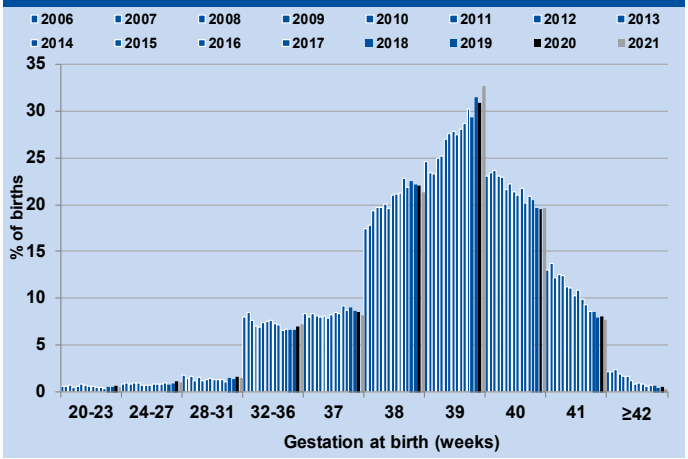
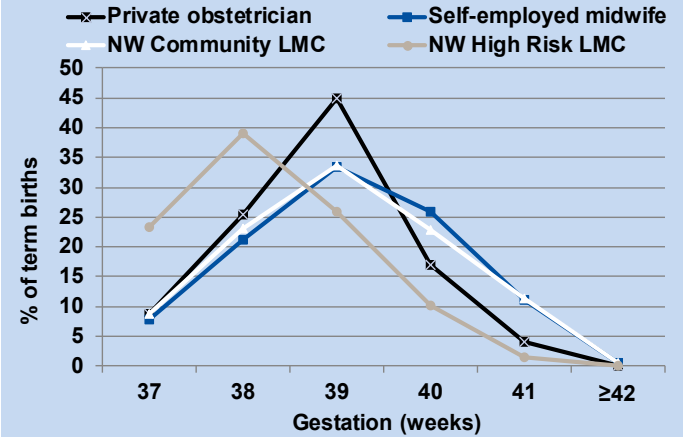


Figure 6.8: Distribution of gestation at birth among term pēpi by LMC 2021



6.1.2 Induction of Labour

Key findings

- The induction of labour rate at NWH continues to rise and reached 40% of all births in 2021 (Figure 6.9).
- The most common indications for induction of labour at term (in order of highest %) in 2021 were diabetes, PROM, postdates, fetal wellbeing, and SGA. This is similar to previous years.
- Where the primary indication was "post dates", 14.3 % were born before 41 weeks, all but one of these wāhine were under the age of 40 years. Note that gestation at birth is not the same as gestation at the time of starting induction of labour.
- The numbers ≥ 42 weeks remain alarming given evidence based recommendations to prevent stillbirth.
- Current ADHB guidelines recommend IOL at 41+0 to 41+1 to reduce risk of stillbirth.

Figure 6.9: Induction of labour rates NWH 1992-2021

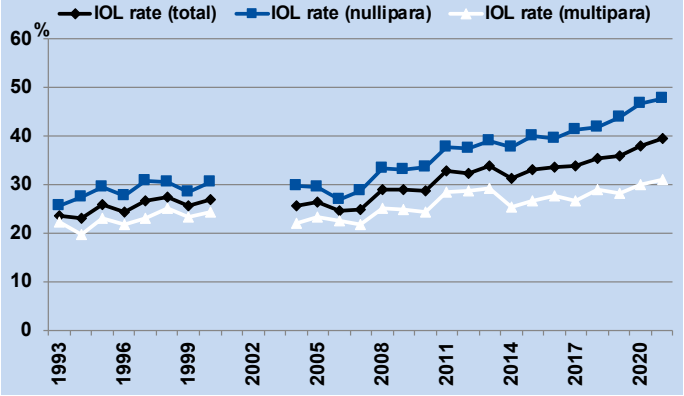


Figure 6.10: Primary indication for induction by gestation (as a percentage of all births) NWH 2021

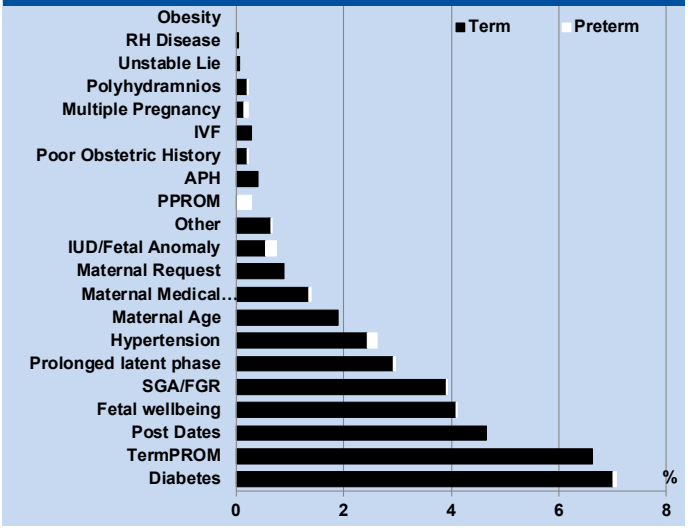


Table 6.1: Gestation at birth among wāhine whose primary indication for induction was 'post dates' by maternal age NWH 2021

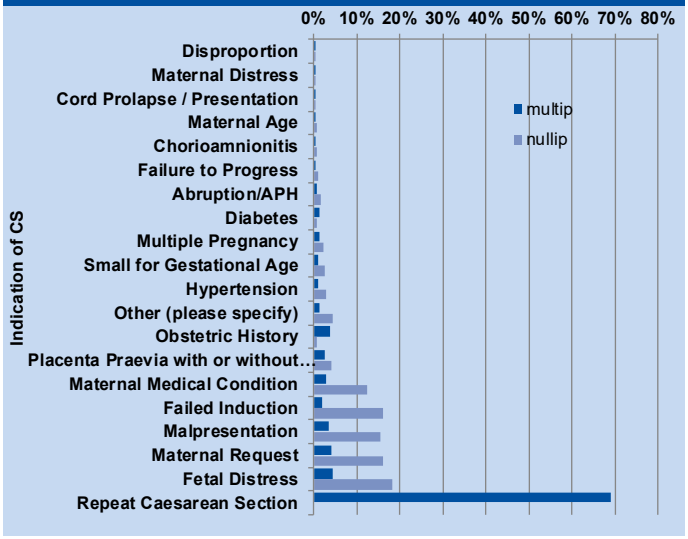
Weeks	Total		Age<35		Age 35-39		Age≥40	
	n=	301	n=	229	n=	69	n=	3
	n	%	n	%	n	%	n	%
39-39[6]	0	0.0	0	0	0	0.0	0	0.0
40-40[6]	43	14.3	31	13.5	11	15.9	1	33.3
41-41[6]	245	81.4	189	82.5	54	78.3	2	66.7
42-42[6]	13	4.3	9	3.9	4	5.8	0	0.0
43-43[6]	0	0.0	0	0.0	0	0.0	0	0.0

6.1.2 Elective and pre-labour Caesarean section

Key Findings

- By far the most common indication for elective and pre-labour caesarean section remains repeat CS. In 2021, the next most common were fetal distress, maternal request, malpresentation, and failed induction of labour. These top five were the same in 2020.
- The top 5 contributors to elective and pre-labour CS in nullipara in 2021 were fetal distress, maternal request, failed induction, malpresentation and maternal medical condition.
- Maternal age and ethnicity are strongly associated with elective CS (Table 6.3). A greater proportion of older wāhine and of non-Māori and non-Pacific ethnicity, undergo elective CS.
- For nullipara, maternal request was the indication in 16% of elective and pre-labour CS. This is similar to 2020.
- Of the 2918 nullipara who birthed at term in our facility in 2021, 103 (3.5 %) had an elective or prelabour CS where the primary indication was stated to be maternal request.

Figure 6.11: Reported primary indication for elective or prelabour CS by parity NWH 2021



6.1.3 Use of syntocinon

All data are checked for wāhine who are given syntocinon prior to 3 cm dilatation, to differentiate augmentation from induction of labour.

In future reports the definition of induction of labour will be changed to reflect updated guidelines, so the use of syntocinon prior to 5 cm will be the new threshold to define induction of labour.

Table 6.2: Use of syntocinon by onset of labour and parity NWH 2021

	Total birth	Syntocinon	
	N	n	%
Total	6462	2338	36.2
Induced labour			
Nullipara	1544	1189	77.0
Multipara	1024	670	65.4
Spontaneous labour			
Nullipara	1183	395	33.4
Multipara	1189	78	6.6

6.1.4 Data tables: Onset of birth

Table 6.3: Onset of birth at term by maternal demographic characteristics NWH 2021

	Total	Spontaneous Labour		Induced labour		CS Elective		CS Emergency before labour	
	N	n	%	n	%	n	%	n	%
Total	5865	2130	36.3	2478	42.3	1147	19.6	110	1.9
Maternal Age									
≤20	91	45	49.5	45	49.5	1	1.1	0	0.0
21-25	424	204	48.1	181	42.7	32	7.5	7	1.7
26-30	1402	573	40.9	658	46.9	152	10.8	19	1.4
31-35	2437	888	36.4	996	40.9	504	20.7	49	2.0
36-40	1306	384	29.4	516	39.5	377	28.9	29	2.2
41+	205	36	17.6	82	40.0	81	39.5	6	2.9
Ethnicity									
Māori	456	190	41.7	203	44.5	57	12.5	6	1.3
Pacific	615	226	36.7	323	52.5	56	9.1	10	1.6
Indian	737	237	32.2	360	48.8	123	16.7	17	2.3
Other Asian	1412	600	42.5	524	37.1	262	18.6	26	1.8
MELAA/Other	306	111	36.3	114	37.3	72	23.5	9	2.9
European	2339	766	32.7	954	40.8	577	24.7	42	1.8
BMI									
<18.5	162	81	50.0	57	35.2	22	13.6	2	1.2
18.5-24.99	3020	1228	40.7	1171	38.8	575	19.0	46	1.5
25-29.99	1400	452	32.3	604	43.1	311	22.2	33	2.4
30-34.99	660	193	29.2	312	47.3	137	20.8	18	2.7
35-39.99	317	87	27.4	169	53.3	54	17.0	7	2.2
≥40	266	54	20.3	161	60.5	48	18.0	3	1.1
Missing	40	35	87.5	4	10.0	0	0.0	1	2.5
LMC at Birth									
Self-employed Midwife	2806	1261	44.9	1193	42.5	308	11.0	44	1.6
Private Obstetrician	1697	419	24.7	666	39.2	568	33.5	44	2.6
NW Community	1047	389	37.2	445	42.5	201	19.2	12	1.1
NW Medical	181	38	21.0	86	47.5	52	28.7	5	2.8
NW Diabetes	102	4	3.9	79	77.5	17	16.7	2	2.0
Other DHB	13	5	38.5	5	38.5	1	7.7	2	15.4
Unbooked	19	14	73.7	4	21.1	0	0.0	1	5.3
Parity									
Nulipara	2918	1062	36.4	1493	51.2	307	10.5	56	1.9
Multipara no previous CS	1895	904	31.0	868	29.7	115	3.9	8	0.3
Multipara with previous CS	1052	164	5.6	117	4.0	725	24.8	46	1.6

Table 6.4: Induction of labour rates 2010-2021												
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Total Births	7709	7523	7695	7223	7400	6933	7241	6846	6481	6660	6212	6462
Wāhine Induced	2214	2463	2483	2438	2315	2289	2423	2312	2290	2381	2359	2568
Incidence (%)	28.7	32.7	32.3	33.8	31.3	33	33.5	33.8	35.3	35.8	38	39.7
Total Nullipara	3650	3539	3778	3441	3604	3321	3517	3343	3183	3202	2981	3204
Nullipara Induced	1226	1330	1382	1337	1354	1328	1391	1378	1332	1407	1389	1544
Incidence (%)	33.5	37.6	36.5	38.9	37.5	40	39.6	41.2	41.8	43.9	46.6	48.2
Total Multipara	4059	3984	3917	3782	3796	3612	3724	3503	3298	3458	3231	3258
Multipara Induced	988	1133	1101	1101	961	961	1032	934	958	974	970	1024
Incidence (%)	24.3	28.4	28.1	29.1	25.3	26.6	27.7	26.7	29	28.2	30	31.4

Table 6.5: Indication for induction by gestation NWH 2021						
	Total number induced		**Preterm**		**Term**	
	n=	**2543**	**n=**	**65**	**n=**	**2478**
	n	**%**	**n**	**%**	**n**	**%**
Diabetes	456	17.9	3	4.6	453	18.3
TermPROM	428	16.8	0	0.0	428	17.3
Post Dates	301	11.8	0	0.0	301	12.1
Fetal wellbeing	266	10.5	2	3.1	264	10.7
SGA/FGR	253	9.9	1	1.5	252	10.2
Prolonged latent phase	191	7.5	2	3.1	189	7.6
Hypertension	170	6.7	12	18.5	158	6.4
Maternal Age	122	4.8	0	0.0	122	4.9
Maternal Medical Complications	90	3.5	3	4.6	87	3.5
Maternal Request	58	2.3	0	0.0	58	2.3
IUD/Fetal Anomaly	48	1.9	13	20.0	35	1.4
Other	43	1.7	1	1.5	42	1.7
APH	27	1.1	0	0.0	27	1.1
PPROM	19	0.7	18	27.7	1	0.0
IVF	18	0.7	0	0.0	18	0.7
Poor Obstetric History	15	0.6	1	1.5	14	0.6
Multiple Pregnancy	15	0.6	6	9.2	9	0.4
Polyhydramnios	14	0.6	1	1.5	13	0.5
Unstable Lie	4	0.2	0	0.0	4	0.2
Rhesus disease	3	0.1	0	0.0	3	0.1

Table 6.6: Indication for induction by parity (term births) NWH 2021

All births at term	Total		Nullipara		Multipara	
	n=	5865	n=	2918	n=	2947
	n	%	n	%	n	%
Total IOL at term	2478	**42.3**	1493	**51.2**	985	**33.4**
Diabetes	453	7.7	247	8.5	206	7.0
Term premature rupture of membranes	428	7.3	310	10.6	118	4.0
Post Dates	301	5.1	209	7.2	92	3.1
Fetal Wellbeing	264	4.5	156	5.3	108	3.7
Small for gestational age/Fetal growth restriction	252	4.3	161	5.5	91	3.1
Prolonged Latent Phase	189	3.2	103	3.5	86	2.9
Hypertension	158	2.7	110	3.8	48	1.6
Maternal Age	122	2.1	53	1.8	69	2.3
Maternal Medical Comps	87	1.5	48	1.6	39	1.3
Maternal Request	58	1.0	20	0.7	38	1.3
Other	42	0.7	18	0.6	24	0.8
Intrauterine death/Fetal anomaly	35	0.6	16	0.5	19	0.6
Antepartum haemorrhage	27	0.5	13	0.4	14	0.5
In vitro fertilisation	18	0.3	13	0.4	5	0.2
Poor Obstetric History	14	0.2	2	0.1	12	0.4
Polyhydramnios	13	0.2	8	0.3	5	0.2
Multiple Pregnancy	9	0.2	4	0.1	5	0.2
Unstable lie	4	0.1	0	0.0	4	0.1
Rhesus disease	3	0.1	2	0.1	1	0.0

*TOPs are excluded

Table 6.7: Rates of induction by age and ethnicity (prioritised) among term nullipara and multipara (excluding previous Caesarean) NWH 2021

	Term Nullipara	Induction of Labour		Term Multipara no previous CS	Induction of labour	
	N	n	%	N	n	%
Total	2918	1493	51.2	1895	868	45.8
Age						
≤25	331	161	48.6	137	54	39.4
26-30	877	457	52.1	377	171	45.4
31-35	1217	611	50.2	789	355	45.0
>35	493	264	53.5	592	288	48.6
Ethnicity						
Māori	165	84	50.9	216	108	50.0
Pacific	209	127	60.8	305	170	55.7
Indian	440	261	59.3	178	82	46.1
Other Asian	716	324	45.3	450	172	38.2
MELAA	122	64	52.5	97	39	40.2
European	1247	627	50.3	646	296	45.8

Table 6.8: Primary indication for elective or prelabour emergency Caesarean section (all gestations) NWH 2021

	Total		Nullipara		Multipara	
	N=	1798	n=	688	n=	1110
	n	%	n	%	n	%
Repeat Caesarean Section	767	42.7	0	0.0	767	69.1
Fetal Distress	176	9.8	126	18.3	50	4.5
Maternal Request	154	8.6	110	16.0	44	4.0
Malpresentation	146	8.1	107	15.6	39	3.5
Failed Induction	131	7.3	110	16.0	21	1.9
Maternal Medical Condition	116	6.5	85	12.4	31	2.8
Other (please specify)	70	3.9	43	6.3	27	2.4
Placenta Praevia with or without bleeding	55	3.1	27	3.9	28	2.5
Obstetric History	45	2.5	4	0.6	41	3.7
Hypertension	32	1.8	20	2.9	12	1.1
Small for Gestational Age	30	1.7	18	2.6	12	1.1
Multiple Pregnancy	29	1.6	16	2.3	13	1.2
Diabetes	20	1.1	5	0.7	15	1.4
Abruption/APH	19	1.1	11	1.6	8	0.7
Maternal Age	6	0.3	5	0.7	1	0.1
Disproportion	2	0.1	1	0.1	1	0.1

Table 6.9: Mode of birth and epidural rate at term by onset of birth and parity (excluding wāhine with previous Caesarean) among intended vaginal births NWH 2021

	Nullipara				Multipara			
	Spontaneous labour		Induced labour		Spontaneous labour		Induced labour	
	N=	1062	N=	1493	N=	904	N=	868
	n	%	n	%	n	%	n	%
Mode of birth								
SVB	601	56.6	511	34.2	855	94.6	738	85.0
Operative Vaginal	276	26.0	336	22.5	26	2.9	44	5.1
CS emergency in labour	185	17.4	447	29.9	23	2.5	51	5.9
CS emergency not in labour*	0	0.0	199	13.3	0	0.0	35	4.0
Epidural	654	61.6	1248	83.6	302	33.4	586	67.5

*failed induction rate at term

Table 6.10: Mode of birth and epidural rate among term nullipara by indication for induction NWH 2021

	Post dates		TermProm		Hypertension		Prolonged latent phase		Diabetes		SGA/FGR		Other	
	n=	209	n=	310	n=	110	n=	103	n=	247	n=	161	n=	351
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Mode of birth														
SVB	63	30.1	111	35.8	46	41.8	31	30.1	72	29.1	69	42.9	119	33.9
Operative vaginal	41	19.6	90	29.0	20	18.2	30	29.1	45	18.2	44	27.3	65	18.5
CS emergency in labour	79	37.8	90	29.0	31	28.2	32	31.1	87	35.2	28	17.4	100	28.5
CS emergency not in labour*	26	12.4	19	6.1	13	11.8	10	9.7	43	17.4	20	12.4	67	19.1
Epidural	174	83.3	277	89.4	83	75.5	94	91.3	206	83.4	130	80.7	282	80.3

* failed induction rate at term

Table 6.11: Mode of birth and epidural rate among term multipara (excluding previous Caesarean) by indication for induction NWH 2021

	Post dates		TermProm		Hypertension		Prolonged latent phase		Diabetes		SGA/FGR		Other	
	n=	73	n=	97	n=	40	n=	74	n=	182	n=	83	n=	317
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Mode of birth														
SVB	64	87.7	86	88.7	33	82.5	66	89.2	150	82.4	74	89.2	263	83.0
Operative vaginal	5	6.8	3	3.1	1	2.5	3	4.1	5	2.7	5	6.0	22	6.9
CS emergency in labour	2	2.7	4	4.1	3	7.5	4	5.4	16	8.8	3	3.6	19	6.0
CS emergency not in labour*	2	2.7	4	4.1	3	7.5	1	1.4	11	6.0	1	1.2	13	4.1
Epidural	41	56.2	56	57.7	20	50.0	52	70.3	79	43.4	48	57.8	204	64.4

*failed induction rate at term

Table 6.12: Dilatation at start of syntocinon infusion among labouring wāhine by induction status NWH 2021

Dilatation	Induced labour		Spontaneous labour	
	n=	1859	n=	473
	n	%	n	%
0	66	3.6	0	0
1	169	9.1	0	0.0
2	471	25.3	0	0.0
3	523	28.1	39	8.2
4	270	14.5	91	19.2
5	83	4.5	85	18.0
6	43	2.3	68	14.4
7	14	0.8	37	7.8
8	15	0.8	30	6.3
9	7	0.4	21	4.4
10	14	0.8	45	9.5
Missing	184	9.9	57	12.1

6.2 Mode of birth

Key Findings

- Spontaneous vaginal birth rate remains low and the previous promising upward trend from a nadir in 2017 has not persisted.
- Just under 50% of parturients at term had SVB, 38% of nullipara and 59% of multipara.
- For standard primipara, mode of birth varies by LMC (Figure 6.13). SVB in 2021 was highest for standard primipara who had NWH as LMC. The standard primipara was defined in order to remove the confounding of maternal age and medical and obstetric complications associated with operative birth. Figure 6.13 uses the NWH definition of the standard primipara (see Appendix 3 - Definitions).
- There is a strong association between maternal age and mode of birth (Figure 6.15).

Water Birth

Twenty four pēpi were recorded in the database as having been born in water in 2021. One of these was under the care of NWH LMC service, 21 were under the care of a self-employed midwife and two were under the care of a private obstetrician. No pēpi were admitted to NICU. All were live births.

Figure 6.12: Mode of birth NWH 1991–2021

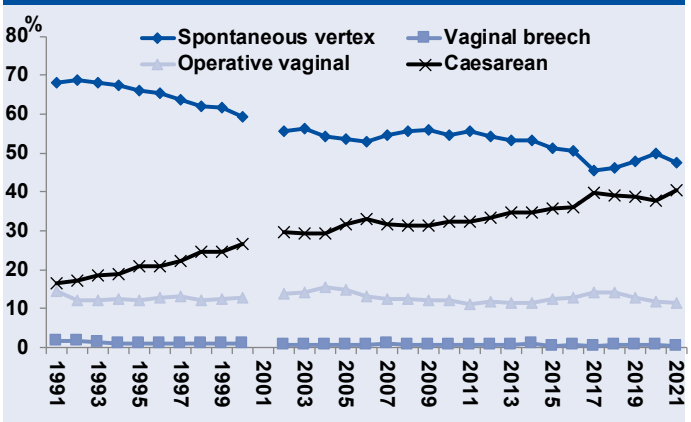


Figure 6.13: Mode of birth at term by LMC at birth among standard primipara NWH 2021

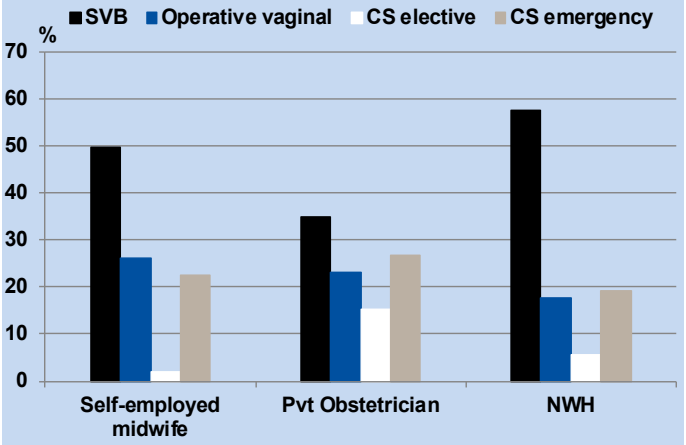


Figure 6.14: Mode of birth by ethnicity among nullipara

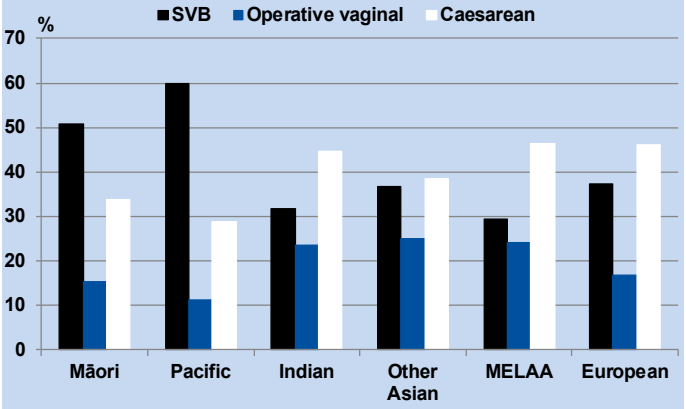


Figure 6.15: Mode of birth by maternal age among nullipara NWH 2021

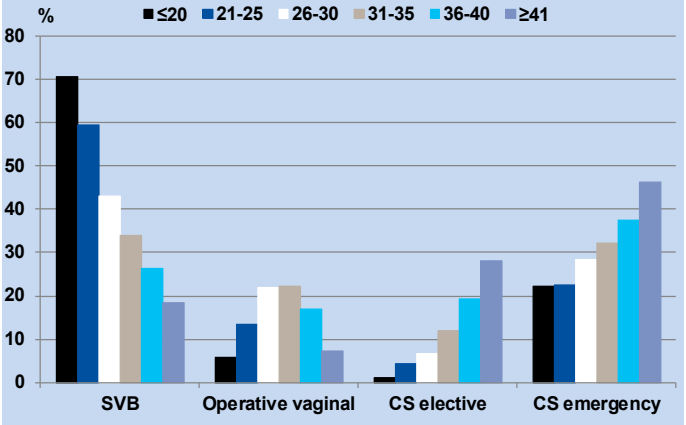
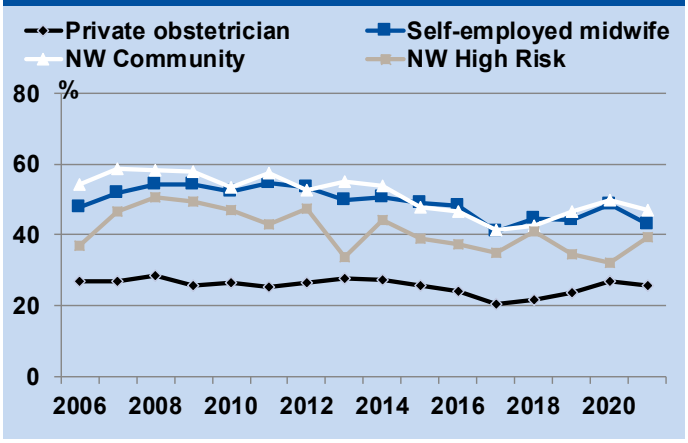


Figure 6.16: Spontaneous vaginal birth rate among all nullipara by LMC 2006 - 2021



6.2.1 Caesarean section

Methods

Since 2004, we have collected data on elective and emergency Caesarean section (CS). An elective CS is defined as a CS which was planned in advance and performed either prior to, or after, the onset of labour. An emergency CS is defined as an unplanned CS that is performed either prior to onset of labour or during labour. CS following failed induction is classified as an emergency CS prior to labour. Labour is defined conservatively as being established when the cervix is greater than or equal to 3cms dilated (and effaced if nulliparous) and there are three contractions in 10 minutes, each lasting more than 40 seconds. (WHO, 2003)

It is noted that clinical guidelines now define active labour as >5cm dilated.

Also it is noted the above terminology in regard to elective and emergency caesarean section is not used by the schedulers/operating room staff, where "elective" is defined as booked into elective slot and performed as planned; whereas " emergency" includes any case done in acute theatres even if the case had previously been planned to be done in elective theatres; and the definition of labour is less strictly defined.

Key Findings

- The caesarean section rate shows a slight upward trend again, after stabilizing in 2019/2020.
- The actual numbers having a CS have not changed significantly since 2016 (remaining around 2600 caesareans performed per year). However birth numbers have declined from around 7200 in 2016, to 6462 births in 2021.
- The largest contribution to the CS rate comes from two main groups. See Robson 10-group Classification. In 2021, Robson group 2 (nullipara, singleton, cephalic, term, induced OR prelabour CS) contributed 909 caesarean sections (34.7% of the total CS). Robson group 5 (Previous CS, singleton, cephalic, term) contributed 832 CS (31.7% of the total CS performed).
- Figure 6.18 and Figure 6.19 show the trend over time in CS rates for Robson groups 1 – 5.

Figure 6.20 shows the reasons for emergency CS in labour (as per Robson), of which the most frequent is still 'obstructed labour'. 'Other fetal indication' includes all fetal indications where the CTG is not necessarily abnormal e.g. cord prolapse, antepartum haemorrhage, suspected uterine rupture, and malpresentation.

Figure 6.17: Caesarean section rate among all nullipara by LMC 2006 - 2021

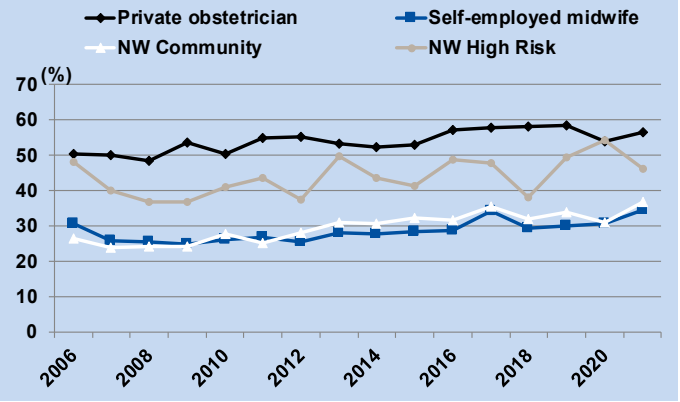


Figure 6.18: Robson groups 1&2: Nulliparous Caesarean section rates among singleton cephalic term pregnancies by onset of labour NWH 2004-2021

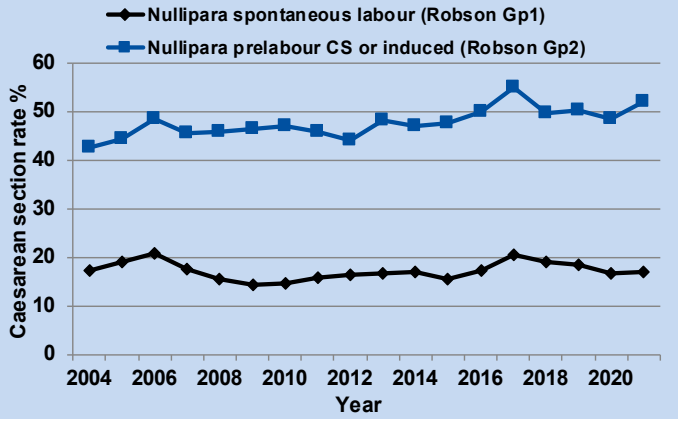


Figure 6.19: Robson groups 3-5: Multiparous Caesarean section rates among singleton cephalic term pregnancies by onset of labour and previous Caesarean status NWH 2004-2021

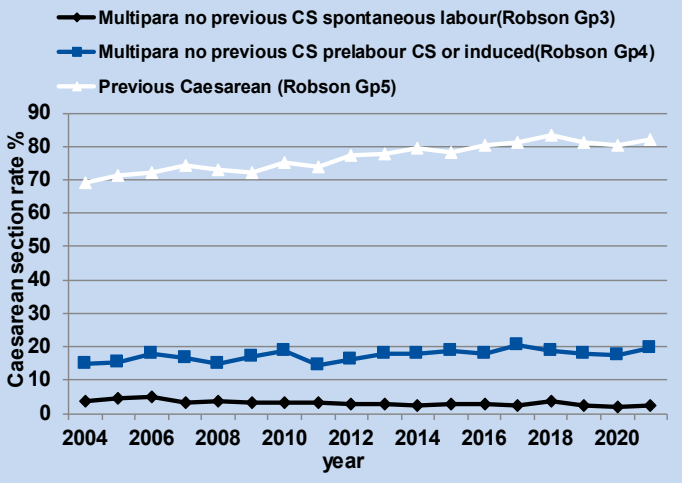
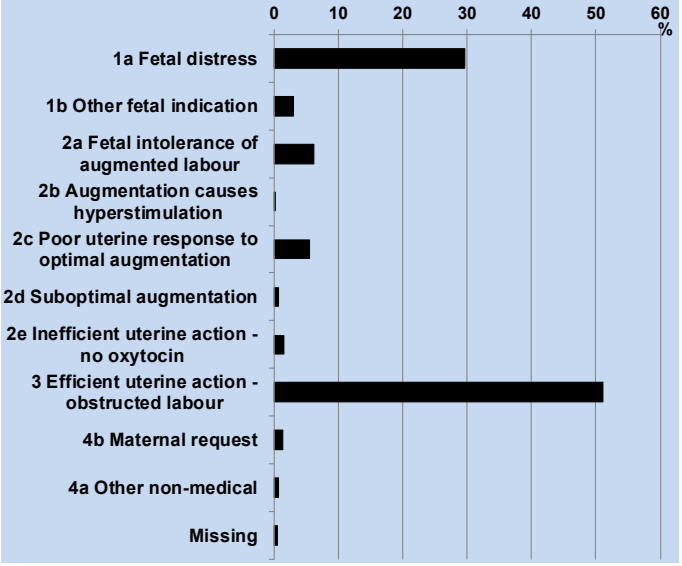


Figure 6.20: Robson group classifcation for In Labour emergency casearean section



Robson 10-group classification 2016-2021

The Robson-10 group classification attempts to "dissect" CS practice so that the maternity unit can understand trends within similar groups of mothers. The final column shows the contribution to the overall CS rate from each of these groups of mothers, and shows very clearly the impact of repeat CS on the CS rate at NWH.

Table 6.13: Robson 10-Group Classification NWH 2016-2021

Robson Group	2016			2017			2018			2019			2020			2021			
	CS	Total	CS Rate	CS	Total	CS Rate	CS	Total	CS rate	CS	Total	CS rate	CS	Total	CS rate	CS	Total	CS rate	Con-tribu-tion to CS rate
Totals	n	N	%	n	N	%	n	N	%	n	N	%	n	N	%	n	N	%	%
	2608	7241	36.0	2709	6846	39.6	2532	6481	39.1	2571	6660	38.6	2356	6212	37.9	2623	6462	40.6	
1 Nullip, singleton, cephalic, term, spontaneous labour	246	1438	17.1	257	1262	20.4	229	1199	19.1	207	1121	18.5	174	1044	16.7	180	1056	17.0	6.9
2 Nullip, singleton, cephalic, term, induced or CS before labour	810	1624	49.9	900	1644	54.7	778	1573	49.5	829	1650	50.2	746	1540	48.4	909	1755	51.8	34.7
3 Multip, singleton, cephalic, no previous CS, term, spontaneous labour	39	1354	2.9	31	1217	2.5	35	1014	3.5	26	1104	2.4	19	964	2.0	22	901	2.4	0.8
4 Multip, singleton, cephalic, no previous CS, term, induced or CS before labour	166	930	17.8	180	883	20.4	169	903	18.7	162	910	17.8	155	887	17.5	187	965	19.4	7.1
5 Previous CS, singleton, cephalic, term	845	1052	80.3	858	1059	81.0	837	1004	83.4	871	1075	81.0	807	1004	80.4	832	1013	82.1	31.7
6 Nullip, singleton, breech	149	166	89.8	143	158	90.5	137	154	89.0	146	161	90.7	122	136	89.7	120	138	87.0	4.6
7 Multiip, singleton, breech (incl prev CS)	90	116	77.6	84	93	90.3	94	109	86.2	88	104	84.6	83	98	84.7	82	93	88.2	3.1
8 All multiple (incl prev CS)	85	127	66.9	84	127	66.1	88	115	76.5	72	100	72.0	69	94	73.4	69	91	75.8	2.6
9 All abnormal lie (incl prev CS)	20	27	74.1	20	23	87.0	18	22	81.8	8	12	66.7	19	21	90.5	5	5	100.0	0.2
10 All preterm singleton cephalic (incl prev CS)	158	407	38.8	152	380	40.0	147	388	37.9	162	423	38.3	162	424	38.2	217	445	48.8	8.3

6.2.2 Vaginal birth after Caesarean

Dr Kira Brent

Key findings

- In 2021, 1179 women birthed at NWH who had had a previous Caesarean section. The overall VBAC rate, including all women at any gestation with a previous Caesarean, was 18%.
- Of the 721 wāhine who were para 1 with a previous CS and a cephalic, singleton pregnancy at term, 505 (70%) had an elective CS. This rate has been stable since 2016.
- 33 wāhine (5%) had a prelabour emergency caesarean.
- Of the 183 wāhine (25%) who had a trial of labour, 55% had a vaginal birth. Of the 107 women who went into spontaneous labour, the VBAC rate was 66%. The vaginal birth rate after induction of labour was 38%.
- VBAC rates vary by LMC.
- The figures which follow look at trends in trial of labour and VBAC rates at NWH over the years 2006 to 2021 in the subgroup of term, cephalic, singleton, P1 wāhine, as a whole group and in relation to LMC. These figures exclude wāhine with previous vaginal birth and previous VBAC, the clinical factors most strongly associated with success.

Figure 6.21: Mode of birth among parity 1, singleton, cephalic, term prior Caesarean pregnancies - all LMCs 2006-2021

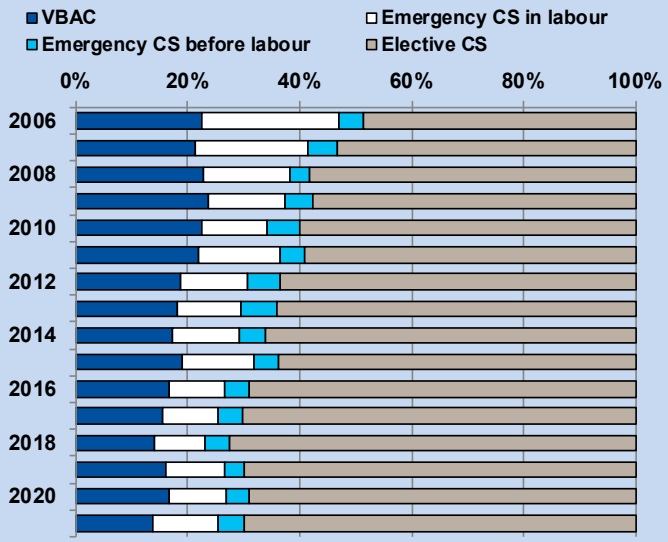


Figure 6.22: Mode of birth among parity 1 term cephalic singleton previous Caesarean pregnancies - Private Obstetrician as LMC at birth 2006-2021

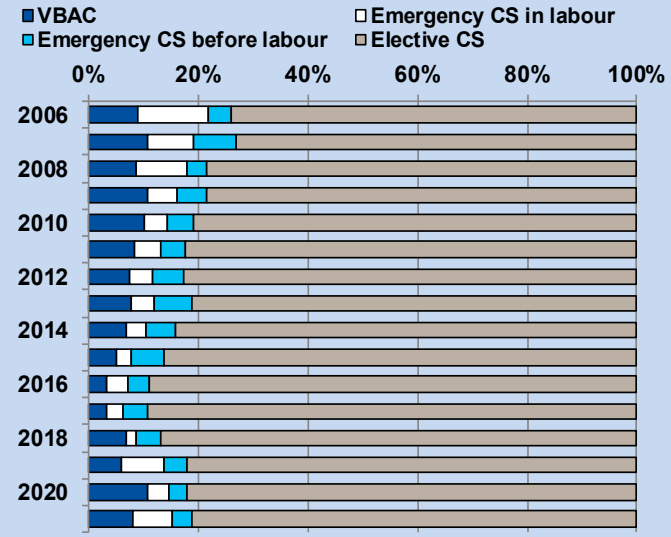


Figure 6.23: Mode of birth among parity 1 term cephalic singleton previous Caesarean pregnancies - Self-employed midwife as LMC at birth 2006-2021

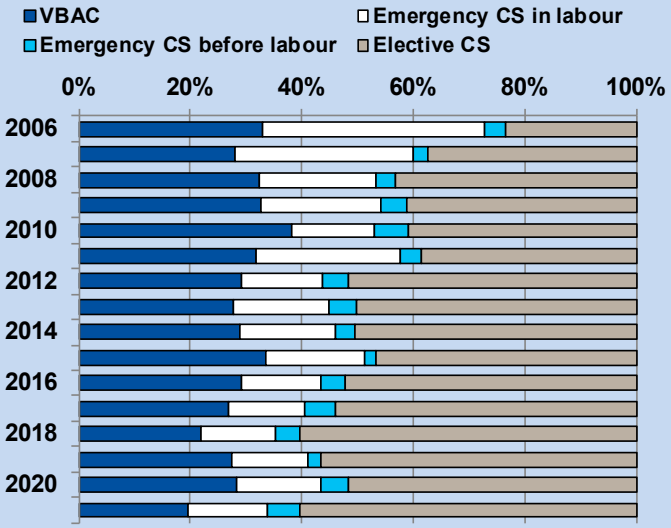
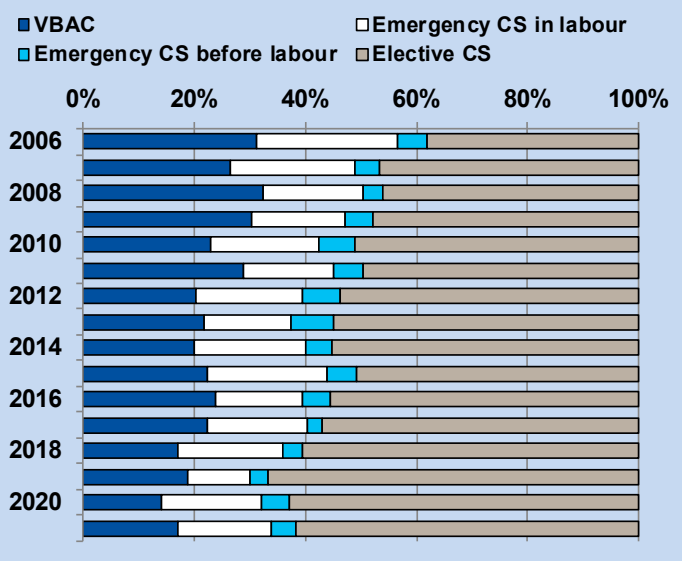


Figure 6.24: Mode of birth among parity 1 term cephalic singleton previous Caesarean pregnancies NWH as LMC at birth 2006-2021



6.2.3 Data tables: Mode of birth

Table 6.14: Mode of birth trends NWH 2007-2021 (n=mother)

Number of births	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	7709	7523	7695	7223	7400	6933	7241	6846	6481	6660	6212	6462
	%	%	%	%	%	%	%	%	%	%	%	%
Spontaneous vertex	54.7	55.6	54.2	53	53.1	51.3	50.5	45.6	46.3	48	49.8	47.4
Vaginal breech	0.8	0.8	0.6	0.8	0.9	0.5	0.7	0.5	0.6	0.7	0.6	0.5
Forceps/ Ventouse	12.2	11.1	11.8	11.5	11.5	12.6	12.8	14.3	14.1	12.8	11.7	11.5
Caesarean	32.3	32.5	33.4	34.7	34.6	35.6	36	39.6	39.1	38.6	37.9	40.6
Elective	15.9	15.7	16.6	17	17.3	18	17.7	19.4	20.6	20.4	19.2	19.7
Emergency	16.4	16.8	16.8	17.7	17.3	17.6	18.3	20.1	18.5	18.2	18.8	20.9

In the case of multiple births only one mode of birth is given and mode of birth is prioritised as Caesarean, forceps/ventouse, vaginal breech, then spontaneous vaginal.

Table 6.15: Spontaneous vaginal birth rates NWH 2010-2021

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total births (mothers)	7709	7523	7695	7223	7400	6933	7241	6846	6481	6660	6212	6462
Spontaneous vaginal birth	4217	4243	4218	3884	3992	3594	3706	3158	3034	3239	3131	3095
Incidence %	55.5	56.4	54.8	53.8	53.9	51.8	51.2	46.1	46.8	48.6	50.4	47.9
Total nullipara	3650	3539	3778	3441	3604	3321	3517	3343	3183	3202	2981	3204
Spontaneous vaginal birth	1675	1674	1746	1501	1603	1392	1427	1150	1164	1211	1238	1233
Incidence %	45.9	47.3	46.2	43.6	44.5	41.9	40.6	34.4	36.6	37.8	41.5	38.5
Total multipara	4059	3984	3917	3782	3796	3612	3724	3503	3298	3458	3231	3258
Spontaneous vaginal birth	2601	2569	2472	2383	2389	2202	2279	2008	1870	2028	1893	1862
Incidence %	64.1	64.5	63.1	63	62.9	61	61.2	57.3	56.7	58.6	58.6	57.2

Table 6.16: Caesarean section rates NWH 2010-2021

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total births (mothers)	7709	7523	7695	7223	7400	6933	7241	6846	6481	6660	6212	6462
Caesarean Sections	2491	2448	2570	2506	2559	2468	2608	2709	2532	2571	2356	2623
Incidence %	32.3	32.5	33.4	34.7	34.6	35.6	36	39.6	39.1	38.6	37.9	40.6
Total nullipara	3650	3539	3778	3441	3604	3321	3517	3343	3183	3202	2981	3204
Caesarean	1223	1222	1288	1266	1289	1206	1338	1424	1263	1295	1161	1341
Incidence %	33.5	34.5	34.1	36.8	35.8	36.3	38	42.6	39.7	40.4	38.9	41.9
Total elective	383	353	408	396	379	369	390	402	394	402	316	349
Elective %	10.5	10	10.8	11.5	10.5	11.1	11.1	12	12.4	12.6	10.6	10.9
Total emergency	840	869	880	870	910	837	948	1022	869	893	845	992
Emergency %	23	24.6	23.3	25.3	25.2	25.2	27	30.6	27.3	27.9	28.3	31
Total multipara	4059	3984	3917	3782	3796	3612	3724	3503	3298	3458	3231	3258
Caesarean	1268	1226	1282	1240	1270	1262	1270	1285	1269	1276	1195	1282
Incidence %	31.2	30.8	32.7	32.8	33.5	34.9	34.1	36.7	38.5	36.9	37	39.3
Total elective	843	830	868	831	902	878	892	929	942	959	874	923
Elective %	20.8	20.8	22.2	22	23.8	24.3	24	26.5	28.6	27.7	27.1	28.3
Total emergency	425	396	414	409	368	384	378	356	327	317	321	359
Emergency %	10.5	9.9	10.6	10.8	9.7	10.6	10.2	10.2	9.9	9.2	9.9	11

Table 6.17: Mode of birth by parity and previous Caesrean section status NWH 2021

	Nullipara preterm		Nullipara term		Multipara no prev CS preterm		Multipara no prev CS term		Multipara prev CS preterm		Multipara prev CS term	
	n=	286	n=	2918	n=	184	n=	1895	n=	127	n=	1052
	n	%	n	%	n	%	n	%	n	%	n	%
Spontaneous vertex	104	36.4	1112	38.1	93	50.5	1592	84.0	22	17.3	141	13.4
Vaginal breech	17	5.9	0	0.0	10	5.4	1	0.1	3	2.4	0	0.0
Operative vaginal birth	18	6.3	612	21.0	1	0.5	70	3.7	2	1.6	41	3.9
Ventouse	10	3.5	374	12.8	1	0.5	40	2.1	0	0.0	20	1.9
Forceps	8	2.8	238	8.2	0	0.0	30	1.6	2	1.6	21	2.0
Caesarean section	147	51.4	1194	40.9	80	43.5	232	12.2	100	78.7	870	82.7
Emergency	105	36.7	887	30.4	55	29.9	117	6.2	42	33.1	145	13.8
Elective	42	14.7	307	10.5	25	13.6	115	6.1	58	45.7	725	68.9

Table 6.18: Mode of birth at term by LMC (nullipara) NWH 2021

	Self-employed Midwife		PVT Obstetrician		NW		Other*	
	n=	1478	n=	870	n=	562	n=	8
	n	%	n	%	n	%	n	%
SVD	632	42.8	222	25.5	253	45.0	5	62.5
Vaginal breech	0	0.0	0	0.0	0	0.0	0	0.0
Forceps	122	8.3	80	9.2	36	6.4	0	0.0
Ventouse	225	15.2	85	9.8	63	11.2	1	12.5
CS elective	68	4.6	192	22.1	47	8.4	0	0.0
CS emergency	431	29.2	291	33.4	163	29.0	2	25.0

*Other includes Other DHB and unbooked

Table 6.19: Mode of birth at term by LMC at birth (standard primipara) NWH 2021

	Self-employed Midwife		PVT Obstetrician		NW		Other*	
	n=	593	n=	326	n=	176	n=	5
	n	%	n	%	n	%	n	%
SVD	295	49.7	114	35.0	101	57.4	3	60.0
Vaginal breech	0	0.0	0	0.0	0	0.0	0	0.0
Forceps	54	9.1	41	12.6	7	4.0	0	0.0
Ventouse	100	16.9	34	10.4	24	13.6	1	20.0
CS elective	11	1.9	50	15.3	10	5.7	0	0.0
CS emergency	133	22.4	87	26.7	34	19.3	1	20.0

*Other includes Other DHB and unbooked

Table 6.20: Mode of birth at term by LMC at birth (multipara, no previous CS) NWH 2021								
	Self-employed Midwife		PVT Obstetrician		NW		Other*	
	n=	994	n=	412	n=	468	n=	21
	n	%	n	%	n	%	n	%
SVD	876	88.1	321	77.9	376	80.3	19	90.5
Vaginal breech	0	0.0	0	0.0	1	0.2	0	0.0
Forceps	12	1.2	10	2.4	7	1.5	1	4.8
Ventouse	20	2.0	10	2.4	10	2.1	0	0.0
CS elective	36	3.6	45	10.9	34	7.3	0	0.0
CS emergency	50	5.0	26	6.3	40	8.5	1	4.8

*Other includes Other DHB and unbooked

Table 6.21: Mode of birth at term by LMC at birth (multipara, previous CS) NWH 2021								
	Self-employed Midwife		PVT Obstetrician		NW		Other*	
	n=	334	n=	415	n=	300	n=	3
	n	%	n	%	n	%	n	%
SVD	56	16.8	30	7.2	54	18.0	1	33.3
Vaginal breech	0	0.0	0	0.0	0	0.0	0	0.0
Forceps	3	0.9	13	3.1	5	1.7	0	0.0
Ventouse	12	3.6	2	0.5	6	2.0	0	0.0
CS elective	204	61.1	331	79.8	189	63.0	1	33.3
CS emergency	59	17.7	39	9.4	46	15.3	1	33.3

*Other includes Other DHB and unbooked

Table 6.22: Mode of birth by ethnicity NWH 2021

	Māori		Pacific		Other Asian		Indian		European		MELAA	
	n=	550	n=	690	n=	1531	n=	804	n=	2556	n=	302
	n	%	n	%	n	%	n	%	n	%	n	%
Spontaneous vertex	335	60.9	454	65.8	715	46.7	310	38.6	1106	43.3	133	44.0
Vaginal breech	3	0.5	3	0.4	4	0.3	6	0.7	14	0.5	1	0.3
Forceps	15	2.7	8	1.2	89	5.8	55	6.8	115	4.5	16	5.3
Ventouse	25	4.5	25	3.6	144	9.4	75	9.3	151	5.9	20	6.6
CS elective	68	12.4	68	9.9	286	18.7	137	17.0	632	24.7	72	23.8
CS emergency	104	18.9	132	19.1	293	19.1	221	27.5	538	21.0	60	19.9

Table 6.23: Mode of birth by ethnicity (nullipara) NWH 2021

	Māori		Pacific		Other Asian		Indian		European		MELAA	
	n=	195	n=	239	n=	777	n=	479	n=	1365	n=	129
	n	%	n	%	n	%	n	%	n	%	n	%
Spontaneous vertex	98	50.3	141	59.0	283	36.4	148	30.9	501	36.7	37	28.7
Vaginal breech	1	0.5	2	0.8	2	0.3	4	0.8	7	0.5	1	0.8
Forceps	11	5.6	5	2.1	72	9.3	49	10.2	95	7.0	13	10.1
Ventouse	19	9.7	22	9.2	122	15.7	64	13.4	134	9.8	18	14.0
CS elective	11	5.6	8	3.3	90	11.6	39	8.1	183	13.4	15	11.6
CS emergency	55	28.2	61	25.5	208	26.8	175	36.5	445	32.6	45	34.9

Table 6.24: Mode of birth by ethnicity (multipara) NWH 2021

	Māori		Pacific		Other Asian		Indian		European		MELAA	
	n=	355	n=	451	n=	754	n=	325	n=	1191	n=	173
	n	%	n	%	n	%	n	%	n	%	n	%
Spontaneous vertex	237	66.8	313	69.4	432	57.3	162	49.8	605	50.8	96	55.5
Vaginal breech	2	0.6	1	0.2	2	0.3	2	0.6	7	0.6	0	0.0
Forceps	4	1.1	3	0.7	17	2.3	6	1.8	20	1.7	3	1.7
Ventouse	6	1.7	3	0.7	22	2.9	11	3.4	17	1.4	2	1.2
CS elective	57	16.1	60	13.3	196	26.0	98	30.2	449	37.7	57	32.9
CS emergency	49	13.8	71	15.7	85	11.3	46	14.2	93	7.8	15	8.7

Table 6.25: Mode of Birth by maternal age (nullipara) NWH 2021

	≤20		21-25		26-30		31-35		36-40		>40	
	n=	85	n=	296	n=	948	n=	1320	n=	473	n=	82
	n	%	n	%	n	%	n	%	n	%	n	%
Spontaneous vertex	59	69.4	174	58.8	406	42.8	442	33.5	120	25.4	15	18.3
Vaginal breech	1	1.2	2	0.7	3	0.3	6	0.5	5	1.1	0	0.0
Forceps	1	1.2	15	5.1	74	7.8	122	9.2	30	6.3	4	4.9
Ventouse	4	4.7	25	8.4	133	14.0	170	12.9	50	10.6	2	2.4
CS elective	1	1.2	13	4.4	64	6.8	157	11.9	91	19.2	23	28.0
CS emergency	19	22.4	67	22.6	268	28.3	423	32.0	177	37.4	38	46.3

Table 6.26: Mode of Birth by maternal age (multipara) NWH 2021

	≤20		21-25		26-30		31-35		36-40		>40	
	n=	26	n=	200	n=	582	n=	1328	n=	962	n=	160
	n	%	n	%	n	%	n	%	n	%	n	%
Spontaneous vertex	19	73.1	145	72.5	400	68.7	731	55.0	491	51.0	62	38.8
Vaginal breech	1	3.8	1	0.5	1	0.2	5	0.4	3	0.3	3	1.9
Forceps	0	0.0	2	1.0	7	1.2	20	1.5	19	2.0	5	3.1
Ventouse	0	0.0	3	1.5	7	1.2	25	1.9	22	2.3	4	2.5
CS elective	1	3.8	28	14.0	108	18.6	391	29.4	327	34.0	68	42.5
CS emergency	5	19.2	21	10.5	59	10.1	156	11.7	100	10.4	18	11.3

Table 6.27: VBAC: Mode of birth among parity 1 wāhine with previous CS by mode of onset of birth (N=819) NWH 2021

	Previous Caesarean (Parity 1), all gestations									
	Spontaneous labour		Induced labour		CS elective		CS emergency before onset of labour		Total	
	n=	127	n=	81	n=	560	n=	51	n=	819
	n	%	n	%	n	%	n	%	n	%
Spontaneous Vaginal birth	57	44.9	23	28.4	0	0	0	0	80	9.8
Operative vaginal birth	27	21.3	9	11.1	0	0	0	0	36	4.4
CS elective	0	0.0	0	0.0	560	100	0	0	560	68.4
CS emergency	43	33.9	49	60.5	0	0	51	100	143	17.5

Table 6.28: VBAC: Mode of birth among parity 1, singleton, cephalic, term prior Caesarean by mode of onset of birth (N=721) NWH 2021

	Parity 1, previous Caesarean, singleton, cephalic, term									
	Spontaneous labour		Induced labour		CS elective		CS emergency before onset of labour		Total	
	n=	107	n=	76	n=	505	n=	33	n=	721
	n	%	n	%	n	%	n	%	n	%
Spontaneous Vaginal birth	46	43.0	20	26.3	0	0	0	0	66	9.2
Operative vaginal birth	25	23.4	9	11.8	0	0	0	0	34	4.7
CS elective	0	0.0	0	0.0	505	100	0	0	505	70.0
CS emergency	36	33.6	47	61.8	0	0	33	100	116	16.1

Table 6.29: VBAC: Mode of birth among parity 1, singleton, cephalic, term prior Caesarean by LMC at birth (n=721) NWH 2021

	Parity 1, previous Caesarean, singleton, cephalic, term							
	IMW		Pvt Obstetrician		NWH*		Total	
	n=	239	n=	328	n=	154	n=	721
	n	%	n	%	n	%	n	%
Spontaneous Vaginal birth	33	13.8	14	4.3	19	12.3	66	9.2
Operative vaginal birth	14	5.9	13	4.0	7	4.5	34	4.7
CS elective	144	60.3	266	81.1	95	61.7	505	70.0
CS emergency	48	20.1	35	10.7	33	21.4	116	16.1

*National Women's Health patients include Community, Medical, Diabetic, Other DHB and unbooked

Table 6.30: Indication for in labour emergency Caesarean section all gestations (spontaneous or induced onset of labour) (N=825) NWH 2021

	n=	825
	n	%
1a Fetal distress	244	29.6
1b Other fetal indication	25	3.0
2a Fetal intolerance of augmented labour	51	6.2
2b Augmentation causes hyperstimulation	1	0.1
2c Poor uterine response to optimal augmentation	46	5.6
2d Suboptimal augmentation	5	0.6
2e Inefficient uterine action - no oxytocin	12	1.5
3 Efficient uterine action - obstructed labour	421	51.0
4b Maternal request	11	1.3
4a Other non-medical	5	0.6
Missing	4	0.5

6.3 Instrumental vaginal birth

The rate of instrumental birth has been fairly stable over recent years, with an overall rate of 11.6% in 2021 (Figure 6.9). The rates are higher in nullipara as expected, with some variation by LMC (Figure 6.26).

Figure 6.25: Operative vaginal birth NWH 1992-2021

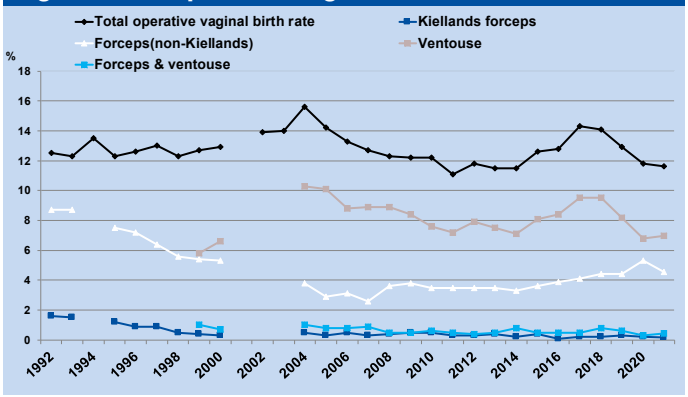
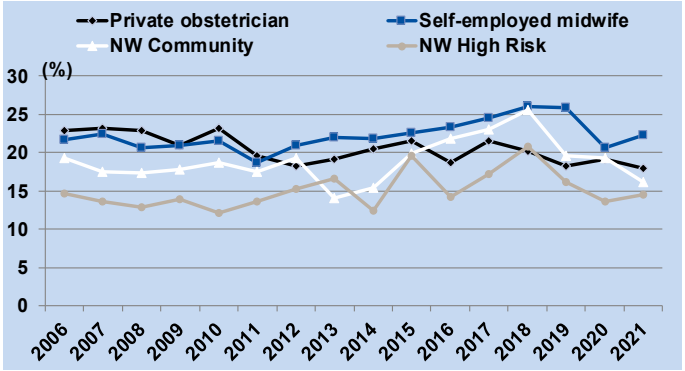


Figure 6.26: Operative vaginal birth rate among all nullipara by LMC 2006 – 2021



6.3.1 Double instrumental and attempted instrumental prior to emergency Caesarean births

These data apply to the birth of a pēpi using more than one instrument (e.g. ventouse and forceps, or different types of forceps) and to birth of a pēpi by CS after an attempted vaginal instrumental birth.

Postpartum haemorrhage rates with double instrumental birth are higher than with single instrument, but lower than with emergency CS, whether preceded by instrumental attempt or not. It is interesting that despite higher PPH rates with emergency CS, transfusion rates are very low in this group. Perineal trauma is increased with double versus single instrumental birth, this may be due to forceps usually being the second instrument. Neonatal outcome data for the 28 pēpi born after double instrumental seem reassuring in comparison to the 46 born by emergency CS after attempted instrumental birth.

Figure 6.27: Maternal outcomes following double or single instrumental vaginal birth, attempted instrumental vaginal birth prior to emergency CS and emergency CS in labour NWH 2021

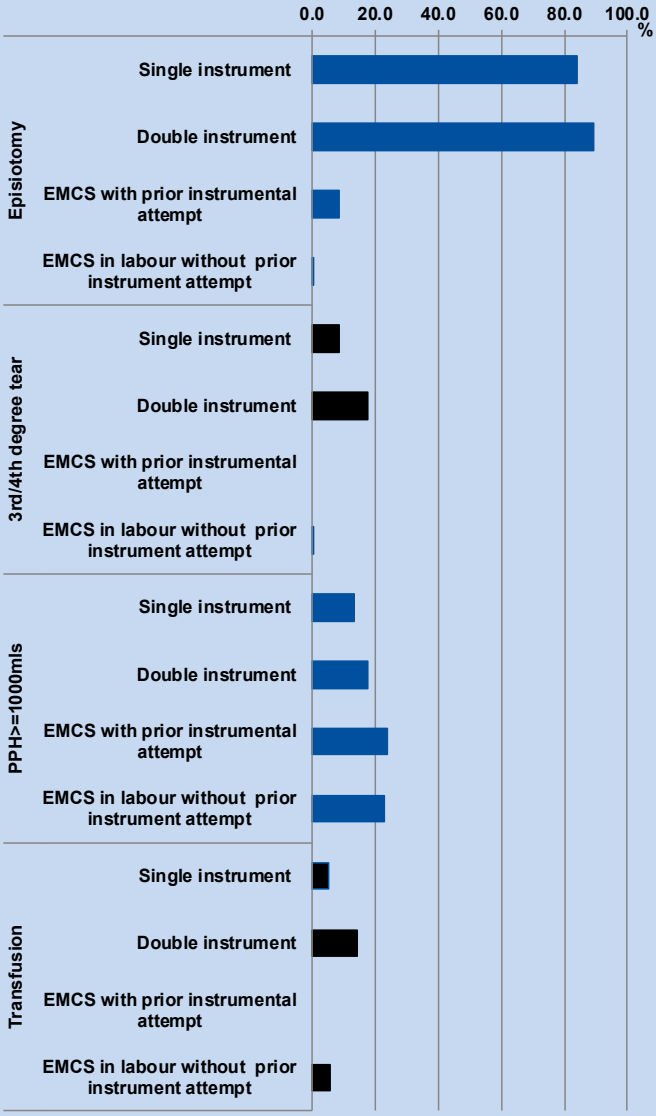


Figure 6.28: Neonatal outcomes following double or single instrumental vaginal birth, attempted instrumental vaginal birth prior to emergency CS and emergency CS in labour NWH 2020

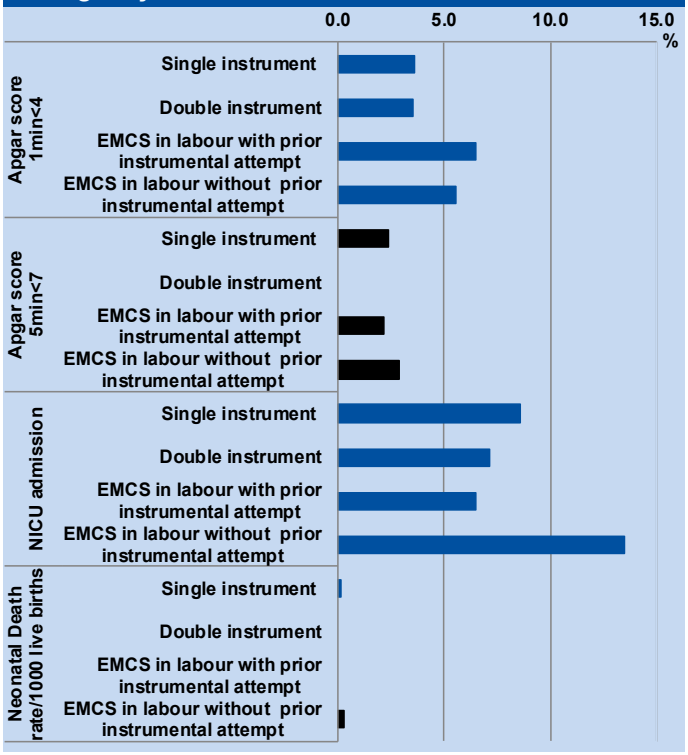


Table 6.31: Type of instrument used in singleton operative vaginal birth NWH 2021

	Number (women)	
	N=	6371
	n	%
Total operative vaginal birth	742	11.6
Total forceps delivery	299	4.7
Keillands forceps	11	0.2
Neville Barnes forceps	267	4.2
Wrigley forceps	15	0.2
Other	7	0.1
Total Ventouse delivery	443	7.0
More than one instrument used	28	0.4
Two forceps	0	0.0
Forceps+ventouse	28	0.4
Any instrument used before spontaneous vaginal birth	0	0.0
Any instrument used before CS emergency	46	0.7

6.4 Breech presentation

6.4.1 Breech birth

In 2021, 87% of wāhine with breech presentation at term had a CS. Overall in 2021, 202 CS were performed at all gestations where the presentation was breech in a singleton. 154 of these were at term.

6.4.2 External cephalic version

This section reports statistics relating to wāhine who attended the Day Assessment Unit at NWH for external cephalic version (ECV) for breech presentation. Data regarding ECV are captured directly into Healthware at the time of the procedure.

Key Findings

- In 2021, a total of 85 wāhine (only 42% of wāhine at term with singleton breech presentation) were referred for ECV. This varied by LMC.
- Of the 82 referrals where ECV was attempted, 44 were successful. The ECV success rate was 54%, an improvement on the past 2 years and consistent with international rates (50-60%).
- 96% of successful ECVs remained cephalic at the time of birth, and four wāhine whose ECV was unsuccessful also had a cephalic presentation at birth. Of the 52 wāhine who had a successful ECV, 31 had a vaginal birth (71%). This is consistent with the range of rates reported internationally (63-85%).

ECV continues to be a safe procedure at NWH, effective in reducing the number of breech presentations at birth and the number of Caesareans performed. The challenge still remains to increase the numbers of wāhine undergoing attempted ECV, and to increase the success rate of ECV, including maintaining a spinal ECV service.

Table 6.32: Mode of birth following attempted ECV NWH 2021

	Failed ECV		Successful ECV	
	n=	38	n=	44
Type of Birth	n	%	n	%
Vaginal	0	0.0	31	70.5
SVB	0	0.0	19	43.2
Operative vaginal	0	0.0	12	27.3
CS elective	35	92.1	1	2.3
CS emergency	3	7.9	12	27.3
Presentation at birth				
Cephalic	4	10.5	42	95.5
Breech	34	89.5	2	4.5

6.4.3 Data tables: Operative vaginal birth, vaginal breech birth

Table 6.33: Operative vaginal birth rates 2010-2021

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total births (mothers)	7709	7523	7695	7223	7400	6933	7241	6846	6481	6660	6212	6462
Total operative vaginal births	942	832	907	833	849	871	927	979	915	850	725	744
Incidence %	12.2	11.1	11.8	11.5	11.5	12.6	12.8	14.3	14.1	12.8	11.7	11.5
Total nullipara	3650	3539	3778	3441	3604	3321	3517	3343	3193	3202	2981	3204
Total nullipara operative vaginal births	752	643	744	674	712	723	752	769	756	696	582	630
Nulliparous operative vaginal birth rate (%)	20.6	18.2	19.7	19.6	19.8	21.8	21.4	23	23.8	21.7	19.5	19.7
Total multipara	4059	3984	3917	3782	3796	3612	3724	3503	3298	3458	3231	3258
Total multipara operative vaginal births	190	189	163	159	137	148	175	210	159	154	143	114
Multiparous operative vaginal birth rate (%)	4.7	4.7	4.2	4.2	3.6	4.1	4.7	6	4.8	4.5	4.4	3.5

Table 6.34: Maternal outcome following double and single instrumental vaginal birth, attempted instrumental vaginal birth prior to emergency caesarean section and emergency caesarean in labour NWH 2021

	Single instrument (vaginal birth)		Double instrument (vaginal birth)		Emergency caesarean with prior instrumental attempt		Emergency caesarean in labour without prior instrumental attempt	
	N= 716		N= 28		N= 46		N= 779	
	n	%	n	%	n	%	n	%
Episotomy	601	83.939	25	89.3	4	8.696	2	0.257
Third or fourth degree tear	61	8.520	5	17.9	0	0	1	0.128
PPH≥ 1000mls	95	13.268	5	17.9	11	23.9	177	22.7
Transfusion	37	5.168	4	14.3	0	0.0	44	5.6

Table 6.35: Neonatal outcomes following double and single instrumental vaginal birth, attempted instrumental vaginal birth prior to emergency CS and emergency CS in labour NWH 2021

	Single instrument (vaginal birth)		Double instrument (vaginal birth)		Emergency CS with prior instrumental attempt		Emergency CS in labour without prior instrumental attempt	
	N= 719		N= 28		N= 46		N= 793	
	n	%	n	%	n	%	n	%
Apgar score 1 min <4	26	3.6	1	3.571	3	6.5	44	5.5
Apgar score 5min <7	17	2.4	0	0	1	2.2	23	2.9
NICU admission	62	8.6	2	7.143	3	6.5	107	13.5
Neonatal death rate (/1000 live births)	1	1.4	0		0		2	2.5

Table 6.36: Breech birth 2009-2021

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total pēpi born	7897	7866	7690	7863	7377	7551	7074	7368	6974	6597	6762	6310	6553
Total breech births	335	434	406	463	401	367	345	351	317	326	322	292	279
Percent of total births	4.2	5.5	5.2	5.9	5.4	4.9	4.9	4.8	4.5	4.9	4.8	4.6	4.3
Total singleton pēpi	7576	7556	7360	7533	7072	7253	6796	7114	6719	6366	6560	6118	6371
Total singleton breech	335	340	310	356	319	294	265	282	251	263	265	234	231
Percent of singletons	4.4	4.3	4.2	4.7	4.5	4.1	3.9	4	3.7	4.1	4	3.8	3.6
Total multiple pēpi	321	310	330	330	305	298	278	254	255	231	202	192	182
Total multiple breech	89	94	96	107	82	73	80	69	66	63	57	58	48
Percent of multiple births	27.7	30.3	34.3	32.4	26.9	24.5	28.8	27.2	25.9	27.3	28.2	30.2	26.4

Table 6.37: Mode of birth by gestation for breech presentation (singletons) NWH 2021

	Singleton Births (N)	Singleton breech	% Breech/total singleton birth	Breech & CS	% CS/singleton breech
Total singleton births	6371	231	4	202	87
20-24 weeks	46	20	43	0	0
25-31 weeks	115	23	20	17	74
32-36 weeks	364	34	9	33	97
≥37 weeks	5846	154	3	152	99

Table 6.38: Referral for ECV (wāhine at term with singleton breech presentation or attempted ECV) by demographic and clinical characteristics NWH 2021

	Singleton Breech at term or attempted ECV	ECV Referral		No referral for ECV	
	N=201	n=	85	n=	116
	N	n	%	n	%
Age (years)					
≤20	4	3	75	1	25
21-30	58	30	52	28	48
31-40	132	52	39	80	61
≥41	7	0	0	7	100
Ethnicity (prioritised)					
Māori/Pacific Island	23	12	52	11	48
Other Asian	44	16	36	28	64
Indian	23	10	43	13	57
NZ/Other European	100	43	43	57	57
MELAA	11	4	36	7	64
BMI					
<18.5	2	0	0	2	100
18.5-24.99	108	50	46	58	54
25-29.99	53	22	42	31	58
30-34.99	22	7	32	15	68
35-39.99	8	4	50	4	50
≥40	8	2	25	6	75
LMC at Birth					
Self-employed Midwife	93	48	52	45	48
NW Community	28	14	50	14	50
NW Diabetes/ Medical	15	4	27	11	73
Private Obstetrician	64	19	30	45	70
Other DHB	1	0	0	1	100
Previous CS					
Yes	41	7	17	34	83
No	160	78	49	82	51

6.5 Obstetric analgesia and anaesthesia

Dr Matt Drake

Data on use of analgesia and anaesthesia for birth are collected by staff in Labour and Birthing Suite. These data include method of analgesia and time, dilatation and indication for epidural. Some tables do not include elective CS patients as these patients did not access the Labour and Birthing Suite during their admission.

When we have used the term epidural/spinal in this chapter, this means any of epidural, combined spinal and epidural (CSE), or spinal anaesthesia. When the term used is epidural, this includes epidural and CSE.

Key Findings

Nearly two thirds (3064/4940(62.0%)) of all labouring wāhine chose epidural analgesia, a similar number to 2020, making it the joint second most popular form of labour analgesia after Entonox (3158/4940(63.9%)).

- Epidurals were more commonly used amongst primiparous (2082/2727(76.3%)) than multiparous wāhine (982/2213(44.4%)), with induction of labour being associated with greater epidural use (87.5% of primiparous wāhine).
- Epidurals were chosen significantly more commonly by nulliparous European wāhine (74.7%) compared to 65.7% of Māori and 54.0% of Pacific wāhine.
- Nulliparous wāhine who had a private obstetrician LMC were more likely to use epidural analgesia for labour (85.7%) than wāhine who had a self-employed midwife (68.6%) or NW community midwife (67.9%).
- Data on the use of General Anaesthesia (GA) at the time of birth includes those GAs given postpartum, for example for management of retained placenta or postpartum haemorrhage, as well as those administered a GA for delivery.
    - It is unfortunately not possible to determine the exact timing of GA administration. GA is higher risk for the mother during pregnancy than immediately postpartum. Conversion from spinal/epidural anaesthesia to GA during surgery is associated with higher rates of anaesthesia complications compared to a planned GA.
    - Reassuringly only 0.9% of wāhine received both a GA and epidural/spinal for an elective caesarean and 1.8% for an emergency caesarean; it is likely that the majority of these, though not all, reflect insufficiently dense anaesthesia under spinal/epidural that required an additional GA to be administered to ensure comfort for the wāhine. This remains well within the accepted international standard of <5% of anaesthetics started under regional block and converted to GA.

Figure 6.29: Epidural use among wāhine with spontaneous and induced labour NWH 2021

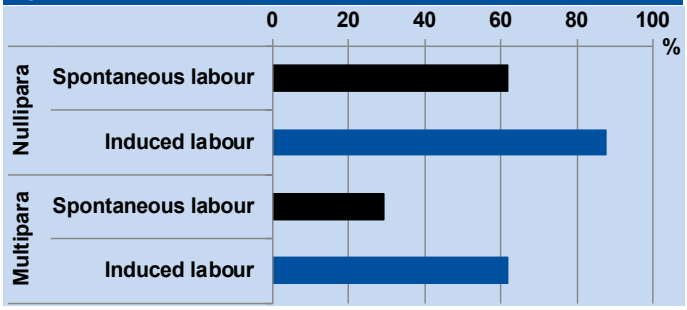


Figure 6.30: Analgesic use and maternal age among labouring nulliparous wāhine NWH 2021

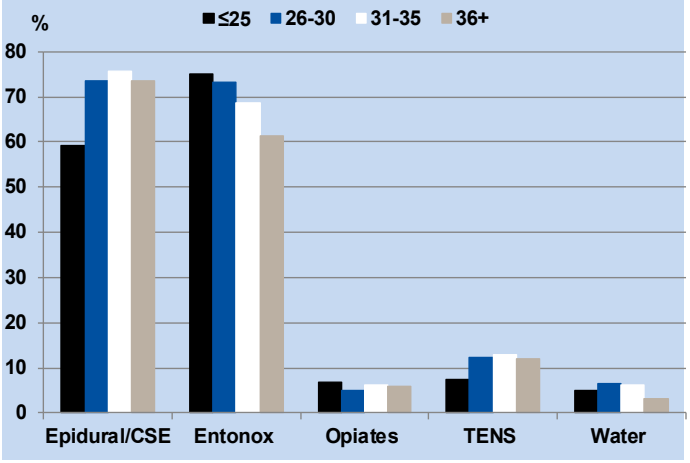


Figure 6.31: Analgesic use and LMC at birth among labouring nulliparous wāhine NWH 2021

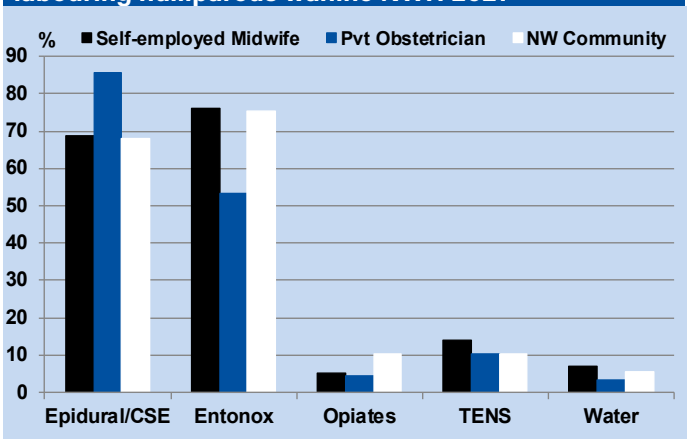
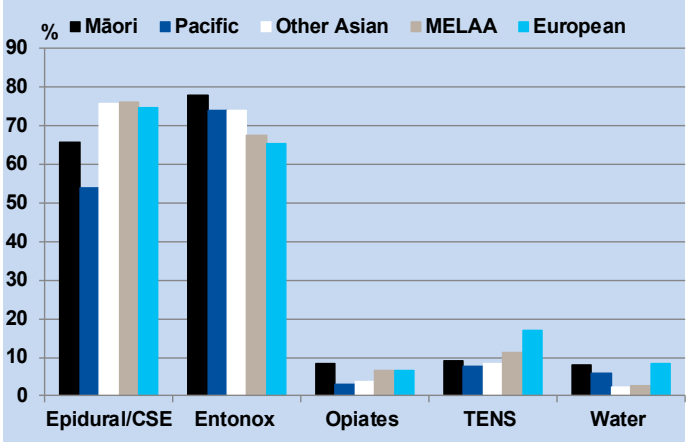


Figure 6.32: Analgesic use and ethnicity among nulliparous labours



6.5.1 Data tables: Obstetric analgesia

Table 6.39: Analgesia use by parity and mode of birth NWH 2021

	Total	Epidural/Spinal		Entonox		Opiates**		TENS		Water	
	N	n	%	n	%	n	%	n	%	n	%
All wāhine	6462	4539	70.2	3229	50.0	237	3.7	410	6.3	208	3.2
Mode of onset of birth											
CS elective	1272	1251	98.3	49	3.9	6	0.5	1	0.1	0	0.0
CS emergency before onset of labour	250	224	89.6	22	8.8	5	2.0	2	0.8	0	0.0
Labouring women*											
Nullipara	2727	2082	76.3	1905	69.9	161	5.9	325	11.9	156	5.7
Multipara	2213	982	44.4	1253	56.6	65	2.9	82	3.7	52	2.3
Induced labour											
Nullipara	1544	1351	87.5	1023	66.3	117	7.6	182	11.8	48	3.1
Multipara	1024	635	62.0	549	53.6	33	3.2	32	3.1	15	1.5
Spontaneous labour											
Nullipara	1183	731	61.8	882	74.6	44	3.7	143	12.1	108	9.1
Multipara	1189	347	29.2	704	59.2	32	2.7	50	4.2	37	3.1

* Exclude elective caesarean and emergency caeserean before onset of labour
**Opiates = if any of pethidine OR morphine OR remifentanyl is used.

Table 6.40: GA use and mode of birth NWH 2021

	Total	GA only		GA + epidural/spinal		Total GA	
	N	n	%	n	%	n	%
Total	6462	143	2.2	43	0.7	186	2.9
Spont vaginal birth	3095	52	1.7	5	0.2	57	1.8
Operative vaginal	744	6	0.8	3	0.4	9	1.2
CS elective	1272	21	1.7	11	0.9	32	2.5
CS emergency	1351	64	4.7	24	1.8	88	6.5

Table 6.41: Epidural use (epidural or CSE) among wāhine with spontaneous and induced labour 2009-2021

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Number of births	**7753**	**7709**	**7523**	**7695**	**7223**	**7400**	**6933**	**7241**	**6846**	**6481**	**6660**	**6212**	**6462**
Number wāhine with spontaneous labour	4125	4007	3628	3666	3270	3523	3139	3292	2924	2633	2703	2434	2372
Spontaneous labour and epidural	1717	1686	1483	1571	1297	1423	1237	1301	1249	1125	1146	1107	1037
%	41.6	42.1	40.9	42.9	39.7	40.4	39.4	39.5	42.7	42.7	42.4	45.5	43.7
Number of wāhine with induced labour	2238	2214	2463	2485	2438	2315	2289	2423	2312	2290	2381	2384	2568
Induced labour and epidural	1599	1557	1707	1780	1709	1583	1624	1702	1660	1642	1721	1790	1873
%	71.4	70.3	69.3	71.6	70.1	68.3	70.9	70.2	71.8	71.7	72.3	75.1	72.9

Table 6.42: Analgesic use and LMC among labouring nulliparous wāhine NWH 2021

	Total	Epidural/CSE		Entonox		Opiates*		TENS		Water	
	N	n	%	n	%	n	%	n	%	n	%
Independent midwife	1480	1015	68.6	1126	76.1	75	5.1	205	13.9	106	7.2
Pvt Obstetrician	677	580	85.7	362	53.5	29	4.3	71	10.5	22	3.2
GP	0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
NWH Community	443	301	67.9	333	75.2	46	10.4	45	10.2	24	5.4
NWH Diabetes	34	25	73.5	26	76.5	0	0.0	0	0.0	0	0.0
NWH Medical	71	51	71.8	42	59.2	8	11.3	3	4.2	4	5.6
Other DHB	10	4	40.0	9	90.0	0	0.0	0	0.0	0	0.0
Unbooked	12	1	8.3	7	58.3	3	25.0	1	8.3	0	0.0

*Opiates = if any of pethidine OR morphine OR remifentanyl is used.

Table 6.43: Analgesic use and ethnicity (prioritised) among labouring nulliparous wāhine NWH 2021

	Total	Epidural/CSE		Entonox		Opiates		TENS		Water	
	N	n	%	n	%	n	%	n	%	n	%
Māori	175	115	65.7	136	77.7	15	8.6	16	9.1	14	8.0
Pacific	224	121	54.0	166	74.1	7	3.1	17	7.6	13	5.8
Indian	425	315	74.1	305	71.8	29	6.8	32	7.5	14	3.3
Other Asian	655	495	75.6	484	73.9	24	3.7	56	8.5	16	2.4
MELAA	108	82	75.9	73	67.6	7	6.5	12	11.1	3	2.8
European	1123	839	74.7	732	65.2	76	6.8	191	17.0	96	8.5
Other/not stated	17	10	58.8	9	52.9	3	17.6	1	5.9	0	0.0

Table 6.44: Analgesic use and maternal age among labouring nulliparous wāhine NWH 2021										
Maternal age (years)	Total	Epidural/CSE		Entonox		Opiates		TENS		Water	
	N	n	%	n	%	n	%	n	%	n	%
≤20	82	45	54.9	63	76.8	6	7.3	3	3.7	6	7.3
21-25	276	167	60.5	206	74.6	18	6.5	24	8.7	12	4.3
26-30	855	628	73.5	625	73.1	44	5.1	106	12.4	56	6.5
31-35	1111	841	75.7	764	68.8	69	6.2	144	13.0	69	6.2
36-40	355	262	73.8	224	63.1	20	5.6	43	12.1	11	3.1
>40	48	34	70.8	23	47.9	4	8.3	5	10.4	2	4.2

6.6 Labour and birth at Birthcare Auckland

Ann Hanson

The data for mothers birthing at Birthcare has been provided via the Patient Information System at Birthcare. The data for mothers transferred to Auckland City Hospital (ACH) in labour and birthed at NWH was extracted from the NWH clinical database Healthware.

Birthcare is a primary maternity hospital located close to ACH. Birthcare's vision is to provide an environment that supports active labour and physiological birth to all wāhine who have a low-risk pregnancy. In June 2018, Birthcare's birthing rooms were refurbished to support wāhine to achieve an active, physiological birth in an environment where wāhine and their whānau are able to relax and feel totally supported.

Birthcare's aim continues to be to increase the number of wāhine choosing to birth at Birthcare and to support them, their whānau, and the LMC midwives to achieve their goals.

On 1st May 2021, Birthcare commenced Natural Childbirth Classes for women registered to birth at Birthcare. These are free to wāhine and are funded by Birthcare. The classes are delivered by two LMC Midwives with a long history of physiological birthing at Birthcare. Birthcare and Auckland have jointly worked on an Early Labour pack which includes a pamphlet, oils, panadol and availability of TENS machines to support early labour at home. This gives both wāhine and midwives more tools in their tool kit to reduce early admission in labour. The plan is to introduce this at Birthcare in the near future.

Findings

299 wāhine commenced labour at Birthcare in 2021 (161 Multipara and 138 Nullipara). 246 birthed at Birthcare. Of women who commenced labour at Birthcare, 36% were aged <31 yrs; 11% were Māori, 6% Pacific, 17% Asian, 58% European, and 8% other ethnicites. This indicates further work needs to be done to increase representation of New Zealand Māori and Pasifika wāhine in birthing numbers at Birthcare. This work should include strengthening the relationship with Te Manawa o Hine and Birthcare. Paula Ryan has recently been appointed Associate Director of Midwifery - Physiological Birth and along with Deb Pittam, Director of Midwifery will be part of the Primary Birthing working group.

The number of women commencing labour at Birthcare dropped in 2021 to 299, from 361 in 2020 and 376 in 2019. Unfortunately, over the last few years some LMCs who birthed large numbers of wāhine at Birthcare have retired and/or made lifestyle changes which has impacted greatly on the birth numbers. Fifteen LMC midwives provide antenatal clinics at Birthcare. These midwives birthed 63 wāhine as a group, many being unregistered to birth at Birthcare but attended clinic in established labour. To encourage and support 1st year of practice LMCs, clinics are free of charge for 6 months up to a year. There has been an increase in the number of Asian midwives providing clinics at Birthcare in 2021. Going forward this should result in an increase in Asian wāhine choosing to birth at Birthcare.

Another impact on birthing numbers has been COVID-19. Whilst there is no published data from the Ministry of Health, midwives providing clinics at Birthcare report an increase in homebirths that they normally would not conduct. As New Zealand starts to reduce restrictions, we anticipate an increase in Birthcare births.

Effective management of third stage has been reflected in only four women having a blood loss of greater than 500mls, which in turn has greatly reduced the need for transfer for postpartum haemorrhage.

Transfer rate in labour in 2021 was 19% (31% among nullipara and 6% among multipara).

Breastfeeding

Birthcare's exclusive breastfeeding rate (EBR) of 93% continues to be above the national average for primary maternity facilities (91.1%). In 2021, wāhine who transferred into Birthcare had an exclusive breastfeeding rate of 84% on admission, and a rate of 69% on discharge. Exclusive breastfeeding on discharge for those women who transferred to Birthcare was 60% for caesarean section, 63% for operative vaginal birth and 78% for spontaneous vaginal births.

Postnatal Stay at Birthcare

There are 45 postnatal beds at Birthcare. In 2021 (calendar year), Birthcare provided postnatal stays for 3,371 wāhine who birthed at NWH, which represents 52.4% of the total births at NWH. This was lower than in previous years due to COVID-19 pandemic which resulted in wāhine choosing to discharge home early from NWH.

Support services at Birthcare include:

- Antenatal assessment with CTG recording available
- LMC Clinic facilities
- Lactation services
- Phototherapy for jaundiced newborns
- Physiotherapy services and classes
- Preparation for home classes
- Natural Childbirth classes
- Refresher classes
- Breastfeeding classes
- Neonatal hearing newborn screening
- Labtest services

6.6.1 Data tables: Labour and birth at Birthcare Auckland

Table 6.45: Demographic characteristics of wāhine labouring at Birthcare by place of birth 2021

	Intrapartum transfer		Birth at Birthcare		Total	
	n=	53	n=	246	n=	299
	n	%	n	%	n	%
Parity						
Nullipara	43	81.1	95	38.6	138	46.2
Multipara	10	18.9	151	61.4	161	53.8
Age						
<21	1	1.9	2	0.8	3	1.0
21-25	3	5.7	23	9.3	26	8.7
26-30	13	24.5	67	27.2	80	26.8
31-35	26	49.1	105	42.7	131	43.8
36-40	9	17.0	43	17.5	52	17.4
>40	1	1.9	6	2.4	7	2.3
Ethnicity						
Māori	4	7.5	28	11.4	32	10.7
Pacific	3	5.7	16	6.5	19	6.4
Indian	0	0.0	6	2.4	6	2.0
Other Asian	9	17.0	35	14.2	44	14.7
MELAA	4	7.5	21	8.5	25	8.4
European	33	62.3	140	56.9	173	57.9
DHB of Domicile						
Auckland	40	75.5	165	67.1	205	68.6
Counties Manukau	4	7.5	15	6.1	19	6.4
Waitematā	7	13.2	66	26.8	73	24.4
Other	1	1.9	0	0.0	1	0.3

Table 6.46: Interventions and outcomes among wāhine who commenced labour at Birthcare 2021

	Intrapartum transfer to NW		Birth at Birthcare		Total	
	n=	53	n=	246	n=	299
	n	%	n	%	n	%
Mode of birth						
Normal vaginal	23	43.4	246	100.0	269	90.0
Operative vaginal	15	28.3	NA		20	6.7
Emergency caesarean	15	28.3	NA		17	5.7
Perineal trauma						
Episiotomy	17	32.1	13	5.3	30	10.0
Third/fourth degree tear	2	3.8	6	2.4	8	2.7
2° tear	16	30.2	98	39.8	114	38.1
1° tear	2	3.8	40	16.3	42	14.0
Graze	3	5.7	4	1.6	7	2.3
Vaginal wall tear	2	3.8	4	1.6	6	2.0
Labial			10	4.1	10	3.3
Intact	5	9.4	79	32.1	84	28.1
Blood loss						
≥500ml	24	45.3	4	1.6	28	9.4
Perinatal outcome						
Stillbirth (/1000)	0		0			
Admitted to NICU	2		0			
Neonatal death (/1000)	0	0.0	0			
Exclusive breastfeeding rate	47	88.7	229	93		

NA = not available

ŪPOKO 7
Ngā Hue o te Whakamamae me te Whānautanga

CHAPTER 7
Labour and Birth Outcomes

Commentator
Dr Meghan Hill

7.1 Perineal trauma

Key Findings:

- The combined 3rd and 4th degree tear rate remains between 3-4%, which approximates the expected incidence of this outcome.
- Episiotomy rates have remained stable at approximately 30% of vaginal births. Indian and other Asian women are overrepresented in incidence of episiotomy at >40% of births, with an overrepresentation of 3rd and 4th degree tears also. Māori and Pacific women have the lowest incidence of episiotomy at <15%. Their 3rd and 4th degree tear rates mirror those of women of European ethnicity.
- Episiotomy is highly likely to be performed with an instrumental vaginal birth. The rate of 3rd and 4th degree tears with instrumental vaginal birth remains at 10-15%.
- Private obstetricians are the most likely providers to perform episiotomy in both nulliparous and parous women. Women treated by private obstetricians are also less likely to experience severe perineal trauma when compared to other provider types. It is unclear if episiotomy is modifying the risk or if there are differences in the population treated by private obstetricians which are responsible for the difference observed.

Figure 7.1: Perineal trauma among all vaginal births NWH 1995-2021

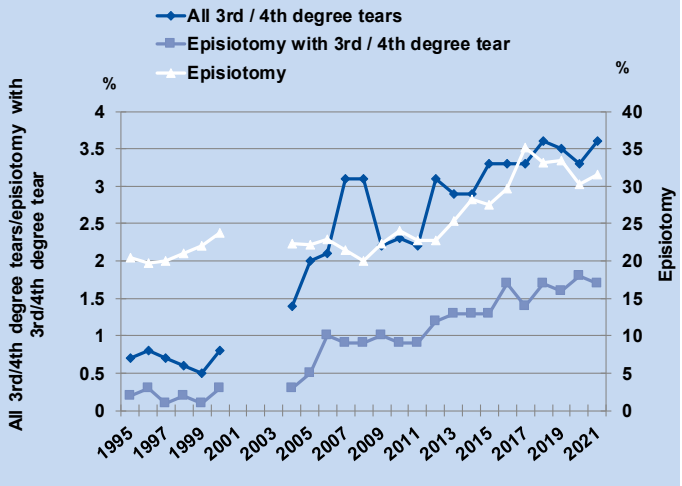


Figure 7.2: Perineal trauma among vaginal births by mode of vaginal birth NWH 2021

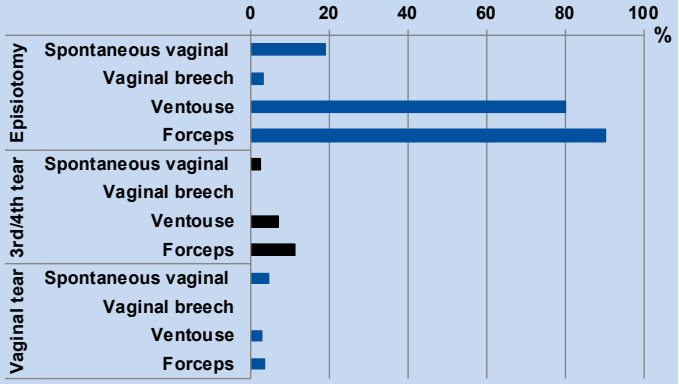


Figure 7.3: Perineal trauma among vaginal births by ethnicity NWH 2021

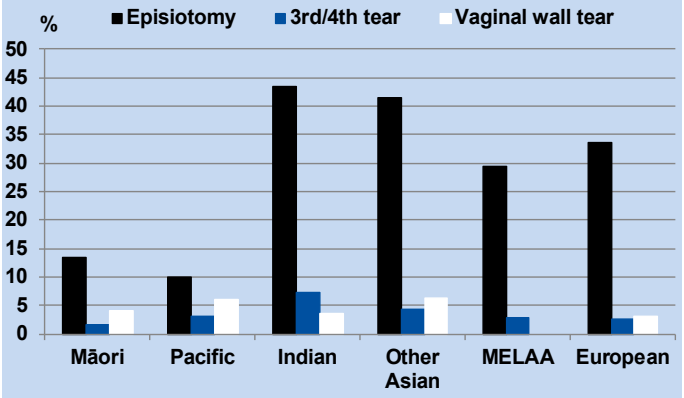
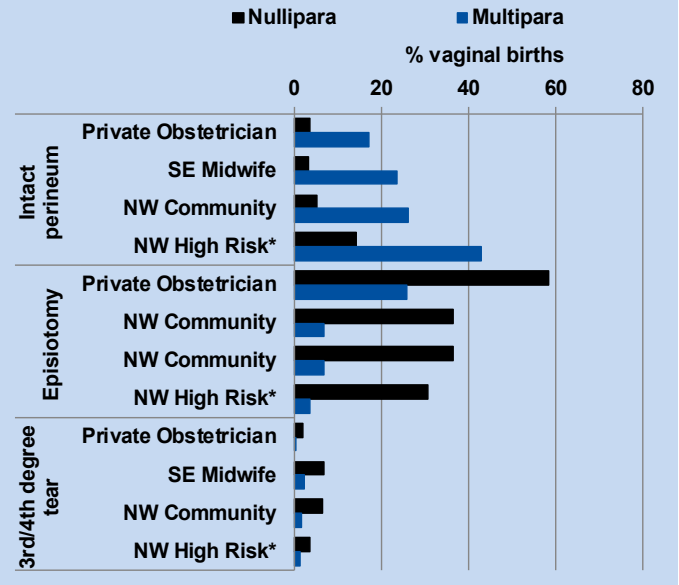


Figure 7.4: Perineal trauma among vaginal births by LMC and parity NWH 2021



7.2 Third stage management

Active management of third stage includes routine uterotonic given with birth of the anterior shoulder followed by gentle traction until the placenta is delivered. Physiologic third stage entails expectant management without uterotonic and with delivery of the placenta by maternal effort. The NWH guideline recommends that 'all wāhine are offered active management of the 3rd stage.'

In 2019 we started to collect routine data on cord clamping time, with the recognition that optimising cord clamping for both preterm and term births is recommended as routine management. More work needs to be done to check the accuracy of these data before they can be included in the report.

Cord clamping should not delay the administration of uterotonics.

Key Findings

- The data on third stage management appears to show good adherence to the NWH guideline.

7.3 Postpartum haemorrhage (PPH)

The source of blood loss data varies for some of the years shown. In the years 2005 to 2007, blood loss in labour and birth was not combined with blood loss recorded postnatally as in numerous births the total blood loss was recorded in both places. The amended data on PPH rate in 2005 and 2006 given here may underestimate the PPH rate in those years. From 2008, the data have been cleaned extensively. This cleaning has included a comparison of blood loss recorded in Healthware to blood loss in the PIMS theatre database. These data were not available in previous years. The effect of this is likely to have been an increase in the reporting of PPH, especially in those wāhine giving birth in Labour and Birthing Suite and then transferring to theatre for the management of retained placenta or bleeding.

Further to these data management improvements, the estimation of blood loss including the weighing of all blood is now part of labour ward culture. While this is undoubtedly a more accurate way to measure blood loss, there are still incidences where losses are not measured and these may lead to inaccurate comparisons at this institution and between units. Postpartum transfusion is recommended as a better comparative measure.

Key Findings:

- Primary PPH of ≥500mL occurs in approximately 35% of women, while primary PPH of ≥1000mL occurs in approximately 10%. These rates have remained stable since 2008.
- Operative interventions, other than planned caesarean, increase the risk of postpartum haemorrhage. Women with induced labour are more likely to experience haemorrhage than those who enter labour spontaneously.

Figure 7.5: Postpartum haemorrhage and transfusion rates NWH 1992-2021

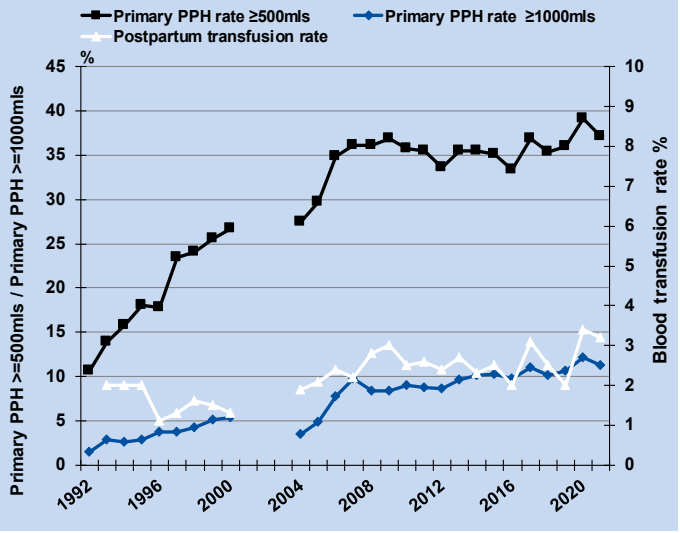


Figure 7.6: Postpartum transfusion by mode of onset of birth and by mode of birth NWH 2021

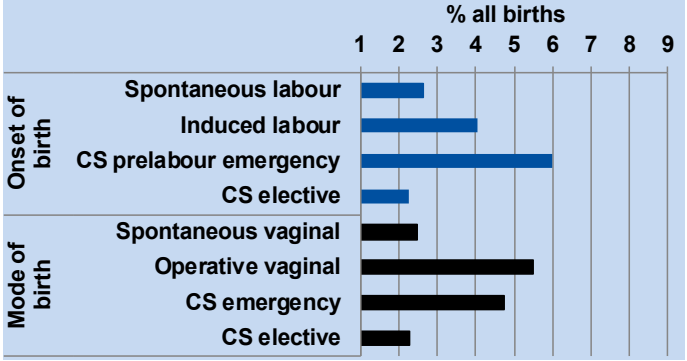


Figure 7.7: Postpartum transfusion by LMC (% of all births) NWH 2021

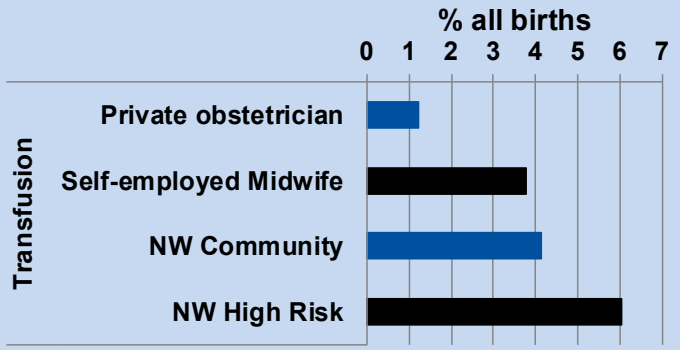


Table 7.1: Postpartum transfusion rates by recorded blood loss at birth NWH 2021

	Total	Postpartum transfusion	
		n	%
Total (mls)	6462	211	3.3
Blood loss <500	3900	12	0.3
PPH 500-999	1595	31	1.9
PPH 1000-1499	446	36	8.1
PPH 1500-2499	212	83	39.2
PPH ≥2500	49	42	85.7
Blood loss unknown	10	1	10.0

7.3.1 Data tables: Perineal trauma

Table 7.2: Episiotomy rates among vaginal births NWH 2011-2021

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	n= 5075	n= 5125	n= 4717	n= 4841	n= 4465	n= 4633	n= 4137	n= 3949	n= 4089	n= 3856	n= 3839
Number of episiotomies	1153	1170	1200	1371	1228	1375	1458	1308	1367	1170	1212
Incidence %	22.7	22.8	25.4	28.3	27.5	29.7	35.2	33.1	33.4	30.3	31.6
Episiotomy with 3rd/4th degree tear	46	60	61	61	58	80	59	67	66	69	64
Incidence %	0.9	1.2	1.3	1.3	1.3	1.7	1.4	1.7	1.6	1.8	1.7
All 3rd/4th degree tears	114	158	138	139	149	153	137	142	144	129	138
Incidence %	2.2	3.1	2.9	2.9	3.3	3.3	3.3	3.6	3.5	3.3	3.6

Table 7.3: Episiotomy rates in vaginal births, all gestations by LMC at birth and parity NWH 2021

	Nullipara			Mullipara		
	Total	n	%	Total	n	%
Total	1863	945	50.7	1976	267	13.5
Self-employed Midwife	1052	565	53.7	1036	130	12.5
Private Obstetrician	409	239	58.4	406	105	25.9
National Women's	402	141	35.1	534	32	6.0
NW Community	317	115	36.3	396	27	6.8
NW High Risk	85	26	30.6	138	5	3.6

Table 7.4: Perineal trauma by mode of birth, parity and LMC at birth among all vaginal births NWH 2021

	Total	Episiotomy		3rd/4th tear		Vaginal tear	
	N	n	%	n	%	n	%
Total vaginal birth	3839	1212	31.6	138	3.6	168	4.4
Mode of birth							
Normal vaginal	3064	585	19.1	72	2.3	143	4.7
Vaginal breech	31	1	3.2	0	0.0	0	0.0
Ventouse	445	356	80.0	32	7.2	14	3.1
Forceps	299	270	90.3	34	11.4	11	3.7
Parity							
Nullipara	1863	945	50.7	104	5.6	118	6.3
Multipara	1976	267	13.5	34	1.7	50	2.5
LMC at birth							
Independent midwife	2088	565	27.1	96	4.6	76	3.6
Private obstetrician	815	239	29.3	10	1.2	13	1.6
NW Community	713	115	16.1	27	3.8	22	3.1
NW Diabetes	59	4	6.8	0	0.0	1	1.7
NW Medical	110	20	18.2	5	4.5	3	2.7
Other DHB	19	1	5.3	0	0.0	1	5.3
Unbooked	35	1	2.9	0	0.0	2	5.7
Ethnicity							
Māori	378	51	13.5	6	1.6	15	4.0
Pacific	490	49	10.0	15	3.1	30	6.1
Indian	446	194	43.5	33	7.4	16	3.6
Other Asian	952	395	41.5	41	4.3	60	6.3
MELAA	170	50	29.4	5	2.9	0	0.0
European	1386	467	33.7	37	2.7	44	3.2

Table 7.5: Perineal outcomes in spontaneous (non-operative) vertex birth, all gestations, by LMC at birth and parity NWH 2021*

	Total	Intact perineum		Episiotomy		Third or forth degree tear	
	N	n	%	n	%	n	%
Nullipara	1216	68	5.6	396	32.6	44	3.6
Self-employed midwife	694	35	5.0	246	35.4	27	3.9
Private Obstetrician	241	13	5.4	96	39.8	4	1.7
NWH	281	20	7.1	54	19.2	13	4.6
Multipara	1829	449	24.5	190	10.4	28	1.5
Self-employed midwife	988	242	24.5	95	9.6	19	1.9
Private Obstetrician	371	69	18.6	80	21.6	1	0.3
NWH	470	138	29.4	15	3.2	8	1.7

*Other DHB and unbooked excluded from table

Table 7.6: Third stage management among vaginal births NWH 2021								
	Physiological		Active syntocinon		Active syntometrine		Unknown	
	n= 164		n= 3174		n= 247		n= 253	
	n	%	n	%	n	%	n	%
Primary PPH (≥500mls)	18	11.0	717	22.6	39	15.8	54	21.3
Primary PPH (≥1000mls)	7	4.3	279	8.8	20	8.1	22	8.7
Postparturm blood transfusion	2	1.2	102	3.2	6	2.4	8	3.2

Table 7.7: Third stage management by PPH risk among vaginal births NWH 2021									
	Total	Physiological		Active syntocinon		Active syntometrine		Unknown	
	3839	n= 164		n= 3174		n= 247		n= 253	
	n	n	%	n	%	n	%	n	%
Spontaneous vaginal birth	3095	159	5.1	2543	82.2	190	6.1	202	6.5
Operative vaginal birth	744	5	0.7	631	84.8	57	7.7	51	6.9
BMI									
<18.5	127	4	3.1	107	84.3	5	3.9	11	8.7
18.5-24.99	2029	95	4.7	1673	82.5	140	6.9	121	6.0
25-29.99	839	40	4.8	695	82.8	48	5.7	56	6.7
30-34.99	405	11	2.7	345	85.2	23	5.7	26	6.4
35-39.99	227	4	1.8	196	86.3	12	5.3	15	6.6
≥40	154	3	1.9	117	76.0	19	12.3	14	9.1
Missing	58	7	12.1	41	70.7	0	0.0	10	17.2
Previous CS	209	6	2.9	172	82.3	12	5.7	19	9.1
Hypertension									
Nil	3572	159	4.5	2939	82.3	236	6.6	237	6.6
Gestational hypertension	123	2	1.6	107	87.0	6	4.9	8	6.5
Chronic hypertension	50	1	2.0	43	86.0	4	8.0	2	4.0
Superimposed preeclampsia	6	0	0.0	5	83.3	0	0.0	1	16.7
Preeclampsia	88	2	2.3	80	90.9	1	1.1	5	5.7
Singleton	3816	164	4.3	3155	82.7	246	6.4	251	6.6
Multiples	23	0	0.0	19	82.6	1	4.3	2	8.7

7.3.2 Data tables: Postpartum haemorrhage

Table 7.8: Postpartum haemorrhage rate NWH 2008-2021

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total Births	7212	7695	7589	7735	7709	7523	7695	7223	7400	6933	6481	6660	6212	6462
Primary PPH (≥500mls)	2302	2507	2736	2850	2753	2674	2587	2563	2628	2433	2289	2397	2428	2302
Incidence %	31.9	32.6	36.1	36.9	35.7	35.5	33.6	35.5	35.5	35.1	35.3	36	39.1	35.6
Primary PPH (≥1000mls)	351	410	634	651	695	659	662	701	746	713	662	707	755	707
Incidence %	4.9	5.3	8.4	8.4	9	8.8	8.6	9.7	10.1	10.3	10.2	10.6	12.2	10.9

Table 7.9: Postpartum blood loss by onset of birth NWH 2021

	Spontaneous labour		Induced labour		CS emergency before onset of labour		CS elective		Total	
	n= 2372		n= 2568		n= 250		n= 1272		N= 6462	
	n	%	n	%	n	%	n	%	n	%
PPH ≥500mls	619	26.1	976	38.0	138	55.2	569	44.7	2302	35.6
PPH≥1000mls	217	9.1	333	13.0	41	16.4	116	9.1	707	10.9
PPH≥1500mls	78	3.3	138	5.4	12	4.8	33	2.6	261	4.0
Post partum transfusion	63	2.7	104	4.0	15	6.0	29	2.3	211	3.3

Table 7.10: Postpartum blood loss by mode of birth NWH 2021

	Spontaneous vaginal birth		Operative vaginal birth		CS emergency		CS elective		Total	
	n= 3095		n= 744		n= 1351		n= 1272		n= 6462	
	n	%	n	%	n	%	n	%	n	%
PPH ≥500mls	573	18.5	256	34.4	904	66.9	569	44.7	2302	35.6
PPH≥1000mls	231	7.5	98	13.2	262	19.4	116	9.1	707	10.9
PPH≥1500mls	98	3.2	42	5.6	88	6.5	33	2.6	261	4.0
Post partum transfusion	77	2.5	41	5.5	64	4.7	29	2.3	211	3.3

Table 7.11: Blood transfusion NWH 2007-2021

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Antenatal	6	6	18	12	13	5	4	7	4	11	3	7	16	7	4
Antenatal & intrapartum	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1
Antenatal & postpartum	0	2	2	0	0	1	2	1	0	2	0	0	1	4	1
Intrapartum	1	4	3	1	3	1	6	2	7	6	0	4	6	4	4
Intrapartum & postpartum	4	1	2	1	1	1	2	1	3	1	0	0	0	4	0
Postpartum	165	212	228	189	193	180	192	170	168	147	211	165	131	205	210
Total transfusions	177	225	253	203	210	189	207	181	182	167	214	176	154	224	220
Total transfusion rate	2.3	3	3.3	2.6	2.8	2.5	2.9	2.4	2.6	2.3	3.1	2.7	2.3	3.6	3.4

7.4 Neonatal Outcomes

Days of admission to NICU are based on total hours of any stay derived from date and time of admission and discharge from NICU and so a day in NICU is a period of 24 hours whenever that started or finished.

Key Findings:

- While there appears to have been a slight increase in the rate of low Apgar scores <4 at 1 minute and <7 at 5 minutes between 2006 and 2021, this has not correlated with an increased risk of perinatal related deaths, or an increased rate of hypoxic ischemic encephalopathy.
- Babies born via emergency caesarean are more likely to be admitted to the NICU and are more likely to stay there for ≥2 days when compared to those born via elective caesarean or via spontaneous or induced vaginal birth. Babies born via emergency caesarean are also less likely to survive.

7.4.1 Neonatal outcomes among term pēpi

Figure 7.8: NICU admission and low Apgar scores among live births at term NWH 2006-2021

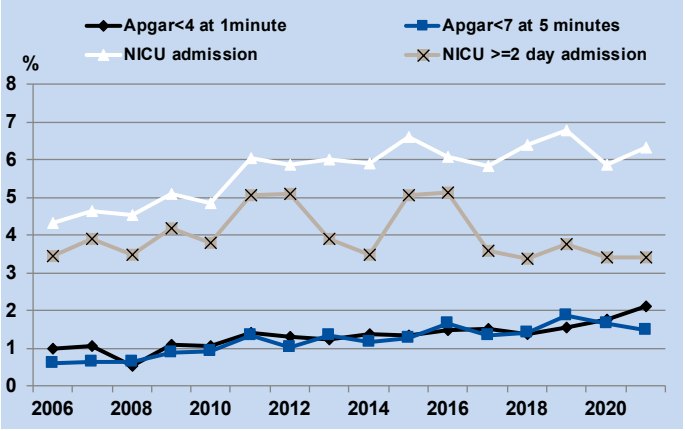


Figure 7.9: Admission to NICU among live births at term by LMC NWH 2006-2021

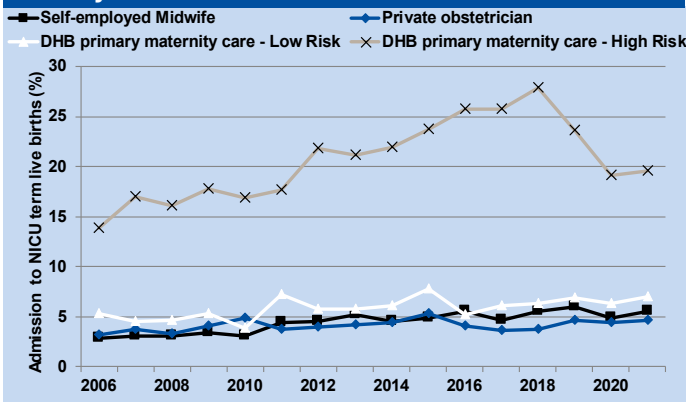


Figure 7.10: Admission (≥2 days) to NICU among live births at term by LMC NWH 2006-2021

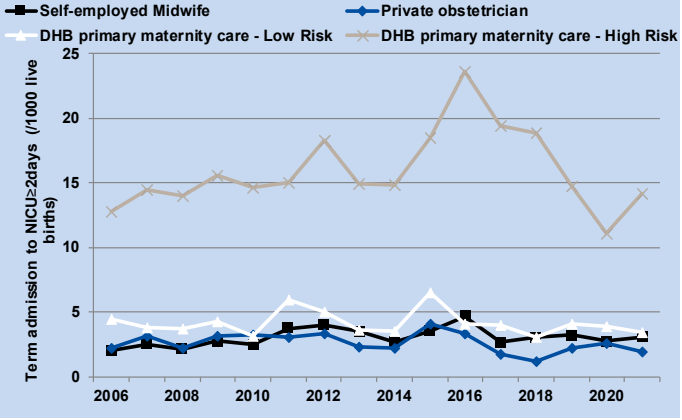


Figure 7.11: Apgar <7 at 5 minutes among live births at term by LMC NWH 2006-2021

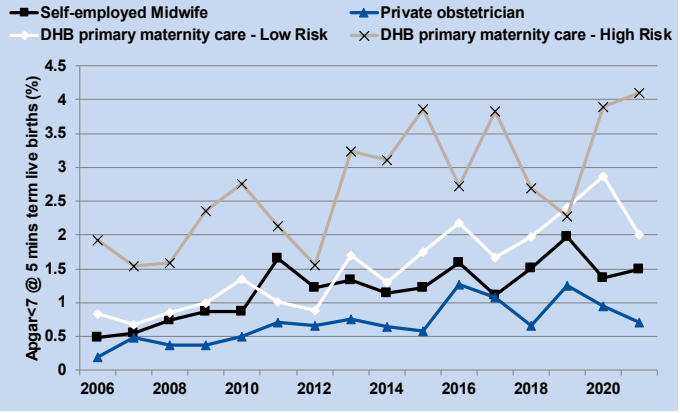


Figure 7.12: Stillbirth and neonatal death rates at term NWH 2006-2021

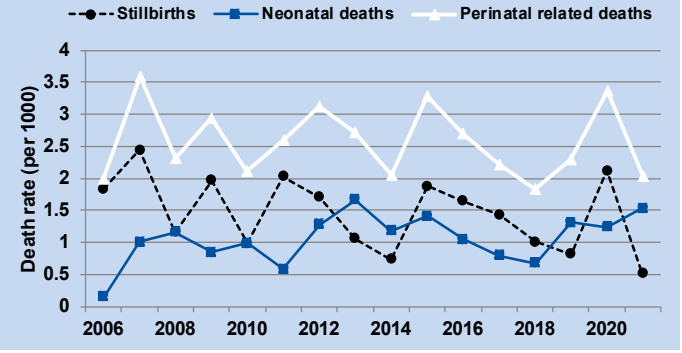


Figure 7.13: Perinatal related mortality rate at term (per 1000 term births) by LMC NWH 2006-2021

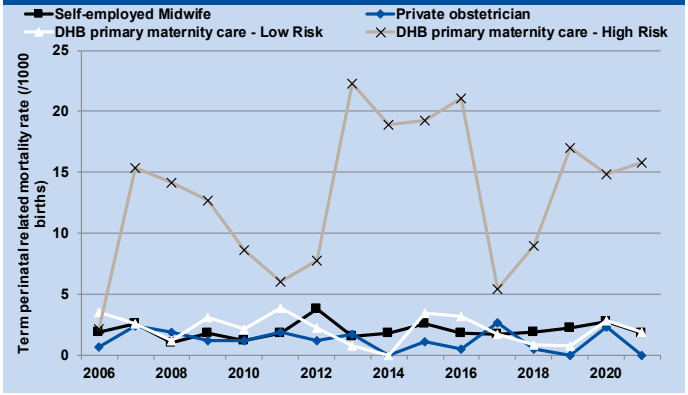
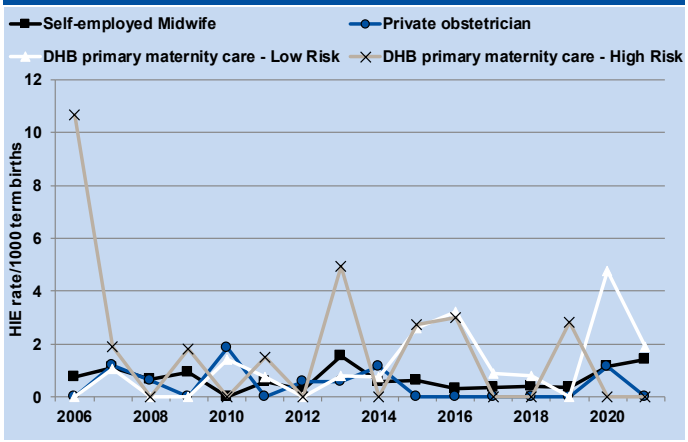


Figure 7.14: HIE (stage 2 and 3) rate (per 1000 term births) by LMC NWH 2006-2021



7.4.2 Data tables: Neonatal outcomes

Table 7.12: Neonatal mortality and morbidity among live births by mode of onset of birth (all gestations) NWH 2021

	Spontaneous labour		Induced labour		CS elective		CS emergency before onset of labour		Total	
	n=	2379	n=	2551	n=	1309	n=	260	n=	6499
	n	%	n	%	n	%	n	%	n	%
1 min Apgar<4	63	2.6	74	2.9	21	1.6	30	11.5	188	2.9
1 min Apgar<7	195	8.2	235	9.2	111	8.5	85	32.7	626	9.6
5 min Apgar <7	47	2.0	56	2.2	28	2.1	31	11.9	162	2.5
Admitted to NICU	239	10.0	197	7.7	164	12.5	152	58.5	752	11.6
≥2 days in NICU	181	7.6	114	4.5	116	8.9	135	51.9	546	8.4
Neonatal deaths (/1000 live births)	16	6.7	12	4.7	3	2.3	7	26.9	38	5.8

Table 7.13: Neonatal mortality and morbidity among live births by mode of birth (all gestations) NWH 2021

	Spontaneous vertex		Vaginal breech		Forceps birth		Ventouse birth		CS elective		CS emergency		Total	
	n=	3051	n=	16	n=	300	n=	447	n=	1309	n=	1376	n=	6499
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1 min Apgar <4	46	1.5	8	50.0	9	3.0	18	4.0	21	1.6	86	6.3	188	2.9
1 min Apgar <7	158	5.2	13	81.3	40	13.3	60	13.4	111	8.5	244	17.7	626	9.6
5 min Apgar <7	43	1.4	10	62.5	7	2.3	10	2.2	28	2.1	64	4.7	162	2.5
Admitted to NICU	220	7.2	6	37.5	20	6.7	44	9.8	164	12.5	298	21.7	752	11.6
≥2 days in NICU	153	5.0	6	37.5	12	4.0	22	4.9	116	8.9	237	17.2	546	8.4
Neonatal deaths (/1000 live births)	17	5.6	7	437.5	0	0.0	1	2.2	3	2.3	10	7.3	38	5.8

Table 7.14: Neonatal mortality and morbidity by mode of birth in live born term or post term (≥37 weeks) baby NWH 2021

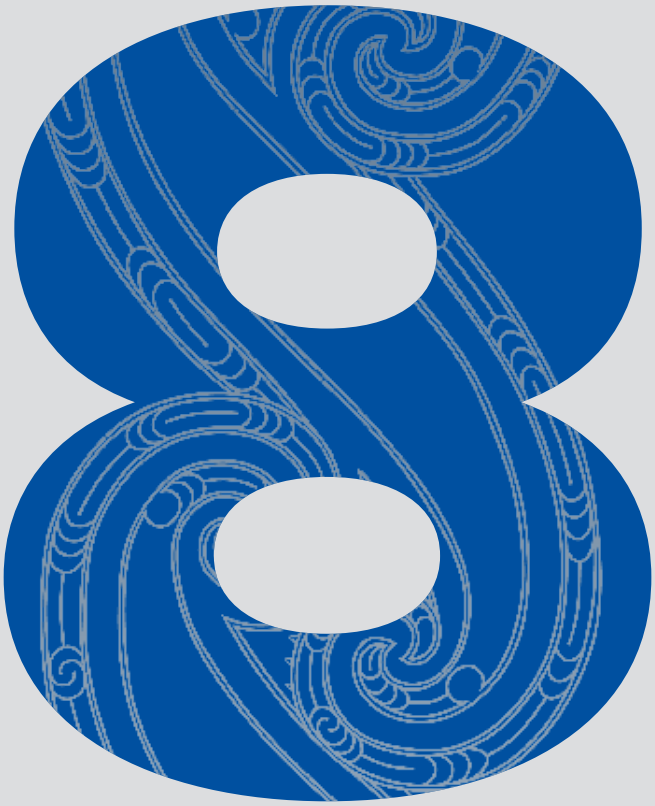
	Spontaneous vertex		Vaginal breech		Forceps birth		Ventouse birth		CS elective		CS emergency		Total	
	n=	2848	n=	1	n=	289	n=	435	n=	1155	n=	1152	N=	5880
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1 min Apgar <4	30	1.1	0	0.0	9	3.1	18	4.1	13	1.1	54	4.7	124	2.1
1 min Apgar <7	108	3.8	0	0	38	13.1	59	13.6	69	6.0	146	12.7	420	7.1
5 min Apgar <7	21	0.7	0	0	7	2.4	9	2.1	17	1.5	34	3.0	88	1.5
Admitted to NICU	116	4.1	0	0	12	4.2	42	9.7	82	7.1	120	10.4	372	6.3
≥2 days in NICU	61	2.1	0	0	5	1.7	20	4.6	46	4.0	69	6.0	201	3.4
Neonatal deaths (/1000 live births)	3	1.1	0	0	0	0.0	1	2.3	2	1.7	3	2.6	9	1.5

Table 7.15: Neonatal morbidity in term or post term live born (≥37 weeks) pēpi NWH 2012-2021

	2012		2013		2014		2015		2016		2017		2018		2019		2020		2021	
	N=7030		N=6596		N=6786		N=6371		N=6677		N=6333		N=5969		N=6110		N=5640		N=	5880
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1 min Apgar <4	92	1.3	81	1.2	95	1.4	86	1.3	100	1.5	96	1.5	82	1.4	96	1.6	99	1.8	124	2.1
5 min Apgar <7	73	1	90	1.4	79	1.2	82	1.3	112	1.7	85	1.3	84	1.4	114	1.9	190	3	88	1.5
Admitted to NICU	413	5.9	396	6	400	5.9	421	6.6	405	6.1	367	5.8	381	6.4	414	6.8	332	5.9	372	6.3
>2 days in NICU	358	5.1	257	3.9	237	3.5	323	5.1	343	5.1	227	3.6	201	3.4	230	3.8	193	3.4	201	3.4
Neonatal deaths (/1000 live births)	9	1	11	2	8	1	9	1.4	7	1	5	0.8	4	0.7	8	1.3	7	1.2	9	1.5

Table 7.16: Neonatal outcomes among term births by LMC 2010-2021

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	n	n	n	n	n	n	n	n	n	n	n	n
Private Obstetrician												
Term births (total)	1606	1562	1677	1707	1708	1742	1812	1872	1823	1827	1703	1705
Stillbirth	0	2	1	2	0	2	1	3	1	1	3	0
Neonatal Death	2	1	1	1	0	0	0	2	0	0	1	0
Apgar<7 at 5 minutes	8	11	11	13	11	10	23	20	12	23	16	12
NICU admission	79	59	67	71	76	93	74	66	68	85	76	80
≥2 days in NICU	52	48	56	39	38	82	60	32	22	41	44	33
Hypoxic ischaemic encephalopathy (2/3)	3	0	1	1	2	0	0	0	0	0	2	0
Self employed midwives												
Term births (total)	3376	3335	3460	3246	3332	3115	3286	2911	2595	2689	2564	2809
Stillbirth	4	6	9	3	3	7	5	4	3	4	6	2
Neonatal Death	0	0	4	2	3	1	1	1	2	2	1	3
Apgar<7 at 5 minutes	28	55	42	43	38	38	52	32	39	53	35	42
NICU admission	103	148	155	168	151	153	181	134	143	160	126	156
≥2 days in NICU	84	124	139	113	90	133	153	77	79	86	71	87
Hypoxic ischaemic encephalopathy (2/3)	0	2	1	5	2	2	1	1	1	1	3	4
NW Community												
Term births (total)	1420	1295	1347	1230	1310	1148	1240	1144	1217	1244	1044	1052
Stillbirth	3	4	1	0	0	1	3	1	1	1	1	1
Neonatal Death	0	1	2	1	0	3	1	1	0	0	2	1
Apgar<7 at 5 minutes	19	13	12	21	17	20	27	19	24	30	30	21
NICU admission	54	93	77	71	80	89	64	70	77	86	66	74
≥2 days in NICU	45	77	67	44	46	78	51	46	37	51	41	36
Hypoxic ischaemic encephalopathy (2/3)	2	1	0	1	1	3	4	1	1	0	5	2
DHB primary maternity care - High risk												
Term births (total)	581	660	515	404	422	364	332	366	335	352	336	317
Stillbirth	0	2	1	2	3	2	2	1	1	0	2	0
Neonatal Death	5	2	3	7	5	5	5	1	2	6	3	5
Apgar<7 at 5 minutes	16	14	8	13	13	14	9	14	9	8	13	13
NICU admission	98	116	112	85	92	86	85	91	93	83	64	62
≥2 days in NICU	85	99	94	60	62	77	78	69	63	52	37	45
Hypoxic ischaemic encephalopathy (2/3)	0	1	0	2	0	1	1	0	0	1	0	0



ŪPOKO 8
Ngā Āwhina Whai Muri I te Whānautanga

CHAPTER 8
Postnatal Care

Commentators
Tracey Senior
Marjet Pot

ŪPOKO 8

Ngā Āwhina Whai Muri I te Whānautanga

CHAPTER 8

Postnatal Care

This chapter provides information on infant feeding and postnatal admissions. Some tables pertaining to this chapter can be found in the text and the remainder at the end of the chapter.

Definitions

Exclusive breastfeeding: The infant has never, to the mother's knowledge, had any water, formula or other liquid or solid food. Only breast milk, from the breast or expressed, and prescribed (as per Medicines Act 1981) medicines have been given from birth.

Fully breastfeeding: The infant has taken breast milk only, no other liquids or solids except a minimal amount of water or prescribed medicines, in the past 48 hours.

Partial breastfeeding: The infant has taken some breast milk and some infant formula or other solid food in the past 48 hours.

Artificial feeding: The infant has had no breast milk but has had alternative liquid such as infant formula with or without solid food in the past 48 hours.

8.1 Infant Feeding

Tracey Senior

The feeding status of infants born at NWH is collected at the time of discharge from the hospital. For some, this is in the immediate postpartum period, leaving from Labour and Birthing Suite, and for others it follows a postnatal stay. Babies admitted and discharged from the Neonatal Intensive Care Unit are excluded from the data presented here. Infant feeding data for NICU babies can be found in Chapter 9.

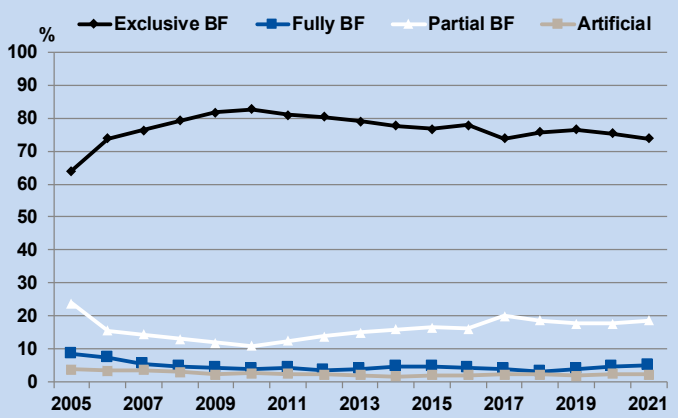
Data is also collected at the time of postnatal discharge (approximately 4-6 weeks post birth) for those women and babies who have midwifery homecare provided by the NWH Community Team or MFM Diabetes Midwifery Teams.

Rautaki Whakamana Whāngote National Breastfeeding Strategy for New Zealand Aotearoa (2020) confirms the importance of BFHI as a quality initiative to protect, promote and support breastfeeding and optimal infant feeding. The strategy acknowledges that improving breastfeeding rates will help reduce Māori inequalities (outcome 1). Māori have been understood, as indicated in policy documents, as having the right to determine Māori-focused breastfeeding interventions—a right under Te Tiriti o Waitangi. The BFHI Programme is also aligned to outcomes 4 & 6 of the Strategy: Outcome 4: All maternity facilities achieve and maintain Baby Friendly Aotearoa (BFHI) accreditation Outcome 5: System settings support the safe provision of donor breast milk for infants in need. Baby Friendly Aotearoa reports that national exclusive breastfeeding rates have decreased overall and for 1.8% for Māori whānau. Māori and Pacific infants continue to have the highest rates of artificial feeding: 5.37% and 5.64% But both rates have declined since 2020.

Key Findings

- In 2021 our average exclusive breastfeeding rate on discharge was 73.9%, which is below the NZ Breastfeeding Authority (NZBFA) target of 75%. The target is 75% every month. This target was not achieved for 8 months in 2021 compared to 6 months in 2020.
- Exclusive breastfeeding rates for 2021 vary by ethnic grouping. We noted an increase for Māori parents to 75.7% from 72.8% which is excellent, but a decrease for Pacific parents to 65.9% from 70.4%. Asian parents rates are 68.1% from 68.6%. Indian parents rates dropped to 66% from 68.5%, and European parents from 83.7% to 82%.
- Nationally, exclusive breastfeeding for tertiary services has fallen from 72.9% in 2020. Of note, 4 out of 6 tertiary services have exclusive breastfeeding rates at discharge below the 75% BFHI standard. Rates for these four tertiary services were sitting between 68.2% and 73.8% in 2021. NZBA have acknowledged that a number of contributing factors have led to the declining exclusive rates in NZ over the last 2 years, including (1) the COVID pandemic and restrictions on partners and other visitors who create the supportive network for breastfeeding dyads, (2) Accelerated early discharge from maternity services which limited hands-on support for mothers and whānau immediately after birth, (3) Limitations on access to on-going breastfeeding support after discharge from maternity services given COVID-19 restrictions, (4) Disruption of on-going staff breastfeeding education at service level, (5) The COVID pandemic has continued to force maternity services to cancel staff and patient in person breastfeeding education classes and/or move to more online education, (6) Antenatal education around breastfeeding is also essential and this is robustly supported by research.
- We, as other DHBs, are still dealing with an ongoing midwifery staffing shortage. To combat this there has been an increase of new to service registered nurses to staff wards, who are less experienced and our institutional memory has been lost. It's important to acknowledge an increase in acuity on our wards due to discharging whānau earlier to Birthcare and home due to COVID, along with the rise in the co-morbidities of birthing parents.
- It is important to interpret the exclusive breastfeeding rate with regard to the complexity of the cohort of women birthing at ADHB and the other compounding factors over the last 2 years.

Figure 8.1: Method of infant feeding at discharge from NWH 2005-2021



Milk bank

- National Breastfeeding strategy Outcome 5: System settings support the safe provision of donor breast milk for infants in need. An important contribution to improving our exclusive breastfeeding rates at discharge would be the introduction of a milk bank. Human donor milk is the gold standard for supplementation after mother's own milk and would reduce infant formula use where infants have clinical indications for supplementation.

Baby Friendly Hospital Accreditation (BFHI)

- It is a MoH (Ministry of Health) requirement that we continue be audited on a 4yrly basis by NZBA on the standards set out by the 10 Steps to Successful Breastfeeding. Our audit was booked for April 22 for the years 2018-2021 and was postponed to Sept 22 due to the COVID pandemic. NZBA have introduced a limited accreditation pathway for 2022-2023 for those DHB who are not meeting the standard of 75% exclusive breastfeeding on discharge. We will be developing a meaningful measureable plan for increasing the (exclusive) breastfeeding rates.

8.1.1 Data tables: Infant feeding

Table 8.1: Method of infant feeding at discharge from NWH 2015-2021

	2015		2016*		2017		2018		2019		2020		2021†	
	N=6171		N=6488		N=6179		N=5782		N=5913		N=5531		N= 5385	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Exclusive breastfeeding	4737	76.7	5046	77.8	4559	73.8	4382	75.8	4523	76.5	4172	75.4	3978	73.9
Fully breastfeeding	278	4.5	269	4.1	248	4	193	3.3	227	3.8	255	4.6	278	5.2
Partial breastfeeding	1026	16.6	1042	16.1	1234	20	1077	18.6	1048	17.7	972	17.6	1004	18.6
Artificial feeding	130	2.1	129	2	138	2.2	130	2.2	115	1.9	132	2.4	125	2.3

Excludes admissions to NICU and Starship
*2 Infants were missing breastfeeding method at discharge in 2016
† 1 infant is missing breastfeeding method at discharge in 2021

Table 8.2: Infant feeding on discharge from NWH by mode of birth, LMC, maternal age NWH 2021

	Total	Exclusive BF		Fully BF		Partial BF		Artificial	
	N	n	%	n	%	n	%	n	%
Total	**5385**	**3978**	**73.9**	**278**	**5.2**	**1004**	**18.6**	**125**	**2.3**
Maternal Age									
≤20	79	54	68.4	4	5.1	17	21.5	4	5.1
21-25	377	281	74.5	25	6.6	59	15.6	12	3.2
26-30	1286	962	74.8	75	5.8	223	17.3	26	2.0
31-35	2260	1684	74.5	95	4.2	430	19.0	51	2.3
36-40	1204	882	73.3	60	5.0	235	19.5	27	2.2
>40	179	115	64.2	19	10.6	40	22.3	5	2.8
Ethnicity									
Māori	412	312	75.7	19	4.6	63	15.3	18	4.4
Pacific	560	369	65.9	34	6.1	125	22.3	32	5.7
Indian	658	434	66.0	47	7.1	174	26.4	3	0.5
Other Asian	1314	895	68.1	57	4.3	334	25.4	28	2.1
MELAA	256	187	73.0	20	7.8	46	18.0	3	1.2
Other European	638	499	78.2	37	5.8	85	13.3	17	2.7
NZ European	1520	1262	83.0	63	4.1	171	11.3	24	1.6
Other	27	20	74.1	1	3.7	6	22.2	0	0.0
Quintile									
1	1042	814	78.1	48	4.6	159	15.3	21	2.0
2	1132	859	75.9	57	5.0	198	17.5	18	1.6
3	1089	787	72.3	55	5.1	225	20.7	22	2.0
4	978	721	73.7	52	5.3	177	18.1	28	2.9
5	1134	791	69.8	63	5.6	245	21.6	35	3.1
Missing	10	6	60.0	3	30.0	0	0.0	1	10.0
Primipara									
Standard	1037	837	80.7	50	4.8	136	13.1	14	1.4
Non standard	1617	1048	64.8	111	6.9	428	26.5	30	1.9
Multipara	2731	2093	76.6	117	4.3	440	16.1	81	3.0
Mode of Birth									
Spontaneous vaginal	2683	2251	83.9	88	3.3	278	10.4	66	2.5
Operative vaginal	653	465	71.2	41	6.3	137	21.0	10	1.5
Elective CS	1054	680	64.5	69	6.5	277	26.3	28	2.7
Emergency CS	995	582	58.5	80	8.0	312	31.4	21	2.1
Birth weight									
2.5-2.9kgs	876	544	62.1	61	7.0	254	29.0	17	1.9
3.0-4.4kgs	4431	3385	76.4	215	4.9	727	16.4	104	2.3
≥4.5kgs	78	49	62.8	2	2.6	23	29.5	4	5.1
LMC at birth									
Self-employed Midwife	2601	1977	76.0	138	5.3	442	17.0	44	1.7
Private Obstetrician	1594	1244	78.0	62	3.9	261	16.4	27	1.7
NW Community	951	636	66.9	63	6.6	218	22.9	34	3.6
NW MFM	122	71	58.2	7	5.7	33	27.0	11	9.0
NW Diabetes	91	34	37.4	5	5.5	46	50.5	6	6.6
Unbooked	17	11	64.7	1	5.9	2	11.8	3	17.6
Other DHB	9	5	55.6	2	22.2	2	22.2	0	0.0

BF=breastfeeding. Excludes admissions to NICU and Starship

8.2 Postnatal Admissions

Marjet Pot

Primary postnatal care is provided at Birthcare Auckland. Where clinically indicated, wāhine receive postnatal care at NWH in either a secondary or tertiary postnatal unit.

Key Findings

- Since 2017, the number of wāhine who have gone directly to Birthcare from Labour and Birthing suite has remained mostly stable, however in 2021 this number reduced to 23.7% of births (Figure 8.2).
- As expected, mothers are initially admitted to the NWH wards after Caesarean section. 44% of the wāhine having a spontaneous vaginal birth are admitted directly to Birthcare Auckland for postnatal care.
- It may appear at first that Māori and Pacific wāhine are less inclined to be transferred to Birthcare immediately postnatal. However, these differences may be attributed to the fact that a larger proportion of wāhine from these ethnic groups go home immediately following birth.

The Birthcare Auckland contract is for the provision of postnatal primary care to well wāhine and their pēpi. Wāhine who have had spontaneous vaginal births but whose pēpi require neonatal care or paediatric review are admitted to NWH postnatal wards to remain close to their pēpi.

Figure 8.2: Maternal destination immediately after birth NWH 2012-2021

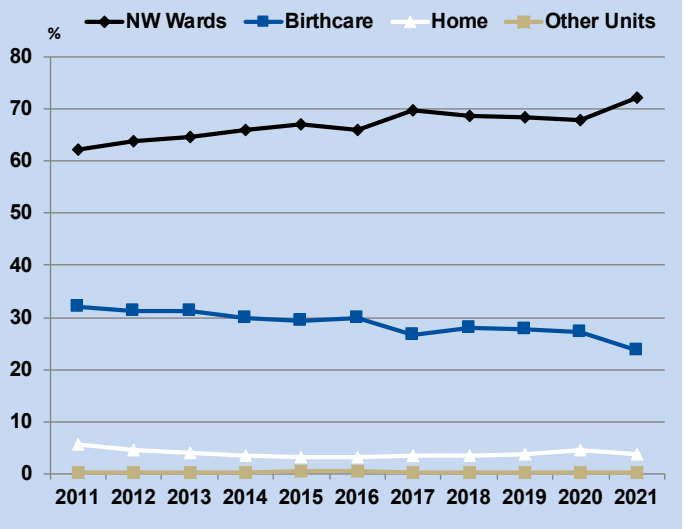


Figure 8.3: Reason for admission to NW Postnatal wards among wāhine having a spontaneous vaginal birth

	N=	1463
	n	%
Neonatal reason	568	38.8
Postpartum haemorrhage	217	14.8
Perineal trauma	145	9.9
Diabetes	128	8.7
Retained placenta/products	23	1.6
Hypertensive disorder	48	3.3
Fainting/dizziness	3	0.2
Other listed reasons*	331	22.6

*Other listed reasons includes epidural complications, infection, matenal medical conditions,social issues, cardiac conditions, wound problems, psychiatric disorders, anaemia

8.2.2 Data tables: Postnatal admissions

Table 8.3: Maternal destination immediately after birth NWH 2015-2021

	2015		2016		2017		2018		2019		2020		2021	
	N=6933		N= 7241		N=6846		N=6481		N=6660		N=6212		N=6462	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
NW Wards	4585	66.1	4855	66.1	4769	69.7	4445	68.6	4550	68.3	4225	68	4670	72.3
Birthcare	2083	30	2123	30	1824	26.6	1812	28	1848	27.7	1693	27.3	1532	23.7
Home	251	3.6	236	3.3	231	3.4	217	3.3	252	3.8	282	4.5	244	3.8
Other Units	14	0.2	27	0.4	22	0.3	7	0.1	10	0.2	12	0.2	16	0.2

Table 8.4: Maternal destination following birth by mode of birth NWH 2021

	Total	NW Wards		Birthcare Auckland		Home		Other Units	
	N	n	%	n	%	n	%	n	%
Total	6462	4670	72.3	1532	23.7	244	3.78	16	0.2
Spontaneous vaginal	3095	1474	47.6	1364	44.1	243	7.85	14	0.5
Operative vaginal	744	575	77.3	168	22.6	1	0.13	0	0.0
CS Elective	1272	1271	99.9	0	0.0	0	0.00	1	0.1
CS Emergency	1351	1350	99.9	0	0.0	0	0.00	1	0.1

Table 8.5: Maternal destination following birth by prioritized maternal ethnicity 2021

	Total	NW Wards		Birthcare		Home		Other Units	
	N	n	%	n	%	n	%	n	%
Māori	550	412	74.9	87	15.8	48	8.7	3	0.5
Pacific	690	505	73.2	127	18.4	56	8.1	2	0.3
Asian	1531	1065	69.6	416	27.2	49	3.2	1	0.1
Indian	804	620	77.1	163	20.3	20	2.5	1	0.1
European	2556	1820	71.2	670	26.2	58	2.3	8	0.3
MELAA	302	223	73.8	65	21.5	13	4.3	1	0.3
Other/not stated	29	25	86.2	4	13.8	0	0.0	0	0.0

Table 8.6: Maternal destination following birth by prioritised maternal ethnicity NWH 2021

	Total	NW Wards		Birthcare		Home		Other units	
	6462	n=4670		n=1532		n=244		n= 16	
	N	n	%	n	%	n	%	n	%
Total	6462	4670	72.3	1532	23.7	244	3.8	16	0.2
Self-employed Midwife	3054	2043	66.9	895	29.3	111	3.6	5	0.2
Private Obstetrician	1816	1320	72.7	461	25.4	33	1.8	2	0.1
NW Community	1161	902	77.7	168	14.5	86	7.4	5	0.4
NW High risk	351	334	95.2	6	1.7	9	2.6	2	0.6
Other DHB	38	36	94.7	1	2.6	1	2.6	0	0.0
Unbooked	42	35	83.3	1	2.4	4	9.5	2	4.8

ŪPOKO 9

Ratonga piripoho

CHAPTER 9

Newborn Services

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CHAPTER 9
Newborn Services

This chapter provides data on the outcomes of pēpi cared for in the Neonatal Intensive Care Unit (NICU). Additional data can be found at the end of this chapter. Data in the Newborn section pertain to all pēpi admitted to and cared for at the NWH Neonatal Intensive Care Unit if born during the 2021 calendar year. This includes pēpi transferred from other units or admitted from home.

Admissions and all other data in this chapter except occupancy relate to pēpi born in the 2021 calendar year. Occupancy data relate to the unit occupancy for each day in 2021.

In the presentation of the data in this chapter, there are a number of comparisons with matched data from other sources. Consequently the denominator used variably relates to (1) all pēpi born in 2021 and admitted to the Starship Child Health NICU, (2) inborn (NWH) pēpi and (3) pēpi born in 2021 assigned to NWH by the Australia New Zealand Neonatal Network (ANZNN).

ANZNN collects standardised data from all level 3 NICUs in Australia and New Zealand. A dataset is collected for each pēpi admitted to a NICU who:

- is <1500g birth weight or
- is <32 weeks gestation or
- requires assisted ventilation (IPPV, CPAP, high flow or HFOV) for four or more hours or dies while receiving mechanical ventilation prior to four hours of age or
- has major surgery (defined as opening of a body cavity) or
- pēpi who are cooled as a treatment for neonatal encephalopathy.

Each infant is assigned to the level 3 NICU at which they were originally treated for at least 4 hours, even if that pēpi was subsequently transferred. Data are collected up to discharge home, even if care is in several hospitals. Long term follow-up data (up to 4 years age) is also collected for eligible pēpi.

ANZNN was established in 1994 and NWH has supplied data since 1995. De-identified data are sent electronically to the Sydney secretariat. Approval to send data was obtained from the North Health Ethics Committee prior to NWH joining ANZNN. An annual report of the combined data from all units is published and feedback data are sent to each unit that contributes, comparing outcomes of that unit to those of the Network overall.

Data presented here are from the ANZNN annual reports and the NWH Healthware maternity and NICU databases. The NICU database was updated partway through 2017. The ANZNN data include data from NWH.

ANZNN data have been included in the figures where these data are able to be extracted from ANZNN reports. The most recent ANZNN annual report includes 2020 data. Sometimes ANZNN data are unavailable due to small numbers and sometimes the data are not available for comparable groupings by gestation.

Average NICU occupancy
38 pēpi

Total pēpi admitted 2021
878 pēpi

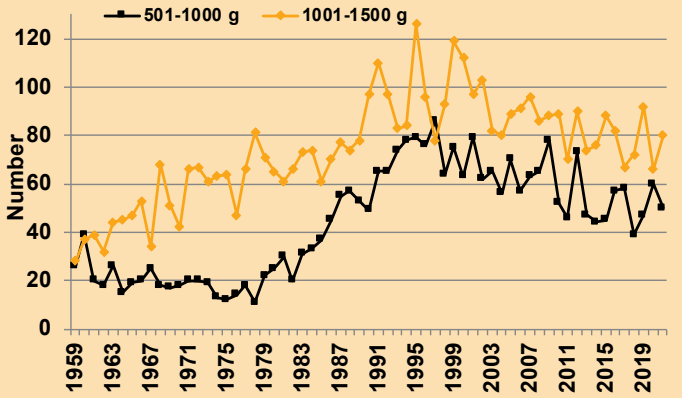
Born in National Women's Health **744 pēpi**

Transferred after birth **134 pēpi**

9.1 Inborn live birth at National Women's Health (NWH) 1959-2021

This includes all pēpi born alive (including those who died at or soon after birth and those with lethal anomalies). The weight ranges 501-1000g and 1001-1500g are used as these data have been collected prospectively since 1959, initially by Professor Ross Howie.

Figure 9.1: Number of inborn live births ≤1500g NWH 1959-2021 (excludes BBAs)



9.2 NICU Occupancy

The 2021 occupancy of 13941 bed days is approximately equivalent to a mean of 38 pēpi per day, representing an average occupancy of around 95%. The average midnight occupancy ranged from 78% in September to 106% in June. Trends for the occupancy by gestational age groups and birth weight are given in the figures below.

Whitinga Ora Pēpi (Transition to Wellness) model of care for late preterm pēpi opened on Ward 96 in November 2021. This resulted in 4 NICU beds being closed to enable staff to provide care for pēpi in Whitinga Ora Pēpi.

Pēpi born at higher gestational age generally have shorter duration of stay as they require less time to achieve maturity. Note that for the last decades the two Waitematā units have cared for their own uncomplicated level 2 pēpi so the overall acuity of the NWH unit has risen for a given occupancy.

Figure 9.2: Occupancy (baby days per year) of NICU by gestational age 1999-2021

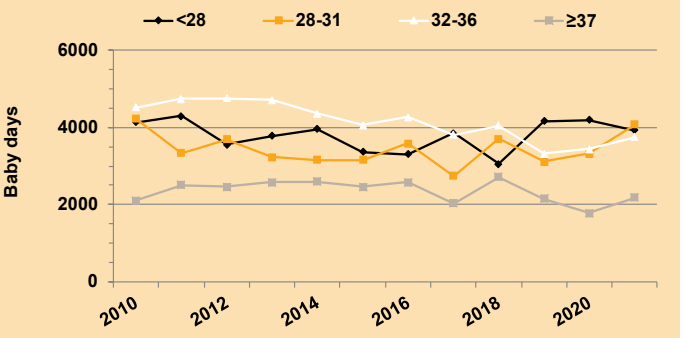
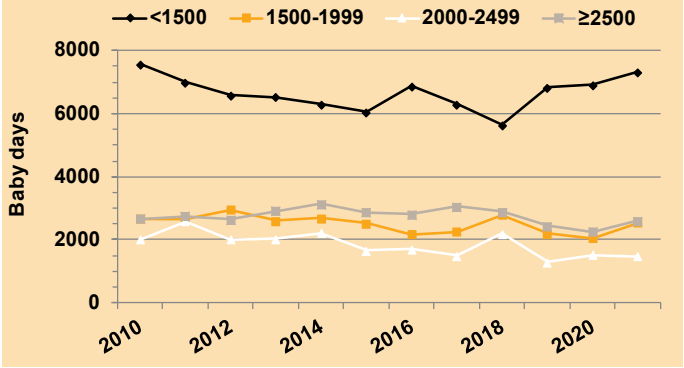


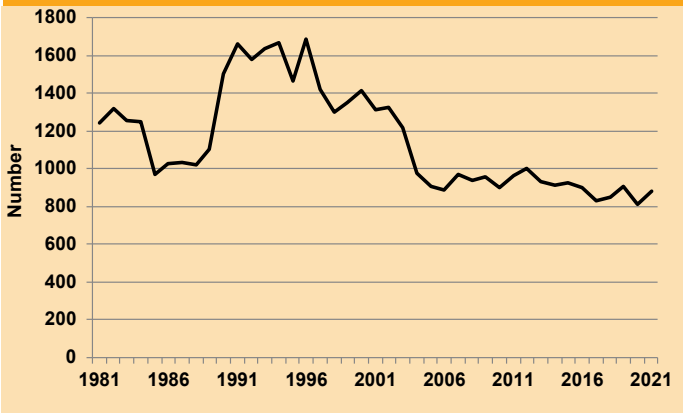
Figure 9.3: Occupancy (baby days per year) of NICU by birth weight 2010-2021



9.3 Admissions to NICU

There were 878 admissions to NICU of pēpi born in 2021 calendar year, up from 812 in 2020. Auckland NICU is the tertiary referral unit for the two Waitematā hospitals and for Northland Base Hospital, and also provides regional intensive care services for pēpi undergoing surgical procedures in the newborn period, and care for pēpi with antenatally diagnosed critical congenital cardiac disease from around the country. The neonatal units at North Shore and Waitakere Hospitals admit pēpi >1500g and/or >32 weeks gestation and provide Level 2 care including CPAP respiratory support.

Figure 9.4: Admissions to NICU 1981-2021



9.3.1 Admissions to NICU by gestation and birth weight

The total number of admissions of pēpi born >36 weeks gestation (term) in 2021 was 439. This includes 70 term pēpi who were outborn. These pēpi are likely to have a mixture of problems but the two most common reasons for admission remain respiratory distress and congenital abnormality, which includes congenital cardiac anomalies (Table 163). The term outborn number includes pēpi retrieved for treatment of hypoxic ischaemic encephalopathy, pēpi with significant congenital anomalies diagnosed postnatally or pēpi unexpectedly needing tertiary care after birth. Although these pēpi are term or close to term and have shorter NICU stay, due to their large numbers, they contribute significantly to the acuity of the unit. There were 5 pēpi born at 23 weeks gestation who were cared for in NICU. This includes one outborn pēpi. Pēpi born very and

extremely preterm spend many weeks in NICU. In 2021, 167 (19%) of total admissions were of pēpi <32 weeks gestation; these pēpi contributed to 57% of total NICU baby days (occupancy).

Figure 9.5: Admissions to NICU (total) by gestational age 1999-2021

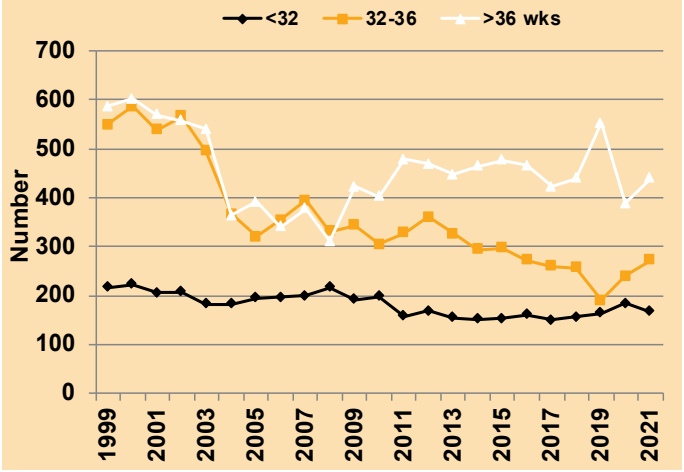


Figure 9.6: Admission to NICU (total) by birth weight 2000-2021

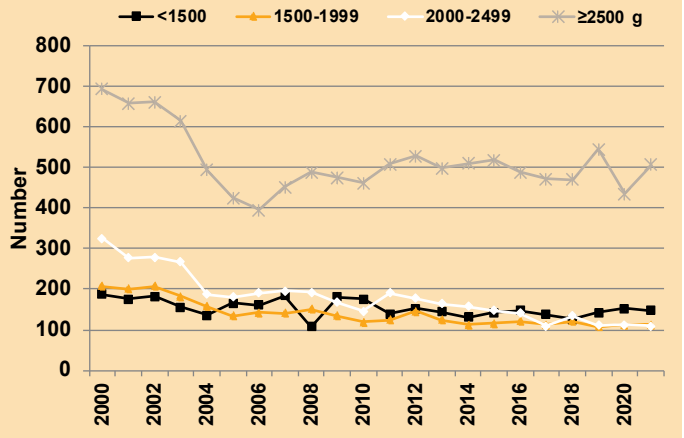
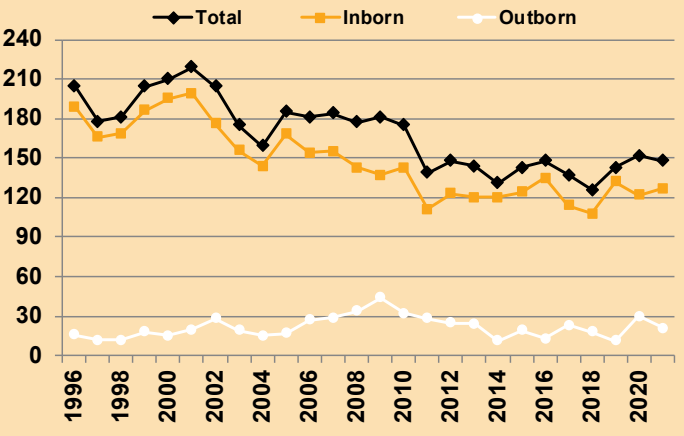


Figure 9.7: Admissions to NICU of <1500g pēpi (VLBW) by place of birth 1996-2021 (outborn includes BBAs)



Twenty one (16.5%) very low birth weight (VLBW) pēpi were outborn in 2021; this number varies over the years but remains low when compared to total number of VLBW pēpi admissions. The total number includes transfers from level 2 units for level 3 care and also infants who are transferred from Middlemore Hospital NICU for surgical care so are another significant group with regard to complexity of care. As a general principle, antenatal transfer is preferable as this avoids transportation of small or fragile infants. Hence the number of outborn infants is very much lower than the number of infants born to mothers domiciled outside of ADHB.

9.3.2 Admissions to NICU by domicile of mother

There was a big decline in admissions of pēpi whose mothers are domiciled in the Waitematā DHB with the opening of their two level 2 units in the early 2000s. In the last few years the proportion of total admissions of pēpi of mothers domiciled in CMDHB has been steady. The reasons for this are not fully elucidated but could be a mixture of CMDHB neonatal unit being full or mothers from CMDHB electing to give birth at NWH. There is also antenatal transfer to Auckland associated with the maternal fetal medicine network providing antenatal care for a small number of infants with major congenital anomalies or maternal conditions. The "unknown" group includes the small number of mothers referred to fetal medicine team from overseas (Cook Islands and Tahiti). The number of these pēpi has remained low over the years.

9.3.3 Admissions to NICU by ethnicity of baby

The most frequent ethnicity of pēpi admitted to NICU in 2021 was NZ European at 28%, followed by Māori at 17% and Other Asian and Pacific, at 15 and 14%, respectively.

This compares to NZ European 26%, Māori 11%, Pacific 12%, Indian 12%, Other Asian 25.8%, MELAA 4%, Other European 7% among all births at NWH in 2021. Māori and Pacific babies are proportionally over-represented in NICU admissions.

Figure 9.8: Admissions to NICU by maternal domicile 2001-2021

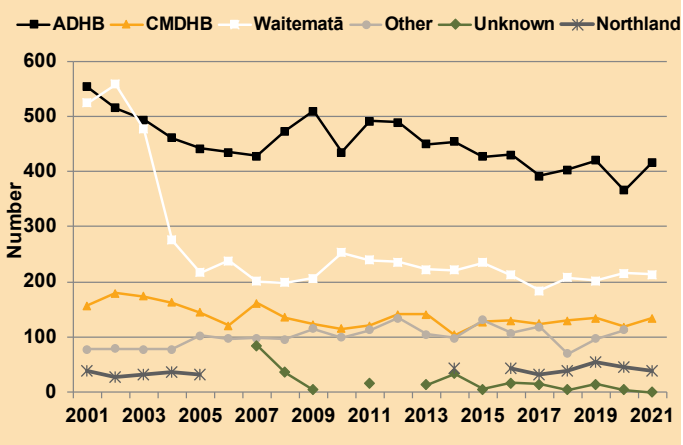
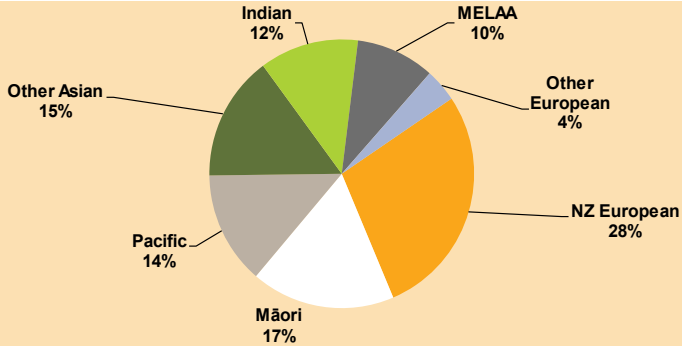


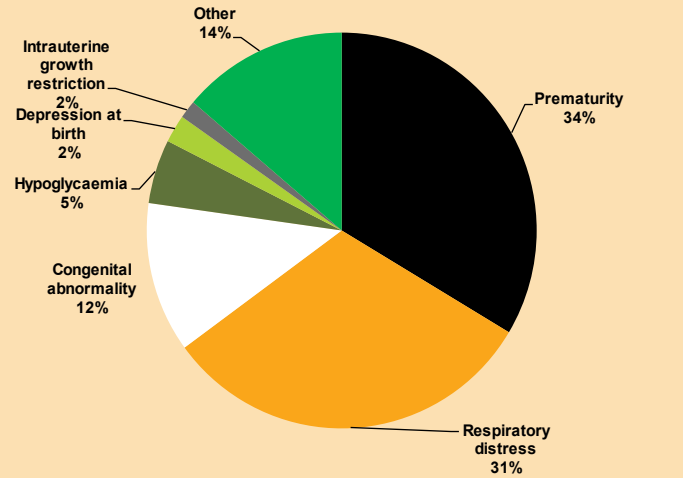
Figure 9.9: Admissions to NICU by ethnicity of pēpi 2021



9.3.4 Reasons for admission to NICU

Prematurity, respiratory distress and congenital anomalies remain the three commonest reasons for admission to NICU, accounting for over three quarters of total admissions in 2021. The number of pēpi admitted to NICU with hypoglycaemia as the main reason for admission has fallen over the years, with 5% of all admissions having hypoglycaemia as the main reason for admission in 2021 compared to 7.1% in 2019. The full list of reasons for admission is presented in Table 9.21.

Figure 9.10: Reasons for admissions to NICU 2021



9.3.5 Antenatal corticosteroids (benchmarked with ANZNN)

Antenatal corticosteroid use has been consistently high in the Network (ANZNN) and in NWH over the last five years. In 2021, 95% of NWH pēpi admitted to NICU at <32 weeks gestation received some antenatal corticosteroids before birth and 79% received a course starting between 24 hours and seven days before birth. Although complete data are not available from ANZNN, it appears that NWH and ANZNN rates are very similar across 24-31 weeks gestational age groups.

Figure 9.11: Any antenatal corticosteroids at 24-27 weeks 1995-2021

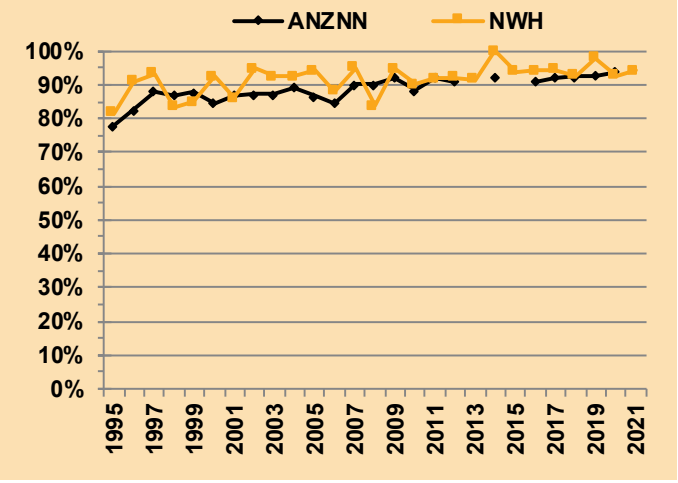
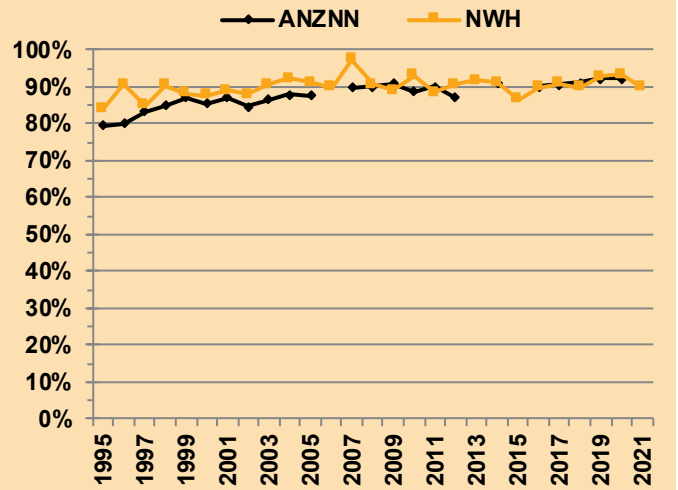


Figure 9.12: Any antenatal corticosteroids at 28-31 weeks 1995-2021



9.4 Care and complications

9.4.1 Infection (inborn admissions)

In 2021, there were 6 pēpi who developed early-onset culture proven septicaemia (one outborn pēpi), which is similar to the previous years (5-10 cases per year). There were 14 cases of early onset infections in 2019, which was higher usual. In 2021 the organisms included Group B Streptococcus (4), Streptococcus pneumoniae(1), and Haemophilus influenzae (1). Three cases of early onset Group B Streptococcus (GBS) septicaemia were in preterm pēpi, including one late preterm pēpi. There were no cases of early onset sepsis caused by E. coli in 2021.

There were 20 episodes of late-onset septicaemia in 19 pēpi (1 pēpi had 2 separate episodes of infection). There were, however, 12 episodes of late onset infections associated with the presence of a central line. For late onset sepsis in pēpi with a central line, the most common organism was Staphylococcus warneri (3), Staphylococcus epidermidis (2), E. coli (2), Staphylococcus capitis (2), Coagulase negative staphylococcus (2) and Staphylococcus hominis (1). There were 8 episodes of late onset infection in pēpi (all

born extremely preterm) who did not have an indwelling central catheter at the time. The organisms isolated included enterococcus faecalis (2), Staphylococcus aureus (2), Staphylococcus epidermidis (2), and one each of Serratia marcescens and E. coli. There was one late preterm pēpi who developed enterobacter cloace meningitis at 23 days of age. Hospital acquired infections remain a very significant concern in this vulnerable group. Efforts to reduce hospital acquired infections is one of the quality improvement activities in NICU.

There were five pēpi with postnatally acquired CMV infection diagnosed in NICU. These were all in preterm pēpi. Other postnatally acquired viral infections included rhinovirus (1), RSV (1), enterovirus (1) and one pēpi with congenital CMV infection.

9.4.2 Hypoxic ischaemic encephalopathy (all admissions)

Six inborn pēpi developed significant (stage 2 or 3) hypoxic ischaemic encephalopathy (HIE) at term in 2021. Two pēpi with severe HIE died.

In addition to this, 8 outborn pēpi were diagnosed with HIE stage 2 or 3, of whom five were cooled. One pēpi commenced cooling but this had to be discontinued due to severe persistent pulmonary hypertension needing treatment with ECMO.

9.4.3 Intraventricular haemorrhage in very low birth weight infants admitted to NICU 1985-2021

Figure 9.13: Intraventricular haemorrhage in <1250g infants admitted to NICU 1985-2021

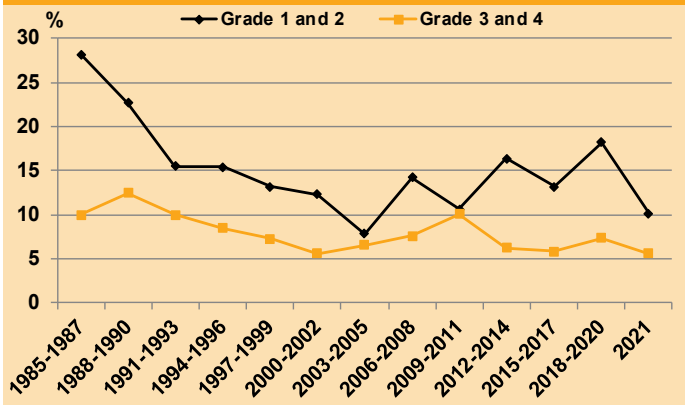
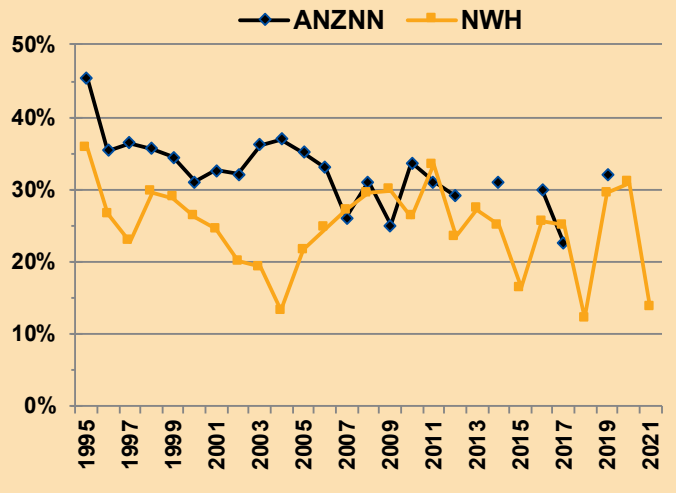


Figure 121 demonstrates the historical trend in IVH rates over the last 30 years. There have been changes in investigation and reporting during this period. In addition to this, changes in technology have resulted in improved detection of minor grades of IVH. In 2005, NWH criteria for routine cerebral ultrasound scanning was changed to <30 weeks or <1250g whereas the ANZNN criteria has remained unchanged. It had previously been <32 weeks or <1500g but there was a very low incidence of significant abnormalities in the larger, more mature infants. From 2010 onward, to avoid major changes in the denominator, we have interpreted those infants in whom an ultrasound was not performed, due to the policy change, as negative (no IVH). The rates of severe grades of IVH in all pēpi <30 weeks has remained stable over the years.

9.4.4 Intraventricular haemorrhage (IVH) (Benchmarked with ANZNN)

Figure 9.14: Any IVH at 24-27 weeks 1995-2021



On the whole, NWH data for rates of IVH are comparable with ANZNN data (Figure 9.14 to Figure 9.17) but with more year-to-year variation due to the smaller number of pēpi in each group. The rates of severe IVH (Grade 3 & 4) remain low but these are associated with significant neurodevelopmental consequences so remain an important benchmark. Included in this group are a consistent but small number of outborn pēpi who have not had tertiary level antenatal care. In 2019, an increase in the rate of grades 1 and 2 IVH in pēpi born at 28 to 31 weeks gestation was noted. In the last two years, rates of any IVH in this group of babies has dropped to levels similar to those prior to 2019 (Figure 124). There is no apparent explanation for the unusually high rate of any IVH in 2019. The data for 2019 were reviewed and verified as being accurate at the time.

Figure 9.15: Severe (G3-4) IVH at 24-27 weeks 1995-2021

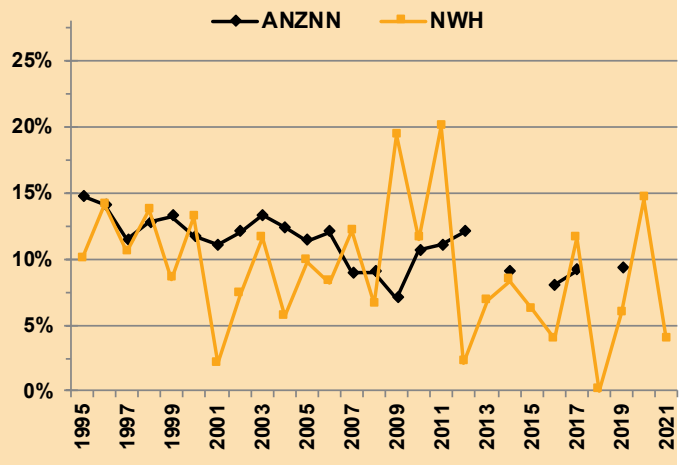


Figure 9.16: Any IVH at 28-31 weeks 1995-2021

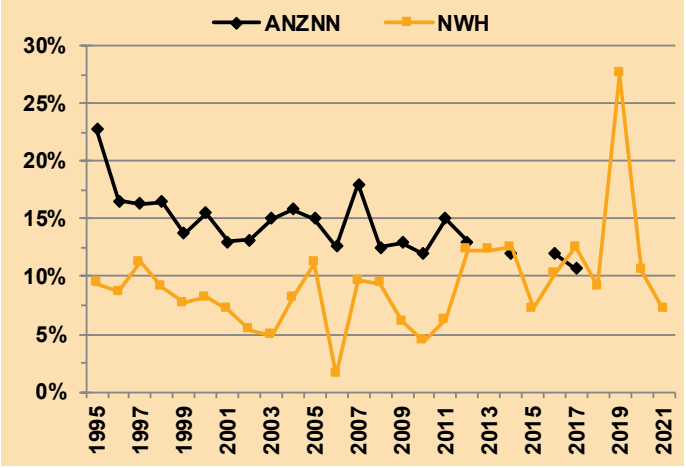
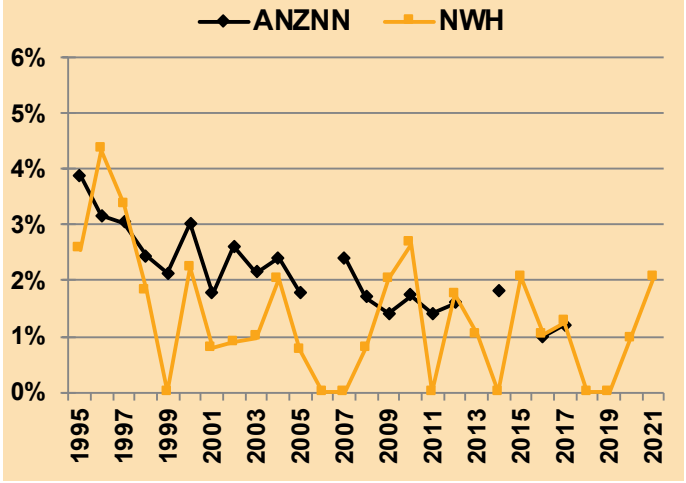


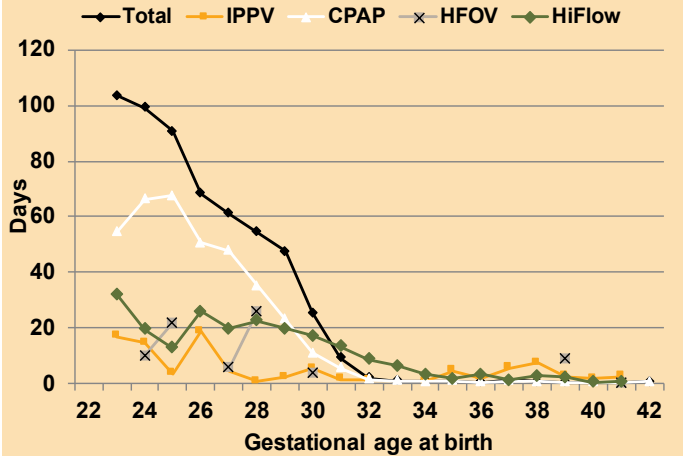
Figure 9.17: Severe (G3-4) IVH at 28-31 weeks 1995-2021



9.4.5 Assisted ventilation

Data in this section are presented for all inborn pēpi at NWH, thus excluding pēpi transferred to NICU in the postnatal period. This allows more meaningful comparisons of postnatal care at NWH over time. Note that we have redrawn the table to include numbers of pēpi who received support using High Frequency Oscillatory Ventilation (HFOV), which in the past has typically been used as a rescue therapy and mostly in term pēpi. Over the past few years, there has been a move towards greater and earlier use of HFOV, especially in the extremely preterm pēpi due to the greater availability and ease of use of this mode of ventilation. Importantly, we have also added numbers receiving Humidified High Flow air/oxygen (HiFlow). This practice was introduced in 2010/11 after HiFlow was shown to be non-inferior to CPAP. Over the years, its use has increased and it now represents a proportion of our respiratory support use. CPAP as the primary mode of respiratory support in uncomplicated inborn premature infants has been in use since the late 1990s. Although the majority of infants born below 26 weeks gestation receive a period of positive pressure ventilation initially, there is a steady reduction in the proportion receiving such support from around 28 weeks gestation. Another change in practice in recent years has been the increasing use of minimally invasive surfactant therapy (MIST), thus avoiding the need for intubation to administer surfactant in some pēpi with respiratory distress syndrome.

Figure 9.18: Median ventilation days by gestational age among (ventilated) inborn survivors NWH 2021



The median days on any respiratory support (ventilation, CPAP and HiFlow) is highest for the extremely preterm pēpi (<28 weeks gestation). Note small peaks in HFOV use at 23-28 weeks and around term.

The use of humidified high flow air/oxygen (HiFlow) as a method of weaning off CPAP or as an alternative to CPAP has now become standard practice in many neonatal units. Data on this is available for the past 8 years and the number of pēpi treated with this form of respiratory support fluctuates over the years. This system offers advantages in the ease of care and handling, and softer interface for the pēpi. At low flow rates and with clinical stability, some pēpi are able to attempt sucking feeds, which is not possible on CPAP respiratory support. As with any changes in practice, there is a need to review this on an ongoing basis, especially in view of duration of respiratory support and long term respiratory outcomes, including chronic lung disease.

9.4.6 Trends in use of assisted ventilation among <32 week inborn survivors

(Note that medians apply only to pēpi ventilated; pēpi not ventilated are NOT included in the calculations)

HiFlow	High flow air oxygen
HFOV	High frequency oscillatory ventilation
IPPV	Intermittent positive pressure ventilation
CPAP	Continuous positive airway pressure

These figures illustrate median days on respiratory support for inborn survivors. This group may be considered a more homogeneous population than the outborn. There are yearly variations in the median days on respiratory support for the different gestational age groups, with the most preterm pēpi needing respiratory support for the greatest number of days. The total number of pēpi in each group is small and the increase seen in pēpi born under 24 weeks is due to a change in practice towards more proactive

management of pēpi born at this gestation. The number of pēpi <24 weeks is very small, resulting in wide variation in the median days on IPPV. There is a trend towards an increase in the median days on any ventilation over the last decade in this group of pēpi. This seems to be largely driven by an increase in CPAP use. The number of pēpi in this group has remained mostly stable over the years.

Figure 9.19: Median days on IPPV NWH 1995-2021

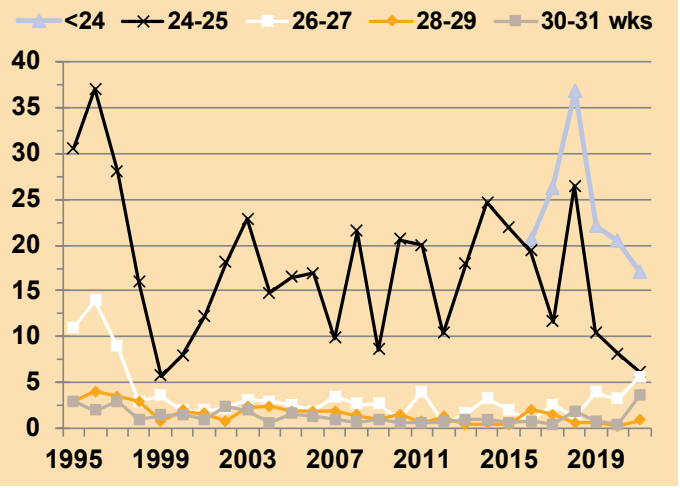


Figure 9.20: Median days on CPAP NWH 1995-2021

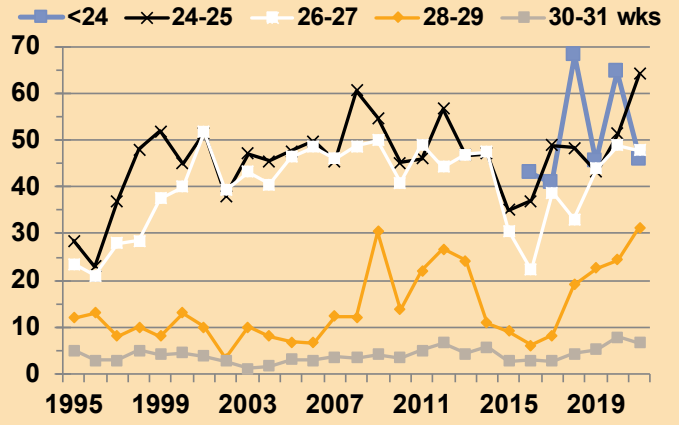
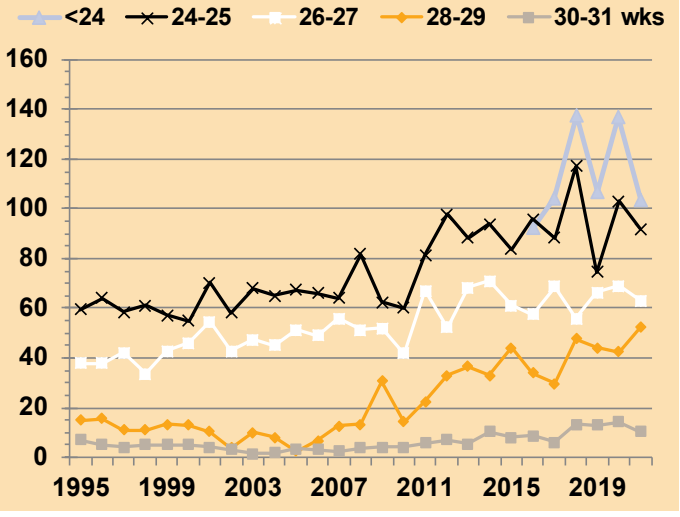


Figure 9.21: Median days on any ventilation NWH 1995-2021



9.4.7 Trends in the use of assisted ventilation among all infants born in NWH

These figures show the number of pēpi requiring respiratory support at NWH from 1995 to 2021.

Figure 9.22: Number on IPPV NWH 1995-2021

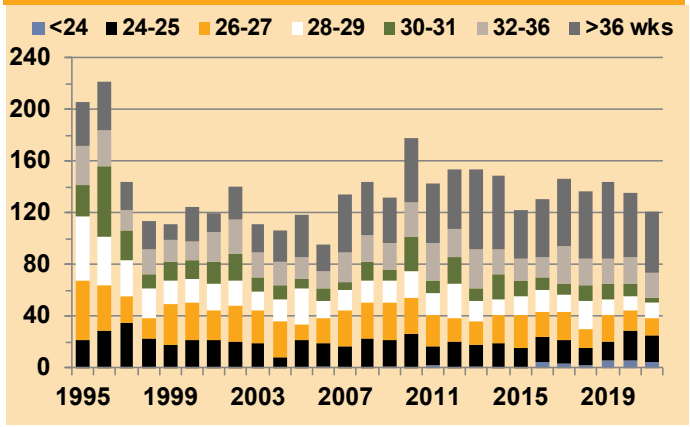


Figure 9.23: Number on CPAP NWH 1995-2021

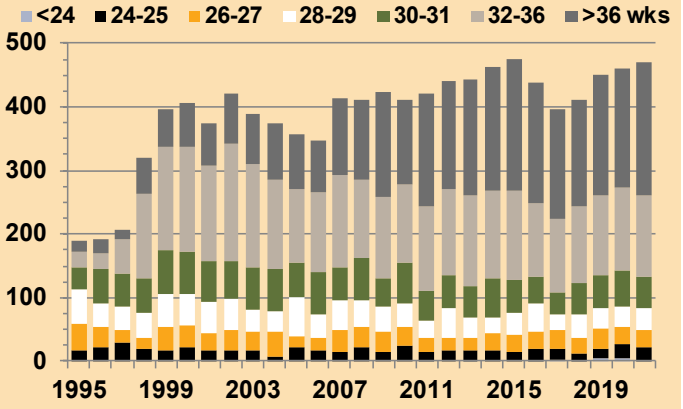
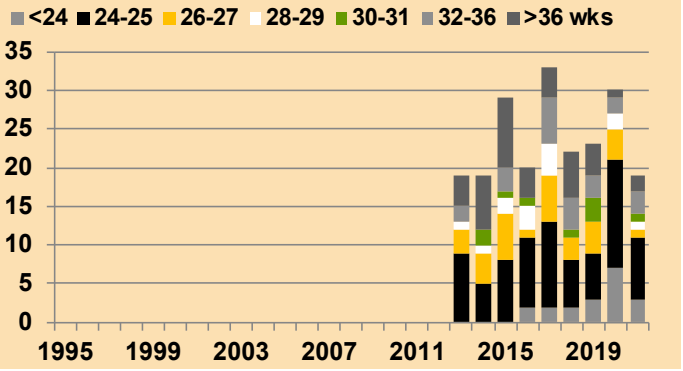


Figure 9.24: Number on HFOV NWH 2013-2021



From 2011 onward we have collected information on the use of High Flow Humidified Air / Oxygen. Figures representing these data and HFOV were added in 2013. Use of HFOV and HiFlow has been fairly stable over the years. In 2014 NICU introduced non-invasive ventilation (NIPPV) but numbers are very small and included in the CPAP group.

With increasing use of CPAP in the late 1990s, the use of IPPV decreased accordingly. In recent years, there is a trend towards greater use of CPAP, especially in term pēpi. There is also a small increase in the use of IPPV in term pēpi. This may be due to a variety of reasons, such as term pēpi ventilated during therapeutic hypothermia and

term pēpi with cardiac or surgical conditions. There is an increasing trend in the use of HFOV for extremely preterm pēpi while HFOV use seems to be stabilizing.

Figure 9.25: Number on HiFlow NWH 2013-2021

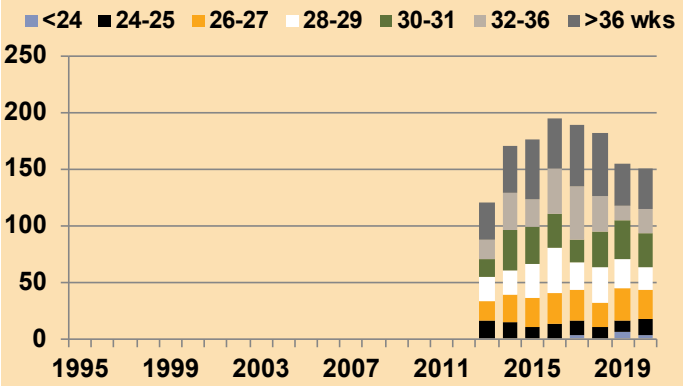
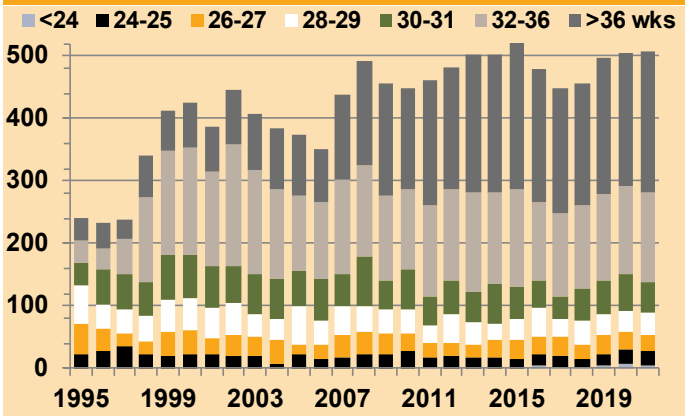


Figure 9.26: Number on any ventilation NWH 1995-2021



9.4.8 Positive pressure ventilation and CPAP use in NWH and across Australia and New Zealand at 24-27 weeks gestation (ANZNN benchmarking)

These data compare the use of IPPV and CPAP in NICU and across the Australia and New Zealand Neonatal Network. The Network collects standardised data from all NICUs in Australia and New Zealand.

The median data presented here are for all pēpi ventilated (i.e. pēpi not ventilated are excluded).

Missing data for ANZNN makes any comparisons in the use of IPPV and CPAP in extremely preterm pēpi with other NICUs difficult. Efforts are made to change to less invasive form of respiratory support (CPAP) sooner in pēpi <28 weeks gestation, reflecting the high CPAP use. The sharp drop in the median days of IPPV in the late 1990s was due to adoption of CPAP as an alternative, less invasive respiratory support in NICU. The drop in the median days on CPAP in 2015/2016 may be partly explained by increasing use of HiFlow as an intermediate step in weaning from CPAP. The median number of CPAP days for this group of pēpi is high at around 50 days. Many pēpi would have been transferred to their local level 2 unit prior to being weaned off CPAP.

Figure 9.27: Percentage on IPPV (24-27 wks ANZNN assigned) NWH 1995-2021

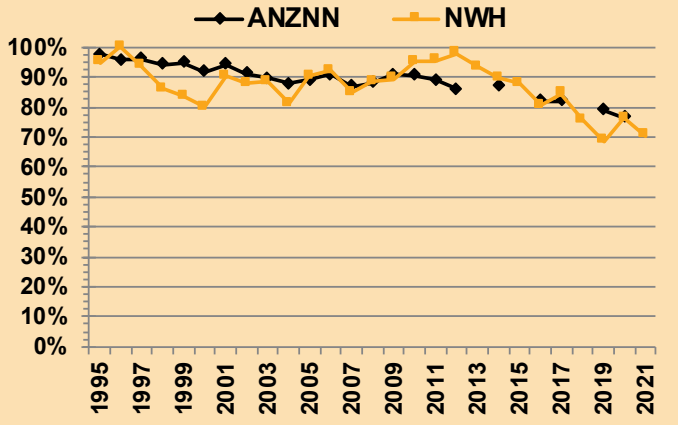


Figure 9.28: Percentage on CPAP (24-27 wks ANZNN assigned) NWH 1995-2021

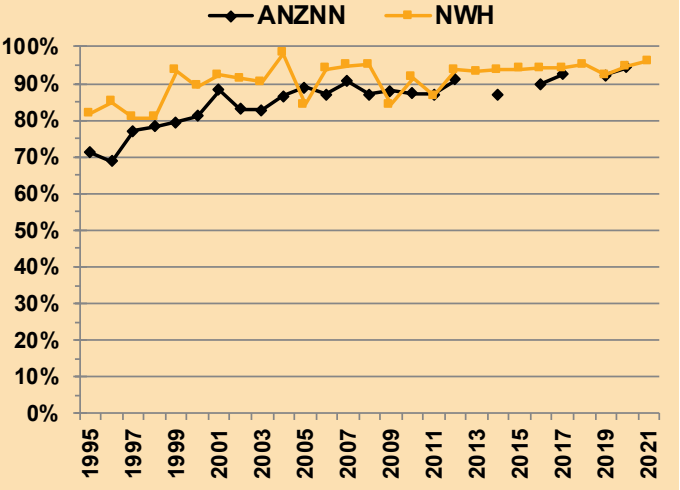


Figure 9.29: Median days on IPPV (24-27 wks ANZNN assigned) NWH 1995-2021

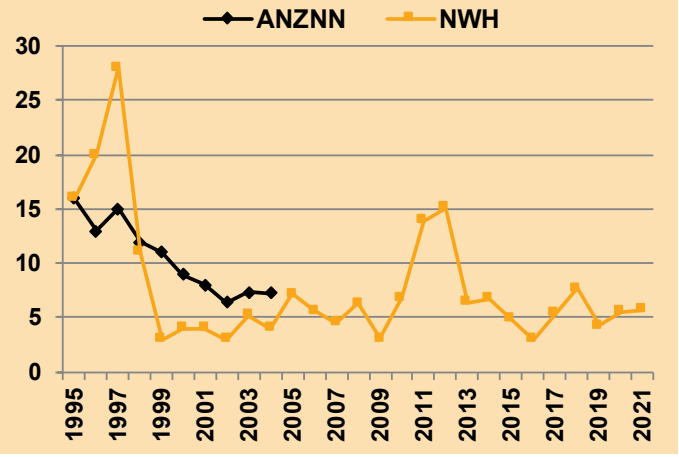


Figure 9.30: Median days on CPAP (24-27 wks ANZNN assigned) NWH 1995-2021

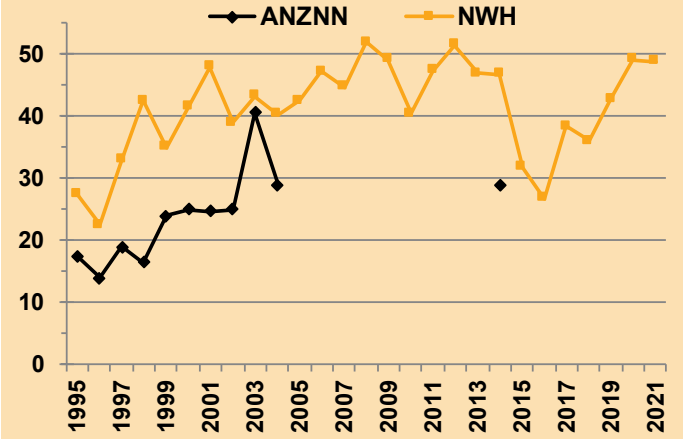
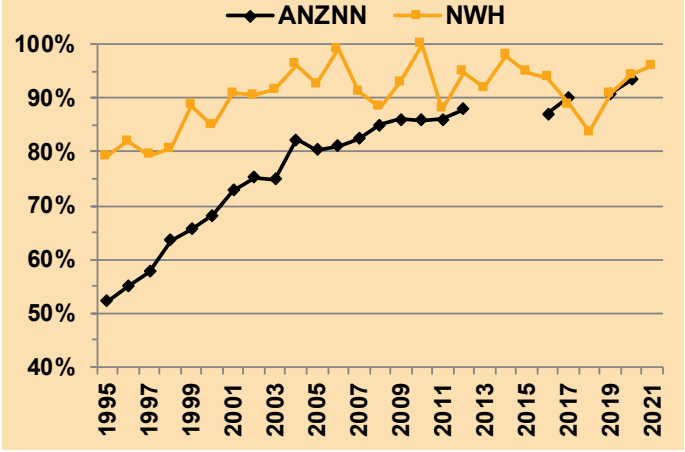


Figure 9.32: Percentage on CPAP (28-31 wks ANZNN assigned) NWH 1995-2021



9.4.9 Positive pressure ventilation and CPAP use in NWH and across Australia and New Zealand at 28-31 weeks gestation (ANZNN benchmarking)

ANZNN data is incomplete therefore direct comparisons of practice between NICU and other neonatal units is not possible. Pēpi born between 28 and 32 weeks are more mature and therefore need less time on respiratory support compared to pēpi born <28 weeks. As CPAP is the main modality of respiratory support after birth in these pēpi almost 100% are treated with CPAP whereas approximately 20% only are treated with IPPV. As these pēpi are more mature, they are ventilated for <48 hours. There has been an increase in the duration of CPAP for this group of pēpi, especially in the last 3-4 years.

Figure 9.33: Median days on IPPV (28-31 wks ANZNN assigned) NWH 1995-2021

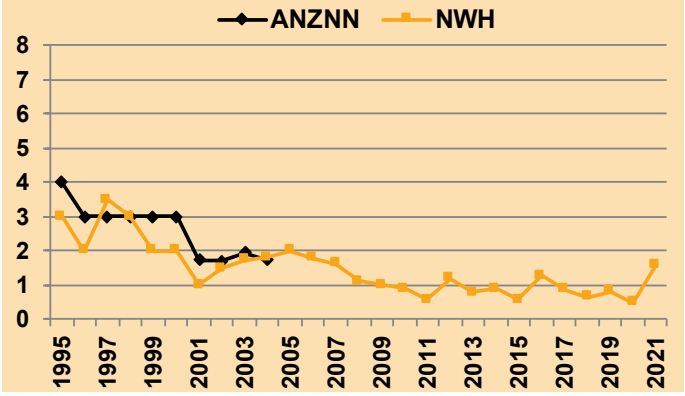


Figure 9.31: Percentage on IPPV (28-31 wks ANZNN assigned) NWH 1995-2021

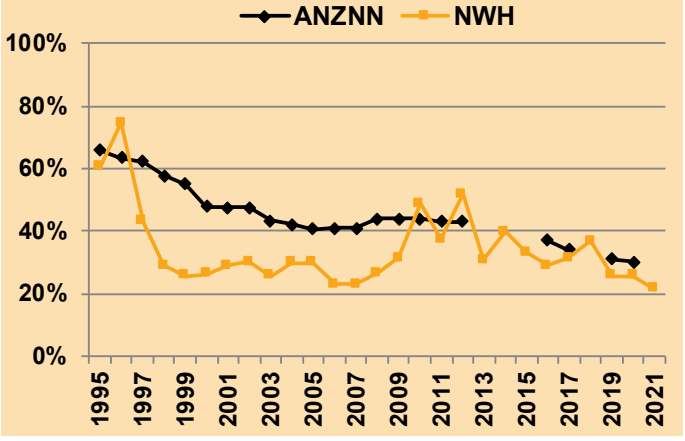
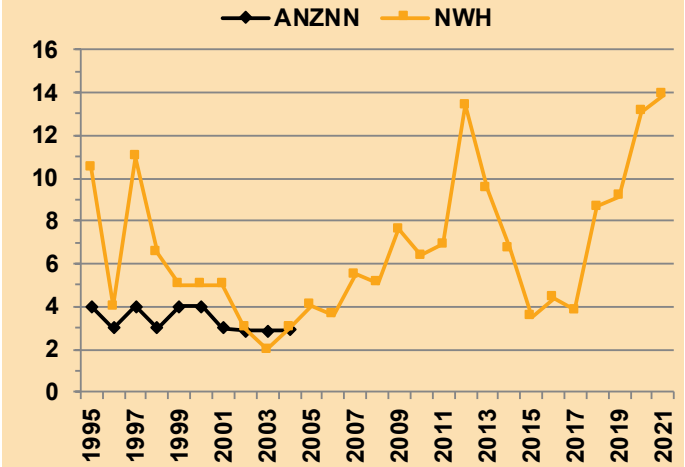


Figure 9.34: Median days on CPAP (28-31 wks ANZNN assigned) NWH 1995-2021



9.4.10 High frequency oscillatory ventilation and inhaled nitric oxide (iNO)

These data are on all pēpi admitted to NICU each year, including those born in other hospitals or at home.

In NICU, high frequency oscillatory ventilation (HFOV) has typically been used for 'rescue' treatment. Hence, pēpi treated with HFOV are the sickest pēpi in NICU who would be expected to have a very poor outlook whatever the treatment. There is, however, a trend towards greater use of HFOV in the more immature pēpi with the ability to deliver this form of support using the Dräger Babylog® VN500 ventilators.

Figure 9.35 and Figure 9.36 compare the use of HFOV and iNO at NWH with use across the ANZNN. Generally, the use of these interventions in preterm infants has increased since 2003 but is probably comparable with ANZNN data as the actual number of pēpi is small and there is variation in practice in the neonatal units within the Network. There is an overall trend towards increasing use of both HFOV and iNO in these extremely premature pēpi, with considerable variation in rates over the years.

Figure 9.35: HFOV at 24-27 weeks (ANZNN assigned pēpi) NWH 1995-2021

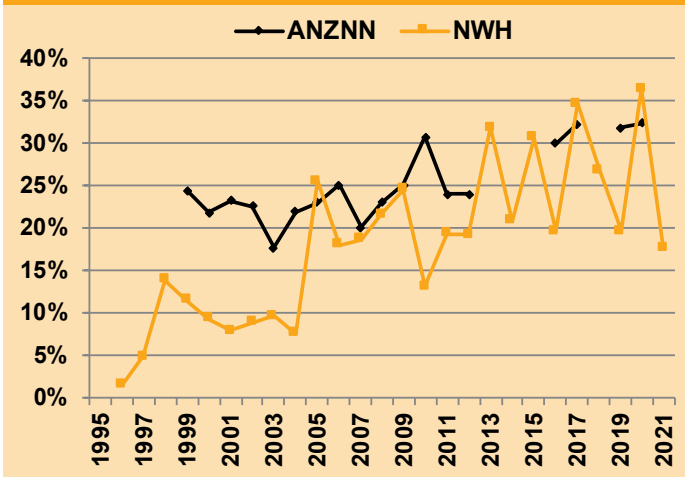
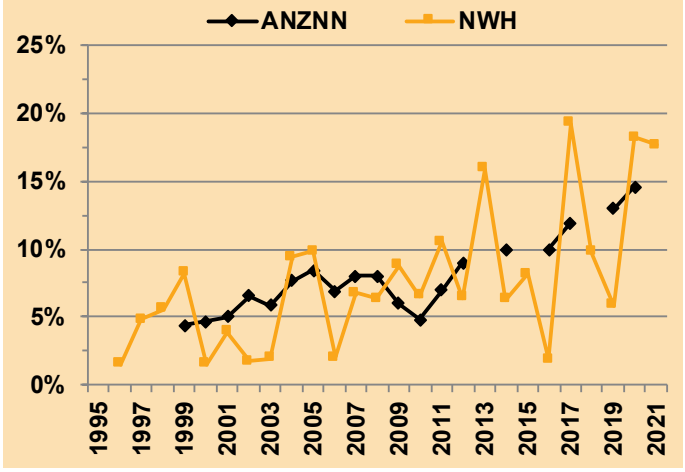


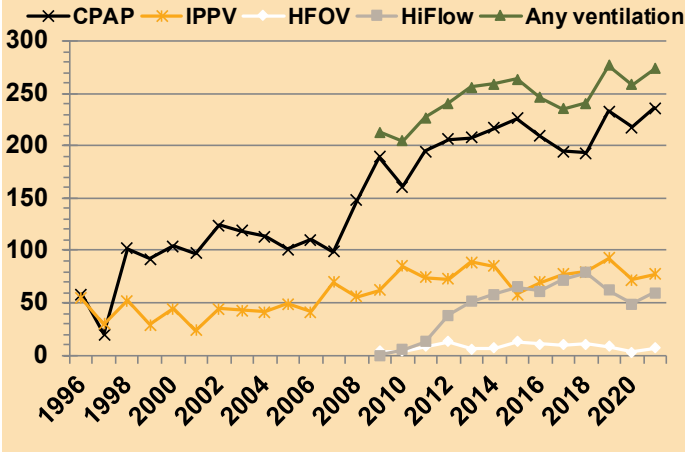
Figure 9.36: Inhaled nitric oxide at 24-27 weeks (ANZNN assigned pēpi) NWH 1995-2021



9.4.11 Term/post-term infants on assisted ventilation from 1995 to 2021

Figure 9.37 shows trends in the number of term infants treated with the available forms of respiratory support. As with preterm infants, in the late 1990s there was a significant increase in CPAP use due to the removal of headbox oxygen as a therapy. Since 2007 there has been an increase in numbers receiving CPAP. In 2013 we revised the figure to include data for HFOV and HiFlow, and included an indication of total respiratory support (i.e. all modes combined). There has been a sustained high use of CPAP in this group of pēpi in the last decade. The use of HiFlow respiratory support is also increasing, but use of the other more invasive forms of support remains stable. The slight decline in the number for CPAP between 2015 and 2018 may be explained by an increase in use of HiFlow as an alternative to CPAP. The use of HiFlow has since stabilised but CPAP use is still increasing. This is a heterogeneous group of pēpi. TTN/RDS, meconium aspiration syndrome/PPHN, infection, congenital anomalies, support for surgery, neonatal encephalopathy and 'other', which could include a neuromuscular problem, were the reasons for ventilation in term infants.

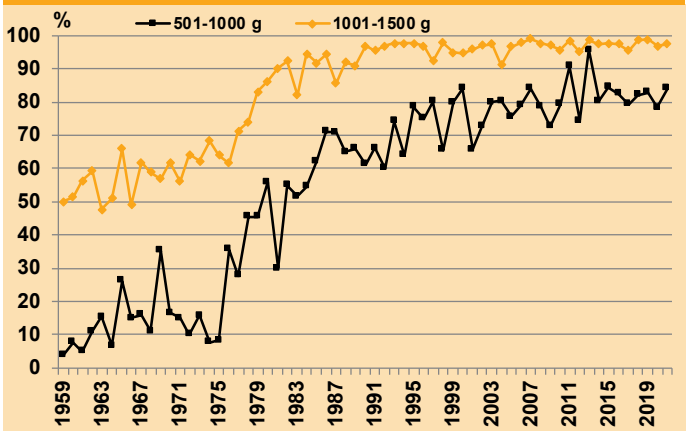
Figure 9.37: Number of term and post term pēpi needing respiratory support (IPPV, HFOV, CPAP and HiFlow) NWH 1995-2021



9.5 Outcomes

9.5.1 Survival of NWH inborn pēpi by birth weight

Figure 9.38: Neonatal survival (0-28 days) of ≤1500g inborn live births NWH 1959-2021



Over the years the definitions used have been the same, counting all pēpi, including those who died soon after birth, if they showed signs of life.

The numbers of pēpi with anomalies and the number who were not actively treated because of their low gestation vary from year to year, and have a big influence on the overall survival rate, particularly in the extremely low birth weight group (500-1000g, ELBW).

Significant advances in neonatal care have been reviewed in previous reports. However, it is worth noting the current quality of survival, in terms of neurodevelopment, as reported in the Child Development Unit (CDU) section of the report.

9.5.2 Survival of inborn pēpi (23 to 31 weeks) by gestational age

There is a gradient in the survival rates between 23 and 31 weeks gestational age. Although the number of pēpi in each group per year is small, the pattern of survival in very preterm infants has been steady over the last decade.

In comparison with ANZNN and some other international data sets, survival at 23 weeks gestation has previously been low. After this was highlighted by a previous review, work has been done locally and nationally to review practice. A national consensus statement on the care of pēpi born at these extremely preterm gestations has now been published by the Newborn Clinical Network. At NWH, we offer intensive care at 23 weeks gestation if parents, after detailed discussions with obstetric and neonatal teams, opt for this. In 2021, 1 out of 4 pēpi born at 23 weeks gestation and admitted to NICU survived to discharge. The number of pēpi admitted at this extremely low gestation remains small hence the large variations in survival over the years. At gestations greater than 24 weeks NWH survival rates are comparable to outcomes published by ANZNN, which approximate population data.

Figure 9.39: Numbers of live inborn pēpi 23 to 31 weeks gestation by outcome NWH 2012-2021 (n=1422)

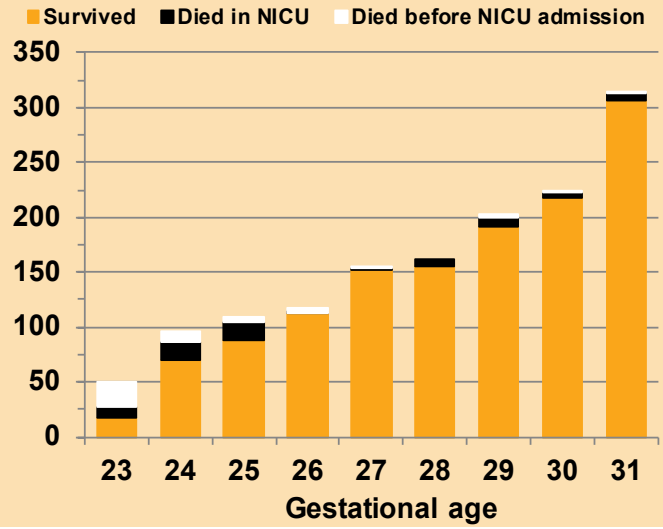


Figure 9.40: Survival of live inborn pēpi 23-31 weeks NWH 2012-2021 (n=1422)

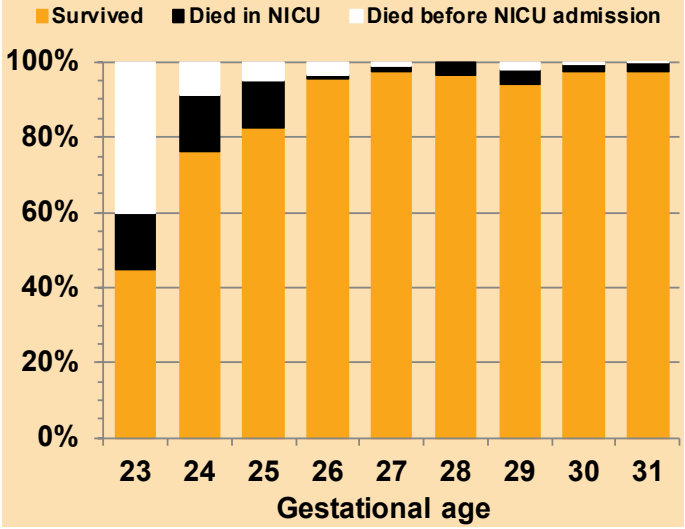
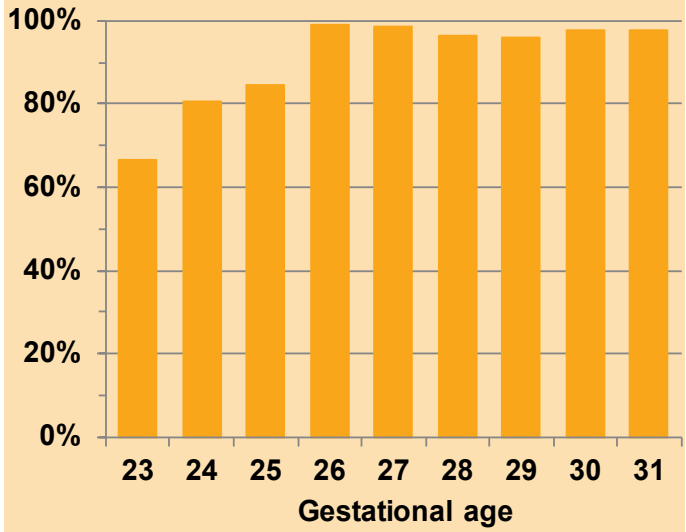


Figure 9.41: Survival of live inborn pēpi admitted to NICU 2012-2021 (n=1373)



9.5.3 Survival of 24-27 week pēpi admitted to NICU (benchmarked with ANZNN)

Figure 9.42: Survival at 24-25 weeks gestation (admitted to NICU) compared with ANZNN data NWH 1995-2021

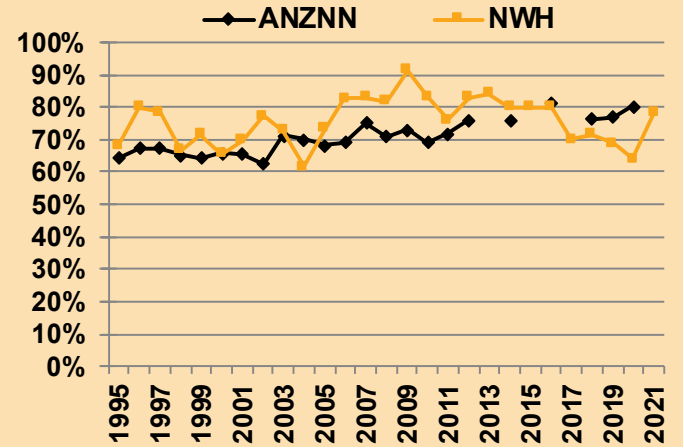
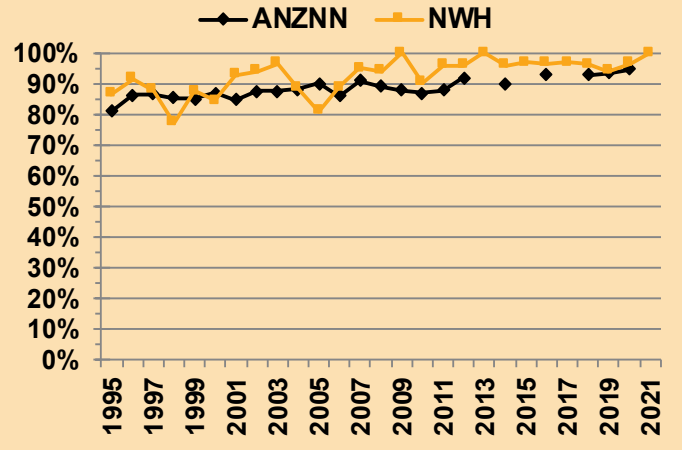


Figure 9.43: Survival at 26-27 weeks (admitted to NICU) compared with ANZNN data NWH 1995-2021



Survival rates for 24-27 weeks gestation are overall good and comparable with ANZNN rates, with some variation due to relatively small numbers at 24-25 weeks gestation. These data are for all inborn pēpi admitted, including those with lethal malformations but excluding deaths in Labour and Birthing Suite.

9.5.4 Cystic periventricular leucomalacia (PVL)

In 2021 there were two pēpi (one inborn & one outborn) diagnosed with cystic PVL. One pēpi was born at 25 weeks and was one of MCDA twins where the pregnancy was complicated by twin to twin transfusion syndrome requiring Laser treatment. The surviving twin was anaemic in utero and noted to have left sided cystic PVL on a 2 week head ultrasound scan. The other pēpi was outborn at 28 weeks gestation and had grade IV IVH on early scans. This evolved into bilateral cystic PVL. Her course was complicated by early onset group B streptococcus septicaemia and meningitis.

9.5.5 Retinopathy of prematurity benchmarked with ANZNN

The rates of significant (Stage 3 or 4) ROP have remained stable over the years and are comparable to the ANZNN data. NICU screens babies <30 weeks gestation or <1250 g birthweight for ROP whereas many other units screen babies <31 weeks or <1250 g. 105 eligible pēpi were screened for ROP, 53 of whom had no ROP and another 16 had stage 1 (mild) ROP. There were 3 pēpi with stage 3 and no pēpi with stage 4 ROP in 2021. Two pēpi were treated with intravitreal Avastin (bevacizumab), one pēpi with laser and one pēpi was treated with both intravitreal Avastin® and laser. All pēpi who received treatment for ROP were born <27 weeks gestation.

Figure 9.44: Stage 3-4 ROP at 24-27 weeks NWH 1995-2021

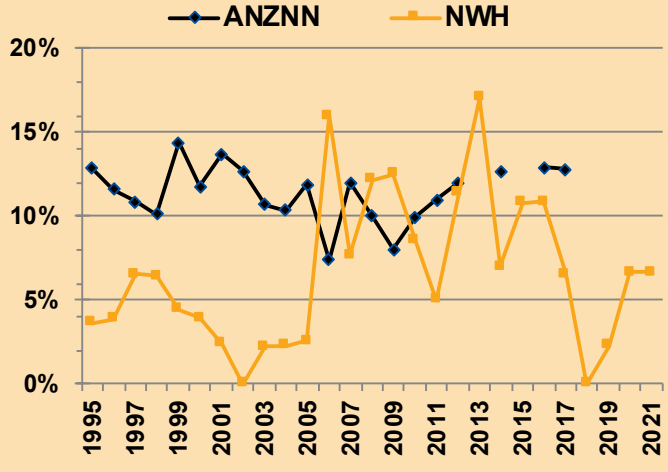
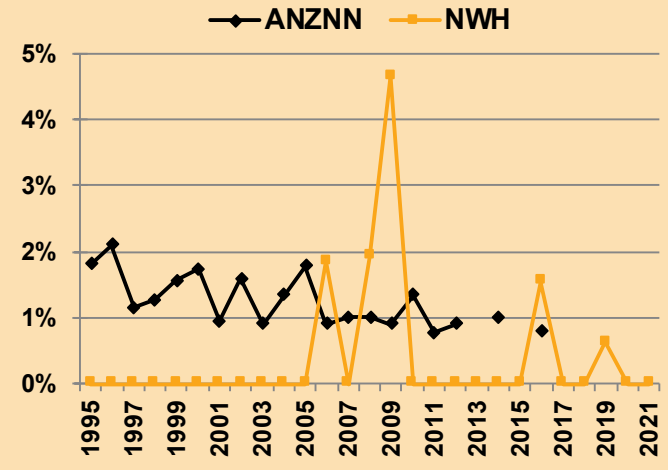


Figure 9.45: Stage 3-4 ROP at 28-31 weeks NWH 1995-2021



9.5.6 Chronic lung disease (CLD) benchmarked with ANZNN

Chronic lung disease is an important clinical outcome, particularly in the very preterm population. Although a variety of definitions exist in the literature, the graphs below have consistently used a rate defined by 'a continued need for any form of respiratory support (supplemental oxygen and/or assisted ventilation) at 36 weeks postmenstrual

age.' ANZNN also uses this definition in its reports.

The graphs below give the outline of CLD in NWH NICU compared with ANZNN since 1995 (ANZNN data are missing for a number of years). It has been previously noted that changes in the target oxygen saturation levels were associated with changes in rates of CLD. In the late 1990s, target levels were increased only then to fall in 2002 with the presentation of the BOOST trial of oxygen saturation in CLD. Between 2005 and 2011 there were no discernible major trends in the incidence of CLD. However, in 2010 the SUPPORT trial reported a higher risk of death if oxygen saturation was targeted in the range 85-89% compared with 91-95% so there has once again been a shift upwards in rates of lung disease defined by ongoing use of respiratory support or supplementary oxygen. This trend has been shown in the other ANZNN units. The rates of chronic lung disease in all pēpi born less than 32 weeks' gestation has remained higher than ANZNN rates in recent years, although some ANZNN data are missing.

Figure 9.46: Chronic lung disease at 24-27 weeks NWH 1995-2021

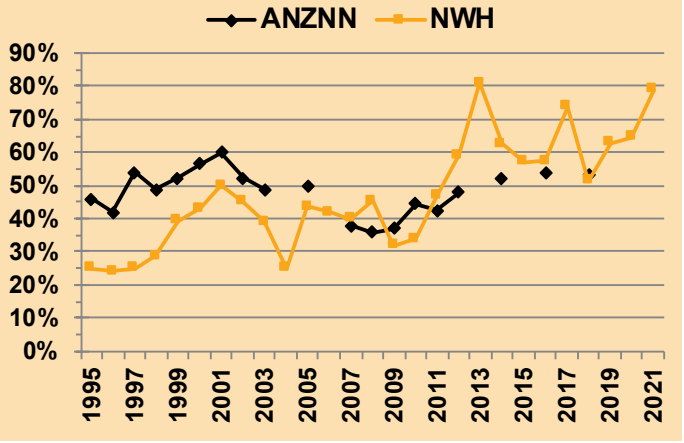
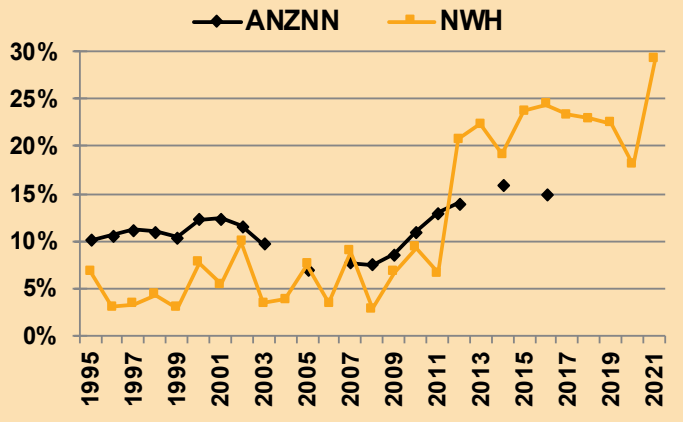


Figure 9.47: Chronic lung disease at 28-31 weeks NWH 1995-2021



From 2016, ANZNN has been collecting data for pēpi born at <28 weeks gestation on chronic lung disease measured quantitatively to determine physiological chronic lung disease status and to provide a comparable indicator of lung disease severity regardless of NICU practices (modified from Quine et al. 2006 Arch Dis Child Fetal Neonatal Ed 91:F409 and Walsh et al. 2004 Pediatrics 114:1305). The outcomes are yet to be reported by ANZNN. 2021 cases of CLD are as per ANZNN pre-2016 definition.

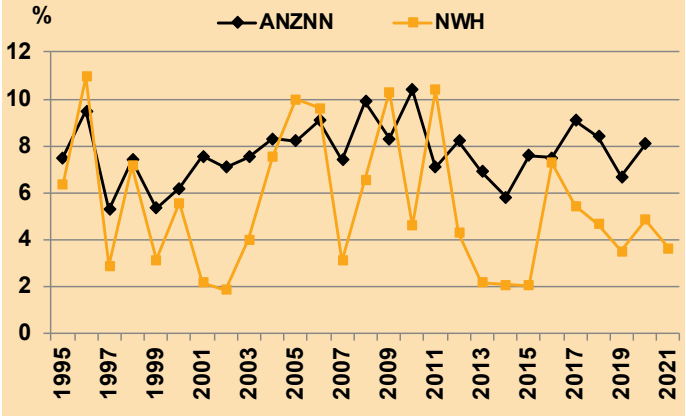
An issue with the diagnosis of CLD is that treatment determines the diagnosis so changes in practice, such as changes in respiratory support or oxygen saturation targets, alters the 'incidence' of CLD. From 2010, there has been an increase in the rates of chronic lung disease, with up to 80% of pēpi born <28 weeks being diagnosed with CLD at 36 weeks gestation. Many of these babies are on respiratory support (high flow or CPAP) without supplemental oxygen, suggesting a component of airway involvement in this condition. As noted earlier, use of CPAP has continued to increase over the recent years. Some of the rise in CLD may also be explained by an increase in survival in <28 week gestation pēpi.

9.5.7 Necrotising enterocolitis (NEC) benchmarked with ANZNN

The benchmarking figure below compares rates for pēpi below 28 weeks gestation from NWH and the ANZNN. Moderate variability in rate due to small numbers has been typical. However, probiotic use was introduced in 2011 initially as a clinical trial and later as a standard treatment for infants below 1500g or 32 weeks gestation so it is important to continue to observe NEC rates closely. Data for individual NEC cases by gestation and birth weight are given in Table 9.38 and Table 9.39 and it is notable that the rates of NEC have remained low following the introduction of probiotics. Two different types of probiotics have been used in NICU due to supply issues over the years.

There were 3 cases of NEC among inborn ANZNN pēpi recorded in 2021, two of whom died as a result of NEC. In addition to this, one outborn pēpi was transferred for management of NEC.

Figure 9.48: Necrotising enterocolitis (NEC) in ANZNN assigned pēpi under 28 weeks gestation compared with the incidence in ANZNN 1995-2021



9.5.8 Patent Ductus Arteriosus (PDA) (all pēpi)

In 2021, a total of 15 pēpi were treated for a symptomatic patent ductus arteriosus, 14 with Indomethacin and two pēpi were treated with surgical ligation (one pēpi was treated with surgical ligation following a course of Indomethacin).

9.5.9 Pneumothorax needing drainage (all pēpi)

In total, 11 pēpi were diagnosed with pneumothorax requiring intervention, 4 were outborn. 6 pēpi were born preterm (<35 weeks; all had severe RDS and had chest drains inserted to treat pneumothorax). 5 pēpi were born at term, 3 were outborn and 2 were inborn. Three term pēpi needed chest drains, two were treated with needle aspiration only.

9.5.10 Postnatal corticosteroids (ANZNN pēpi)

These data are on the use of postnatal corticosteroids to treat CLD. Data on steroid use to facilitate extubation, associated with upper airway oedema are excluded. The denominator used in the figures is the number of pēpi alive at 1 week of age. In 2021, a total of 14 pēpi were treated with postnatal steroids. All pēpi treated with postnatal steroids were born at less than 28 weeks gestation. There is an intention to use steroids rationally and at the lowest required dose, often to facilitate extubation in extremely preterm pēpi who are still ventilated beyond 7-10 days of age.

Figure 9.49: Percentage receiving postnatal dexamethasone by gestational age (ANZNN alive at one week <30wks) NWH 1995-2021

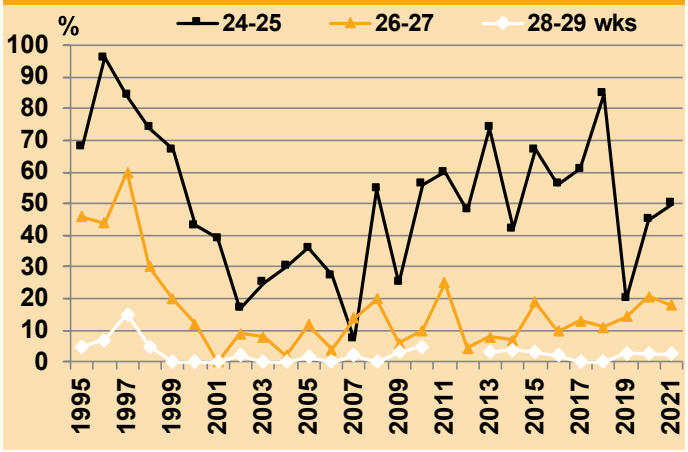
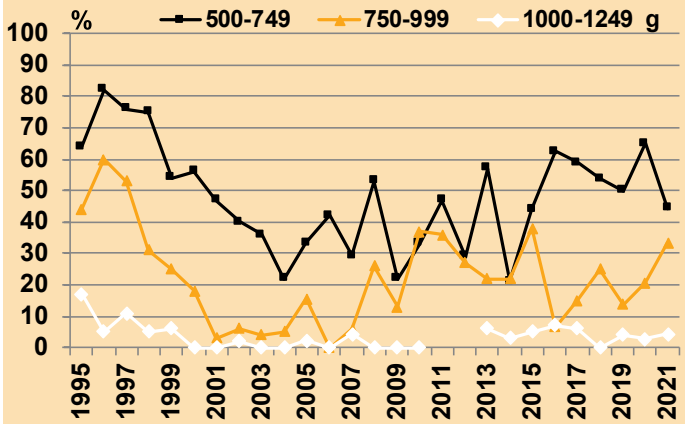


Figure 9.50: Percentage receiving postnatal dexamethasone by birth weight (ANZNN alive at one week <1250g) NWH 1995-2021



9.6 Immunisation

9.6.1 Hepatitis B

In 2021, three inborn pēpi whose mothers were hepatitis B surface antigen positive were admitted to NICU. All received hepatitis B vaccine and immunoglobulin.

9.6.2 BCG

Since 2018, no pēpi have been given BCG vaccination whilst in the neonatal unit. There has previously been an interruption of BCG vaccine supply due to a global shortage. BCG vaccine is, however, available now and eligible pēpi are routinely referred to Public Health at the time of discharge.

9.6.3 Infrarix Hexa and Prevanar at 6 weeks

In 2021, 105 pēpi were in NICU when their 6-week immunisations were due. 96 pēpi were immunised at or close to 6 weeks of age. Three pēpi had their immunisations delayed due to their clinical condition at the time (1) or transfer to another unit at 6 weeks of age (2). All three pēpi were subsequently immunised. Another four pēpi, all born at <30 weeks gestation, were not immunised due to parental choice (immunisations declined by parents of 3 pēpi and deferred for one pēpi) . One pēpi could not be immunised as it was medically contraindicated, and one pēpi was critically unwell when immunisations were due and died shortly thereafter.

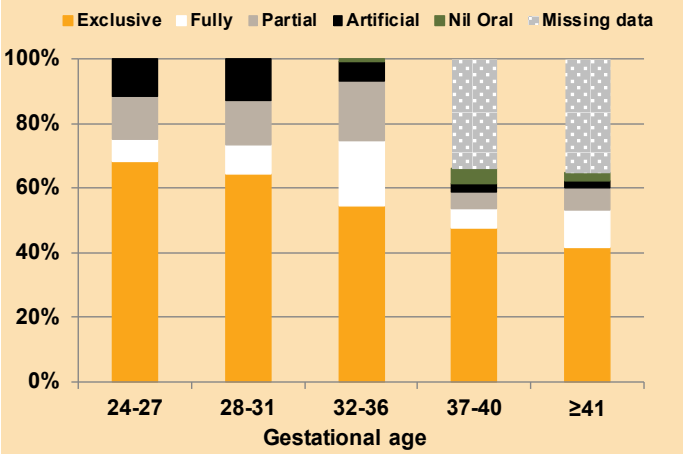
9.6.4 Infrarix Hexa and Prevanar at 3 months

Twenty eight pēpi were still in NICU at three months of age. All 28 pēpi received their 3 month immunisations. Three month immunisations were delayed by two weeks in 2 pēpi, one of whom was sick with post-operative complications and the other pēpi was receiving a course of postnatal corticosteroids which delayed the administration of 6 week immunisations and therefore 3 month immunisations had to be delayed as a result.

9.7 Infant Feeding (inborn)

Data are presented on pēpi admitted to the NICU who were either discharged to the postnatal ward or to home. Note it is a standard of care for VLBW infants to receive human milk fortifier, which is classified as a breast milk substitute. For the purposes of this report VLBW infants who only receive breast milk and fortifier are classified as exclusive breastfeeding.

Figure 9.51: Method of feeding at discharge from NICU by gestational age 2021



The data for 2021 show that almost two thirds of infants born at 24-27 weeks' gestation were exclusively breastfeeding at discharge, and almost three quarters were either exclusively or fully breastfeeding. The majority of NICU infants born below 28 weeks received breast milk to some degree when in the neonatal unit. Rates of fully or exclusively breastfeeding are also high for the other gestational age groups. Overall these data are consistent with the high rates of breast milk feeding reported previously.

The newborn service strives to achieve a high rate of breastfeeding across the range of gestational age groups. However, there are on-going and different challenges for the different groups of pēpi.

Preterm pēpi born below 28 weeks gestation may be in hospital for 3 or more months and optimal neonatal growth can be a major issue for some of these pēpi. In addition, mothers may have to express milk for many weeks before the pēpi is ready to breastfeed, often at times of considerable stress, especially if pēpi is unwell. Some mothers are unable to maintain their supply up to the time of infant discharge despite input and support from staff but nevertheless have provided valuable breastmilk earlier in the neonatal course. Other situations where exclusive breastfeeding may not be possible are when the mother is unwell and not able to express sufficient milk to maintain supply for a relatively large well pēpi or in cases of multiple births where a mother may not have enough supply initially for all pēpi to receive exclusive breast milk feeds. Some pēpi born between 32 and 36 weeks gestational age and whose mothers wish to breastfeed are involved in the DIAMOND trial which is investigating different ways of giving nutrition to preterm pēpi to find out how it affects their fat stores and brain development.

9.8 Neonatal deaths prior to NICU discharge among pēpi admitted to NICU in 2021

In 2021, fourteen inborn pēpi died within the first month after birth (neonatal death) while still in NICU and two pēpi died beyond a month of age while still in NICU. Another four died in the first month after discharge from NICU. The gestational ages of these pēpi ranged from 23 weeks to 41 weeks. Eight deaths were in pēpi born extremely preterm (<28 weeks gestation) and causes of death included sepsis (both early and late onset), pulmonary hypoplasia, HIE, major congenital anomalies and surgical (NEC or bowel perforation). Two pēpi with diagnosis of congenital cardiac abnormalities died in PICU following complications of surgery, and a further 6 pēpi with severe cardiac abnormalities died (2 in the community) while receiving palliative care as surgical treatment was not able to be offered due to the complexity of the underlying cardiac condition and/or associated abnormalities or prematurity. Two pēpi (41 weeks and 36 weeks) died following severe HIE, and two late preterm pēpi with multiple congenital anomalies died while receiving care in NICU.

A further 7 outborn pēpi died in NICU – 1 preterm pēpi following NEC and 6 term pēpi – 4 with HIE stage 3 and two with congenital abnormalities.

Infant (<12 month) deaths that occurred following transfer from NICU to Starship Hospital (or to other hospitals) are not reported here as these are largely in pēpi with cardiac or other anomalies and are reported by the Starship services involved.

9.9 Child Development Unit

Janice Taylor

A note on 2021 and the 'Covid lockdowns'

New Zealand has undergone a number of nationwide and regional lockdowns and social restrictions since March 2020 and like so many services we were unable to operate our usual assessment clinics. In 2020 we offered parents the interim option of completing an Ages and Stages Questionnaire (ASQ-3) which derives scores from parent report. The return rate for these questionnaires was 48%. Despite this limited uptake we offered the questionnaires again to parents during the 2021 restrictions with the intention of maintaining a level of contact with families during what were, at times, quite protracted restrictions. Most parents declined the ASQ option. Of those who accepted (six parents) three forms were completed and returned.

All parents were offered our usual clinical assessments as Alert Levels were lowered. Some parents elected to wait until it was "safe to come in". A number of parents declined to visit the hospital even when we were operating under MOH guidelines.

9.1.1 Follow up at 2 years (corrected) of children under 1500 grams born in 2019

One hundred and twenty-four infants born in 2019 who weighed less than 1500 grams (very low birth weight) were cared for in the Newborn Service and survived to hospital discharge. Of these children:

- 36 infants (29%) weighed less than 1000 grams
- 59 infants (48%) had a gestational age of between 23 and 28 weeks
- 19 infants (15%) were SGA
- One child died after discharge.

Follow up data was obtained for 64 children (52% retrieval). Information was not obtained, or not provided in this report, for 60 children for the following reasons:

- 56 children were lost to follow up because of
  - living overseas (3 children)
  - 28 children were living in other New Zealand centres (23% of the cohort)
  - The families of 14 children could not be traced (11%)
  - Eleven parents declined follow up (9%)
- Results for one child were excluded because of other confounding medical conditions.
- One child died post-discharge.
- Reliable results were not achieved for two children because of behavior issues in testing (one of whom slept through the entire session).

Of the 64 children seen, 60 children received individual assessment at the Child Development Unit ("CDU"). The Bayley Scales of Infant and Toddler Development-IV were administered by a registered psychologist as close as possible to the child reaching two years (corrected age). Neurological examinations were carried out by paediatricians. Results for a further 4 children were obtained from paediatricians, psychologists and neurodevelopmental therapists outside of the CDU.

The demographic distribution of this data cohort (N=64) is broadly similar to the total cohort described in paragraph 9.1.1 of this report:

- 25 children (39%) weighed less than 1000 grams at birth
- 34 (53%) had a gestational age of between 23 and 28 weeks
- 9 children (14%) were SGA at birth

From the information gathered, children were placed into outcome categories; a description of these categories is presented in the table below.

Table 9.1: Outcome categories for infants under 30 months of age

Category I	**(Severe disability): one or more of the following**	
	(i)	Sensorineural deafness (requiring hearing aids)
	(ii)	Bilateral blindness
	(iii)	Severe cerebral palsy
	(iv)	Developmental delay (Bayley* Cognitive Score 2 or more standard deviations below mean)
Category II	**One or more of the following**	
	(i)	Bayley* Cognitive Score between 1 & 2 standard deviations below mean
	(ii)	Mild-moderate cerebral palsy without developmental (cognitive) delay
	(iii)	Impaired vision requiring spectacles
	(iv)	Conductive hearing loss requiring aids
Category III**	**Presence of tone disorder or motor delay**	
		Bayley* Motor Score more than 1 standard deviation below mean (but Cognitive score within average range)
Category IV	**Normal development**	
	(i)	No apparent tone disorder
	(ii)	No apparent developmental delay (Bayley* Cognitive and Motor Scores within average range or above)

Note: Outcome categories modified from Kitchen et al, 1984, 1987.
**Bayley Scales of Infant & Toddler Development IV – all scores adjusted for gestational age.*
***Category III is included to signal that a number of preterm infants tested at an early age have minor tone disorders or motor delay.*
These may improve as the children mature with age and experience.

Table 9.2 presents the results, using these outcome categories, for the 64 children tested at 2 years of age (corrected).

Table 9.2: Outcome categories at 2 years (corrected) for children under 1500g born in 2019 (n=64) NWH

	Number	Description
Category I	6 (9%)	All children with full scale IQ scores greater than 2 standard deviations below the mean . All additionally presented with similarly distributed language skills. Five of the six children had motor scores greater than one standard deviation below the mean.
Category II	13 (20%)	1 child with mild CP and Cognitive scores between 1 and 2 standard deviations below the mean. 12 children with Cognitive scores between 1 and 2 standard deviations below the mean.
Category III	2 (3%)	2 children with Bayley* Motor Scores more than 1 standard deviation below mean and Cognitive scores within average range.
Category IV	43 (67%)	Children with no apparent tone disorders and no apparent developmental delay.

The distribution of the children within each Category is presented by gestational age (Table 9.3) and by birthweight (Table 9.4).

Table 9.3: Outcome of children <1500g born in 2019 at 2 years (corrected) by gestational age groups (n=64) NWH

Outcome Category	23 - 28 weeks	29 - 35 weeks	Total
	n= 34	n=30	n= 64
	n (%)	n (%)	n (%)
I	5 (15)	1 (3)	6 (9)
II	6 (17)	7 (23)	13 (20)
III	2 (6)	0 0	2 (3)
IV	21 (62)	22 (73)	43 (67)

Table 9.4: Outcome of children <1500g born in 2019 at 2 years (corrected) by birthweight groups (n=64) NWH

Outcome Category	Birthweight (grams)		
	<1000g	1000 – 1499g	Total
	n= 25	n=39	n= 64
	n %	n %	n %
I	4 (16)	2 (5)	6 (9)
II	6 (24)	7 (18)	13 (20)
III	2 (8)	0 0	2 (3)
IV	13 (52)	30 (77)	43 (67)

The distribution by Category for this 2021 (2 year old) cohort is compared with NWH outcomes since 2001 in Figure 9.52.

Figure 9.52: Outcome at 24 months (corrected age) of children <1500g birthweight born 2001-2019 NWH

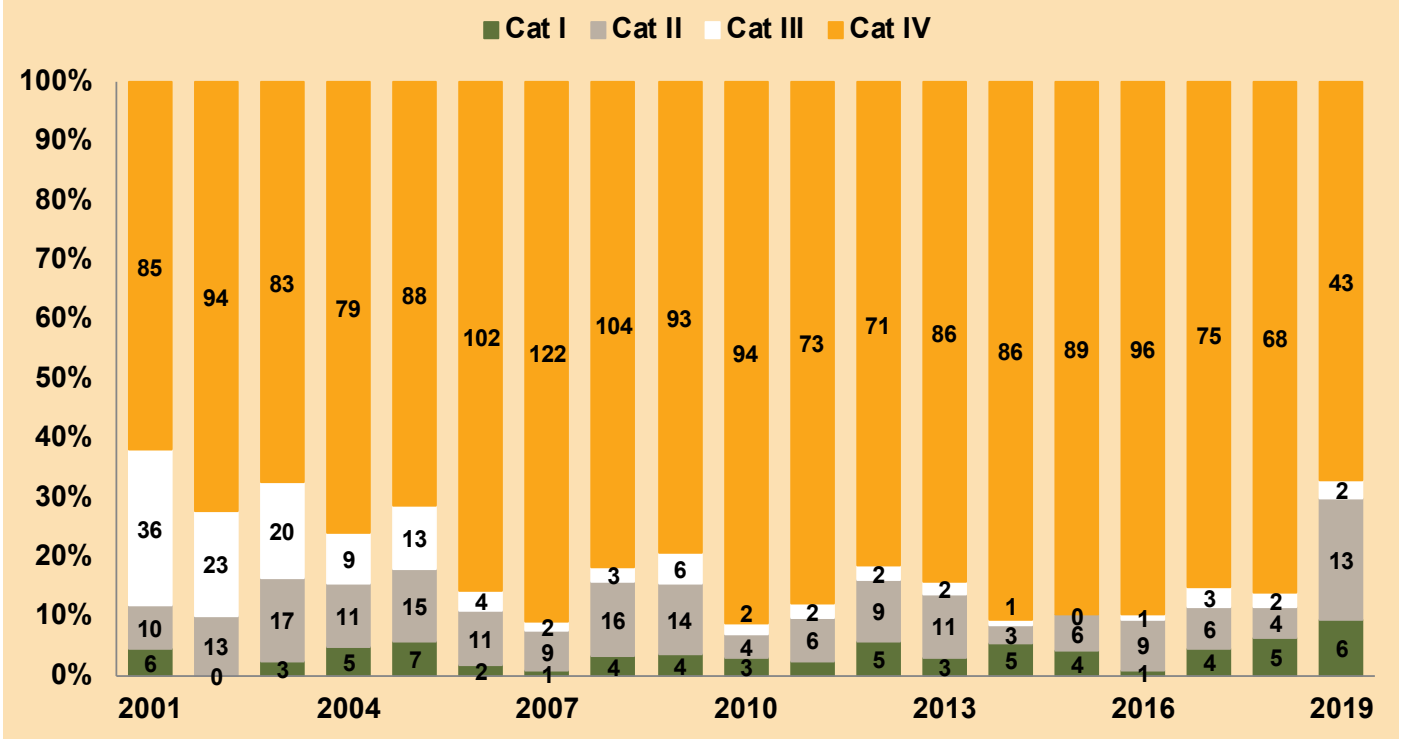
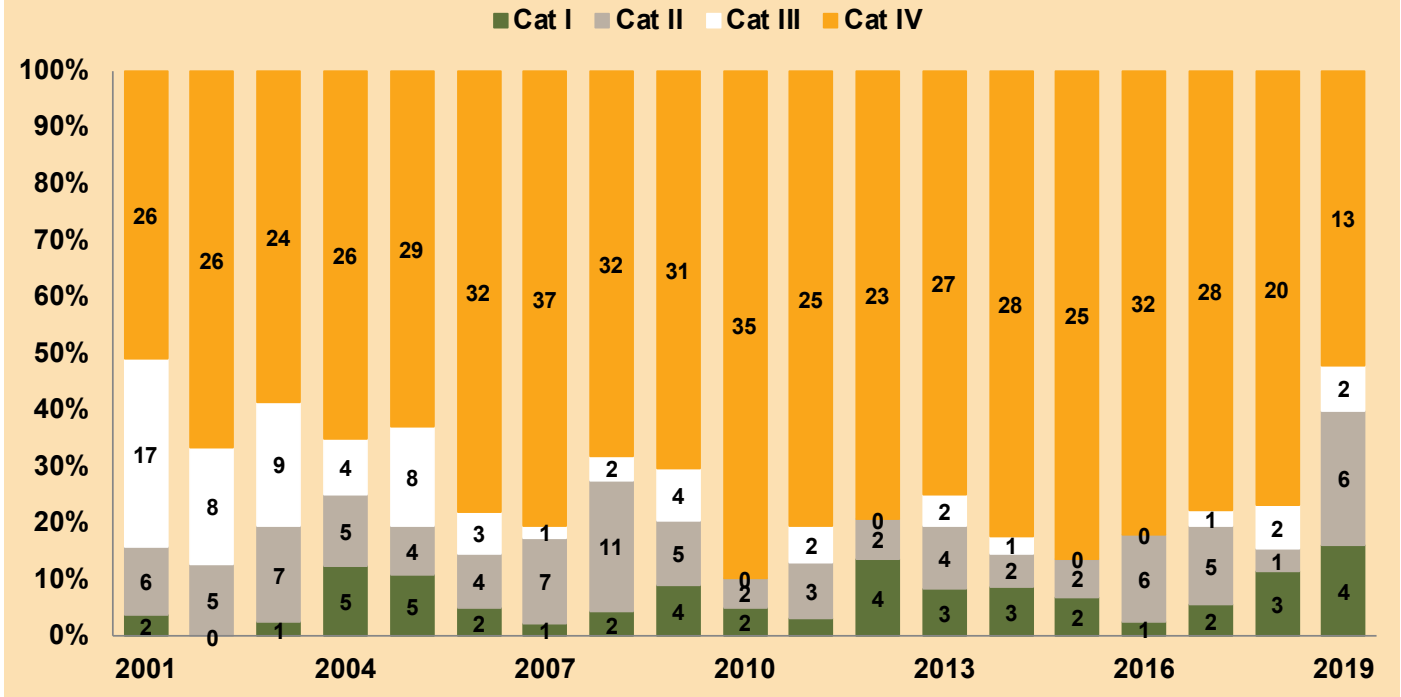


Figure 9.53 presents a comparison of the distribution by Category for babies weighing under 1000 grams at birth, from 2001 to 2019.

Figure 9.53: Outcome at 24 months (corrected age) of children <1000g birthweight born 2001-2019 NWH



9.9.2 Development at 4 years of children under 1500g born in 2017

One hundred and twenty-two children born in 2017 who weighed less than 1500 grams were cared for in the Newborn Service and survived to hospital discharge. Of these 122 children:

- 49 infants (40%) weighed less than 1000 grams
- 61 infants (50%) had a gestational age of between 23 and 28 weeks.
- 20 infants (16%) were SGA.

At four years of age data was obtained for 56 children (46%). Information was unobtainable for 66 children for the following reasons:

- 1 child was excluded because of a diagnosis of Koolen de Vries Syndrome
- 4 children were excluded because they were diagnosed with Autistic Spectrum Disorder
- 61 children were not tested either because they were:
  - unable to be traced (8 children)
  - parents declined follow up (9 children)
  - living overseas (2 children)
  - living in other New Zealand centres (42 children, equating to 34% of the total cohort).

It is our usual practice to request developmental information from other centres where children live outside of Auckland. Most children in other regions have, however, been discharged from follow-up by approximately age 2 years if there are no developmental concerns, so that there is limited information available at the 4 year level for children living at a distance.

The demographic profile of the 56 children in our data cohort is similar to that of the original total cohort of 122 children born in 2017, as follows:

- 23 (41%) infants weighed less than 1000g at birth
- 29 infants had a gestational age between 23 and 28 weeks (52%)
- 8 infants were SGA (14%)

Of the 56 children for whom outcome data was obtained, 55 attended at the CDU and were individually assessed by a registered psychologist. Data was obtained from other sources (Paediatric review) for 1 child who did not live locally. Psychologist assessment at our service involved interviewing parents and administering standardised tests for cognitive and motor skills. Tests administered were the Wechsler Preschool and Primary Scale of Intelligence, 4th edition, Australian and New Zealand ("WPPSI") and the Vineland Adaptive Behaviour Scales – Third Edition (2016).

The results for all children are presented in Outcome Categories as described in Table 9.5. Using these Categories the results for the 56 children are presented in Table 9.6 below.

Table 9.5: Outcome categories at 4 years

Category I	(Severe disability): one or more of the following (i) Sensorineural deafness (requiring hearing aids) (ii) Bilateral blindness (iii) Severe cerebral palsy (iv) WPPSI Full Scale IQ score 2 or more standard deviations below mean
Category II	One or more of the following: (i) Mild-moderate cerebral palsy (ii) WPPSI Full Scale Score between 1 & 2 standard deviations below mean.
Category III	Motor Skills† Standard Score more than one standard deviation below mean
Category IV	Normal development i.e. none of the above

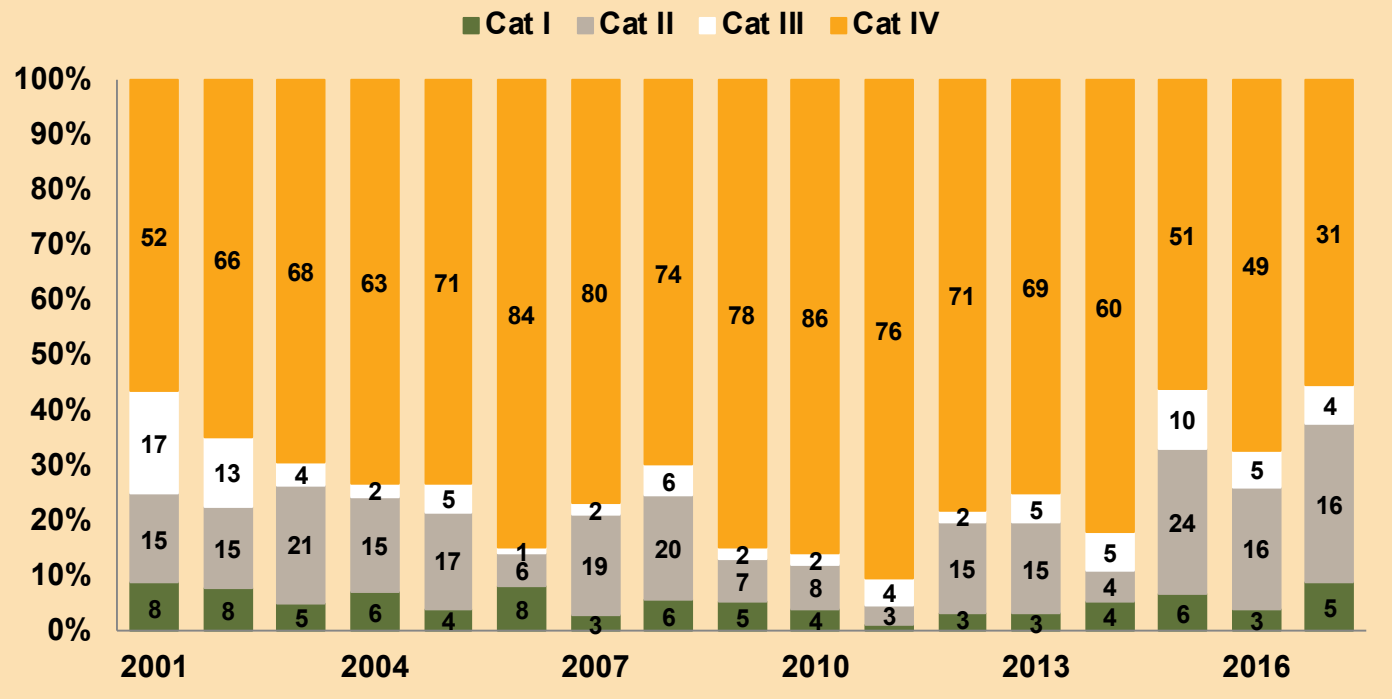
* The Wechsler Preschool and Primary Scale of Intelligence, 4th edition, Australian and New Zealand
† Vineland Adaptive Behavior Scales, 2016: Motor Skills Domain.

Table 9.6: Outcome categories at 4 years for children under 1500g born 2017 (n=56)

	Number	Description
Category I	5 (9%)	1 child with spastic quadriplegia, global developmental delay and cortical visual blindness. 1 child with spina bifida and a Full Scale score more than 2 standard deviations below the mean. 3 children with a global developmental delay,
Category II	16 (29%)	12 children with FSIQ scores between 1 and 2 standard deviations below the mean, but with normal Motor scores 3 children with FSIQ scores between 1 and 2 and Motor scores just below 1 standard deviation below the mean 1 child wearing hearing aids for hearing loss
Category III	4 (7%)	All 4 children with Motor Scores between 1 and 2 standard deviations below the mean and Cognitive scores within the average range
Category IV	31 (55%)	Children with no apparent tone disorders and no apparent developmental delay.

Figure 9.54 provides a comparison of the distribution by Category of the (above) 2017 cohort with outcomes for the period 2001 to 2017.

Figure 9.54: Outcome at 4 years of children <1500g birthweight born 2001-2017 NWH



The distribution of the children in these categories is presented below in Table 9.7 and Table 9.8 comparing Outcome Categories by Gestational Age and then by Birthweight.

Table 9.7: Outcome of children <1500g born in 2017 at 4 years by gestational age groups (n=56) NWH

Outcome Category	Gestational age (weeks)					
	23 - 28 weeks		29 - 35 weeks		Total	
	n= 29		n=27		n= 56	
	n	%	n	%	n	%
I	3	10	2	7	5	9
II	8	28	8	31	16	29
III	2	7	2	7	4	7
IV	16	55	15	55	31	55

Table 9.8: Outcome of children <1500g born in 2017 at 4 years by birthweight groups (n=56) NWH

Outcome Category	Birthweight (grams)					
	<1000g		1000 – 1499g		Total	
	n= 23		n=33		n= 56	
	n	%	n	%	n	%
I	3	13	2	6	5	9
II	9	39	7	21	16	29
III	2	9	2	6	4	7
IV	9	39	22	67	31	55

Review of 4 Year Results

Results presented in this report show that:

- 9% of this population presented with severe disabilities (Category I).
- A significant proportion (29%) of this population was placed in Category II, with moderate disabilities identified. All of these children presented with Full Scale IQ scores between one and two standard deviations below the mean. 75% of this population had normal range motor scores.
- 62% of our 4 year old children presented with Full Scale IQ scores in the average range (Categories III and IV).

SGA

Of the total cohort of 122 children born in 2017, 20 (16%) children were identified as being SGA at birth. At four years outcome data were obtained for 8 SGA children (14%). Three of the 8 children (37%) were placed in Category IV indicating normal cognitive and motor development at that stage. Two children (25%) were placed in Category III. One child was placed in Category II (13%) and two children in Category I (25%). All of the identified SGA babies had a gestational age of 28 weeks or above (28- 34 weeks), five weighed over 1000g at birth.

Autistic Spectrum Disorders

Four children in this 2017 cohort were formally diagnosed with Autistic Spectrum Disorder and were either not tested or obtained results were excluded. This represents approximately 3% of the study cohort and a higher incidence than that reported in the latest Ministry of Health information, last updated on 08 January 2020 (https://www.health.govt.nz/your-health/conditions-and-treatments/disabilities/autism-spectrum-disorder) which suggests an incidence of approximately 1:100 in the general NZ population.

Note

There are two issues remaining to be discussed when considering this year's results:

The first is that our retrieval rates of 46% (four-year olds) and 52% (two-year olds) is lower than previous years and results derived from such small populations are inherently unreliable.

The second relates to the use of the WPPSI –IV for the four year cognitive assessments. We changed from the Stanford-Binet in April 2019 and in our 2021 annual report we noted that, compared to previous years, there appeared to be a higher percentage of children in Category Two and perhaps a slightly lower percentage of children in Category Four. The WPPSI-IV and the Stanford Binet arguably measure slightly different constructs but at this stage we do not have a clear picture of any possible effects or differences because of the low data cohort numbers. It will be important to monitor this over time.

Summary

Babies weighing less than 1500 grams at birth are identified in the literature as being at risk for developmental problems.

Review of two-year olds: In 2021 the Child Development Unit assessed or received information on the developmental outcomes for 64 two-year old, very low birthweight children born in 2019. Retrieval rates from a total population of 124 children were low, at 52%. Outcome data for these children indicated that 67% had no apparent tone abnormalities or developmental delays. Nine percent of the cohort presented with severe disabilities. A further 20% demonstrated mild or moderate disabilities.

Review of four-year olds: In 2021 the Child Development Unit assessed or received information on the developmental outcomes of 56 four-year old, very low birthweight children born in 2017. Retrieval rates were low at 49% for this population and slightly lower than previous coronavirus-affected years. Sixty-two percent had no apparent tone abnormalities or cognitive delays.

Across both cohorts, higher birthweights and greater gestational ages appeared to be associated with better outcomes.

9.9.3 Data tables: Newborn service

Table 9.9: Characteristics of <32 week or <1500g babies cared for at NWH NICU by ANZNN status 2021

			<32 weeks or <1500g			
	Total		ANZNN		Non ANZNN	
	N=190		n=176		n=14	
	N	%	n	%	n	%
Gestation (weeks)						
<24	5	3	4	2	1	7
24-25	25	13	23	13	2	14
26-27	34	18	28	16	6	43
28-29	44	23	41	23	3	21
30-31	59	31	57	32	2	14
32-36	22	12	22	13	0	0
>36	1	1	1	1	0	0
Weight (g)						
<500	2	1	2	1	0	0
500-749	19	10	18	10	1	7
750-999	35	18	25	14	10	71
1000-1249	47	25	46	26	1	7
1250-1499	45	24	45	26	0	0
1500-1999	35	18	33	19	2	14
2000-2499	5	3	5	3	0	0
2500-2999	2	1	2	1	0	0
Birthplace						
National Women's	162	85	162	92	0	0
Northland	4	2	3	2	1	7
Waitematā DHB	8	4	7	4	1	7
Counties Manukau DHB	7	4	0	0	7	50
BBA/Home	5	3	4	2	1	7
Other	4	2	0	0	4	29

9.9.4 Data tables: NICU Occupancy

Table 9.10: Occupancy (baby days) on NICU 2009–2021

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Baby days	15236	14982	14877	14461	14296	14070	13060	13779	12430	13514	12741	12735	13941

Table 9.11: Occupancy (baby days) for NICU by gestational age 2010-2021

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total	14982	14877	14661	14296	14070	13050	13743	12430	13514	12741	12735	13941
<28	4133	4302	3563	3774	3956	3370	3305	3851	3049	4160	4201	3930
28-31	4230	3336	3684	3228	3153	3157	3582	2735	3701	3114	3318	4077
32-36	4519	4736	4752	4713	4362	4066	4271	3812	4048	3321	3434	3748
≥37	2100	2503	2462	2581	2599	2457	2585	2031	2716	2146	1782	2186

Table 9.12: Occupancy (baby days) for NICU by birth weight 2010-2021

Weight(g)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total	14982	14877	14461	14296	14070	13060	13779	12430	13514	12741	12735	13941
<1500	7563	6988	6583	6517	6302	6059	6866	6305	5644	6833	6905	7312
1500-1999	2662	2658	2951	2606	2687	2530	2169	2254	2790	2194	2055	2534
2000-2499	2005	2592	2009	2031	2209	1661	1697	1498	2186	1281	1513	1484
≥2500	2667	2752	2639	2918	3142	2872	2810	3047	2894	2434	2261	2611

9.9.5 Data tables: Admissions to NICU

Table 9.13: NICU admissions by year 2008-2021

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Number	939	957	902	963	1000	930	910	925	898	832	852	907	812	878

Table 9.14: Admissions of inborn pēpi to NICU by birth weight 2010-2021

Birth Weight (g)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total (n)	791	839	872	831	809	825	797	720	739	777	692	744
<500	2	0	1	0	1	0	0	0	3	2	0	2
500-749	23	20	14	13	19	16	21	18	14	19	24	18
750-999	29	24	25	32	23	21	31	32	22	22	33	25
1000-1249	39	25	35	29	37	39	42	29	29	49	31	41
1250-1499	50	42	48	46	40	48	41	35	40	40	34	41
1500-1999	110	110	132	112	102	109	110	98	105	96	98	91
2000-2499	135	176	169	152	145	131	124	96	118	99	101	96
2500-2999	126	129	118	115	121	124	114	114	114	143	110	126
3000-3999	226	259	277	270	270	288	269	263	256	254	211	254
≥4000	51	54	53	62	51	49	45	35	38	53	50	50

Table 9.15: Admissions of inborn pēpi to NICU by gestational age 2010-2021

Gestation (weeks)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total	791	839	872	831	809	825	797	720	739	777	692	744
23	0	2	0	1	0	0	4	3	2	6	7	4
24	13	8	7	7	12	6	11	8	4	4	12	12
25	15	8	13	10	7	9	9	10	9	12	11	11
26	10	14	7	13	14	14	10	11	10	15	15	6
27	20	11	13	8	13	17	18	19	14	18	13	20
28	16	16	16	21	11	17	23	10	14	12	14	21
29	21	15	31	15	15	17	25	18	23	21	21	16
30	36	22	25	21	37	23	18	10	17	29	27	16
31	33	28	30	31	26	31	25	31	37	32	32	35
32	29	42	34	43	25	43	26	41	33	35	22	35
33	59	44	53	66	46	40	49	37	43	40	48	37
34	90	96	96	77	65	83	66	66	53	47	51	48
35	55	68	81	62	68	46	45	47	54	47	41	47
36	51	55	70	60	70	60	67	44	45	49	48	67
37	58	72	61	65	67	70	68	55	75	84	71	71
38	93	84	111	92	105	99	104	86	111	100	82	92
39	67	107	99	92	98	110	101	112	83	120	89	110
40	78	78	76	98	80	93	90	85	78	71	60	57
41	41	59	41	46	46	43	34	27	32	31	25	38
42	6	10	8	3	4	4	4	0	2	4	3	1

Table 9.16: Admissions of outborn pēpi to NICU by birth weight 2010-2021

Birth Weight (g)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total	111	124	128	99	101	100	101	112	113	130	120	134
<500	1	0	1	0	0	0	0	0			0	0
500-749	5	3	4	2	3	1	0	2	3		2	1
750-999	11	10	5	9	2	3	2	8	5	3	10	10
1000-1249	8	10	7	4	1	5	5	8	5	4	10	6
1250-1499	7	5	8	9	6	10	6	5	5	4	8	4
1500-1999	10	15	13	12	10	7	11	15	16	11	14	22
2000-2499	10	14	9	12	11	16	16	14	16	12	11	14
2500-2999	10	14	22	16	14	13	9	14	14	22	19	22
3000-3999	37	41	50	27	44	38	39	37	38	52	31	44
>4000	12	12	9	8	10	7	13	9	11	22	15	11

Table 9.17: Admissions of outborn pēpi to NICU by gestational age 2010-2021

Gestation (weeks)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total	111	124	128	99	101	100	101	112	113	130	120	134
22	1	0	0	0	0	0	0	0	0			0
23	0	1	0	1	0	0	0	0	0			1
24	4	6	1	1	3	0	1	2	1		2	1
25	4	1	4	4	1	2	1	4	2	1	3	1
26	3	5	3	5	2	1	0	5	3	3	4	4
27	7	4	4	2	0	3	5	1	4	3	2	4
28	7	3	5	2	1	4	1	5	4	1	5	4
29	5	6	4	3	1	3	3	2	2	3	7	3
30	2	4	4	4	4	3	1	8	3	2	5	3
31	0	3	2	6	4	2	5	3	7	2	4	5
32	3	4	3	3	2	2	2	4	4	4	8	8
33	4	6	6	1	4	5	5	4	7	3	5	3
34	3	4	7	4	5	6	5	8	9	8	6	5
35	4	5	4	6	4	5	5	5	3	6	10	11
36	5	4	7	5	5	7	2	3	5	8	1	11
37	9	8	13	12	6	12	7	9	10	13	10	9
38	12	9	17	5	12	13	14	13	7	13	10	16
39	9	15	13	13	15	10	14	8	12	21	15	14
40	17	19	18	19	18	12	22	17	23	26	15	21
41	11	17	12	2	13	9	7	9	7	11	7	8
42	1	0	1	1	1	1	1	0	0	2	1	2

Table 9.18: Domicile of mother of all pēpi admitted to NICU 2014-2021

	2014		2015		2016		2017		2018		2019		2020		2021	
	n=910		n=925		n=898		n=832		n=852		n=907		N=812		N=878	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Northern Region	892	92.6	915	91.5	856	92	732	88	778	91.3	810	89.3	745	91.7	802	91.3
Auckland	491	51	489	48.9	449	48.3	392	47.1	403	47.3	420	46.3	366	45.1	417	47.5
Counties Manukau	121	12.6	141	14.1	141	15.2	124	14.9	129	15.1	134	14.8	118	14.5	134	15.3
Waitematā	239	24.8	236	23.6	222	23.9	184	22.1	208	24.4	202	22.3	216	26.6	213	24.3
Northland	41	4.3	49	4.9	44	4.7	32	3.8	38	4.5	54	6	45	5.5	38	4.3
Midland Region	24	2.5	33	3.3	24	2.6	39	4.7	36	4.2	45	5	35	4.3	38	4.3
Central Region	12	1.3	10	1.2	14	1.1	28	3.4	15	1.8	17	1.9	8	1	12	1.4
Southern Region	13	1.4	20	2.2	20	2	19	2.3	19	2.2	21	2.3	20	2.5	25	2.8
Overseas	0		2	0.4	0	0.4	0								1	0.1
Missing	33	3.6	9	1	9	1.8	14	1.7	4	0.5	14	1.5	4	0.5	0	0.0

Table 9.19: DHB of mothers of all pēpi admitted to NICU 2021

DHB	2021 n=787		DHB	2021 n=787	
	n	%		n	%
Auckland	417	47.5	Hawkes Bay	6	0.7
Counties Manukau	134	15.3	MidCentral	2	0.2
Waitematā	213	24.3	Hutt	1	0.1
Northland	38	4.3	Capital & Coast	3	0.3
Waikato	10	1.1	Nelson Marlborough	4	0.5
Bay of Plenty	10	1.1	Canterbury	10	1.1
Wairarapa	0	0.0	South Canterbury	1	0.1
Tairawhiti	2	0.2	Southern	10	1.1
Taranaki	8	0.9	West Coast	0	0.0
Lakes	8	0.9	Overseas	1	0.1
Whanganui	0	0.0			

Table 9.20: Prioritised ethnicity of pēpi admitted to NICU by gestation 2021

	Preterm (<37 weeks) N=439		Term (≥37 weeks) N=439		Total N=878	
	n	%	n	%	n	%
NZ European	123	28.0	123	28.0	246	28.0
Māori	91	20.7	63	14.4	154	17.5
Pacific	64	14.6	55	12.5	119	13.6
Other Asian	67	15.3	65	14.8	132	15.0
Indian	50	11.4	56	12.8	106	12.1
MELAA	32	7.3	52	11.8	84	9.6
Other European	12	2.7	23	5.2	35	4.0
Not stated/ Unknown	0	0.0	2	0.5	2	0.2

Table 9.21: Main reason for admission to NICU by gestation 2021

	Preterm N=439		Term N=439		Total N=878	
	n	%	n	%	n	%
Prematurity	295	67.2	0	0.0	295	33.6
Respiratory distress	69	15.7	206	46.9	275	31.3
Congenital abnormality	20	4.6	88	20.0	108	12.3
Hypoglycaemia	13	3.0	33	7.5	46	5.2
Depression at birth	2	0.5	18	4.1	20	2.3
IUGR	10	2.3	3	0.7	13	1.5
Cyanotic episode	3	0.7	9	2.1	12	1.4
Suspected infection	5	1.1	8	1.8	13	1.5
Neurological problem	2	0.5	13	3.0	15	1.7
Haemolytic disease	2	0.5	2	0.5	4	0.5
Feeding difficulty	0	0.0	1	0.2	1	0.1
Bile stained vomiting	1	0.2	7	1.6	8	0.9
Jaundice	2	0.5	6	1.4	8	0.9
Other	15	3.4	45	10.3	60	6.8

9.9.6 Data tables: Antenatal cortiscosteroids

Table 9.22: Percentage receiving antenatal corticosteroids by birth weight among ANZNN assigned pēpi <1500g (2018-2021)

Birth weight (g)	2018			2019			2020			2021		
	N	1-7d	Any	N	1-7d	Any	N	1-7d	Any	N	1-7d	Any
	n	%	%	n	%	%	n	%	%	n	n(%)	n(%)
Total	141	55	91	135	67	97	135	49	90	127	102 (80)	121 (95)
<500	3	100	100	2	100	100	0			2	2 (100)	2 (100)
500-749	14	86	100	19	79	100	24	71	100	18	13 (72)	18 (100)
750-999	24	58	92	22	73	100	37	43	92	25	21 (84)	25 (100)
1000-1249	30	43	93	51	65	94	36	61	86	41	35 (85)	40 (98)
1250-1499	44	61	89	41	61	98	38	29	87	41	31 (76)	36 (88)

Table 9.23: Percentage receiving antenatal corticosteroids by gestational age among ANZNN assigned pēpi <32 weeks (2018-2021)

Gestation (weeks)	2018			2019			2020			2021		
	N	1-7d	Any	N	1-7d	Any	N	1-7d	Any	N	1-7d	Any
	n	%	%	n	%	%	n	%	%	n	%	%
Total	141	55	91	149	64	95	167	51	93	141	112 (79)	134 (95)
<24	2	50	100	6	83	100	7	71	100	4	3 (75)	4 (100)
24-25	14	64	93	16	75	100	25	44	96	23	19 (83)	23 (100)
26-27	27	59	93	35	51	97	30	57	90	26	20 (77)	24 (92)
28-29	39	49	92	34	65	94	40	38	93	37	32 (86)	37 (100)
30-31	59	54	88	64	63	92	65	57	94	51	38 (75)	46 (90)

9.9.7 Data tables: Care and complications

9.9.7.1 Intraventricular haemorrhage

Table 9.24: Intraventricular haemorrhage by birth weight 2021 (benchmarked with ANZNN)

Birth Weight (g)	N	Unknown	None	Grade 1	Grade 2	Grade 3	Grade 4
Total	176	50	107	13	0	1	5
<500	2	0	1	0	0	1	0
500-749	18	0	12	5	0	0	1
750-999	25	1	20	3	0	0	1
1000-1249	46	1	42	1	0	0	2
1250-1499	45	21	20	3	0	0	1
1500-1999	33	23	9	1	0	0	0
2000-2499	5	2	3	0	0	0	0
2500-2999	2	2	0	0	0	0	0

Table 9.25: Intraventricular haemorrhage by gestation 2021 (benchmarked with ANZNN)

Gestation (weeks)	N	Unknown	None	Grade 1	Grade 2	Grade 3	Grade 4
Total	176	50	107	13	0	1	5
<24	4	0	0	2	0	1	1
24-25	23	1	16	5	0	0	1
26-27	28	0	27	0	0	0	1
28-29	41	0	35	4	0	0	2
30-31	57	38	18	1	0	0	0
32-36	22	10	11	1	0	0	0
>36	1	1	0	0	0	0	0

Table 9.26: Intraventricular haemorrhage in all <1250g pēpi admitted to NICU 2006-2021

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total	99	129	101	124	118	92	92	89	86	85	102	97	81	99	110	103
Unknown	8	5	0	17	18	12	13	8	8	9	0	0	12	6	14	14
None	75	95	77	85	80	56	63	58	59	66	79	76	59	62	71	75
Grade 1	8	7	14	3	5	8	9	12	13	5	11	11	9	21	5	9
Grade 2	3	10	3	7	7	2	4	3	1	1	5	3	0	4	9	0
Grade 3	0	4	3	3	5	7	0	3	1	1	3	1	0	1	1	1
Grade 4	5	8	4	9	3	7	3	5	4	3	3	5	1	5	10	4

9.9.8 Assisted ventilation

Table 9.27: Number of pēpi on assisted ventilation (inborn) NWH 2007-2021

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Any ventilation	444	446	455	453	469	482	501	501	522	478	449	456	497	505	508
IPPV	141	145	134	184	154	154	154	149	122	131	146	137	144	136	121
CPAP	419	415	423	418	427	441	443	462	476	437	397	411	450	461	470
HFOV	18	21	22	11	17	20	19	19	29	20	33	22	23	30	19
HiFlow					63	125	121	170	176	195	189	182	154	150	153

Table 9.28: HFOV and inhaled nitric oxide (iNO) use and survival NWH 2021

	HFOV			iNO			HFOV + iNO		
	Treated	Survivors	Survival	Treated	Survivors	Survival	Treated	Survivors	Survival
	N	n	%	N	n	%	N	n	%
Total	25	15	60	39	33	85	16	11	69
<28 weeks	12	5	42	10	5	50	8	3	38
28-31 weeks	2	2	100	2	2	100	1	1	100
32-36 weeks	4	1	25	2	2	100	0	0	
≥37 weeks	7	7	100	25	24	96	7	7	100

Table 9.29: High Frequency Oscillatory Ventilation 2012-2021

Gestation (wks)	2012		2013		2014		2015		2016		2017		2018		2019		2020		2021		10 year survival
	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	%
Total	29	21	25	19	20	12	35	31	30	23	42	34	32	24	32	21	38	28	25	15	74
<28	10	6	14	11	10	5	16	14	14	8	20	15	14	9	16	9	29	20	12	5	66
28-31	5	3	2	1	3	1	3	3	5	5	5	5	2	0	4	3	4	3	2	2	74
32-36	1	1	3	2	0	0	3	2	0	0	7	4	5	4	4	1	2	2	4	1	59
≥37	13	11	6	5	7	6	13	12	11	10	10	10	11	11	8	8	3	3	7	7	93

Table 9.30: Inhaled Nitric Oxide (iNO) 2012-2021

Gestation (wks)	2012		2013		2014		2015		2016		2017		2018		2019		2020		2021		10 year survival
	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	%
Total	33	26	29	25	17	12	20	18	22	20	36	30	36	29	32	26	29	24	39	33	83
<28	4	2	7	6	3	1	4	3	1	0	12	9	6	4	4	1	13	9	10	5	63
28-31	4	3	1	0	2	1	2	2	2	2	4	3	3	2	3	2	1	1	2	2	80
32-36	0	0	5	3	1	1	2	2	1	1	5	4	7	5	3	1	7	6	2	2	76
≥37	25	21	16	16	11	9	12	11	18	1	15	14	20	20	22	22	8	8	25	24	83

Table 9.31: iNO plus HFOV 2012-2021

Gestation (wks)	2012		2013		2014		2015		2016		2017		2018		2019		2020		2021		10 year survival
	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	%
Total	19	15	14	11	10	7	16	15	14	12	21	17	21	15	16	10	17	13	16	11	77
<28	4	2	6	5	3	1	3	3	1	0	12	9	6	2	4	1	13	9	8	3	58
28-31	3	3	1	0	1	1	2	2	2	2	2	2	1	0	3	2	0	0	1	1	81
32-36	0	0	2	1	0	0	2	2	0	0	2	1	4	3	2	0	2	2	0	0	64
≥37	12	10	5	5	6	5	9	8	11	10	5	5	10	10	7	7	2	2	7	7	93

Table 9.32: Reason for IPPV and CPAP in term and post-term infants 2012-2021																				
	2012		2013		2014		2015		2016		2017		2018		2019		2020		2021	
	IPPV	CPAP	IPPV	CPAP	IPPV	CPAP	IPPV	CPAP	IPPV	CPAP	IPPV	CPAP	IPPV	CPAP	IPPV	CPAP	IPPV	CPAP	IPPV	CPAP
TTN/RDS	9	111	10	108	6	112	11	144	10	125	5	122	16	126	14	155	9	150	13	150
Infection	3	14	0	11	4	18	3	23	2	18	0	1	1	3	0	8	1	2	0	1
Meconium	15	32	12	21	11	22	5	16	7	22	10	21	12	16	5	5	10	20	17	20
Anomaly	5	4	4	6	6	6	10	7	7	6	18	18	16	14	18	17	20	17	11	8
PPHN	7	4	7	7	5	4	4	3	6	6	9	8	11	19	22	25	4	5	8	8
Encephalopathy	1	2	13	2	11	4	6	3	8	6	4	3	3	3	4	4	8	6	7	6
Support for surgery	15	4	23	9	13	5	8	1	18	4	25	16	19	10	24	10	15	9	18	10
Other	17	35	20	43	28	46	11	29	12	22	6	5	2	2	4	6	8	13	3	4
Missing reason			0	1	1	0			1	1							1	1	0	29

9.9.9 Data tables: Outcomes

9.9.9.1 Survival

Table 9.33: Numbers of survivors by gestational age of pēpi <32 weeks gestation 2021												
Gestation (weeks)	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**
Born alive in NWH*	0	3	3	7	13	18	6	20	21	17	15	35
Died at birth in NWH		3	3	3	1	5	0	0	0	1	0	0
Born alive at NWH and admitted to NICU				4	12	13	6	20	21	16	15	35
Born alive at NWH and survived				1	11	2	6	20	20	16	14	35
Outborn admitted and survived				1	1	1	4	4	4	3	3	5

*using NICU definition excluding BBA

9.9.9.2 Retinopathy of prematurity

Table 9.34: Retinopathy of prematurity by birth weight in pēpi surviving to 36 weeks gestation (ANZNN assigned pēpi) 2021

Birth Weight(g)	N	Unknown/not examined	None	Stage 1	Stage 2	Stage 3	Stage 4
Total	165	64	50	16	32	3	0
<500	0	0	0	0	0	0	
500-749	15	1	3	2	7	2	
750-999	22	0	6	3	12	1	
1000-1249	46	1	27	8	10	0	
1250-1499	42	25	12	3	2	0	
1500-1999	33	30	2	0	1	0	
2000-2499	5	5	0	0	0	0	
2500-2999	2	2	0	0	0	0	

Table 9.35: Retinopathy of prematurity by gestational age in pēpi surviving to 36 weeks gestation (ANZNN assigned pēpi) 2021

Gestation (wks)	N	Unknown/not examined	None	Stage 1	Stage 2	Stage 3	Stage 4
Total	165	64	50	16	32	3	0
<24	1	0	0	0	1	0	0
24-25	18	0	3	0	12	3	0
26-27	28	1	12	5	10	0	0
28-29	40	0	23	10	7	0	0
30-31	56	48	5	1	2	0	0
>31	22	15	7	0	0	0	0

9.9.9.3 Chronic lung disease

Table 9.36: Chronic lung disease by birth weight (inborn pēpi <1500gms) 2021

Birth Weight (g)	Inborn <1500g n	Dead by 36 wks/28days	Alive at 36 wks	CLD	CLD/ livebirth admissions %	CLD/ survivors to 36 wks %
Total	127	10	117	58	46	50
<500	2	2	0	0		
500-749	18	3	15	13	72	87
750-999	25	3	22	17	68	77
1000-1249	41	0	41	25	61	61
1250-1499	41	2	39	9	22	23

Table 9.37: Chronic lung disease by gestational age (inborn pēpi <32weeks) 2021

Gestation (weeks)	Inborn <32wks N	Dead by 36 wks/28 days	Alive at 36 wks	CLD	CLD/ livebirth admissions %	CLD/ survivors to 36 wks %
Total	141	10	131	60	43	46
<24	4	3	1	1	25	100
24-25	23	5	18	18	78	100
26-27	26	0	26	15	58	58
28-29	37	1	36	18	49	50
30-31	51	1	50	8	16	16

9.9.9.4 Necrotising enterocolitis ANNZN

Table 9.38: Necrotising enterocolitis (NEC) by birth weight ANNZN <1500g 2015-2021

Weight (g)	2015			2016			2017			2018			2019			2020			2021		
	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%
Total	136	1	1	140	6	4	123	3	2	115	2	2	135	2	1	135	4	3	136	3	2
<500				0			0			3	0		2	0	0				2	1	50
500-749	16	1	6	21	2	10	18	1	6	14	1	7	19	1	5	24	2	8	18	1	6
750-999	23	0	0	31	3	10	36	1	3	24	1	4	22	1	5	37	1	3	25	0	0
1000-1249	42	0	0	44	1	2	31	1	3	30	0	0	51	0	0	36	0		46	1	2
1250-1499	55	0	0	44	0	0	38	0	0	44	0	0	41	0	0	38	1	3	45	0	0

Table 9.39: Necrotising enterocolitis by gestational age ANNZN <32wks 2015-2021

Gestation (weeks)	2015			2016			2017			2018			2019			2020			2021		
	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%
Total	146	1	1	152	7	5	135	3	2	141	4	3	155	2	1	167	4	2	153	3	2
<24	0			4	0		3	0	0	2	0	0	6	1	17	7	1	14	4	1	25
24-25	15	1	7	20	3	15	20	2	10	14	2	14	16	1	6	25	2	8	23	1	4
26-27	34	0	0	31	1	3	32	1	3	27	0	0	35	0	0	30	0		28	0	0
28-29	39	0	0	50	1	2	31	0	0	39	0	0	34	0	0	40	1	3	41	1	2
30-31	58	0	0	47	2	4	49	0	0	59	2	3	64	0	0	65	0		57	0	0

9.9.9.5 Pneumothorax (All pēpi <1500g or <32 weeks)

Table 9.40: Pneumothorax requiring drainage by birth weight (<1500g) 2015-2021

Birth weight (g)	2015			2016			2017			2018			2019			2020			2021		
	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%
Total <1500g	143	1	1	148	0	0	137	3	2	126	2	2	143	1	1	152	4	3	148	5	3
<500	0									3			2						2	1	50
500-749	17	1	6	21			20	0	0	17			19	1	5	26	2	8	19	2	11
750-999	24	0	0	33			40	2	5	27	1	4	25			43	1	2	35	1	3
1000-1249	44	0	0	47			37	1	3	34			53			41	1	2	47	0	0
1250-1499	58	0	0	47			40	0	0	45	1	2	44			42	0		45	1	2

Table 9.41: Pneumothorax requiring drainage by gestation (all pēpi <32wks) 2015-2021

Gestation (weeks)	2015			2016			2017			2018			2019			2020			2021		
	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%
Total <32wks	152	1	1	160	0	0	150	6	4	156	3	2	164	1	1	184	5	3	167	5	3
<24	0			4			3	0	0	2	0		6	0		7	1	14	5	1	20
24-25	17	1	6	22			24	1	4	16	0		17	1	6	28	2	7	25	2	8
26-27	35	0	0	33			36	0	0	31	2	6	39	0		34	1	3	34	0	0
28-29	41	0	0	52			35	4	11	43	0		37	0		47	0		44	2	5
30-31	59	0	0	49			52	1	2	64	1	2	65	0		68	1	1	59	0	0

Table 9.42: Inborn pēpi receiving postnatal corticosteroids by birth weight 2021 (pēpi alive at 1 week and less than 1500g)

Birth weight (g)	N	n	%
Total	124	18	15
<500	1	0	0
500-749	18	8	44
750-999	24	8	33
1000-1249	41	2	5
1250-1499	40	0	0

Table 9.43: Inborn pēpi <32 weeks receiving postnatal corticosteroids by gestational age 2021 (pēpi alive at 1 week)

Gestation (weeks)	N	n	%
Total	150	18	12
<24	3	1	33
24-25	22	11	50
26-27	28	5	18
28-29	40	1	3
30-31	57	0	0

Table 9.44: Method of feeding at discharge from NICU by gestational age and birth weight 2021 (inborn)

	Total	Exclusive		Fully		Partial		Artificial		Nil Oral		Missing data	
	N	n	%	n	%	n	%	n	%	n	%	n	%
Total	728	342	47	67	9	66	9	34	5	17	2	202	28
Gestation (weeks)													
20-23	1	1	100	0	0	0	0	0	0	0	0	0	0
24-27	44	30	68	3	7	6	14	5	11	0	0	0	0
28-31	87	56	64	8	9	12	14	11	13	0	0	0	0
32-36	229	82	36	31	14	28	12	9	4	1	0	78	34
37-40	332	155	47	20	6	17	5	8	2	15	5	117	35
>41	35	18	51	5	14	3	9	1	3	1	3	7	20
Birth weight (g)													
<500	0												
500-749	15	10	67	0	0	3	20	2	13	0	0	0	0
750-999	22	12	55	2	9	3	14	5	23	0	0	0	0
1000-1249	41	29	71	4	10	3	7	5	12	0	0	0	0
1250-1499	40	30	75	3	8	4	10	3	8	0	0	0	0
1500-1999	89	37	42	9	10	13	15	6	7	0	0	24	27
2000-2499	96	38	40	9	9	12	13	1	1	0	0	36	38
2500-2999	124	40	32	14	11	14	11	4	3	9	7	43	35
3000-3999	251	125	50	23	9	9	4	7	3	6	2	81	32
>3999	50	21	42	3	6	5	10	1	2	2	4	18	36

ŪPOKO 10

Te Materoto me te Mate a te Whaea

CHAPTER 10

Perinatal and Maternal Mortality

Commentators
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ŪPOKO 10

Te Materoto me te Mate a te Whaea

CHAPTER 10

Perinatal and Maternal Mortality

This chapter provides information on perinatal related and maternal deaths and severe maternal morbidity.

Dr Jason Waugh

The data for 2021 suggest that the figures we saw for 2020 were a "one-off" and not the start of a worrying trend. Last year we described a spike in fetal and neonatal death rates (contributing to a peak in perinatal mortality rate) as well as a spike in our maternal mortality ratio. These figures have all thankfully improved and our rates are more in keeping with our rates over the past 10 years though we cannot be complacent as overall the perinatal mortality rate is still higher than pre-COVID reports.

We are now coming out of the second wave of the pandemic and the figures for 2021 are from a year dominated by the Alert levels. We spent most of our year in Auckland in Alert level 3 and 4 as we watched the vaccination rates climb. The impact of changes to working practices remains difficult to quantify. Certainly with the second wave of COVID in 2021 we may have seen the benefits of the vaccination program with a relatively low disease burden in terms of severity for maternity services but the impact of changes to service provision and the net result of all the things we either 'didn't do' or 'did less of' may always be unclear.

Worldwide the impact of changes to the provision of routine care continues to be reported and universally is associated with greater morbidity (and mortality). If we have seen women less often, taken fewer blood pressures, dipped less urine and just generally know our clients less well does this make a difference?

In chapter 5 our rates of hypertensive disease remain high at 9.9% and preterm birth rates are 9.2%. Cause specific perinatal deaths amongst Māori are higher than other ethnic groups for hypertension and preterm birth. Did we diagnose or detect these problems too late to have optimized care and outcomes for these whānau?

At the time of writing this chapter we have had 18 months of the most intense pressure on staff and services. Whether dealing with COVID because of infection, or dealing with the demands of low staffing levels as a result of infection or isolation, pressure on all staff has been immense. Rosters have been stretched to breaking point, clinical decisions have been impacted by resource availability and despite all of this high quality care has still been delivered as supported by this year's improved statistics.

I would however struggle to list what lessons we have learnt from 2020. Cases have been reviewed internally and externally; reports have been written; some discussion has occurred across services but real change is difficult when new challenges with staffing recruitment and retention overwhelm everyone's desire to do better. I look forward to writing the 2022 report and outlining how we are implementing change at a service level to further build on the improved perinatal figures we have seen for 2021.

In March 2022 the Ockenden Report published in the UK highlighted the systemic failures of a maternity service in an NHS trust. I would recommend that anyone with an interest in improving outcomes reads this report as there are lessons and recommendations within it for any large organisation that provides maternity care. One such change in the UK, which has had a very target driven Heath Service for many years, is the recommendation that Hospital chiefs in England have been told to stop using targets for caesarean section rates over patient safety concerns.[1]

[1] Hospitals in England are told to stop using caesarean rates to assess performance. BMJ 2022; 376 doi: https://doi.org/10.1136/bmj.o446 (Published 21 February 2022))

Methods

All perinatal related deaths are reviewed monthly by a multidisciplinary team comprising an obstetrician (perinatal mortality meeting convener), perinatal specialist midwife, neonatologist, and perinatal pathologist. This group classifies the cause of death and summarises recommendations for management if there is a future pregnancy. They also complete the documentation for the NZ Perinatal and Maternal Mortality Review Committee (PMMRC), assign contributing factors, and determine whether the death was potentially avoidable.

The classification of perinatal related death uses the Perinatal Society of Australia and New Zealand (PSANZ) system updated in 2018. Neonatal deaths are classified by relevant conditions preceding neonatal death using the PSANZ Neonatal Death Classification (PSANZ-NDC). PSANZ Perinatal Death Classification (PSANZ-PDC) is used to identify the single most important factor which led to the chain of events that resulted in the death. PSANZ -NDC is applied, in addition to the PSANZ-PDC, to identify the single most important factor in the neonatal period which caused the neonatal death. Two associated factors can be recorded in each of these systems. Associated factors are not included in the analysis in this report.

Perinatal mortality rate is defined in New Zealand as fetal death (stillbirth of a pēpi of at least 20 weeks gestation at issue or at least 400 grams birthweight if gestation is unknown) plus early neonatal death (death of a live born pēpi, of at least 20 weeks of gestation at issue or at least 400 grams birthweight if gestation is unknown, before completion of the first 7 days of life), and expressed as a rate per 1000 total pēpi born. Perinatal related mortality rate includes, in addition, late neonatal deaths (deaths from 7 days of life and before completion of 28 days of life). Perinatal related death risk is presented by gestation and is the risk of fetal or neonatal death per 1000 pēpi remaining in utero. Fetal death rate is calculated per 1000 pēpi, meaning pēpi remaining in utero if data are presented by gestation, or meaning total pēpi born if presented as an overall rate. Neonatal death rate is per 1000 live born pēpi, except in the perinatal mortality time trends figure where neonatal death rates are per 1000 total pēpi born. This variation is to demonstrate the contribution of fetal deaths and neonatal deaths to overall perinatal related mortality rates.

Perinatal related mortality rates are also presented excluding deaths of pēpi with or from congenital abnormality.

National Women's Health (NWH) has pregnancy loss counselling services to provide support for wahine with stillbirth and neonatal death and also those who undergo termination. A Perinatal Specialist Midwife coordinates the perinatal loss service at NWH as well as organizing perinatal reviews.

Key Findings

- Perinatal related mortality rate fell from 16.2/1000 in 2020 to 14.0/1000 in 2021
- Fetal death rate fell from 10.6/1000 to 8.1/1000 and was the main contributor to the fall in perinatal mortality rate.
- The rate of perinatal post-mortem investigation (28%) continues to decline and this is a worrying trend.

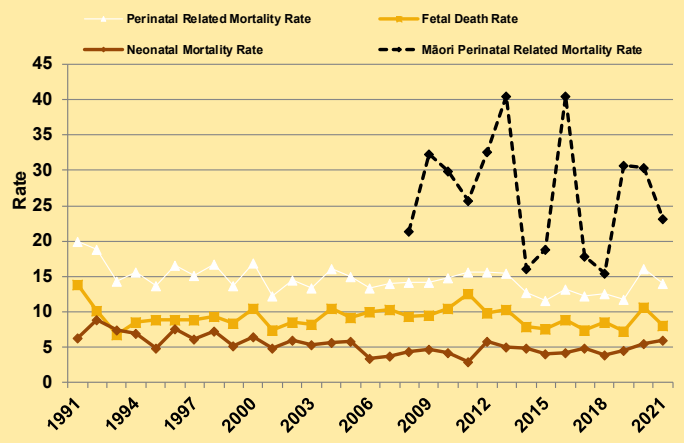
10.1 Perinatal and perinatal related mortality rates

Between 2006 - 2019, there had been a significant reduction in perinatal related death rate (p=0.04), stillbirth rate (p=0.0017); but no change in neonatal death rate (p=0.54). However, in 2020 there was a sharp rise in all three perinatal measures.

With small numbers of perinatal deaths at ADHB (n=92 in 2021) risk factors vary from year to year. Prematurity remains a major risk factor and it was encouraging to see perinatal mortality fall across all gestations apart from 28-36 weeks. Given the falling rates of 20-23 weeks and 24-27 weeks one could ask whether we are waiting too long to deliver some babies between 28-30 weeks when their 27 week counterparts seem to have better survival. Given the very small numbers involved in 1 year's statistics this question cannot be answered here but might be worthy of discussion if the trends continue.

It should be acknowledged that ADHB is the major tertiary referral centre for NZ as well as housing the largest Maternal Fetal Medicine Service and the country's fetal therapy service. As such a proportion of the mortality we report is for whānau who are not ADHB domiciled. This is highlighted in Table 189 where we can see that only 52% of the stillbirths are from our own domiciled patients (and 51% of perinatal deaths).

Figure 10.1: Perinatal related mortality, fetal death, and neonatal mortality rate, and Māori perinatal related mortality rate 1991-2021 NWH



10.2 Perinatal related mortality among Māori whānau

This year we can again report in more detail on perinatal mortality amongst Māori whānau. Whilst Māori remain disadvantaged compared to other ethnic groups (Figure 164) there was a reassuring fall in line with overall population falls. In Figure 166, including 10 years of perinatal related mortality data, congenital anomaly, deaths, spontaneous pre-term birth, hypertension, and unexplained antepartum death are elevated amongst Māori compared with non-Māori mothers. There are clearly many complex inter-related variables at play that make specific interventions for specific ethnic groups difficult to implement. However the challenge for the service here is to identify where the most effective intervention might be.

If we believe that the services we offer to manage obstetric complications are effective then how do we change the perception of those services to make them something that whānau want to engage with. We have interventions that we know can make a difference to outcomes whether it be intervention through a specialist pre-term birth clinic or community prescribed aspirin for pre-eclampsia prevention. How do we move from a situation of having to persuade people to attend to having them insist that they can attend because they want it? If our population knows that wearing a life jacket is life-saving when you go fishing but they don't know that we might be able to prevent a pre-term birth then perhaps more subtle and targeted messaging is the way forward. Maybe we don't need a poster campaign led by the Ministry but rather a pre-eclampsia storyline on Shortland Street to get the message across.

10.3 Multiple births and perinatal related mortality

The perinatal related mortality rate in multiple pregnancies in 2021 was 65.9/1000 multiple births (13/182). This compares to 12.6/1000 for singletons. That is a 5-fold increased risk and cannot be over-emphasised as a consideration when planning antenatal and delivery care for multiples.

10.4 Classification (PSANZ-PDC) of perinatal related deaths

The commonest cause of perinatal related death remains congenital anomalies, which is in keeping with data from previous years.

Figure 10.2: Perinatal related mortality risks(/1000 pregnancies) by gestation 2006-2021

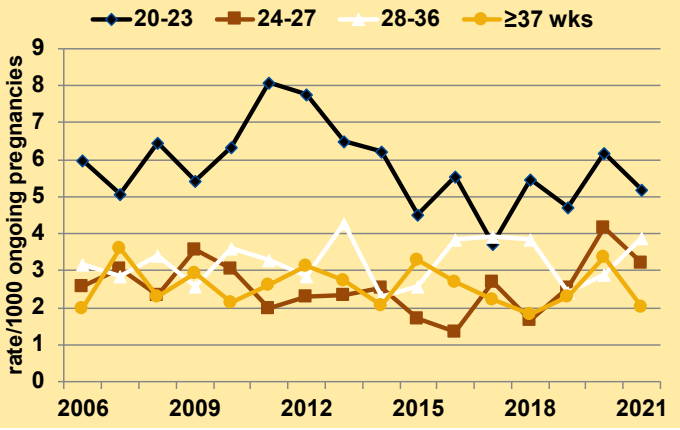
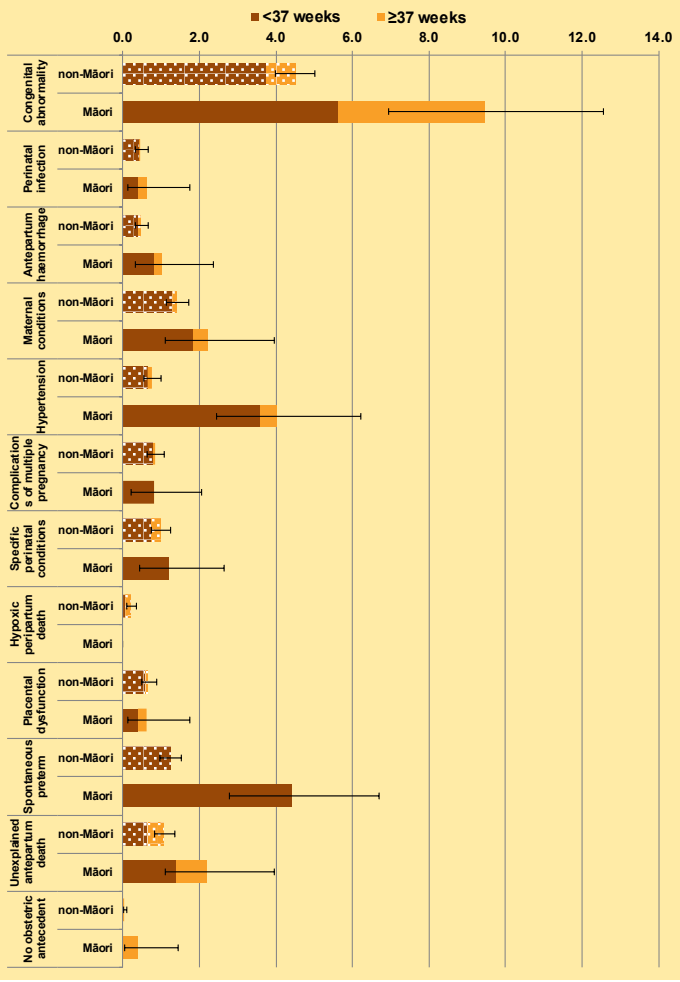


Figure 10.3: Cause specific perinatal related mortality for Māori and non-Māori 2012-2021 (with 95% CIs)



CI = Confidence Interval

10.5 Neonatal deaths

Deaths with congenital abnormality (50%) and extreme prematurity (21%) were the most common causes of neonatal death in 2021. It is also worth noting that the postmortem rate for neonatal deaths remains very low at 23%. Given the high rates of congenital abnormalities in this group and the knowledge that postmortem will generally yield new information in 50-60% of cases we should try to improve this rate in 2022.

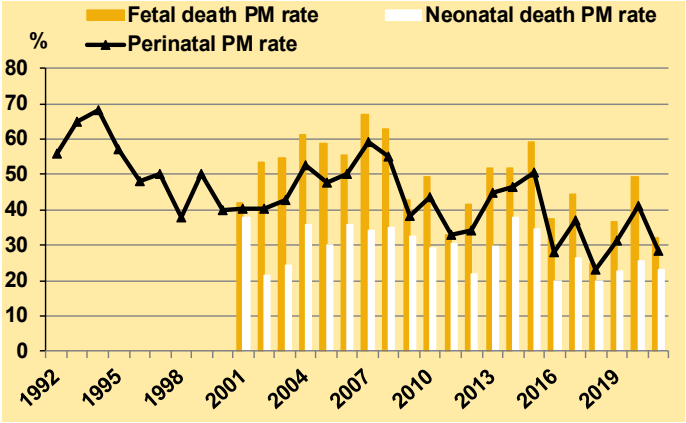
Table 10.1: Neonatal deaths by neonatal classification (PSANZ-NDC) and gestational age at birth NWH 2021

	Total neonatal deaths n=38		< 37 weeks n=29		≥ 37 weeks n=9	
	n	%	n	%	n	%
Congenital abnormality	19	50	12	41	7	78
Perivaible infants	8	21	8	28	0	0
Cardio-respiratory disorders	1	3	1	3	0	0
Neonatal infection	2	5	2	7	0	0
Neurological	6	16	4	14	2	22
Gastrointestinal	1	3	1	3	0	0
Other	1	3	1	3	0	0

10.6 Post-mortem

Post-mortem is considered the gold standard investigation for perinatal related death. The post-mortem rate was 26/92 (28%) in 2021, (17 stillbirths and 9 neonatal deaths). The relevance of this low rate has been highlighted in the commentary.

Figure 10.4: Post-mortem rates NWH 1992-2021



10.1.1 Data tables: Perinatal related mortality

Table 10.2: Inborn and BBA deaths NWH 2010-2021

		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Fetal death	**20-22 wks**	33	41	33	24	25	17	16	15	19	19	21	18
	23-24 wks	9	16	11	18	8	9	9	5	9	7	15	8
	25-26 wks	8	5	9	6	11	1	6	6	4	4	6	7
	27-28 wks	5	2	4	4	2	5	5	1	2	3	5	7
	29-38 wks	24	26	13	20	13	12	25	19	20	14	12	10
	>38 wks	4	7	7	5	1	10	5	6	3	2	8	3
Total fetal deaths		83	97	77	77	60	54	66	52	57	49	67	53
Neonatal deaths	**Early neonatal deaths (<7 days)**	21	37	28	28	23	24	26	20	23	23	27	30
	Late neonatal deaths (8-28 days)	8	2	9	9	9	6	7	8	6	8	8	9
Total neonatal deaths		34	23	46	37	37	29	31	34	25	31	35	39
Total deaths		117	120	123	114	97	83	97	86	83	80	102	92
Perinatal mortality rate/1000		13.9	15.3	14.5	14.2	11.7	10.9	12.2	11.2	11.7	10.6	14.9	12.7
Perinatal related mortality rate/1000		14.9	15.6	15.6	15.5	12.8	11.7	13.2	12.3	12.6	11.8	16.2	14.0
Perinatal related mortality rate (excluding lethal & terminated fetal abnormalities)		10.5	10.1	9.2	9.8	7.5	9.3	9.1	9.1	7	6.4	11.2	8.4

Table 10.3: Perinatal related loss and DHB of residence NWH 2021

DHB of residence	TOP		Stillbirth		Neonatal death		Perinatal related death	
	n=28		n=29		n=35		n=92	
	n	%	n	%	n	%	n	%
Auckland	20	71	15	52	12	34	47	51
Counties Manukau	2	7	5	17	5	14	12	13
Waitemata	5	18	4	14	9	26	18	20
Northland	0		0		2	6	2	2
Other	1	4	5	17	7	20	13	14

Table 10.4: Gestational age and perinatal related mortality NWH 2021

	Births		Fetal deaths			Neonatal deaths			Total perinatal related deaths		
	n=6553		n=53			n=39			n=92		
	n	%	n	%	FD risk*	n	%	NND rate‡	n	%	Perinatal related mortality risk†
<24 weeks	35	0.5	22	41.5	3.4	12	30.8	923.1	34	37.0	5.2
24-27 weeks	68	1.0	15	28.3	2.3	6	15.4	113.2	21	22.8	3.2
28-31 weeks	97	1.5	5	9.4	0.8	3	7.7	32.6	8	8.7	1.2
32-36 weeks	470	7.2	8	15.1	1.3	9	23.1	19.5	17	18.5	2.7
37-40 weeks	5,356	81.7	2	3.8	NC	8	20.5	1.5	10	10.9	1.7
>41 weeks	527	8.0	1	1.9	NC	1	2.6	NC	2	2.2	NC

* Fetal death rate = number of fetal deaths per 1000 births
‡ Neonatal death rate = number of deaths per 1000 live births
† Perinatal-related mortality rate = number of perinatal related deaths per 1000 births
NC Not calculated if n<3

Table 10.5: Multiple births and perinatal related mortality NWH 2021

	Births		Fetal deaths			Neonatal deaths			Total perinatal related deaths		
	N=6553		n=53			n=39			n=92		
	n	%	n	%	FD rate*	n	%	NND rate‡	n	%	Perinatal related mortality rate†
Singleton	6371	97.2	45	84.9	7.1	35	89.7	5.5	80	87.0	12.6
Multiple	182	2.8	8	15.1	44.0	4	10.3	23.0	12	13.0	65.9

* Fetal death rate = number of fetal deaths per 1000 births
‡ Neonatal death rate = number of deaths per 1000 live births
† Perinatal-related mortality rate = number of perinatal related deaths per 1000 births

Table 10.6: LMC at birth and perinatal related mortality NWH 2021

	Births		Fetal deaths			Neonatal deaths			Total perinatal related deaths		
	n=6553		n=53			n=39			n=92		
	N	%	n	%	FD rate*	n	%	NND rate‡	n	%	Perinatal related mortality rate†
Self-employed Midwife	3,076	46.9	19	35.8	6.2	19	48.7	6.2	38	41.3	12.4
Private Obstetrician	1,848	28.2	7	13.2	3.8	1	2.6	NC	8	8.7	4.3
NW Community	1,186	18.1	13	24.5	11.0	6	15.4	5.1	19	20.7	16.0
NW Diabetes	124	1.9	0	0.0	NC	2	5.1	NC	2	2.2	NC
NW MFM	237	3.6	6	11.3	25.3	6	15.4	26.0	12	13.0	50.6
Other DHB	39	0.6	2	3.8	NC	3	7.7	81.1	5	5.4	128.2
Unbooked	43	0.7	6	11.3	139.5	2	5.1	NC	8	8.7	186.0

Unbooked = not registered with an LMC prior to labour
* Fetal death rate = number of fetal deaths per 1000 births
‡ Neonatal death rate = number of deaths per 1000 live births
† Perinatal related mortality rate = number of perinatal related deaths per 1000 births
NC Not calculated if n<3

Table 10.7: Perinatal death by Perinatal Death Classification (PSANZ-PDC) NWH 2021									
	Fetal deaths			Neonatal deaths			Total		
	n=53			n=39			n=92		
	n	%	Rate*	n	%	Rate‡	n	%	Rate*
Congenital abnormality	19	35.8	2.9	19	48.7	2.9	38	41.3	5.8
Perinatal infection	1	1.9	NC	1	2.6	NC	2	2.2	NC
Hypertension	1	1.9	NC	0	0.0	NC	1	1.1	NC
Antepartum haemorrhage	1	1.9	NC	4	10.3	0.6	5	5.4	0.8
Maternal conditions	6	11.3	0.9	2	5.1	NC	8	8.7	1.2
Multiple pregnancy	8	15.1	1.2	2	5.1	NC	10	10.9	1.5
Specific perinatal conditions	1	1.9	NC	0	0.0	NC	1	1.1	NC
Hypoxic peripartum death	0	0.0	NC	1	2.6	NC	1	1.1	NC
Fetal growth restriction/placental dysfunction	9	17.0	1.4	0	0.0	NC	9	9.8	1.4
Spontaneous preterm	3	5.7	0.5	10	25.6	1.5	13	14.1	2.0
Unexplained antepartum death	4	7.5	0.6	0	0.0	NC	4	4.3	0.6
No obstetric antecedent	0	0.0	NC	0	0.0	NC	0	0.0	NC

* Rate: per 1000 births
‡ Rate: per 1000 live births
NC Not calculated if n<3

Table 10.8: Maternal characteristics and perinatal related mortality NWH 2021

	Births		Stillbirths			Neonatal deaths			Perinatal related deaths		
	n=6553		n=53			n=39			n=92		
	n=	%	n=	%	rate*	n=	%	rate‡	n=	%	rate†
Maternal ethnicity (prioritised)											
Māori	561	8.6	6	11.3	10.7	7	17.9	12.6	13	14.1	23.2
Pacific	699	10.7	6	11.3	8.6	8	20.5	11.5	14	15.2	20.0
Indian	811	12.4	9	17.0	11.1	4	10.3	5.0	13	14.1	16.0
Other Asian	1548	23.6	7	13.2	4.5	4	10.3	2.6	11	12.0	7.1
MELAA	303	4.6	3	5.7	9.9	2	5.1	NC	5	5.4	16.5
Other European	778	11.9	7	13.2	9.0	3	7.7	3.9	10	10.9	12.9
NZ European	1823	27.8	14	26.4	7.7	11	28.2	6.1	25	27.2	13.7
Other/not stated	30	0.5	1	1.9	NC	0	0.0	NC	1	1.1	NC
Parity											
Nullipara	3243	49.5	26	49.1	8.0	22	56.4	6.8	48	52.2	14.8
Multipara	3310	50.5	27	50.9	8.2	17	43.6	5.2	44	47.8	13.3
Maternal age											
≤25	616	9.4	11	20.8	17.9	13	33.3	21.5	24	26.1	39.0
26-34	3757	57.3	26	49.1	6.9	14	35.9	3.8	40	43.5	10.6
≥35	2180	33.3	16	30.2	7.3	12	30.8	5.5	28	30.4	12.8
Maternal smoking at booking											
Currently smoking	278	4.2	4	7.5	14.4	1	2.6	NC	5	5.4	18.0
Not smoking	6275	95.8	49	92.5	7.8	38	97.4	6.1	87	94.6	13.9
Maternal BMI (WHO)											
<18.5	181	2.8	1	1.9	NC	1	2.6	NC	2	2.2	NC
18.5-24.99	3289	50.2	29	54.7	8.8	13	33.3	4.0	42	45.7	12.8
25-29.99	1581	24.1	4	7.5	2.5	10	25.6	6.3	14	15.2	8.9
30-34.99	765	11.7	7	13.2	9.2	6	15.4	7.9	13	14.1	17.0
35-39.99	368	5.6	6	11.3	16.3	5	12.8	13.8	11	12.0	29.9
≥40	306	4.7	3	5.7	9.8	4	10.3	13.2	7	7.6	22.9
Missing	63	1.0	3	5.7	47.6	0	0.0	NC	3	3.3	47.6
NZDep 2013 (quintile)											
1 (least deprived)	1225	18.7	6	11.3	4.9	5	12.8	4.1	11	12.0	9.0
2	1366	20.8	6	11.3	4.4	7	17.9	5.1	13	14.1	9.5
3	1347	20.6	10	18.9	7.4	10	25.6	7.5	20	21.7	14.8
4	1156	17.6	11	20.8	9.5	7	17.9	6.1	18	19.6	15.6
5 (most deprived)	1444	22.0	20	37.7	13.9	10	25.6	7.0	30	32.6	20.8
Missing data	15	0.2	0	0.0	NC	0	0.0	NC	0	0.0	NC

* Stillbirth rate = number of stillbirths per 1000 births,
‡ Neonatal Death rate = number of neonatal deaths per 1000 live births
† Perinatal related mortality rate = number of stillbirths & neonatal deaths to 27 days per 1000 births
NC Not calculated if n<3

Table 10.9: Postnatal transfer deaths (pēpi born elsewhere who transferred to NWH for postnatal care) 2008-2021

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	N	N	N	N	N	N	N	N	N	N	N	N	N
Early neonatal deaths(<7 days)	4	5	3	4	2	3	2	1	1	2	3	2	3
Late neonatal deaths (7–27 days)	5	1	0	0	2	1	2	1	1	3	2	0	1
Total neonatal deaths	9	6	3	4	4	4	4	2	2	5	5	2	4

Table 10.10: Perinatal full post-mortem rates (%) 2009-2021

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Perinatal post-mortem (%)	38	44	33	34	45	46	51	28	37	23	31	41	28

Table 10.11: Classification of perinatal-related death (PSANZ-PDC) 2012-2021

Classification (PSANZ-PDC)	2012		2013		2014		2015		2016		2017		2018		2019		2020		2021	
	N=123		N=114		N=97		N=83		N=97		N=86		N=83		N=80		N=102		N=92	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Congenital abnormality	48	39	38	33	37	38	28	34	33	34	20	23	33	40	36	45	31	30	38	41
Perinatal infection	2	2	6	5	2	2	4	5	3	3	7	8	1	1	3	4	3	3	2	2
Hypertension	5	4	3	3	5	5	1	1	0		3	3	7	8	3	4	12	12	1	1
Antepartum haemorrhage	15	12	15	13	10	10	9	11	14	14	9	10	7	8	6	8	7	7	5	5
Maternal conditions	10	8	4	4	7	7	2	2	7	7	5	6	8	10	5	6	13	13	8	9
Complications of multiple pregnancy													8	10	5	6	7	7	10	11
Specific perinatal conditions	14	11	21	18	13	13	11	13	15	15	14	16	4	5	5	6	1	1	1	1
Hypoxic peripartum death	1	1	2	2	2	2	1	1	0		3	4	0		0		3	3	1	1
Fetal growth restriction	3	2	8	7	5	5	7	8	6	6	6	7	Retired code							
Placental dysfunction													1	1	0		1	1	9	10
Spontaneous preterm	15	12	9	8	9	9	10	12	10	10	10	12	9	11	7	9	11	11	13	14
Unexplained antepartum death	10	8	8	7	6	6	9	11	9	9	9	10	5	6	10	13	11	11	4	4
No obstetric antecedent	0		0		1	1	1	1	0		0		0		0		2	2	0	0

Table 10.12: Classification of death among terminations of pregnancy 2021

Classification (PSANZ-PDC)	Termination of pregnancy	
	n=28	
	n	%
Congenital abnormality	17	61
Antepartum haemorrhage	1	4
Maternal conditions	7	25
Specific perinatal conditions	1	4
Fetal growth restriction/placental dysfunction	1	4
Spontaneous preterm	1	4

Table 10.13: Perinatal related deaths by classification and gestational age 2021

	Total deaths		Preterm (<37 weeks)		Term (≥ 37 weeks)	
	n=92		n=80		n=12	
	n	%	n	%	n	%
Congenital abnormality	38	41	31	39	7	58
Perinatal infection	2	2	2	3	0	0
Hypertension	1	1	1	1	0	0
Antepartum haemorrhage	5	5	4	5	1	8
Maternal conditions	8	9	7	9	1	8
Multiple pregnancy	10	11	10	13	0	0
Specific perinatal conditions	1	1	1	1	0	0
Hypoxic peripartum death	1	1	1	1	0	0
Fetal growth restriction/placental dysfunction	9	10	8	10	1	8
Spontaneous preterm	13	14	13	16	0	0
Unexplained antepartum death	4	4	2	3	2	17
No obstetric antecedent	0	0	0	0	0	0

10.7 Maternal Mortality

Dr Lynn Sadler

In 2021 there were two maternal deaths among wāhine who birthed, or were booked to birth, at NWH. These serious adverse events are reviewed locally and referred to the PMMRC for national review.

10.8 Maternal Morbidity

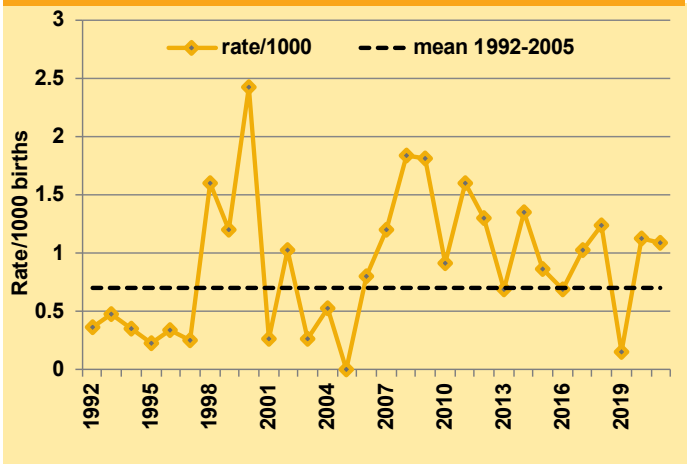
These data are extracted by queries from Healthware and the hospital discharge coding dataset.

Emergency peripartum hysterectomy

Emergency peripartum hysterectomy is defined as hysterectomy performed for complications related to pregnancy within six weeks of birth, when that pregnancy resulted in birth at NWH at or beyond 20 weeks gestation. Planned hysterectomy for morbidly adherent placenta is included but planned hysterectomy for malignancy is excluded.

There were seven peripartum hysterectomies performed among wāhine birthing at NWH in 2021, at least 6 of which were associated with abnormal placentation.

Figure 10.5: Emergency peripartum hysterectomy rates/1000 births NWH 1992-2021



Ruptured uterus

One wāhine was diagnosed with ruptured uterus associated with birth in 2021.

Uterine rupture and dehiscence are defined according to RCOG and RNZCOG consistent definition as:

Uterine rupture: A disruption of the uterine muscle extending to and involving the uterine serosa or disruption of the uterine muscle with extension into bladder or broad ligament.

Uterine scar dehiscence: A disruption of the uterine muscle with intact uterine serosa.

Transfusion

The data were not available in 2021 for women who birthed at NWH and received a postpartum blood transfusion of 4 or more units of red blood cells.

Admission to an intensive care unit

Among wāhine birthing at NWH in 2021, there were 33 wāhine admitted to DCCM or CVICU (25 to DCCM and 8 to CVICU). Five wāhine were admitted antenatally and the remainder postpartum.

Table 10.14: Severe maternal morbidity rates (among births at NWH) 2017-2021

Diagnosis	2017	2018	2019	2020	2021
	N=6846	N=6481	N=6660	N=6212	N= 6462
	n (/1000)	n (/1000)	n (/1000)	n (/1000)	n (/1000)
Emergency peripartum hysterectomy	7 1	8 1.2	1 0.2	7 1.1	7 1.1
Ruptured uterus	2 0.3	3 0.5	3 0.5	4 0.6	1 0.2
Amniotic fluid embolism	0	0	0	1 0.2	1 0.2
Eclampsia	0	1 0.2	2 0.3	1 0.2	1 0.2
Transfusion > 4 units red cells*	NA	21 0.3	9† 1.4	15 2.4	NA
Admission to DCCM/CVICU	69 10.4	82 12.7	36 5.4	44 7.1	33 5.1

* postpartum only
† in 2019 these data were extracted directly from blood bank without review against the patient notes
NA = not available
DCCM = Department of Critical Care Medicine
CVICU = Cardiovascular Intensive Care Unit

11

ŪPOKO 11

Mātai Ahuatanga Wāhine

CHAPTER 11

Gynaecology

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ŪPOKO 11

Mātai Ahuatanga Wāhine

CHAPTER 11

Gynaecology

11.1 Colposcopy

Dr Deralie Flower

The data presented in this section come from data entered into the Solutions Plus database by clinicians and support staff. The data have been checked against appointments recorded in the PHS outpatient services management system. Post-treatment data are based on treatments in 2020.

Key Findings

- There were 1,092 initial cervical colposcopies performed in the department in 2021.
- The proportion of wāhine in each age group shows an increase in the 26-30 year age bracket and a decrease in the 21-25 year. This is expected and is a reflection of the age of initiation of screening increasing from 20 to 25 years in 2020.
- The number of wāhine being referred from outside ADHB remains at 5%, reflecting the tertiary Gynae Oncology service.
- Proportions of referrals for high grade, low grade or invasive disease are similar to last year.
- The service employs 14 Colposcopists, each averaging 78 new cases per year (well above cQuIP and NCSP standards).
- Invasive disease (particularly micro invasive) is infrequently seen in colposcopy clinic.
- There had been a fall in the number of LLETZ treatments between 2013-2019, but the numbers of procedures in 2021 is similar to that in 2020 .
- The average number of LLETZ treatments per clinician is 15.
- Comparisons with cQuIP standards are all similar to or slightly improved compared to 2020 data.
- The proportion of wāhine with high grade referral smear who have a biopsy taken has reduced slightly. This has been audited multiple times in previous years. It was consistently due to lack of biopsies for normal colposcopies. This situation mandates MDM review. Colposcopists are encouraged to consider biopsy even in the presence of normal colposcopy if the referral cytology is high grade.

Due to NCSP changes in 2020, we now discharge most patients post-LLETZ to primary care for a cervical smear test and HRHPV 6 months post-treatment - where previously we did a colposcopy and cytology at 6 months. This means we no longer have ready access to outcome data. In order to assess the impact of this change, a review was done of referrals back to ADHB colposcopy service after the post-treatment smear test. The findings were as follows:

- 46 wāhine (out of 194 who had LLETZ treatments in 2020) were referred back from primary care.
- Their cytology results were: 9 high grade (ASC-H or HSIL), 15 low grade (LSIL or ASCUS), 22 normal (with positive HRHPV).
- All 9 who had high grade cytology were seen for colposcopy; one had a repeat LLETZ for persistent high grade disease. Eight had no further evidence of high grade disease, all had negative margins on LLETZ specimen histology.
- Of those 15 referred with low grade cytology, 13 attended for colposcopy, one had low grade dysplasia on biopsy, 12 had normal colposcopies, none had high grade disease.
- Of those 22 referred with normal cytology and positive HRHPV, 17 attended for colposcopy, one had low grade dysplasia on biopsy, 16 had normal colposcopies, none had high grade disease.
- There are several limitations to interpreting this data, including that we have not looked at those who did not get a followup smear. Nonetheless, overall the findings are reassuringly consistent with previous years' post treatment outcomes.

- This does raise an important point for counseling wāhine when they are discharged after treatment – about one in four will be referred back after their next smear test at 6 months, mostly due to the presence of HRHPV, but the vast majority will still have had a successful treatment.

At the time of writing, we still do not have a confirmed date for changes to the National Screening Program; there is currently an intention for the program to be changed to HPV-based screening in July 2023. Colposcopists continue to advocate for the change to HPV-based screening, particularly self-screening. This has the potential to greatly improve equity in prevention of cervical cancer for wāhine Māori.

Table 11.1: Referral smear cytology among wāhine presenting for initial colposcopy NWH 2021

	Initial Visit	
	N=	1092
	n	%
Referral Smear cytology		
Invasive	5	0.5
High grade	288	26.4
Low grade	678	62.1
Atypical Glandular	14	1.3
Unsatisfactory	2	0.2
Other	38	3.5
Normal	58	5.3
No smear taken	9	0.8

Table 11.2: Histology of biopsy among wāhine presenting for initial colposcopy NWH 2021

	Initial Visit	
	N=	1092
	n	%
Invasive	4	0.4
High grade	171	15.7
Low grade	177	16.2
Dysplasia NOS	17	1.6
HPV	27	2.5
Inflammation	32	2.9
Insufficient sample	11	1.0
Normal	169	15.5
No biopsy taken	484	44.3

Table 11.3: Cervical treatments NWH 2021

	2021	
	N=	235
	n	%
LLETZ	218	92.8
Cold knife cone	12	5.1
Total hysterectomy	1	0.4
Other	4	1.7

Table 11.4: C-QuIP Standards for Colposcopy 2021

	Standard	Numerator	Denominator	2020			2021		
				n	N	%	n	N	%
	Quality standards for Diagnostic Colposcopists								
1	Maintaining skill levels: Each practitioner is required to undertake 75 colposcopies in each 3 year period (SMOs only).					100	14	14	100
2	≥95% of women with HG cytology have punch or excisional biopsy.	Number of women referred with HG cytology who have a punch or excisional biopsy within 6 months (exclude pregnant women)	Number of women seen in 2020 with HG cytology	227	252	90.1	220	251	87.6
3	≥90% of biopsies are suitable for histological interpretation	Number of satisfactory histology biopsies	Number of biopsies in 2021	618	623	99.2	597	608	98.2
4a	Correlation of high grade colposcopic diagnosis with histological findings - no standard given	Number of women with high grade histology (CIN2/3 or cancer) within 6 months of HG colposcopy diagnosis (exclude pregnant women)	Number of women with high grade colposcopic finding in 2020	107	174	61.5	99	162	61.1
4b	Correlation of high grade cytology diagnosis with histological findings - no standard given	Number of women referred with HG cytology who have high grade histology (CIN2/3 or cancer) within 6 months (exclude pregnant women)	Number of women seen in 2020 with HG cytology	120	252	47.6	117	251	46.6
	Quality standards for Therapeutic Colposcopists								
1a	100% of treatments should have a histology sample	Number of women treated in 2021 who have histology performed prior to or at treatment	Number of women who are treated	208	211	98.6	233	233	100.0
3	Histology among women treated in 2021 shows high grade changes (≥80%)	Number of women treated in 2021 who have high grade changes at punch biopsy within 6 months of treatment or on treatment specimen	Number of women who are treated	177	211	83.9	205	235	87.2

Table 11.5: Histological diagnosis (biopsy at initial colposcopy) by referral smear cytology NWH 2021

Referral smear cytology	Total Colposcopies	Histological diagnosis															
		No Biopsy		Invasive		High grade		Low Grade		Dysplasia NOS		Inflammation		HPV		Insufficient Sample		Normal	
	n	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Total	1092	484	44.3	4	0.4	171	15.7	177	16.2	17	1.6	32	2.9	27	2.5	11	1.0	169	15.5
Invasive	5	2	40.0	1	20.0	2	40.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
High Grade	288	61	21.2	1	0.3	111	38.5	51	17.7	9	3.1	9	3.1	9	3.1	1	0.3	36	12.5
Low Grade	678	348	51.3	0	0.0	49	7.2	119	17.6	8	1.2	18	2.7	17	2.5	8	1.2	111	16.4
Atypical glandular	14	3	21.4	1	7.1	1	7.1	0	0.0	0	0.0	1	7.1	0	0.0	0	0.0	8	57.1
Unsatisfactory	2	2	100.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Other	38	17	44.7	1	2.6	7	18.4	3	7.9	0	0.0	3	7.9	0	0.0	1	2.6	6	15.8
Normal	58	44	75.9	0	0.0	1	1.7	4	6.9	0	0.0	0	0.0	1	1.7	1	1.7	7	12.1
No Smear	9	7	77.8	0	0.0	0	0.0	0	0.0	0	0.0	1	11.1	0	0.0	0	0.0	1	11.1

Table 11.6: Cervical histology findings by colposcopic diagnosis (at initial colposcopy if satisfactory*) NWH 2021

Colposcopic diagnosis	Total Colposcopies	Histological diagnosis															
		No biopsy Taken		Invasive		High grade		Low Grade		Dysplasia NOS		Inflammation		HPV		Insufficient Sample		Normal	
	n	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Total	978	400	40.9	2	0.2	167	17.1	173	17.7	16	1.6	30	3.1	26	2.7	9	0.9	155	15.8
Invasive	3	2	66.7	1	33.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
High grade	151	15	9.9	1	0.7	85	56.3	28	18.5	4	2.6	4	2.6	3	2.0	1	0.7	10	6.6
Low grade	449	50	11.1	0	0.0	75	16.7	138	30.7	11	2.4	25	5.6	23	5.1	7	1.6	120	26.7
Condyloma/ inflammation	9	4	44.4	0	0.0	0	0.0	0	0.0	0	0.0	1	11.1	0	0.0	0	0.0	4	44.4
Other	13	8	61.5	0	0.0	1	7.7	1	7.7	1	7.7	0	0.0	0	0.0	1	7.7	1	7.7
Normal	353	321	90.9	0	0.0	6	1.7	6	1.7	0	0.0	0	0.0	0	0.0	0	0.0	20	5.7

* A colposcopy is "satisfactory" if TZ Seen = "Fullly seen ectocervix (Type 1)" and Limits of lesion visible = "yes"
or TZ seen = "Fully seen in endocervical canal (Type 2)" and Limits of lesion visible = "yes"

11.1.1 Colposcopy

Table 11.7: Demographic details of wāhine having an initial colposcopic examination in NWH 2015-2021

	2015		2016		2017		2018		2019		2020		2021	
	N=1182		N=1348		N=1088		N=1152		N=1117		N=1087		n=1092	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Ethnicity														
Māori	79	6.7	78	5.8	91	8.4	91	7.9	84	7.5	82	7.5	96	8.8
Pacific	129	10.9	114	8.5	97	8.9	101	8.8	88	7.9	91	8.4	98	9.0
Indian	40	3.4	58	4.3	39	3.6	48	4.2	56	5	57	5.2	55	5.0
Other Asian	191	16.2	223	16.5	204	18.8	203	17.6	212	19	202	18.6	238	21.8
MELAA					35	3.2	32	2.8	47	4.2	47	4.3	46	4.2
Other	39	3.3	66	4.9									4	
European	704	59.6	809	60	622	57.2	669	58.1	628	56.2	608	55.9	555	50.8
Age (yrs)														
<20	3	0.3	2	0.1	1	0.1	0		0		1	0.1	0	0.0
21-25	212	17.9	224	16.6	181	16.6	199	17.3	171	15.3	157	14.4	126	11.5
26 -30	256	21.7	324	24	249	22.9	248	21.5	224	20.1	237	21.8	278	25.5
31-40	357	30.2	401	29.7	344	31.6	357	31	381	34.1	353	32.5	373	34.2
41-50	186	15.7	192	14.2	159	14.6	168	14.6	183	16.4	153	14.1	143	13.1
51-60	123	10.4	130	9.6	91	8.4	114	9.9	92	8.2	109	10	102	9.3
>60	45	3.8	75	5.6	63	5.8	66	5.7	66	5.9	77	7.1	70	6.4
Smoking														
Yes	62	5.2	216	16	130	11.9	154	13.4	114	10.2	111	10.2	108	9.9
No	304	25.7	983	72.9	819	75.3	758	65.8	767	68.7	712	65.5	735	67.3
Unknown	816	69	149	11.1	139	12.8	240	20.8	236	21.1	264	24.3	249	22.8
DHB of residence														
Auckland	1112	94.1	1253	93	1031	94.8	1080	93.8	1049	93.9	1031	94.8	1021	93.5
Counties Manukau	17	1.4	31	2.3	19	1.7	25	2.2	24	2.1	17	1.6	20	1.8
Waitematā	29	2.5	43	3.2	26	2.4	35	3	36	3.2	27	2.5	42	3.8
Other	24	2	21	1.6	12	1.1	12	1	8	0.7	12	1.1	9	0.8

Table 11.8: Cervical treatments NWH 2014 – 2021

	2014		2015		2016		2017		2018		2019		2020		2021	
	N=286		N=300		N=310		N=234		N=229		N=202		N=211		n= 235	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
LLETZ	262	91.6	284	94.7	267	86.1	215	91.9	212	92.6	187	92.6	194	91.9	218	92.8
Cold knife cone	21	7.3	14	4.7	38	12.3	17	7.3	11	4.8	11	5.4	11	5.2	12	5.1
Hysterectomy	3	1	0		0		1	0.4	0		1	0.5	1	0.5	1	0.4
Other			2	0.7	5	1.6	1	0.4	6	2.6	3	1.5	5	2.4	4	1.7

11.2 Gynaecologic oncology (GO) surgical services

Dr Lois Eva

The data in this section are extracted from a stand-alone Gynaecologic Oncology (GO) clinical database (including details of all cases referred to multidisciplinary review (MDM) or for surgery, and details of all surgeries undertaken by the GO team), the hospital CMS database, and the theatre database (PIMS). The data in most of the clinical tables pertain to those patients with data in the GO clinical database.

ADHB is the largest of the three New Zealand GO centres, providing care for over half the population of New Zealand. We continue to provide surgical services for, and lead the coordination of, the MDM for the eight DHBs of the Northern and Midland Cancer networks.

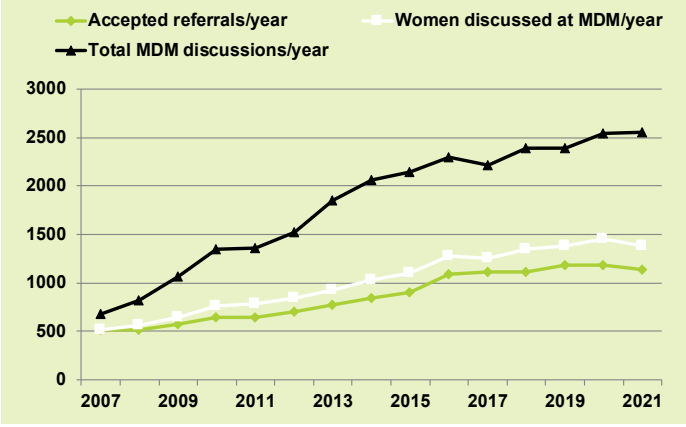
Key Findings

There were 1,134 new referrals to the MDM in 2021. This is the first reduction (down 4.4%) in referral numbers since the database was established and may reflect the effect of the Omicron wave of COVID, with fewer wāhine able to access primary or secondary care.

A total of 2,548 MDM discussions regarding 1383 wāhine were held in 2021, averaging 49 patient discussions per week (over 52 weeks), which is a stable weekly MDM workload from the previous year. This workload has remained the same despite the decrease in new referrals and likely reflects a need for increasing discussion for wāhine with recurrent cancers and the increasing complexity of pathological diagnosis and management decisions.

Service sizing has shown required SMO FTE is 5.0. The loss of 2 SMOs in September 2021 decreased the GO SMO FTE to 2.0, but by November we had recruited up to 3.0 FTE, and ongoing recruitment and training continues.

Figure 11.1: Referrals and Multidisciplinary meetings (MDMs) 2007-2021



At the end of 2021 the multidisciplinary team consisted of 1.8 MDM coordinators, three gynaecological oncologists, three medical oncologists, three radiation oncologists, four gynaecological pathologists, four gynaecological radiologists and three Clinical Nurse Specialists (two surgical and one medical), one GO Fellow plus junior staff. There had been a temporary reduction in specialist pathology FTE during 2021 which led to a regional CEOs sanctioned decision not to review low grade low stage endometrial cases and acceptance of the clinical risk that this proposed. There is concern that this would increase inequity as Pacific wāhine are over represented in this group.

The ongoing challenge of an electronic referral and management system for the MDM continues. The project to provide electronic referrals from the 8 referring DHBs has stalled this year due to COVID.

Referrals from Counties Manukau DHB continue to rise with a slight rise from Northland, whereas Waitamatā and ADHB have seen a fall in numbers, with other DHBs remaining stable.

This is the first year in the past 15 years that the number of new referrals has fallen and it has been assumed that this is a COVID effect, although we do not have data. Endometrial cancer referrals have fallen slightly this year, which is against the annual national trend, and cervical cancer referrals in Pacific wāhine have increased significantly. Given the COVID pandemic had initially disproportionately affected the Pacific population it is possible that this had prevented or delayed presentation to health services within this group. The numbers of tubovarian cancers have also increased compared to the previous year.

11.2.1 Reporting to Faster Cancer Treatment standards

Table 11.9: Faster Cancer Treatment 62-Days Performance Measures Jan-Dec 2021

Reporting Month	Total 62-Day (HiSCan) Patients Diagnosed with Cancer	Reported Percentage (%)	Adjusted Percentage (%)
Jan-21	8	62.5	83.3
Feb-21	0	100	100
Mar-21	2	50	100
Apr-21	2	50	50
May-21	5	60	75
Jun-21	3	33	50
Jul-21	3	66.7	66.7
Aug-21	3	33.3	50
Sep-21	3	66.7	100
Oct-21	4	100	100
Nov-21	3	33.3	100
Dec-21	1	100	100
Overall Performance	37	62.2	79.3

Table 11.10: Time from first referral to first MDM (first MDM in 2021)*

	2020		2021	
	N=1068		N= 963	
	n	%	n	%
<7 days	499	46.7	352	36.6
7-14 days	444	41.6	478	49.6
>14 days	125	11.7	133	13.8

*Referrals have to be accepted, excludes molar pregnancy and referred for prophylaxis surgery.

Table 11.11: Time from first MDM to first GO Clinic appointment (clinic in 2021)*

	2020		2021	
	N=343		N= 349	
	n	%	n	%
<7 days	186	54.2	185	53.0
7-14 days	58	16.9	44	12.6
>14 days	94	27.4	116	33.2
Clinic before MDM	5	1.5	4	1.1

*This table includes first clinic appointment which happened in 2021, referrals have to be accepted, molar pregnancy and referred for prophylaxis surgery are excluded.
To make first MDM and first clinic appointment relevant (after the first referral), women who had surgery for recurrence are excluded (hard to know if the clinic is for recurrence based on data stored in the databases).

Table 11.12: Time from first clinic visit to primary surgical treatment (surgery in 2021)*

	2021	
	N= 271	
	n	%
<14 days	168	62.0
14 - 31 days	70	25.8
>31 days	33	12.2

*Primary treatment only, excludes brachytherapy, surgery for prophylaxis, molar pregnancy, and women who had surgery before a clinic visit or without clinic.

11.2.2 Gynaecological Oncology MDM

The Gynae tumour stream is the only MDM that functions 52 weeks per year, however proportion of MDM discussions occurring within two weeks from referral has significantly dropped from 46.7% to 36.6%. Discussions waiting more than two weeks are usually due to outstanding investigations in local DHBs and the impact of the Omicron wave on both the ability to provide diagnostic services and the patient to attend may account for this reduction.

The number of wāhine seen for FSA within a week from the MDM has remained constant at 53% and this reflects the increased use of telehealth for patients who were unwilling to attend in person during the Auckland lockdown period.

The New Zealand Gynaecological Cancer Group recommendation is that patients are offered surgery within two weeks of their first specialist appointment (FSA). This improved dramatically in 2020 from 46% to 81.5%, but has dropped off in 2021 to 62%. Those waiting 14-31 days doubled to 25.8% and more than 31 days tripled to 12.2%.

Although SMO FTE has been significantly reduced in 2020 and 2021 during the COVID lockdowns, the remaining SMOs flexed and covered all lists and there was little change in surgical theatre capacity. The delay in surgery reflects the increased infection rates of patients during the Omicron wave, and the reluctance of patients from out of Auckland to travel to the centre.

Another factor is the increase in advanced ovarian cancer cases. These are resource intensive and often take up to 6 hours. This means there is insufficient capacity on an 8 hour list to complete a second case. The outcome of a business case for 10 hour days to bring Level 9 theatres in line with level 8 is with peri operative services and should be expedited to maximize efficient use of theatre time.

11.2.3 Gynaecological Oncology surgeries

This section describes the surgery and short term outcomes of wāhine undergoing inpatient surgery in 2021 under the care of the GO team.

It remains disappointing that long term data is still unable to be collected and we still cannot report survival data, which we consider a fundamental requirement for a Cancer Centre.

Surgical output remained constant with 497 operations in 2021. Of these, 400 were for new cancers, with 80.7% of the workload having a malignant diagnosis and a further 5.6% for pre-invasive conditions. The remaining cases are mainly ovarian masses that are suspicious on imaging with high risk of malignancy index, but ultimately benign.

Endometrial Cancer: We reported the first year of change of practice from full lymphadenectomy to sentinel node assessment in July 2021 and it appears to be successful. This has been implemented in both laparoscopic and open cases.

The proportion of endometrial cancers managed by minimal access surgery increased slightly to 52% from 50% in 2020 and up from 43% in 2019. Many of the endometrial cancers have BMI in the 50-70 range which previously has offered challenges for laparoscopic surgery, but we are now focusing on offering a minimal access approach regardless of BMI to improve equity of surgical morbidity.

Ovarian, tubal and peritoneal cancers: There has been a 20% rise in the number of tubo-ovarian cancers this year. Radical surgery for these tumours accounts for 40% of surgical activity, with over half of cases (N=72) having

advanced (Stage 3/4) disease, which are resource intensive. This is a 14% increase in the number of advanced ovarian cancers compared to 2020. However the proportion of early to advanced cancers has not changed since 2020, which is reassuring that COVID delays do not appear to have caused upstaging of cancers.

For wāhine with advanced (stage 3/4) cancers treated with surgery in 2021, primary debulking surgery reduced to 36% from 45% of all new diagnosis, with 64% receiving neo-adjuvant chemotherapy and interval debulking surgery. We feel only a small proportion of this change in practice is due to COVID delay and more likely reflects changing surgical philosophy. This approach has significantly reduced the bowel resection rate at primary debulking from 32.1% to 7.7%, with a slight reduction at interval debulking from 29.4% to 21.7%

In wāhine receiving primary surgery, complete macroscopic resection increased for the 4th consecutive year to 84.6% (55% 2018, 68% 2019, 78.6% 2020), increasing to 92.3% for resection to <1cm. For interval debulking surgery, complete resection was stable at 71%, with 100% resection rates to <1cm residual disease. Unfortunately we are still unable to report survival outcomes as we do not have the ability to collect long term follow up data.

The proportion of wāhine with advanced ovarian cancer who did not receive surgery remains stable at 30%. Of the 31/103 who did not get to surgery at ADHB, 9 patients died before any treatment, 3 died and 3 progressed on chemotherapy. Four patients declined surgery, 2 were unfit for extensive surgery, 4 patients were not referred back for consideration of interval debulking, and 5 patients were not offered interval debulking surgery as their disease was thought to be unresectable. The final patient developed COVID during chemotherapy, which led to cessation of treatment.

Cervical and vulval cancers: The number of cervical cancers treated surgically has fallen by a third, whilst vulval cancer surgery has remained constant. This may reflect the reduced number of cervical referrals or an increase in higher stage tumours, but we do not have the data to explain this reduction.

Complication rates have remained stable and acceptable with no ureteric injury and bowel and bladder injury rates around 2 and 0.5%. Wāhine undergoing interval debulking surgery for advanced tuboovarian cancer had the greatest rate of all post operative complications, with particularly increased rates of ileus and transfusion.

Transfusion rates have increased, largely due to the increased numbers of patients undergoing interval debulking surgery, with 70% requiring transfusion, reflecting the preoperative anaemia caused by chemotherapy and advanced cancer. The readmission and return to theatre rate has remained stable. Most readmissions remain related to infective morbidity. There was one post operative death in 2021.

Summary/Implications

Dr John Whittaker retired this year after nearly 40 years at National Women's. He was the first New Zealander to be awarded the CGO and helped to establish dedicated gynaecological cancer services in Auckland. His contribution to the department has been constant and we wish him well in his next adventure. Sadly our first Auckland trained Gynaecological Oncologist Dr Niveditha Rajadevan also left to return to Australia with her family and will be missed. At the end of the year we welcomed Dr Tom de Greve as a new SMO and look forward to a new chapter within the department.

The second year of the pandemic required the department to be even more agile in the reorganisation of services, as more patients cancelled at very short notice due to COVID than during the delta wave of 2020. However we have maintained full surgical capacity albeit under varying circumstances and surgical numbers have remained unchanged. The contributions of our CNS and RMO staff handling the constant change and last minute replacements was outstanding and made the efficiency within the service possible, as well as the efforts of the theatre staff to flex across the operating theatre floors.

The effect of COVID has been seen however in the time patients took to get to surgery, due to the need to wait 7 weeks after infection before undertaking major surgery.

We have continued to use telehealth for wāhine from the regions or those unable to attend in person and the clinic has been developed into a hybrid model.

Our MDM workload has been put under pressure by lack of pathology resource and this has been elevated to regional level. This led to the temporary restrictions in cases that could be reviewed by central pathologists with early endometrial cancers being excluded. This has capacity to increase inequity as although lower risk these patients are significantly more likely to be Pacific or Māori wāhine and there is risk that they will be under treated if the pathology is downgraded or staged without review. Hopefully this will be resolved soon.

Our surgical workload has continued despite the loss of GO SMO FTE, and our debulking rates are excellent when benchmarked against regional and international standards.

The department has continued academic output with successful grant applications for current and future studies, with multiple international publications and oral and poster presentations at several international virtual conferences.

Members of the department have continued to provide representation on the CGO training committees, IGCS training development committee, ASCCP committee, boards of the Journal of Lower Genital Tract Disease and South African Journal of Gynae Oncology and are regular reviewers for multiple journals.

In summary, the department is at the beginning of a new era, with the prospect of increasing staffing levels providing the opportunity for growth and development, although our ability to report long term outcomes still is lacking.

11.2.4 Data tables: Gynaecologic Oncology

Table 11.13: ADHB Gynaecologic Oncology MDM workload: Referrals and MDM discussions 2010 – 2021

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	n	n	n	n	n	n	n	n	n	n	n	n
All referrals (by year of referral)												
Accepted	645	643	703	775	839	905	1089	1112	1115	1183	1184	1134
Referral reason (accepted only)												
Molar pregnancy	52	64	72	49	76	59	55	60	69	58	44	58
Consideration of prophylactic surgery	10	13	7	15	15	15	6	5	23	4	8	6
Other	583	566	624	711	748	831	1028	1047	1023	1121	1132	1070
Referrals proceeding to MDM (accepted referrals only)												
Had MDM	624	616	692	753	818	878	1065	1105	1086	1180	1174	1124
No MDM	21	27	11	22	21	27	24	7	29	3	10	10
Total wāhine discussed at MDM by year (irrespective of referral date)	759	788	839	924	1026	1105	1277	1250	1342	1383	1454	1383
Total MDM reviews per year	1351	1363	1517	1856	2060	2138	2299	2219	2386	2392	2541	2548

Table 11.14: Demographic characteristics of women discussed at MDM in 2021 by primary site

	Total		Ovarian		Peritone-um		Fallopian tube		Endometri-um		Uterus		Cervix		Vulva		Vagina		Placenta		Non-gynae cancer		Unknown	
	N=	1383	N=	410	N=	12	N=	30	N=	498	N=	72	N=	138	N=	52	N=	20	N=	88	N=	27	N=	34
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Ethnicity																								
Māori	228	16.5	66	16.1	3	25.0	3	10.0	80	16.1	9	12.5	33	23.9	6	11.5	3	15.0	11	12.5	5	18.5	9	26.5
Pacific	235	17.0	45	11.0	0	0.0	3	10.0	125	25.1	17	23.6	22	15.9	2	3.8	0	0.0	17	19.3	3	11.1	1	2.9
Asian	210	15.2	64	15.6	2	16.7	8	26.7	58	11.6	15	20.8	21	15.2	1	1.9	3	15.0	27	30.7	6	22.2	5	14.7
MELAA	19	1.4	9	2.2	0	0.0	0	0.0	4	0.8	2	2.8	0	0.0	0	0.0	0	0.0	3	3.4	0	0.0	0	0.0
European	685	49.5	225	54.9	7	58.3	16	53.3	227	45.6	28	38.9	62	44.9	43	82.7	14	70.0	30	34.1	13	48.1	19	55.9
Not stated	6	0.4	1	0.2	0	0.0	0	0.0	4	0.8	1	1.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Age (yrs)																								
≤25	36	2.6	13	3.2	1	8.3	0	0.0	0	0.0	0	0.0	2	1.4	0	0.0	2	10.0	16	18.2	1	3.7	1	2.9
26-35	151	10.9	39	9.5	0	0.0	1	3.3	23	4.6	7	9.7	24	17.4	1	1.9	0	0.0	53	60.2	1	3.7	2	5.9
36-45	166	12.0	60	14.6	2	16.7	1	3.3	42	8.4	9	12.5	27	19.6	5	9.6	1	5.0	15	17.0	2	7.4	2	5.9
46-55	255	18.4	79	19.3	0	0.0	9	30.0	70	14.1	27	37.5	45	32.6	8	15.4	1	5.0	4	4.5	7	25.9	3	8.8
56-65	328	23.7	94	22.9	4	33.3	5	16.7	162	32.5	11	15.3	22	15.9	9	17.3	9	45.0	0	0.0	5	18.5	7	20.6
66-75	272	19.7	74	18.0	3	25.0	11	36.7	128	25.7	12	16.7	8	5.8	16	30.8	4	20.0	0	0.0	7	25.9	9	26.5
>75	175	12.7	51	12.4	2	16.7	3	10.0	73	14.7	6	8.3	10	7.2	13	25.0	3	15.0	0	0.0	4	14.8	10	29.4
DHB of Residence																								
Auckland	217	15.7	65	15.9	2	16.7	4	13.3	73	14.7	15	20.8	20	14.5	6	11.5	0	0	21	23.9	4	14.8	7	20.6
Counties Manukau	345	24.9	85	20.7	2	16.7	7	23.3	126	25.3	27	37.5	41	29.7	11	21.2	3	15	28	31.8	9	33.3	6	17.6
Waitematā	314	22.7	95	23.2	4	33.3	6	20.0	118	23.7	12	16.7	24	17.4	12	23.1	6	30	29	33.0	5	18.5	3	8.8
Northland	120	8.7	30	7.3	0	0.0	1	3.3	48	9.6	5	6.9	20	14.5	6	11.5	3	15	1	1.1	1	3.7	5	14.7
Bay Of Plenty	113	8.2	45	11.0	3	25.0	3	10.0	34	6.8	5	6.9	9	6.5	4	7.7	1	5	2	2.3	3	11.1	3	8.8
Waikato	178	12.9	58	14.1	0	0.0	5	16.7	68	13.7	5	6.9	14	10.1	10	19.2	5	25	1	1.1	4	14.8	7	20.6
Lakes	65	4.7	21	5.1	1	8.3	2	6.7	22	4.4	2	2.8	7	5.1	0	0.0	0	0	6	6.8	1	3.7	3	8.8
Tairawhiti	21	1.5	9	2.2	0	0.0	2	6.7	7	1.4	0	0.0	0	0.0	2	3.8	1	5	0	0.0	0	0.0	0	0
Other	10	0.7	2	0.5	0	0.0	0	0.0	2	0.4	1	1.4	3	2.2	1	1.9	1	5	0	0.0	0	0	0	0

Table 11.15: Demographic characteristics of women undergoing surgery by the gynaecology oncology team in 2021 by primary site (excludes surgery for complications)

	Total		Ovarian		Peritoneum		Fallopian tube		Endometrium		Uterus		Cervix		Vulva		Vagina		Placenta		Non-gynae cancer		Unknown		Brachytherapy	
	N=	472	n=	184	n=	3	n=	11	n=	140	n=	10	n=	31	n=	47	n=	14	n=	1	n=	10	n=	2	n=	19
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Ethnicity*																										
Māori	69	14.6	31	16.8	0	0.0	1	9.1	20	14.3	1	10.0	3	9.7	3	6.4	1	7.1	0	0.0	2	20	0	0	7	36.8
Pacific	58	12.3	20	10.9	0	0.0	0	0.0	23	16.4	2	20.0	7	22.6	1	2.1	1	7.1	0	0.0	1	10.0	0.0	0	3	15.7
Other Asian	65	13.8	17	9.2	0	0.0	2	18.2	21	15.0	2	20.0	9	29.0	3	6.4	5	35.7	0	0.0	3	30.0	0	0.0	3	15.7
MELAA	1	0.2	1	0.5	0	0.0	0	0.0	1	0.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0	0	0	0	0
European	277	58.7	116	63.0	3	100.0	8	72.7	74	52.9	4	40.0	12	38.7	40	85.1	7	50.0	1	100.0	4	40.0	2	100.0	6	31.5
Age (yrs)																										
≤25	5	1.1	1	0.5	0	0.0	0	0.0	0	0.0	0	0.0	1	3.2	0	0.0	3	21.4	0	0.0	0	0	0	0	0	0
26-35	26	5.5	8	4.3	0	0.0	1	9.1	2	1.4	0	0	9	29.0	3	6.4	0	0.0	0	0	1	10	0	0	2	10.5
36-45	43	9.1	21	11.4	1	33.3	0	0.0	5	3.6	2	20	6	19.4	2	4.3	2	14.3	0	0	0	0	0	0	4	21.1
46-55	97	20.6	39	21.2	0	0.0	2	18.2	20	14.3	5	50	7	22.6	9	19.1	2	14.3	0	0	4	40	0	0	8	42.1
56-65	134	28.4	59	32.1	1	33.3	3	27.3	45	32.1	0	0	7	22.6	10	21.3	5	35.7	0	0	1	10	0	0	3	15.8
66-75	119	25.2	40	21.7	1	33.3	3	27.3	52	37.1	2	20	1	3.2	12	25.5	2	14.3	0	0	3	30	1	50	2	10.5
>75	48	10.2	16	8.7	0	0.0	2	18.2	16	11.4	1	10	0	0.0	11	23.4	0	0.0	0	0	1	10	1	50	0	0.0
DHB of residence																										
Auckland	93	19.7	24	13.0	1	33.3	1	9.1	26	18.6	2	20	16	51.6	11	23.4	4	28.6	0	0	4	40	0	0	4	21.1
Counties Manukau	90	19.1	38	20.7	0	0.0	1	9.1	21	15.0	6	60	4	12.9	11	23.4	2	14.3	0	0	4	40	0	0	3	15.8
Waitematā	110	23.3	41	22.3	2	66.7	2	18.2	35	25.0	0	0	2	6.5	15	31.9	5	35.7	1	100	1	10	0	0	6	31.6
Northland	50	10.6	15	8.2	0	0.0	0	0.0	19	13.6	2	20	3	9.7	3	6.4	2	14.3	0	0	1	10	0	0	5	26.3
Bay Of Plenty	35	7.4	20	10.9	0	0.0	2	18.2	9	6.4	0	0	2	6.5	2	4.3	0	0.0	0	0	0	0	0	0	0	0.0
Waikato	63	13.3	30	16.3	0	0.0	3	27.3	23	16.4	0	0	2	6.5	4	8.5	0	0.0	0	0	0	0	1	50	0	0.0
Lakes	18	3.8	11	6.0	0	0.0	1	9.1	4	2.9	0	0	1	3.2	0	0.0	0	0.0	0	0	0	0	1	50	0	0.0
Other	13	2.8	5	2.7	0	0.0	1	9.1	3	2.1	0	0	1	3.2	1	2.1	1	7.1	0	0	0	0	0	0	1	5.3

*2 women's ethnicity not stated

Table 11.16: Malignant status prior to and after surgery by primary site among all surgical precedures performed by the gynaecology oncology team in 2021 (excluding surgery for complications and brachytherapy) (some women will have more than one surgery)

	Total		Ovarian		Peritoneum		Fallopian tube		Endometrium		Uterus		Cervix		Vulva		Vaginal		Non-gynae cancer/unknown	
	N=	497	N=	200	N=	3	N=	14	N=	142	N=	11	N=	34	N=	61	N=	16	N=	15
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Reason for surgery																				
Diagnostic	53	10.7	22	11.0	1	33.3	2	14.3	5	3.5	1	9.1	8	23.5	2	3.3	7	43.8	5	33.3
Primary treatment	353	71.0	126	63.0	0	0.0	4	28.6	132	93.0	10	90.9	24	70.6	41	67.2	7	43.8	8	53.3
Interval debulking	51	10.3	42	21.0	0	0.0	6	42.9	2	1.4	0	0	0	0.0	0	0.0	0	0.0	1	6.7
Recurrence	35	7.0	9	4.5	1	33.3	1	7.1	3	2.1	0	0	1	2.9	18	29.5	2	12.5	0	0.0
Open and close	5	1.0	1	0.5	1	33.3	1	7.1	0	0.0	0	0	1	2.9	0	0.0	0	0.0	1	6.7
Diagnosis (prior to surgery)																				
Benign	13	2.6	5	2.5	0	0.0	1	7.1	0	0.0	0	0.0	0	0.0	4	6.6	3	18.8	0	0
Premalignant	41	8.2	2	1.0	1	33.3	0	0.0	3	2.1	0	0.0	9	26.5	21	34.4	5	31.3	1	6.7
Malignant	310	62.4	95	47.5	3	100.0	11	78.6	135	95.1	3	27.3	19	55.9	29	47.5	6	37.5	9	60.0
Prophylactic	8	1.6	7	3.5	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	6.7
Unknown	125	25.2	91	45.5	0	0.0	2	14.3	4	2.8	8	72.7	6	17.6	7	11.5	2	12.5	4	26.7
Diagnosis (after surgery)																				
Benign	66	13.3	42	21.0	0	0.0	1	7.1	2	1.4	4	36.4	3	8.8	7	11.5	4	25.0	3	20
Premalignant	28	5.6	2	1.0	0	0.0	0	0.0	0	0.0	0	0.0	10	29.4	11	18.0	5	31.3	0	0
Malignant	401	80.7	156	78.0	3	100.0	13	92.9	140	98.6	7	63.6	21	61.8	43	70.5	6	37.5	12	80

Table 11.17: Malignant status prior to and after surgery by year 2015-2021 among all surgical procedures performed by the Gynaecology Oncology team (excluding surgery for complications and brachytherapy) (some wāhine will have more than one surgery included)

	2015		2016		2017		2018		2019		2020		2021	
	N=412*		n=504*		n=483*		n=515*		n=525		n=496		N= 497	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Reason for surgery														
Diagnostic					0		1	0.2	41	7.8	85	17.1	53	10.7
Primary treatment					390	80.7	405	78.6	385	73.3	325	65.5	353	71.0
Interval debulking					49	10.1	45	8.7	40	7.6	38	7.7	51	10.3
Recurrence					43	8.9	63	12.2	59	11.2	59	11.9	35	7.0
Unknown					1	0.2	1	0.2	0		2	0.4	5	1.0
Diagnosis (prior to surgery)														
Benign	15	3.6	9	1.8	25	5.2	23	4.5	18	3.4	10	2	13.0	2.6
Pre-malignant	68	16.5	64	12.7	33	6.8	45	8.7	57	10.9	49	9.9	41.0	8.2
Malignant	233	56.6	304	60.3	329	68.1	340	66	341	65	314	63.3	310.0	62.4
Prophylactic	3	0.7	9	1.8	8	1.7	12	2.3	7	1.3	7	1.4	8.0	1.6
Unknown	93	22.6	118	23.4	88	18.2	95	18.4	102	19.4	116	23.4	125.0	25.2
Diagnosis (after surgery)														
Benign	46	11.2	58	11.5	78	16.1	59	11.5	63	12	54	10.9	66.0	13.3
Pre-malignant	45	10.9	28	5.6	26	5.4	25	4.9	32	6.1	28	5.6	28.0	5.6
Malignant	321	77.9	386	76.6	375	77.6	422	81.9	429	81.7	412	83.1	401.0	80.7
Molar pregnancy	0		0		2	0.4	0		0		0			

Excluding surgery for complications (2019-2021) and brachytherapy
*Database could not dstinguish surgery for complications prior to 2019.

Table 11.18: Surgical debulking and bowel sugery at primary, interval and recurrence surgery for ovarian, fallopian tube and peritoneum cancer 2021

	Total		Primary treatment				Interval debulking				Surgery for recurrence	
			stage 1/2		stage 3/4		stage 1/2		stage 3/4			
	N=	148	N=	63	N=	26	N=	2	N=	46	N=	11
	n	%	n	%	n	%	n	%	n	%	n	%
Residual diease												
None	129	87.2	61.0	96.8	22.0	84.6	2	100	33	71.7	11	100
<1cm	16	10.8	1.0	1.6	2.0	7.7	0	0	13	28.3	0	0
≥1cm	3	2.0	1.0	1.6	2.0	7.7	0	0	0	0.0	0	0
Bowel surgery												
Yes	18	12.2	2	3.2	2	7.7	0	0.0	10	21.7	4	36.4
No	130	87.8	61	96.8	24	92.3	2	100.0	36	78.3	7	63.6

Table 11.19: Clinical outcomes/complications among inpatient surgeries performed by the Gynaecological Oncology team by cancer status 2021 (n=surgeries)

Complication	Premalignant/ Benign	Malignant										
	Total		Total		Diagnostic surgery		Primary treatment		Interval debulking		Surgery for recurrence		Open and close	
	N= 95		N= 400		N= 40		N= 276		N= 51		N= 28		N= 5	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Intra-operative complications														
Anaesthetic complication			2	0.5	0	0	2	0.7	0		0	0	0	0
>1000ml blood loss	2	2.1	32	8.0	1.0	2.5	18	6.5	13	25.5	0	0	0	0
Bowel injury	2	2.1	9	2.3	0.0	0	5	1.8	1	2.0	3	10.7	0	0
Bladder injury	0	0.0	2	0.5	0.0	0	0	0.0	0	0.0	2	7.1	0	0
Ureteric injury	0	0.0	0	0.0	0.0	0	0	0.0	0	0.0	0	0.0	0	0
Other	1	1.1	25	6.3	1.0	2.5	15	5.4	7	13.7	1	3.6	1	20
Post-operative complications														
Transfusion	5	5.3	76	19.0	1.0	2.5	36	13.0	36	70.6	2	7.1	1	20
Febrile morbidity	0	0.0	19	4.8	1.0	2.5	11	4.0	6	11.8	0	0.0	1	20
Wound infection	2	2.1	31	7.8	0.0	0	24	8.7	6	11.8	1	3.6	0	0
Thromboembolism	0	0.0	7	1.8	0.0	0	1	0.4	6	11.8	0	0.0	0	0
Cardiovascular	0	0.0	3	0.8	0.0	0	1	0.4	2	3.9	0	0.0	0	0
Gastro-intestinal	1	1.1	38	9.5	4.0	10	20	7.2	12	23.5	1	3.6	1	20
Urinary retention	2	2.1	15	3.8	0.0	0	11	4.0	3	5.9	1	3.6	0	0
Return to theatre within 6 wks	3	3.2	6	1.5	2.0	5	3	1.1	1	2.0	0	0.0	0	0
Readmission with complication within 6 wks	4	4.2	39	9.8	0.0	0	30	10.9	4	7.8	3	10.7	2	40
Death	0	0.0	1	0.3	0.0	0	1	0.4	0	0	0	0	0	0

Table 11.20: Clinical outcomes/complications among inpatient surgeries with malignancy (n=surgeries) performed by the Gynaecological Oncology team by year (2015-2021)

	2015*		2016*		2017*		2018*		2019		2020		2021	
	N=321		N=386		N=375		N=422		N=429		N=413		N= 400	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Intra-operative complications														
Anaesthetic Complication											2		2	0.5
>1000mls blood loss	20	6.2	18	4.7	13	3.5	22	5.2	13	3	24	5.8	32	8.0
Bowel injury	2	0.6	4	1	4	1.1	4	0.9	6	1.4	6	1.5	9	2.3
Bladder injury	1	0.3	5	1.3	5	1.3	6	1.4	2	0.5	1	0.2	2	0.5
Ureteric injury	1	0.3	1	0.3	2	0.5	1	0.2	1	0.2	1	0.2	0	0.0
Other	3	0.9	11	2.8	4	1.1	13	3.1	22	5.1	11	2.7	25	6.3
Post-operative complications														
Transfusion	45	14	49	12.7	42	11.2	76	18	51	11.9	58	14	76	19.0
Febrile morbidity	10	3.1	24	6.2	21	5.6	35	8.3	22	5.1	19	4.6	19	4.8
Wound infection	10	3.1	7	1.8	13	3.5	6	1.4	14	3.3	9	2.2	31	7.8
Thromboembolism	0		2	0.5	3	0.8	3	0.7	3	0.7	2	0.5	7	1.8
Cardiovascular	4	1.2	5	1.3	1	0.3	8	1.9	3	0.7	2	0.5	3	0.8
Gastro-intestinal	16	5	23	6	24	6.4	21	5	15	3.5	23	5.6	38	9.5
Urinary retention	22	6.9	26	6.7	21	5.6	27	6.4	30	7	17	4.1	15	3.8
Return to OT within 6 weeks	8	2.5	12	3.1	14	3.7	12	2.8	13	3	7	1.7	6	1.5
Readmission with complication within 6 weeks	17	5.3	43	11.1	38	10.1	38	9	34	7.9	35	8.5	39	9.8
Death	1	0.3	1	0.3	1	0.3	1	0.2	0		0		1	0.3

Excluding surgery for complicatoins (2019-2021) and brachytherapy
*Database could not distinguish surgery for complications prior to 2019.

11.3 Abortion

Dr Gillian Gibson, SCD

Abortion is the most performed procedure in gynaecology. Introduction of the Abortion Legislation Act 2020 has significantly changed the way abortion care can be provided in New Zealand, with the potential to improve access, reduce inequities and transform the abortion model of care. The Ministry of Health Abortion Services team was established in 2020 following the legislation changes. The inaugural annual abortion report[1], a national clinical guideline[2] and abortion service standards[3] have been released.

A new model of care, which rapidly evolved at Epsom Day Unit (EDU) following both law reform and the Covid pandemic in 2020, remains well established. During 2021 EDU provided over 80% of first trimester Metro Auckland abortion care. Second trimester surgical abortions are provided as a contracted specialist service for several DHBs, predominantly upper North Island. ADHB women undergoing second and third trimester medical abortions are cared for as inpatients on the Gynaecology Ward (less than 20 weeks) or on Women's Assessment Unit for later gestations.

11.3.1 First trimester regional service

At EDU 3583 first trimester abortions were performed in 2021, a slight reduction compared to 2020. An existing central Auckland provider, Auckland Medical Aid Centre (AMAC), provided 666 publically funded first trimester abortions April – December 2021. Wāhine accessing abortion at Auckland reside in Counties Manukau (41%), Waitematā (32%) and Auckland (27%) regions.

Wāhine aged 25-29 years access the largest proportion of abortions, consistent with national data[1]. Early medical abortion (EMA) rates, for gestations 9 weeks and under, were already increasing in 2019 (Figure 171) and have continued to trend upwards in 2021, remaining proportional across all ethnicity groups. Close to 50% of all abortions were EMA in 2021 compared to 40% the previous year, and 25% in 2019. Our figures benchmark well against national EMA rate 56%[1] and is higher compared to EMA rate 41% reported by AMAC in 2021.

Figure 11.2: First trimester medical abortion rate among first trimester TOP by ethnicity NWH 2017-2021

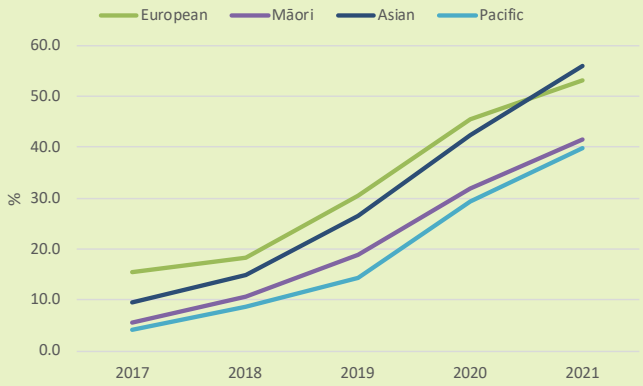
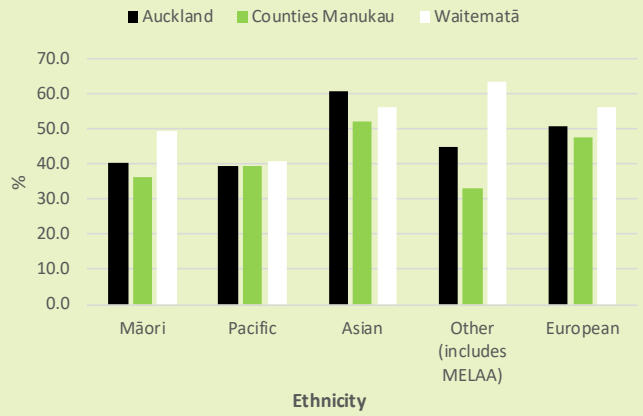


Figure 11.3: First trimester medical abortion rate among first trimester TOP by ethnicity NWH 2017-2021



The increasing EMA rate is attributable to a number of factors facilitated by abortion law reform. There is reduction in delays to access, with increasing proportion of gestations eligible for EMA (9 weeks or less), with self-referral (64%) and telehealth contributing significantly. Self-administration of abortion medication at home has improved acceptability of EMA with more choice about timing and location, with 92% taking misoprostol within 24 hours of mifepristone and 8% within 48 hours.

Investigations are arranged directly from EDU, including the option of point of care ultrasound (POCUS) providing 1578 dating scans, reducing cost and delay associated with community providers. This was an EDU initiative which needs to be maintained with adequate resourcing. Selective ultrasound has been recommended in the national clinical guidelines[2], which potentially will impact on future demand.

Medical abortion rates remain lowest amongst Pacific (40%) and Māori (42%) compared to highest rates amongst Asian (56%). The EMA rate for CMDHB domiciled Māori wāhine has improved 27% to 36% compared to 2020

which is a favourable trend. Improving access to EMA is an important consideration for future services setting up in the Counties Manukau area for wāhine who may not fulfil criteria for EMA at home. In 2021 EDU began recruiting for a multicentre international RCT (VEMA) investigating very early medical abortion prior to 6 weeks gestation.

All wāhine are counselled at EDU about contraception post abortion. Initiation of long-acting reversible contraception (LARC) at the time of abortion reduces abortion return rates[4]. LARC is convenient, acceptable and safe when provided immediately after an abortion. Copper IUCD, Mirena IUS and Jadelle are all funded devices. In 2021 up to half of wāhine having EMA have no planned future contraception method, or are deferring until an appointment with their GP, compared to less than 20% following surgical procedure. The choice of LARCs is limited following EMA to a funded implant. Only 12% chose to have a LARC (implant) on the day of initiation of EMA, compared to 54% opting for immediate LARC (IUCD, Mirena or Implant) after surgical abortion.

EDU is reviewing contraception after EMA to consider strategies to improve access. Nationally, provision of contraception at the time of the abortion procedure fell in 2020[1]. This was possibly attributable to limited contraception access during Alert Levels 3 and 4 lockdown in response to the COVID-19 pandemic, plus increasing EMA and telehealth abortion, which requires for patients to attend a separate contraception appointment after the abortion for intrauterine LARC. There are barriers to LARC access in primary care with variation in eligibility for funded provision and providers across Metro Auckland DHBs.

Approximately equal numbers of surgical and medical abortions were performed in 2021. A total of 87 (5%) wāhine at EDU in 2021 were identified as requiring further review or treatment within 30 days after surgical abortion, compared to 187 (9%) for EMA. Four wāhine were transferred from EDU directly to Auckland City Hospital for further assessment. There was one uterine perforation. Of the readmissions, ERPOC was required for 30 wāhine after surgical abortion compared to 93 following EMA.

11.3.2 Second trimester surgical service

In 2021 an interregional service for gestations 13-18 weeks was provided for 213 wāhine by private specialists who have facility access at Greenlane Clinical Centre. Upskilling DHB specialists remains a priority to ensure future workforce capability, governance and a sustainable service for the Auckland region.

11.3.3 Second trimester medical service

Forty-seven (47) wāhine had a medical termination of pregnancy/induction of labour as an inpatient between 13 and 19 weeks in 2021. Following international studies, we continue to administer Misoprostol buccally instead of vaginally. This route has the same efficiency, is less invasive with fewer gastrointestinal side effects, therefore more acceptable for wāhine. In 2021, six wāhine (13%) required manual removal of the placenta and four had a blood transfusion.

Eighty-one percent of wāhine were managed either as a day stay or required one night in hospital in 2021 which is a stable trend. The aim is to run this as a day stay service with the majority (57%) only requiring 1-2 doses misoprostol.

The main fetal indications for medical abortion/induction under 20 weeks remain fetal anomaly (40%), intrauterine death (32%) and premature rupture of membranes (13%). Maternal mental health indication (15%) accounts for the remainder, a slight increase from 2020, but still less than half the rate reported in 2013 (33%). There has not been a significant change since the legislation changed in 2020.

11.3.4 Future access to abortion care in the greater Auckland area

The former Abortion Supervisory Committee, noting the burden of travel particularly impacting wāhine domiciled in Waitematā and Counties Manukau DHBs recommended providing abortion services closer to home. Project work has been completed but the timeline for reconfiguration of the regional service remains uncertain. A single regional contract awarded to AMAC has not significantly impacted on EDU volumes in 2021 but it is noted that wāhine from Counties Manukau (25%) were less likely to use the service than those from ADHB (34%) and WDHB (40%). The publicly funded national abortion telehealth Service "DECIDE" will roll out in phases in 2022, aiming to improve equity of access[5]. People who are expected to benefit most are those in regions without locally available EMA services, which is likely to influence the configuration of abortion care provision in Metro Auckland from 2023.

[4] Roberts H, Silva M, Xu S (2010) Postabortion contraception and it's effects on repeat abortions in Auckland, New Zealand. https://doi.org/10.1016/j.contraception.2010.03.003

[5]DECIDE - National Abortion Telehealth Service (2022) https://www.health.govt.nz/our-work/regulation-health-and-disability-system/abortion-legislation-information-health-practitioners/decide-national-abortion-telehealth-service

11.3.5 Data tables: Abortion

Table 11.21: Number of first trimester abortions EDU 2008-2021

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Total number of abortions	5550	5391	5049	4949	4535	4213	3842	3603	3501	3648	3645	3550	3605	3583

Table 11.22: Number of counselling sessions EDU 2009-2021

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	N	N	N	N	N	N	N	N	N	N	N	N	N
Post op counselling	22	33	32	18	41	33	28	36	47	57	49	60	76
Pregnancy option counselling	102	84	76	64	84	66	63	47	40	45	54	119	174
Declines %	2.7	2.8	3	2.9	2.9	3.4	2.4	2.5	1.9	2	2.3	1.2	0.4

Table 11.23: Demography and characteristics of wāhine attending EDU NWH 2016-2021

	2016		2017		2018		2019		2020		2021	
	n=3501		n=3648		n=3645		n=3550		n=3605		n=3583	
	n	%	n	%	n	%	n	%	n	%	n	%
Ethnicity												
Māori	643	18.3	687	18.8	696	17.8	634	17.9	545	15.1	573	16.0
Pacific	752	21.5	705	19.3	762	18.6	653	18.4	606	16.8	614	17.1
Asian	891	25.5	1002	27.4	868	30.2	1163	32.8	1243	34.5	1180	32.9
Other*	60	1.7	65	2.5	79	2.4	97	2.7	110	3.1	86	2.4
European	1135	32.4	1161	31.8	1190	30.8	1003	28.3	1096	30.4	1127	31.5
Unknown	20	0.6	22	0.6	8	0.1	0		1	0.03	3	0.1
Age												
≤ 19	418	11.9	365	10	442	9.1	307	8.6	283	7.9	270	7.5
20 – 24	920	26.3	970	26.6	1056	25.8	847	23.9	826	22.9	840	23.4
25 – 29	904	25.8	990	27.1	843	26.1	918	25.9	959	26.6	882	24.6
30 – 34	669	19.1	711	19.5	665	20.6	781	22	751	20.8	825	23.0
35 –39	412	11.8	454	12.4	437	13.2	508	14.3	581	16.1	537	15.0
≥40	163	5.1	158	4.2	160	5.2	189	5.3	205	5.7	229	6.4
Gestation (weeks) at Termination												
6	39	1.1	63	1.7	907	2.6	208	5.86	526	14.69	890	25.0
7	303	8.7	367	10.1	750	12.6	726	20.45	853	23.71	826	23.1
8	777	22.2	858	23.5	602	24.9	902	25.41	899	24.94	781	21.8
9	813	23.2	770	21.1	459	20.6	586	16.51	484	13.39	392	10.9
10	608	17.4	659	18.1	458	16.5	503	14.17	378	10.43	296	8.2
11	540	15.4	513	14.1	333	12.6	324	9.13	234	6.46	194	5.4
12	418	11.9	401	11	95	9.1	246	6.93	183	5.05	159	4.4
13	3	0.1	17	0.5	41	1.1	55	1.55	48	1.33	44	1.2
14											1	0.0

*Other inclues MELAA (Middle Eastern, Latin American, and African)

Table 11.24: Medical and surgical first trimester abortion by ethnicity and DHB of residence 2021 (includes abortions in EDU, GSU, and ACH)

	Auckland			Counties Manukau			Waitematā			Other DHB			TOTAL		
	S	M	M%	S	M	M%	S	M	M%	S	M	M%	S	M	M%
Māori	89	60	40.3	154	87	36.1	106	104	49.5	7	3	30.0	356	254	41.6
Pacific	106	69	39.4	204	132	39.3	72	50	41.0	2	2	50.0	384	253	39.7
Asian	148	230	60.8	248	270	52.1	134	171	56.1	3	6	66.7	533	677	56.0
Other (includes MELAA)	21	17	44.7	18	9	33.3	11	19	63.3	0	0		50	45	47.4
European	168	173	50.7	119	109	47.8	260	337	56.4	9	13	59.1	556	632	53.2
Total	532	549	50.8	743	607	45.0	583	681	53.9	21	24	53.3	1879	1861	49.8

S = Surgical TOP M = Medical TOP M% = Medical TOP%

Table 11.25: Characteristics of wāhine undergoing second trimester medical TOP/induction NWH 2013-2021

	2013		2014		2015		2016		2017		2018		2019		2020		2021	
	N=40		N=51		N=40		N=35		N=32		N=41		N=49		N=49		N=	47
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
DHB of residence																		
Auckland	32	80	43	84	33	83	29	83	29	91	32	78	42	86	43	88	41	87
Counties Manukau	6	15	2	4	4	10	3	9	1	3	6	15	4	8	1	2	3	6
Waikato			1	2	0								1	2	1	2	0	0
Waitematā	2	5	5	10	2	5	3	9	1	3	2	5	1	2	4	8	3	6
Other					1	3			1	3	1	2	1	2	0	0	0	0
Indication for termination of pregnancy/induction																		
Fetal anomaly	14	35	24	47	15	38	10	29	7	22	14	34	23	47	18	37	19	40
Intrauterine death	8	20	13	25	10	25	15	43	13	41	16	39	11	22	17	35	15	32
Maternal mental health	13	33	8	16	10	25	4	11	8	25	5	12	7	14	8	16	7	15
Spontaneous rupture of membranes	5	13	6	12	5	13	6	17	4	13	6	15	8	16	6	12	6	13
Gestation (wks)																		
12											2	5				0	0	0
13			7	14					2	6	2	5	2	4	4	8	3	6
14	4	10	6	12	7	18	2	6	3	9	3	7	6	12	9	18	12	26
15	4	10	5	10	9	23	6	17	3	9	8	20	9	18	6	12	4	9
16	10	25	9	18	6	15	9	26	4	13	6	15	7	14	6	12	7	15
17	1	3	15	29	4	10	1	3	5	16	4	10	10	20	11	22	4	9
18	10	25	5	10	4	10	9	26	6	19	8	20	8	16	5	10	6	13
19	11	28	4	8	9	23	8	23	9	28	8	20	7	14	8	16	10	21
20					1	3									0	0	1	2

Table 11.26: Medical and surgical first trimester TOP by age and ethnicity 2021 (includes TOP in EDU, GSU, and ACH)

Age (yrs)	Māori			Pacific			Asian			Other (includes MELAA)			European			TOTAL		
	S	M	M%	S	M	M%	S	M	M%	S	M	M%	S	M	M%	S	M	M%
<20	71	45	38.8	72	35	32.7	23	21	47.7	7	6	46.2	75	78	51.0	248	185	42.7
20-24	83	83	50.0	101	65	39.2	45	76	62.8	5	7	58.3	118	142	54.6	352	373	51.4
25-29	87	70	44.6	99	72	42.1	112	166	59.7	13	6	31.6	131	158	54.7	442	472	51.6
30-34	64	33	34.0	71	42	37.2	173	210	54.8	12	16	57.1	119	126	51.4	439	427	49.3
35-39	36	17	32.1	28	25	47.2	124	154	55.4	9	6	40.0	79	89	53.0	276	291	51.3
≥40	15	6	28.6	13	14	51.9	56	50	47.2	4	4	50.0	34	39	53.4	122	113	48.1
Total	356	254	41.6	384	253	39.7	533	677	56.0	50	45	47.4	556	632	53.2	1879	1861	49.8

S = Surgical TOP M = Medical TOP M% = Medical TOP%

Table 11.27: Clinical details and outcomes of second trimester medical TOP/induction NWH 2013-2021

	2014		2015		2016		2017		2018		2019		2020		2021	
	N=51		N=40		N=35		N=32		N=41		N=49		N= 49		N= 47	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Mifegynae	48	94	39	98	29	83	29	91	39	95	42	86	44	90	47	100
Vaginal misoprostol (800mg)	45	88	27	68	26	74	24	75	11	27	1	2	2	4	1	2
Buccal misoprostol (800mg)	4	8	8	20	5	14	8	25	30	73	45	92	46	94	43	91
Misoprostol (400mg) (oral or buccal)																
Not given	17	33	13	33	9	26	7	22	14	34	10	20	11	22	7	15
1 dose	17	33	12	30	11	31	13	41	8	30	16	33	19	39	17	36
2 dose	11	22	3	8	8	23	5	16	7	26	6	12	5	10	10	21
3 doses	2	5	2	5	3	9	4	13	5	19	6	12	5	10	6	13
≥ 4 doses	4	8	10	25	4	11	3	9	7	17	11	22	9	18	7	15
Syntocinon infusion	4	8	6	15	5	14	2	6	4	10	2	4	1	2	2	4
Manual removal of placenta	2	5	5	13	3	9	6	19	6	15	8	16	8	16	6	13
Retained products of conception (requiring ERPOC)	2	5	3	8	3	9	2	6	1	2	3	6	2	4	4	9
Transfusion	3	6	1	3	3	9	1	3	1	2	3	7	1	2	4	9
Nights in hospital																
0	30	59	20	50	15	43	16	50	16	39	19	39	25	51	18	38
1	17	33	18	45	16	46	13	41	19	46	23	47	17	35	20	43
2-3	4	8	1	3	3	9	2	6	4	10	7	14	6	12	9	19
>3			1	3	1	3	1	3	2	5			1	2	0	0

ERPOC = Evacuation of retained products of conception

11.4 General Gynaecology inpatient surgery

Prof Cindy Farquhar

The majority of the data in this section relates to inpatient gynaecologic surgeries on Level 9 performed by the general gynaecology team. The 2021 data include only months January to October. On November 1st, the general gynaecology data moved from Healthware to Dendrite in line with the decommissioning of the Healthware database.

Surgeries performed by the Gynaecologic Oncology team are collected in a separate database and are presented in Section 11.2.

The numbers relate to episodes of surgery rather than individuals. Some individuals had more than one surgical episode in the year and all episodes are included.

As more than one procedure may occur at a single operation, it may appear that numbers are not consistent within this section. If a specific procedure is discussed, then all accounts of the procedure are included, however for summary tables, the first procedure entered into the database has been used to represent the primary surgical episode.

Definitions

Where surgical complications are given, these relate to the following definitions:

Intra-operative injury to internal organs: Injury to bladder, bowel, ureter, major blood vessel or other.

Significant post-operative infection: Any infection (defined by evidence of wound dehiscence or wound collection, pelvic abscess, or fever >39°C) occurring as a result of surgery.

Readmission: Readmission to hospital (hospital stay of 3 hours or more) for a reason related to the surgical procedure within 6 weeks of surgery. From 2015, total readmissions have included planned and unplanned readmissions but the number of unplanned readmissions is also identified separately.

Other significant complications: Includes gastrointestinal complications (ileus, bowel obstruction), fistulae.

Key Findings

- From Jan - Oct 2021, we performed 1067 general gynaecological surgeries.
- We are not reporting data from the Greenlane Surgical Unit for 2021 as the data was incompletely collected.
- There is a reduction in the number of surgical complications among inpatient primary surgeries overall from 12.6% in 2018 to 6.3% in 2021.
- There has been a further decline in the number of readmissions following surgery from 7.8% in 2018 to 1.4% in 2021. A nurse led clinic reviewing all hysterectomies and wāhine with laparotomies 1-2 weeks after surgery was introduced at the end of 2018. We also introduced a surgical (operative) bundle in 2018.

Table 11.28: Primary indication for primary inpatient gynaecologic surgery at ACH in 2021

	2021	
	N=	1257
	n	%
Primary indication for surgery		
Abnormal bleeding, non-pregnant	266	21.2
Termination	126	10.0
Urogynaecology / Prolapse	84	6.7
Miscarriage	111	8.8
Other, Please specify	116	9.2
Endometriosis	102	8.1
Ovarian cyst	102	8.1
Ectopic pregnancy	62	4.9
Abscess	60	4.8
Pain, cause unknown	86	6.8
Cancer / Pelvic mass	35	2.8
Polyp(s)/Endometrial Sampling	28	2.2
Infertility	31	2.5
CIN/VIN/VAIN	13	1.0
Anatomical anomalies of the genital tract	35	2.8

Figure 11.4: Demographic details of wāhine having inpatient primary surgery performed by the general gynaecology team at ACH 2021

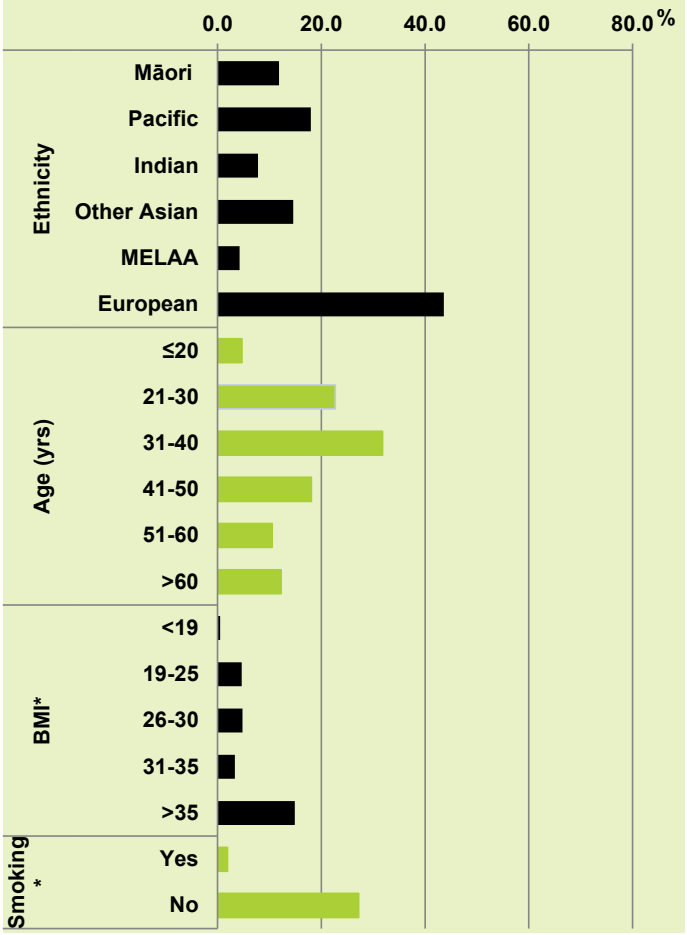


Figure 11.5: Complications of surgery among inpatient primary surgeries performed by the general gynaecology team by timing of surgery at ACH 2022

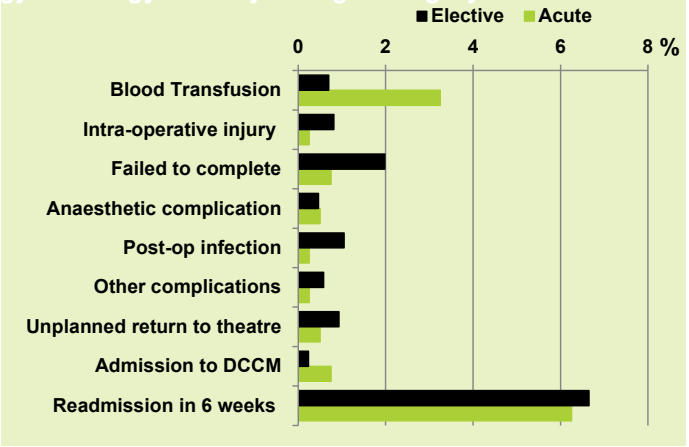


Figure 11.6: Complications of surgery among inpatient primary surgeries performed at ACH by the general gynaecology team at ACH 2013-2021

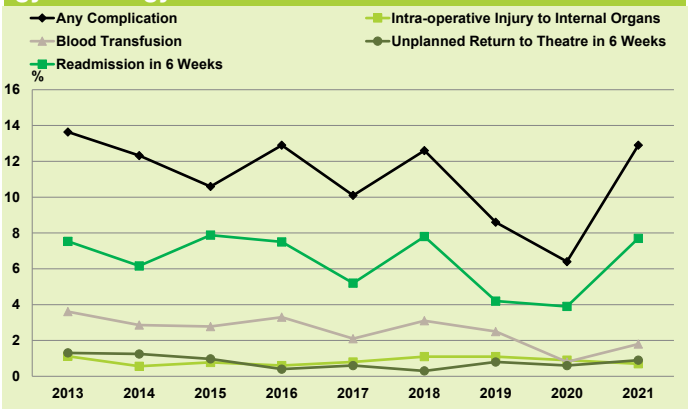


Table 11.29: Primary surgical procedure and timing of surgery among primary surgeries performed by the general gynaecology team at ACH 2021

	Timing of surgery					
	Total		Acute		Elective	
	N= 1257		n= 400		n= 857	
	N	%	n	%	n	%
Other uterine/cervical	132	10.5	52	13.0	80	9.3
Hysteroscopy	206	16.4	15	3.8	191	22.3
Surgical termination of pregnancy	104	8.3	3	0.8	101	11.8
Ovarian and/or tubal surgery	175	13.9	101	25.3	74	8.6
Hysterectomy	164	13.0	5	1.3	159	18.6
Urogynaecology procedure	67	5.3	0	0.0	67	7.8
Diagnostic laparoscopy	82	6.5	32	8.0	50	5.8
Evacuation retained products conception	139	11.1	129	32.3	10	1.2
Endometriosis surgery	87	6.9	3	0.8	84	9.8
Other vulval procedure	25	2.0	24	6.0	1	0.1
Other	71	5.6	35	8.8	36	4.2
Fibroid embolisation	5	0.4	1	0.3	4	0.5

Table 11.30: Intra-operative injury at primary surgery among inpatient primary surgeries performed by the general gynaecology team NWH 2017-2021

	2017		2018		2019		2020		2021	
	N=1271		N=1238		N=1256		N=1245		N= 1257	
	n	%	n	%	n	%	n	%	n	%
Bladder	3	0.2	5	0.4	3	0.2	2	0.2	1	0.1
Bowel	5	0.4	1	0.1	6	0.5	6	0.5	4	0.3
Ureter	1	0.1	2	0.2	2	0.2	0		0	0.0
Major blood vessel	1	0.1	0		1	0.1	0		0	0.0
Uterine perforation							2	0.2	1	0.1
Uterus									1	0.1
Other	1	0.1	5	0.4	1	0.1	1	0.1	2	0.2
Total	11	0.9	13	1.1	13	1	11	0.9	9	0.7

Table 11.31 Complications of surgery among primary surgeries performed by the general gynaecology team by timing of surgery at ACH 2021

	Acute admission		Elective admission	
	N=	400	N=	857
	n	%	n	%
Any complication	44	11.0	94	11.0
Failure to complete planned procedure	3	0.8	17	2.0
Intra operative injury to internal organs	1	0.3	7	0.8
Significant post op infection	1	0.3	9	1.1
Anaesthetic complication	2	0.5	4	0.5
Other significant complication	1	0.3	5	0.6
Thromboembolic complication	0	0.0	0	0.0
Unplanned return to theatre in 6 weeks	2	0.5	8	0.9
Admission to DCCM	3	0.8	2	0.2
Readmission in 6 weeks	25	6.3	57	6.7
Postop complication	22	5.5	45	5.3
Planned re-admission	2	0.5	8	0.9
Other, please specify	1	0.3	4	0.5
Transfusion	13	3.3	6	0.7

Table 11.32:Definitions of complications:
Intra operative injury to internal organs: Injury to bladder, bowel, ureter, major blood vessel, or other.
Significant postop infection: Any infection (defined by evidence of wound dehiscence or wound collection, pelvic abscess, or fever>39oC) occurring as a result of surgery.
Readmission: Readmission to hospital (hospital stay of 3 hours or more) for a reason related to the surgical procedure occurs within 6 weeks of surgery.
Readmission in 6 weeks includes planned re-admissions
Other significant complications: Includes gastrointestinal complications (ileus, bowel obstruction), fistulae.

Table 11.32 Post-operative complications among primary inpatient surgeries by primary surgical procedures at ACH 2021

	Total	Any complication		Failure to Complete Procedure		Intra operative injury to internal organs		Blood transfusion		Significant post-op infection		Unplanned return to theatre in 6 weeks		Readmission in 6 weeks		Anaesthetic complication		Thromboembolic complication		Other significant complication		Admission to DCCM	
	N	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Total	1257	138	11.0	20	1.6	8	0.6	19	1.5	10	0.8	10	0.8	1257	100.0	6	0.5	0	0.0	6	0.5	5	0.4
Ovarian and /or tubal surgery	175	20	11.4	1	0.6	0	0.0	4	2.3	1	0.6	2	1.1	175	100.0	0	0.0	0	0.0	0	0.0	0	0.0
Hysteroscopy	206	17	8.3	8	3.9	1	0.5	0	0.0	1	0.5	0	0.0	206	100.0	2	1.0	0	0.0	0	0.0	0	0.0
Urogynaecology procedure	67	3	4.5	0	0.0	0	0.0	0	0.0	1	1.5	0	0.0	67	100.0	0	0.0	0	0.0	0	0.0	0	0.0
Hysterectomy	164	36	22.0	0	0.0	4	2.4	4	2.4	5	3.0	6	3.7	164	100.0	1	0.6	0	0.0	5	3.0	2	1.2
Endometriosis surgery	87	10	11.5	2	2.3	0	0.0	0	0.0	0	0.0	1	1.1	87	100.0	1	1.1	0	0.0	0	0.0	0	0.0
Fibroid embolisation	5	1	20.0	0	0.0	0	0.0	1	20.0	0	0.0	0	0.0	5	100.0	0	0.0	0	0.0	0	0.0	0	0.0
Surgical termination of pregnancy	104	1	1.0	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	104	100.0	0	0.0	0	0.0	0	0.0	0	0.0
Evacuation retained products of conception	139	14	10.1	0	0.0	1	0.7	6	4.3	0	0.0	1	0.7	139	100.0	1	0.7	0	0.0	1	0.7	1	0.7
Diagnostic laparo- scopy	82	18	22.0	5	6.1	2	2.4	1	1.2	1	1.2	0	0.0	82	100.0	0	0.0	0	0.0	0	0.0	2	2.4
Other vulval procedure	25	2	8.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	25	100.0	1	4.0	0	0.0	0	0.0	0	0.0
Other uterine/ cervical	132	12	9.1	3	2.3	0	0.0	3	2.3	0	0.0	0	0.0	132	100.0	0	0.0	0	0.0	0	0.0	0	0.0
Other	71	4	5.6	1	1.4	0	0.0	0	0.0	0	0.0	0	0.0	71	100.0	0	0.0	0	0.0	0	0.0	0	0.0
No surgery: abandoned																							

note: Readmission in 6 weeks includes planned re-admissions.

11.4.1 Data tables: General Gynaecology surgery

Table 11.33: Primary indication for primary gynaecologic surgery at ACH 2015-2021

	2017		2018		2019		2020		2021	
	N=1271		N=1238		N=1256		N=1245		N= 1257	
	n	%	n	%	n	%	n	%	n	%
Primary indication for surgery										
Abnormal bleeding, non-pregnant	298	23.4	246	19.9	270	21.5	260	20.9	266	21.2
Miscarriage	109	8.6	109	8.8	100	8	140	11.2	111	8.8
Abortion	153	12	155	12.5	100	8	121	9.7	126	10.0
Urogynaecology / prolapse	127	10	138	11.2	126	10	76	6.1	84	6.7
Ovarian cyst	111	8.7	90	7.3	116	9.2	94	7.6	102	8.1
Abscess	59	4.6	54	4.4	83	6.6	40	3.2	60	4.8
Pain, cause unknown	72	5.7	54	4.4	97	7.7	90	7.2	86	6.8
Cancer / Pelvic mass	34	2.7	45	3.6	36	2.9	35	2.8	35	2.8
Endometriosis	82	6.5	90	7.3	74	5.9	84	6.7	102	8.1
Ectopic pregnancy	55	4.3	68	5.5	86	6.8	87	7	62	4.9
Infertility	22	1.7	27	2.2	29	2.3	31	2.5	31	2.5
Anatomical anomalies of the genital tract	17	1.3	8	0.6	8	0.6	18	1.4	35	2.8
CIN/VIN/VAIN	26	2	20	1.6	20	1.6	22	1.8	13	1.0
Polyps/endometrial sampling	39	3.1	39	3.2	39	3.1	39	3.1	28	2.2
Other, please specify	26	2	20	1.6	72	5.7	108	8.7	116	9.2

Table 11.34: Demographic details of wāhine having gynaecologic primary surgery ACH 2017-2021

	2017		2018		2019		2020		2021	
	N=1271		N=1238		N=1256		N=1245		N=1257	
	n	%	n	%	n	%	n	%	n	%
Ethnicity										
Māori	167	13.1	134	10.8	142	11.3	150	12	149	11.9
Pacific	243	19.1	236	19.1	257	20.5	208	16.7	226	18.0
Indian	109	8.6	117	9.5	108	8.6	138	11.1	98	7.8
Other Asian	150	11.8	165	13.3	175	13.9	177	14.2	183	14.6
MELAA	42	3.3	43	3.5	41	3.3	47	3.8	53	4.2
European	560	44.1	541	43.7	532	42.4	524	42.1	548	43.6
Not stated	0		2	0.2	1	0.1	1		0	0.0
Age (years)										
≤20	84	6.6	72	5.8	50	4	72	5.8	59	4.7
21-30	289	22.7	297	24	286	22.8	302	24.3	285	22.7
31-40	373	29.3	350	28.3	390	31.1	431	34.6	400	31.8
41-50	257	20.2	221	17.9	244	19.4	200	16.1	227	18.1
51-60	121	9.5	125	10.1	137	10.9	115	9.2	132	10.5
>60	147	11.6	173	14	149	11.9	125	10	154	12.3
BMI										
<18.5	47	3.7	31	2.5	22	1.8	25	2	6	0.5
18.5-24.99	481	37.8	427	34.5	413	32.9	320	25.7	58	4.6
25-29.99	250	19.7	272	22	292	23.2	175	14.1	60	4.8
30-34.99	127	10	171	13.8	200	15.9	98	7.9	42	3.3
≥35	314	24.7	316	25.5	306	24.4	207	16.6	27	2.1
Missing	52	4.1	21	1.7	23	1.8	420	33.7	161	12.8
Smoking status										
Currently smoking	174	13.7	149	12	154	12.3	86	6.9	24	1.9
Not currently smoking	1061	83.5	1070	86.4	1080	86	766	61.6	342	27.2
Unknown	36	2.8	19	1.5	22	1.8	392	31.5	891	70.9

Table 11.35: Complications of Gynaecology surgery performed at ACH 2017-2021										
	2017 N=1271		2018 N=1238		2019 N=1256		2020 N=1245		2021 N=1257	
	n	%	n	%	n	%	n	%	n	%
Total complications	145	11.4	156	12.6	107	8.6	79	6.4	138	12.9
Blood transfusion	30	2.3	38	3.1	31	2.5	10	0.8	19	1.8
Intra-operative injury to internal organs	12	0.9	13	1.1	13	1.1	11	0.9	8	0.7
Failure to complete planned surgery	11	0.8	13	1.1	9	0.7	9	0.7	20	1.9
Anaesthetic complications	8	0.6	6	0.5	6	0.5	2	0.2	6	0.6
Significant post-operative infection	9	0.6	11	0.9	7	0.6	0		10	0.9
Other significant complications	0		2	0.2	3	0.2	4	0.3	6	0.6
Unplanned return to theatre	9	0.6	4	0.3	10	0.8	7	0.6	10	0.9
Admission to DCCM	7	0.5	5	0.4	5	0.4	4	0.3	5	0.5
Readmission in 6 weeks	75	5.9	96	7.8	52	4.2	49	3.9	82	7.7
Postop complication	32	2.2	82	6.7	34	2.7	38	3.1	67	6.3
Planned re-admission	5	0.3	8	0.6	5	0.4	5	0.4	10	0.9
Other, please specify	38	2.7	6	0.5	13	1.1	6	0.5	5	0.5

11.5 Hysterectomy

Dr Michael Wynn-Williams

This section includes only hysterectomies performed by the general gynaecology surgical team from Ward 97. It does not include hysterectomies performed by the Gynaecologic Oncology team, or hysterectomy cases done from another hospital ward or under the care of other services (e.g. urology).

On November 1st 2021, the database platform changed from Healthware to Dendrite. This report includes only surgeries from January - October 2021.

Key Findings

- The proportion of wāhine undergoing hysterectomy by abdominal approach in 2021 continued to trend downward from previous years. After a rise in numbers of vaginal hysterectomies from 2018 – 2020, there was a decline in numbers in 2020, continuing the downward trend since 2000.
- The indication for hysterectomy in 2021 was similar to previous years with abnormal uterine bleeding still the most common.
- The length of hospital stay overall for hysterectomy has remained at 2 days. Minimally invasive hysterectomy length of stay average is 2 days and abdominal hysterectomy is 4 days.
- Total complication rates were static at 11.3% (9.8% in 2020), remaining significantly lower than rates in 2015. There was a small increase in the rate of intra-operative injury (3.5% v 1.8% in 2020). It is unclear what has driven this. There was also a small increase in post operative infection (2.1% v 0 in 2020) but this still remains lower than the high of 9.1% in 2015. Whilst the rate of return to theatre remains very stable, the rate of readmissions in the first six weeks has dropped from 12.5 % in 2018 to 5.7% in 2021. The rate of blood transfusion remains low at 1.4% from a high of 5.6% in 2016.
- Around three quarters of BMI and smoking data is missing.

Figure 11.7 Complications of surgery among wāhine undergoing hysterectomy performed by the general gynaecology team at ACH 2013-2021

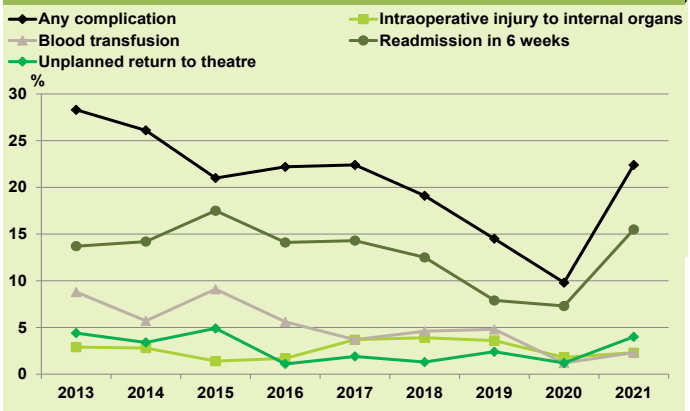
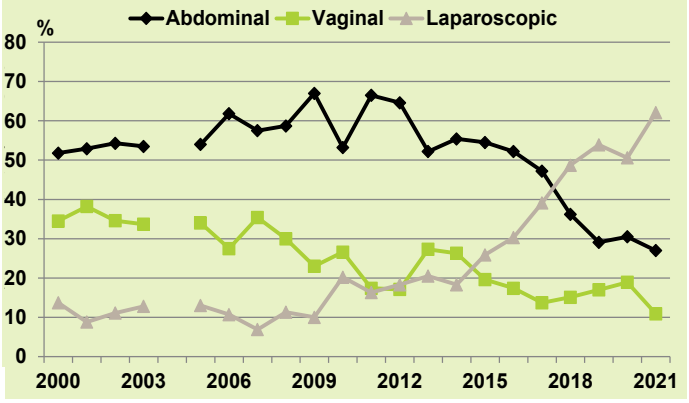


Figure 11.8 Route of hysterectomy among hysterectomies performed by general gynaecologists at ACH 2000-2021



Summary / Implications

Supporting equitable public access to minimally invasive hysterectomy, both laparoscopic and vaginal, has been an ongoing aim of the department. This has included collegial surgical support for specialists and ongoing education and adherence to evidence based guidelines. There is currently no routine review or audit of hysterectomy (by route or indication) by MDM.

Over the last 5 years, more wāhine continue to be offered a trial of minimally invasive approach to hysterectomy with a subsequent reduction in the length of stay. There has been a small increase in intraoperative complications but the cause and significance of this is unclear. The reliability of the data in this year in unknown due to the change of audit tools and subsequent need to retrain staff in the new tool.

The establishment of a nurse led clinic at day 7-14 post operatively for all hysterectomies and laparotomies in September 2018 appears to have had a positive impact with a marked reduction in post-operative readmissions.

11.5.1 Data tables: Hysterectomy

Table 11.36 Characteristics of wāhine undergoing hysterectomy by the general gynaecology team at ACH 2015-2021

	2015		2016		2017		2018		2019		2020		2021	
	N=143		N=177		N=161		N=152		N=165		N=162		N=	174
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Age (years)														
<20	1	0.7	0		2	1.2	0		2	1.2	1	0.6	1	0.6
21-30	2	1.4	2	1.1	5	3.1	5	3.3	3	1.8	5	3.1	1	0.6
31-40	18	12.6	20	11.2	26	16.1	15	9.9	23	13.9	19	11.7	27	15.5
41-50	63	44.1	85	47.8	81	50.3	71	46.7	67	40.6	71	43.8	73	42.0
51-60	40	28	37	20.8	24	14.9	35	23	40	24.2	35	21.6	40	23.0
>60	19	13.3	33	18.6	23	14.3	26	17.1	30	18.2	31	19.1	32	18.4
Ethnicity														
Māori	16	11.2	15	8.4	14	8.7	12	7.9	16	9.7	9	5.5	17	9.8
Pacific	20	14	33	18.5	32	19.9	35	23	35	21.2	32	19.8	36	20.7
Indian	21	14.7	11	6.2	21	13	14	9.2	15	9.1	18	11.1	19	10.9
Other Asian	18	12.6	32	18	16	9.9	26	17.1	25	15.2	24	14.8	23	13.2
MELAA					9	5.6	2	1.3	5	3	3	1.9	11	6.3
European	63	44.1	79	44.8	69	42.9	63	41.4	69	41.8	76	46.9	68	39.1
Other	5	3.5	7	3.9	0		0		0		0		0	0
District Health Board of residence														
Auckland	126	88.1	162	91	144	89.4	134	88.2	149	90.3	143	88.3	151	86.8
Waitematā	5	3.5	7	3.9	5	3.1	2	1.3	9	5.5	7	4.3	8	4.6
Counties Manukau	4	2.8	3	1.7	5	3.1	6	3.9	4	2.4	5	3.1	7	4.0
Other	7	4.9	5	2.8	5	3.1	9	5.9	3	1.8	7	4.3	8	4.6
Unknown	1	0.7	0		2	1.2	1	0.7	0		0		0	
BMI														
<18.5	2	1.4	3	1.7	1	0.6	2	1.3	2	1.2	2	1.2	1	0.6
18.5-24.99	39	27.3	51	28.8	37	23	32	21.1	39	23.6	36	22.2	5	2.9
25-29.99	48	33.6	50	28.1	38	23.6	39	25.7	45	27.3	35	21.6	21	12.1
30-34.99	29	20.3	32	18	46	28.6	26	17.1	32	19.4	18	11.1	10	5.7
35-39.99	15	10.5	22	12.4	21	13	19	12.5	20	12.1	22	13.6	5	2.9
≥40	10	7	19	10.7	18	11.2	29	19.1	21	12.7	13	8.5	23	13.2
Missing	0		0		0		5	3.3	6	3.6	36	22.2	109	62.6
Smoking														
Currently	14	9.8	15	8.4	18	11.2	15	9.9	13	7.9	13	8	1	1
Not currently	127	88.8	157	88.6	142	88.1	126	82.9	147	89.1	115	71	66	38
Unknown	2	1.4	5	2.8	1	0.6	11	7.2	5	3	34	21	107	61

Table 11.37 Complications of surgery among wāhine undergoing hysterectomy performed by the general gynaecology team at ACH 2015-2021

	2015		2016		2017		2018		2019		2020		2021	
	N=143		N=177		N=161		N=152		N=165		N=162		N= 174	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Any complication	30	21	39	22.2	36	22.4	29	19.1	25	15.2	16	9.8	39	22.4
Blood transfusion	13	9.1	10	5.6	6	3.7	7	4.6	8	4.8	2	1.2	4	2.3
Intra-operative injury	2	1.4	3	1.7	6	3.7	6	3.9	7	4.2	3	1.8	4	2.3
Anaesthetic complications	1	0.7	1	0.6	2	1.2	1	0.7	0		0		1	0.6
Significant post-operative infection	13	9.1	4	2.3	6	3.7	1	0.7	3	1.8	0		5	2.9
Other significant complications	10	7	5	2.8	4	2.5	1	0.7	3	1.8	1	0.6	5	2.9
Unplanned return to theatre	7	4.9	2	1.1	3	1.9	2	1.3	3	1.8	2	1.2	7	4.0
Admission to DCCM	6	4.2	2	1.1	0		2	1.3	2	1.2	0		2	1.1
Readmission to hospital	25	17.5	25	14.1	23	14.3	19	12.5	13	7.9	12	7.3	27	15.5
Planned readmissions	1	0.7	2	1.1	2	1.2	0		1	0.6	1	0.6	3	1.7
Postop complications	18	12.6	17	9.6	12	7.5	18	11.8	10	6.1	10	6.1	22	12.6
Other	6	4.2	6	3.4	9	5.6	1	0.7	2	1.2	1	0.6	1	0.6
Failed to complete planned surgery			2	1.1	6	3.7	0		2	1.2	0		0	

Table 11.38 Surgical details of hysterectomies performed by the general gynaecology team at ACH 2016-2021

	2016		2017		2018		2019		2020		2021	
	N=177		N=161		N=152		N=165		N=162		N=	174
	n	%	n	%	n	%	n	%	n	%	n	%
Approach												
Laparotomy	84	47.5	74	46	51	33.6	47	28.5	46	28.4	34	19.5
Total laparoscopic hysterectomy	44	24.9	55	34.2	68	44.7	77	46.7	81	50	99	56.9
Laparoscopic assisted vaginal	10	5.6	8	5	6	3.9	12	7.3	2	1.2	9	5.2
Laparoscopic converted to laparotomy	8	4.5	2	1.2	4	2.6	1	0.6	3	1.9	2	1.1
Vaginal	31	17.5	22	13.7	23	15.1	28	17	30	18.5	19	10.9
Timing of surgery												
Elective	175	98.9	157	97.5	150	98.7	162	98.2	156	96.3	168	96.6
Acute	2	1.1	4	2.5	2	1.3	3	1.8	6	3.7	6	3.4
Primary indication for surgery												
Abnormal bleeding, non-pregnant	82	46.3	81	50.3	67	44.1	71	43	73	45.1	70	40.2
Cancer /pelvic mass	25	14.1	20	12.4	31	20.4	25	15.2	19	11.7	25	14.4
Urogynaecology / prolapse	35	19.8	25	15.5	21	13.8	26	15.8	27	16.7	20	11.5
Pain, cause unknown	7	4	6	3.7	3	2	10	6.1	8	4.9	10	5.7
Endometriosis	9	5.1	8	5	8	5.3	12	7.3	20	12.3	26	14.9
Ovarian cyst	6	3.4	5	3.1	6	3.9	2	1.2	4	2.4	2	1.1
Other	13	7.3	16	9.9	16	10.5	19	11.5	11	6.8	21	12.1
ASA rating												
1	57	32.2	52	32.3	44	28.9	49	29.7	20	12.3	17	9.8
2	92	52	75	46.6	86	56.6	87	52.7	77	47.5	29	16.7
3	12	6.8	26	16.1	21	13.8	23	13.9	17	10.5	11	6.3
4	0		0		0		1	0.6	1	0.6	1	0.6
5	1	0.6	0		0		0		0		0	0.0
Missing	0		8	5	1	0.7	5	3	47	28.7	116	66.7
LENGTH OF STAY (days)	**Median (IQR)**		**Median (IQR)**		**Median (IQR)**		**Median (IQR)**		**Median (IQR)**		**Median (IQR)**	
All hysterectomies	3	(2-4)	2	(2-3)	2	(2-3)	2 (2-3)		2 (1-4)		2 (2-4)	
By approach:												
Abdominal	3	(3-4)	3	(3-4)	3	(3-4)	3	(2-3)	3.5	(3-4.8)	37	4 (3-5)
Laparoscopic	2	(2-2)	2	(1-2)	2	(1-2)	2	(1-2)	2	(1-2)	89	2 (1-3)
Vaginal	3	(2-3)	2	(2-3)	2	(2-2.5)	2	(2-3)	2	(2-3)	15	3 (2-5)

Table 11.39 Route of hysterectomy among hysterectomies performed by the general gynaecology team ACH 2013-2021

	2013		2014		2015		2016		2017		2018		2019		2020		2021	
	N=205		N=176		N=143		N=177		N=161		N=152		N=165		N=162		N=	174
	N=	%	N=	%	N=	%	N=	%	N=	%	N=	%	N=	%	N=	%	N=	%
Abdominal	107	52.2	98	55.7	78	54.5	92	52	76	47.2	55	36.2	48	29.1	49	30.2	47	27.0
Vaginal	56	27.3	46	26.1	28	19.6	54	30.5	22	13.7	23	15.1	28	17	30	18.5	19	10.9
Laparoscopic	42	20.5	32	18.2	37	25.9	31	17.5	63	39.1	74	48.7	89	53.9	83	51.2	108	62.1

11.6 Gynaecology laparoscopic procedures

Dr Tin Lok Chiu

This section includes laparoscopic procedures performed by the general gynaecology surgical team. Procedures performed by the gynaecologic oncology team are excluded.

Key Findings

- Over 70% of laparoscopic cases were electively booked.
- Hysterectomy and endometriosis treatment were the dominant reasons for elective laparoscopic surgery.
- Ectopic pregnancy remains the most common reason for acute laparoscopic surgery.
- Total complication rate remained stable at around 7% since 2019. This continues the reducing trend from the years prior to 2019.
- There was a possible increasing trend to intra-operative injuries and unplanned return to theatre which needs to be monitored in future years
- Readmission within 6 weeks at 2.4% is lowest recorded within the last 8 years. This continues the reducing trend over the past 3 years.

Figure 11.9: Complications of primary inpatient gynaecologic laparoscopic surgery at ACH 2013-2021

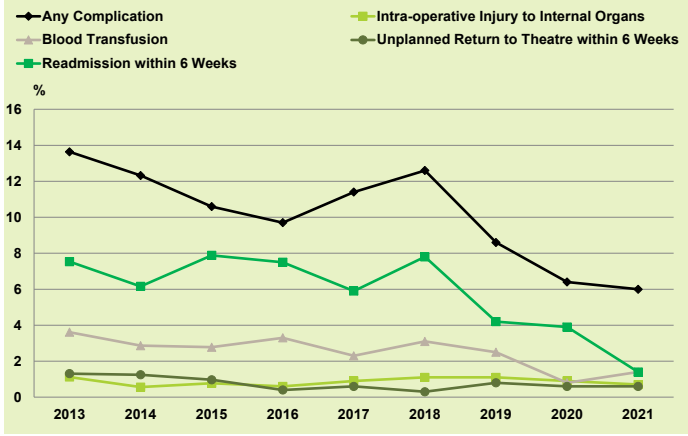


Table 11.40: Complications of primary gynaecologic laparoscopic surgery at ACH Jan-Oct 2021

	Total	
	N=	369
	n	%
Any Complication	25	6.8
Blood transfusion	5	1.4
Intra operative injury	4	1.1
Failure to complete procedure	6	1.6
Anaesthetic complication	1	0.3
significant post-operative infection	3	0.8
Unplanned return to theatre	3	0.8
Admission to DCCM	2	0.5
Other significant complications	2	0.5
Readmission to hospital	9	2.4
Post op complications	8	2.2
Planned re-admission	0	0.0
Other	1	0.3

11.6.1 Data tables: Gynaecology laparoscopic procedures

Table 11.42 Primary surgery performed and timing of surgery among patients having primary laparoscopic procedures at ACH 2021

Primary procedure	Surgery in 2021	Acute admission		Elective admission	
	N	n	%	n	%
Total	428	124	29.0	304	71.0
Ovarian/tubal	145	86	59.3	59	40.7
Diagnostic laparoscopy	79	31	39.2	48	60.8
Endometriosis surgery	83	2	2.4	81	97.6
Hysterectomy	103	2	1.9	101	98.1
Other uterine/cervical	3	1	33.3	2	66.7
Hysteroscopy	9	0	0.0	9	100.0
Urogynaecology	1	0	0.0	1	100.0
Fibroid embolisation	0	0	0.0	0	0.0
ERPOC	0	0	0.0	0	0.0
Other	5	2	40.0	3	60.0

Table 11.43: Primary indication for surgery by timing of surgery among patients having primary laparoscopic at ACH 2021

Primary indication	Surgery in 2021	Acute admission		Elective admission	
	N	n	%	n	%
Total	428	124	29.0	304	71.0
Endometriosis	95	0	0.0	95	100.0
Ovarian cyst	78	33	42.3	45	57.7
Ectopic pregnancy	57	56	98.2	1	1.8
Pain, cause unknown	76	24	31.6	52	68.4
Abnormal bleeding	55	2	3.6	53	96.4
Infertility	20	0	0.0	20	100.0
Cancer/Pelvic mass	13	0	0.0	13	100.0
Urogynaecology/Prolapse	2	0	0.0	2	100.0
Other	31	9	29.0	23	74.2

Table 11.44 Complications of laparoscopic surgery at ACH 2015-2021

	2015		2016		2017		2018		2019		2020		2021	
	N=341		N=385		N=350		N=373		N=426		N=411		N= 428	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Any complications	35	10.3	49	12.7	40	11.4	46	12.3	29	6.8	29	7.1	65	15.2
Blood transfusion	4	1.2	8	2.1	6	1.7	8	2.1	5	1.2	1	0.2	6	1.4
Intra-operative injury to internal organs	2	0.6	3	0.8	0		0		3	0.7	7	1.7	4	0.9
Failure to complete planned surgery	10	2.9	2	0.5	7	2	0		4	0.9	3	0.7	8	1.9
Anaesthetic complications	2	0.6	5	1.3	1	0.3	2	0.5	1	0.2	1	0.2	1	0.2
Significant post-operative infection	4	1.2	4	1	5	1.4	0		2	0.5	0		5	1.2
Unplanned return to theatre	0		3	0.8	2	0.6	2	0.5	1	0.2	2	0.5	7	1.6
Admission to DCCM	3	0.9	1	0.3	1	0.3	1	0.3	0		1	0.2	2	0.5
Other significant complications	3	0.9	0		1	0.3	0		1	0.2	0		3	0.7
Readmission to hospital	28	8.2	35	9.1	26	7.4	34	9.1	15	3.5	20	4.9	45	10.5
Post op complications	13	3.8	14	3.6	8	2.3	29	7.8	7	1.6	15	3.6	40	9.3
Planned readmission	3	0.9	0		0		0		2	0.5	1	0.2	2	0.5
Other	12	3.5	21	5.5	18	5.1	5	1.3	6	1.4	4	1	3	0.7

11.7 Urogynaecology

Dr Carolyn Bilborough

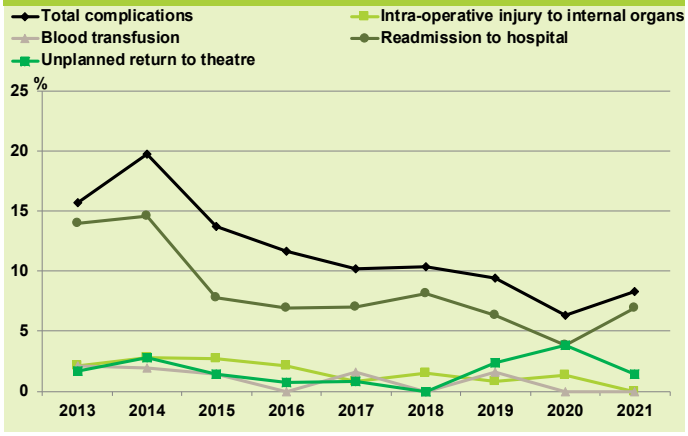
The section on urogynaecology will concentrate on operative procedures rather than clinic throughput or urodynamic investigations as only surgical data are systematically collected. In 2021 this chapter includes surgery performed as an inpatient at Auckland City Hospital (ACH) from January to October. In 2021 we have not looked at the cases done in GSU as the data were incomplete.

From 2012, urogynaecology procedures were categorised as: TVT, mesh repair, prolapse repair or urogynaecology-other. Urogynaecology-other procedures are grouped together and include operations such as cystoscopy, Botulinum toxin injection into the bladder muscle, vaginal mesh removal, mid-urethral sling release or removal, bladder instillation and cystoscopy.

Key Findings

- From January-October 2021, 72 urogynaecology procedures were undertaken at Auckland City Hospital (i.e. excluding procedures undertaken during an admission for a postsurgical complication and this year excluding day stay or overnight stay procedures performed at the Greenlane surgical unit).
- There were 8 tension-free vaginal tape repairs (TVT), 5 abdominal mesh repairs, 50 prolapse repairs, and 44 other urogynaecology procedures. Some wāhine will have had two or more urogynaecology procedures at the time of a primary admission. 18 wāhine also had a hysterectomy at the time of their primary admission for urogynaecology surgery.
- It is hard to comment on the case mix this year as BMI and smoking status is missing in over 70% of cases. Ethnicity shows a slight decrease in Māori and Pacific patients from 15% in 2020 to 11% in 2021. District Health Board of residence is very similar to previous years.
- NWH accepts tertiary referrals from other Gynaecology units, and these made up 20% of all cases in 2021.
- Complications were seen in a total of six wāhine (8%) who underwent urogynaecological surgery at a primary inpatient admission. This is up from 6% in 2020 and is due to more readmissions than last year.
- There was no one that required a blood transfusion, no failure to complete surgery, admissions to DCCM or intra operative injuries to internal organs.
- There is noted a return to theatre, but this was for a patient who was having a laparoscopic hysterectomy for endometriosis and adenomyosis and sustained a ureteric injury. She also had a posterior repair which is unrelated to the complication or return to theatre. She returned to theatre for stenting and had a readmission. This is probably more appropriate to be recorded in the laparoscopic surgical data.
- With regards to urogynaecology procedures, there were no returns to theatre or significant complications. There was an anaesthetic complication with one patient who went into bronchospasm and required metaraminol for low blood pressure.
- There were five readmissions: three for significant post-operative infections, namely vaginal vault infections post hysterectomy, one for a blocked catheter and one with pain and a urinary tract infection. This is slightly up from last year when there were only 3 readmissions. This is the reason our total complications shows an increase compared to 2020, but is still better than previous years.

Figure 11.10: Complications of primary urogynaecologic surgery procedures at ACH 2013-2021



The Covid shut downs have significantly affected the numbers we have operated on, bringing us down to approximately 55% of what we operated on pre Covid years, even allowing for data collection only from January to October. This combined with the choice not to replace staff who have retired or resigned has put a limit on the service as well. This has only been a minor issue to date but will severely limit the ability to clear waiting lists as the hospitals get back to a more normal throughput of patient operations.

11.7.1 Data tables: Urogynaecology

Table 11.44: Demography of wāhine undergoing primary inpatient urogynaecology surgery ACH 2015-2021

	2015		2016		2017		2018		2019		2020		Jan-Oct 2021	
	N=219		N=145		N=129		N=135		N=126		N=78		N=72	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Age (years)														
≤30	5	2.3	3	2.1	2	1.6	2	1.4	0		0		1	1.4
31-40	13	5.9	4	2.8	9	7	5	3.7	12	9.5	3	3.8	4	5.6
41-50	42	19.1	20	13.8	19	14.7	22	16.3	23	18.3	16	20.5	10	13.9
51-60	60	27.3	31	21.4	34	26.4	28	20.7	28	22.2	15	19.2	12	16.7
>60	99	45.2	87	60	64	50.4	78	57.8	63	50	44	56.47	45	62.5
Ethnicity														
Māori	16	7.3	12	8.2	10	7.8	9	6.7	12	9.5	8	10.3	4	5.6
Pacific	15	6.8	15	10.3	5	3.9	8	5.9	9	7.1	4	5.1	4	5.6
Indian	19	8.6	5	3.4	11	8.5	9	6.7	11	8.7	5	6.4	3	4.2
Other Asian	12	5.5	10	6.9	13	10.1	11	8.1	8	6.3	4	5.1	8	11.1
MELAA					2	1.6	1	0.7	0		1	1.3	5	6.9
European	148	67.6	103	71.5	88	68.2	97	71.9	86	68.3	56	71.8	48	66.7
Other	9	4.1	0		0		0		0		0			
District Health Board of residence														
Auckland	189	86.3	112	77.2	95	73.6	97	71.9	97	77	65	83.3	58	80.6
Waitematā	13	5.9	3	2.1	5	3.9	3	2.2	4	3.2	1	1.3	1	1.4
Counties Manukau	2	0.9	4	2.8	3	2.3	5	3.7	3	2.4	2	2.6	2	2.8
Other	14	6.4	26	17.9	26	20.2	30	22.2	22	17.5	10	12.8	11	15.3
Missing	1	0.5	0		0		0		0		0		0	0.0
BMI														
<18.5	4	1.8	3	2.1	3	2.3	1	0.7	0		0		1	1.4
18.5-24.99	64	29.2	32	22.1	37	28.7	49	36.3	28	22.2	15	19.2	5	6.9
25-29.99	77	35	54	37	35	27.3	41	30.4	47	37.3	13	16.7	5	6.9
30-34.99	41	18.6	32	22.1	26	20.2	19	14.1	35	27.8	14	17.9	5	6.9
35-39.99	18	8.2	16	11	18	14	9	6.7	7	5.6	7	9	2	2.8
≥40	13	5.9	8	5.5	10	7.8	9	6.7	9	7.1	9	11.4	1	1.4
Missing	2	0.9	0		0		7	5.2	0		20	25.6	53	73.6
Smoking														
Currently smoking	15	6.8	5	3.4	11	8.5	8	5.9	11	8.7	3	3.8	21	29.2
Not currently smoking	199	90.8	127	87.5	114	88.4	111	82.3	114	89.8	58	73.2	1	1.4
Missing	5	2.3	13	9	4	3.1	16	11.9	2	1.6	17	21.8	50	69.4
Length of stay (days)														
(median (IQR))	2(1-3)		2(1-3)		2 (1-3)		2(1-3)		2(1-3)		2(1-3)		2(1-3)	

Missing smoking status for 50 women
Missing BMI for 53 women

Table 11.45: Complications of primary urogynaecologic surgery procedures at ACH 2016-2021

	2016		2017		2018		2019		2020		Jan-Oct 2021	
	N=145		N=129		N=135		N=127		N=78		N= 72	
	n	%	n	%	n	%	n	%	n	%	n	%
Total complications	17	11.7	13	10.1	14	10.4	12	9.4	5	6.4	6	8.3
Blood transfusion	0		2	1.6	0		2	1.6	0		0	
Intra-operative injury to internal organs	3	2.1	1	0.8	2	1.5	1	0.8	1	1.3	0	
Failure to complete planned surgery	1	0.7	1	0.8	0		1	0.8	0		0	
Anaesthetic complications	3	2.1	0		1	0.7	1	0.8	0		1	1.4
Significant post-operative infection	2	1.4	1	0.8	0		0		0		3	4.2
Unplanned return to theatre	1	0.7	1	0.8	0		3	2.4	3	3.8	1	1.4
Admission to DCCM	0		0		0		0		0		0	
Other significant complications	1	0.7	2	1.6	0		0		1	1.3	1	1.4
Readmission to hospital	10	6.9	9	7	11	8.1	8	6.3	3	3.8	5	6.9
Post-operative complication	4	2.8	6	4.7	10	7.4	6	4.7	2	2.6	5	6.9
Planned readmission	0		2	1.6	1	0.7	1	0.8	0		0	
Other	6	4.1	1	0.8	0		1	0.8	1	1.3	0	

11.8 Faster Cancer Treatment

Dr Cindy Ooi

The Faster Cancer Treatment (FCT) target is a Ministry of Health benchmark requiring at least 90% of women diagnosed with gynaecological malignancy to receive their treatment within 62 days from receipt of referral. Referrals should be triaged as High Suspicion of Cancer (HiSCan) and be seen within two weeks. Reasons for breach of this target are categorised into "Patient Choice", Clinical Consideration" and "Lack of Capacity".

For the period of January-December 2021, we saw a drop in our performance of the FCT 62-day target. 37 wāhine with a confirmed diagnosis of gynaecological malignancy were tracked. The overall adjusted performance was 79.3%. Compared to the corresponding period in 2020, a total of 53 women with confirmed gynaecological malignancy were tracked, and the overall adjusted performance was 100%.

There were several factors, both external and internal, which contributed to this. The main external factor was the Covid-19 pandemic. Wāhine were not able to attend their appointments due to sickness, or needing to self-isolate as a close contact. There was also a proportion of wāhine who declined their appointments due to fear of catching covid if they attended the hospital, especially over the lockdown/ red light period. Consequently, clinic attendance was significantly impacted, as wāhine either did not attend (DNA'ed) or rescheduled their appointments. This added extra pressures to the backlog of first specialist appointments (FSAs) once restrictions were eased. The pandemic also impacted on the delayed triaging time of referrals, and gynaecology theatre capacity, due to staff sickness and redeployment. This led to further delays in FSA timing and limited surgical capacity to achieve diagnosis and complete treatment. In addition, within the service, there was a high turnover of clinic scheduling staff over the corresponding period. The lack of continuity, combined with the relative inexperience of schedulers contributed to clinics not being booked optimally. Overall, not unlike other services, these factors posed challenges to the FCT team to meet the performance target. Whilst some measures have been introduced to address these challenges, such as implementing additional clinics, engaging closely with the scheduling team, and working on a triaging roster, these remedial plans will take time to reflect performance. From July 2021, a FCT Clinical Nurse Specialist was appointed at 0.5 FTE. This additional resource would help navigate the challenges ahead.

11.8.1 Rapid Access Clinic (RAC)

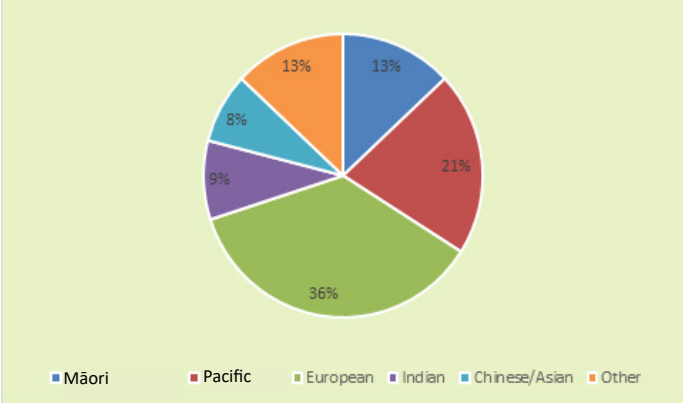
The RAC was set up in September 2016, with the aim of helping to achieve the Faster Cancer Treatment target for gynaecology. Previously, some of the identified reasons for breach of this target were delay in FSA for wāhine triaged as HiSCan (High Suspicion of Cancer), and limited capacity in pre-admission clinics and theatre for wāhine who needed diagnostic procedures such as hysteroscopy and endometrial sampling to achieve diagnosis. Consequently, a HiSCan pathway with an expedited timeline for managing these women was published internally in September 2016.

The RAC was set up within this model of care. It aims to see HiSCan wāhine within 7-14 days of referral being received, and offers them the option of outpatient hysteroscopy, endometrial sampling and simple operative hysteroscopic procedures, such as polypectomy/myomectomy using the Myosure equipment in a 'one-stop', outpatient setting, so that wāhine can be assessed, investigated and treated without delays. Wherever possible, these wāhine will have a virtual follow-up for their histology, to maximise the throughput of the clinic. Should there be capacity available, wāhine triaged for Abnormal Uterine Bleeding (AUB) Clinic can also be seen in RAC.

Wāhine attending RAC are provided with a patient information brochure, enclosed with the appointment letter prior to attending, to alleviate their anxiety around the clinic. Since July 2021, the FCT Clinical Nurse Specialist is also tasked to pre-contact these wāhine to provide additional information and support prior to their appointment. This also encourages a higher uptake of outpatient hysteroscopy at the first visit, if clinically indicated. Wāhine who need an urgent appointment will be emailed an electronic version of this brochure.

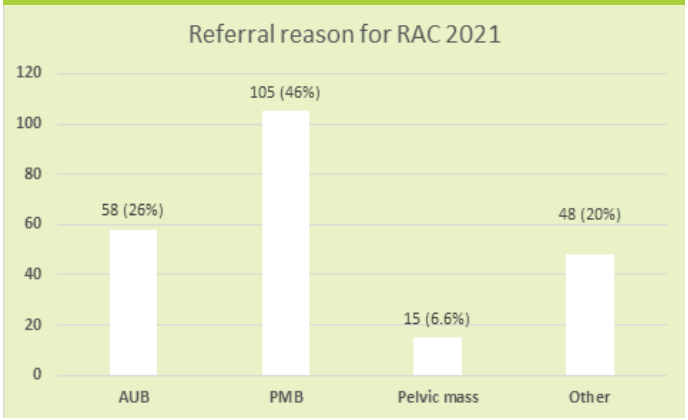
From January to December 2021, 264 wāhine were seen in RAC, of which 226 were FSAs. BMI ranged from 17-68. Of these wāhine, 203 (90%) were triaged as HiSCan. The ethnicity breakdown is shown below:

Figure 11.11: Ethnicity of wāhine seen in RAC 2021



74% wāhine seen were referred from primary care, whilst 16% were referred internally from other ADHB services. The referral reasons are depicted below.

Figure 11.12: Referral reason for RAC 2021



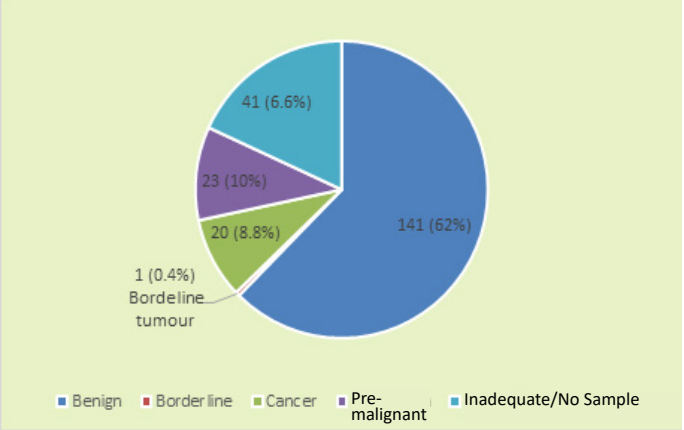
AUB = abnormal uterine bleeding
PMB = postmenopausal bleeding

119 (53%) wāhine had outpatient hysteroscopy. Of these, 11 (9.2%) proceeded to have a hysteroscopy under general anaesthesia. The main reason for this was the finding of endometrial lesion(s), which are deemed inappropriate for resection in the outpatient setting, patient intolerance, and/or patient request.

Of the 119 wāhine who underwent outpatient hysteroscopy, 7 (5.8%) had post-procedural complications, mainly mild local anaesthetic toxicity, and pain and vaginal bleeding. None required admission. Only 1 (0.8%) required overnight observation for potential uterine perforation.

Of the 226 FSAs seen, 20 (8.8%) wāhine had gynaecological malignancy, of which 19 were uterine, and 1 was Mullerian in origin. The overall outcome of the wāhine is shown below.

Figure 11.13: Outcome of wāhine seen in RAC FSA 2021



17 (6.4%) of wāhine did not attend (DNA) one or more appointments. Of these, 1.5% never attended any appointments. Wāhine who DNA'ed resided in deprived areas, based on their recorded addresses as matched to the NZDep 2018 Index of Deprivation Scale[1], with a mean deprivation score of 7. 71% of DNA wāhine were Maori and Pasifika.

Some future projects planned include qualitative studies of the experience of wāhine attending the clinic, especially those undergoing outpatient hysteroscopy, to ensure we continue to deliver a wāhine-centred model of care. Prospective data collection of the clinic, including DNA rates is also ongoing, to inform us of any barriers of engagement especially for Maori and Pasifika wāhine to improve equitable access and outcome.

[1] Atkinson J, Salmond C, Crampton P (2019). NZDep2018 Index of Deprivation, Final Research Report, December 2020. Wellington: University of Otago

11.9 Fertility PLUS

Jeanette MacKenzie

Table 249 summarises the 2021 results of IVF/ICSI autologous cycles (wāhine having their own eggs used for insemination) and resultant embryos transferred, including data from private and public funded cycles. Our results are benchmarked against the ANZARD (Australian and New Zealand Assisted Reproduction) Database which records all treatment cycles for Australia and New Zealand.

The data in Table 249 represent women of all ages. Donor/recipient, surrogacy and PGD cycles are not included.

The data collection for all accredited fertility clinics allows individual units to make their own comparisons against the figures for all patients in Australia undergoing treatment in any given year. As a comparison group for our 2021 data, we have been able to use the data from the ANZARD Report for 2019 (the most recently published ANZARD data).

IVF/ICSI cycles

A total of 586 cycles were started and there were 447 cycles (92%) with an egg collection.

Donor egg cycles

In 2021, there were 12 egg collections for egg donors.

There have been 32 frozen embryo transfers of embryos made with donor eggs of which 8 have on-going pregnancies.

Surrogacy cycles

There were nine surrogates undergoing 12 embryo transfers of which six have an on-going pregnancy.

Embryo Donation

There were seven embryo donor recipients who underwent 12 embryo transfers. Three embryo recipients have on-going pregnancies and three recipients have embryos remaining in storage and continue their treatment.

Stopped cycles

The definition of a 'stopped cycle' is one in which the cycle starts (with treatment designed to stimulate the ovaries) but it is stopped before an egg collection takes place. Our 8% stopped cycle rate is under the ANZARD benchmark of 10%. Three cycles were stopped due to over-response as these woman were considered to have a high risk of severe ovarian hyperstimulation syndrome (OHSS) to have an egg collection. We had four hospitalisations for OHSS in 2021 (0.7%). All women were managed conservatively.

A large proportion of stopped cycles were for poor ovarian response (28 from 39 stopped cycles). In most women poor response is based on poor ovarian reserve which is not amenable to treatment. Women with poor ovarian reserve who do not respond to maximal gonadotrophins can be offered oocyte donation.

No embryo transfer

Fifty-three percent of cycles had a fresh embryo transfer and this is higher than the 46% ANZARD benchmark for 2018.

Reasons for 'freeze-all' cycles include progesterone levels ≥6 nmol/L (n=12) (allows for transfer in a later cycle when the endometrial synchrony is better), women at risk for severe OHSS (n=97) (transfer in a later cycle reduces OHSS risk). Endometrial anomalies such as polyps on ultrasound were a reason for freeze-all in 12 women.

Thirty-three women of the 447 undergoing egg collection did not develop embryos. Seven women had no eggs collected (this is always a potential risk in women with a low response and only a couple of follicles), twenty women had no fertilization of their eggs, the majority being women who had very few or very poor quality eggs. Unexpected failed fertilization of good numbers of apparently good quality eggs is a rare event.

Pregnancies

As single embryo transfer and freeze all cycles become more common, the outcome of the fresh embryo transfer cycle, the traditionally expressed standard outcome measure, is assuming less relevance as a key performance indicator. Of more relevance is the cumulative live birth rate per woman undergoing IVF stimulation, of healthy singleton babies at term, when all embryos from both fresh and thaw are transferred from one initiated cycle.

Single embryo transfer

Although single embryo transfer had been introduced at Fertility Plus in 2006 for public cycles, it was only in the second half of 2014 that a single embryo transfer policy was introduced regardless of funding. In 2014 Fertility Plus had a multiple birth rate of 6.5% but in 2021 the multiple pregnancy rate was 0.8% which is similar to the rate for natural pregnancies. There were 0 multiple pregnancies from 76 pregnancies from fresh transfer and 2 of 163 pregnancies from thaw cycle transfers in 2021.

Intrauterine Insemination (IUI)

The 2021 ongoing pregnancy rate for IUI was 12.6% per insemination cycle (40/317). The 2021 ongoing pregnancy rate for donor insemination was 15.8% per insemination cycle (6/38).

Data Tables: Fertility PLUS

Table 11.46: Number of patients receiving fertility treatments by ethnicity 2021

	N=878	
	N	%
Māori	26	3
Pacific	45	5
Asian	413	47
MELAA	30	3.5
European	356	40.5
Other ethnicity	8	0.9

Table 11.47: Cause of Infertility for all Fertility Plus Treatments 2021

Cause of Infertility	N=865	
	N	%
Male Factor only	102	11.8
Tubal disease only	56	6.5
Endometriosis	89	10.3
Ovulatory disorders	180	20.8
Other female only	127	14.7
Combined female and male factor	56	6.5
Unexplained	238	27.5
Social	17	2

Table 11.48: Fertility Preservation for Medical Reasons

	2021 N=15		
	Frozen (N)	Mean Oocytes (N)	Range
Oocyte Freeze	12	10	1-22
Embryo Freeze	3	3.5	1-8

Table 11.49: Fertility Plus IVF cycle outcomes 2017-2021 (compared to ANZARD benchmark data 2019)										
	IVF cycles		IVF/ICSI cycles		IVF/ICSI cycles		IVF/ICSI cycles		IVF/ICSI cycles	
	2017		2018		2019		2020		2021	
	n	%	n	%	n	%	n	%	n	%
Number of cycles started	503		509		534		539		486	
Number of cycles stopped	38	8	47	9.2	47	8.8	96	18	39	8
ANZARD Benchmark for % cycles stopped										10
Reasons for stopped cycles										
1) Over response			7	1.3	3	0.5	1	0.2	3	0.6
2) Poor response	27	5	32	6.2	27	5	39	7.3	28	5.8
3) Other (including patient choice)	5	1	8	1.5	17	3.2	16	3	8	1.6
4) COVID Level 4 Lockdown							40	7.5		
Number of cycles reaching oocyte pick up (OPU)	465	92	462	91	487	91	441	82	447	92
Number of cycles with fresh embryo transfer	322	64	308	61	290	60	275	62	259	53
ANZARD Benchmark for cycles reaching transfer										46
Reasons for no transfer										
1) Freeze all cycle	125	27	125	27	148	30.4	134	30.4	155	34.6
- Egg vitrification	4		7		14		18		19	
- Elevated progesterone	31		25		20		6		12	
- OHSS risk	29		20		30		82		97	
- Endometrial (needing surgery)	8		5		4		15		12	
- Agonist trigger (combined with OHSS risk 2021)	43		39		69		n/a		n/a	
- Fertility preservation- embryos	4		5		2		3		3	
- COVID Level 4 Lockdown							4		0	
- Other	6		24		9		6		12	
2) No eggs	1	1	4	0.9	5		4	0.9	7	1.6
3) No fertilisation	3	3	20	4.3	13		17	3.9	20	4.4
4) Other	1	1	5	1	31		11		6	1.3

Table 11.50: Fertility Plus Ongoing Pregnancy Rates 2021

	n	%	ANZARD Benchmark for Live Birth 2019
Ongoing pregnancy rate/Cycle started (fresh transfer only)	76	15.6	11.6
Ongoing pregnancy rate/OPU (fresh transfer only)	76	17	12.9
Ongoing pregnancy rate/fresh embryo transfer	76	29.3	25.3
IVF/ICSI cycles Single Embryo Transfer (SET) – all ages	258	99	88.6
Fresh Ongoing pregnancy rate for Day 5 SET	37	48	
Twinning			RTAC Guidelines
From DET	0		<10
From SET (monozygotic)	0		<10
Thaw Cycles			
Ongoing pregnancy rate per thaw (Blastocyst)	158	33	30.3
% which were SET thaw cycles	3	99.4	94.1
Twinning rate from embryo thaw cycles	2	2	<10
Admission for OHSS	4		0.4

Appendix

12.1 Methodology

Maternity data

Description of women and babies included in the Annual Clinical Report.

The maternity section of this Annual Clinical Report includes data pertaining to women giving birth to babies at and beyond 20 weeks gestation at NWH during the 2021 calendar year or, if prior to arrival, due to unplanned birth at home or en route (BBA = born before arrival), and the babies of these women.

Data sources

Maternity data for this report have been extracted from the NWH maternity clinical database (Healthware CSC). Data from the Titan database (ICD-10 coded data on hospital discharges), supported by the Business Intelligence Unit, and from the PIMS-theatre database were used to check the accuracy of some maternity data.

Maternity data for years prior to 2001 were collected into the AMSIS (Auckland Maternity Services Information System) database. For this report, most data for the years prior to 2001, included in tables and figures to demonstrate time trends, have been obtained from previous Annual Clinical Reports, rather than from source data.

The majority of registration data for mothers with self-employed lead maternity caregivers (LMCs) were shared by LMCs and entered into Healthware by one Healthware administrator. Registration data for mothers under the care of NWH primary maternity services, and all antenatal, birth, and postnatal data were entered by clerks and NWH midwives.

In June 2019, the Maternal Fetal Medicine Service (MFM) updated to Version 6 of the Viewpoint database. Data from Viewpoint V5 is no longer available and the Women's Health Intelligence (WHI) team has been unable to successfully extract data from Viewpoint V6.

Data quality

Data cleaning is undertaken daily prior to extraction of the birth list for the Department of Internal Affairs. On a monthly basis, cleaning of place and mode of birth, breastfeeding status and reconciliation with Birthcare numbers is undertaken. Further in depth data cleaning is undertaken as time allows.

For the 2004 - 2021 years, the data have been cleaned for ad hoc analysis for service provision, audit and research, policy, and for this clinical report. Cleaning has included completing missing data and checking out of range and inconsistent data. These cleaning strategies have been focused around priority areas for reporting and areas where cleaning could be efficiently completed within the resource available. Further details of variables cleaned are provided below.

NWH acknowledges that these cleaning efforts, whilst extremely time consuming, are not exhaustive. On occasion, it became apparent during analysis that further cleaning was required and this was performed on an ad hoc basis and may not be included in the list provided.

Services or individuals wishing to use the NWH data for further analysis should be aware that areas not mentioned may not have been cleaned. For further advice please contact the WHI team.

A data dictionary covering some of the data collection variables can be obtained from the WHI department.

The introduction of comprehensive computerised clinical records (CRIS, 3M, Concerto, Éclair and Impax (Radiology PACS System)) by ADHB has enhanced data collection, checks on data integrity and clinical audit tremendously. Authorised clinical staff can access the complete clinical record electronically so that no clinical record is lost and the delays inherent in the old paper-based system are avoided.

Newborn Data

Data in the Newborn section pertain to all babies admitted to and cared for at the NWH Neonatal Intensive Care Unit (NICU) if born during the 2021 calendar year. This includes babies transferred from other units or home.

Data for this report have been extracted from a stand-alone SQL database for neonatology.

NICU data are collected prospectively by the Resident Medical Officers and Nurse Specialists - Advanced Neonatal Practice working on the NICU. The neonatal database is used to produce problem lists, flow sheets and letters which also ensure checks of data integrity throughout a baby's stay. Further data are collected and accuracy checked for the Australia and New Zealand

Neonatal Network (ANZNN).

An updated version of the neonatal database was introduced in June 2017.

Newborn Data Quality

Additional checks of the accuracy of the data (including checking clinical records and some original radiology) are made in preparing the annual report and prior to sending the data to ANZNN.

Data is checked against the Healthware database for birth weight, Apgar score, gestation and length of stay.

Images were checked on all serious adverse outcomes (IVH, PVL, ROP, NEC, death). Laboratory and clinical records were checked on all possible or definite septicaemias or meningitides. Records were checked when the data entered in different fields in the database appeared inconsistent. Maternal and neonatal records of all babies with encephalopathy or neonatal seizures were reviewed.

Gynaecology data

Data sources

General gynaecologic surgery data were obtained from Healthware for 2019 - October 2021. Data from prior years was obtained from a stand-alone Access database. From November 1st 2021, general gynaecologic surgery data were entered into a purpose built Dendrite database. These data were incomplete in 2021 and not included in this report.

Fertility Plus data were extracted and reported by the service from their Artemis database system, and Epsom Day Unit data were extracted from the PHS system.

The data presented in the Colposcopy section arise from data collected from 2009-2011 into Healthware and data collected into the (Solutions Plus) Colposcopy database from July 2012. Data are not included for the transition period from January-July 2012.

The data in the Gynaecologic Oncology section have been obtained from an Access database recording gynaecologic oncology, MDM reviews, and inpatient surgeries among women cared for by the gynaecologic oncology service.

At the end of 2019, the Referrals database and the clinical databases were merged into one Access database.

Data Quality

The data in the gynaecologic oncology and general gynaecologic surgery databases were compared to surgeries entered in the PIMS theatre database and to hospital discharge coded surgeries which are stored in the Titan data warehouse to identify missing, inconsistent and out of range data. Inconsistencies were clarified by review of clinical case records. Clinical review of individual cases where complications occurred was also undertaken by clinicians responsible for individual surgical areas.

The definitions used in these databases can be viewed on the shared computer drive at N:\Groups\O and G Projects\Gynaecology Surgical Cases Database\Update and N:\Groups\Gynae Oncology\Database.

Analytical and statistical methods

All data have been extracted and analyzed using SQL, Access, Excel, Python and STATA17. Tables are formatted with either column or row percentages as indicated. Statistical testing is occasionally included.

Data cleaning queries (Maternity data)

The following is a list of the data cleaning and validation queries which were carried out for the production of this report. This list is not exhaustive and some further ad hoc cleaning was carried out during analysis.

Lead Maternity Carer

Check all LMC have correct LMC type and group

Check all unbooked women that LMC screen is correct

Check that all women have a LMC screen at birth

If women have booked after 13 weeks with NW LMC check that there is a reason for late booking

Antenatal

Ethnicity is Not Stated or Other

Check parity if parity is less than parity at previous live birth (although previously parity was defined as 2 for twins). Check that obstetric history has been completed for women with a gravidity >1.

Previous Caesarean; If indication for Caesarean section=repeat Caesarean, previous Caesar=yes and parity is > 0.

BMI (Body Mass Index) Calculated from earliest weight recorded, as weight (kg)/height(m)2. If BMI <17 or >40, check height and weight or any mismatch of data

Antenatal Complications

If Antenatal Admission for Hypertension, APH or Diabetes, check Labour and birth mother screen, Medical conditions is not = missing &/or check data is consistent.

If Induction Indication is Hypertension, APH or Diabetes, check Labour and birth mother screen medical conditions is not = missing &/or check data is consistent.

If Reason for Operative Birth is Hypertension, APH or Diabetes, check Labour and birth mother screen medical conditions is not = missing &/or check data is consistent.

If HDU Admission for Hypertension, APH or Diabetes, check AN or PN screen medical conditions & blood loss/transfusion is not = missing &/or data is consistent.

Eclampsia = Yes, check Labour and birth mother screen and 3m chartview

Antenatal Diabetes screen without a PN Diabetes Screen & vice versa.

Newborn Diabetes; Newborn Discharge Summary, check for missing diabetic data.

Height and weight, check all fields are complete

Smoking, check all women have smoking status at booking and at birth. Check all women who smoke have been offered smoking cessation. Reconcile data discrepancy between smoking at booking and smoking at birth.

Induction of Labour

If SROM at term and syntocinon is given before established labour then reason for induction is rupture of membranes at term

If time at ARM is earlier than established labour time, add an induction screen.

If time at start of Syntocinon is earlier than established labour time, then check this is an induction.

If Syntocinion is started before 3 cms dilated check for Induction

If indication for ARM is induction and time of ARM is established labour, then induction data are entered.

If indication for ARM is induction and time of ARM is after established labour time, then indication for ARM is labour augmentation.

If an induction occurred, ensure completeness of all required fields on the induction screen.

If indication for Induction Is Other Please Specify then comment fields are checked for use of a drop down menu rather than free text.

Induction indication rupture of membranes at term but gestation is preterm

Induction indication PPROM but baby is term

Induction indication multiple pregnancy but baby is singleton

Induction indication maternal age but baby is preterm

Induction indication is poor Ob Hx but baby is preterm

Induction time is after time of birth

Reason for induction is rupture of membranes of term but membrane method is a ARM

Rupture of membranes time is after start of IOL

IOL time was checked against time of birth.

Method of IOL is amniotomy but membrane rupture method is SRM

Pregnancy/Birth

Homebirths & BBAs (babies born before arrival at hospital when intended birth in hospital) All checked as appropriately classified. If placenta is born at ACH then birth is considered born at ACH not a BBA.

Check all transfers in labour from Birthcare

Check that admission to Labour & Birth Suite/Operating Theatre/WAU is before birth time (unless is recorded as BBA).

If birth location is BBA, then birth time is before admission.

Onset of contraction time is before full dilatation which is in turn before Birth time (sometimes there is no onset of contraction time because of pre-labour Caesarean)

Onset of contraction time should not be missing if method of Birth is Caesarean (elective or emergency) in labour.

Full Dilatation Time should not be null if Birth Method is a vaginal birth.

If indication for induction is SRM then rupture of membrane time should be before induction start time which in turn is before onset of contraction time.

Syntocinon time is before birth time.

Membranes ruptured time is not null.

Membranes ruptured time is before birth time.

Membrane method is ARM but mode of birth is elective CS.

Time of epidural insertion is before birth time.

Full dilatation time is before birth time.

Birth time is before birth of placenta time.

Placenta birth time is not null.

Check all Classical Caesareans to ensure they are authentic.

Check all in established labour CS

A Caesarean Section (CS) must have an option from the expanded tree to describe what type of CS. Cannot be just Lower Segment Caesarean Section or Classical Caesarean Section.

All emergency in labour CS must have Robson Group, urgency status and SMO present at birth.

All emergency CS are checked for accuracy of definition.

Check there is a reason for all CS.

If Birth Method is a SVD or Spontaneous Breech Birth, check there is NO reason for operative birth.

If indication for operative birth is fetal distress, then fetal distress variable (in Labour & Birth Baby) is yes or meconium was present

Only emergency CS not labour can have reason for CS as failed induction

Indication for Operative Birth Is Other Please Specify + Comment fields - for checking.

If Birth Presentation is Breech, should not be a Spontaneous Vertex Birth.

If Birth method is breech, then presentation is breech.

If Birth method is 'Elective CS' then Dilatation at Syntocinon should be null.

Membrane method is SRM but has indication for ARM, check.

If ARM check there is an indication for ARM.

If vaginal birth, membranes method should not be at time of CS.

CS is booked in the risk sheet then check mode of birth

Birth Presentation is null, check presentation

If Dilatation at Epidural is not Null then Anaesthesia should show Epidural Lumbar or Epidural Spinal.

If Time of Epidural is not Null then Anaesthesia should show Epidural Lumbar or Epidural Spinal.

If Caesarean is mode of birth, anaesthesia is not missing.

Analgesia with elective CS

If had an epidural, then dilatation at last VE is not missing and time of epidural is not missing.

If there is postpartum transfusion and blood loss is < 1000mls, check blood loss.

Blood Loss is not out of range ie: <50, >1500 or is null.

Blood Loss >=1500 & Blood Transfusion = No.

Blood Loss <1500 & Blood Transfusion =Yes.

Vaginal Birth & Lacerations is Null.

Sutured by is Not Null, Lacerations is Null.

If Instrumental Birth (Forceps) then check for Episiotomy.

If woman has placenta praevia but not a elective CS

In 2019 new cleaning queries were developed to improve the quality of data for PROM and PPROM. These queries included missing newborn steroid fields, missing MgSo4 fields, comparing PROM data with Titan data.

Comparisons with the mortality screen were made against the labour and birth baby screen for outcome.

Mortality screen was checked for missing PDC and NDC, stage of death, and termination.

CMS was checked against Healthware for deceased baby.

Postnatal

Mothers Destination to Ward is somewhere within Auckland City Hospital but PN screen does not reflect this.

Mothers and baby's destination are not null

Mothers destination not NWH & PN Admission screen entered

PN Admission - Missing 'Admitted to ward time', 'CMS Discharge date' or 'Admission Type'

PN Admission - 1° Reason for PN Admission is Other & Comment

PN Admission - 1° Reason for PN Admission is Null or SVD

Mothers Destination to Ward & Admitted to (PN Admission Screen) do not match or is null

If reason for admission is CS or instrumental birth but none of these occurred

PN Admission - missing Admission Type

Baby Destination (L&B Baby) is a NWH location, check Discharge Time & Discharge to & Discharge Care (Newborn Discharge Summary) is not null

Newborn Discharge Summary Missing Data (If DHB is ADHB & LMC is NWH LMC)

Discharge Care - Postnatal Admission is NWH Homecare (includes Diabetic etc) but missing Postnatal Homecare Summary or Newborn Discharge Summary

Discharge Care - Postnatal Admission NOT NWH, but Postnatal Homecare Summary Screen

Postnatal Homecare Missing Data

Breast Feeding Baby Unknown or missing fields from Immediate Newborn Assessment & Newborn Discharge Summary Screen.

Titan is checked for uterine rupture, amniotic fluid embolism, pulmonary embolism, peripartum hysterectomy, placenta accreta/ percreata/increta.

Baby

Birth weight – check if <400g or >5kg.

If gestation <35 weeks, check birth weight if >2500g.

If gestation >35 weeks, check birth weight if <2500g.

Gestation: check if < 20wks or > 44 wks.

If indication for induction is post term, check gestation if gestation is < 40 weeks.

Gestation to Neonatal Gestation (Immediate Newborn Assessment screen) > 1 week difference if <28 weeks and >2 weeks difference if $\geq$ 28 weeks.

Neonatal database gestation to derived gestation > 1 week difference.

(Because of the incomplete reconciliation of data sets, there may be a minimal number of cases where gestation varies in reporting of the neonatal and maternity data.)

Gestational Age (Immediate Newborn Assessment) Is Null.

Days in NICU/PIN/Paed care on Ward are not null or check if >30.

Missing Apgars.

Live birth with Apgars 1min or Apgars 5 min of 0.

Data Checks with Other Sources

CMS/ Coding data to ensure correct birth numbers.

Neonatology database; fields checked include Birthweight, Gestation, Apgars & Days in NICU.

PIMs theatre data checked against Healthware for epidural and GA, blood loss, operative vaginal birth and CS

Titan coding data cross checked with Healthware for hypertension, APH, diabetes, perineal trauma, mode of birth, General anaesthetic, manual removal of placenta, PPH, blood transfusion, anaesthesia. amniotic fluid embolism, uterine rupture, placenta accreta, admission to DCCM.

12.2 Abbreviations

ABA	American Board of Anaesthesiologists
ACH	Auckland City Hospital
ACL	Anticardiolipin antibody
ACHS	Australian Council Healthcare Standards
AMOSS	Australasian maternity outcomes surveillance system
AMSIS	Auckland Maternity Services Information System
ANA	Antinuclear antibody
ANZNN	Australia and New Zealand Neonatal Network
APH	Antepartum haemorrhage
ARM	Artificial rupture of membranes
ASA	American Society of Anaesthesiologists
AUT	Auckland University of Technology
BBA	(Baby) Born Before Arrival (not a planned home birth)
BFHI	Baby Friendly Hospital Initiative
BI	Business Intelligence
BMI	Body mass index
BP	Blood Pressure
BPD	Bronchopulmonary dysplasia
CDU	Child Development Unit
CHD	Congenital Heart Disease
CI	Confidence Interval
CLD	Chronic lung disease
CPAP	Continuous positive airways pressure
CRIS	Clinical Records Information System
CS	Caesarean section
CVA	Cerebro Vascular Accident
CVS	Chorionic villus sampling
DAU	Day Assessment unit
DBP	Diastolic blood pressure
DCCM	Department of Critical Care Medicine
DCDA	Dichorionic diamniotic twin
DHB	District Health Board
DIC	Disseminated intravascular coagulopathy
DNA	Did not attend
DORV	Double outlet right ventricle
DRG	Diagnosis related groups
ECMO	Extra Corporeal Membrane Oxygenation
EDU	Epsom Day Unit
ENND	Early neonatal death
ERPOC	Evacuation of retained products of conception
fFN	Fetal Fibronectin
FH	Fetal heart
FTE	Fulltime equivalent
GA	General anaesthetic
GDM	Gestational diabetes mellitus
GH	Gestational hypertension
GLH	Green Lane Hospital
GO	Gynaecologic oncology
GP	General Practitioner
GPH	Gestational proteinuric hypertension
GROW	Gestation Related Optimal Weight software
GSU	Greenlane Surgical Unit
GTT/ OGTT	Oral Glucose Tolerance Test
Hb	Haemoglobin
HbA1c	Glycosylated haemoglobin
HDU	High Dependency Unit
HELLP	Hemolysis, Elevated Liver Enzymes, Low Platelets
HFOV	High frequency oscillatory ventilation
HIE	Hypoxic ischaemic encephalopathy
HiFlow	High flow air oxygen
HIV	Human Immunodeficiency Virus
HMD	Hyaline Membrane Disease
HPV	Human papilloma virus
ICH	Intracerebral haemorrhage
ICSI	Intracytoplasmic sperm injection
IDDM	Insulin dependent diabetes mellitus
Indo	Treated with indomethacin
iNO	Inhaled nitrous oxide
IOL	Induction of labour
IPPV	Intermittent positive pressure ventilation
IUD	Intrauterine death
IVF	In vitro fertilisation
IVH	Intraventricular haemorrhage
KPI	Key performance indicator
LB	Live birth
Ligate	Surgical ligation of PDA
LLETZ	Large loop excision of the transformation zone
LMC	Lead Maternity Carer
LMP	Last menstrual period
LNND	Late neonatal death
LSCS	Lower segment Caesarean section
LSIL	Low-grade squamous intraepithelial lesion

LV	Left ventricle
MAS	Meconium aspiration syndrome
MCDA	Monochorionic diamniotic twin
MCMA	Monochorionic monoamniotic twin
MDM	Multidisciplinary meeting
MFM	Maternal Fetal Medicine
MSU	Midstream urine
N/R	Not resuscitated
NAS	Neonatal abstinence syndrome
NEC	Necrotising enterocolitis
NFD	Not further defined
NICU	Neonatal Intensive Care Unit
NIDDM	Non-insulin dependent diabetes mellitus
NPSU	National perinatal statistics unit (Australia)
NSU	National screening unit
NWH	National Women's
NZBFA	NZ Breast Feeding Authority
OP	Occiput posterior
OPU	Oocyte pick up
PCR	Protein Creatinine ratio
PDA	Patent ductus arteriosis
PE/PET	Pre-eclampsia
PG	Prostaglandin
PIN	Parent Infant Nursery
PM	Postmortem
PMMRC	Perinatal & Maternal Mortality Review Committee
PMR	Perinatal mortality rate
PPHN	Persistent pulmonary hypertension of the newborn
PRLR	Perinatal related loss rate
(P)PROM	(Preterm) prolonged rupture of membranes
PROM	Prolonged rupture of membranes
PVL	Periventricular leukomalacia
RDS	Respiratory distress syndrome
ROP	Retinopathy of prematurity
RR	Relative risk
SBP	Systolic blood pressure
SCBU	Special Care baby Unit
SGA	Small for gestational age
SLE	Systemic Lupus Erythematosus
SRM	Spontaneous rupture of membranes
STOP	Surgical termination of pregnancy
SVB	Spontaneous vaginal birth
TCM	Transcutaneous oxygen monitor
TGA	Transposition of the great arteries
TIA	Transient Ischaemic Attack
TOP	Termination of pregnancy
UAC	Umbilical artery catheter
US/USS	Ultrasound/ultrasound scan
VBAC	Vaginal birth after Caesarean
VLBW	Very low birth weight
VSD	Ventricular septal defect
WAU	Women's Assessment Unit
WHO	World Health Organisation
wks	Weeks
yrs	years

12.3 Definitions

Antepartum haemorrhage (APH)

Antepartum haemorrhage includes vaginal bleeding from any cause at or beyond 20 weeks during pregnancy and labour, and in this report includes placenta praevia without bleeding.

Augmentation of labour

Describes use of oxytocin or artificial rupture of membranes to accelerate established labour.

Breastfeeding

Exclusive breastfeeding: The infant has never, to the mother's knowledge, had any water, formula or other liquid or solid food. Only breast milk, from the breast or expressed, and prescribed (as per Medicines Act 1981) medicines have been given from birth.

Fully breastfeeding: The infant has taken breast milk only, no other liquids or solids except a minimal amount of water or prescribed medicines, in the past 48 hours.

Partial breastfeeding: The infant has taken some breast milk and some infant formula or other solid food in the past 48 hours.

Artificial feeding: The infant has had no breast milk but has had alternative liquid such as infant formula with or without solid food in the past 48 hours.

Early Neonatal Death (ENND)

Death of a live born baby in the first week of life before completion of 7 days of life.

Elective Caesarean section

An elective Caesarean is defined as a Caesarean which was scheduled in advance and scheduled prior to the onset of labour. Therefore, Caesarean sections performed after the onset of labour but booked prior to labour are included with elective Caesarean.

Ethnicity

Ethnicity is collected at each hospital registration with the standard census 2001 question. The ethnicity used in this report represents the most recent response by an individual to the ethnicity question, and so may not be the ethnicity given at the time of birth admission. Up to three options are input into the CMS (Case Management System) database. In preparing the data for this report, each mother has been allocated to a single ethnic group. When more than one ethnic group is recorded, the prioritised ethnicity system has been used.

Table A.1: Level 2 prioritisation of ethnicity[1]

Priority order	Ethnic Group Description
1	Māori
2	Tokelauan
3	Fijian
4	Niuean
5	Tongan
6	Cook Island Maori
7	Samoan
8	Other Pacific Island
9	Pacific Island NFD (Not Further Defined)
10	South East Asian
11	Indian
12	Chinese
13	Other Asian
14	Asian NFD
15	Latin American / Hispanic
16	African
17	Middle Eastern
18	Other
19	Other European
20	European NFD
21	NZ European

The most summarised (Level 1) prioritisation is as follows: Māori, Pacific peoples, Asian, MELAA (Middle Eastern, Latin American, African), other groups except NZ European, NZ European. To this, we have added 'Other European' and separated 'Indian' from Asian, the former because it is a large group in our population and the latter because the obstetric risk profile of Indian mothers is significantly different from the remaining women in the Asian grouping. In the majority of figures in this document, NZ European and Other European are recombined. Level 2 prioritisation is given in **Table A.1**.

Fetal Death

Baby of at least 20 weeks gestation at issue, or at least 400 grams birth weight if gestation is unknown, born without any signs of life.

Gestation

The gestation used in the maternity section of this report is derived from best estimate of date of birth (EDD Best) calculated by Healthware at booking based on last menstrual period (LMP), scan data (overriding LMP data based on scan accuracy data sourced from

[1] Ministry of Health. 2017 Ethnicity Data Protocols. Wellington: Ministry of Health. (available online at https://www.health.govt.nz/publication/hiso-100012017-ethnicity-data-protocols)

the Australasian Society for Ultrasound Medicine), or clinical override of these dates as deemed appropriate. Healthware does not include gestation calculated from these data into its dataset, so this gestation, in weeks, is derived by taking the integer value of 40 + ((date of birth - EDD Best)/7).

Gestational Diabetes (GDM)

At NWH, a diagnosis of GDM is made based on any of the following criteria:

- HbA1c 41-49mmol/mol - called GDM/ underlying prediabetes at our hospital
- or 50g polycose result >11.0mmol/L
- or 75g OGTT result of fasting equal to or greater than 5.5mmol/L (not greater than)
- or 2 hour glucose equal to or greater than 9.0mmol/L (not greater than)
- or elevated capillary glucose measures on testing (our hospital criteria)

Capillary glucose criteria:

- fasting capillary glucose level (over several days) >5.0mmol/L
- or 2 hours post meal (from start of eating) capillary glucose levels averaging >6.0mmol/L or more than one individual result >6.5mmol/L

Hypertension

Gestational hypertension: Gestational hypertension (GH) is a blood pressure SBP ≥140 and or DBP ≥90 mmHg on two or more consecutive occasions at least 4 hours apart or one measurement SBP ≥170 and or DBP ≥110 mmHg. (ADHB Clinical Practice). A rise of 30 (systolic) or 15 (diastolic) from booking may be of clinical relevance, but is not used to make a diagnosis.

Preeclampsia: The new onset of hypertension occurs after 20 weeks' gestation and before 5 weeks postpartum (in a woman who had normal blood pressure before 20 weeks' gestation) or superimposed on pre-existing hypertension and one or more of the following also develop as new conditions:

1. Proteinuria – spot urine protein:creatinine ratio ≥30 mg/mmol or ≥2+ on dipstick testing confirmed by a protein creatinine ratio test.

2. Other maternal organ dysfunction: – renal insufficiency (creatinine >90 µmol/L, urine output of <80mL/4hr) – liver involvement – (elevated transaminases (ALT & AST) – at least twice upper limit of normal ± right upper quadrant or epigastric abdominal pain). Note normal ranges are: ALT 0-30 u/L and AST 10-50 u/L – neurological complications (eg, eclampsia, altered mental status, blindness, stroke or, more commonly, hyperreflexia when accompanied by clonus, severe headaches and persistent visual scotomata) – haematological complications (thrombocytopenia – platelet count below 100 x 10^9/L, haemolysis).

3. Uteroplacental dysfunction (fetal growth restriction). *At NWH, in lieu of further definition in the national guideline this is taken to mean SGA <10th customised birthweight centile at birth. HOWEVER, in the case of super-imposed preeclampsia in women with chronic hypertension, SGA <10th birthweight centile is INSUFFICIENT evidence, and requires the presence of an element of 1. or 2. above.

Chronic hypertension (CH): diastolic BP ≥ 90mmHg at booking or a medical history of essential hypertension. Includes women with superimposed preeclampsia if these are not categorised separately.

Superimposed pre-eclampsia: The development of preeclampsia in a woman with chronic hypertension.

Eclampsia: Convulsions associated with gestational hypertension, usually after the onset of preeclampsia. Convulsions are not due to any other cause such as epilepsy.

Infant Death

Death of a baby born alive before the age of one year.

Large for Gestational Age (>90th customised centile)

Birth weight greater than 90th percentile for gestation, gender, ethnicity, maternal height, weight, age and parity, calculated using the GROW customised birth centile calculator.

Late Neonatal Death (LNND)

Death of a baby after the 7th day and before completion of 28 days of life.

Lead Maternity Carer (LMC)

The Lead Maternity Carer is the practitioner or caregiver service selected by the woman to have the legal, professional and practical responsibility for ensuring the woman and her baby are given clinically appropriate care.

National Women's LMC services

- **Community Midwives** are the LMC for women who either self-refer or are referred to NWH for maternity care. This includes women cared for by the community diabetes team. The midwives provide continuity of antenatal and postnatal care to women who live in NWH geographical boundary. Labour and birth care is provided by NWH core Labour and Birthing Suite midwives.
- **Diabetes Midwives** are the LMC for women who are referred to the Diabetes Service for secondary/tertiary and LMC care. The midwives provide continuity of antenatal and postnatal care to women who live in NWH geographical boundary. The Diabetes Midwives are not the LMC for all women referred to this service as some women will have an Independent LMC.
- **Medical Midwives** are the LMC for women who are referred to the Medical Service for secondary/tertiary and LMC care. These women have complex

- medical needs. The midwives provide continuity of antenatal and postnatal care to women who live in NWH geographical boundary. The Medical Midwives are not the LMC for all women referred to this service as some women will have an Independent LMC.
- **Te Manawa o Hine** are a team of Māori midwives employed by ADHB providing care for Māori women.

Self-employed LMC services

- **Independent midwife**
- **General Practitioner** (arranges private or hospital midwifery care)
- **Private Obstetrician** (arranges private or hospital midwifery care)
- **Other LMC services**
- **Other DHB:** These women are usually transferred to NWH in late pregnancy, and remain with their original LMC. This LMC might be another District Health Board LMC or a non- NWH access holder (e.g. a private obstetrician or independent midwife without access rights at NWH or a homebirth midwife without access rights at NWH).
- **Unbooked** are women who present at NWH, usually in labour or pre-labour, and who do not have an LMC.

Live birth

Birth of a baby showing signs of life. In this report, live births are only included if ≥20 weeks' gestation at birth or ≥400g if gestation unknown.

Maternal age

Defined as mother's age at her baby's birth.

Mode of birth for multiple pregnancies

For analyses where the denominator is mothers, mode of birth is represented as the mode of birth of the baby requiring most intervention. Mode of birth has been prioritised as emergency Caesarean, elective Caesarean, forceps, ventouse, vaginal breech, then spontaneous vertex birth.

Onset of birth

Onset of birth has been defined by the 4 pathways to birth: (1) elective Caesarean section, (2) emergency Caesarean before the onset of labour, (3) induction of labour, and (4) spontaneous onset of labour.

Neonatal hypoglycaemia

Blood glucose < 2.3mmol/L.

Neonatal Death

Death of a live born baby before completion of 28 days of life

Neonatal Death Rate

Early and late neonatal deaths per 1000 live births

New Zealand Deprivation index (NZDep2018)

An area-based measure of socioeconomic deprivation derived from variables from the Census of Population and Dwellings 2018. The score is assigned according to most recently recorded maternal place of residence and is presented as a decile or quintile. Increasing deciles of deprivation, from least deprived (decile 1) to most deprived (decile 10), are associated with higher mortality and rates of many diseases (Atkinson, Salmond and Crampton, 2014). Census area unit level data are used throughout this report.

NICU admission days

Length of stay in NICU is based on hours from admission to discharge, added across all admissions. One day stay in NICU is equivalent to 24 hours.

Parity

The number of times a woman has given birth to a live born baby of any birth weight or gestation or to a stillborn infant at or after 20 weeks' gestation or where the infant weighed 400g or more if gestation is unknown. Multiple birth adds only one to parity total.

Perinatal Mortality Rate (PMR)

Fetal and early neonatal deaths per 1000 total births

Perinatal Related Mortality Rate (PRLR)

Fetal and early and late neonatal deaths per 1000 total births

Postnatally (or newly) Diagnosed Type 2 Diabetes

Type 2 diabetes diagnosed by postnatal oral glucose tolerance test (oGTT or HbA1c) in a woman diagnosed with gestational diabetes (GDM) during pregnancy.

Postpartum haemorrhage (PPH)

Primary PPH is ≥500mls blood loss from the genital tract within the first 24 hours of birth. Secondary PPH is ≥500mls blood loss from the genital tract after 24 hours up to 6 weeks postpartum.

PSANZ-PDC (Perinatal Society of Australia and New Zealand Perinatal Death Classification)

Identifies the single most important factor which led to the chain of events which resulted in the perinatal death.

PSANZ-NDC (Perinatal Society of Australia and New Zealand Neonatal Death Classification)

Used in addition to the PSANZ-PDC to identify the single most important factor in the neonatal period which caused a neonatal death.

Small for gestational age (SGA) (customised)

Birthweight less than 10th percentile for gestation, gender, ethnicity, maternal height, weight, age and parity, calculated using the GROW customised birth centile calculator (Perinatal Institute).

Standard primipara

A woman with

- no prior birth ≥20 weeks,
- aged 20-34 years at index birth,
- with a singleton pregnancy,
- cephalic presentation,
- gestation 37-41 completed weeks,
- baby not small for gestational age (customised centile ≥10th),
- no medical disease, defined as no history of cardiac disease, renal disease, mental health disorder, SLE, HIV infection, CVA/TIA, diabetes or hypertension,
- no gestational diabetes in index pregnancy,
- no pregnancy associated hypertensive disease in index pregnancy,
- no antepartum haemorrhage during index pregnancy.

Vaginal birth after Caesarean section (VBAC)

Vaginal birth in a pregnancy where any previous birth was by Caesarean section

Very Low Birth Weight

Birth weight less than 1500g