Audit of Chronic Lung Disease at NWH

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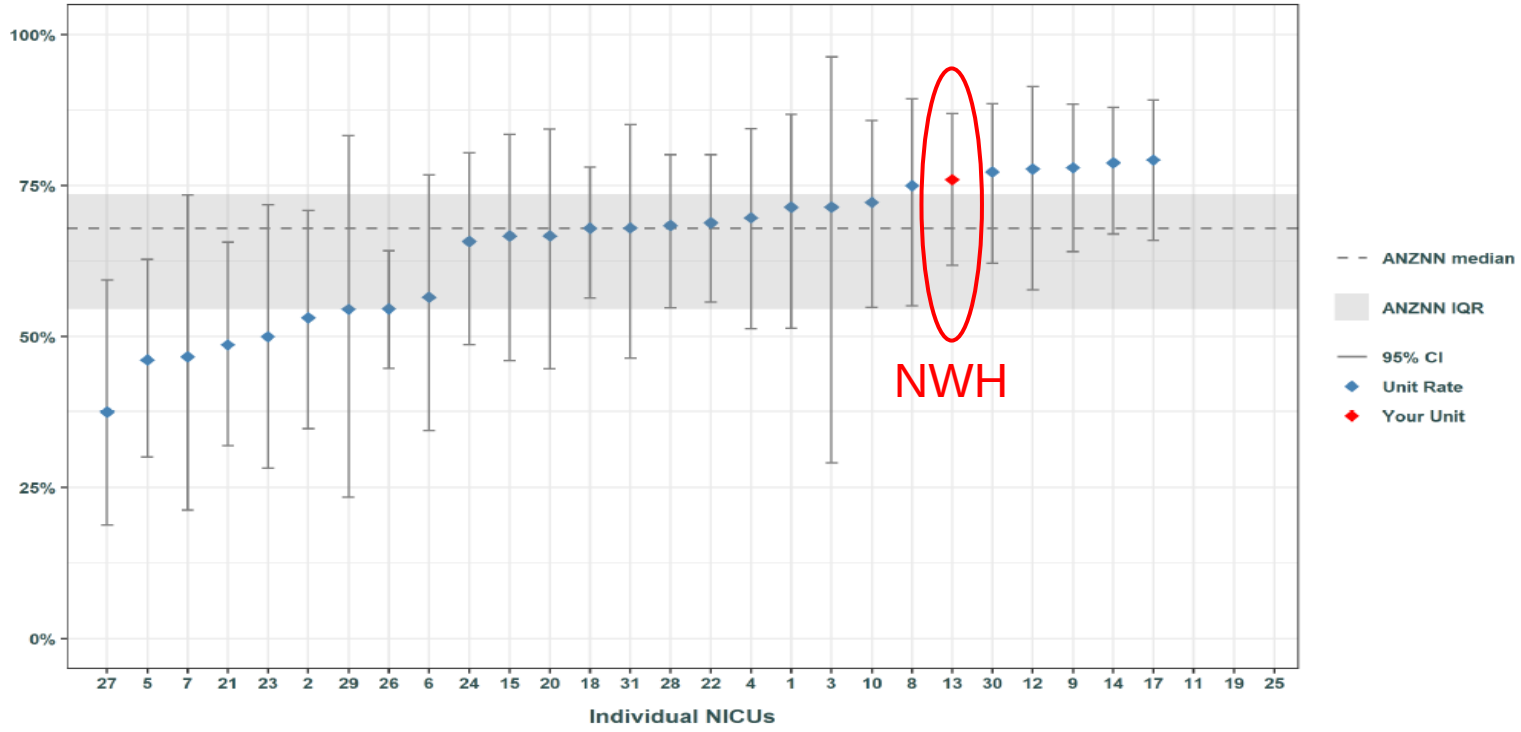
May 2021

The problem:
Latest unit feedback report from ANZNN

Chronic lung disease

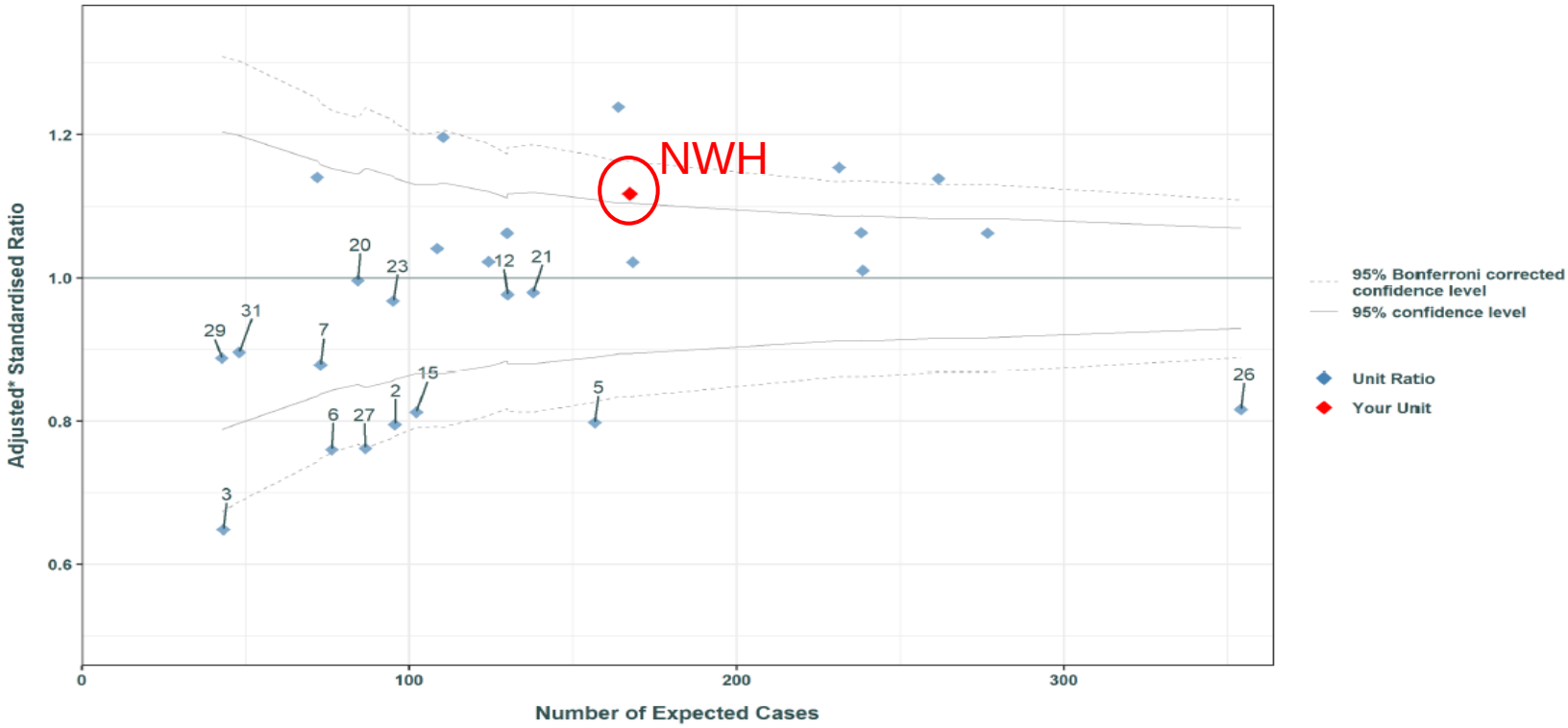
Babies <28 weeks who survived to 36 weeks PMA



Latest unit feedback report from ANZNN

Chronic lung disease, 2015-2019

Babies born at 23-28 weeks who survived to 36 weeks PMA



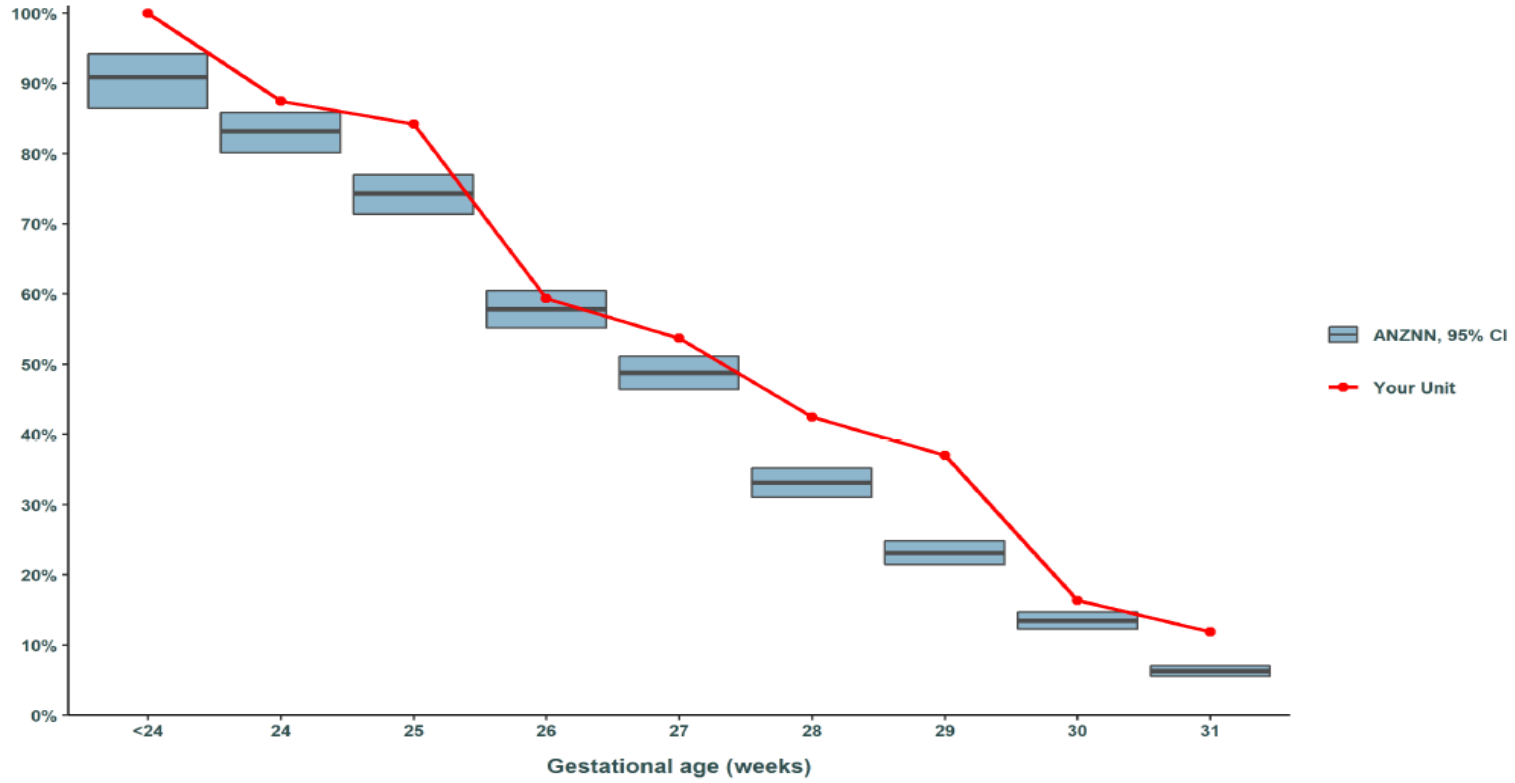
*Adjusted for: GA, sex, SGA, Inborn status

AUSTRALIAN & NEW ZEALAND NEONATAL NETWORK

Latest unit feedback report from ANZNN

Chronic lung disease by gestational age, 2015-2019

Babies who survived to 36 weeks PMA



AUSTRALIAN & NEW ZEALAND NEONATAL NETWORK

ANZNN definitions of CLD in <32 week babies

- CLD is needing either respiratory support or oxygen at 36 weeks PMA
- In 2016, it started collecting data on the type of respiratory support at 36 weeks PMA
- In 2016 it started asking for Shift and Walsh tests at 35-36 weeks PMA in babies <28 weeks gestation
  - But results not yet reported.
- CLD DAGNOSIS IS BASED ON TREATMENT CHOSEN, NOT DISEASE SEVERITY
- **NWH incidence of CLD has INCREASED in last few years**

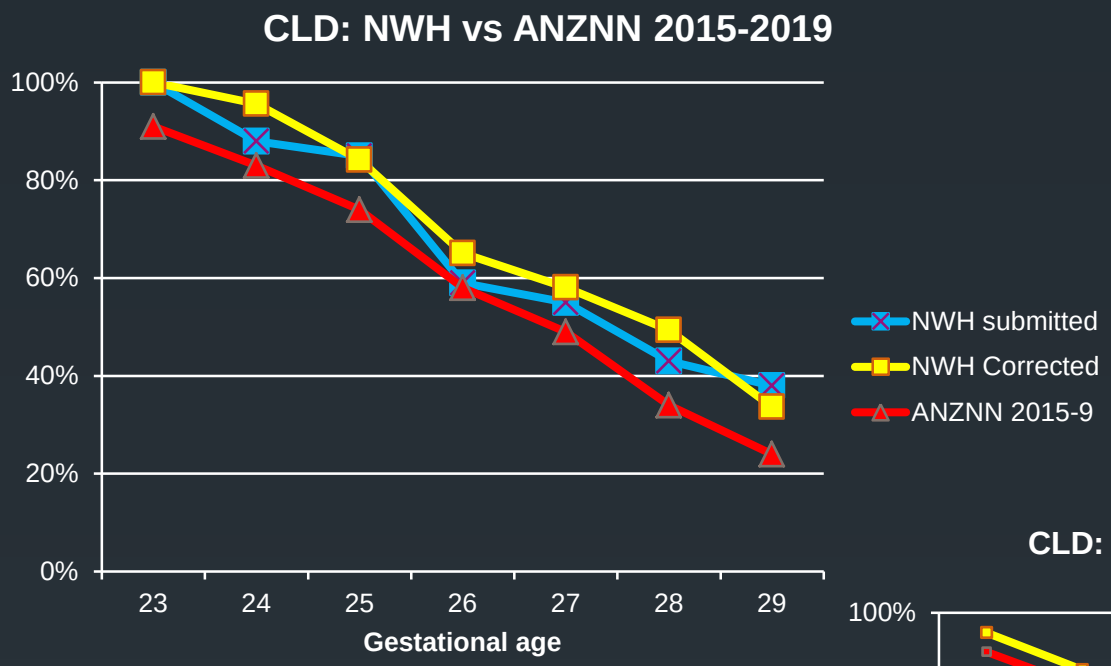
Method

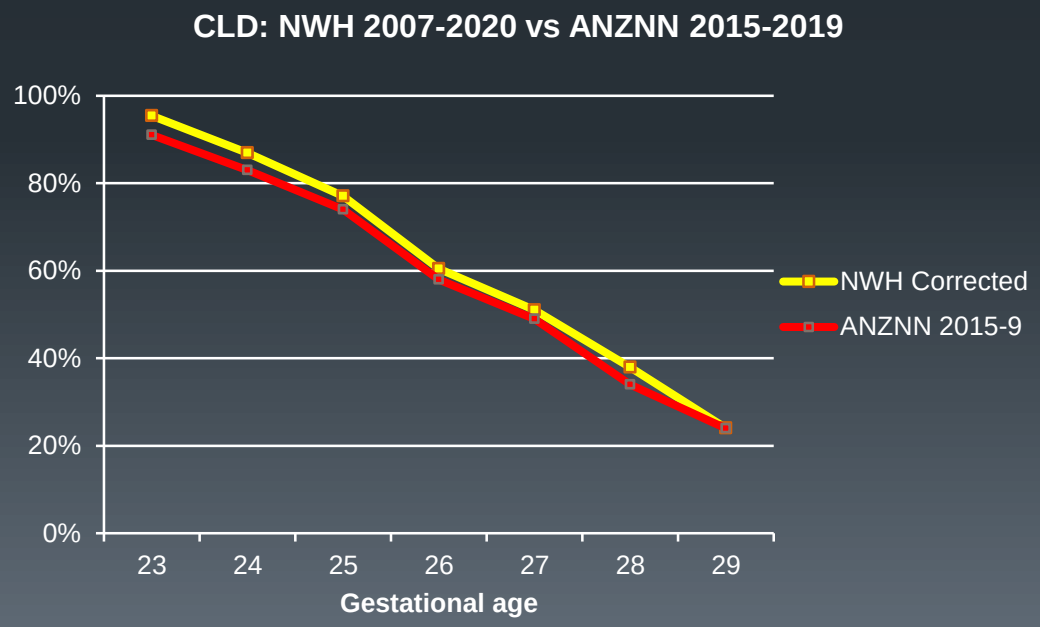
- Audit CLD data in babies born <30 weeks' gestation from 2007 to 2020
- Review charts to apply new ANZNN definitions to babies born before 2016
- Document FiO_2 at 36 weeks (not collected by ANZNN)
- Look for errors in our ANZNN data collection
- Compare babies born in different epochs
  - Why has our incidence increased?
    - Is it the BABIES or the TREATMENT?

How accurate is our CLD data submitted to ANZNN from 2007-2020

	Submitted	Correct	Incorrect	No data
CLD	481	452	27	2
No CLD	725	536	136	53
Died by 36 weeks	114	114	-	-
Missing data	18	8 had CLD	5 No CLD	5
Total	**1338**	**1102**	**176**	**60**

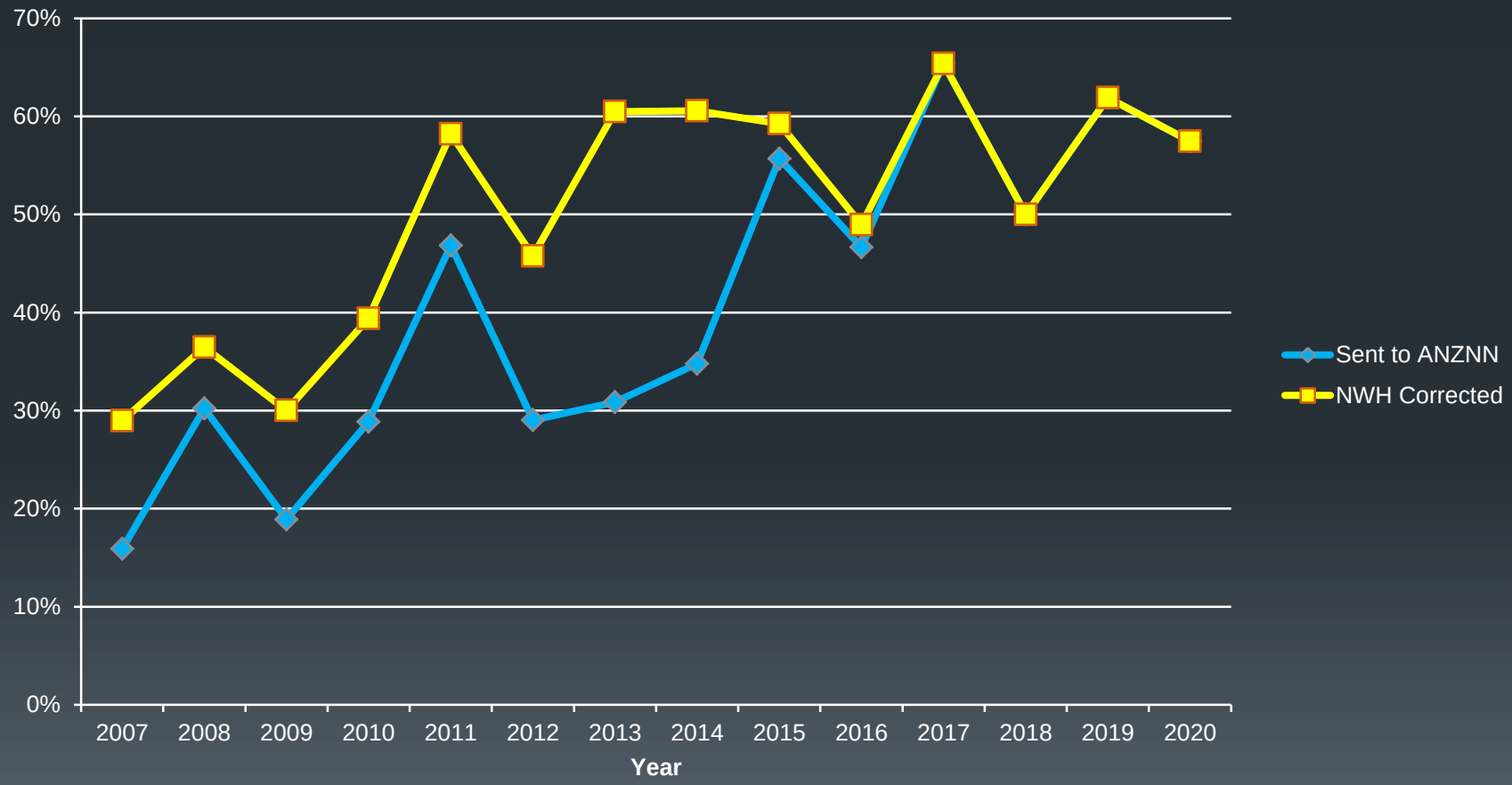
CLD vs Gestational age





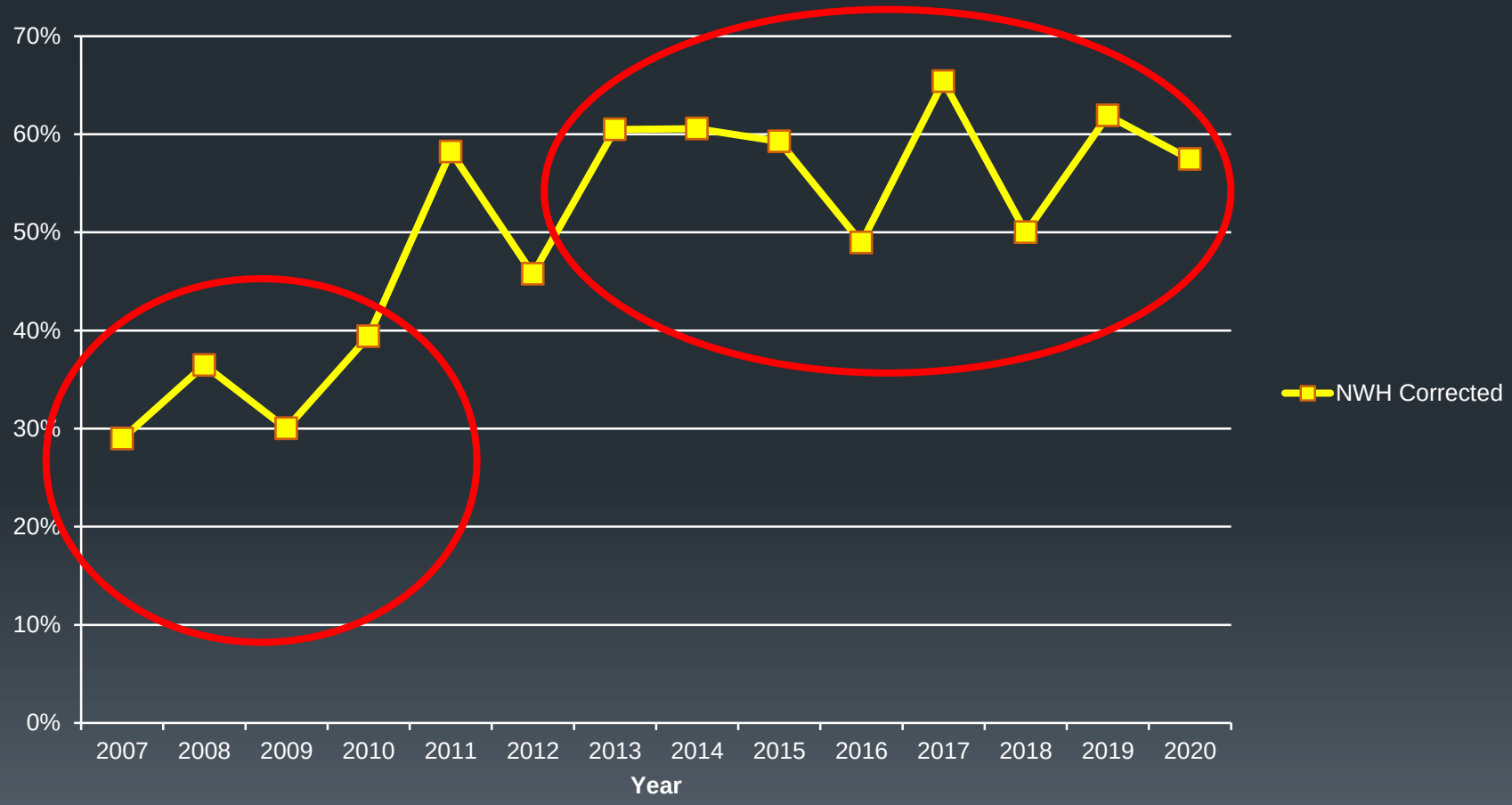
NWH CLD 2007-2020

Babies <30 weeks gestation

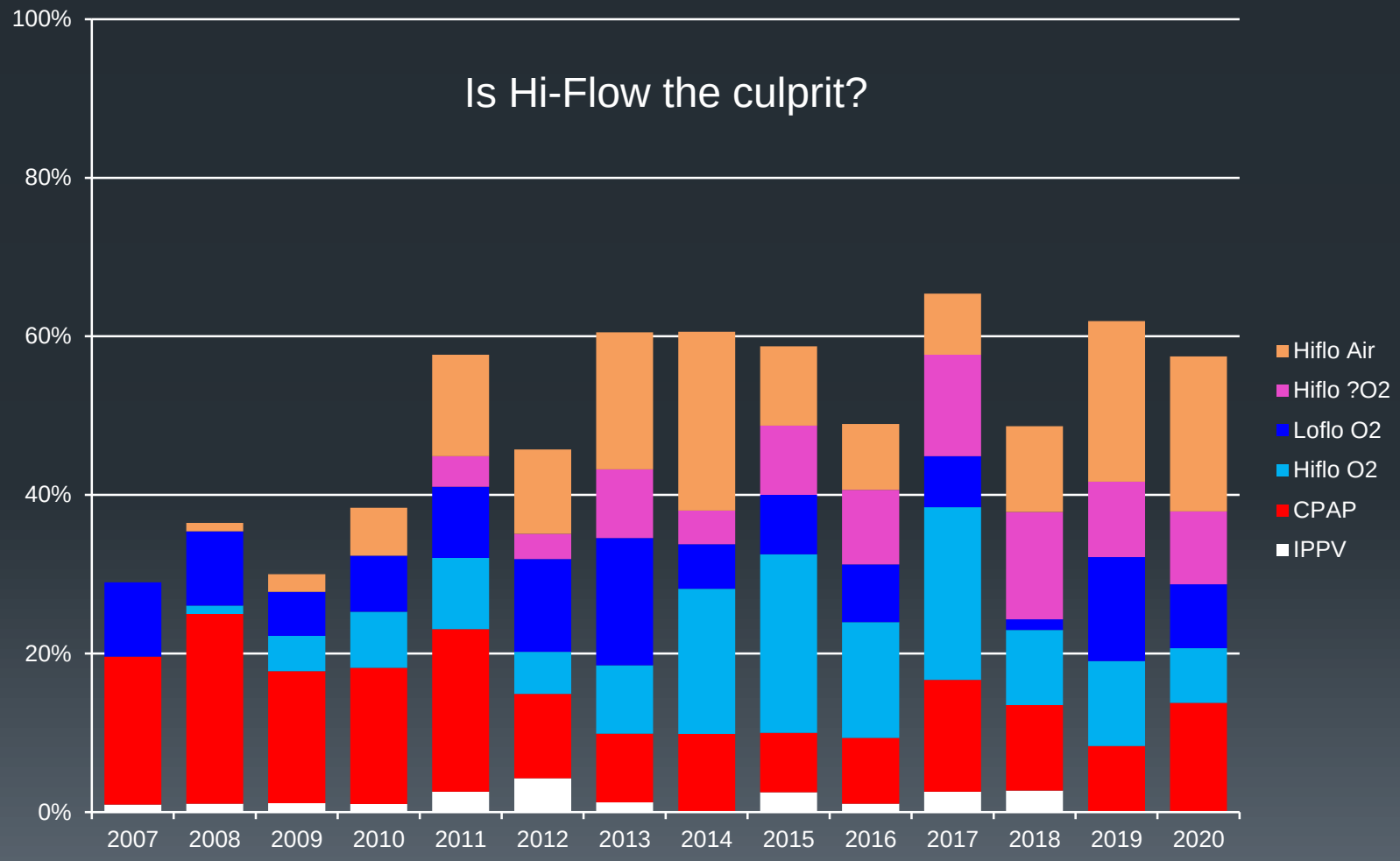


NWH CLD 2007-2020

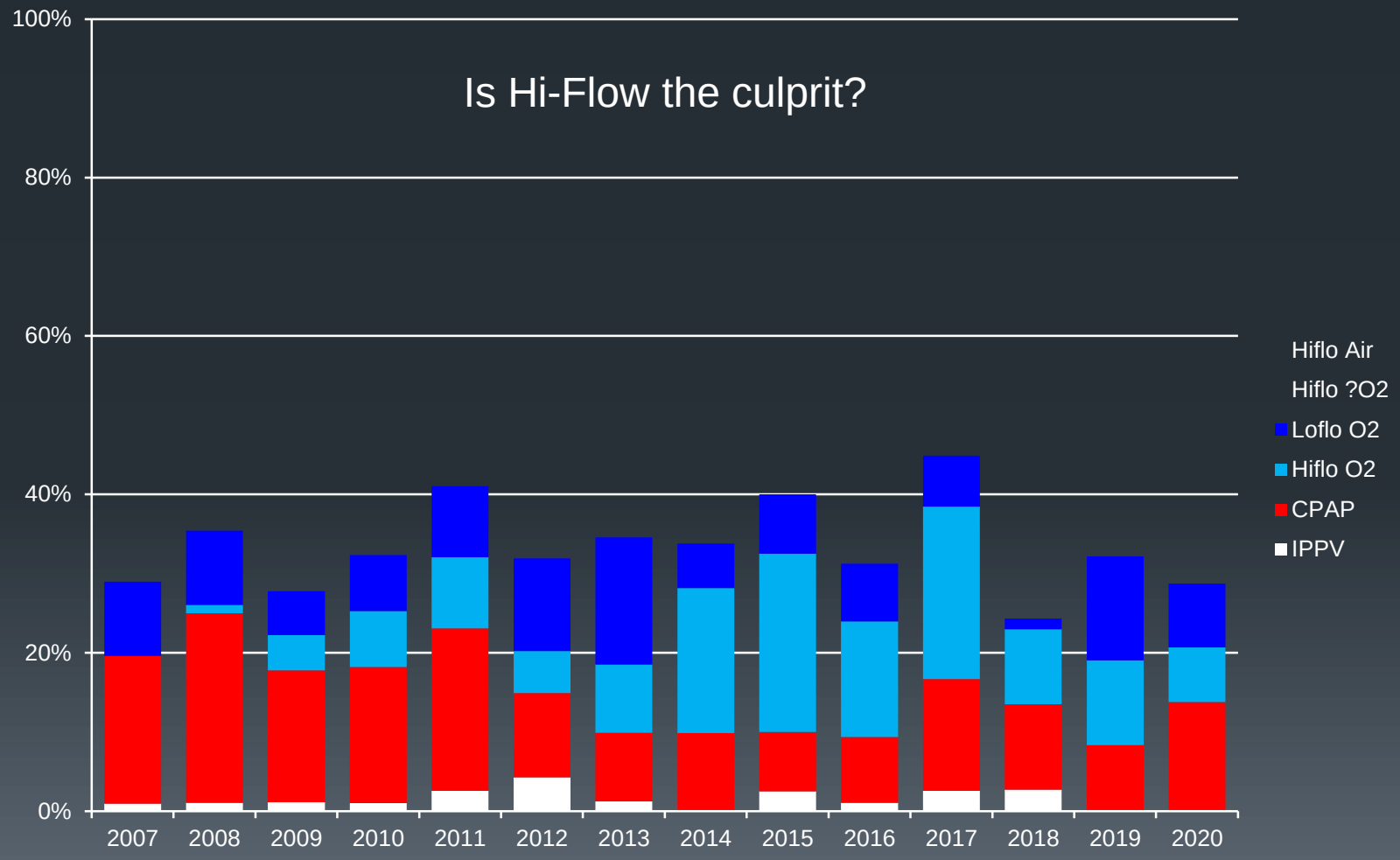
Babies <30 weeks gestation



Mode of respiratory support at 36 weeks. Babies <30 weeks



Mode of respiratory support at 36 weeks. Babies <30 weeks



Outcome in different epochs

	24-25 weeks			26-27 weeks			28-29 weeks	
	2007-10	2013-20		2007-10	2013-20		2007-10	2013-20
Excluded		5			4			7
Included	93	143		147	240		185	294
Survived	74%	76%		88%	95%		97%	97%
CLD	60%	92%		40%	63%		17%	37%
Home Oxygen	38%	64%		29%	35%		10%	17%
LOS	114	121		87	93		65	71

Antecedents in different epochs

	24-25 weeks			26-27 weeks			28-29 weeks	
	2007-10	2013-20		2007-10	2013-20		2007-10	2013-20
Maternal age	28	30		29	30		29	30
A/N steroids any	56%	62%		60%	56%		59%	60%
A/N steroids complete	90%	97%		93%	93%		90%	93%
Inborn	97%	96%		93%	90%		91%	91%
Caesarean	25%	38%		57%	58%		63%	56%
PPROM	24%	16%		23%	22%		21%	17%
Preterm labour	70%	43%		48%	34%		42%	30%
Polynesian Ethnicity	40%	31%		36%	35%		34%	32%

Early condition in different epochs

	24-25 weeks			26-27 weeks			28-29 weeks	
	2007-10	2013-20		2007-10	2013-20		2007-10	2013-20
Gestational age	25.0	24.9		27.0	27.0		29.1	29.0
Birth weight	760g	756g		961g	950g		1211g	1231g
Multiple	25%	22%		25%	25%		32%	20%
Apgar 1/5 minutes	4/6	5/7		5/7	5/7		6/8	6/7
Base excess <=-9	19%	16%		5%	13%		5%	2%
Ventilated <2hrs old	91%	87%		64%	52%		22%	27%
Surfactant	95%	94%		78%	74%		40%	51%
Air leak	5%	4%		3%	2%		3%	1%
Early infection	6%	2%		0	2%		1%	3%

Other outcomes in different epochs

	24-25 weeks			26-27 weeks			28-29 weeks	
	2007-10	2013-20		2007-10	2013-20		2007-10	2013-20
NEC	9%	8%		6%	1%		2%	0
Surgery	17%	14%		12%	4%		4%	5%
IVH G3 or G4	22%	15%		6%	3%		2%	2%
ROP S3 or S4	14%	11%		2%	4%		1%	0
PDA R_x	45%	45%		41%	15%		8%	4%
Late infection	24%	37%		16%	16%		5%	6%
Survived	74%	76%		88%	95%		97%	97%
Outcome 2yrs: seen*	93%	99%		78%	92%		70%	72%
Normal/mild delay	75%	86%		90%	87%		89%	90%

ANZNN survival (2018) 76% 93% 96%

* Born up to 2018

Median days on support in different epochs

	24-25 weeks			26-27 weeks			28-29 weeks	
	2007-10	2013-20		2007-10	2013-20		2007-10	2013-20
IPPV and HFOV	17	21		1	0		0	0
CPAP	53	46		46	39		15	17
IPPV+HFOV+CPAP	71	69		51	43		16	17
Hi-Flow	0	22		0	21		0	19
CPAP + Hi-flow	53	69		47	61		15	41
Total	76	91		51	64		16	42

Oxygen administration at 36 weeks in different epochs

Babies discharged home from NWH as data complete in these

	24-25 weeks			26-27 weeks			28-29 weeks	
	2007-10	2013-20		2007-10	2013-20		2007-10	2013-20
Any oxygen	41%	63%		29%	30%		8%	12%
Air	59%	37%		71%	70%		93%	88%
Low-flow or 22-29%	21%	54%		14%	22%		5%	12%
30-39%	14%	3%		10%	5%		1%	0%
>=40%	7%	6%		4%	3%		1%	0%

Oxygen administration at 36 weeks in different epochs

Babies discharged home from NWH as data complete in these

	24-25 weeks			26-27 weeks			28-29 weeks	
	2007-10	2013-20		2007-10	2013-20		2007-10	2013-20
Any oxygen	41%	63%		29%	30%		8%	12%
Air	59%	37%		71%	70%		93%	88%
Low-flow or 22-29%	21%	54%		14%	22%		5%	12%
30-39%	14%	3%		10%	5%		1%	0%
>=40%	7%	6%		4%	3%		1%	0%

Oxygen administration at 36 weeks in different epochs

Babies discharged home from NWH as data complete in these

	24-25 weeks			26-27 weeks			28-29 weeks	
	2007-10	2013-20		2007-10	2013-20		2007-10	2013-20
Any oxygen	41%	63%		29%	30%		8%	12%
CLD	58%	92%		52%	62%		17%	25%
Air	59%	37%		71%	70%		93%	88%
Low-flow or 22-29%	21%	54%		14%	22%		5%	12%
30-39%	14%	3%		10%	5%		1%	0%
>=40%	7%	6%		4%	3%		1%	0%

Conclusions

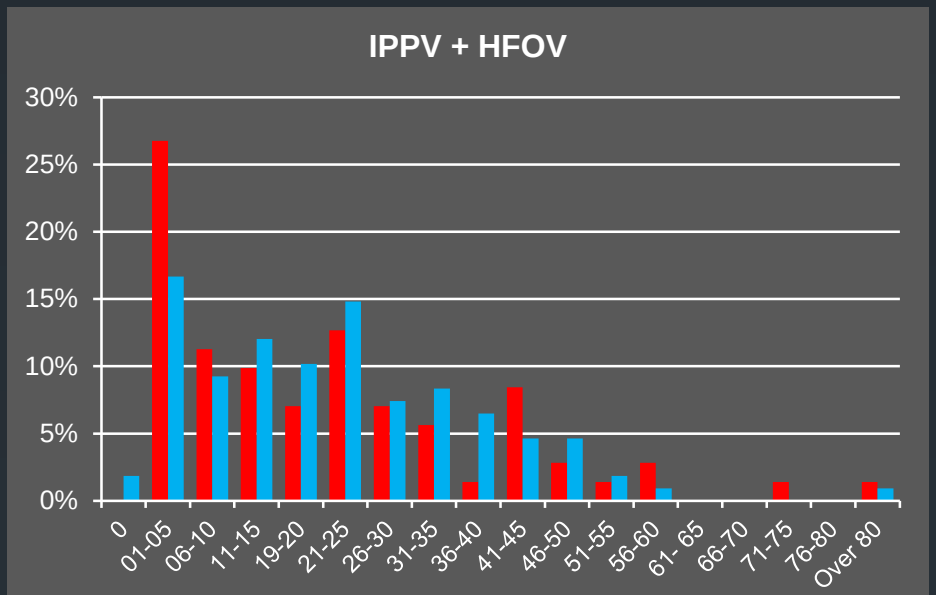
- The definition of CLD is sub-optimal
- It would be better to report FiO_2 at 36 weeks
- Shift and Walsh tests will be better, but data will be incomplete

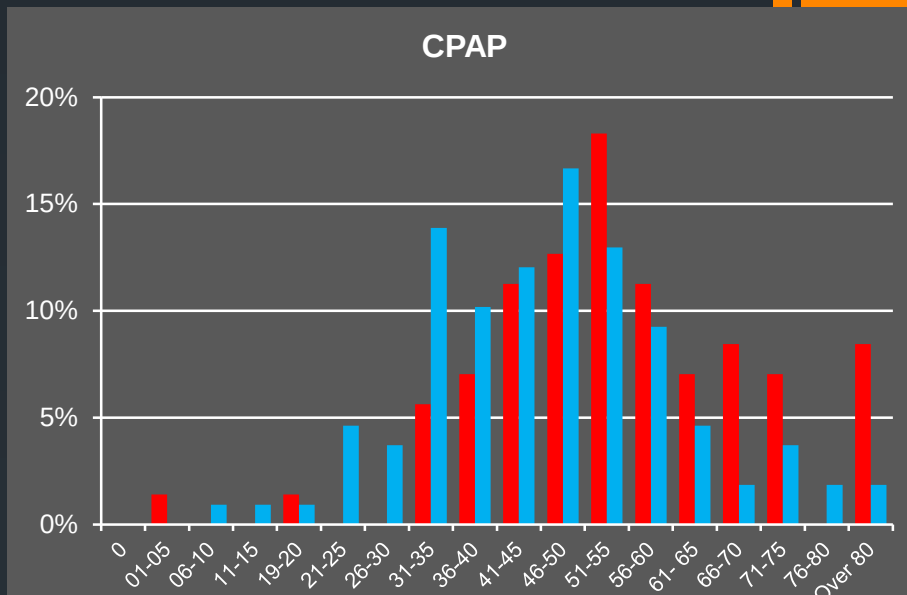
- In babies <30 weeks gestation, NWH has had an INCREASE in
  - CLD
  - Length of stay
  - Home Oxygen use

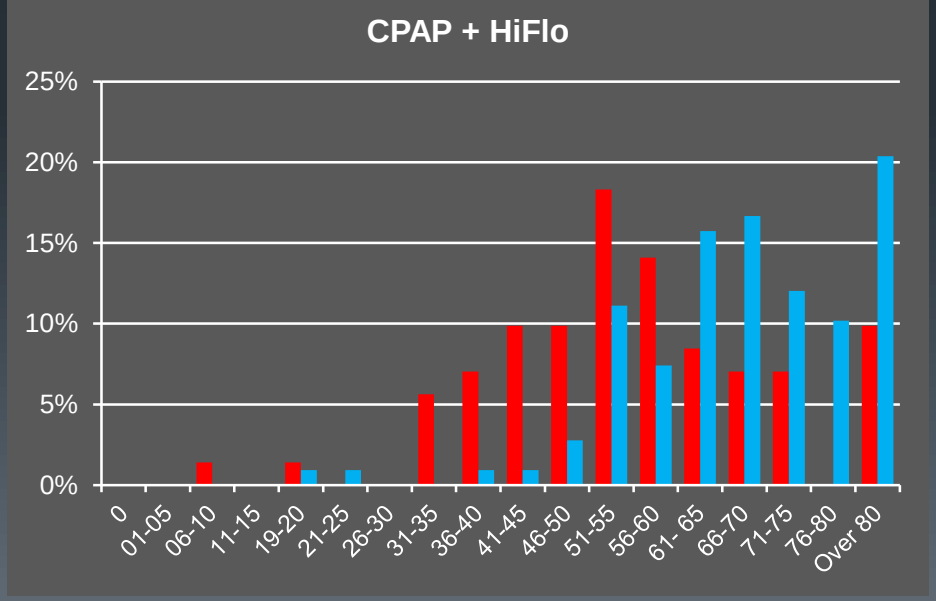
- Most of the increases are from
  - Greater use of Hi-Flow
  - Greater use of low oxygen concentrations during stay
  - Lower threshold to use home oxygen

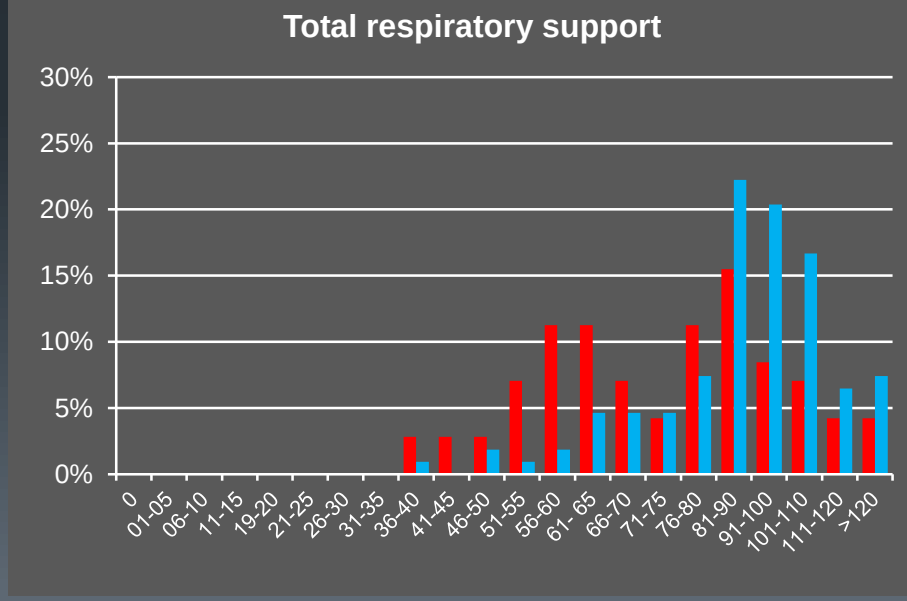
- Most of these changes are from changing treatment decisions
- Some may be because babies have been sicker (esp 24-25 weeks group)

Days on respiratory support 24-25 week babies

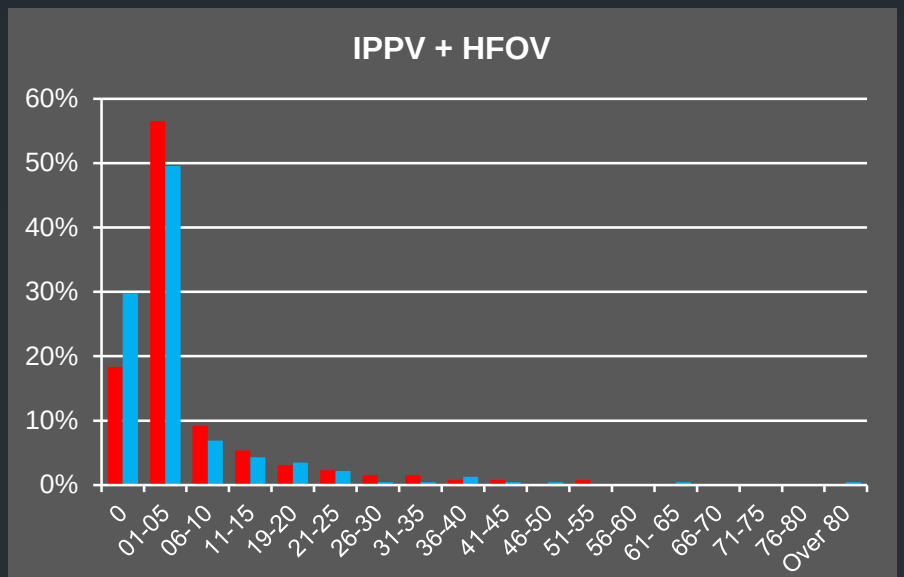


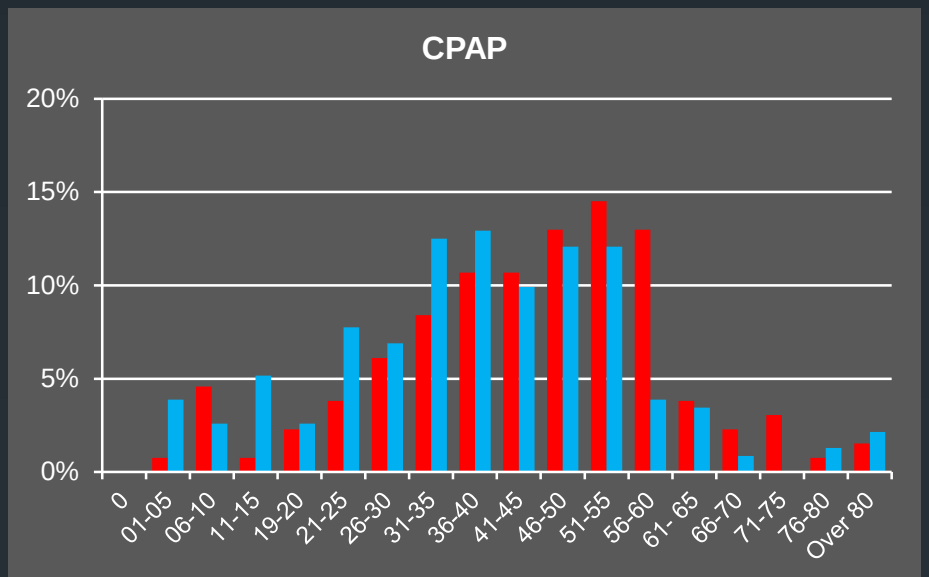


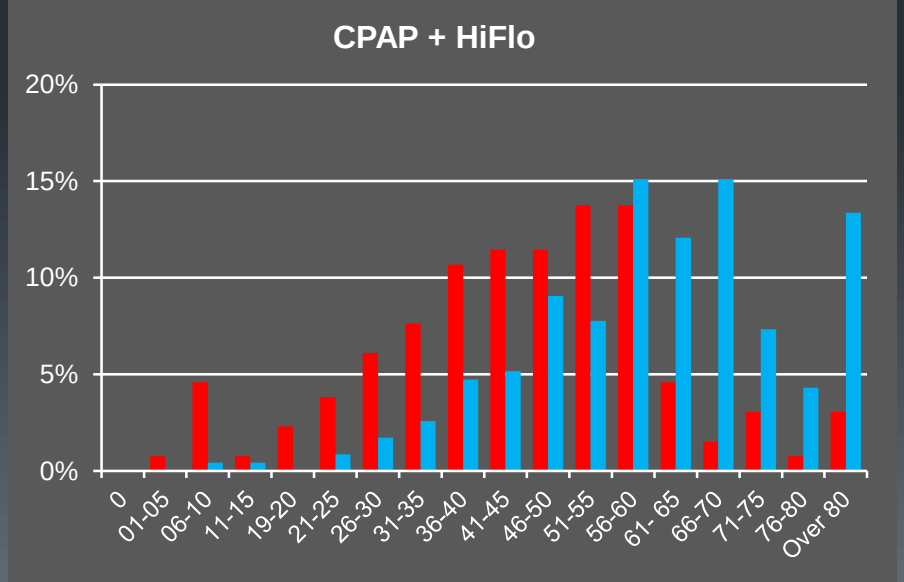


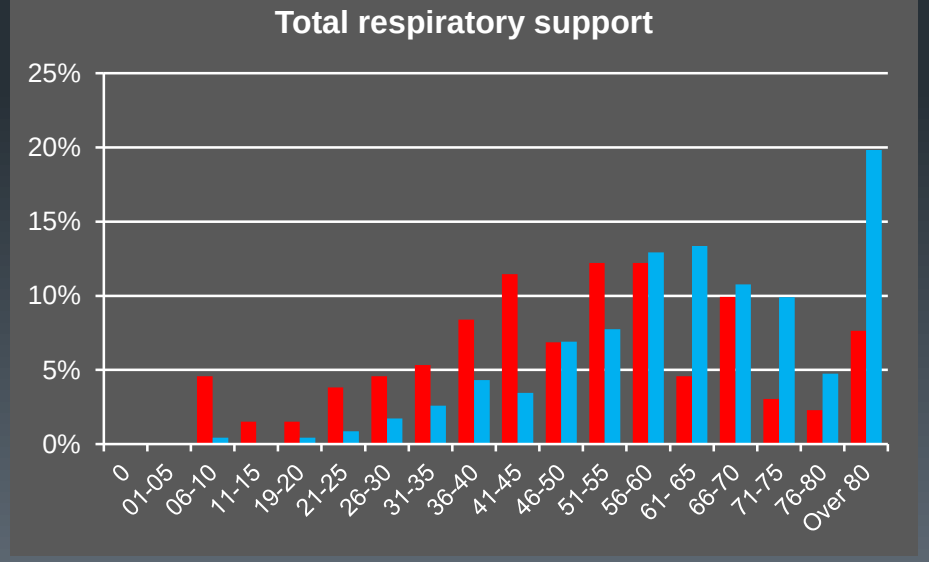


Days on respiratory support 26-27 week babies

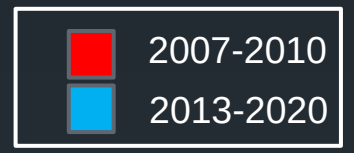


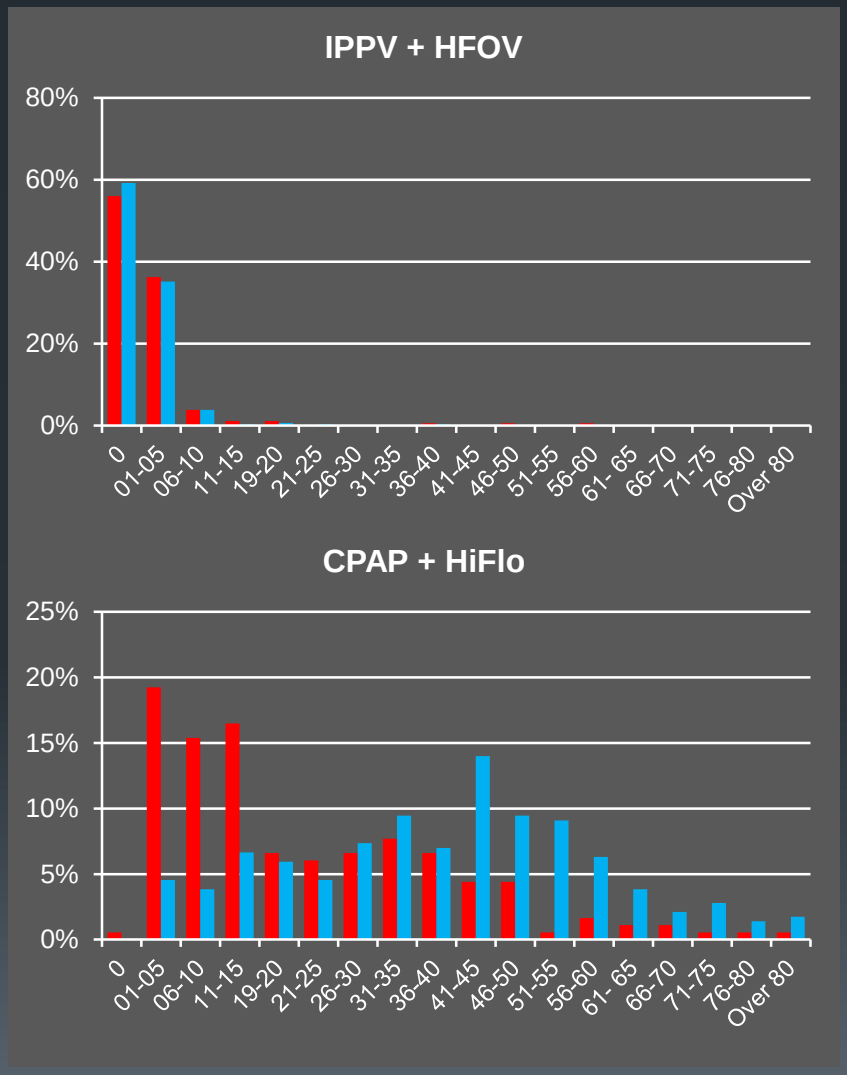


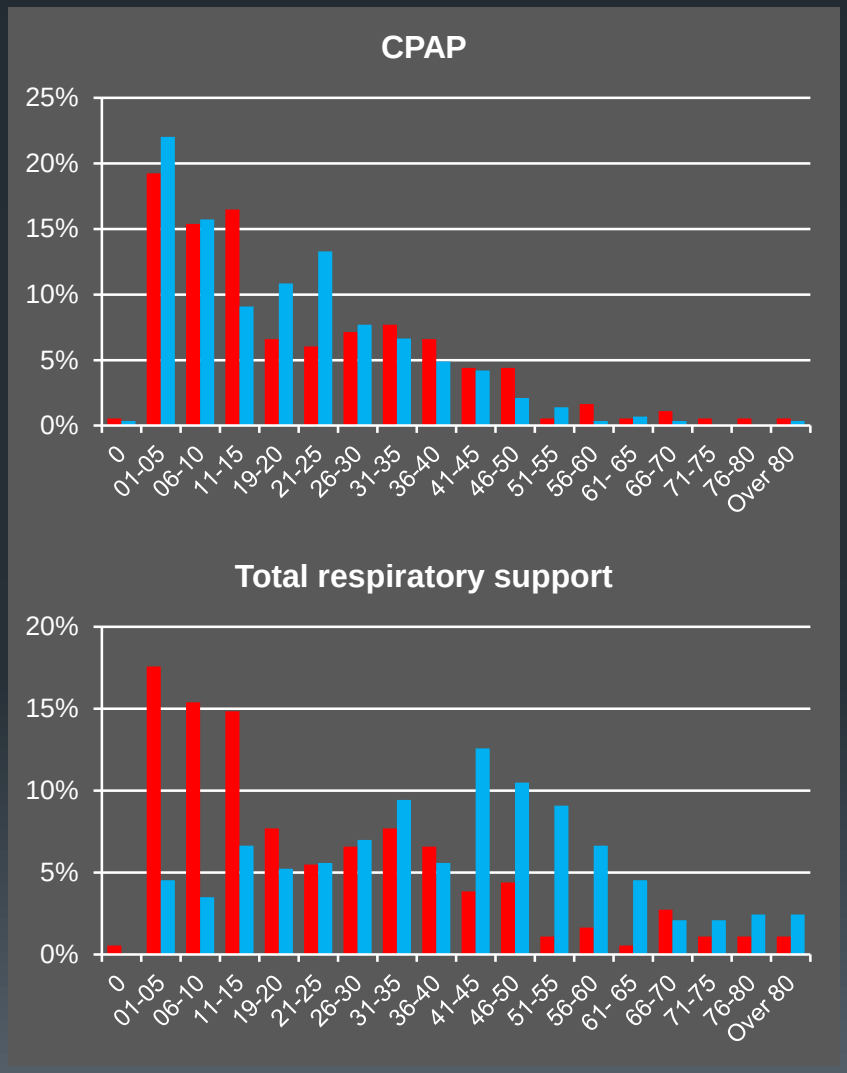




Days on respiratory support 28-29 week babies







CLD and Home oxygen by unit of discharge

	2007-10		2013-20	
	NWH	Level 2	NWH	Level 2
	CLD		CLD	
24-25w	59%	60%	92%	94%
26-27w	52%	36%	62%	62%
27-29w	17%	14%	25%	43%
	Home O_2		Home O_2	
24-25w	48%	26%	74%	65%
26-27w	43%	25%	31%	41%
28-29w	9%	8%	12%	22%