

### Aim

- Improve survival of babies born at 23-24 GA by at least 30-40% from 2018
- Reduce overall morbidity of babies born at 23-24 weeks
- 22 week GA infants are not routinely resuscitated at our site, but were included in Pilot/Audits if they were admitted to the NICU

### Importance

- The PCE NICU is a 69-bed inborn NICU located in Edmonton, Alberta
- On average, there are ~150 Extremely preterm infants admitted per year, around 30 per year admitted were <25 weeks GA
- These infants were accounting for high mortality (Figure 1) and morbidity

### Plan Development

- The MICROPREMIE working group was established late 2018 to work on QI initiatives aimed at improving care and outcomes in the <25 week population
- Kaizen event with 30+ attendees across a variety of disciplines held in 2019 to brainstorm ideas for improvement and change
- Ideas generated from event were categorized and implemented based on feasibility, cost, expected impact etc.
- Site visit to Iowa in 2019 to learn about their practices at 22-24 weeks

### Change plan

- 2019 – Now: “MICROPREMIE” focused education days for front line staff **minimum once a year**
- 2019 – Now: Improved communication with Obstetrics and MFM
  - Daily OB “Huddles” to discuss inpatients
  - Joint NICU/OB consults
  - Joint MFM/OB/NICU rounds twice per year
- March 2020 – Now: Consistent practice bundles developed based on evidence and best practices for babies born <25 weeks
  - Bundle piloted in one out of three NICU teams in 69 bed level 3 inborn unit
  - Processes and outcome measures for babies admitted to “Pilot” and “Non-Pilot” teams have been audited on redcap since roll-out in 2020
  - Ongoing review of audit data and adjustment to bundle elements
  - Survey of staff to determine gaps in bundles and barriers to being able to adhere to bundle elements

### Data

#### Example Bundle Elements and Process Measures

Process Variable	Non-Pilot	Pilot
Intubation <30 mins	71%	56%
Intubation with pre-medication	30%	52%
Surfactant within 1 hour of intubation	42%	70%
First intention high frequency	43%	100%

Table 2: Sample of Respiratory bundle process variable comparisons

Key Point	Details
1. STABILIZE	<ul style="list-style-type: none"> <li>• Immediate CPAP +/- PPV for respiratory stabilization</li> <li>• Low threshold to intubate during NRP (apneic, HR &lt;100)</li> </ul>
2. INTUBATE	<ul style="list-style-type: none"> <li>• Intubation with pre-medication (when possible) for all babies &lt;25 weeks</li> </ul>
3. SURFACTANT	<ul style="list-style-type: none"> <li>• Surfactant administration for all babies &lt;25 weeks within 30 minutes of intubation</li> <li>• Xray prior</li> <li>• Do not delay surfactant administration for UAC placement</li> <li>• Give on the ventilator: HFO &gt; AC-VG &gt; PPV</li> </ul>
4. VENTILATE	<ul style="list-style-type: none"> <li>• First intention HFJV, HFO if HFJV not available</li> <li>• Titrate / minimize pressures – wean as able after surfactant</li> </ul>

Table 1: Respiratory bundle resuscitation and stabilization key points

#### Demographics and Outcome Data

Demographics	Non-Pilot	Pilot
GA		
22	1	3
23	7	9
24	15	13
Birth Weight (g)	652 (380-845)	634 (460-645)
Full course antenatal Steroids	67%	53%
MgSO4	94%	89%

Table 3: Basic demographics comparing Non-Pilot with Pilot babies  
NB: Out-born infants were excluded  
(Data from March 2020 to November 2022)

Outcome Variable	Non-PILOT	PILOT
PDA requiring treatment	78 %	60 %
Pulmonary Hemorrhage	27 %	12 %
IVH (grade 2 or higher)	47 %	36%
BPD (Oxygen at 36 weeks)	93%	70%
Tracheostomy required for BPD	8%	0%
SIP/NEC (stage 2 or higher)	27%	25%
ROP (stage 2 or higher)	33%	32%
Survival to Discharge	56 %*	56%*

Table 4: Major morbidities comparison between Non-Pilot and Pilot babies  
\* Several babies still admitted to hospital  
NB: Out-born infants were excluded (Data from March 2020 to November 2022)

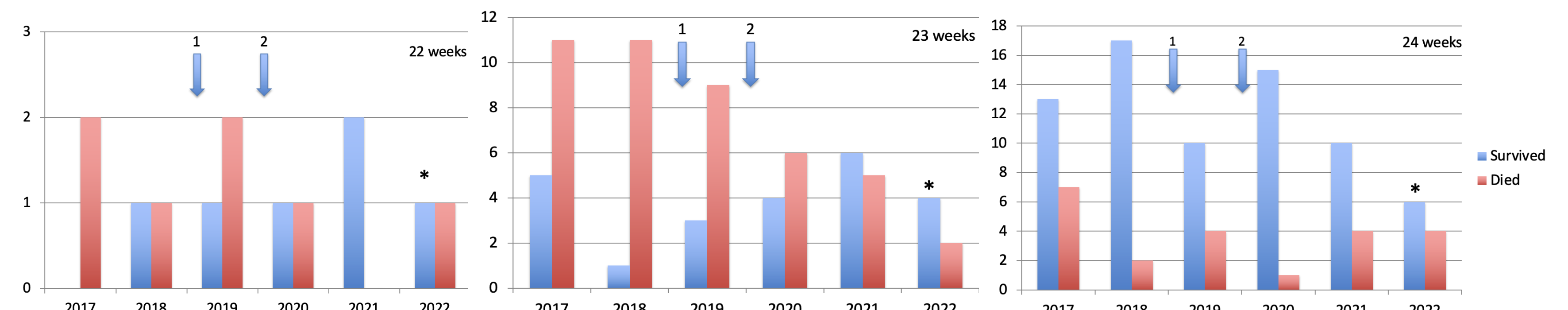


Figure 1: Death and Survival to discharge at 22-24 weeks gestation, arrow 1 indicates formation of MICROPREMIE working group and start of front-line education and improved OB communication, arrow 2 indicates standardized care bundle roll-out in pilot group \*Data from 2022 is incomplete, several babies still in hospital  
NB: 22-week GA infants are not routinely resuscitated but are included in audit if admitted to NICU

### Next Steps

- Revisions to existing bundles and development of new bundles based on audit results (revisions to respiratory and hemodynamics bundles, new fluids bundle in development)
- Unit-wide roll out of bundles with ongoing audits, incorporation of new evidence and adjustments as needed