



Experience of Care and Follow-up for Preterm Infants in Thailand

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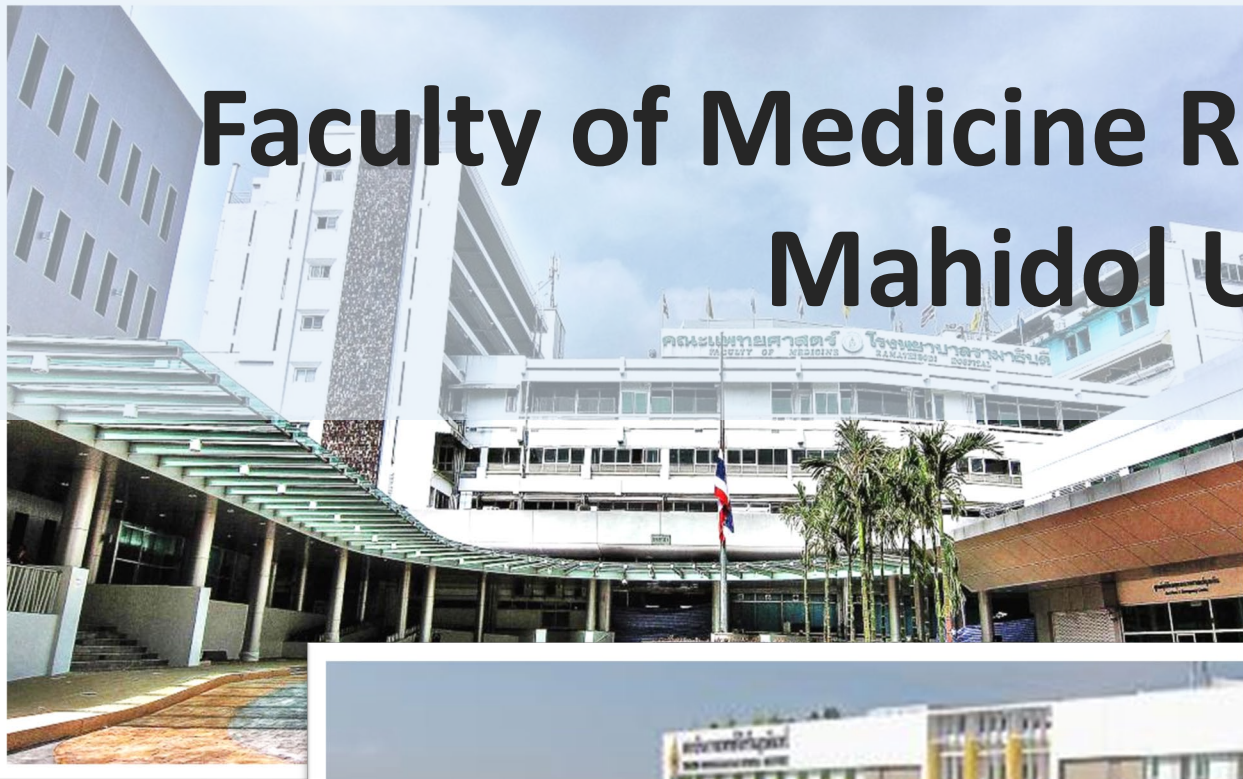
Mahidol University



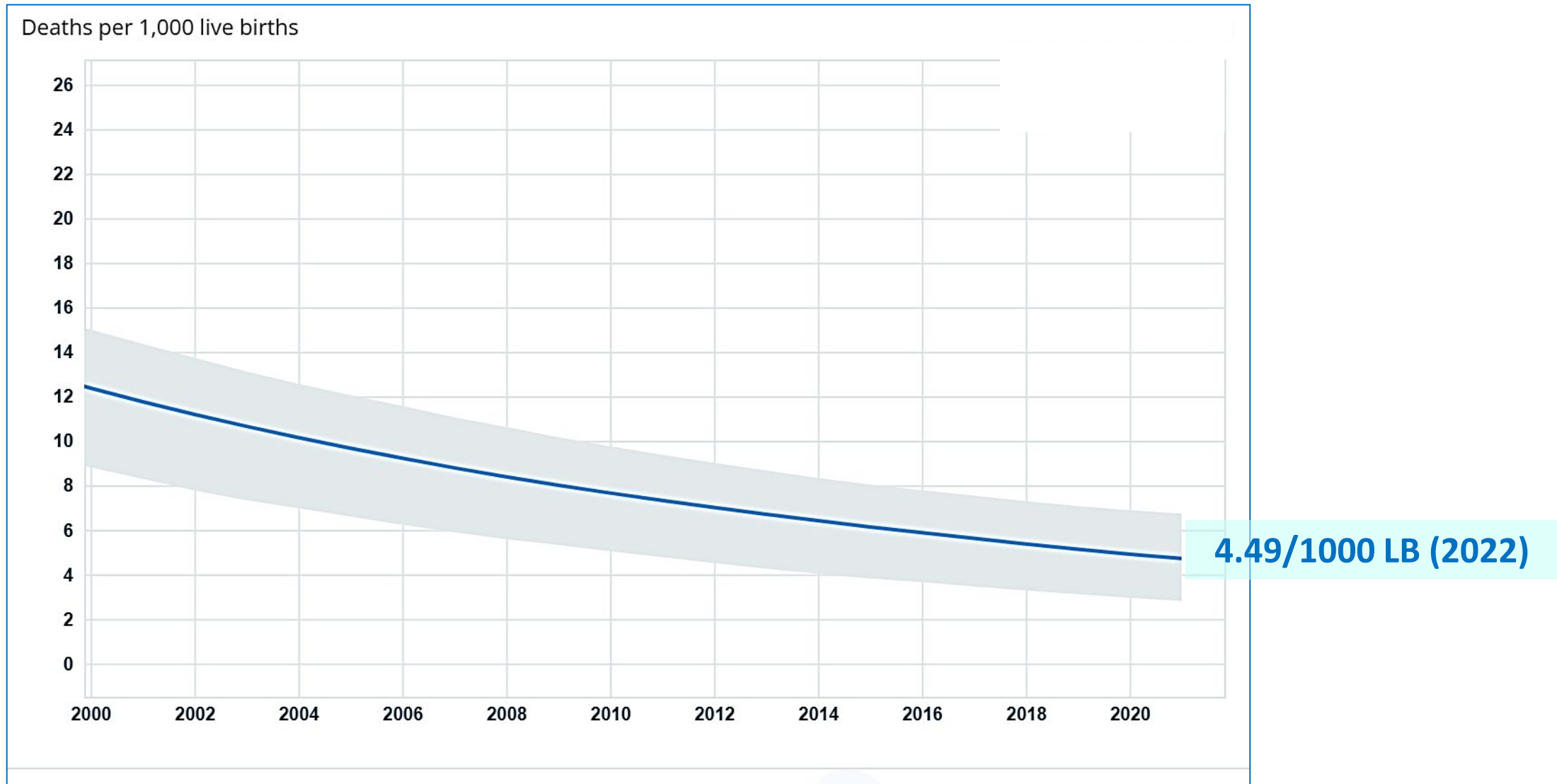
Disclosures

- **No financial disclosure**
- **No conflict of interest**

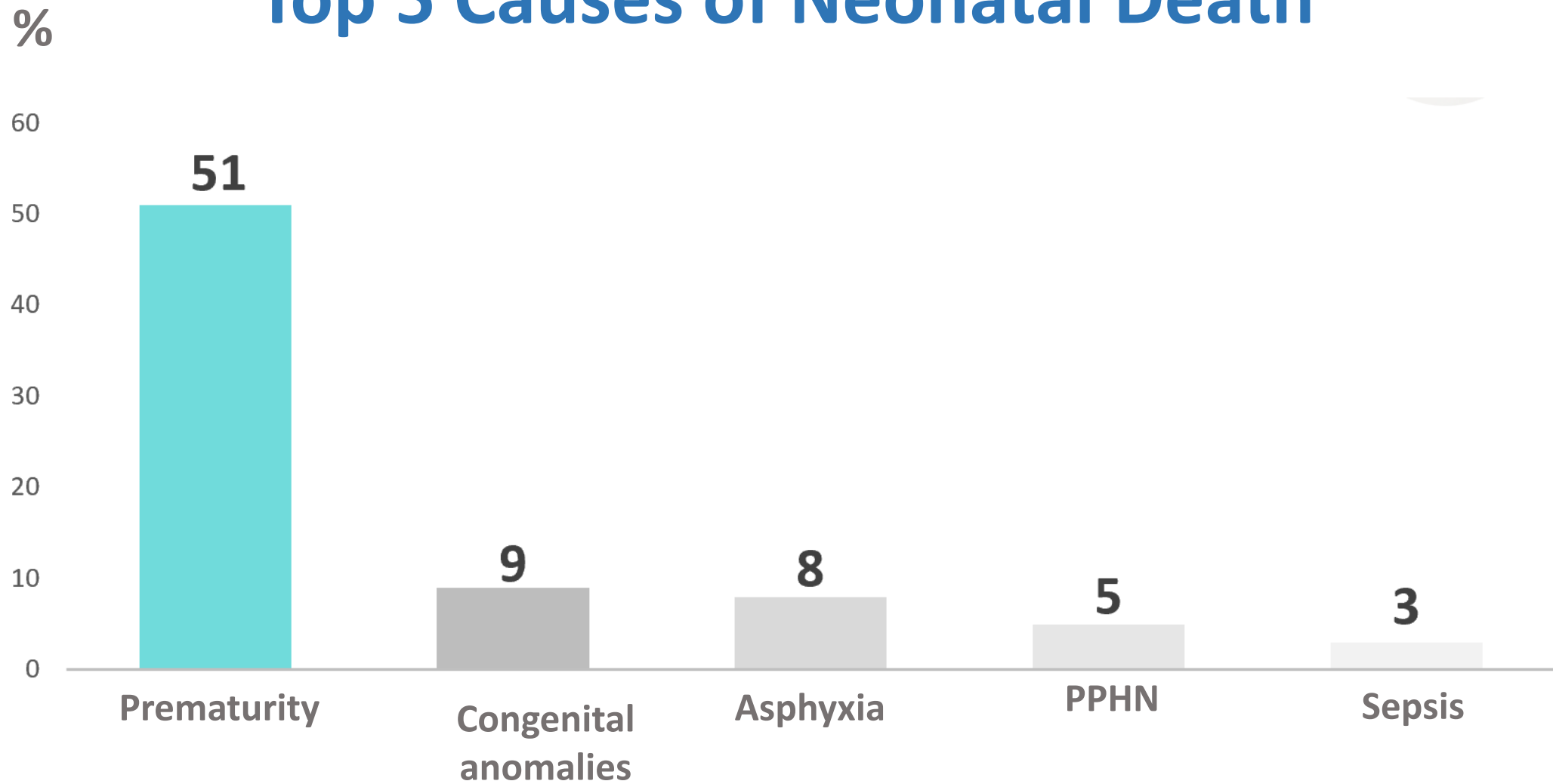
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Neonatal Mortality Rate in Thailand



Top 5 Causes of Neonatal Death

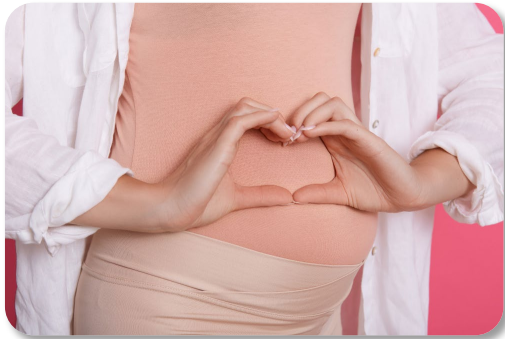


Preterm Care and Follow-up in Thailand

Prenatal

Neonatal Unit

After D/C



Variation of practice ...
“Ramathibodi’s Experience”



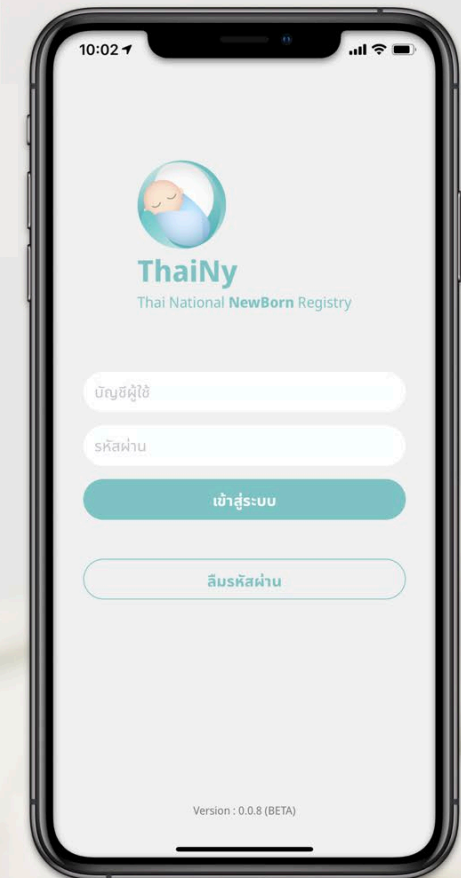


ThaiNy

 Thai Newborn Registry

Data Driven Quality Improvement

- ✓ VLBW
- ✓ HIE
- Sick Newborn
- Normal Newborn



Preterm Care and Follow-up in Thailand

Prenatal

1. Prevent preterm labor

Neonatal Unit

2. Prepare for preterm delivery

- Antenatal steroid
- Antibiotics
- MgSO₄
- Intrauterine transfer

After D/C

3. Preterm care at birth

- Adequate NRP
- Delayed cord clamp

2. Prepare for preterm delivery

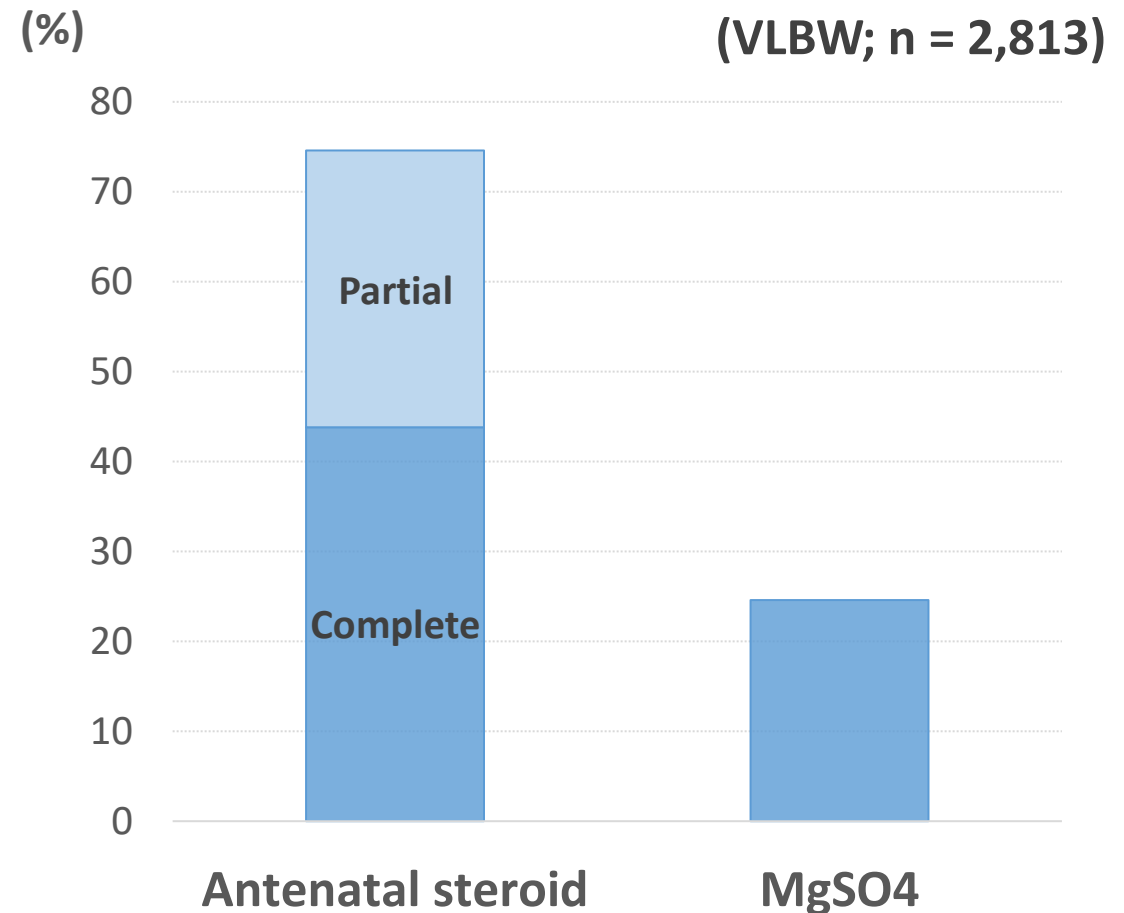


Antenatal steroid

- **Dexamethasone** 6 mg q 12 h
x 4 doses (total 24 mg)
- **Rescue course** – at least 7
days from 1st course

MgSO₄

- GA < 28-32 weeks
- Loading 4-5 g, MT 1-2 g/kg/h
- Prior to delivery

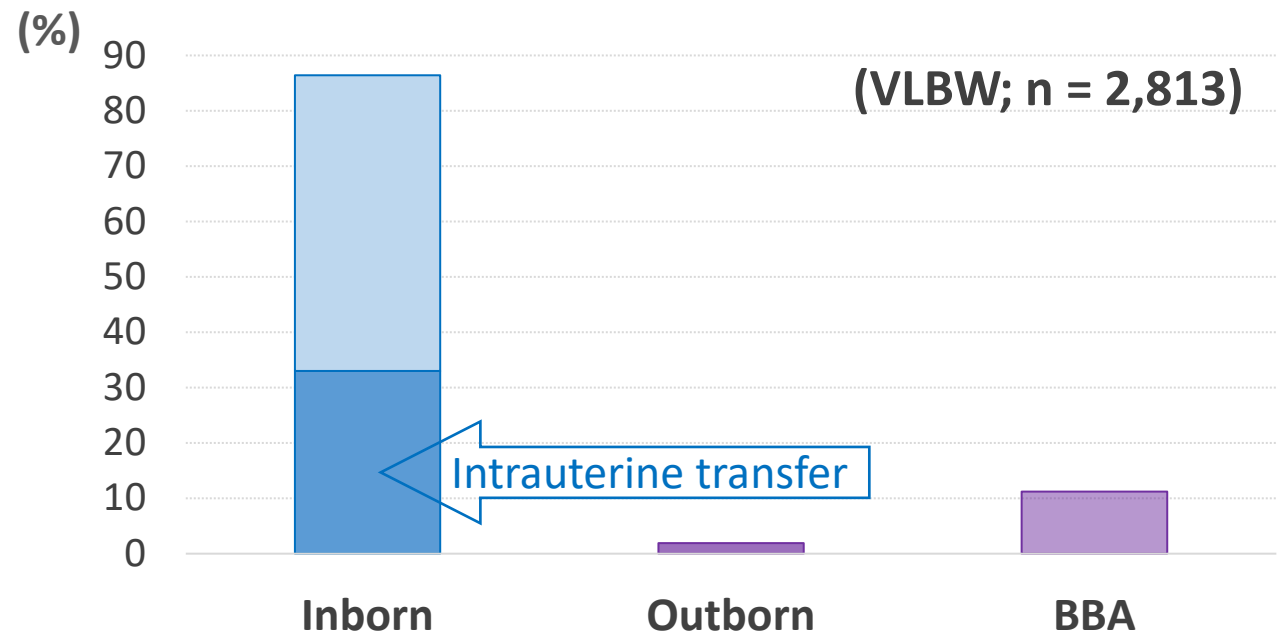


2. Prepare for preterm delivery



Intrauterine transfer

- Preterm delivery in equipped hospitals improves neonatal outcomes.
- For mothers with high-risk **premature labor** => Transfer to hospitals that can handle premature infants



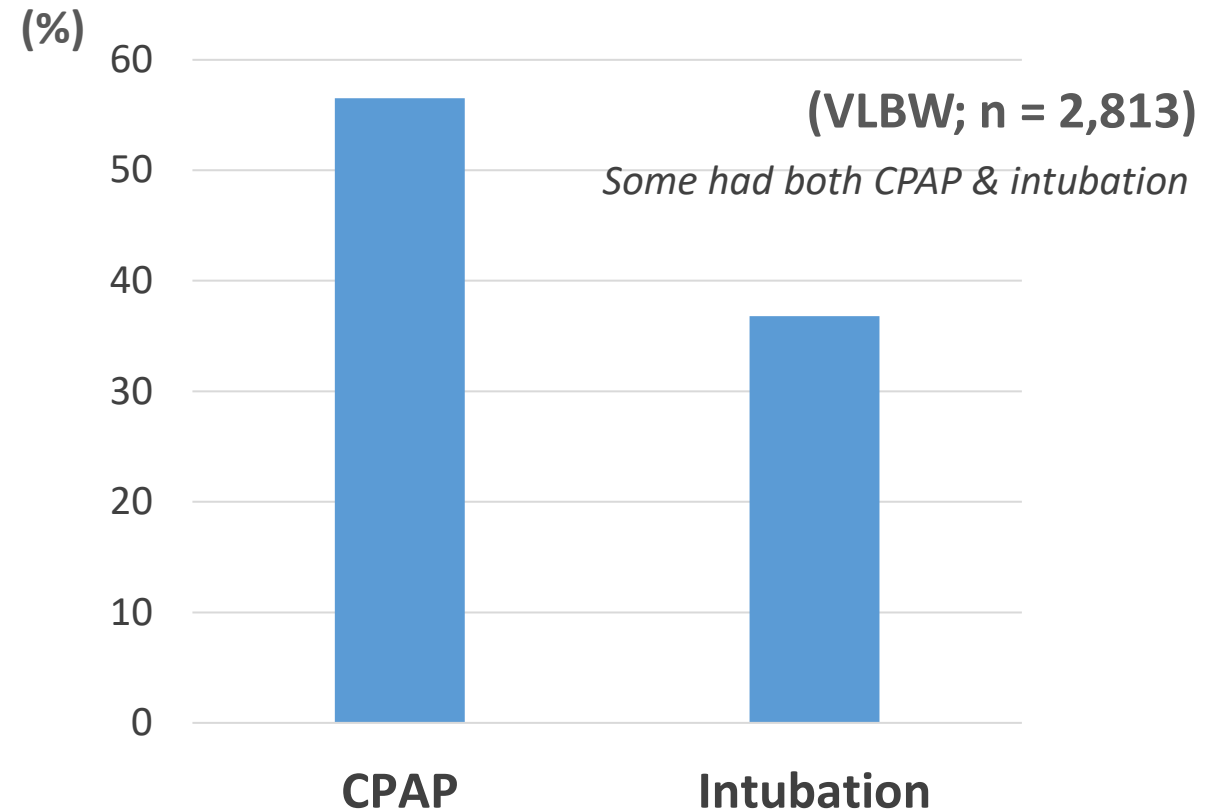
3. Preterm care at birth



Adequate newborn resuscitation

- T-piece resuscitator device
- Early CPAP with 5 cmH₂O
- PPV
 - PIP 20-25, PEEP 5-7
 - FiO₂ 0.3
- Surfactant NOT given at DR/OR

During resuscitation at birth

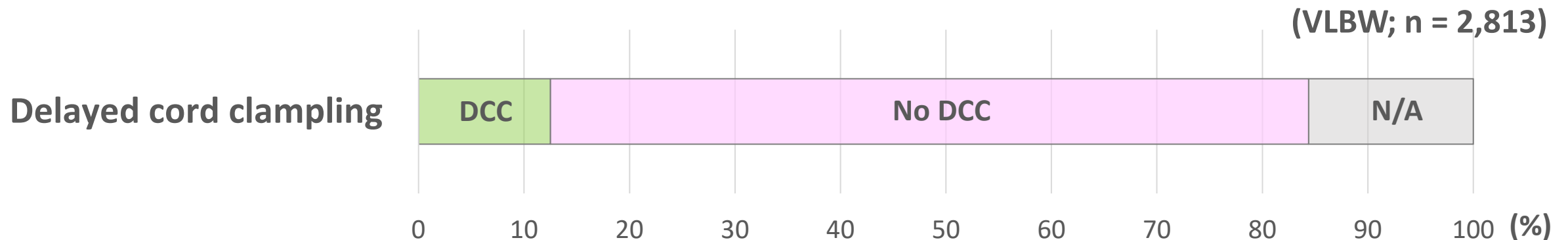


3. Preterm care at birth



Delay cord clamping

- Done in all preterm infants
- Not done in preterm with
 - Placental circulation not intact / Non vigorous
 - Twins / Multiples
- Usually **NOT** provide umbilical cord milking



Preterm Care and Follow-up in Thailand

Prenatal

Neonatal Unit

After D/C



1. Well-trained Staffs

- Doctors
- Nurses
- Other personnel

2. Appropriate equipment

- Monitoring
- Treatment

3. Treatment Guideline

4. Screening Program

5. Developmental Care

3. Treatment Guideline – RS support in NICU



- CPAP as a primary mode
- Intubation if
 - $FiO_2 > 0.3-0.5$
 - Increased WOB
 - Frequent apnea
 - Severe RS acidosis
- MV mode
 - CMV – AC / SIMV + PS / VTV (VG)
 - HFOV only => early rescue
 - NAVA – rarely use

RS support during hospitalization

- VLBW ($n=2,813$)

➤ Mechanical Ventilator = 97.6%

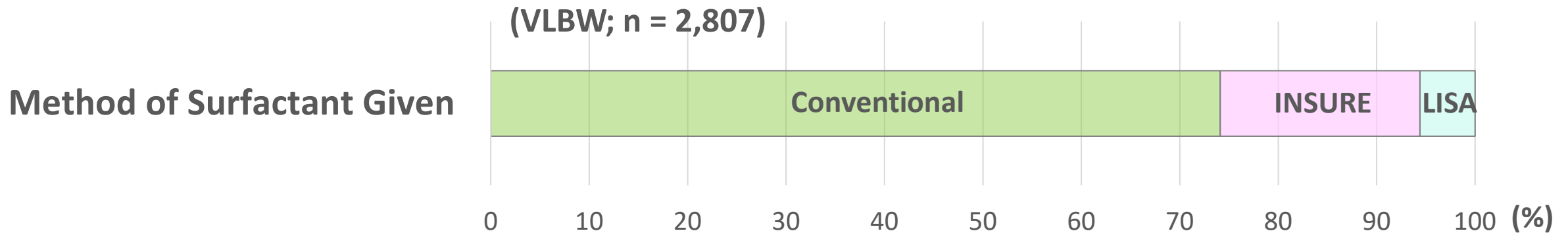
	Invasive (days)	Non-invasive (days)
BW < 1,500 g ($n=2,813$)	9.1	18.2
BW < 1,000 g ($n=840$)	19.0	28.0

3. Treatment Guideline – RS support in NICU



- **Surfactant** - if $FiO_2 > 0.3$ or increased WOB
 - Conventional method
 - INSURE
 - LISA

	VLBW (n=2,807)	ELBW (n=839)
RDS	69.3 %	86.1 %
Surfactant use	46.1 %	66.8 %



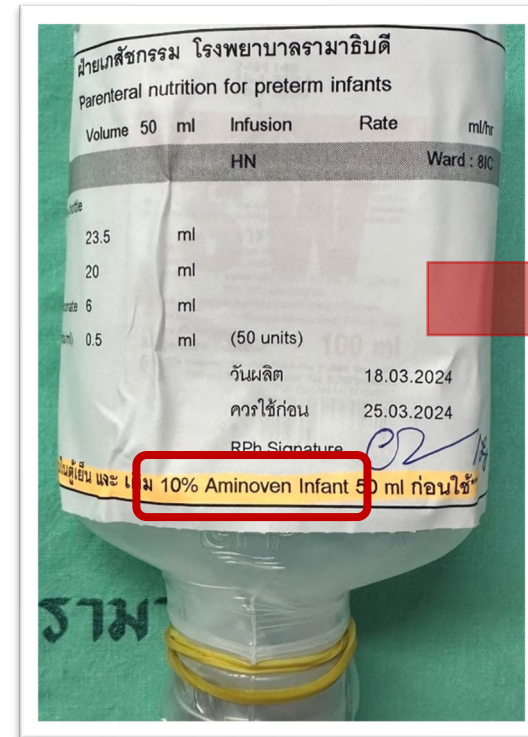
3. Treatment Guideline – RS support in NICU

- **Surfactant** - if $FiO_2 > 0.3$ or increased WOB
 - Conventional method
 - INSURE
 - LISA
- **Point-of-care ultrasound (POCUS)**
 - Lung ultrasound
 - Targeted echo (TnECHO)
- **Postnatal corticosteroids**
 - DART regimen for extubation
 - Inhaled steroids -> high risk for BPD



3. Treatment Guideline – Nutrition support

- Total fluid intake
 - 60-80 -> gradually increase to 160-170 ml/kg/day
- Early start with PN
 - Standard PN - DOL 1
 - Customized PN - DOL 2-3



Composition per bottle	
Sterile Water	23.5
50% Dextrose	20
10% Calcium gluconate	6
Heparin (100 units/ml)	0.5

3. Treatment Guideline – Nutrition support

- Total fluid intake
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- **PICC line** for prolonged IV administration



3. Treatment Guideline – Nutrition support



- **Total fluid intake**
 - 60-80 -> gradually increase to 160-170 ml/kg/day
- **Early start with PN**
 - Standardized PN - DOL 1
 - Customized PN - DOL 2-3
- **PICC line** for prolonged IV administration
- **Early feeding**
 - Breast milk / Donor human milk
 - HMF fortification at 80-100 ml/kg/day
 - Feeding protocol
 - Probiotics - only some centers



Feeding during hospitalization

- **Start feed** **3.8 days**
- **Full feed** (120 ml/kg/d) **14.2 days**

4. Screening program for premature infants

Day 1-3

- **1st HUS** for IVH
- TnECHO for PDA (extremely preterm)
- **Thyroid screening** +/- Expanded metabolic screening (EMS)

Day 7-10

- **2nd HUS** for IVH

Day 14-21

- **Anemia, Osteopenia** -> q 1-3 weeks as indicated
- **TFT (FT4, TSH)** -> q 2-4 weeks (+/- repeated EMS for abnormal 1st result)

Day 28

- **ROP screening**
- **HUS** for PVL

Prior to discharge

- **Hearing screening**

5. Developmental care

- **Environment**
 - Good design unit
 - Nest, water-in-glove, clothes
- **Nursing care**
 - Gentle, minimal handling and cluster of care



Photo Courtesy of parents and N. Tongsaewang

5. Developmental care

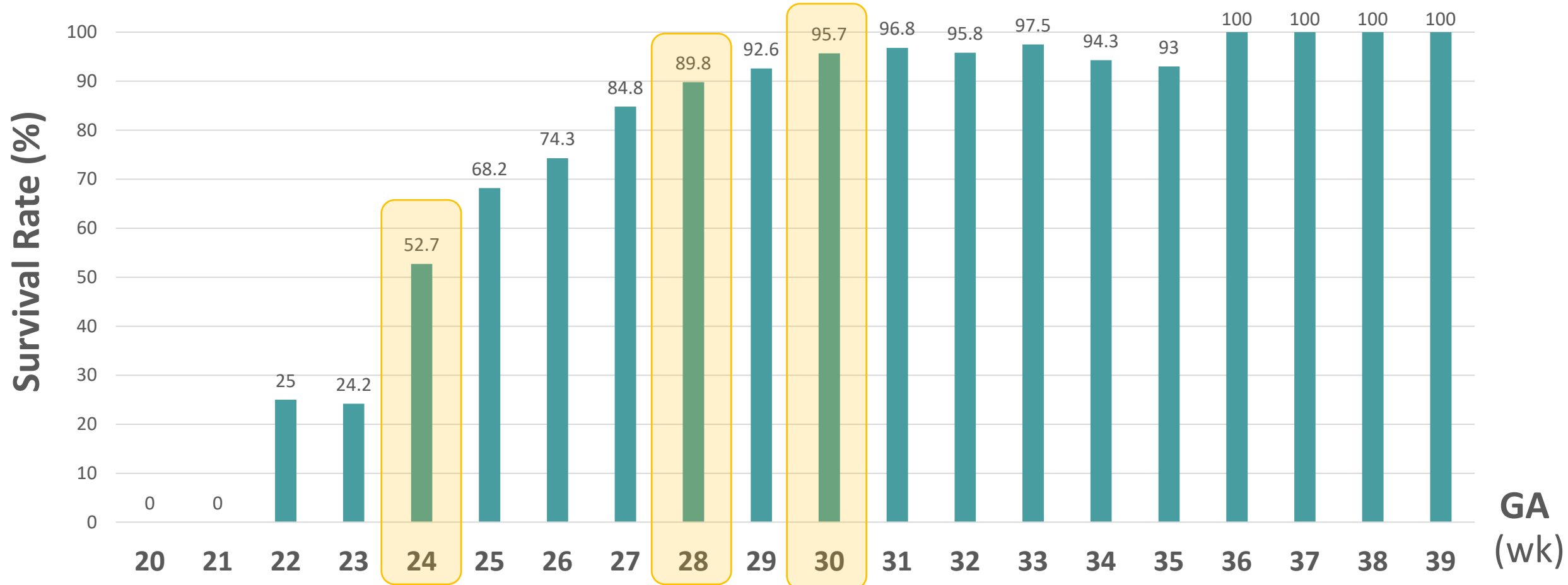
- **Environment**
 - Good design unit
 - Nest, water-in-glove, clothes
- **Nursing care**
 - Gentle, minimal handling and cluster of care
- **Kangaroo mother care**
- **Parent support group**
- **Discharge planning**



Photo Courtesy of parents and N. Tongsavang

Hospital Outcomes

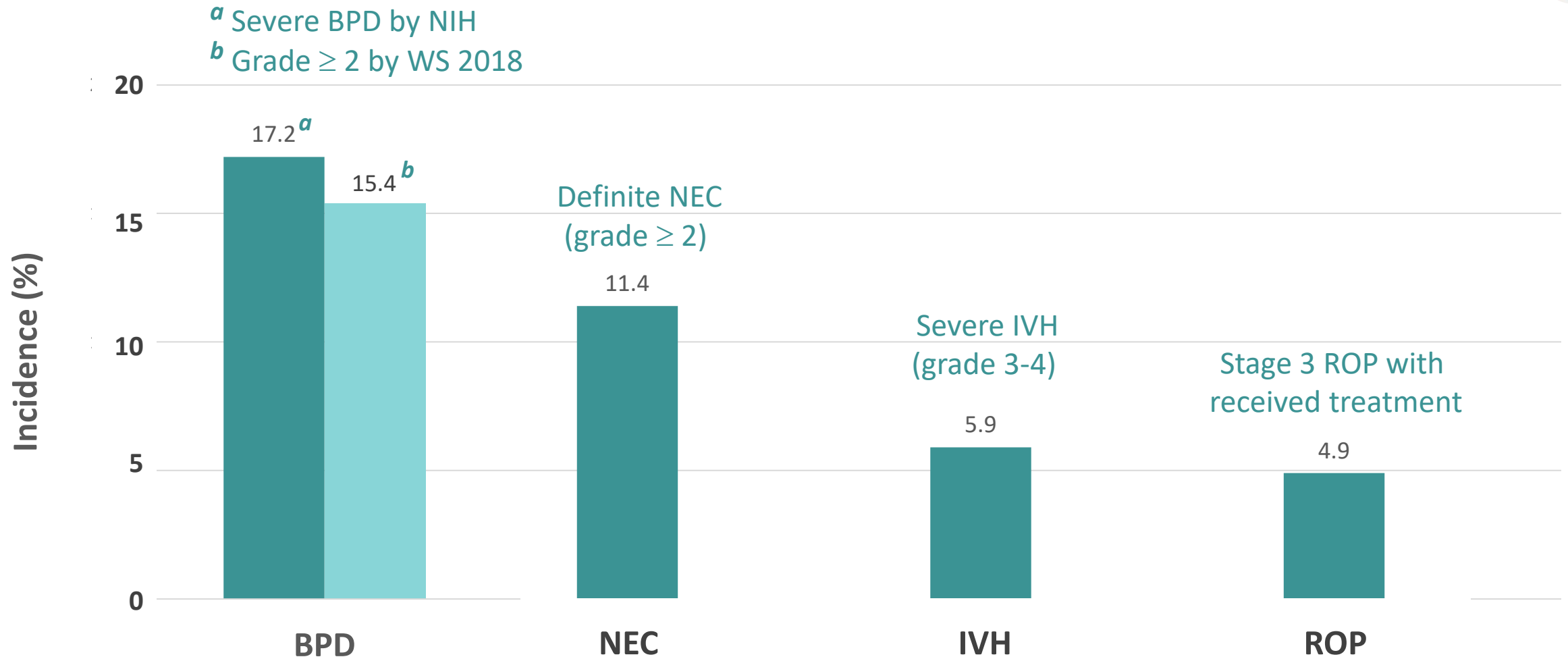
Survival Rate by GA (n = 2,813)



Survival (n)	0	0	1	8	49	90	130	207	317	361	465	426	182	115	66	40	20	12	6	1
Total (N)	1	2	4	33	93	132	175	244	353	390	486	440	190	118	70	43	20	12	6	1

Data from Thai Newborn Registry (ThaiNy), Cumulative data from Oct 2019- Jul 2023

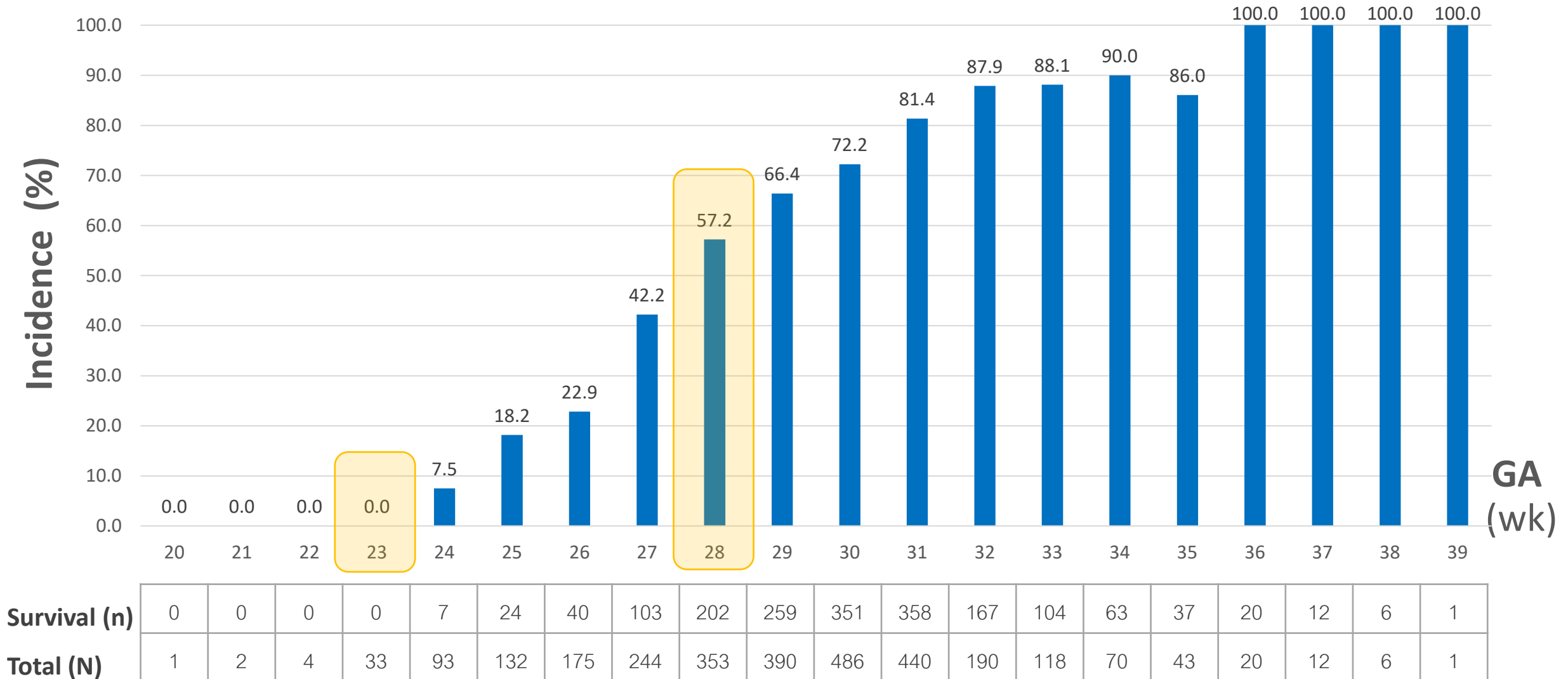
Major morbidities of VLBW infants (n = 2,813)



Survival without Major Morbidity by GA (n = 1,556)



(Major Morbidity = BPD grade ≥ 2 (WS 2018) or severe (NIH), NEC stage ≥ 2 , ROP stage 3 with Px, IVH 3-4)



Preterm Care and Follow-up in Thailand

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Neonatal Unit

After D/C

Follow-up program

- High-risk / Continuity clinic
- Multidisciplinary team => **“ONE STOP Clinic”**
 - Nutrition, Child-Dev, Chest, PT/OT, Neuro
 - Eye, Hearing
- Focus on ...
 - Growth, development, other common problems



Ramathibodi Continuity Clinic



	2 m	4 m	6 m	9 m	12 m	15 m	18 m	2 y	2.5 y	3-6 y (yearly)	6-8 y (yearly)
Neonatologist - Growth & Nutrition - ND Screening (<i>Denver</i>) - Vaccination - Other conditions											
Hearing test			1 st F/U	Every 6-12 months							
Child development - Developmental Test							Bayley			Pre-academic skill (3-4 y)	
PT / OT											
Others: - Chest/ GI / Nutrition	As indicated										
Neurology											

Major Neurodevelopmental Impairment at 2 years old



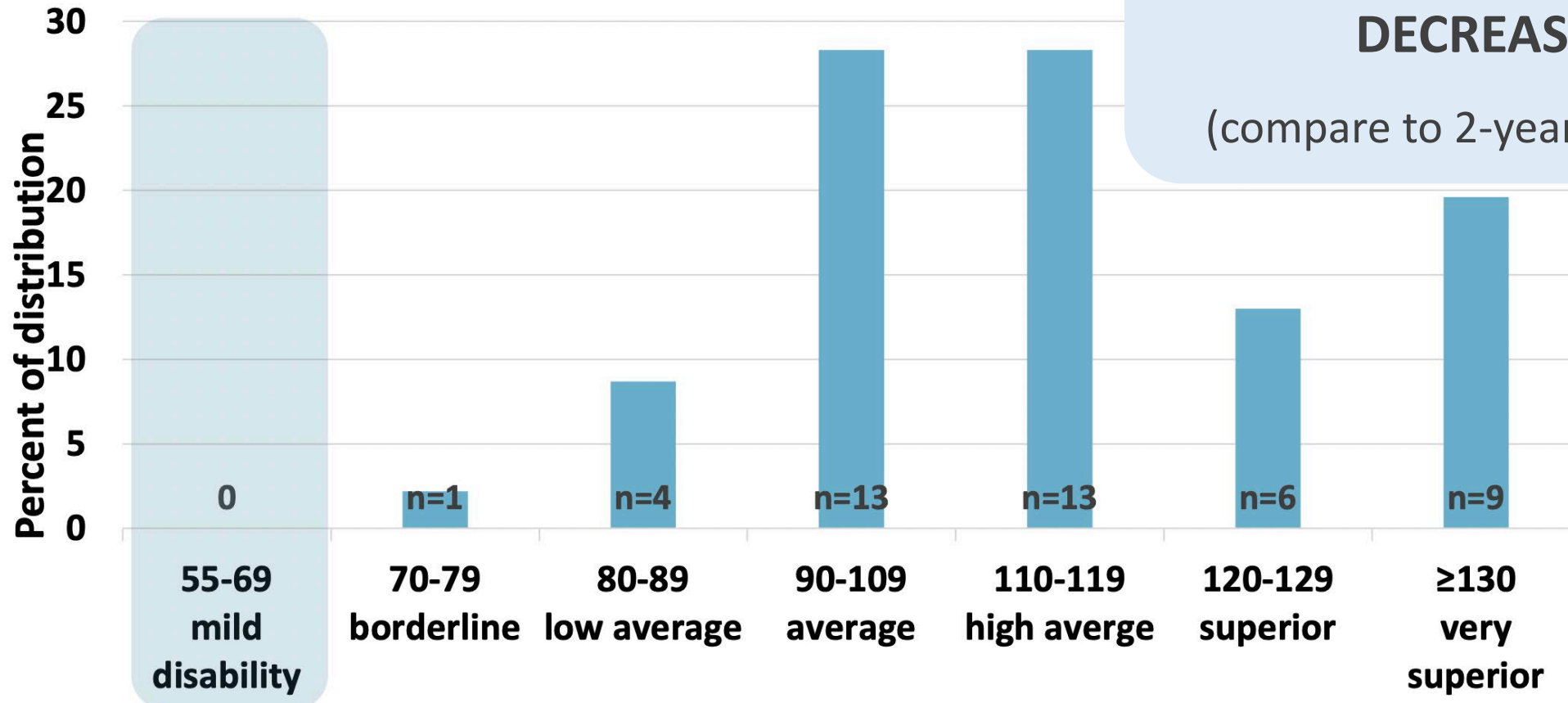
Age at last follow-up, median (IQR) = 4 (3-7) years, (N=243)

Major neurodevelopmental impairment	n(%)
Bilateral blindness	3 (1.2)
Bilateral sensorineural hearing loss	1 (0.4)
Severe cerebral palsy (GMFCS \geq 4)	3 (1.2)
Cognitive impairment	
- GDD	10 (4.1)
- BSID-II < 70	22 (9.1)
Any major neurodevelopmental impairment	38 (15.6%)

Neurodevelopmental Evaluation at ≥ 6 years old



Distribution of WISC-III scores (N=46)

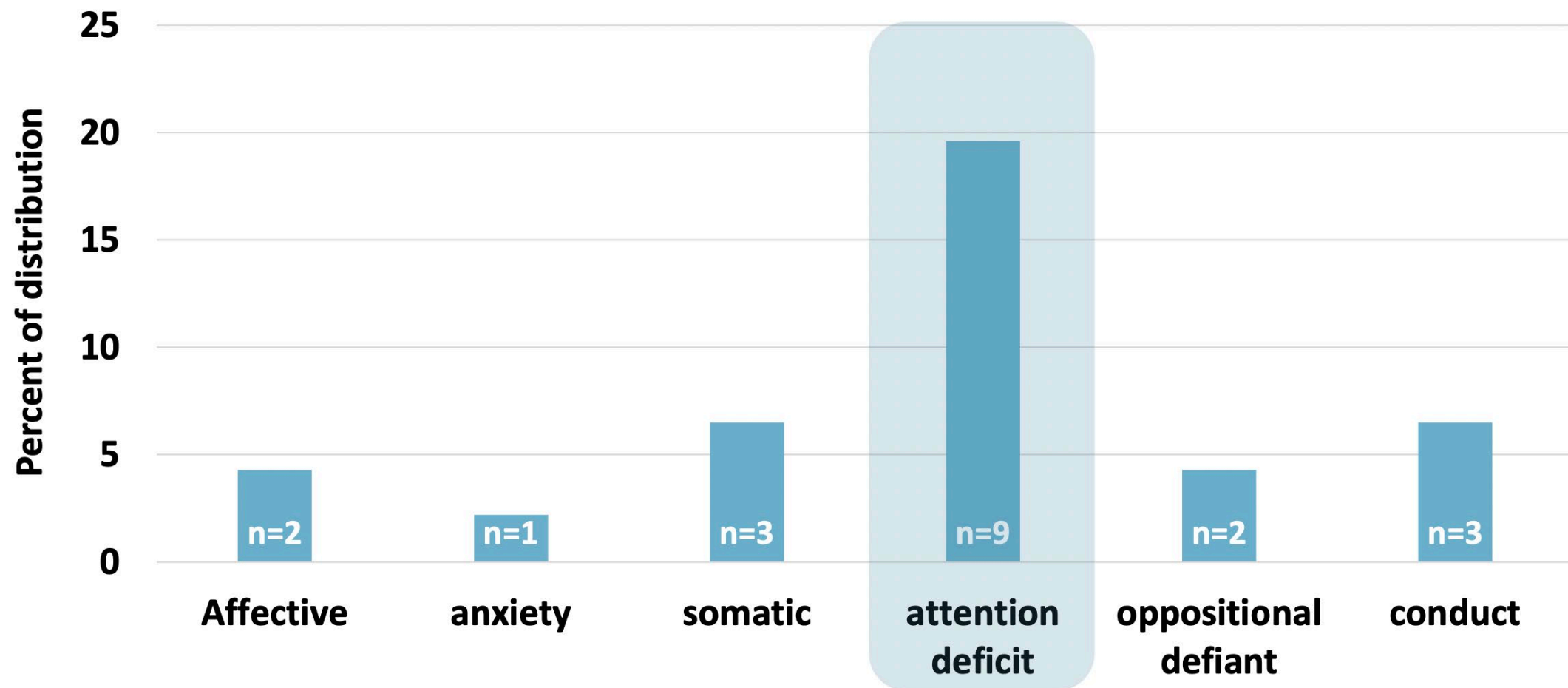


Severe cognitive impairment

DECREASING

(compare to 2-year evaluation)

DSM – Oriented Scales at ≥ 6 years old (n=46)





Thank you

謝謝

ขอบคุณค่ะ

