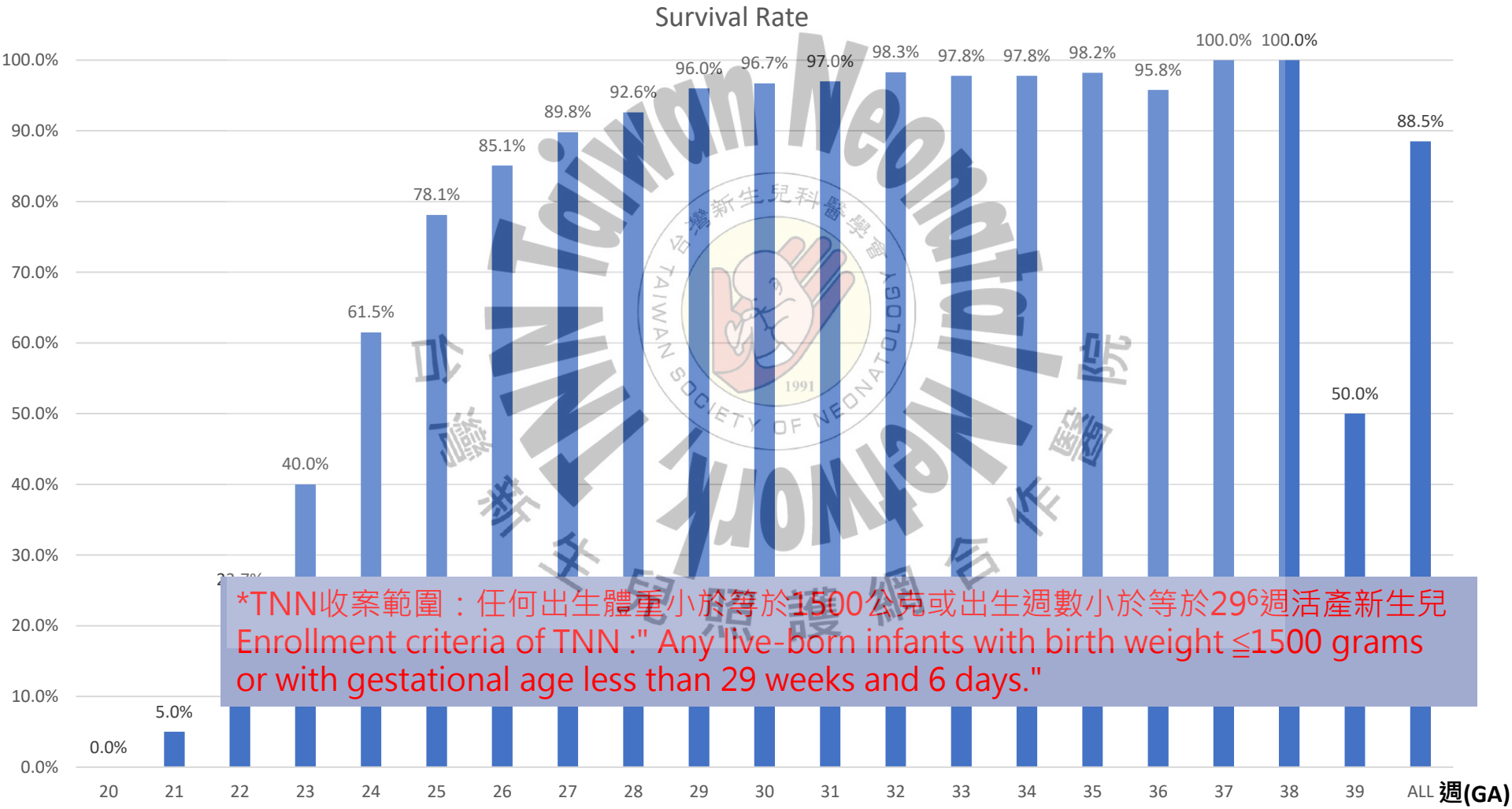
Annual Report

2026年台灣新生兒醫療聯合網絡年度報告

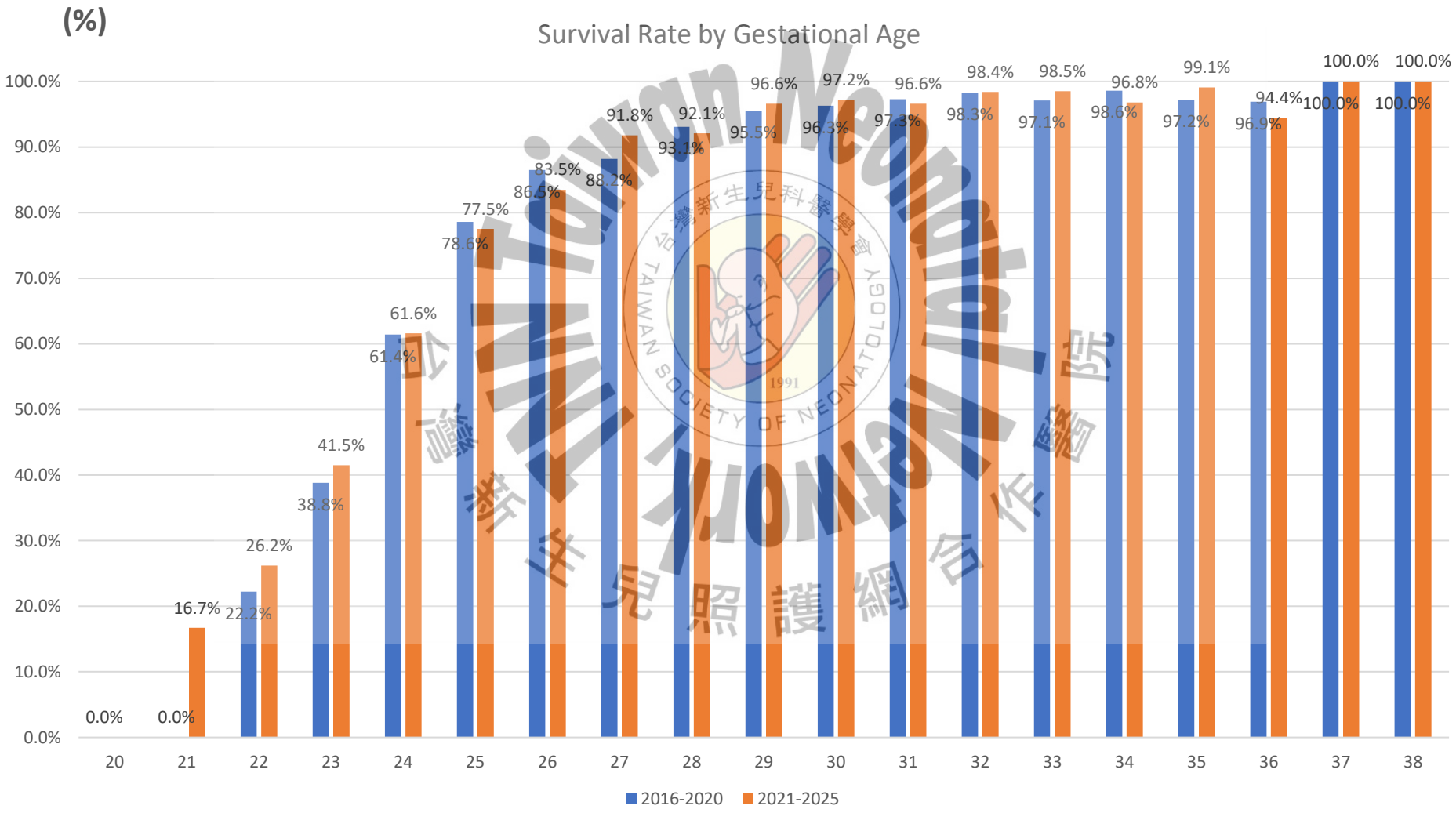
TNN2016-2025年新生兒週數別存活率
Survival rate of TNN in 2016-2025



*TNN收案範圍：任何出生體重小於等於1500公克或出生週數小於等於29[6]週活產新生兒
Enrollment criteria of TNN :" Any live-born infants with birth weight ≦1500 grams or with gestational age less than 29 weeks and 6 days."

N Survival rate by gestational age

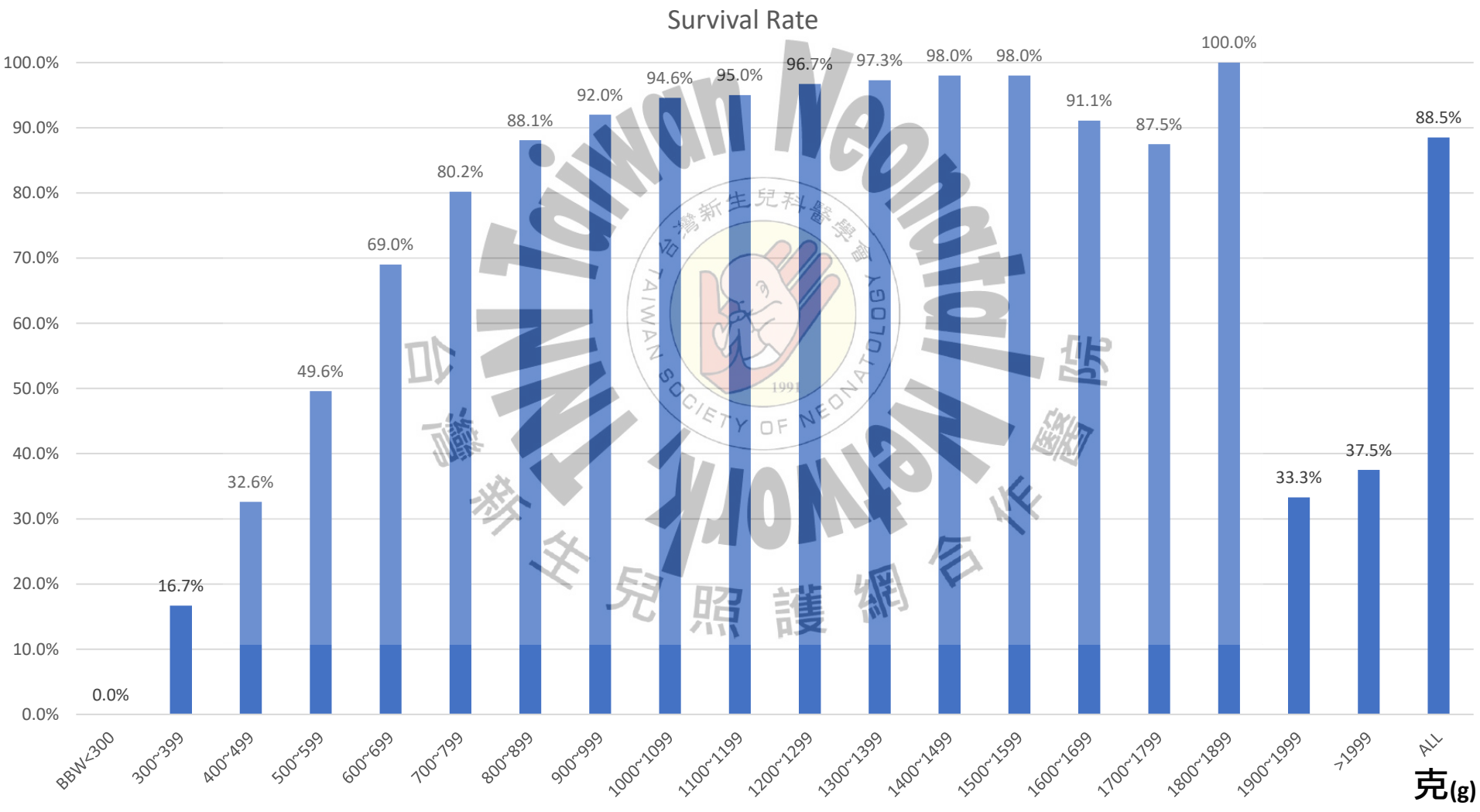
TNN2016-2025年新生兒週數別存活率
Survival rate of TNN in 2016-2025



N= 11853

Survival rate by gestational age

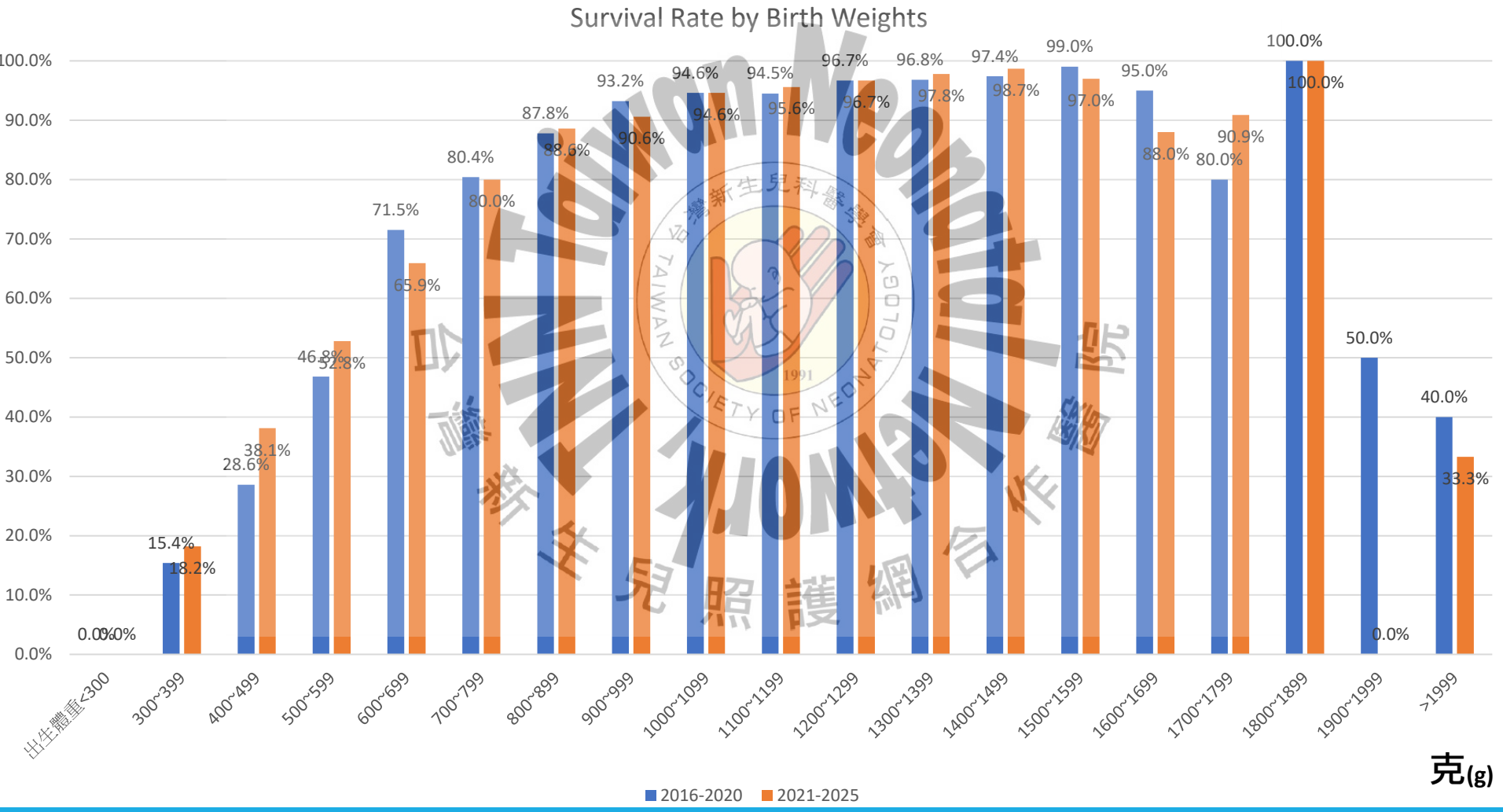
TNN 2016-2025年 新生兒體重別存活率
Survival rate of TNN in 2016-2025



N= 11853

Survival rate according to birth weights

TNN2016-2025 新生兒體重別存活率
Survival rate of TNN in 2016-2025



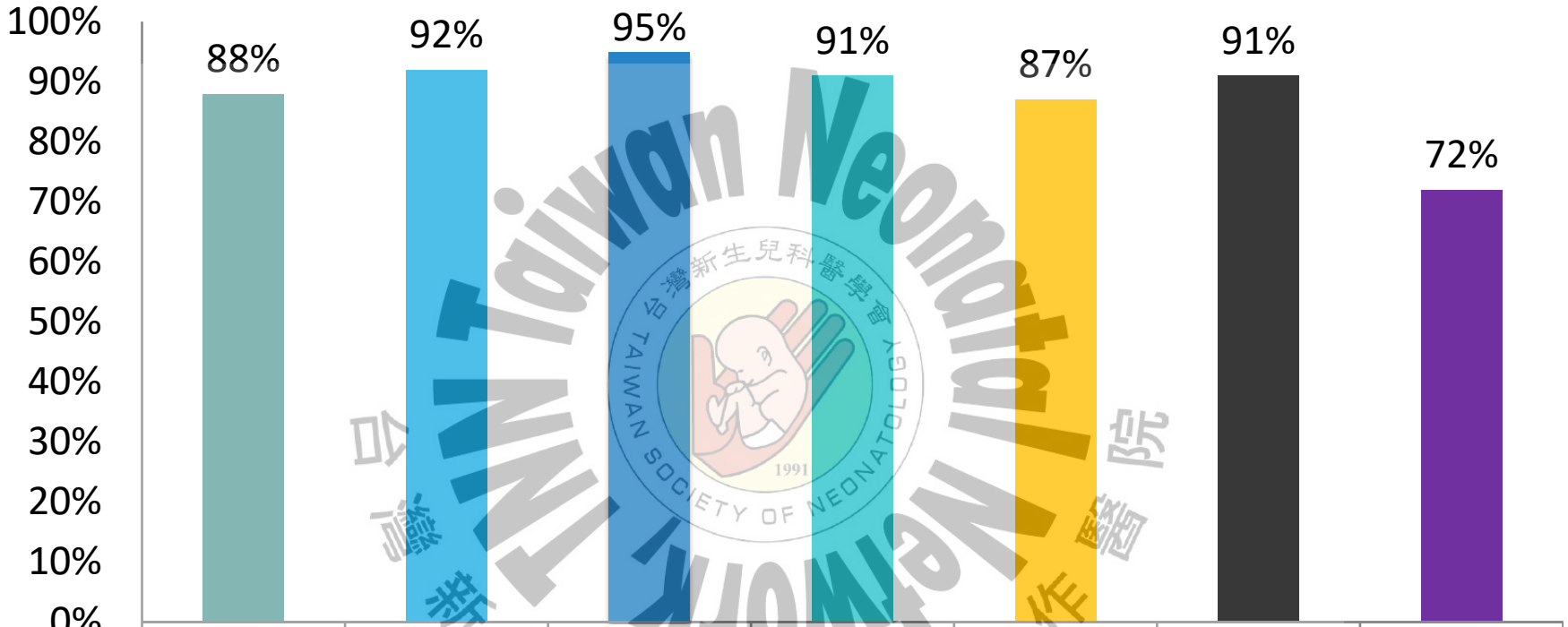
N= 11853

Survival rate by birth weights

各國新生兒照護系統名稱	縮寫
Taiwan Neonatal Network	TNN
Premature Baby Foundation Network of Taiwan	PBFT
Canadian Neonatal Network	CNN
Institute of Child Health Development	NICHD
Neonatal Research Network	NRN
Neonatal Research Network of Japan	NRNJ
The International Network for Evaluation of Outcomes	i-Neo
Korean Neonatal Network	KNN

<1500克(VLBW)新生兒各國照護系統存活率

Survival Rates in Various Neonatal Network Systems of VLBW



	TNN (2016-2024) (n=10695)	iNeo (2012-2015) (n=73427)	NRNJ (2016-2019) (n=16929)	CNN (2016-2020) (n=14584)	KNN (2013-2020) (n=16351)	PBFT (2016-2020) (n=5436)	NICHD (2003-2007) (n=9575)
■ Survival rate	88%	92%	95%	91%	87%	91%	72%

*部分收案範圍差異:NRNJ為GA<32 wks之VLBW ； PBFT含等於1500 g個案 ； NICHD為≦28週之VLBW

採福佛特牛津網(Vermont Oxford Network)相同的參數與統計選項
Referenced from VON: Same Parameters and Statistical Options

Antenatal steroids	孕期使用類固醇
Multiple gestation	多胞胎
Cesarean section	剖腹產
Any major birth defect	先天性重大缺陷
APGAR at 1 min <4	阿帕嘉分數
Admission temperature<36。C	入院第一小時所測得溫度
Any resuscitation	初始復甦
Chorioamnionitis	絨毛膜羊膜炎
Maternal hypertension	妊娠高血壓
Mortality	死亡個案
Mortality excluding early death	排除早期死亡個案
Death or morbidity	死亡與罹病率
Any late infection	遲發性感染
NEC	壞死性腸炎
Chronic lung disease<33wks	<33週的慢性肺疾病

台灣新生兒照護網合作團隊 Taiwan Neonatal Network TNN 台灣新生兒科醫學會 TAIWAN SOCIETY OF NEONATOLOGY 1991

採福佛特牛津網(Vermont Oxford Network)相同的參數與統計選項
Referenced from VON: Same Parameters and Statistical Options

Pneumothorax	氣胸
Severe IVH	嚴重級數的腦室周圍與腦室內出血
Cystic PVL	囊泡狀腦室周圍白質軟化
severe ROP	嚴重級數的早產兒視網膜病變
RDS	新生兒呼吸窘迫症候群
Surfactant at any time	入院期間曾投予肺表面活性劑
Any ventilation	任何通氣型呼吸器
Nasal CPAP before ETT ventilation	個案有使用鼻正壓呼吸器且住院期間未曾接受插管治療，或住院期間雖行插管治療，但使用時間是在CPAP之後
Inhaled nitric oxide	吸入性一氧化氮
Any ROP exam	視網膜眼底檢查
ROP surgery	手術治療早產兒視網膜病變
PDA ligation	開放性動脈導管結紮手術
NEC surgery	手術治療壞死性腸炎
Other surgery	其他手術
Cranial imaging	腦部攝影診斷
Any human milk	母奶
Oxygen	出院帶氧

TNN 2016-2025

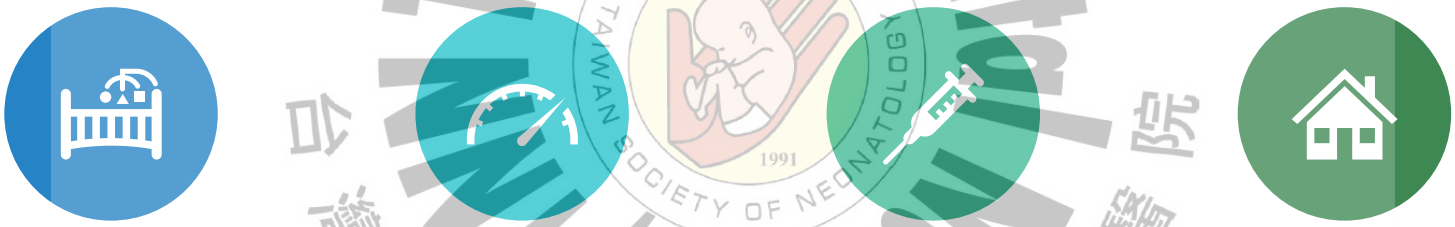
At Birth

Key Performance Measures

Procedures and Interventions

At Discharge Home

TNN 2016-2025: **At Birth**



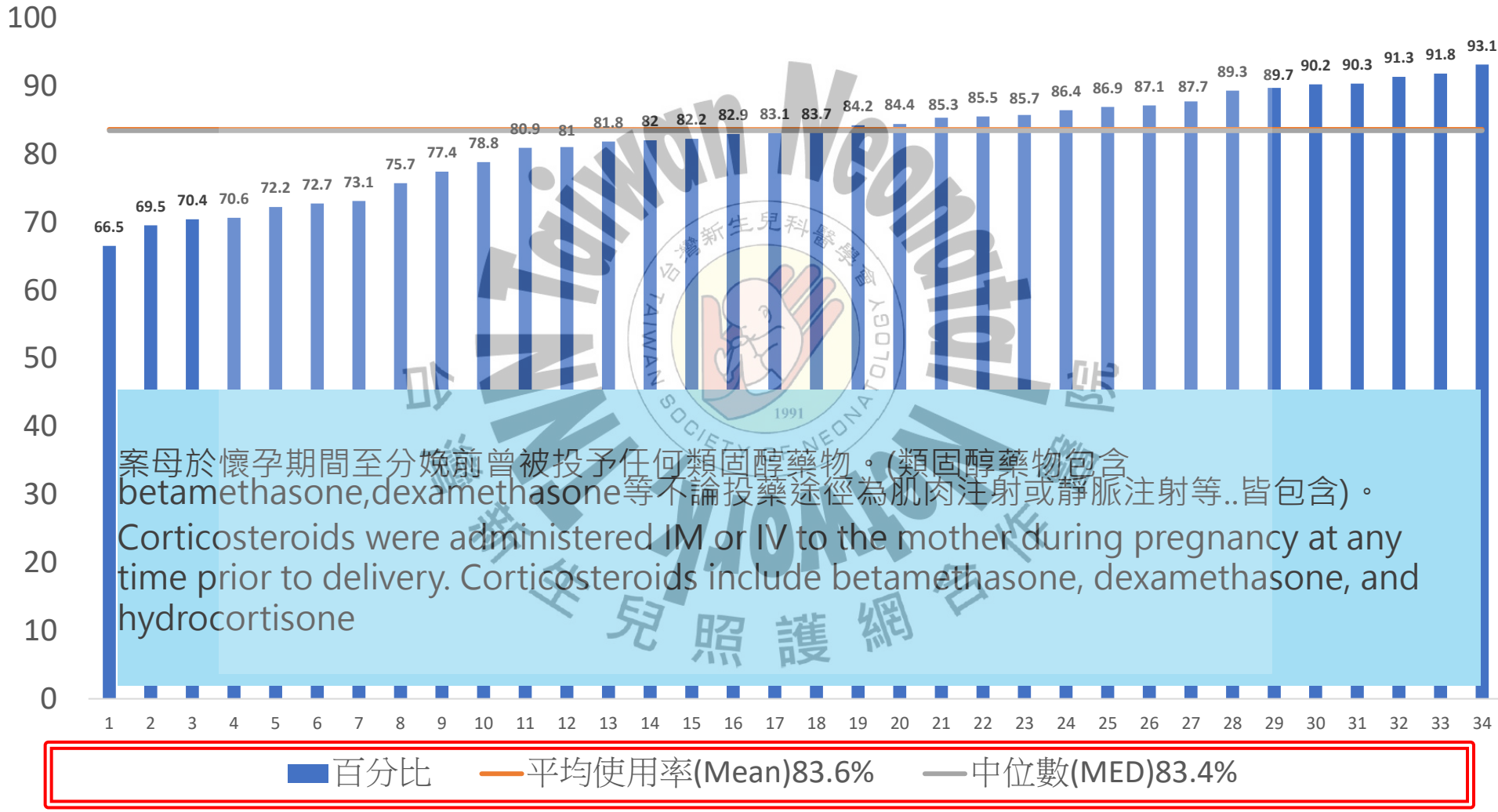
AT BIRTH

KEY PERFORMANCE MEASURES

PROCEDURES AND INTERVENTIONS

AT DISCHARGE HOME

2016-2025年(Antenatal steroids)
參與TNN各院案母孕期使用類固醇比例



案母於懷孕期間至分娩前曾被投予任何類固醇藥物。(類固醇藥物包含betamethasone,dexamethasone等不論投藥途徑為肌肉注射或靜脈注射等..皆包含)。

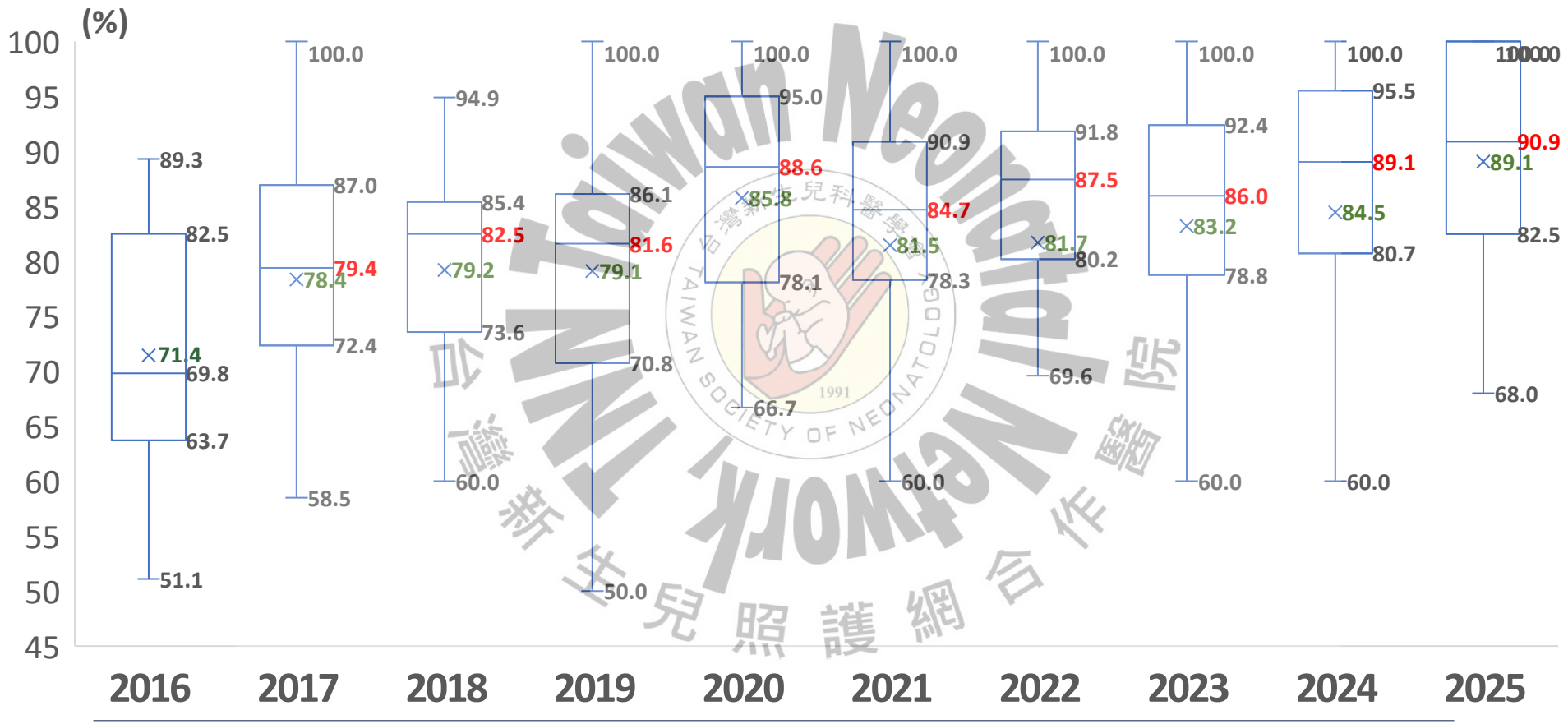
Corticosteroids were administered IM or IV to the mother during pregnancy at any time prior to delivery. Corticosteroids include betamethasone, dexamethasone, and hydrocortisone

Taiwan Neonatal Network 台灣新生兒照護網合作聯盟

Ranking No., Not Hospital ID

各年度Antenatal steroids使用率

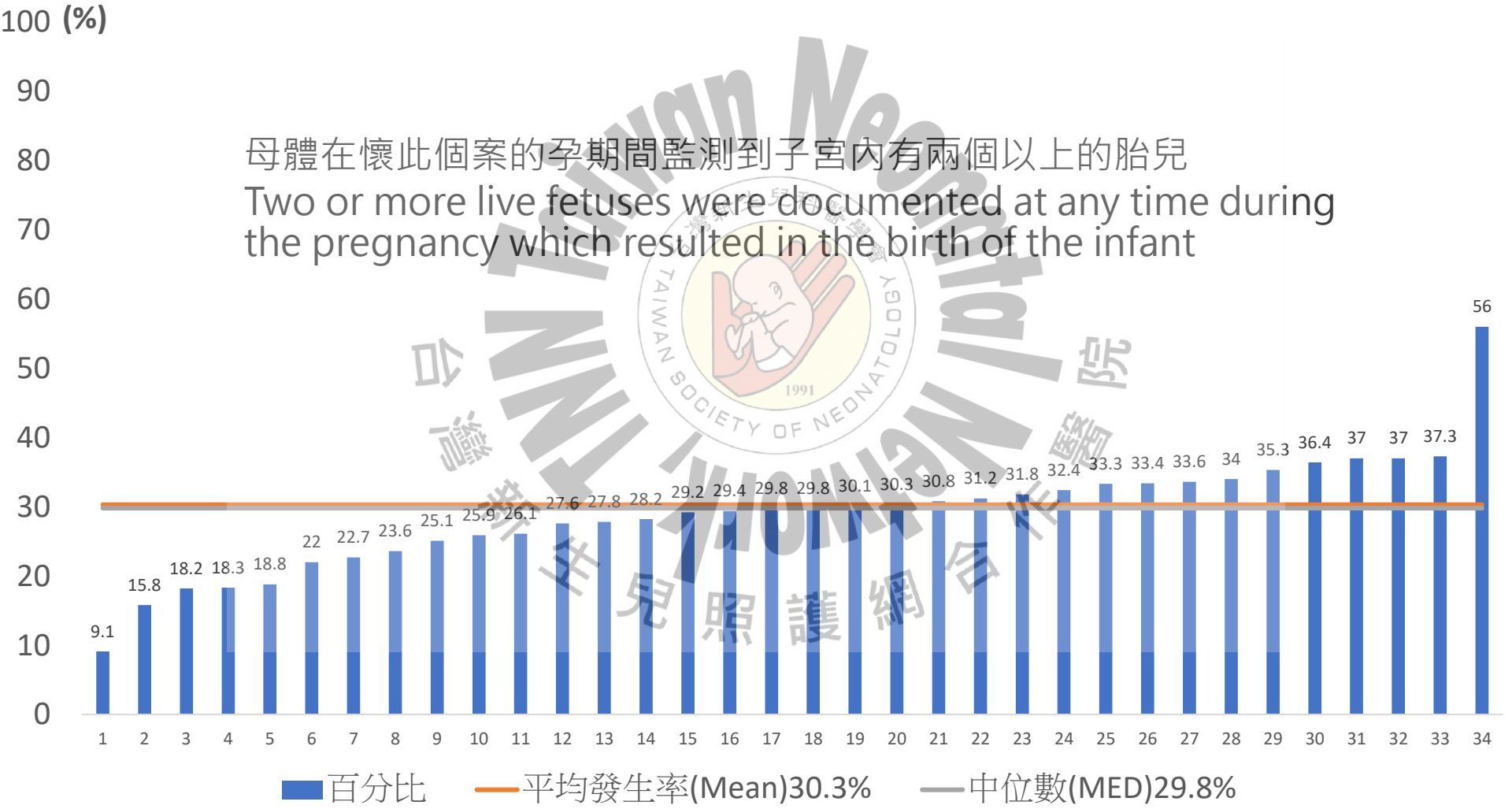
—中位數(MED)　　x平均數(Mean)



2016-2025年(Antenatal steroids)案母孕期使用類固醇比例

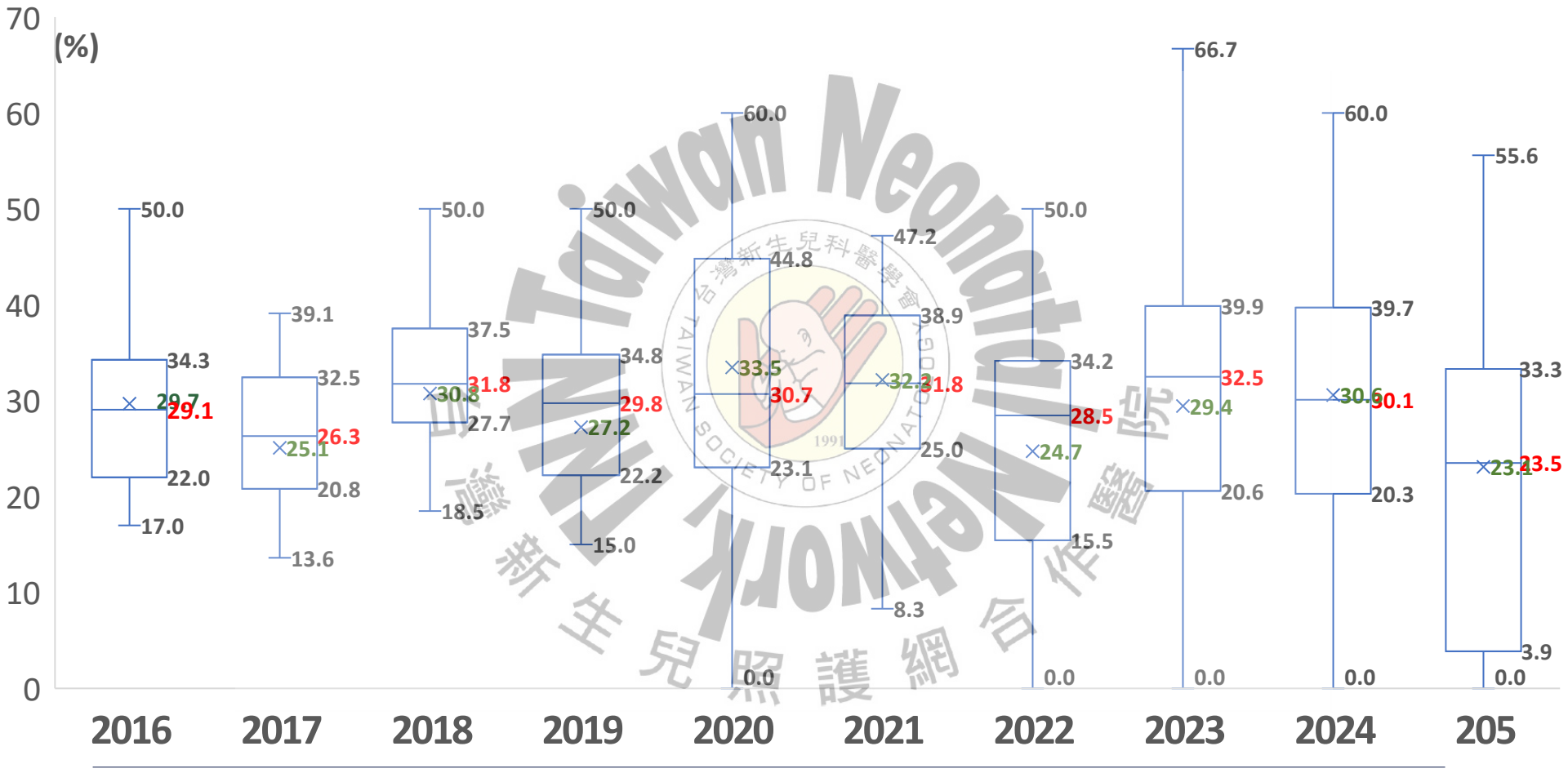
*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年(Multiple gestation)
參與TNN各院案母於懷孕期間為多胞胎妊娠



各年度Multiple gestation發生率

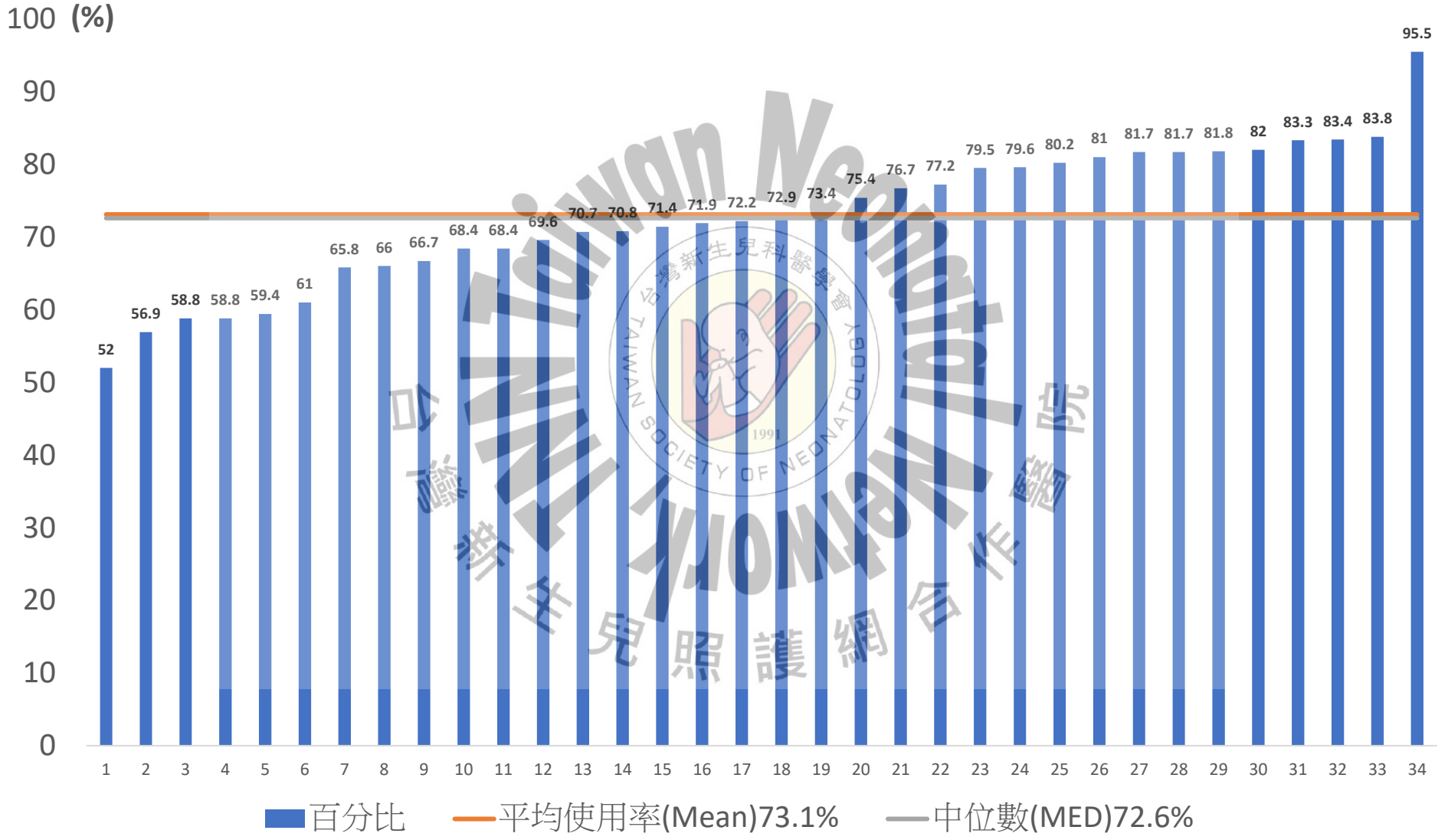
—中位數(MED)　　x平均數(Mean)



2016-2025年(Multiple gestation)案母於懷孕期間為多胞胎妊娠

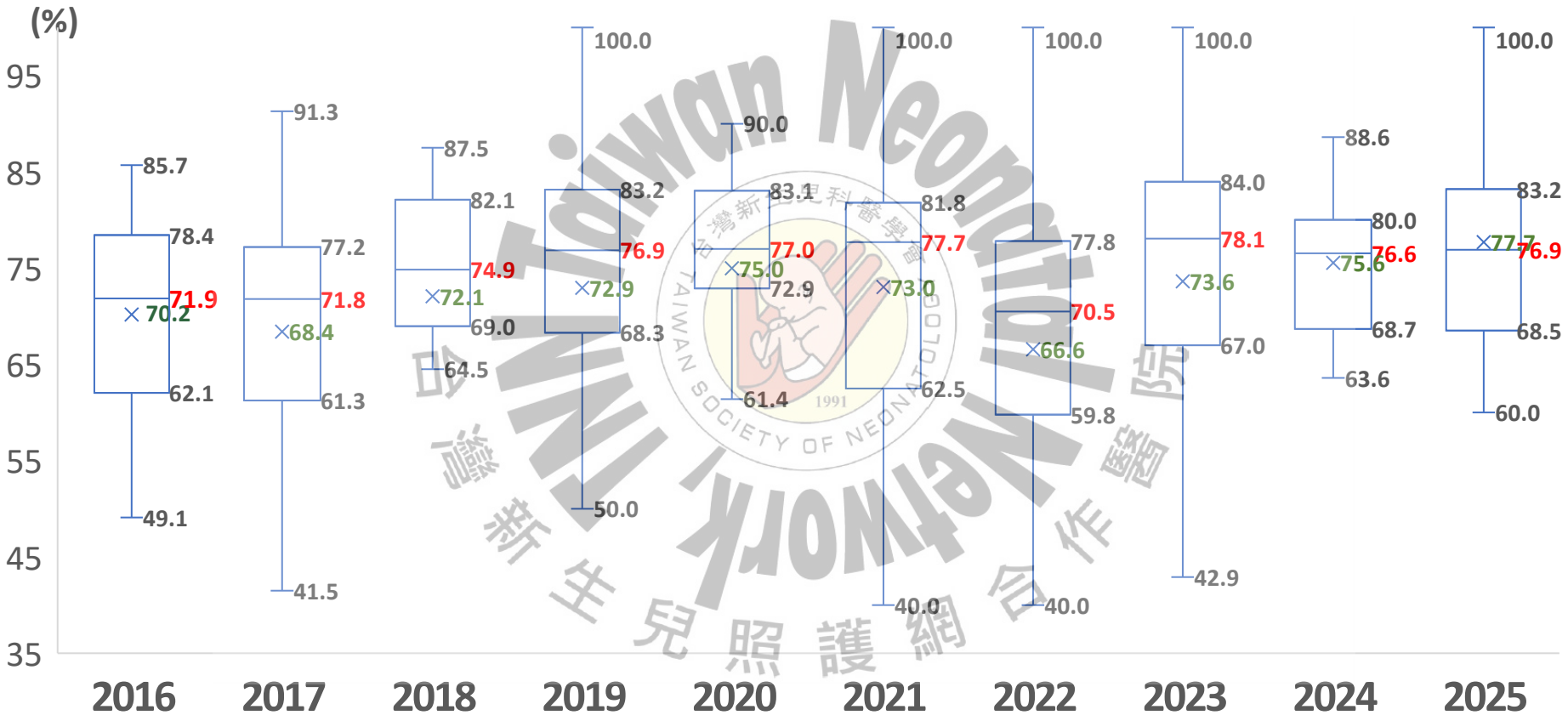
*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年(Cesarean section)
參與TNN各院案母為剖腹產



各年度Cesarean section使用率

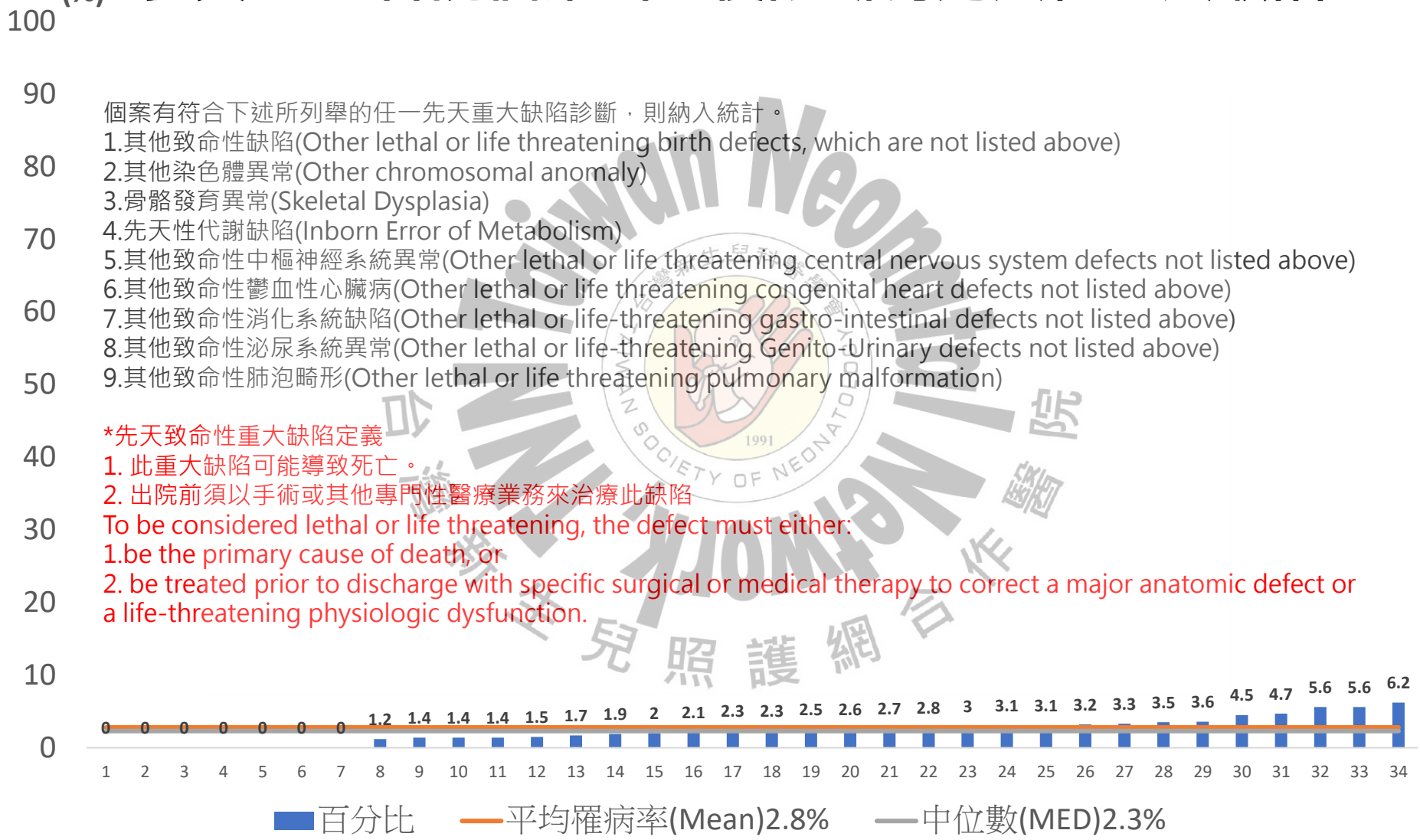
—中位數(MED)　　x平均數(Mean)



2016-2025年(Cesarean section)案母為剖腹產

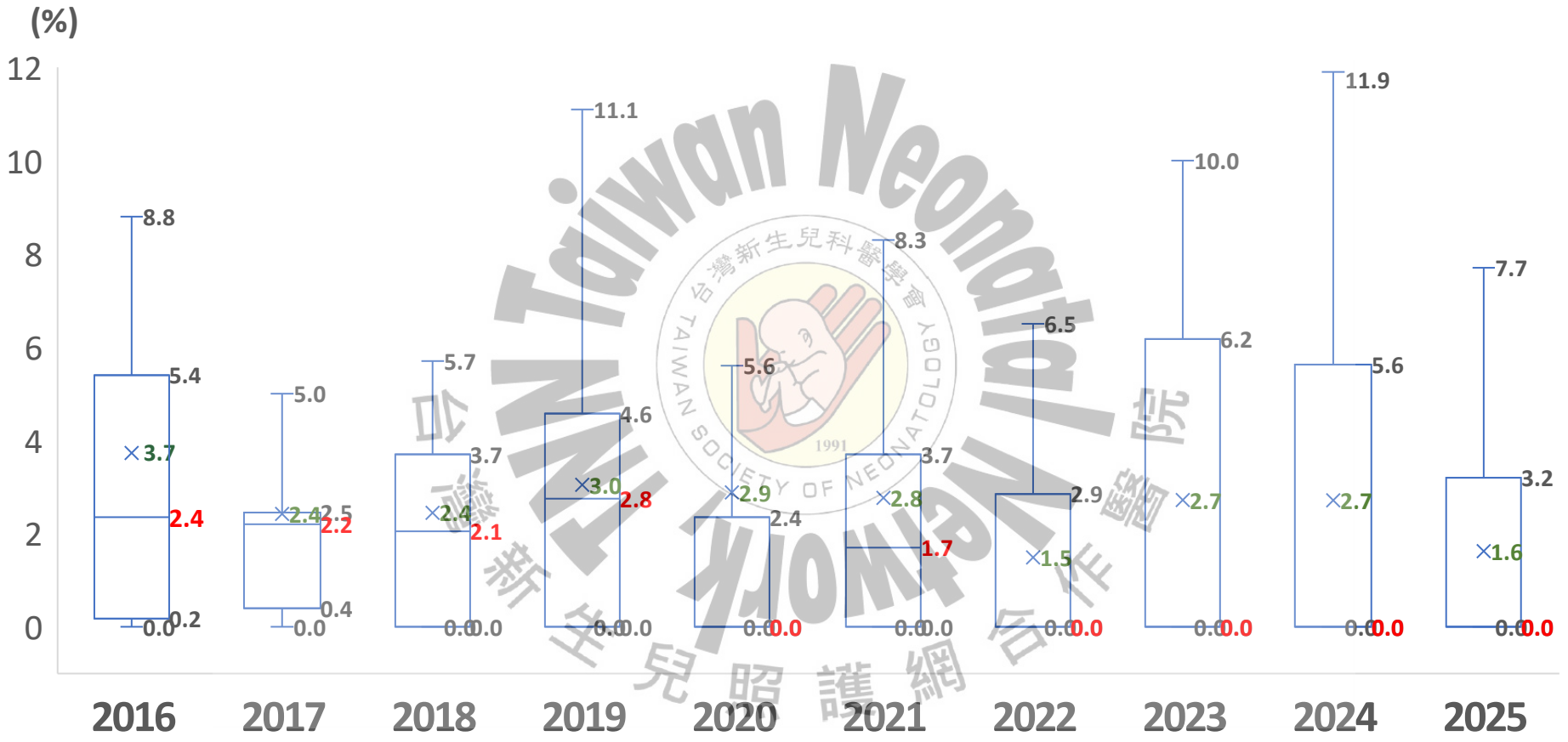
*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年(Any major birth defect)
參與TNN各院個案出生後診斷有先天性重大缺陷



各年度Any major birth defect罹病率

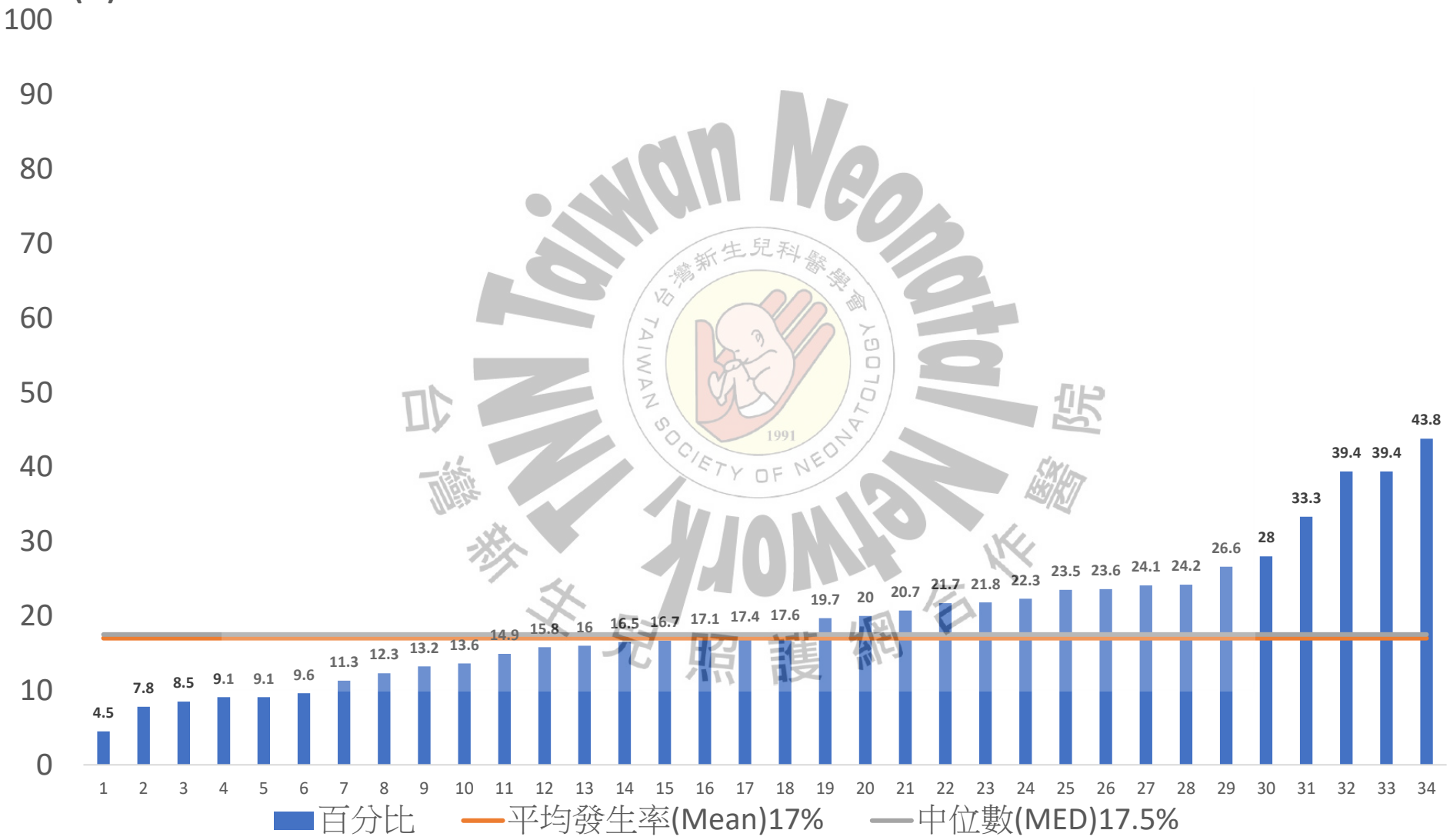
—中位數(MED)　　x平均數(Mean)



2016-2025年(Any major birth defect)個案出生後診斷有先天性重大缺陷

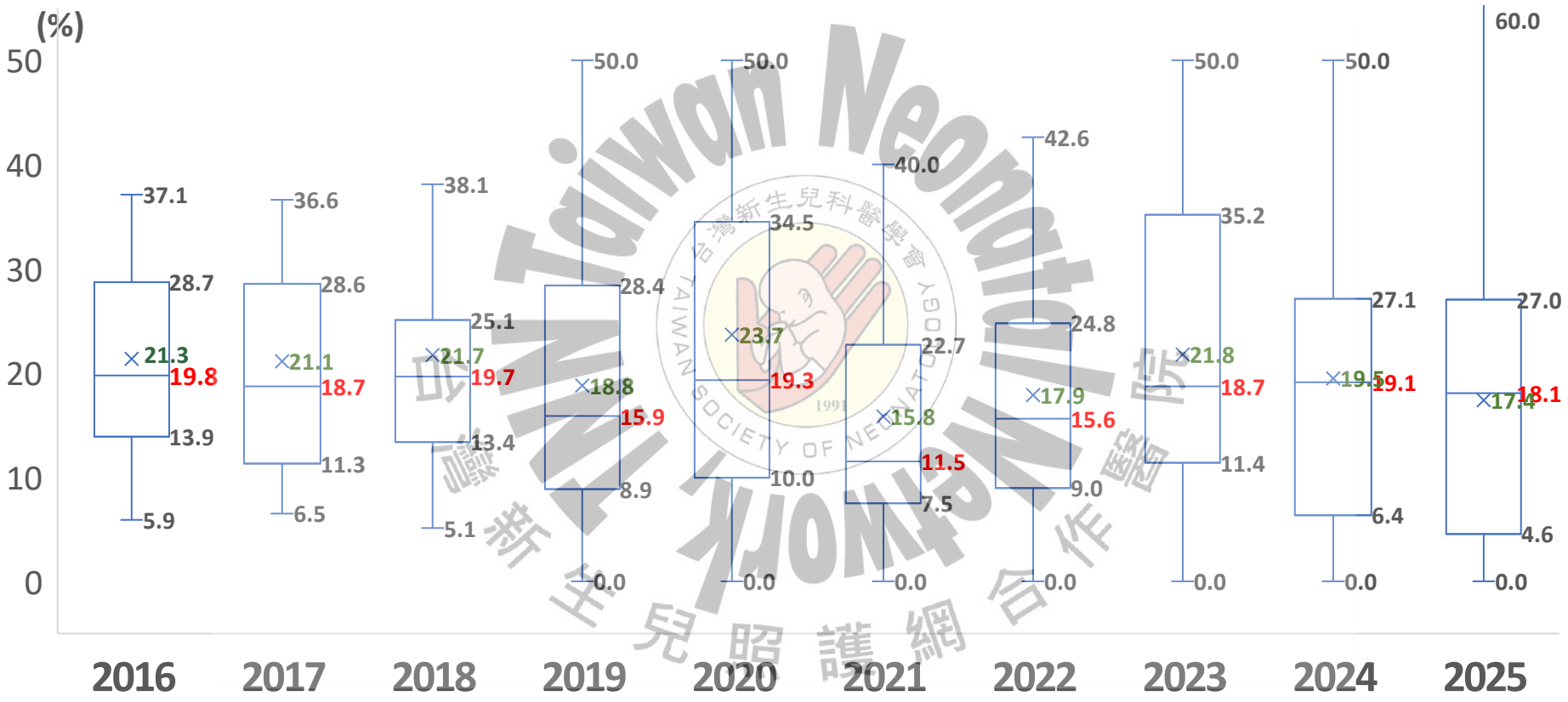
*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年(APGAR at 1 min <4)
參與TNN各院個案於出生第一分鐘阿帕嘉分數小於4



各年度APGAR at 1 Min<4發生率

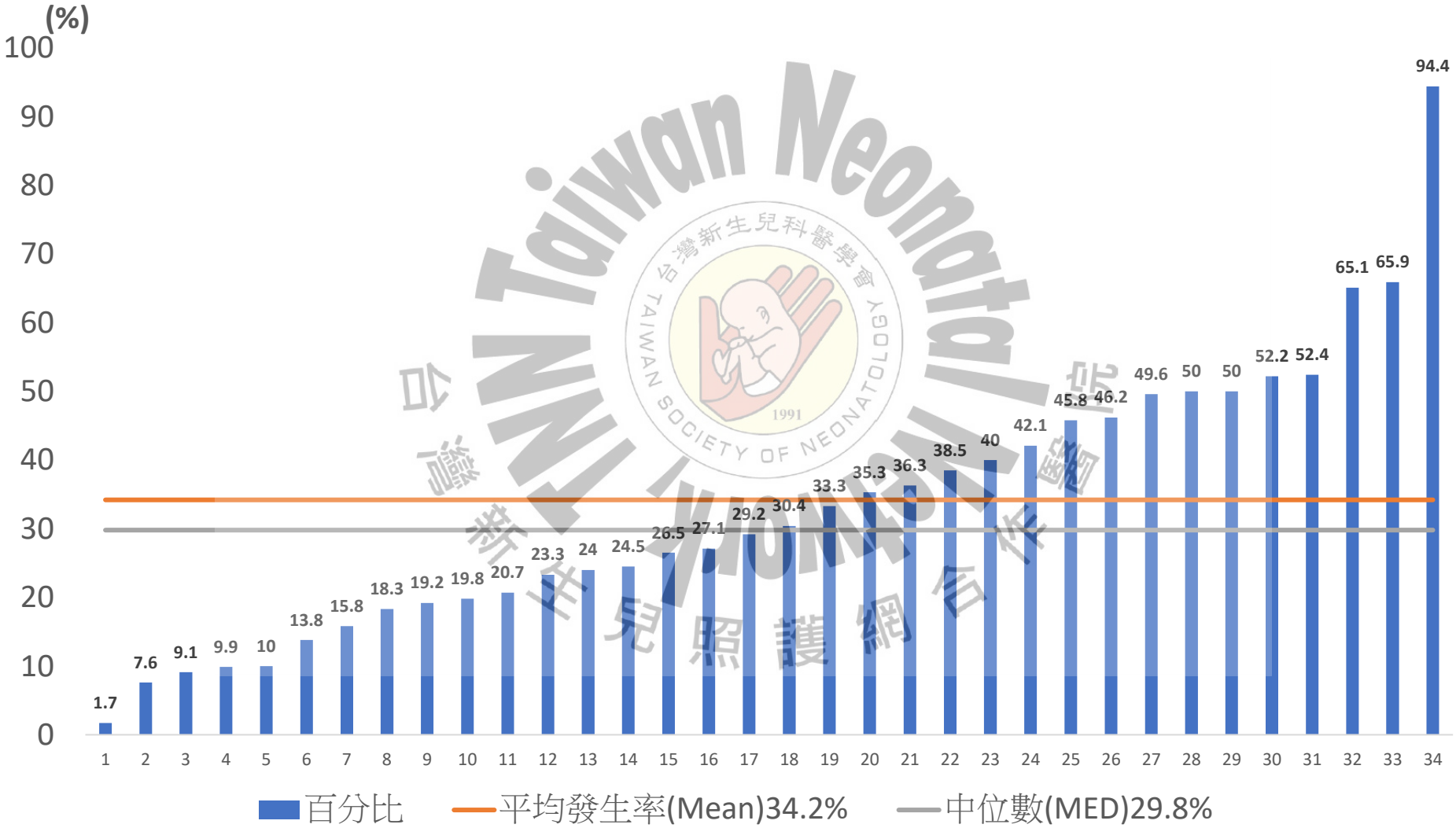
—中位數(MED)　　x平均數(Mean)



2016-2025年(APGAR at 1 Min<4)個案於出生第一分鐘阿帕嘉分數小於4

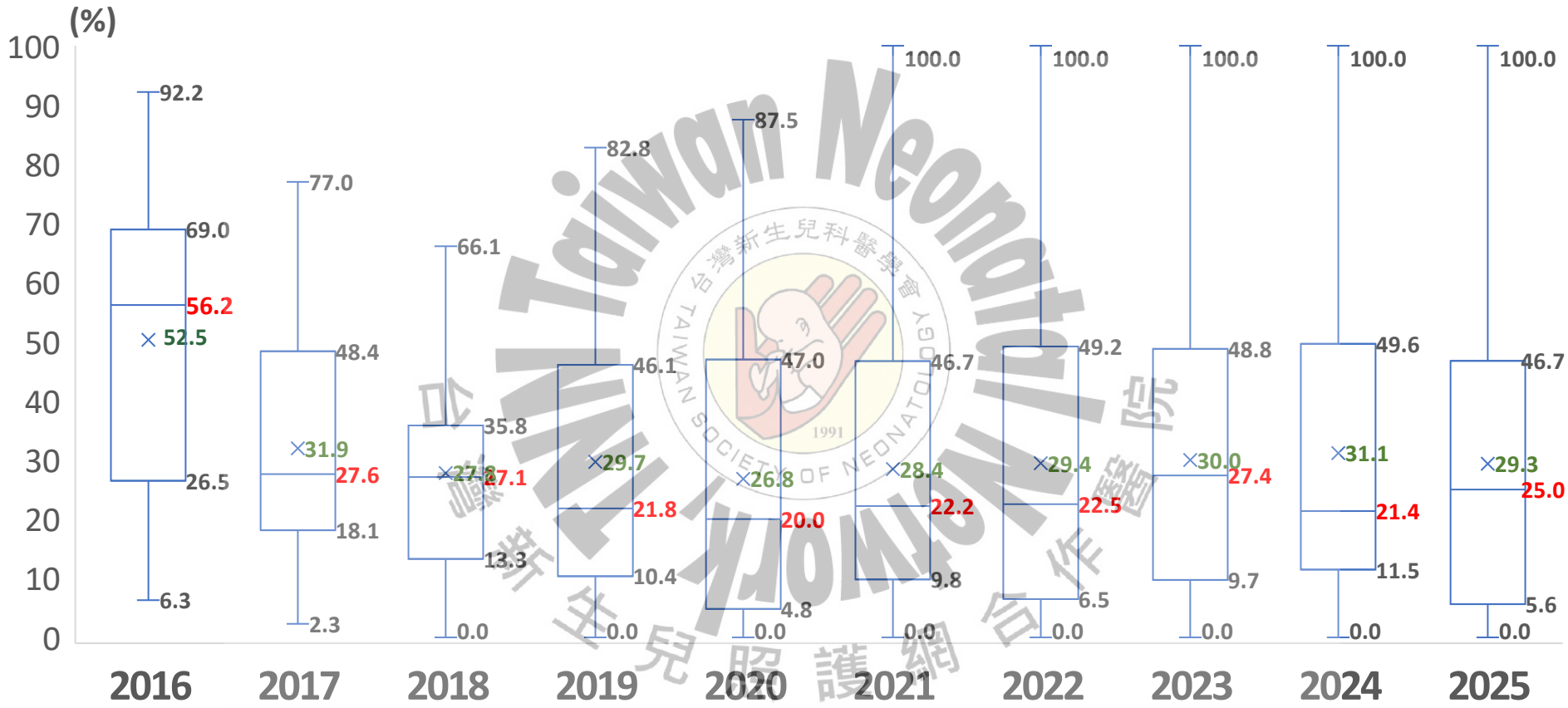
*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年(Admission Temperature<36 ℃)
參與TNN各院中的個案
入NICU第一小時所測得溫度小於36 ℃



各年度Admission Temperature<36℃發生率

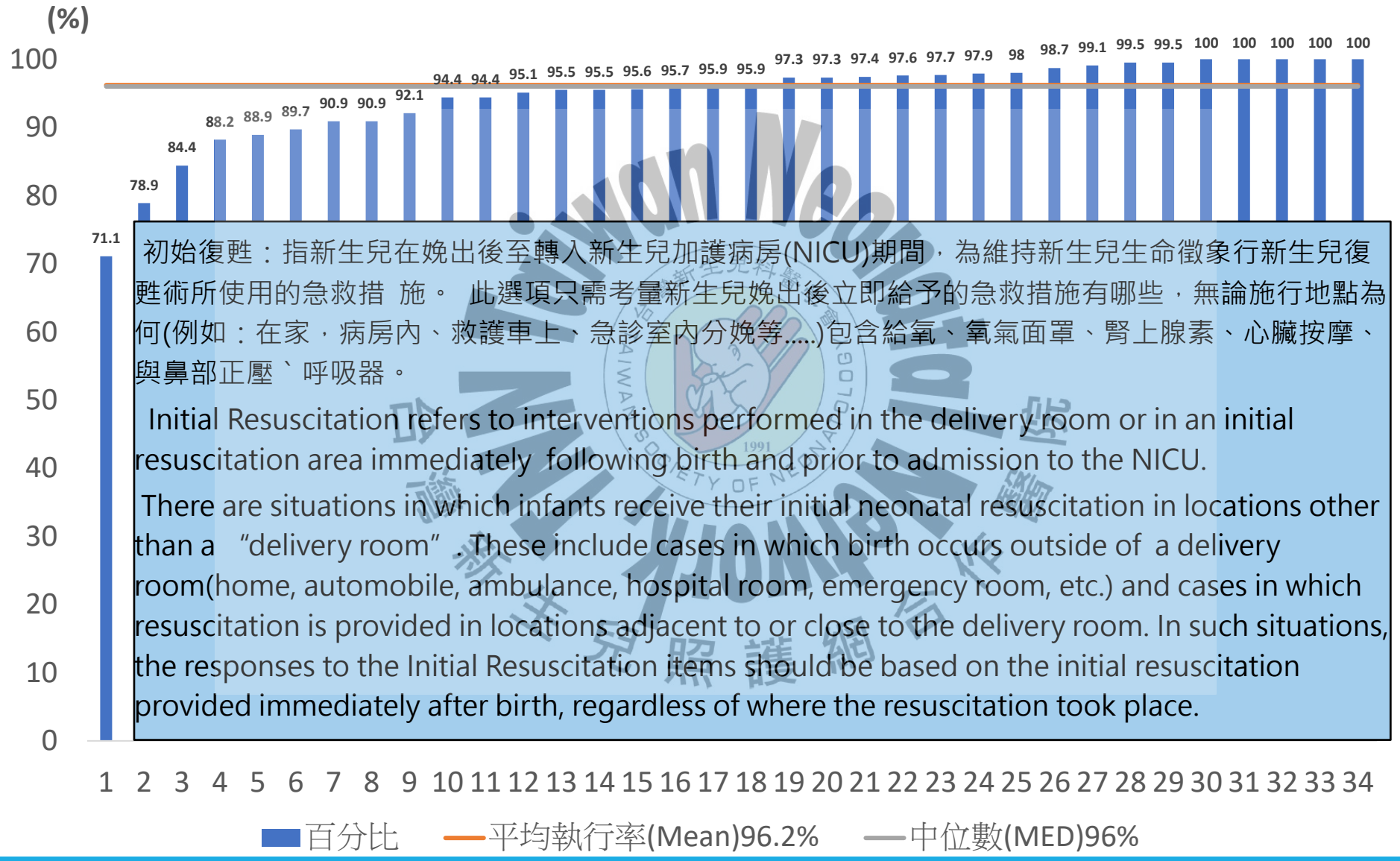
—中位數(MED)　　x平均數(Mean)



2016-2025年(Admission Temperature<36℃) 個案入NICU < 1 h所測得溫度小於36℃

*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年(Any Resuscitation)
參與TNN各院中的個案有行初始復甦



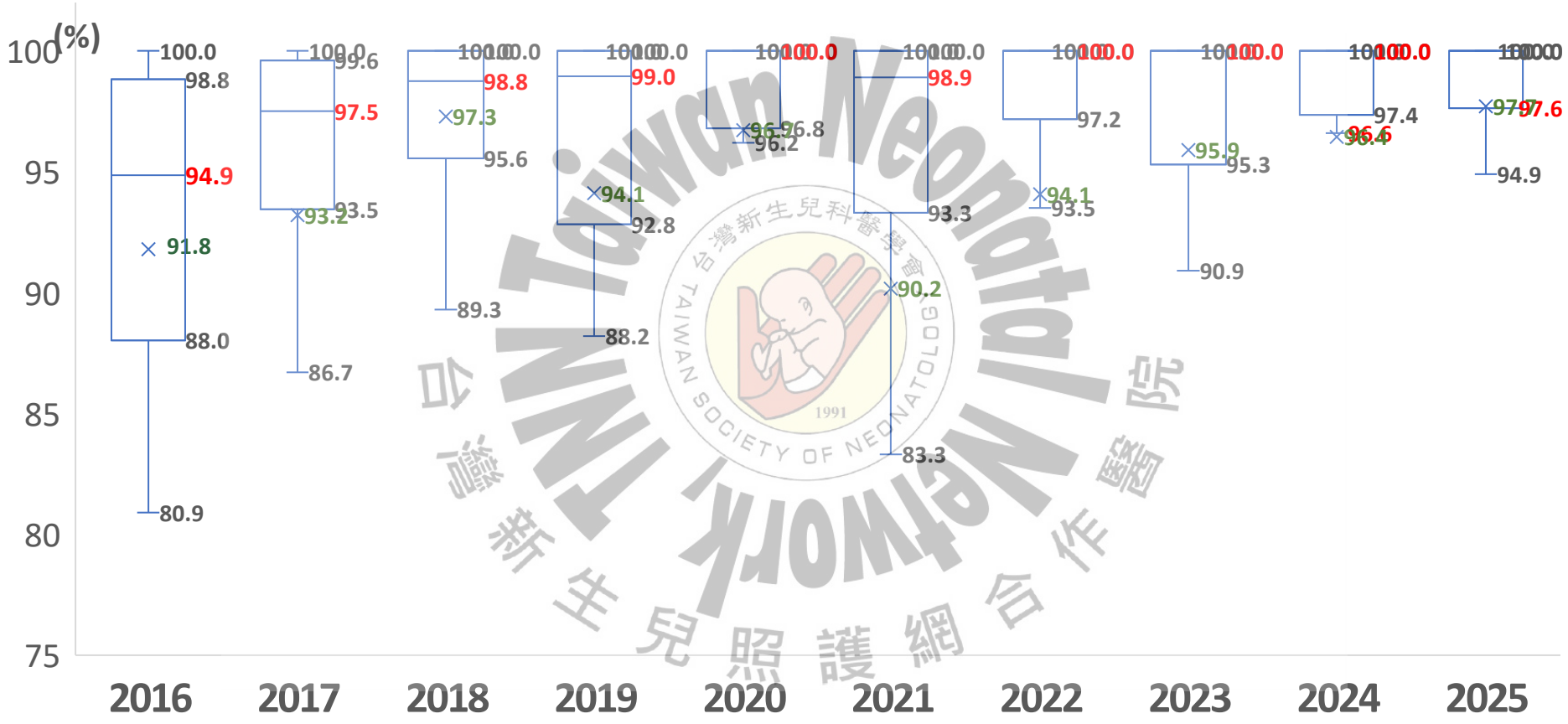
初始復甦：指新生兒在娩出後至轉入新生兒加護病房(NICU)期間，為維持新生兒生命徵象行新生兒復甦術所使用的急救措 施。 此選項只需考量新生兒娩出後立即給予的急救措施有哪些，無論施行地點為何(例如：在家，病房內、救護車上、急診室內分娩等.....)包含給氧、氧氣面罩、腎上腺素、心臟按摩、與鼻部正壓、呼吸器。

Initial Resuscitation refers to interventions performed in the delivery room or in an initial resuscitation area immediately following birth and prior to admission to the NICU.

There are situations in which infants receive their initial neonatal resuscitation in locations other than a "delivery room". These include cases in which birth occurs outside of a delivery room(home, automobile, ambulance, hospital room, emergency room, etc.) and cases in which resuscitation is provided in locations adjacent to or close to the delivery room. In such situations, the responses to the Initial Resuscitation items should be based on the initial resuscitation provided immediately after birth, regardless of where the resuscitation took place.

各年度Any Resuscitation執行率

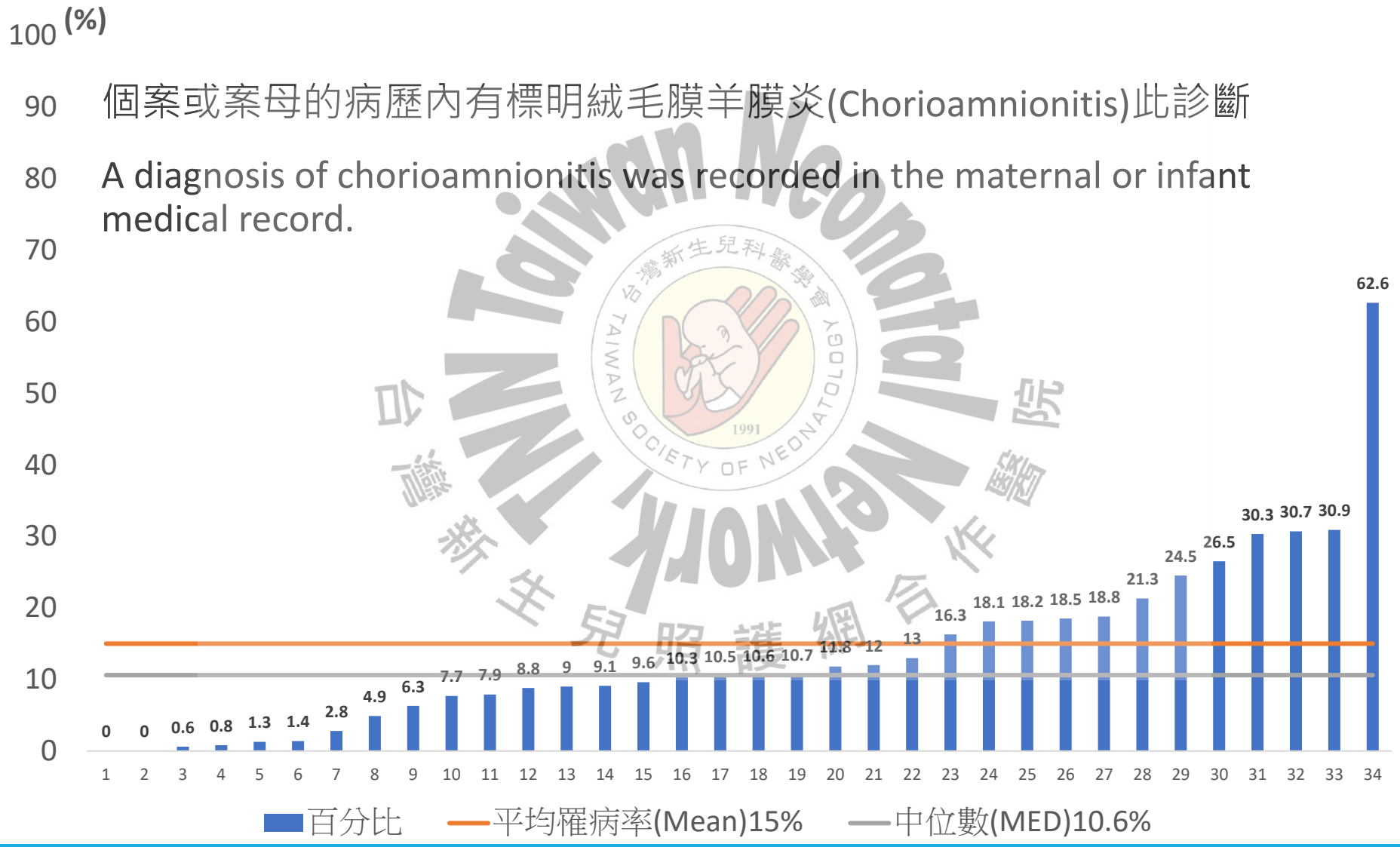
—中位數(MED)　　x平均數(Mean)



2016-2025年(Any Resuscitation)個案有行初始復甦

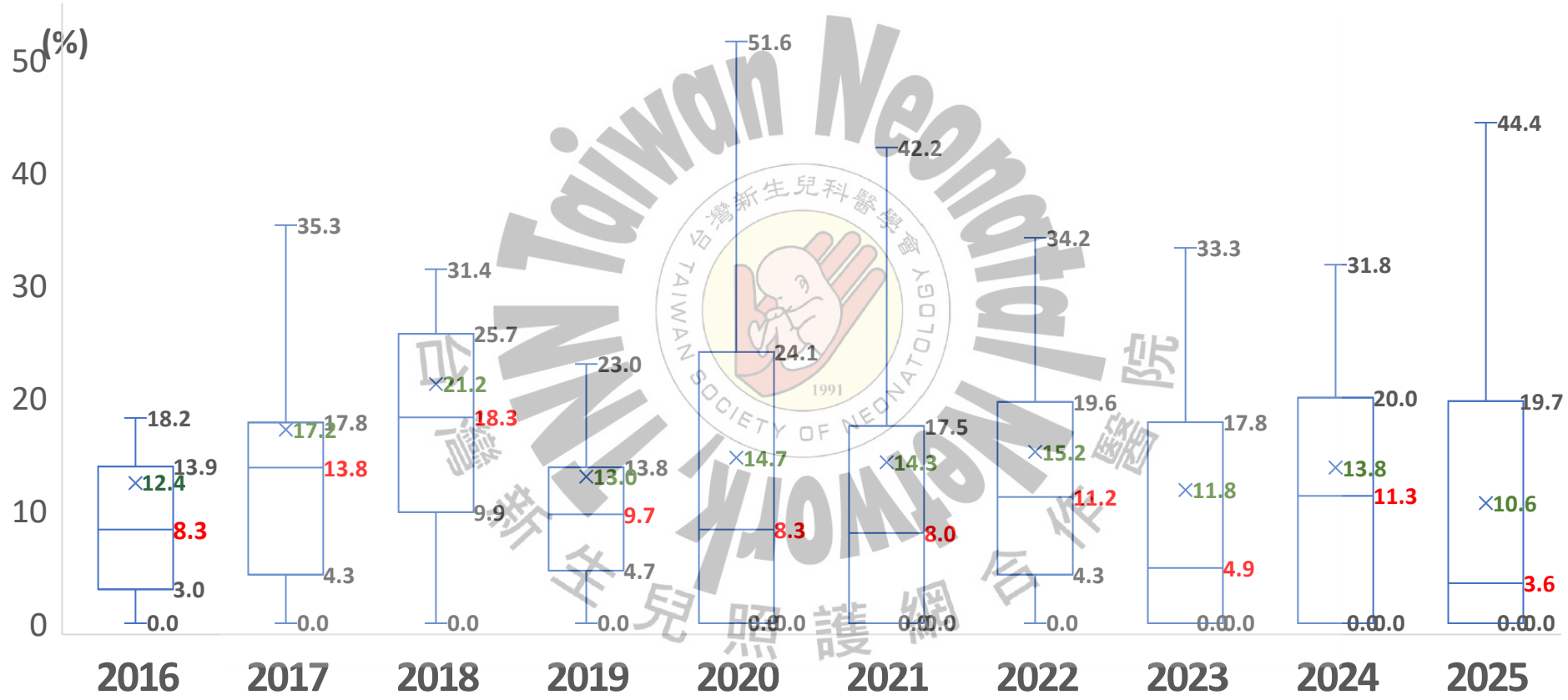
*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年(Chorioamnionitis)
案母診斷有絨毛膜羊膜炎



各年度Chorioamnionitis罹病率

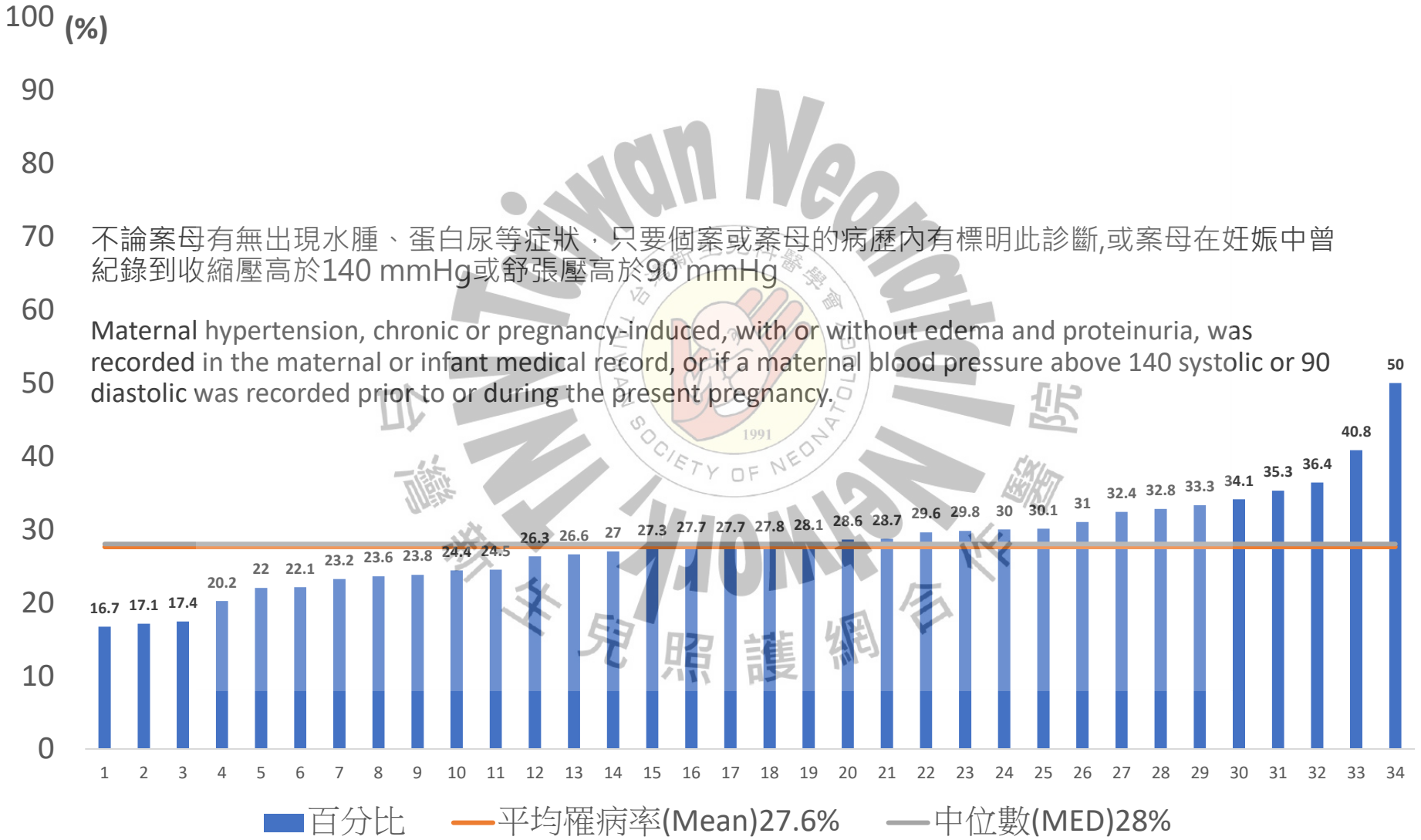
—中位數(MED)　　x平均數(Mean)



2016-2025年(Chorioamnionitis)案母診斷有絨毛膜羊膜炎

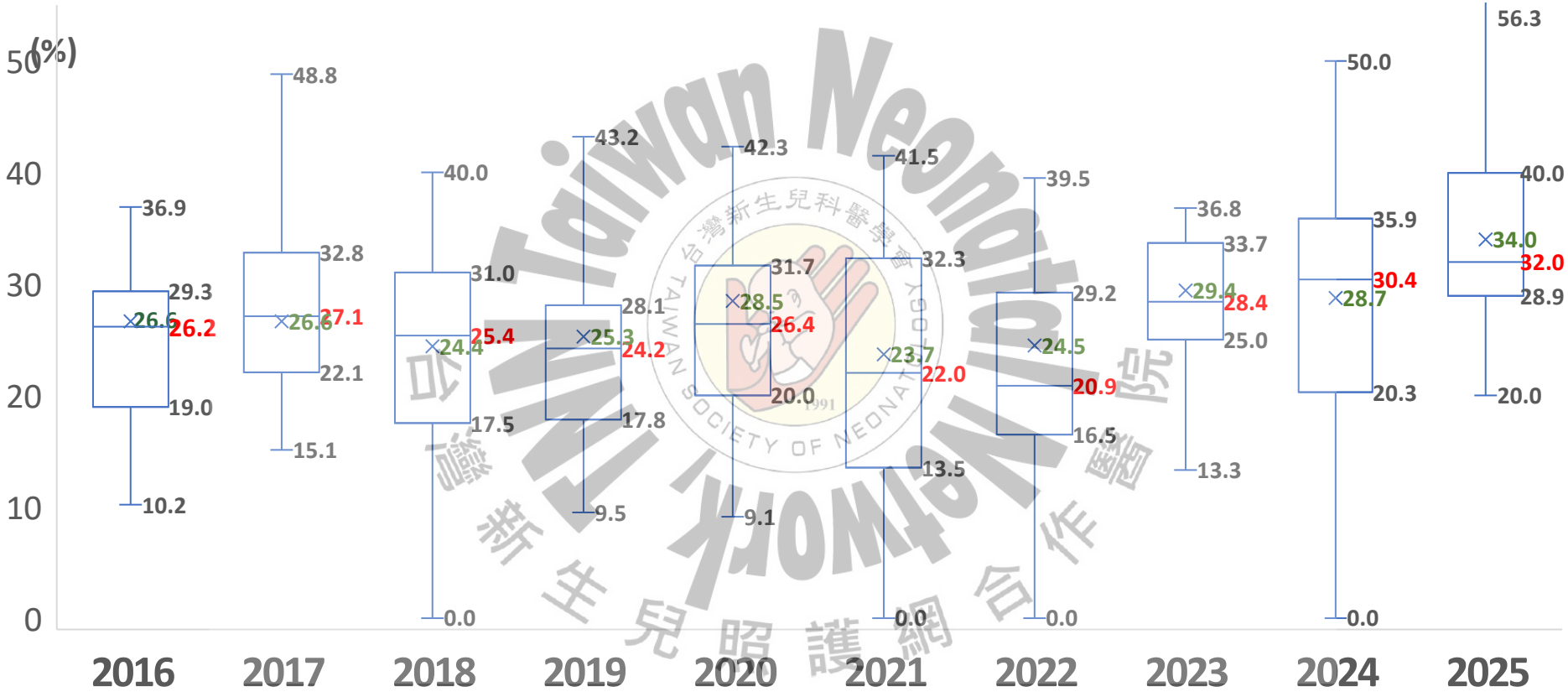
*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年(Maternal Hypertension)
參與TNN各院案母診斷有妊娠高血壓



各年度Maternal Hypertension罹病率

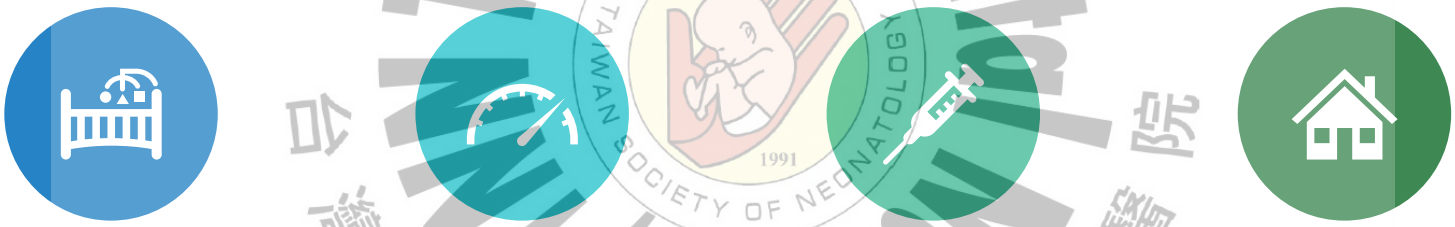
—中位數(MED)　　x平均數(Mean)



2016-2025年(Maternal Hypertension)案母診斷有妊娠高血壓

*極端值未顯示於圖表中(Outliers are not displayed in the chart)

TNN 2016-2025:
Key Performance Measures



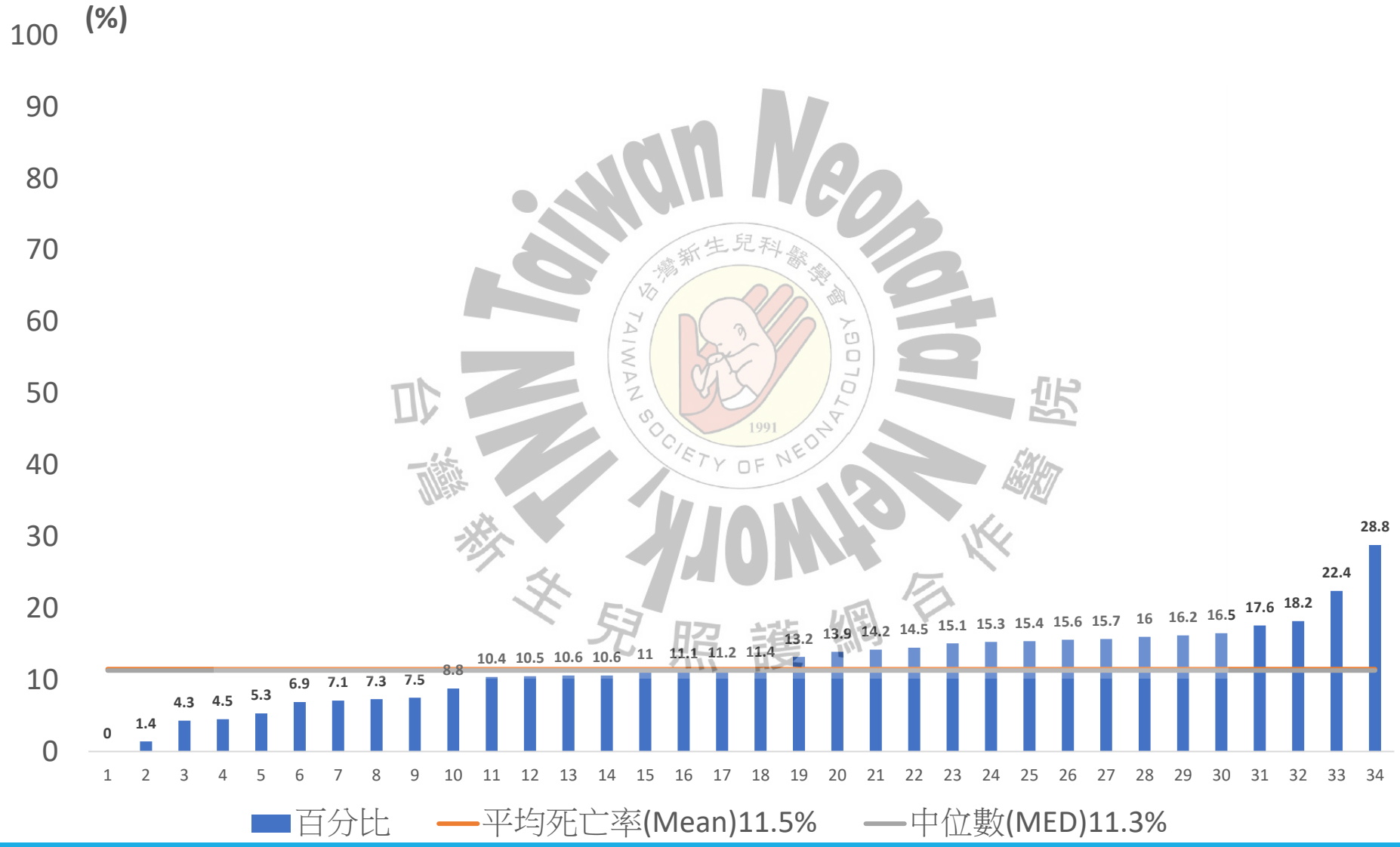
AT BIRTH

KEY PERFORMANCE MEASURES

PROCEDURES AND INTERVENTIONS

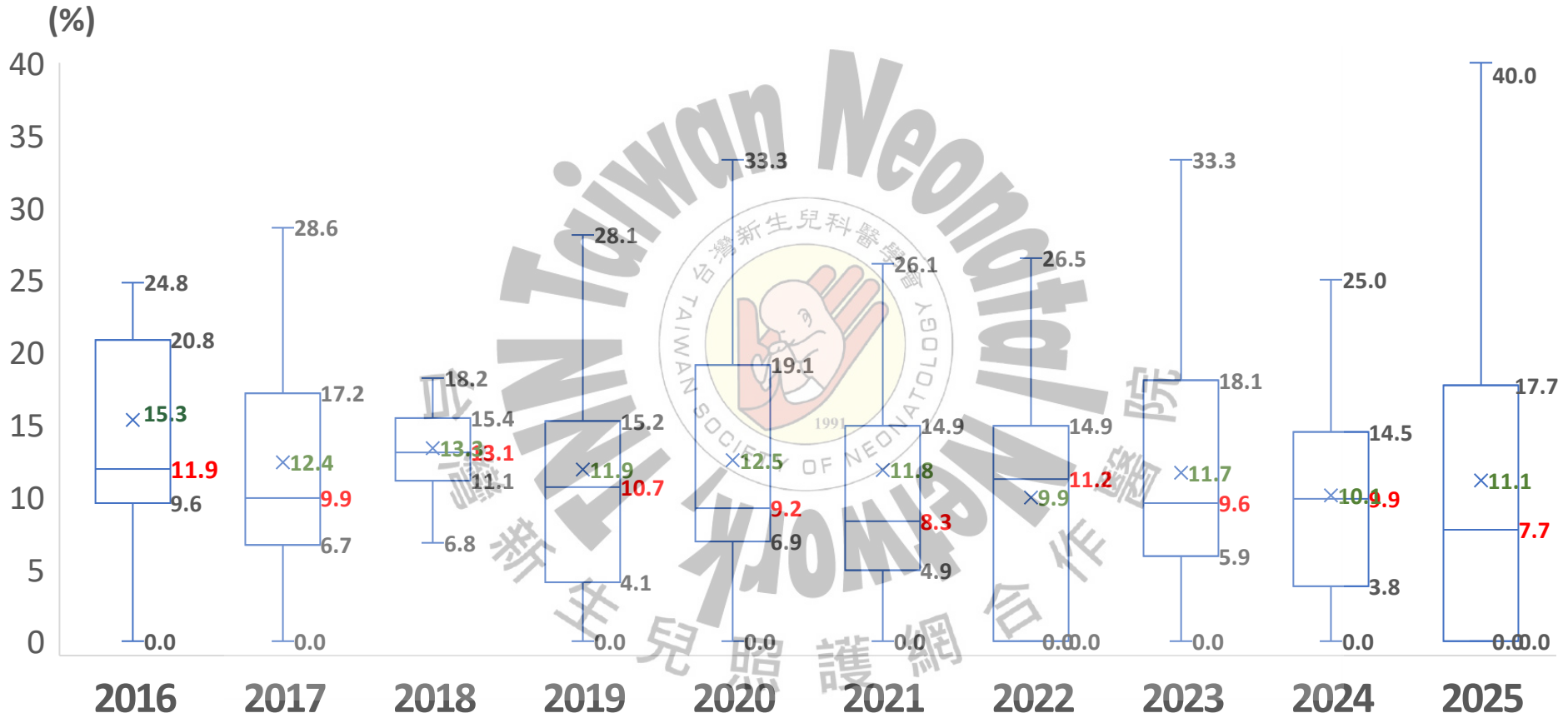
AT DISCHARGE HOME

2016-2025年(Mortality)
參與TNN各院死亡率



各年度Mortality死亡率

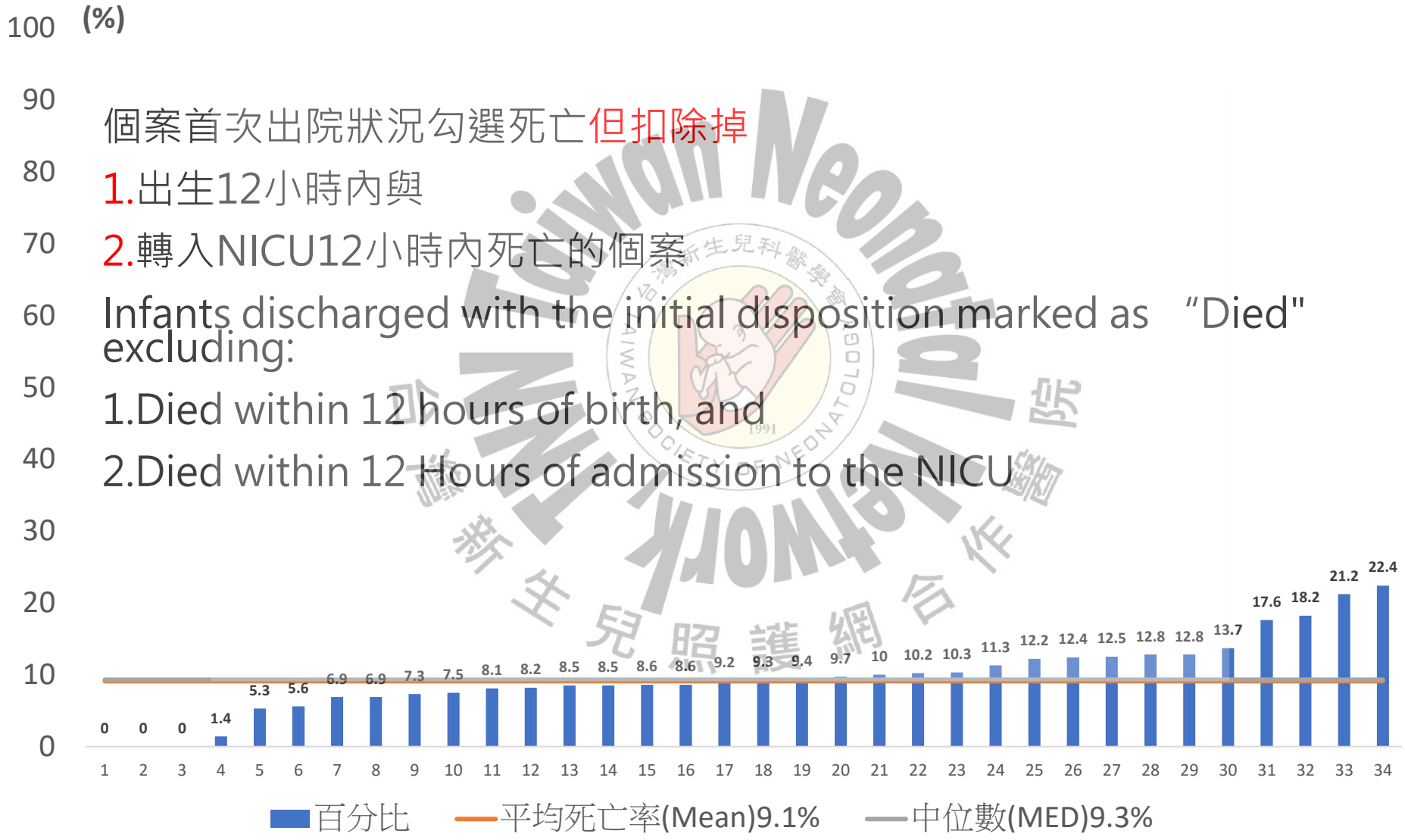
—中位數(MED)　　x平均數(Mean)



2016-2025年(Mortality) 死亡率

*極端值未顯示於圖表中(Outliers are not displayed in the chart)

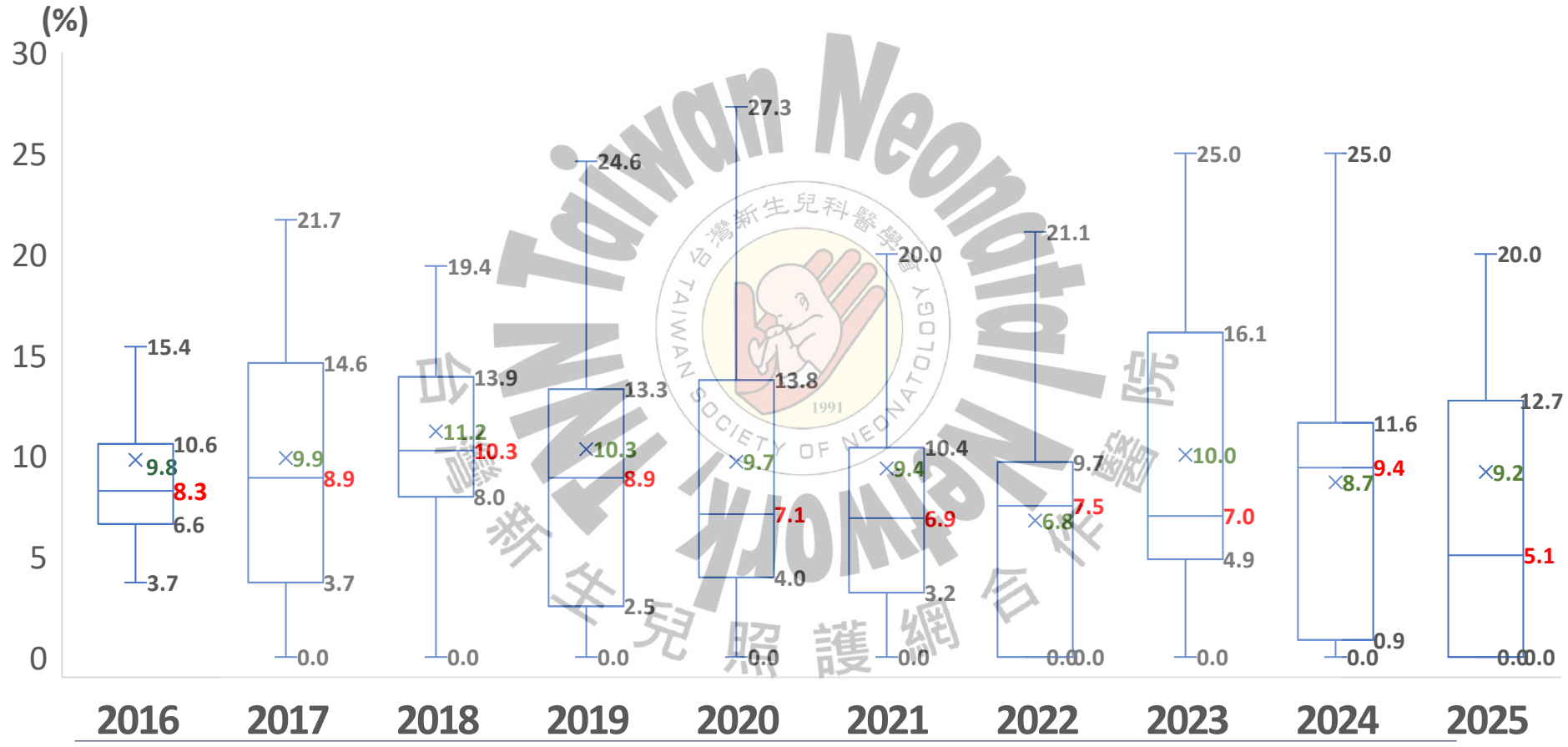
2016-2025年(Mortality excluding early death)
參與TNN各院個案死亡率(排除早期死亡個案)



各年度Mortality excluding early death死亡率

—中位數(MED)

x平均數(Mean)



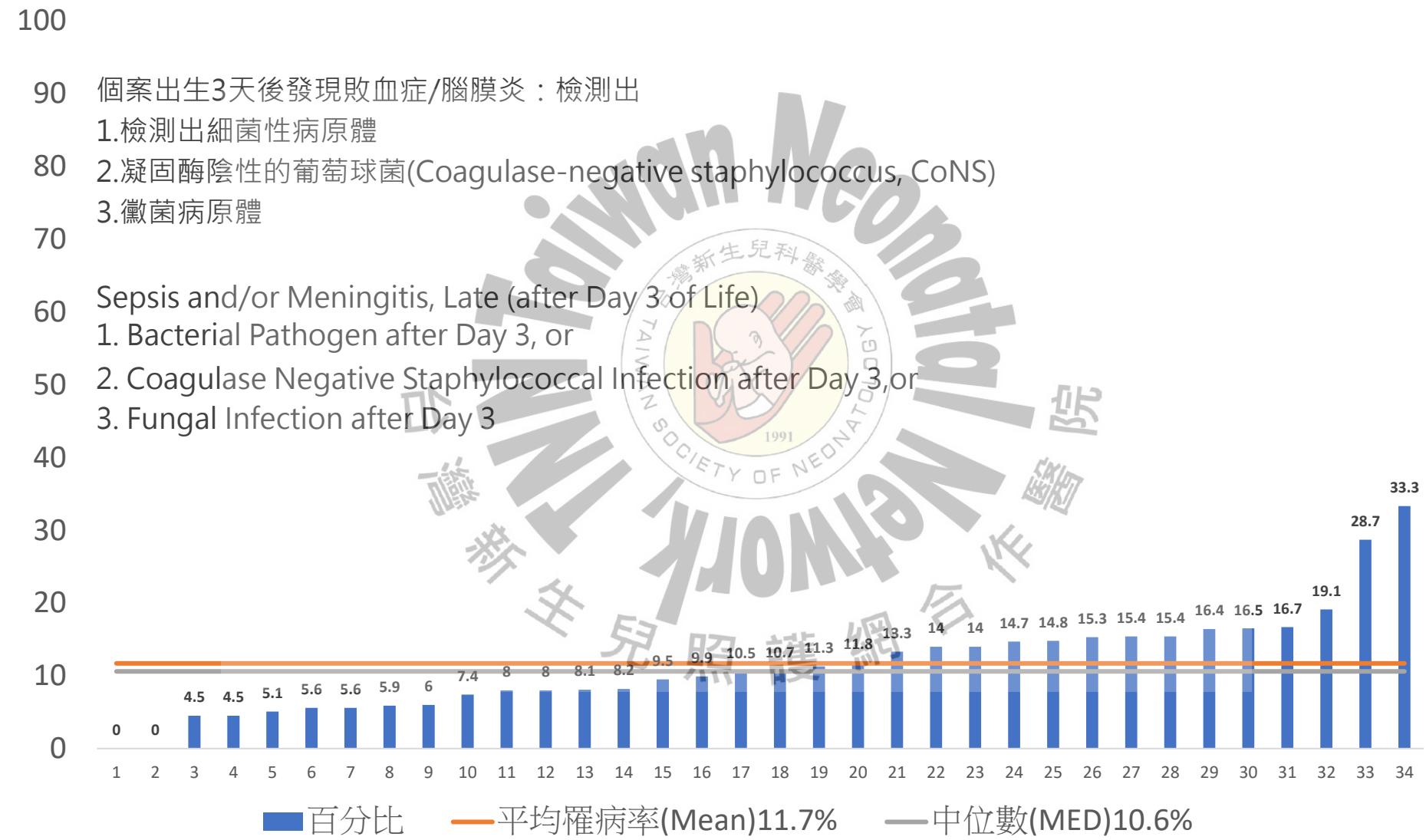
2016-2025年(Mortality excluding early death) 死亡率(排除早期死亡個案)

*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年(Any late infection)
參與TNN各院個案入院期間診斷有遲發性感染

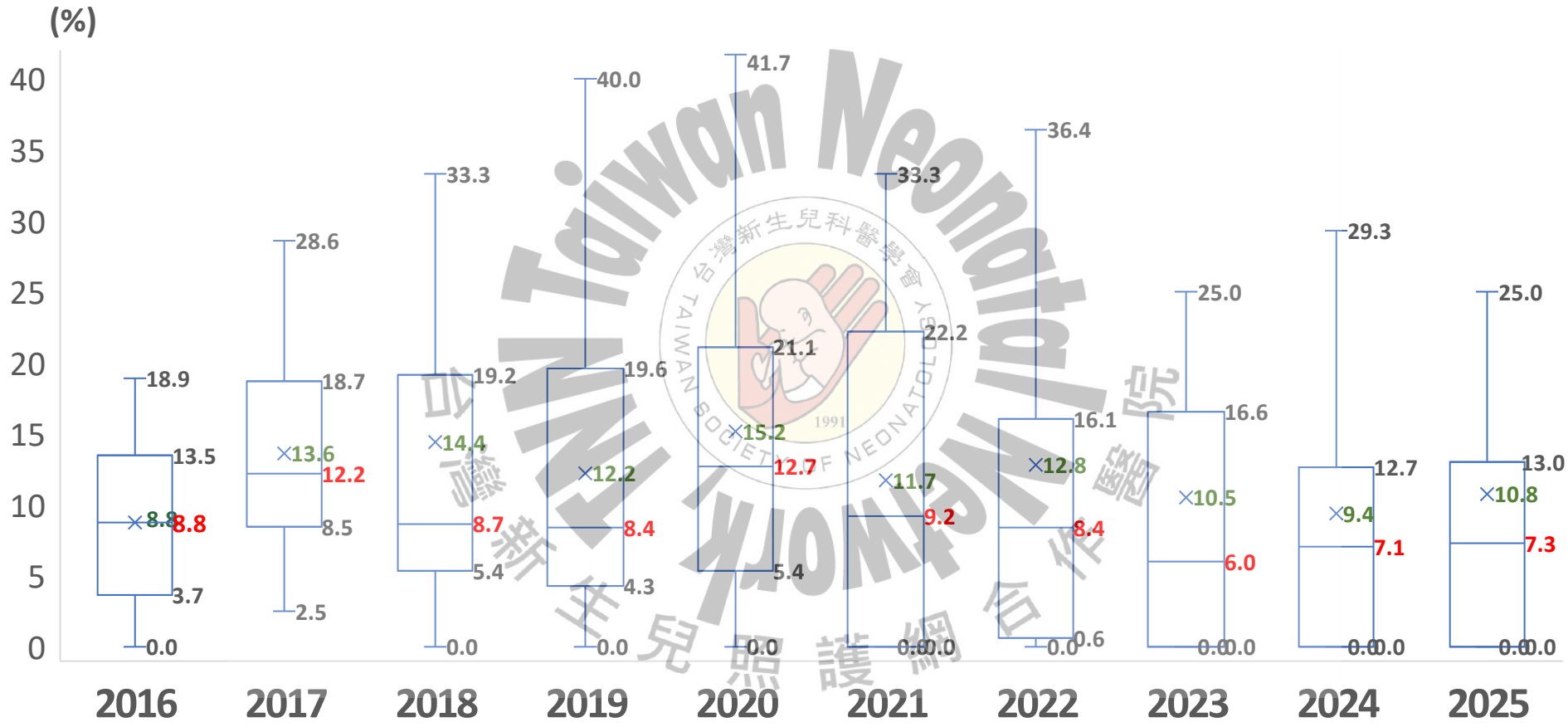
個案出生3天後發現敗血症/腦膜炎：檢測出
1.檢測出細菌性病原體
2.凝固酶陰性的葡萄球菌(Coagulase-negative staphylococcus, CoNS)
3.黴菌病原體

Sepsis and/or Meningitis, Late (after Day 3 of Life)
1. Bacterial Pathogen after Day 3, or
2. Coagulase Negative Staphylococcal Infection after Day 3,or
3. Fungal Infection after Day 3



各年度Any late infection罹病率

—中位數(MED)　　x平均數(Mean)



2016-2025年(Any late infection)個案入院期間診斷有遲發性感染

*極端值未顯示於圖表中(Outliers are not displayed in the chart)

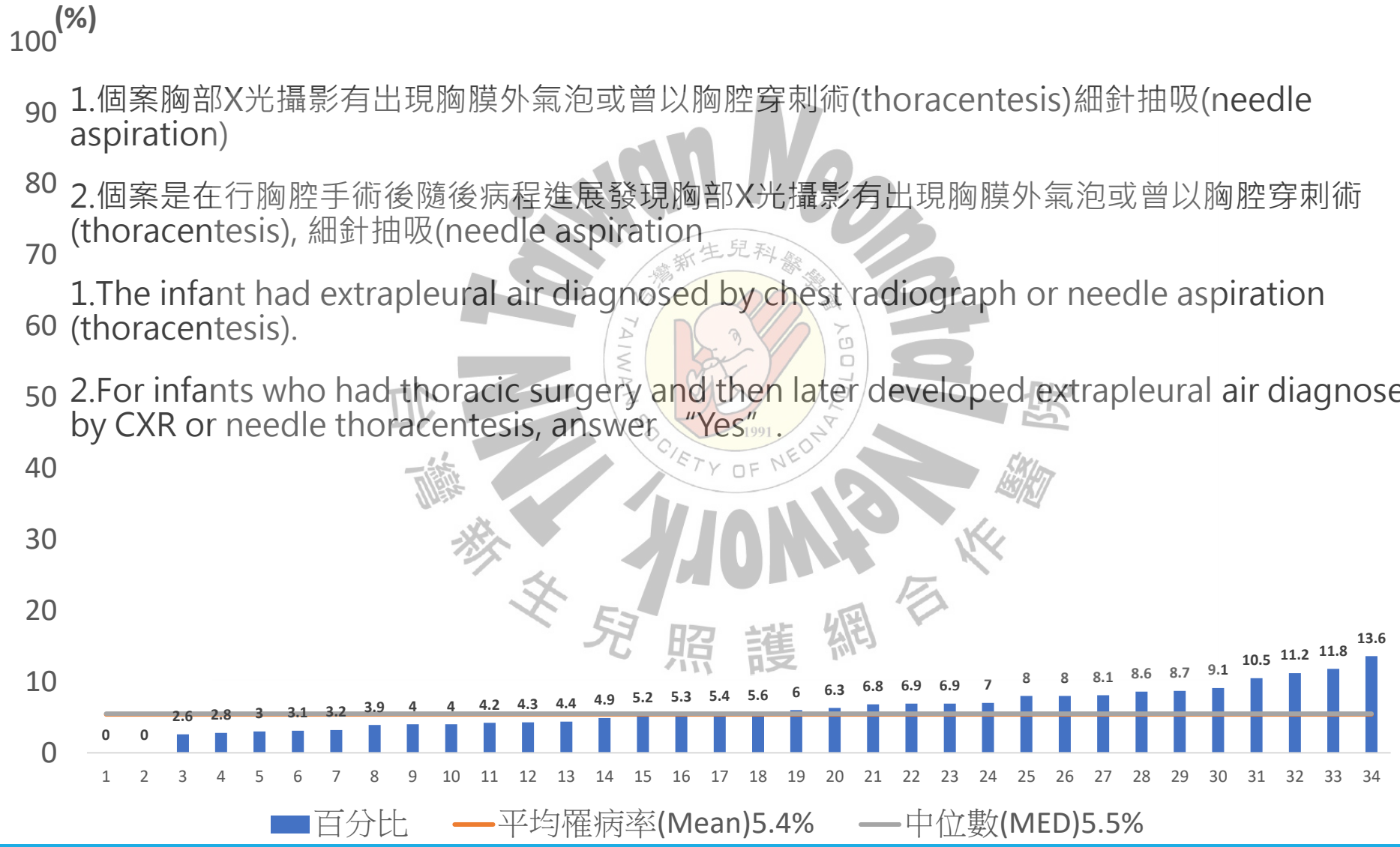
2016-2025年(Pneumothorax)
參與TNN各院個案入院期間曾診斷有氣胸

1.個案胸部X光攝影有出現胸膜外氣泡或曾以胸腔穿刺術(thoracentesis)細針抽吸(needle aspiration)

2.個案是在行胸腔手術後隨後病程進展發現胸部X光攝影有出現胸膜外氣泡或曾以胸腔穿刺術(thoracentesis), 細針抽吸(needle aspiration

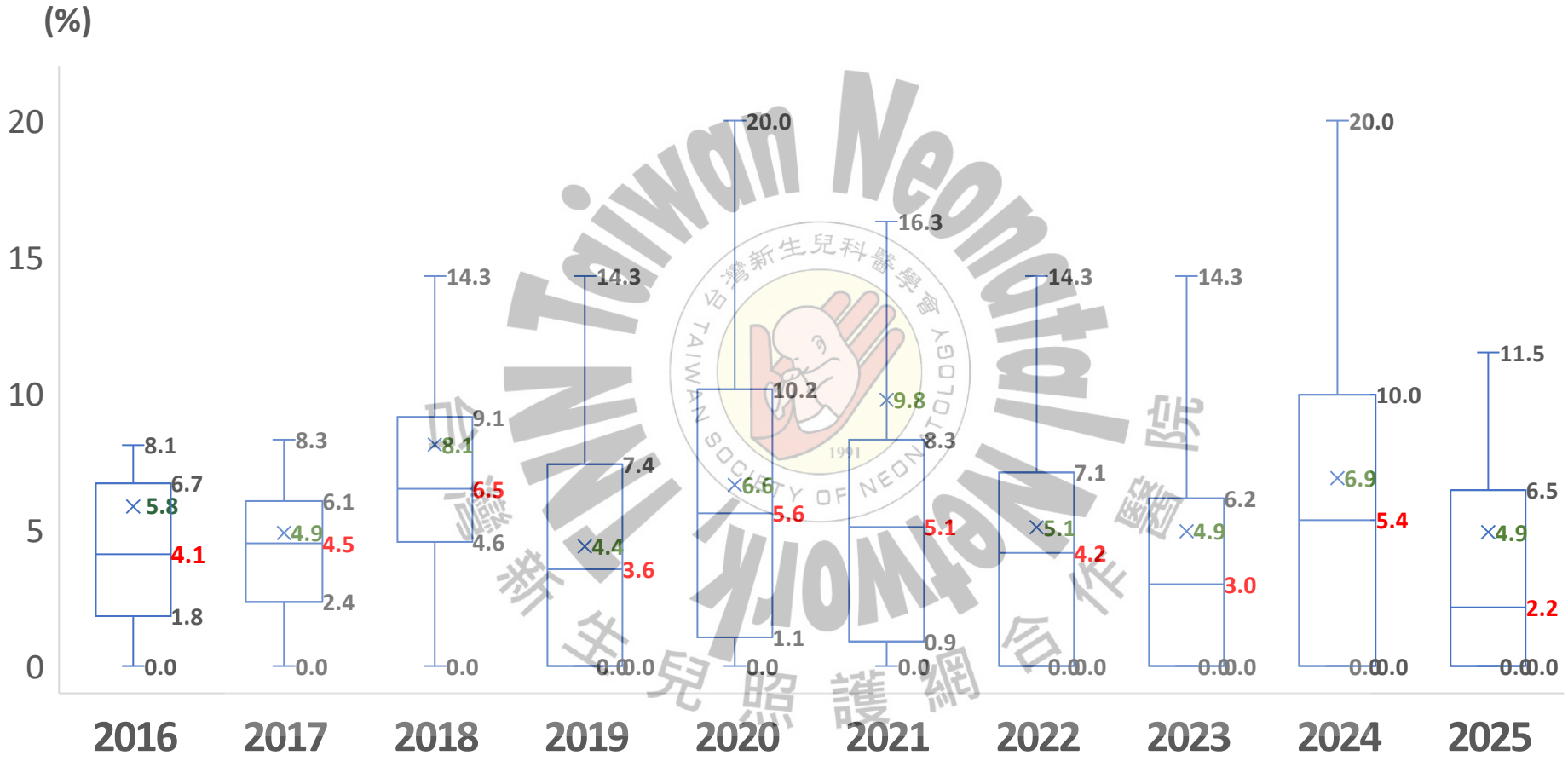
1.The infant had extrapleural air diagnosed by chest radiograph or needle aspiration (thoracentesis).

2.For infants who had thoracic surgery and then later developed extrapleural air diagnosed by CXR or needle thoracentesis, answer "Yes".



各年度Pneumothorax罹病率

—中位數(MED)　　x平均數(Mean)



2016-2025年(Pneumothorax) 個案入院期間診斷有氣胸

*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年(Chronic Lung Disease<33wks)參與TNN各院出生週數<33週之個案於矯正年齡36週或出院時診斷有慢性肺疾病

出生週數<33週的個案,但排除矯正週數滿36週前死亡者

1.個案住院期間有使用類固醇治療CLD)

2.個案出院週數>矯正36週且於矯正週數36周當日有使用氧氣

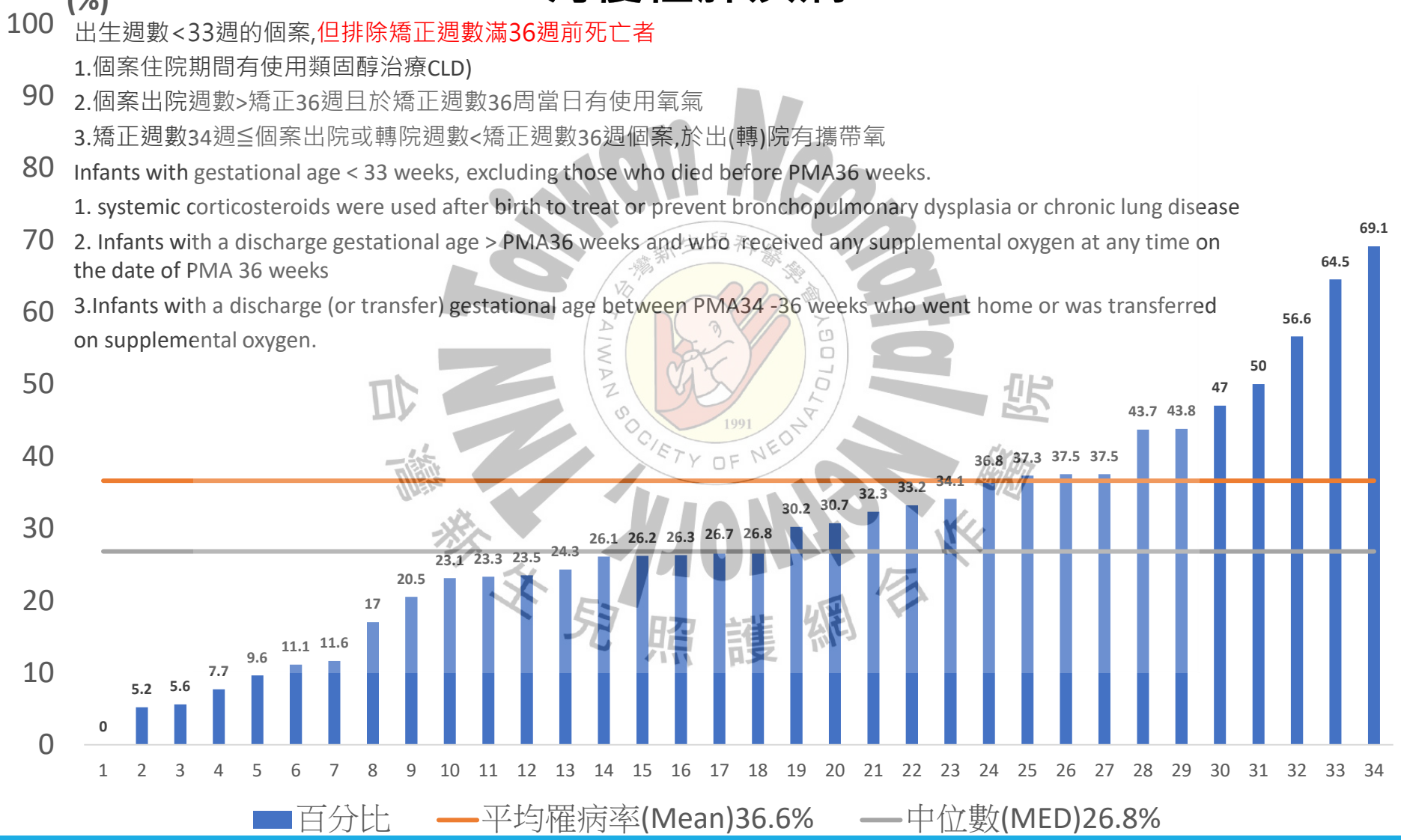
3.矯正週數34週≦個案出院或轉院週數<矯正週數36週個案,於出(轉)院有攜帶氧

Infants with gestational age < 33 weeks, excluding those who died before PMA36 weeks.

1. systemic corticosteroids were used after birth to treat or prevent bronchopulmonary dysplasia or chronic lung disease

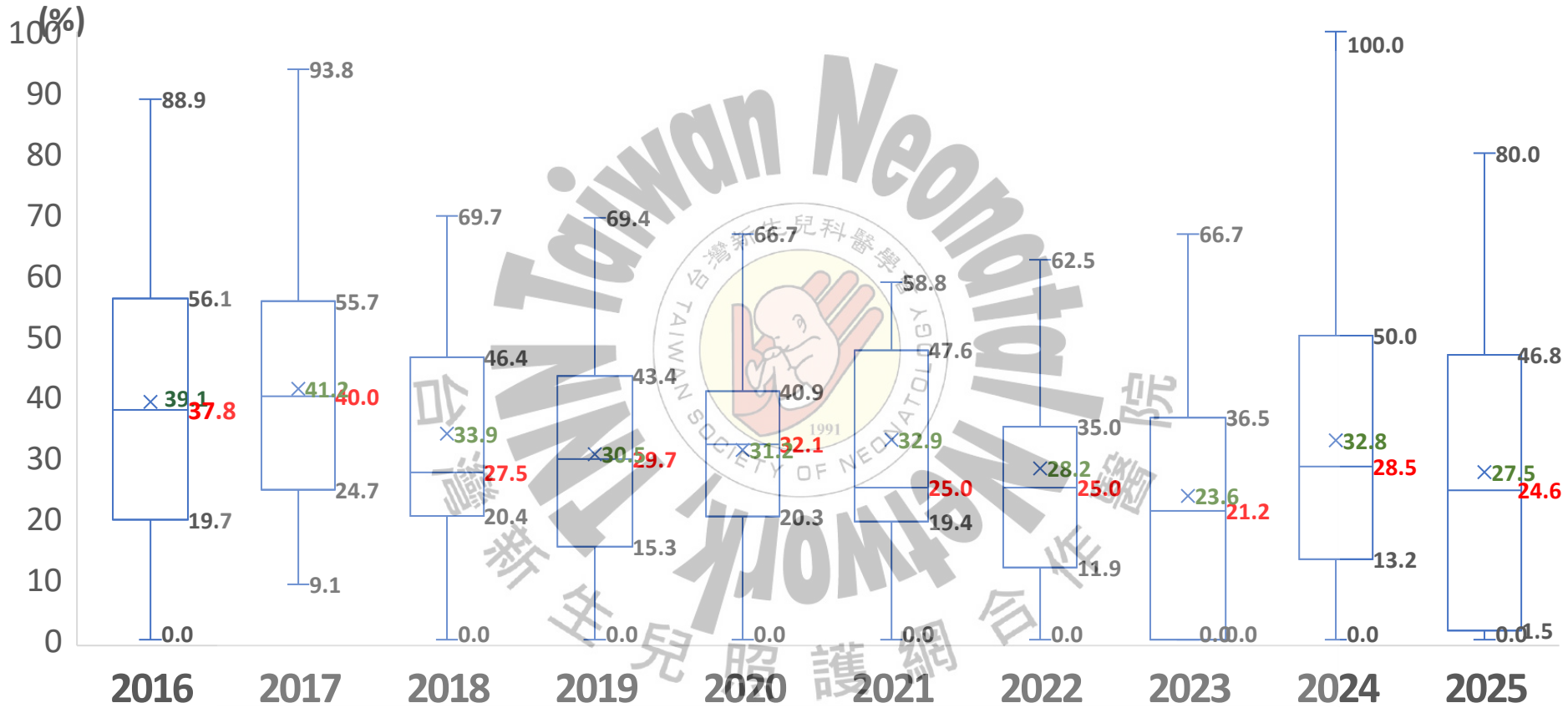
2. Infants with a discharge gestational age > PMA36 weeks and who received any supplemental oxygen at any time on the date of PMA 36 weeks

3.Infants with a discharge (or transfer) gestational age between PMA34 -36 weeks who went home or was transferred on supplemental oxygen.



各年度Chronic Lung Disease<33wks罹病率

—中位數(MED)　　x平均數(Mean)



2016-2025年(Chronic Lung Disease<33wks)

出生週數<33週之個案於矯正年齡36週或出院時診斷有慢性肺疾病

*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年(Severe IVH)
參與TNN各院個案腦部攝影診斷發現嚴重級數的腦室周圍與腦室內出血

個案在出生28天內曾多次進行腦部超音波、腦部斷層掃描(cranial CT)或腦部核磁共振(cranial MRI)，則挑選紀錄中最嚴重的一次級別填入。出現腦室內出血級數≥第三級

第三級：腦室出血且心室擴張

第四級：腦實質內出血

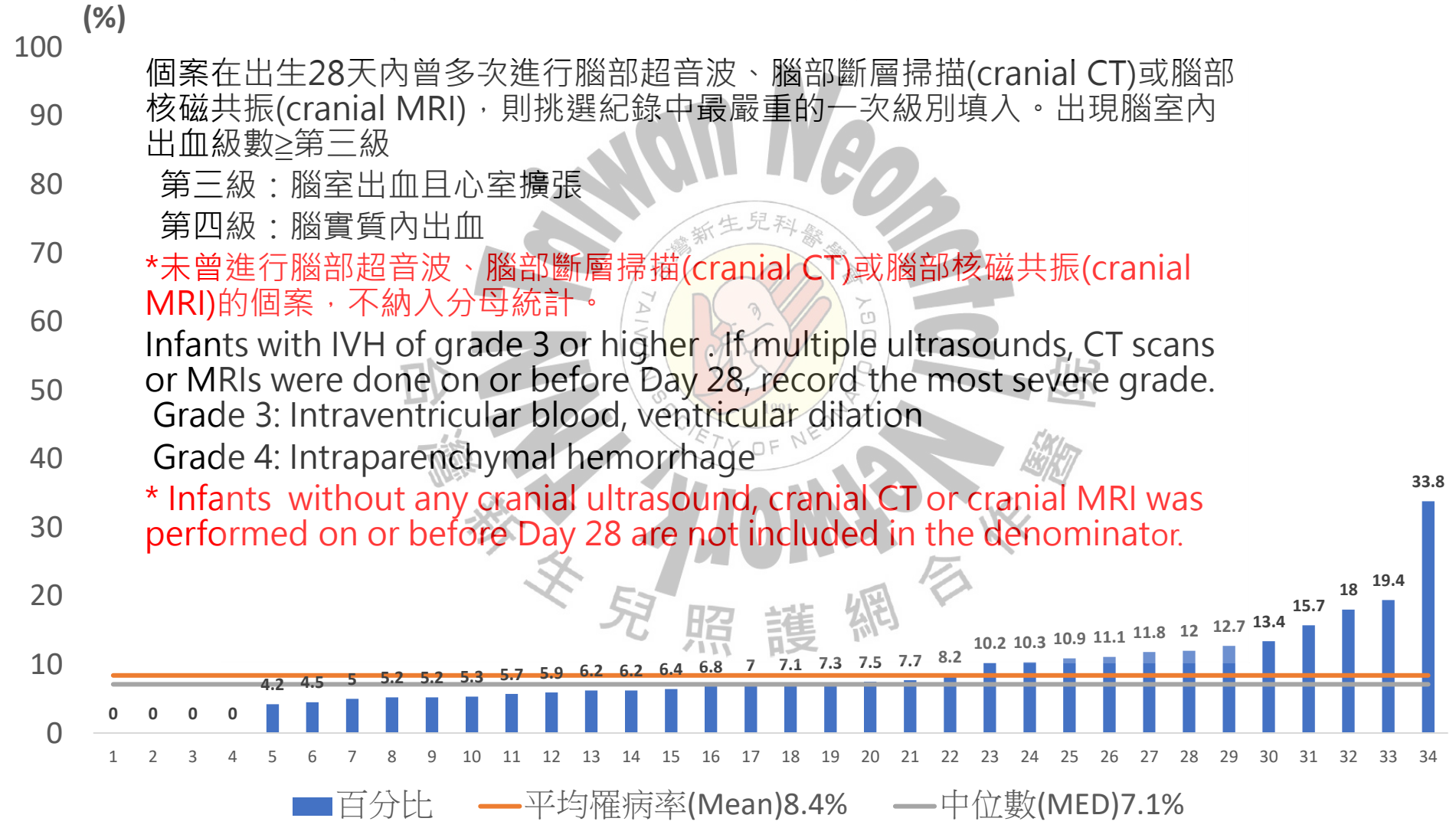
*未曾進行腦部超音波、腦部斷層掃描(cranial CT)或腦部核磁共振(cranial MRI)的個案，不納入分母統計。

Infants with IVH of grade 3 or higher . If multiple ultrasounds, CT scans or MRIs were done on or before Day 28, record the most severe grade.

Grade 3: Intraventricular blood, ventricular dilation

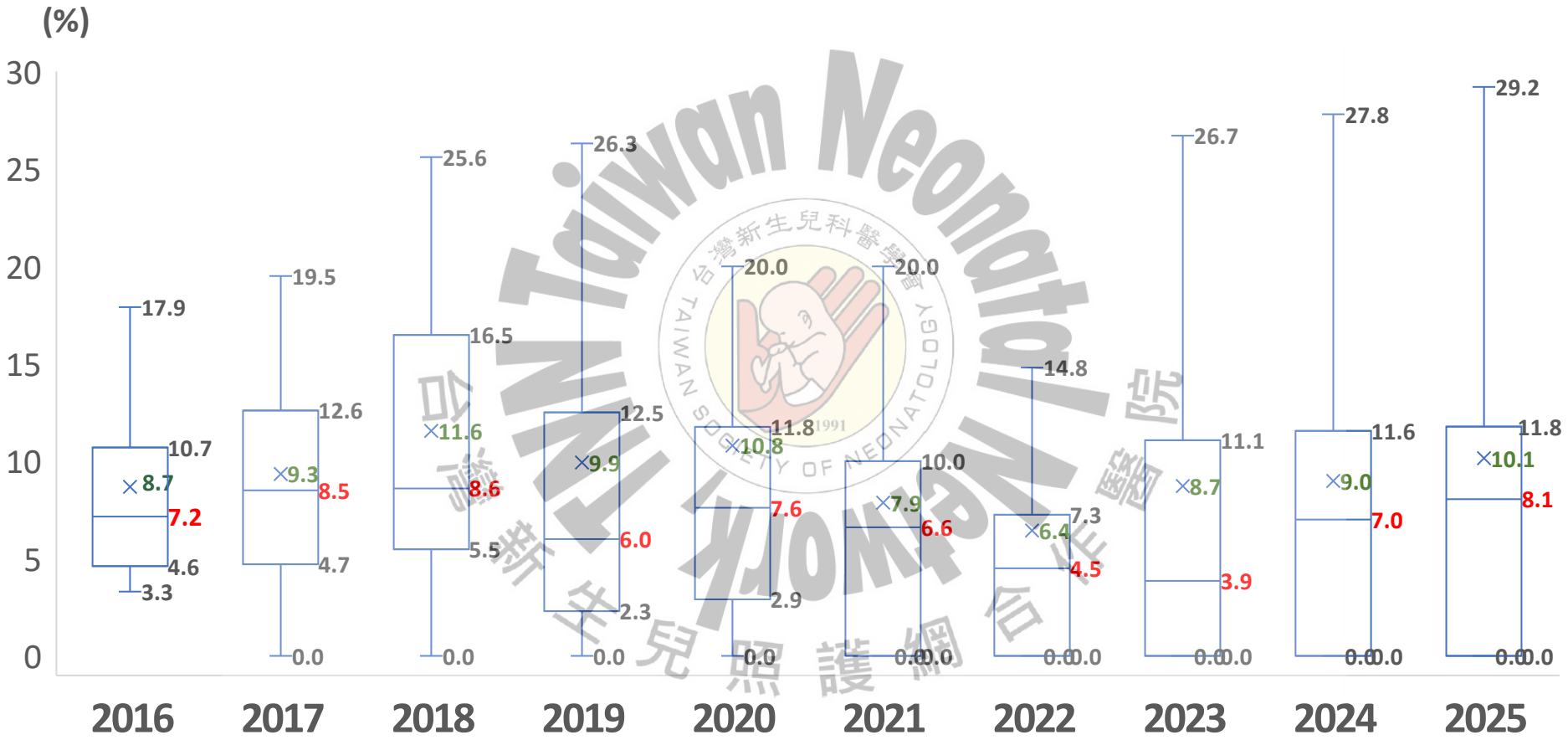
Grade 4: Intraparenchymal hemorrhage

* Infants without any cranial ultrasound, cranial CT or cranial MRI was performed on or before Day 28 are not included in the denominator.



各年度Severe IVH罹病率

—中位數(MED)　　x平均數(Mean)

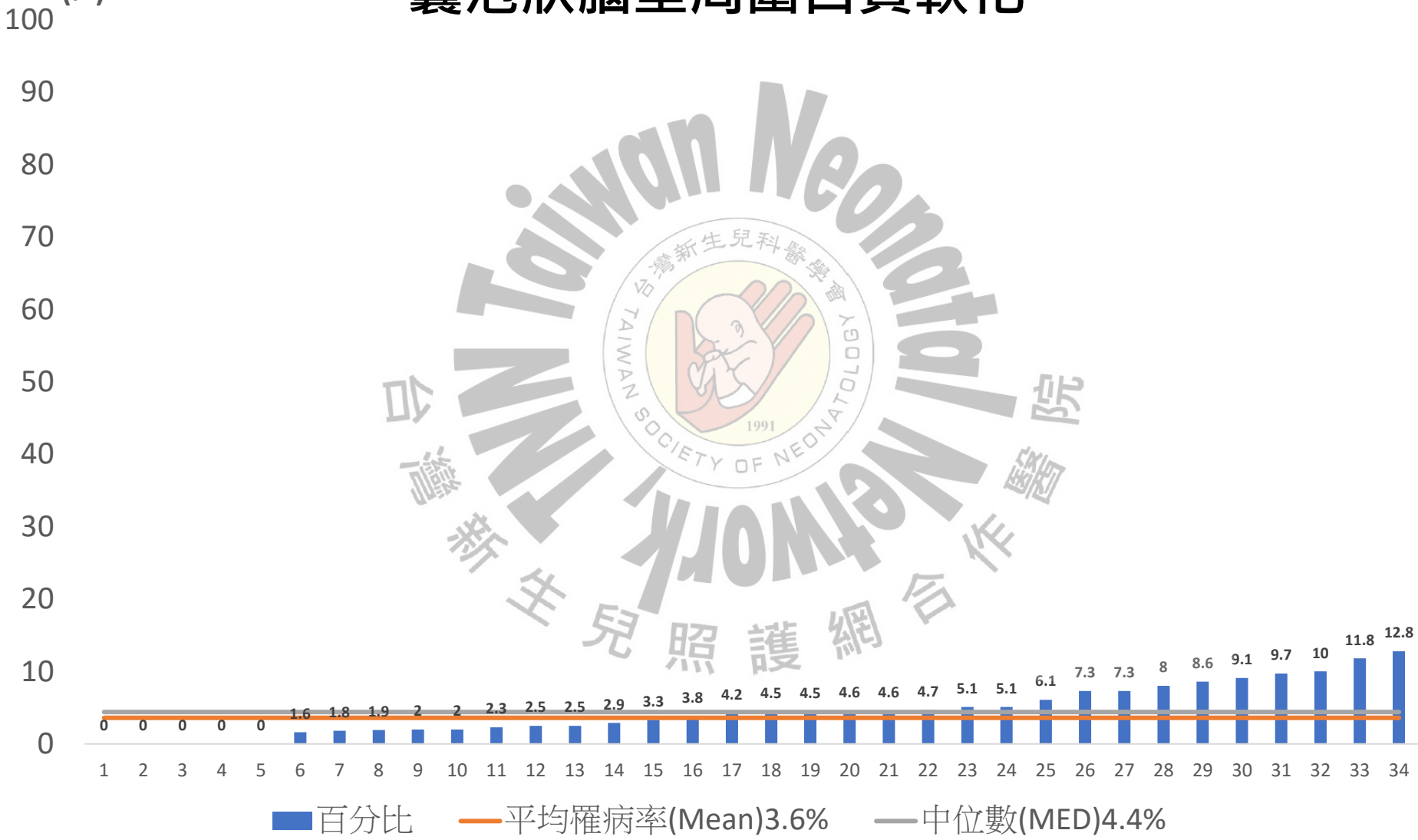


2016-2025年(Severe IVH)

個案腦部攝影診斷發現嚴重級數的腦室周圍與腦室內出血

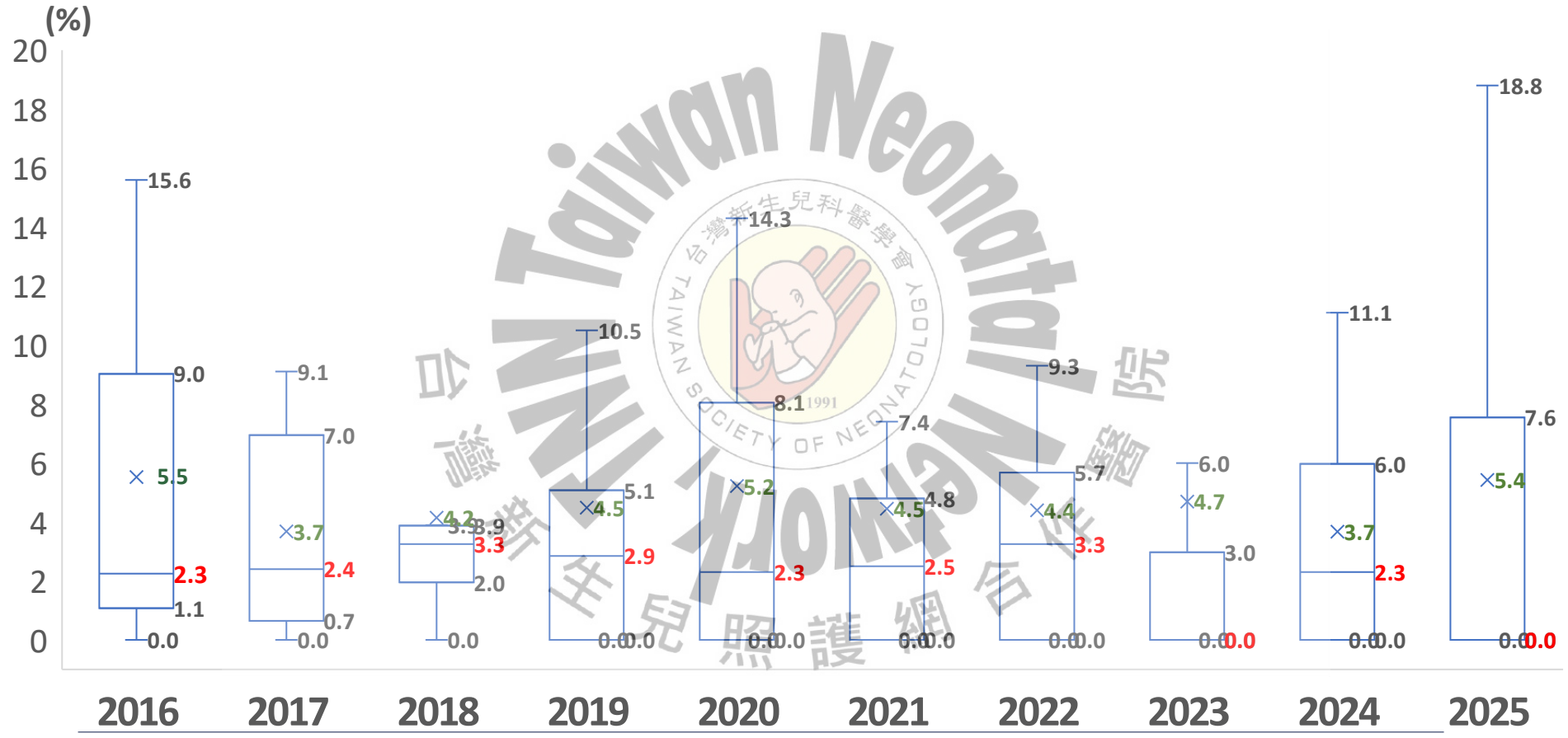
*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年(Cystic PVL)
參與TNN各院個案腦部攝影診斷發現
囊泡狀腦室周圍白質軟化



各年度Cystic PVL罹病率

—中位數(MED)　　x平均數(Mean)



2016-2025年(Cystic PVL)個案腦部攝影診斷發現囊泡狀腦室周圍白質軟化

*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年(NEC)
參與TNN各院個案診斷壞死性腸炎

下述情況中，a與b皆要至少符合一項，則可視為有壞死性腸炎。

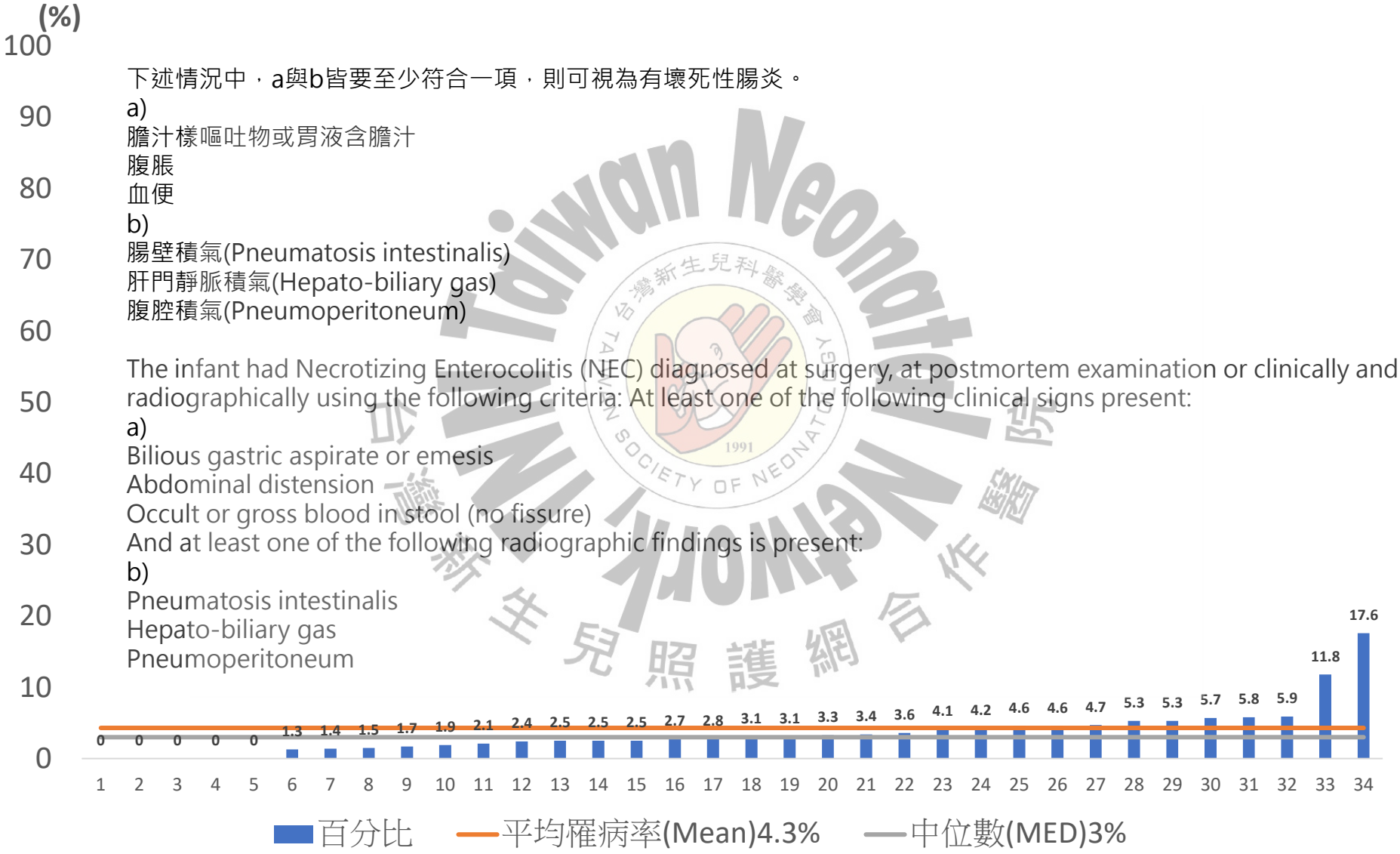
a)
膽汁樣嘔吐物或胃液含膽汁
腹脹
血便

b)
腸壁積氣(Pneumatosis intestinalis)
肝門靜脈積氣(Hepato-biliary gas)
腹腔積氣(Pneumoperitoneum)

The infant had Necrotizing Enterocolitis (NEC) diagnosed at surgery, at postmortem examination or clinically and radiographically using the following criteria: At least one of the following clinical signs present:

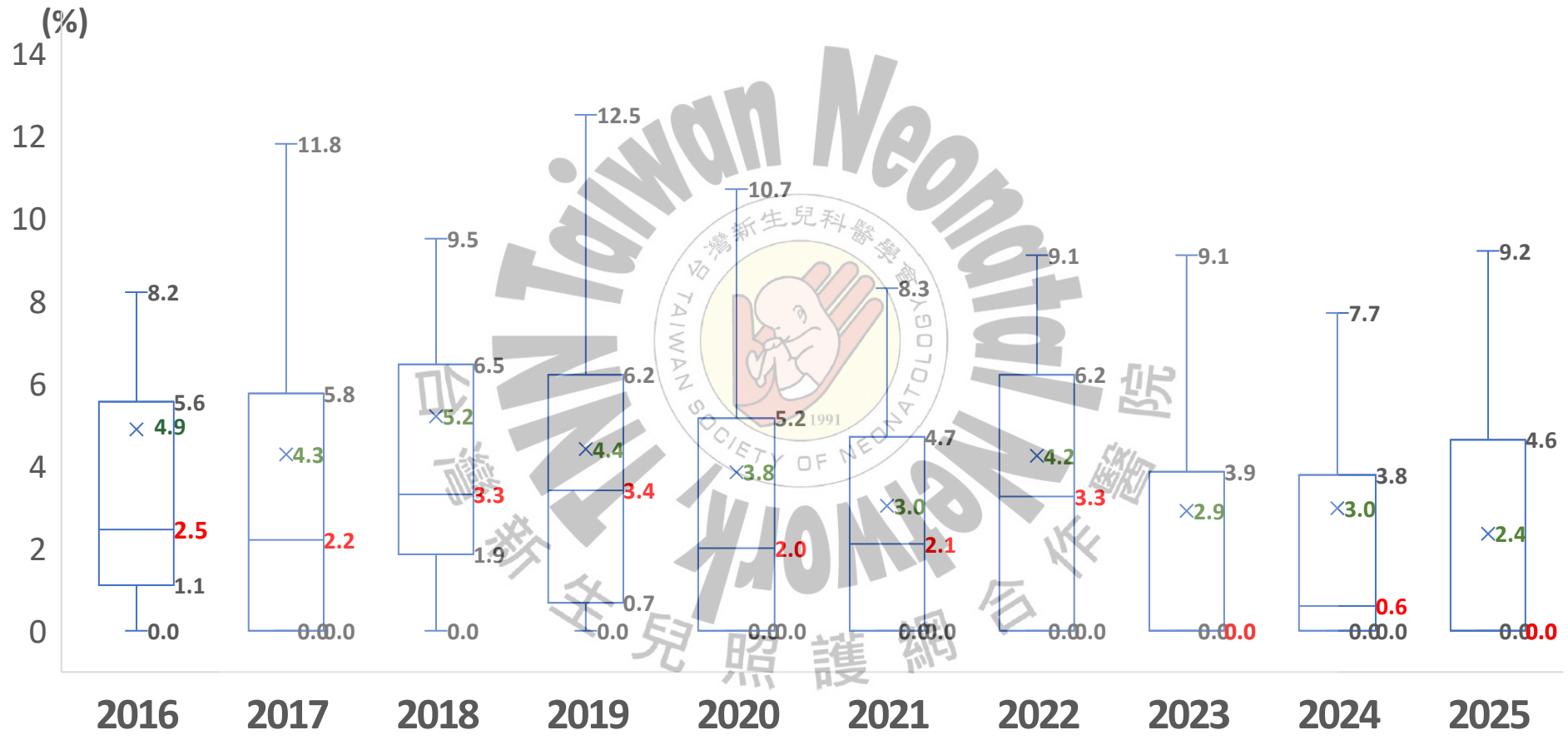
a)
Bilious gastric aspirate or emesis
Abdominal distension
Occult or gross blood in stool (no fissure)
And at least one of the following radiographic findings is present:

b)
Pneumatosis intestinalis
Hepato-biliary gas
Pneumoperitoneum



各年度NEC罹病率

—中位數(MED)　　x平均數(Mean)



2016-2025年(NEC)個案診斷壞死性腸炎

*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年(Severe ROP)
參與TNN各院個案入院期間診斷有嚴重級數的早產兒視網膜病變

個案在住院過程中，進行過幾次視網膜檢驗，填入最嚴重的早產兒視網膜病變(ROP)級數。

出現ROP級數≥第三級

級數3：視網膜內隆脊(intraretinal ridge)出現纖維化血管增生

級數4：部分視網膜剝離

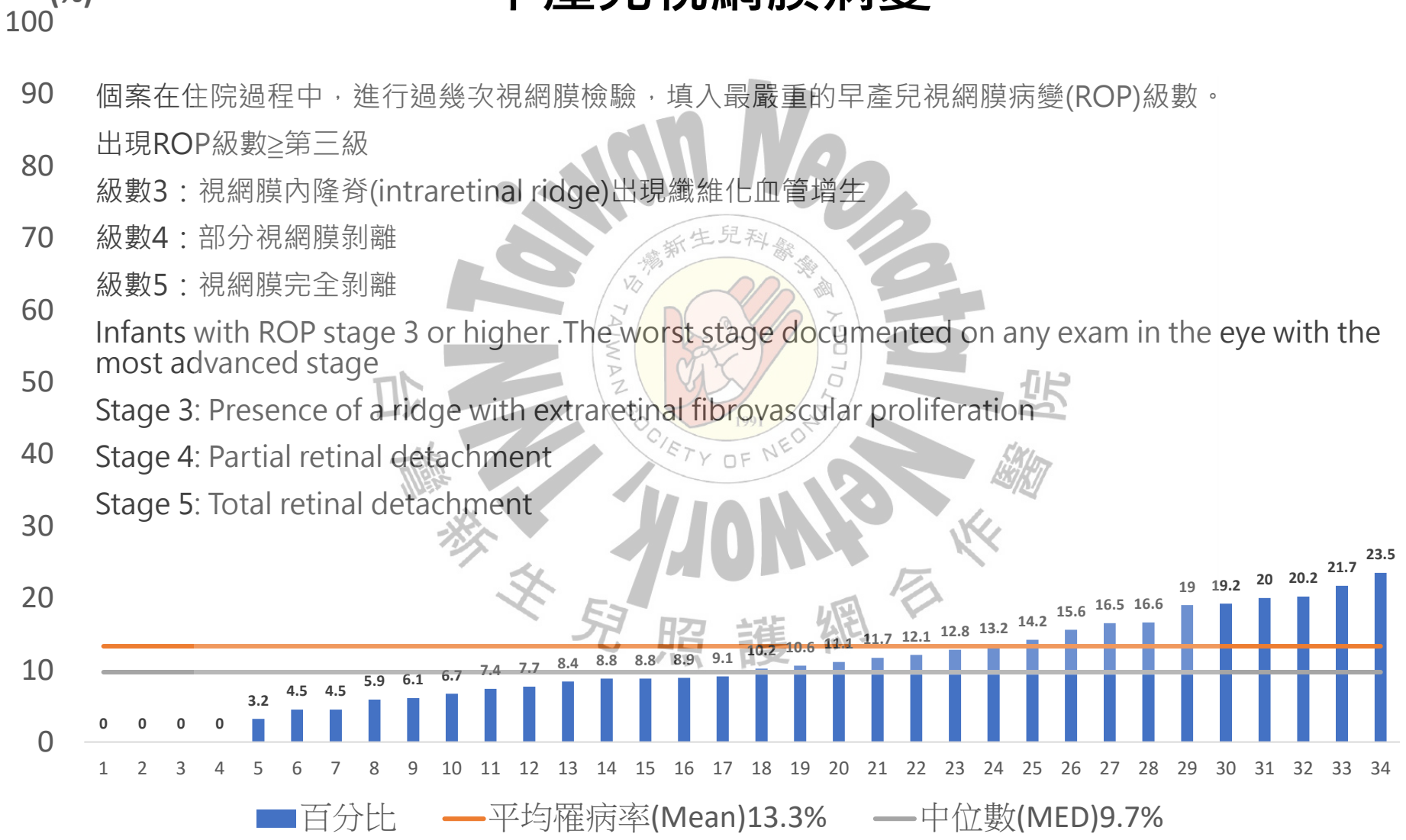
級數5：視網膜完全剝離

Infants with ROP stage 3 or higher .The worst stage documented on any exam in the eye with the most advanced stage

Stage 3: Presence of a ridge with extraretinal fibrovascular proliferation

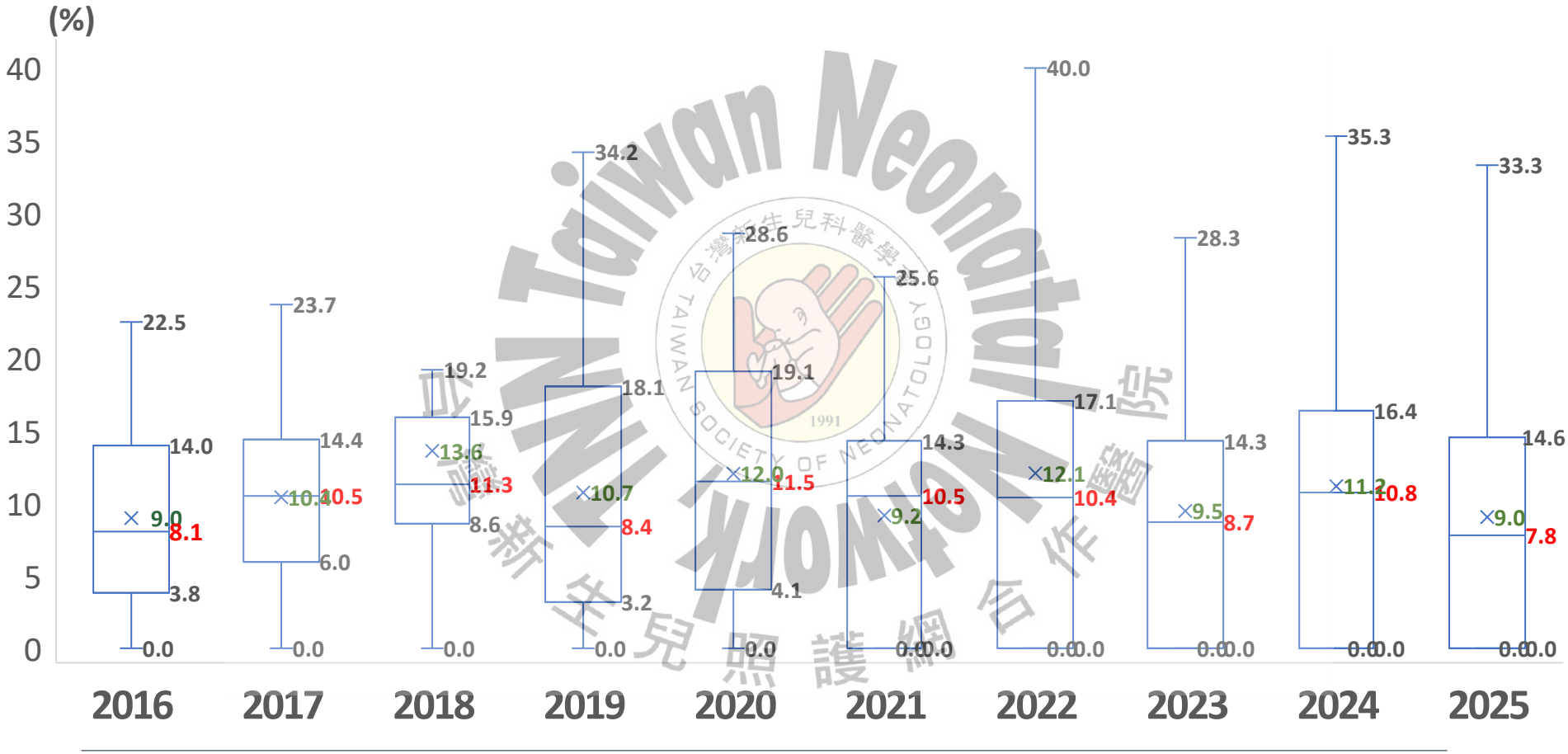
Stage 4: Partial retinal detachment

Stage 5: Total retinal detachment



各年度Severe ROP罹病率

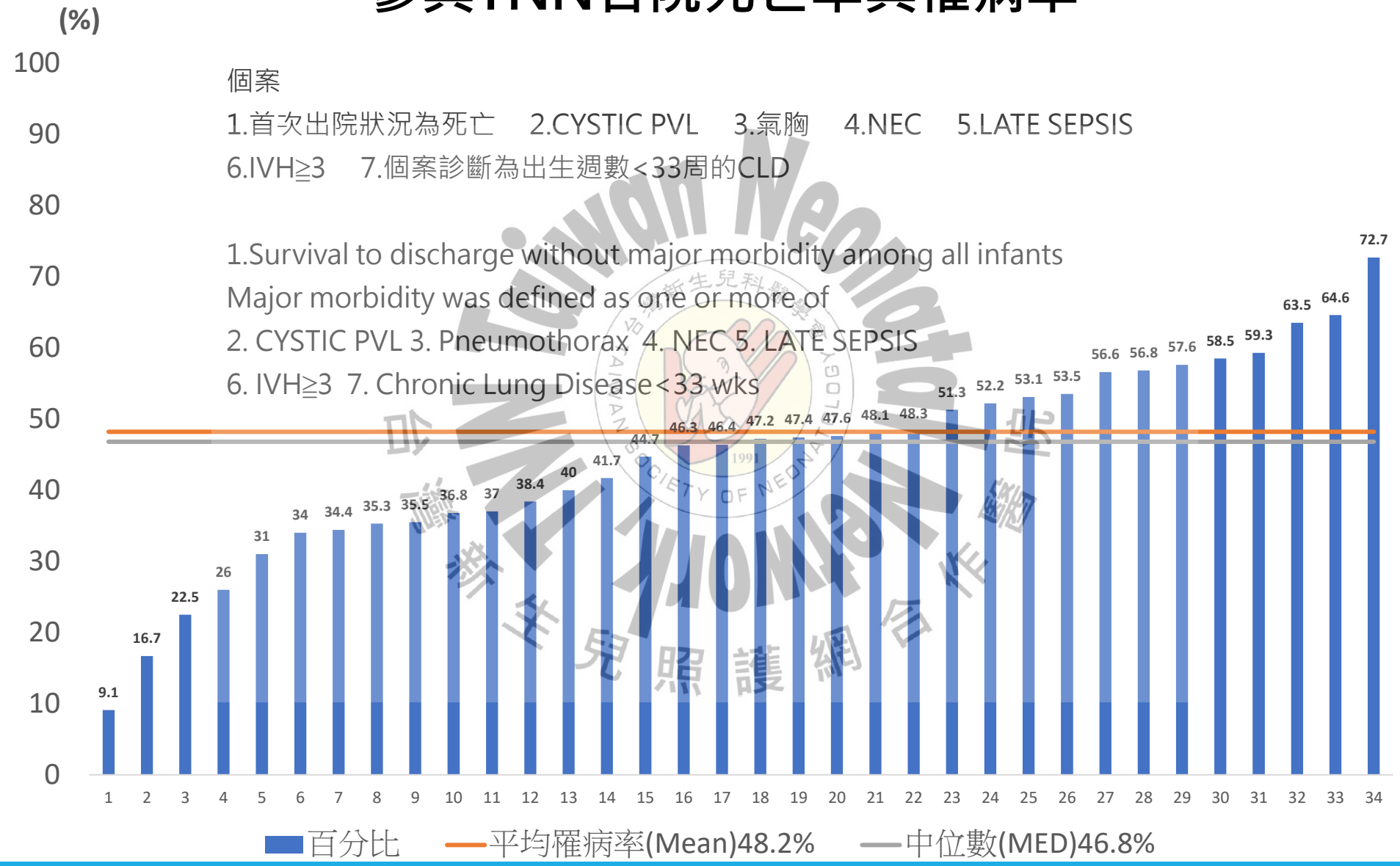
—中位數(MED)　　x平均數(Mean)



2016-2025年(Severe ROP) 個案入院期間診斷有嚴重級數的早產兒視網膜病變

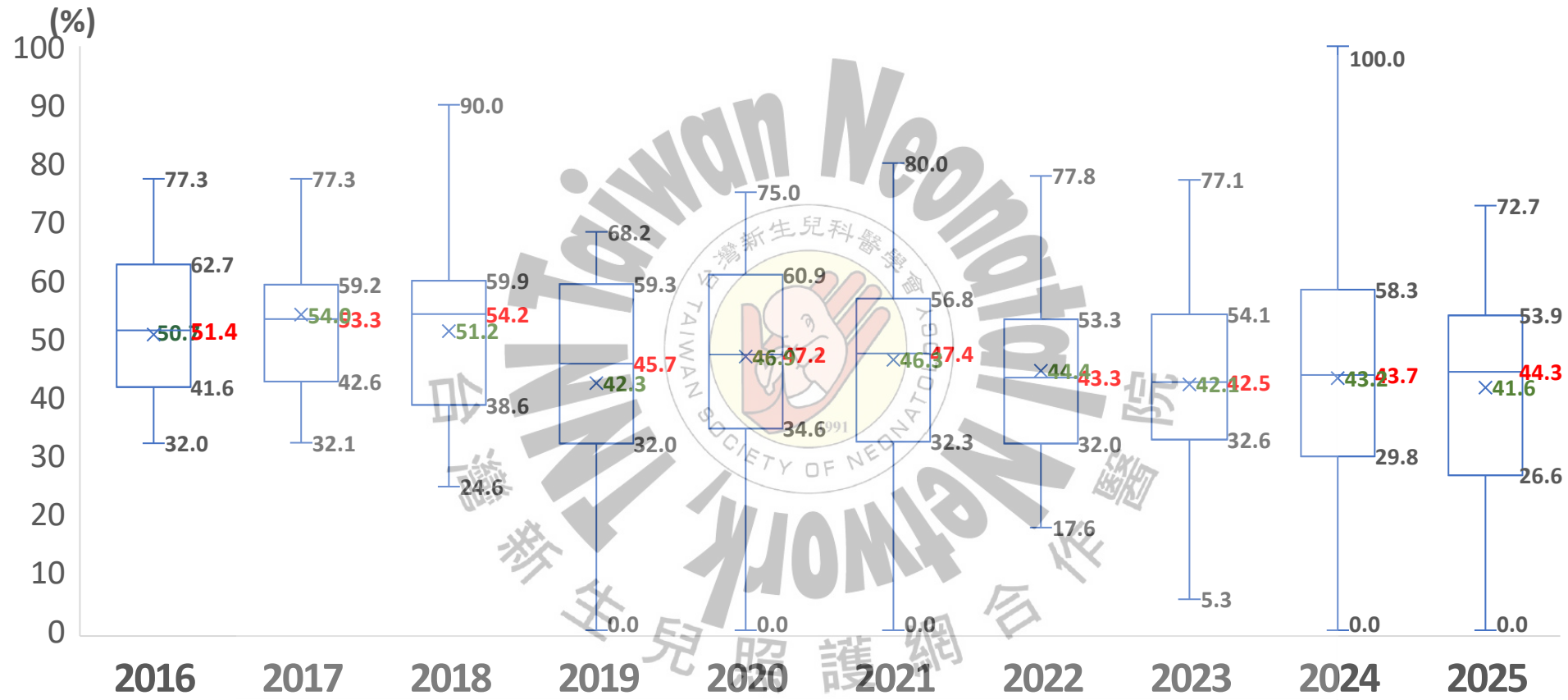
*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年(Death or Morbidity)
參與TNN各院死亡率與罹病率



各年度Death or Morbidity發生率

—中位數(MED)　　x平均數(Mean)



2016-2025年(Death or Morbidity)死亡率與罹病率

*極端值未顯示於圖表中(Outliers are not displayed in the chart)

TNN 2016-2025:
Procedures and Interventions

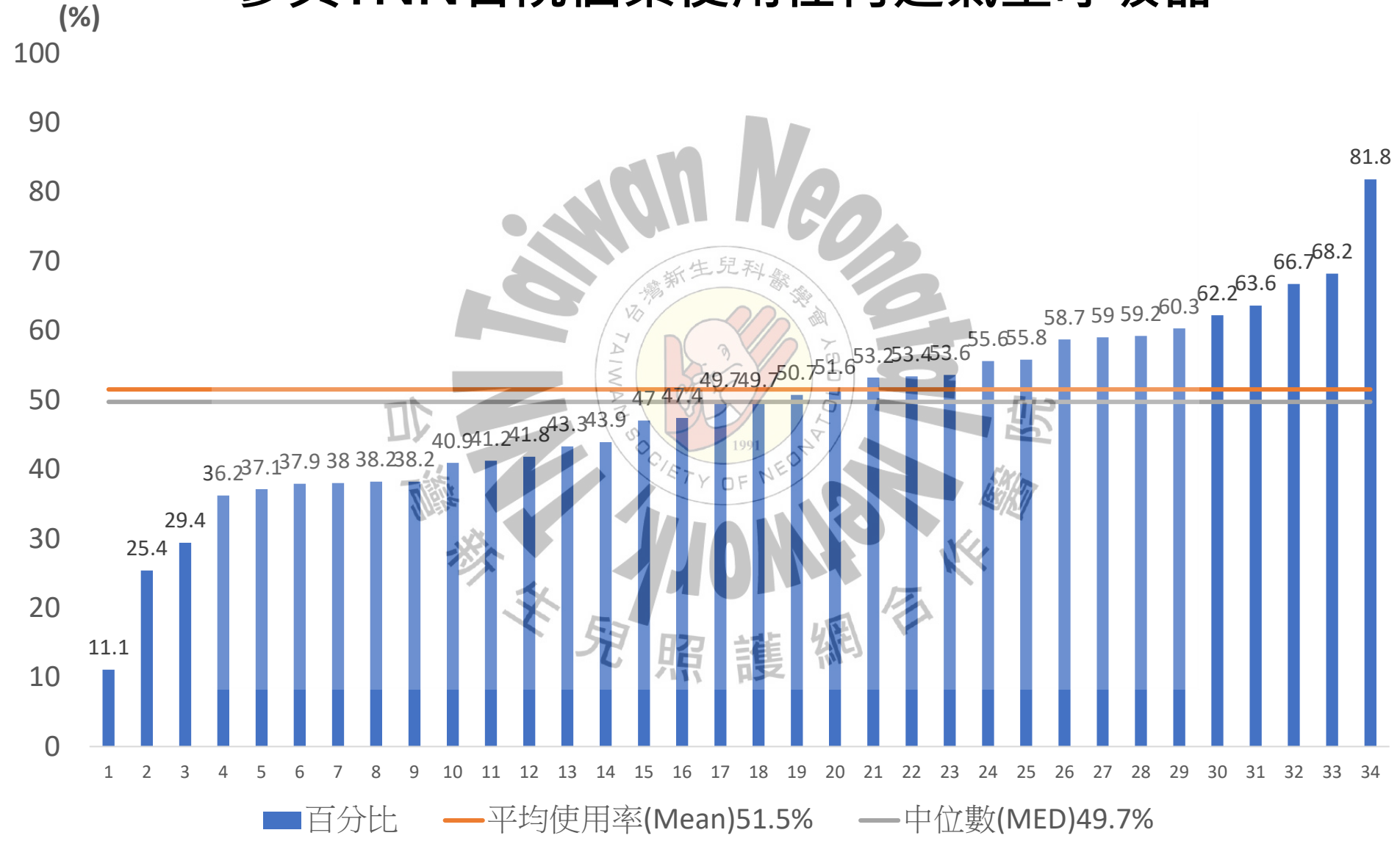
AT BIRTH

KEY PERFORMANCE MEASURES

PROCEDURES AND INTERVENTIONS

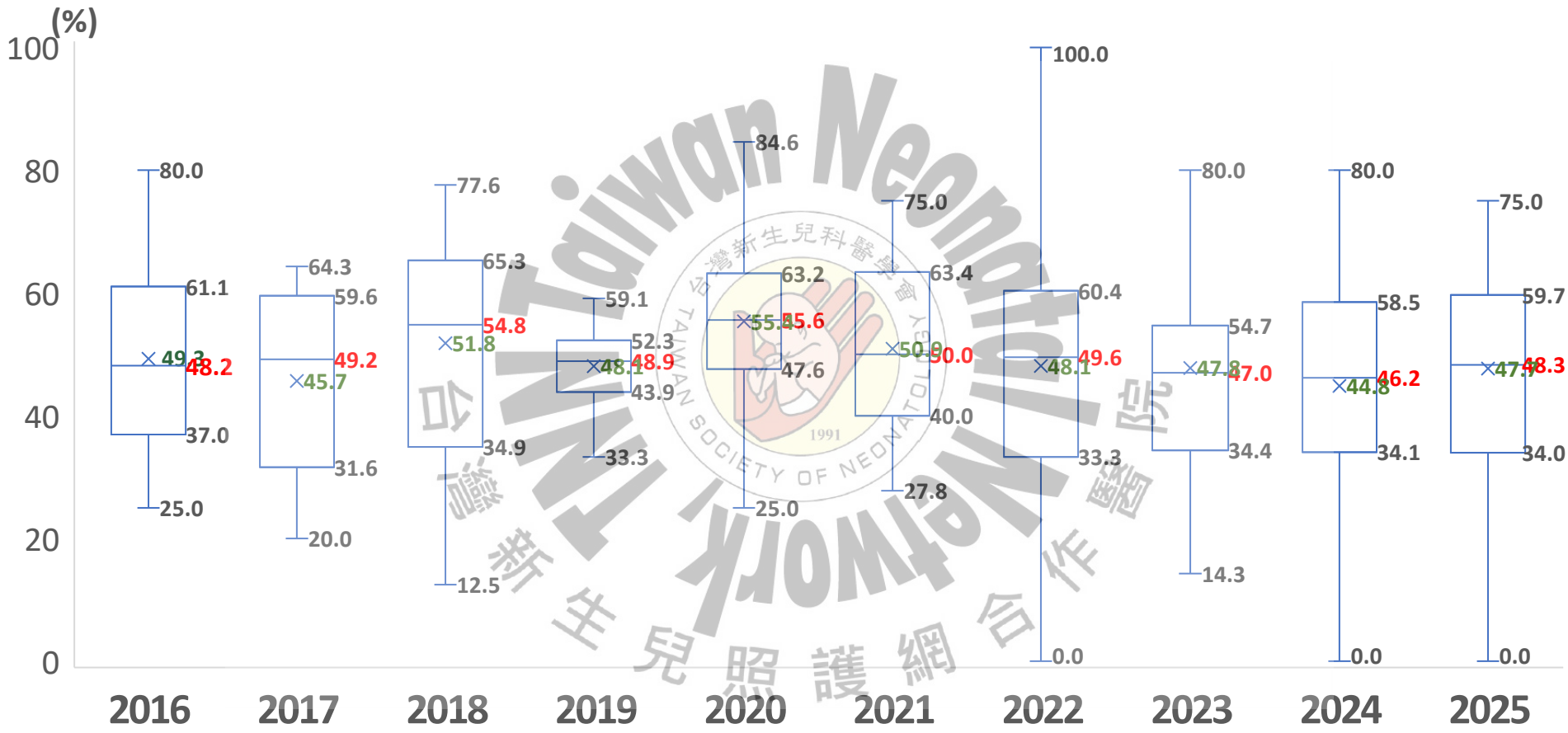
AT DISCHARGE HOME

2016-2025年(Any ventilation)
參與TNN各院個案使用任何通氣型呼吸器



各年度Any ventilation使用率

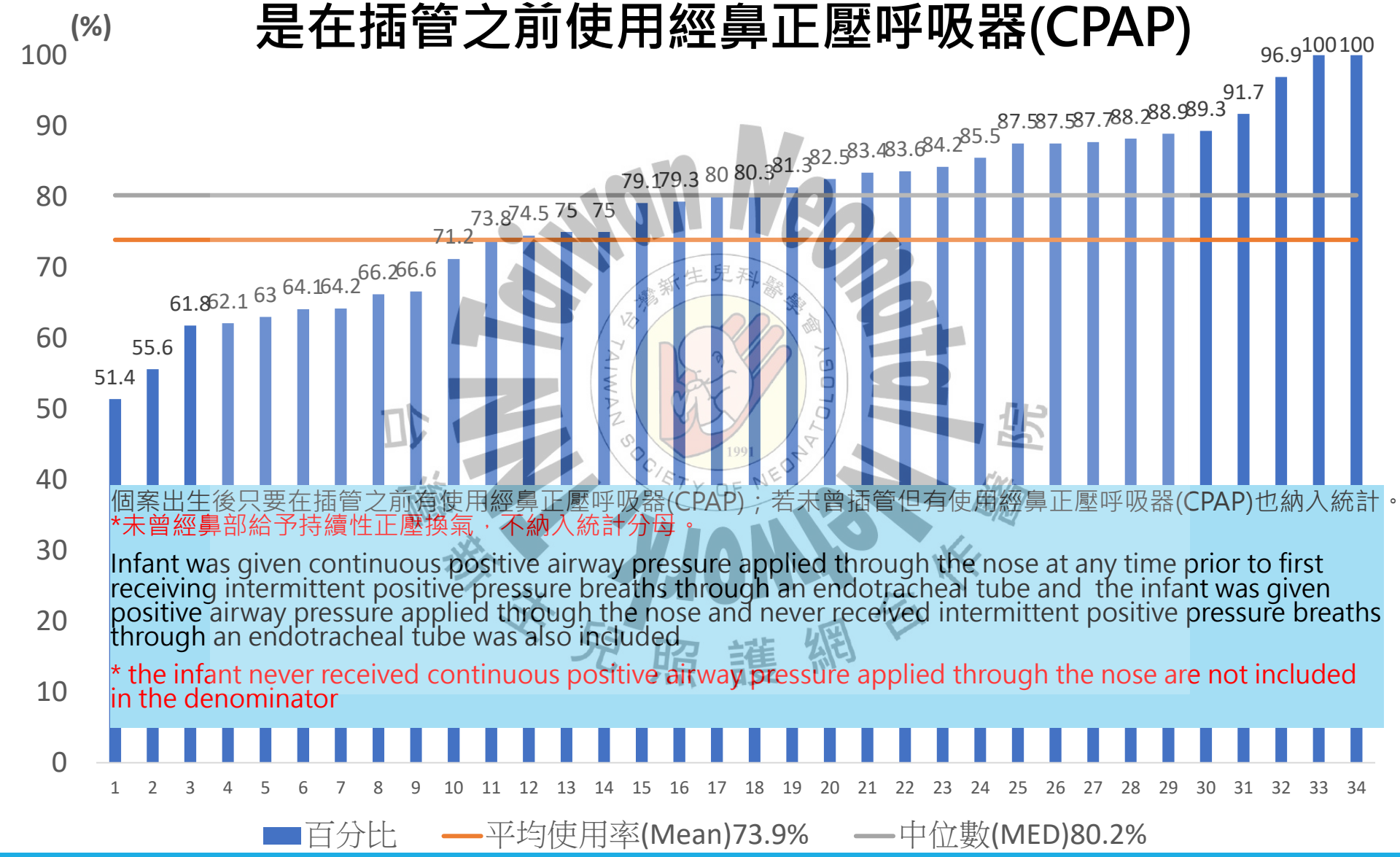
—中位數(MED)　　x平均數(Mean)



2016-2025年(Any ventilation)個案使用任何通氣型呼吸器

*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年(Nasal CPAP before ETT Ventilation)
參與TNN各院個案出生後，不論有無插管，
是在插管之前使用經鼻正壓呼吸器(CPAP)



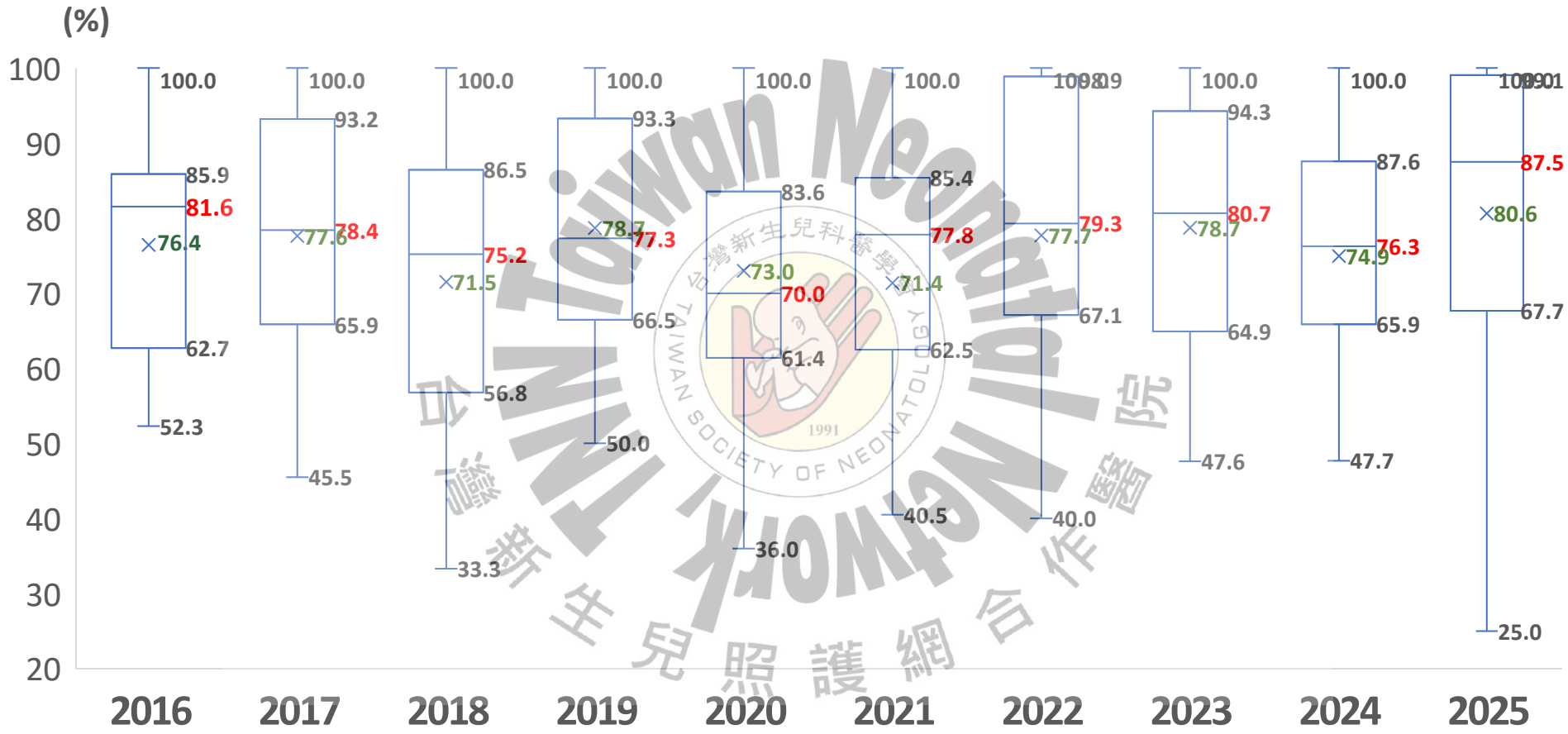
個案出生後只要在插管之前有使用經鼻正壓呼吸器(CPAP)；若未曾插管但有使用經鼻正壓呼吸器(CPAP)也納入統計。
*未曾經鼻部給予持續性正壓換氣，不納入統計分母。

Infant was given continuous positive airway pressure applied through the nose at any time prior to first receiving intermittent positive pressure breaths through an endotracheal tube and the infant was given positive airway pressure applied through the nose and never received intermittent positive pressure breaths through an endotracheal tube was also included

* the infant never received continuous positive airway pressure applied through the nose are not included in the denominator

各年度Nasal CPAP before ETT Ventilation使用率

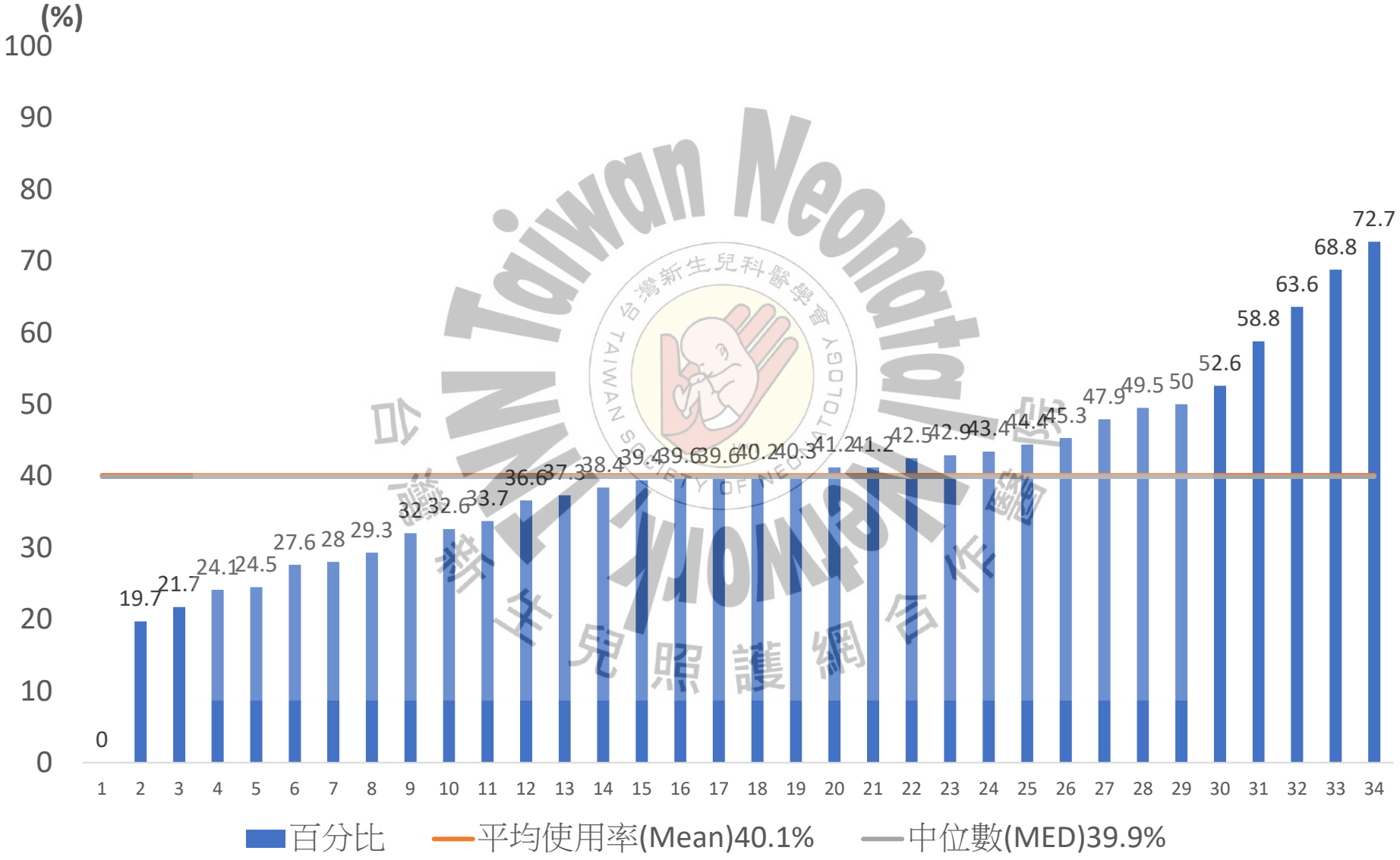
—中位數(MED)　　x平均數(Mean)



2016-2025年 (Nasal CPAP before ETT Ventilation)個案出生後，不論有無插管，是在插管之前使用經鼻正壓呼吸器(CPAP)

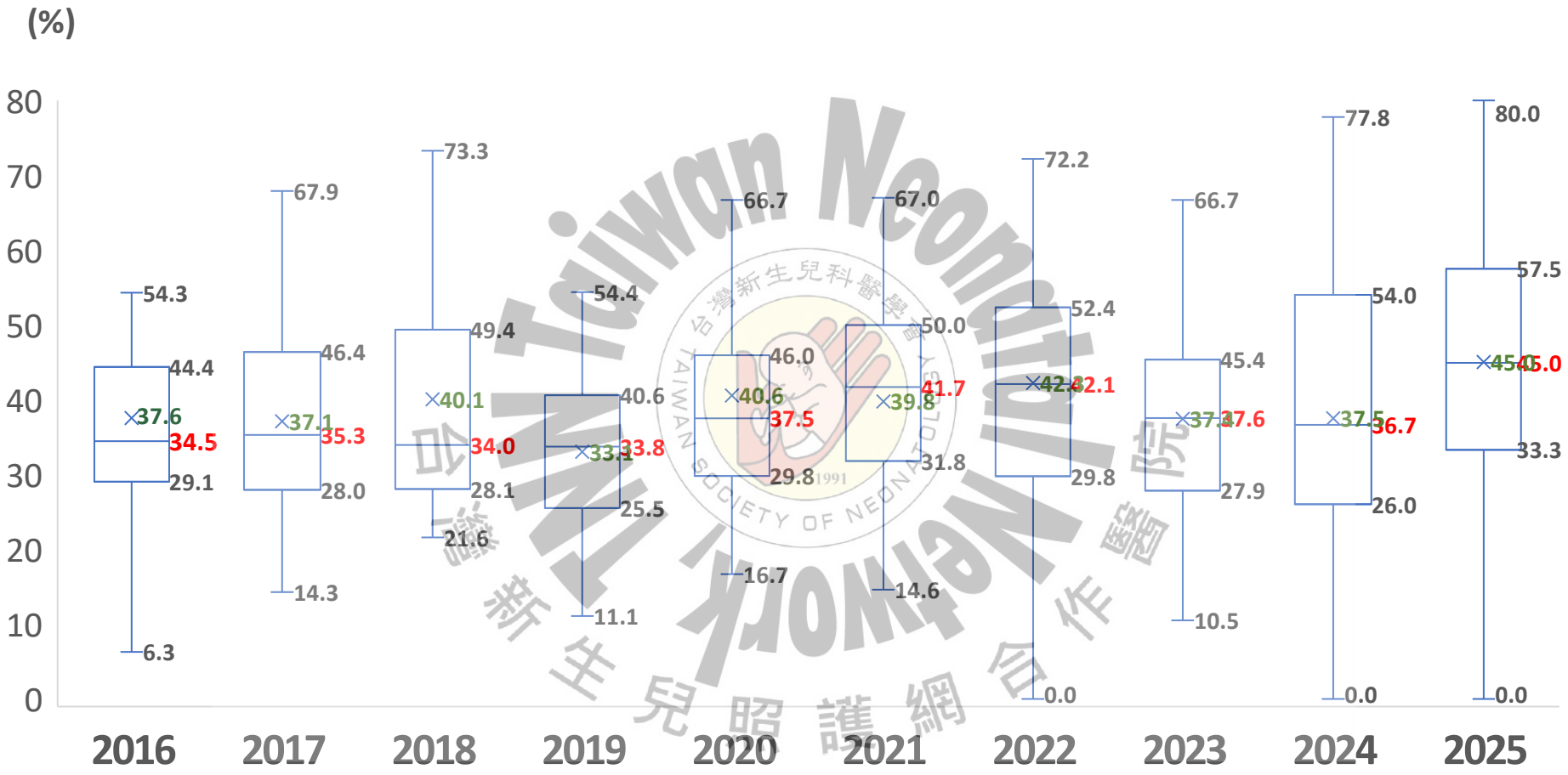
*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年(Surfactant given at any time)
參與TNN各院個案入院期間曾投予肺表面活性劑



各年度Surfactant使用率

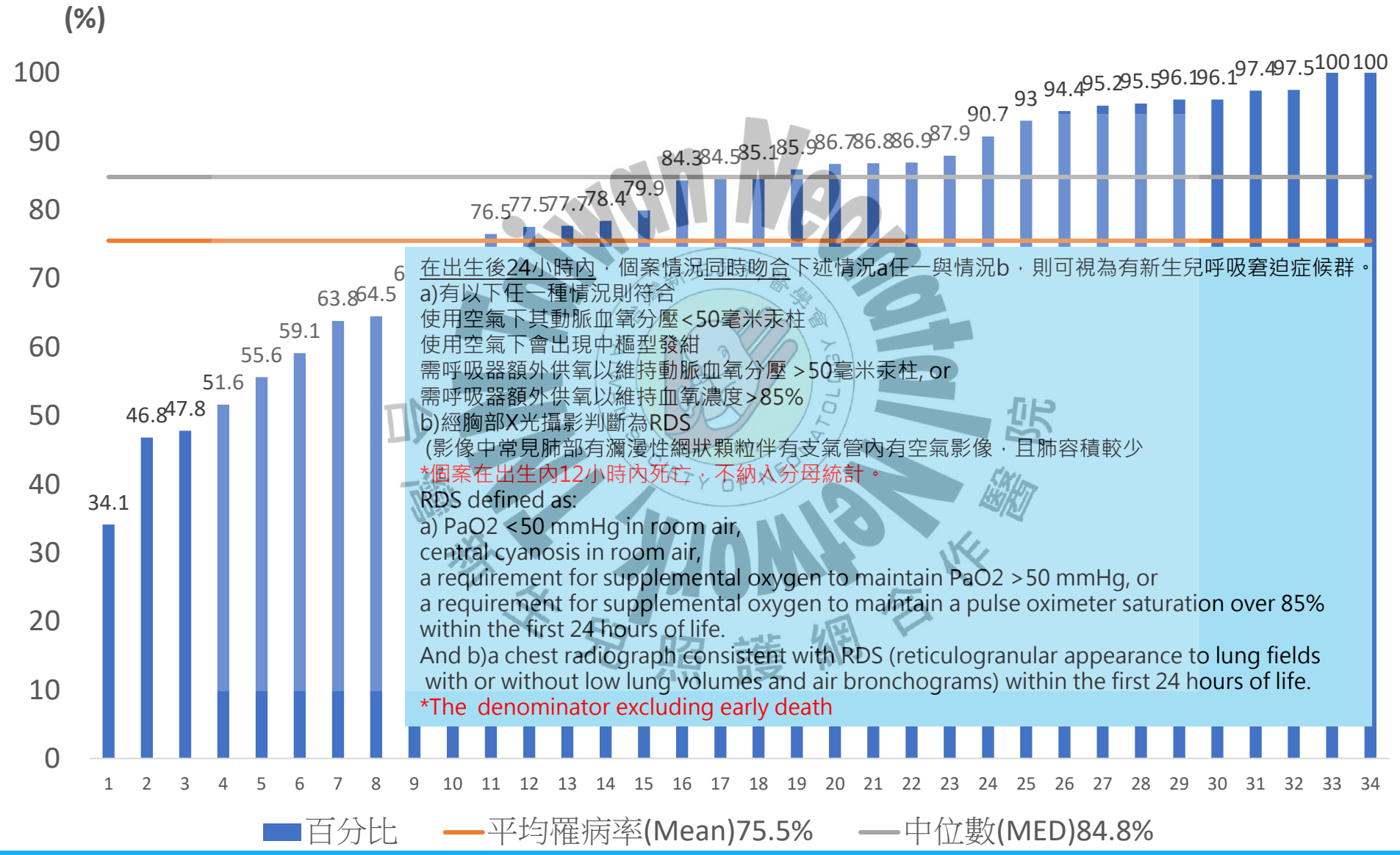
—中位數(MED)　　x平均數(Mean)



2016-2025年(Surfactant at any time)個案入院期間曾投予肺表面活性劑

*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年參與TNN各院個案診斷有新生兒呼吸窘迫症候群(RDS)



在出生後24小時內，個案情況同時吻合下述情況a任一與情況b，則可視為有新生兒呼吸窘迫症候群。

a)有以下任一種情況則符合

使用空氣下其動脈血氧分壓<50毫米汞柱

使用空氣下會出現中樞型發紺

需呼吸器額外供氧以維持動脈血氧分壓 >50毫米汞柱, or

需呼吸器額外供氧以維持血氧濃度>85%

b)經胸部X光攝影判斷為RDS

(影像中常見肺部有瀰漫性網狀顆粒伴有支氣管內有空氣影像，且肺容積較少

*個案在出生內12小時內死亡，不納入分母統計。

RDS defined as:

a) PaO2 <50 mmHg in room air,

central cyanosis in room air,

a requirement for supplemental oxygen to maintain PaO2 >50 mmHg, or

a requirement for supplemental oxygen to maintain a pulse oximeter saturation over 85%

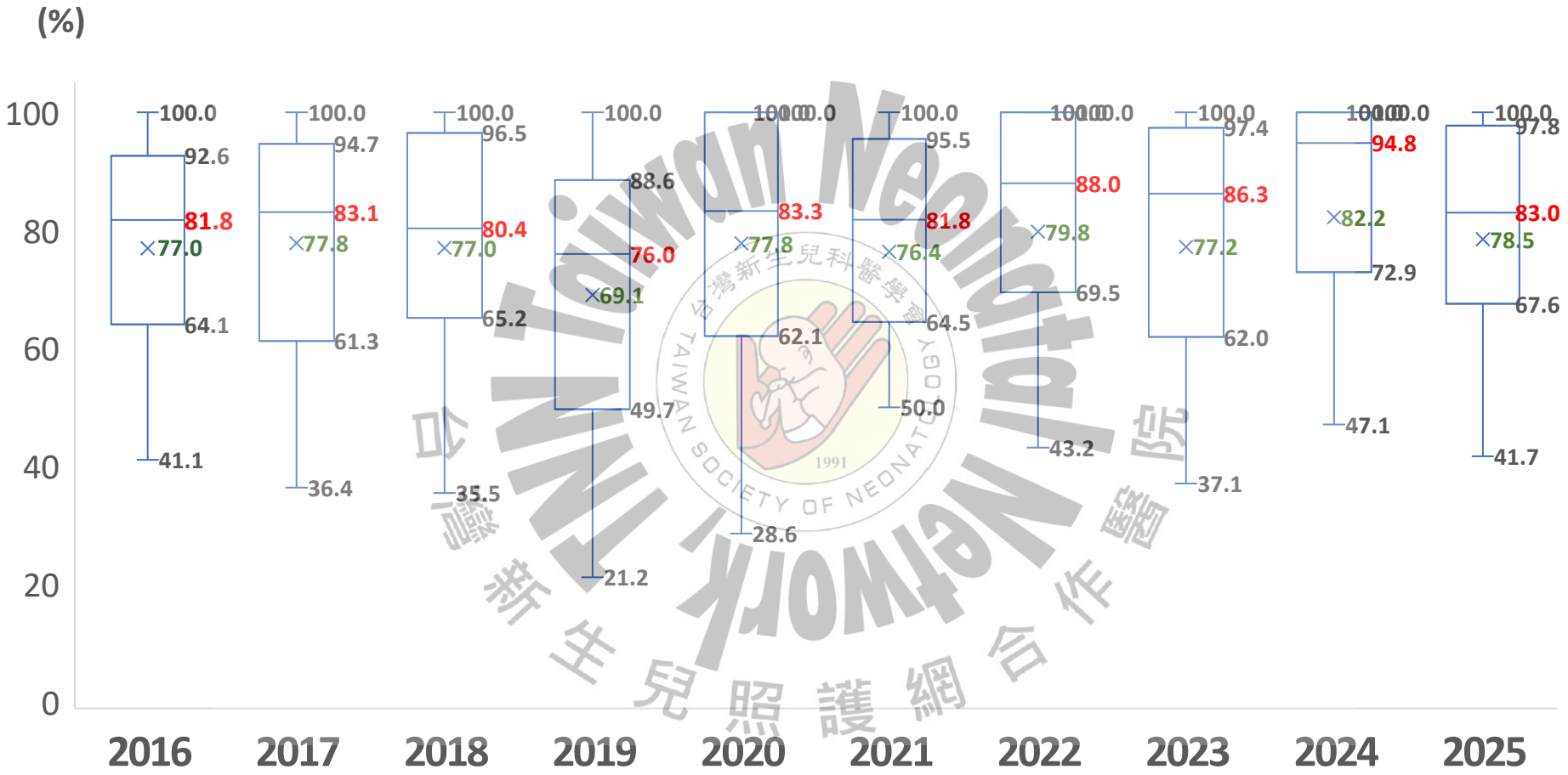
within the first 24 hours of life.

And b)a chest radiograph consistent with RDS (reticulogranular appearance to lung fields with or without low lung volumes and air bronchograms) within the first 24 hours of life.

*The denominator excluding early death

各年度RDS罹病率

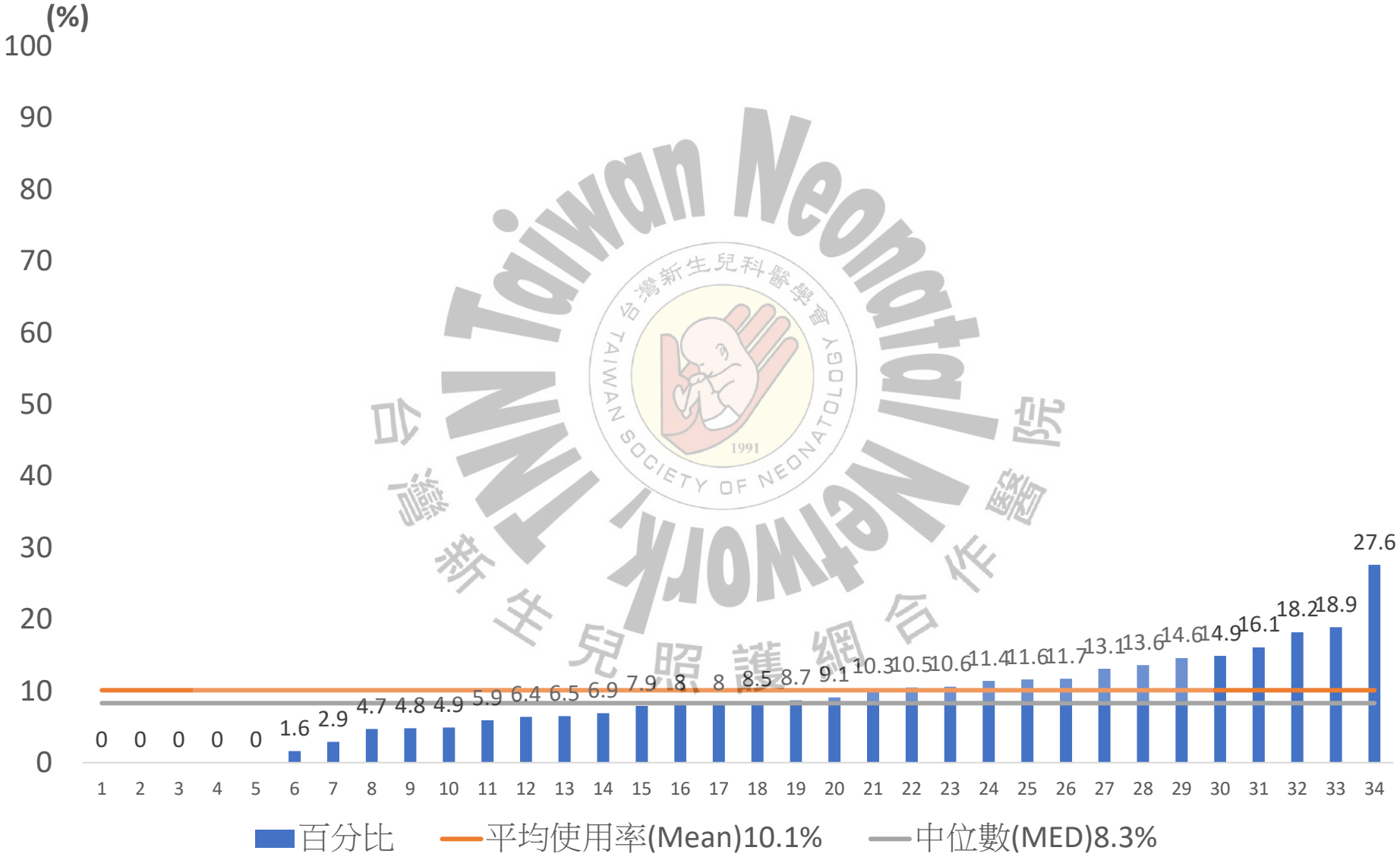
—中位數(MED)　　x平均數(Mean)



2016-2025年 個案診斷有新生兒呼吸窘迫症候群(RDS)

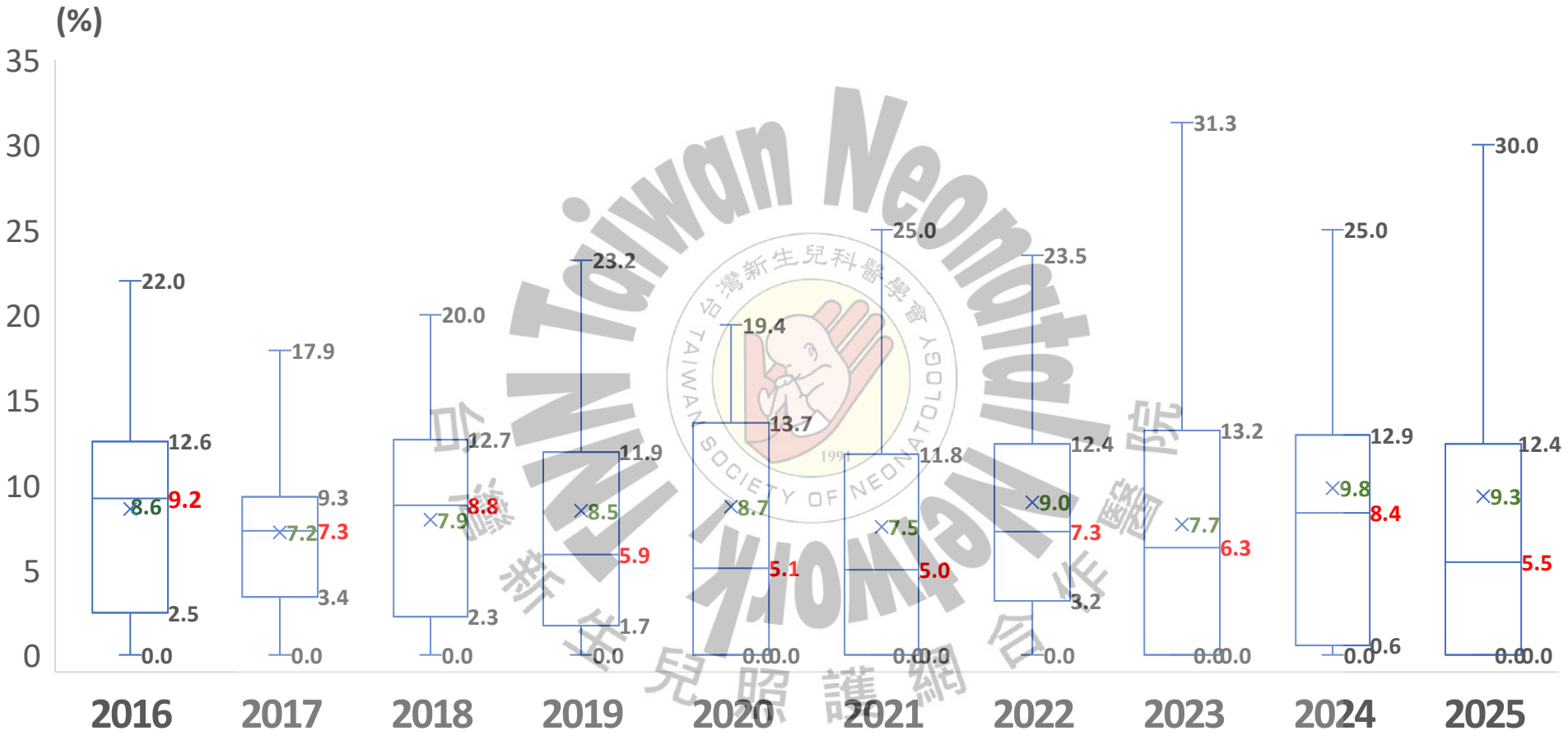
*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年(Inhaled Nitric Oxide)
參與TNN各院個案入院期間曾使用吸入性一氧化氮



各年度Inhaled Nitric Oxide使用率

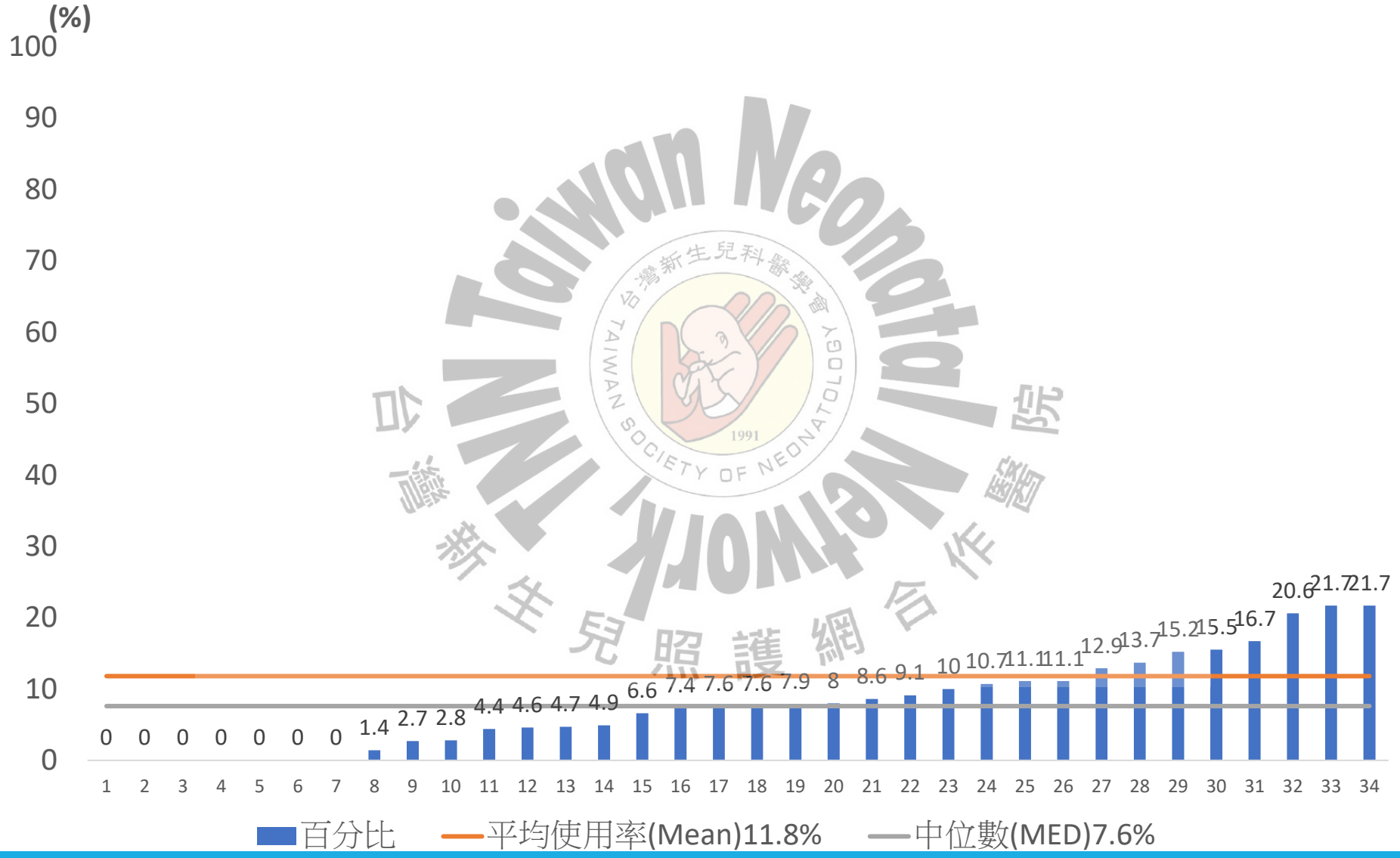
—中位數(MED)　　x平均數(Mean)



2016-2025年(Inhaled Nitric Oxide)個案入院期間曾使用吸入性一氧化氮

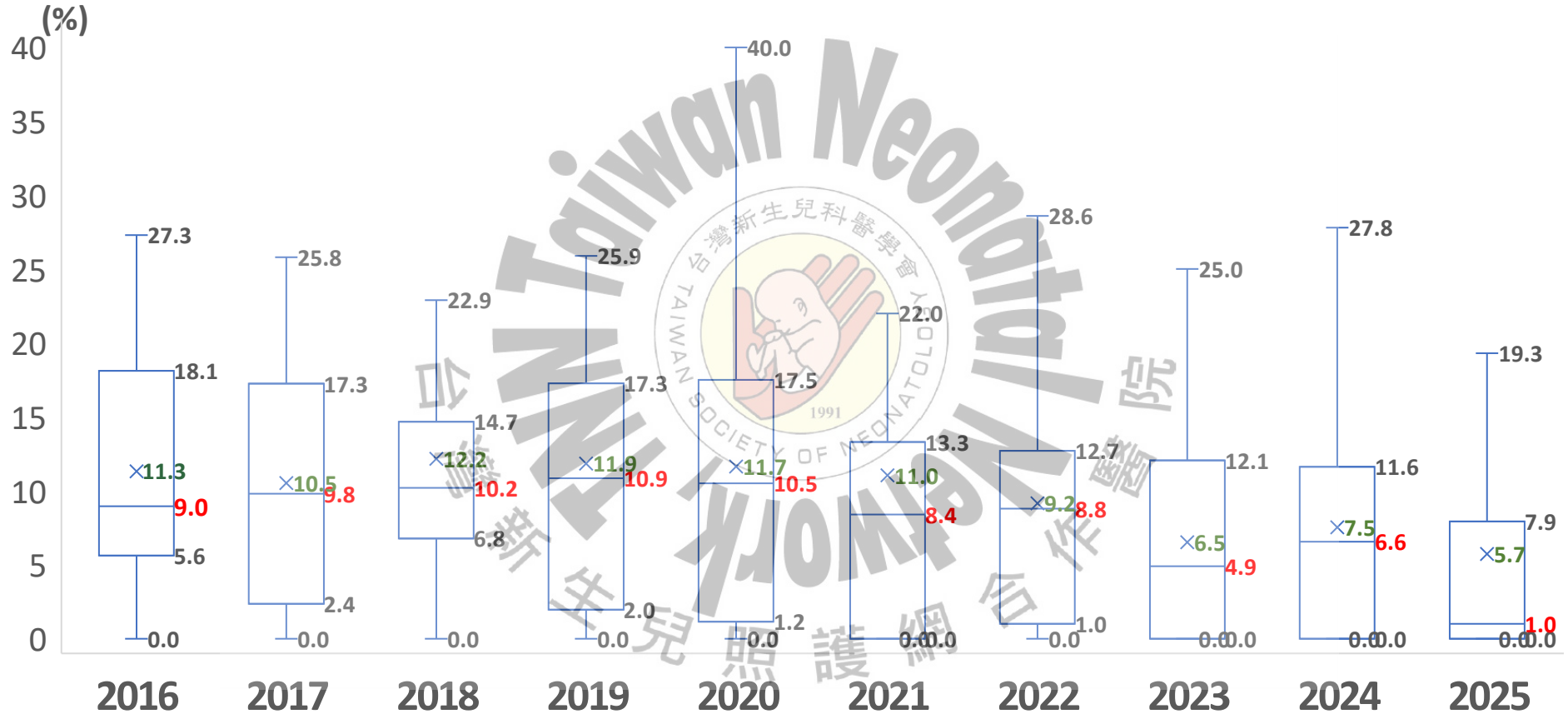
*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年(PDA Ligation)
參與TNN各院個案入院期間曾行開放性動脈導管結紮手術



各年度PDA Ligation使用率

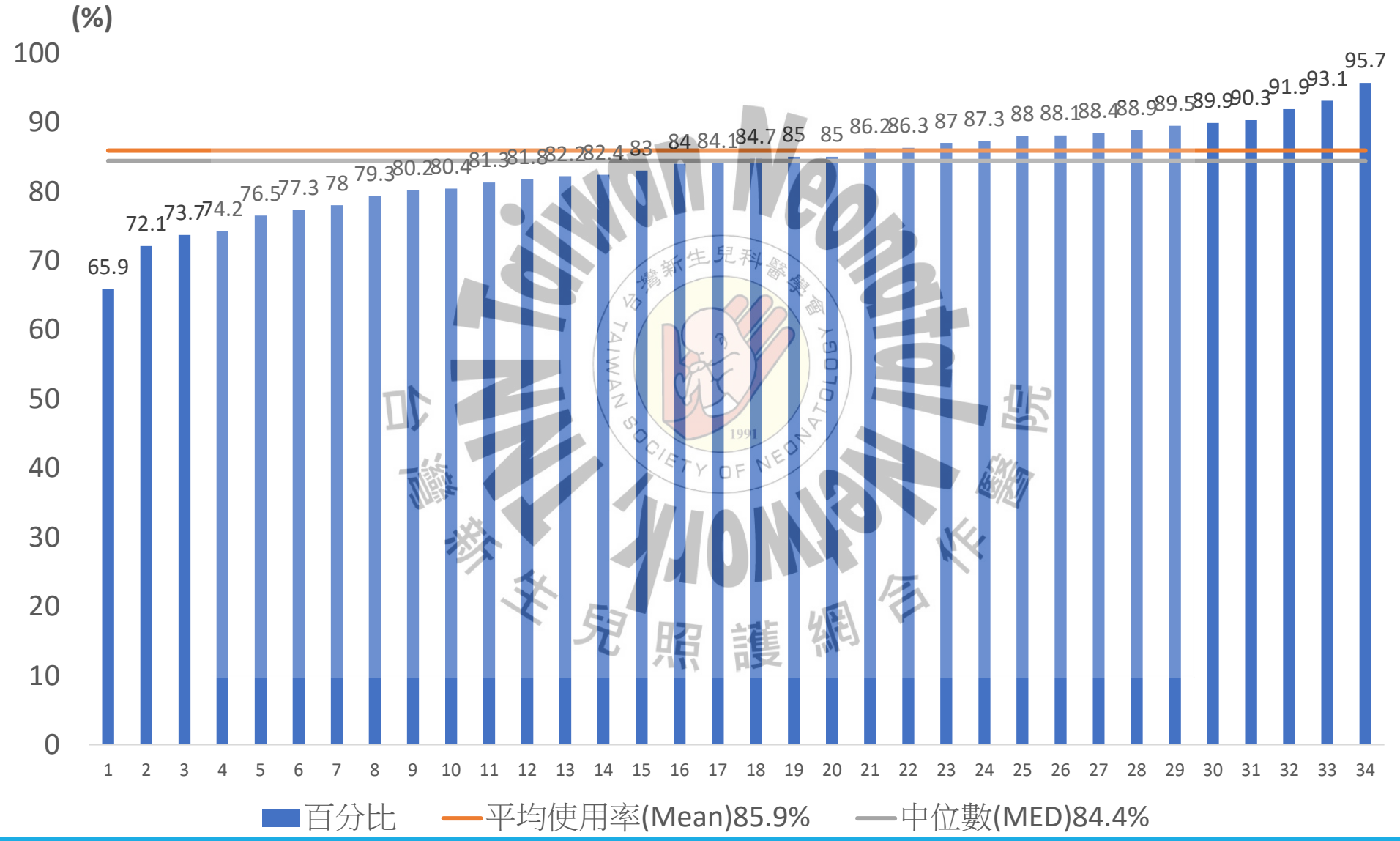
—中位數(MED)　　x平均數(Mean)



2016-2025年(PDA Ligation)個案入院期間曾行開放性動脈導管結紮手術

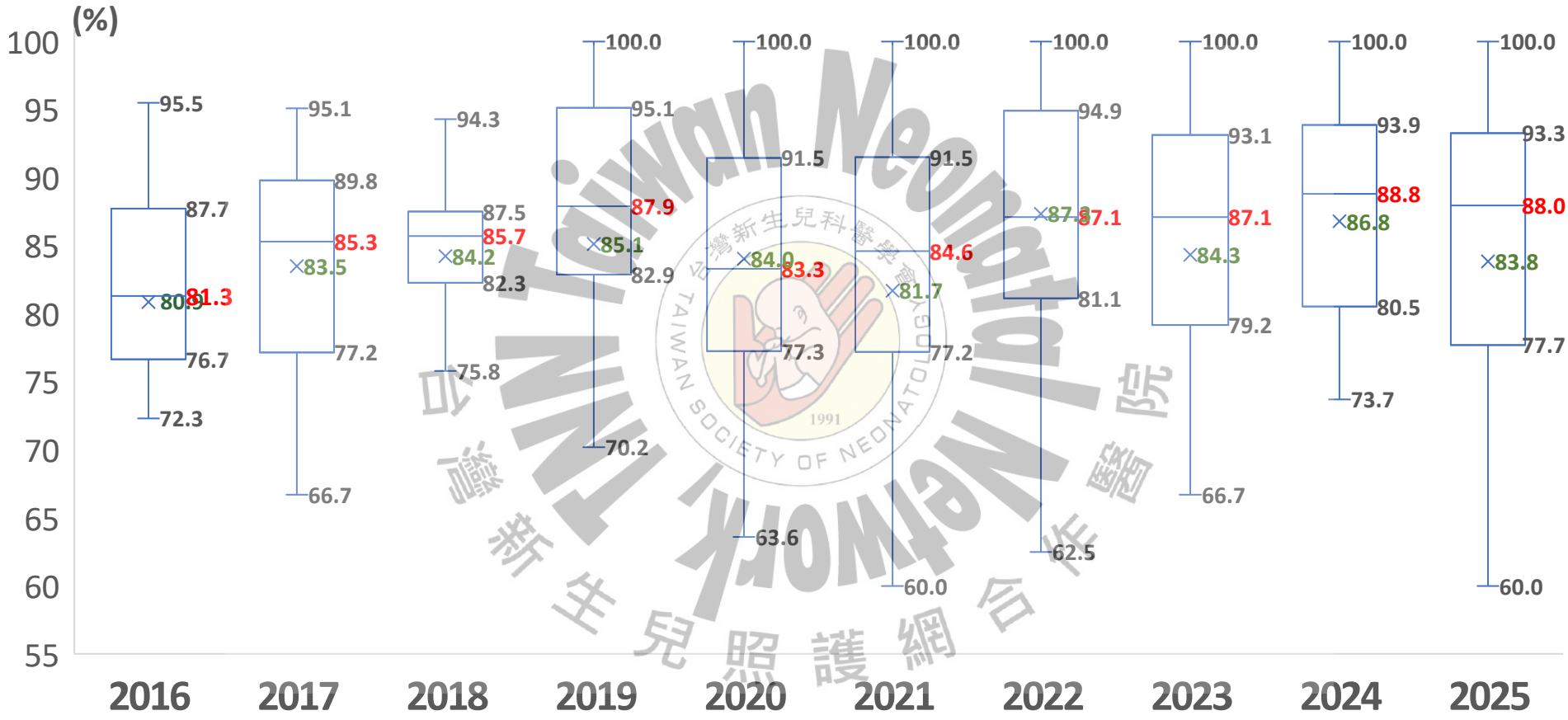
*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年(Any ROP Exam)
參與TNN各院個案入院期間曾行視網膜眼底檢查



各年度Any ROP Exam執行率

—中位數(MED)　　x平均數(Mean)



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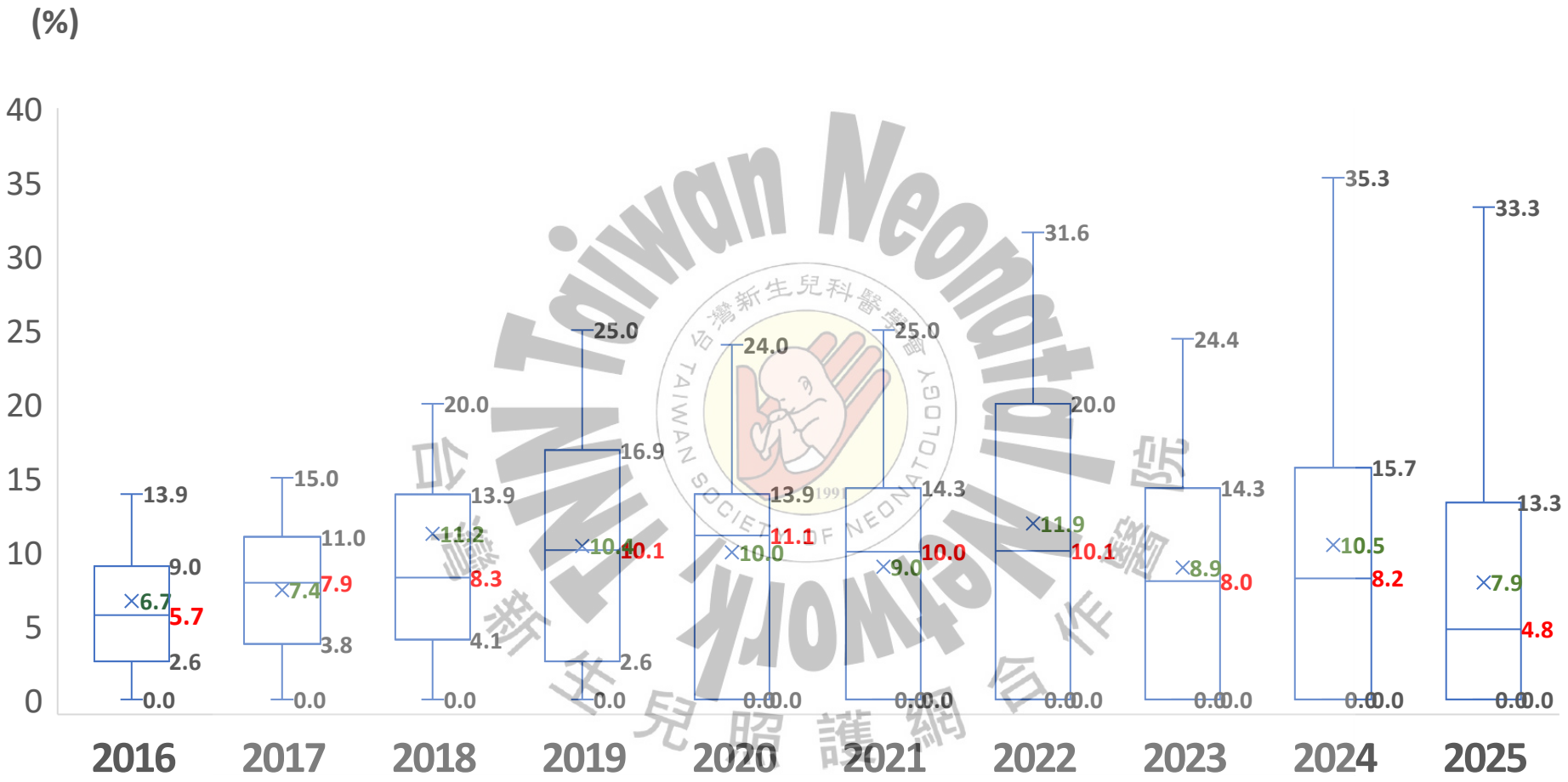
2016-2025年(Any ROP Exam) 個案入院期間曾行視網膜眼底檢查

*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年參與TNN各院個案入院期間曾以ANTI-VEGF治療早產兒視網膜病變

各年度ANTI-VEGF使用率

—中位數(MED)　　x平均數(Mean)



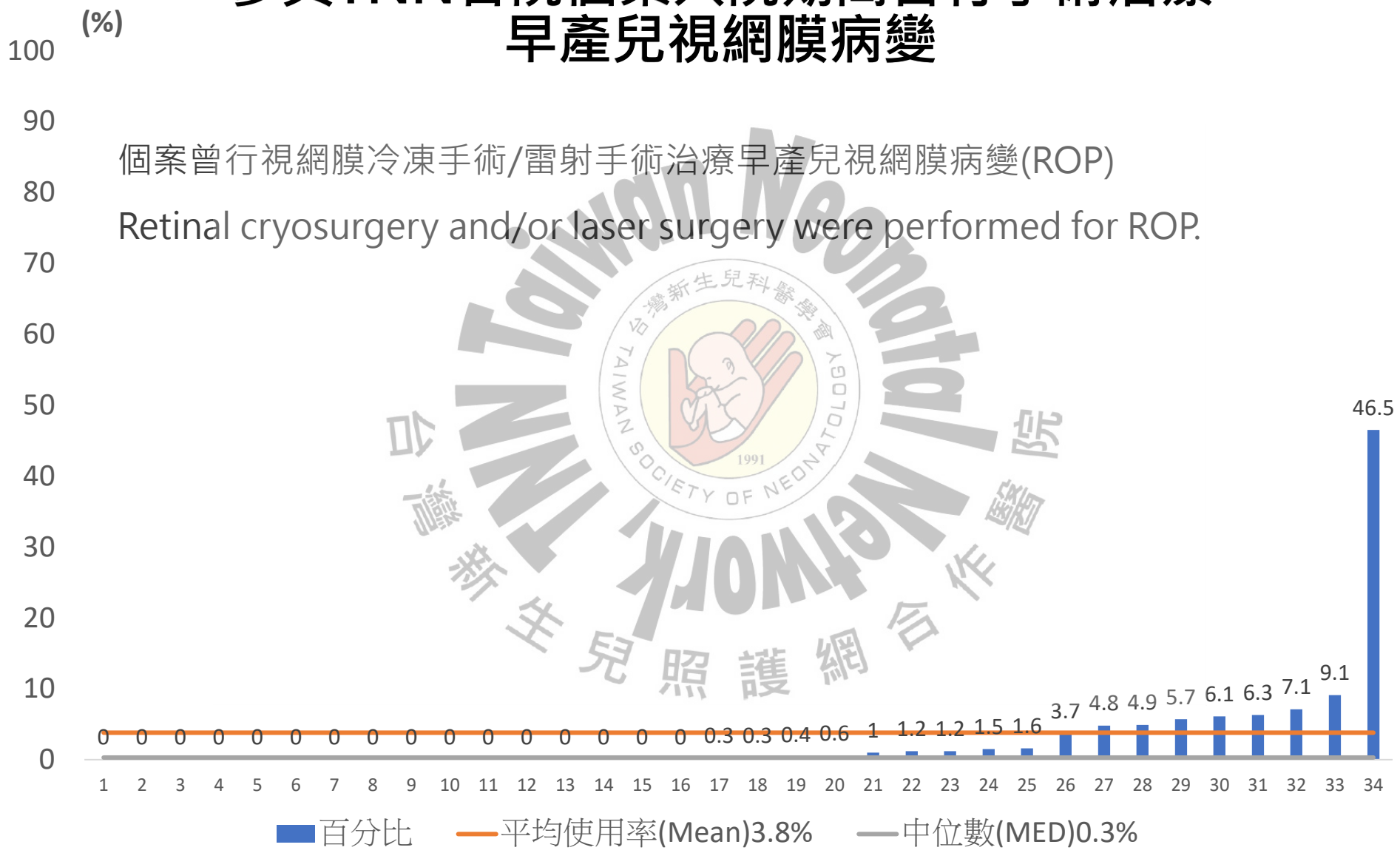
2016-2025年個案入院期間曾以ANTI-VEGF治療早產兒視網膜病變 ROP

*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年(ROP Surgery)
參與TNN各院個案入院期間曾行手術治療早產兒視網膜病變

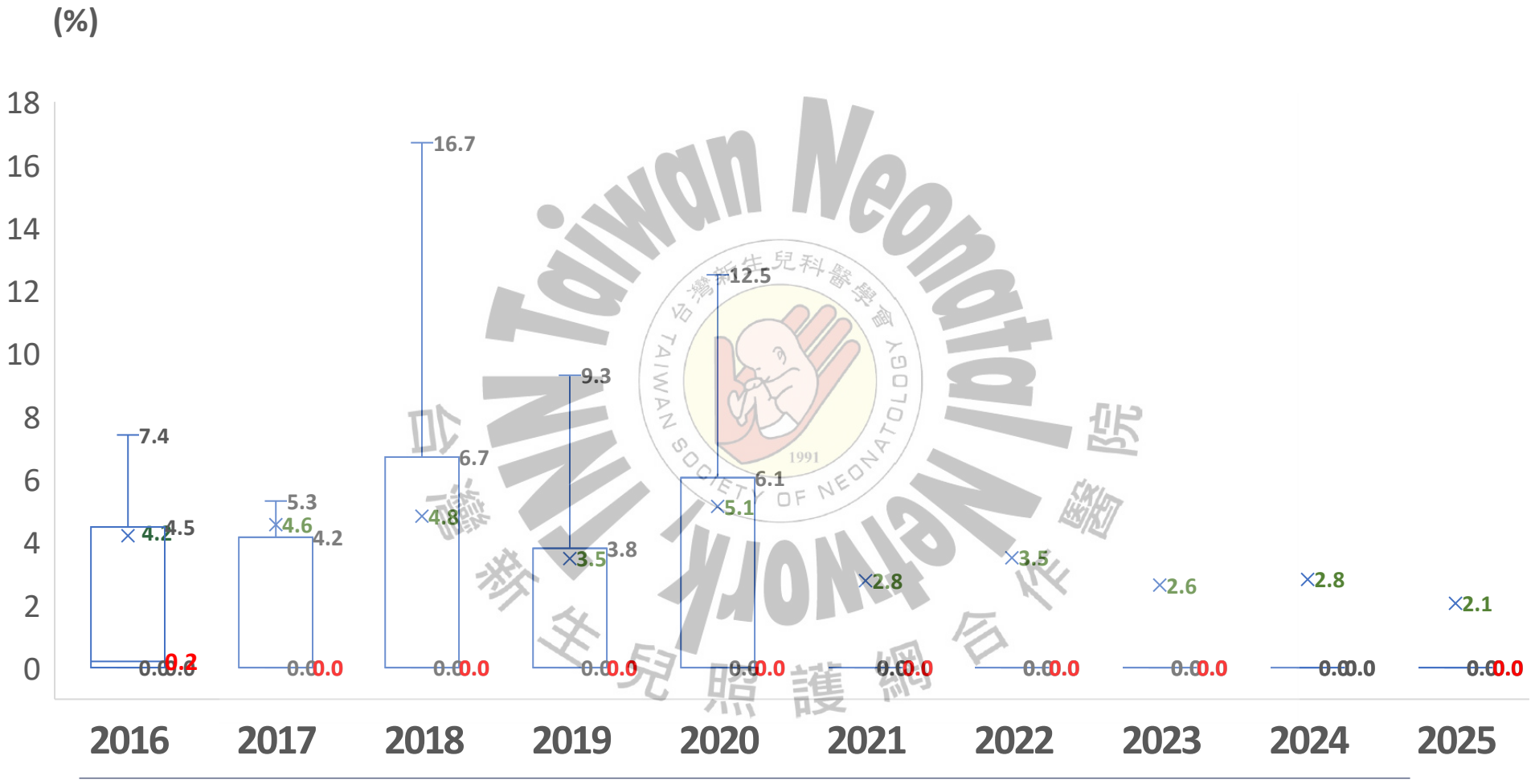
個案曾行視網膜冷凍手術/雷射手術治療早產兒視網膜病變(ROP)

Retinal cryosurgery and/or laser surgery were performed for ROP.



各年度ROP Surgery使用率

—中位數(MED)　　x平均數(Mean)



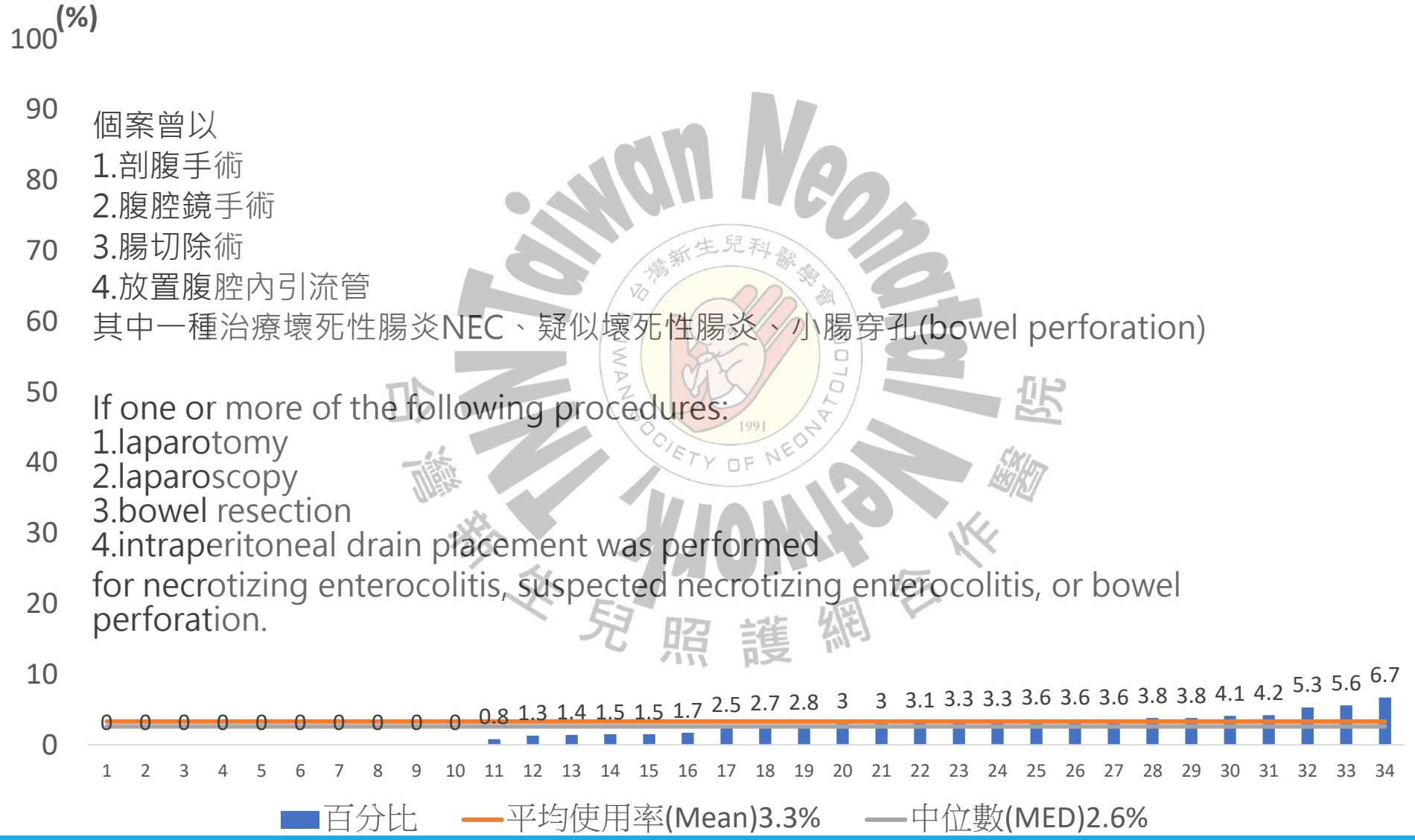
2016-2025年(ROP Surgery)個案入院期間曾行手術治療早產兒視網膜病變

*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年(NEC Surgery)
參與TNN各院個案入院期間曾行手術治療壞死性腸炎

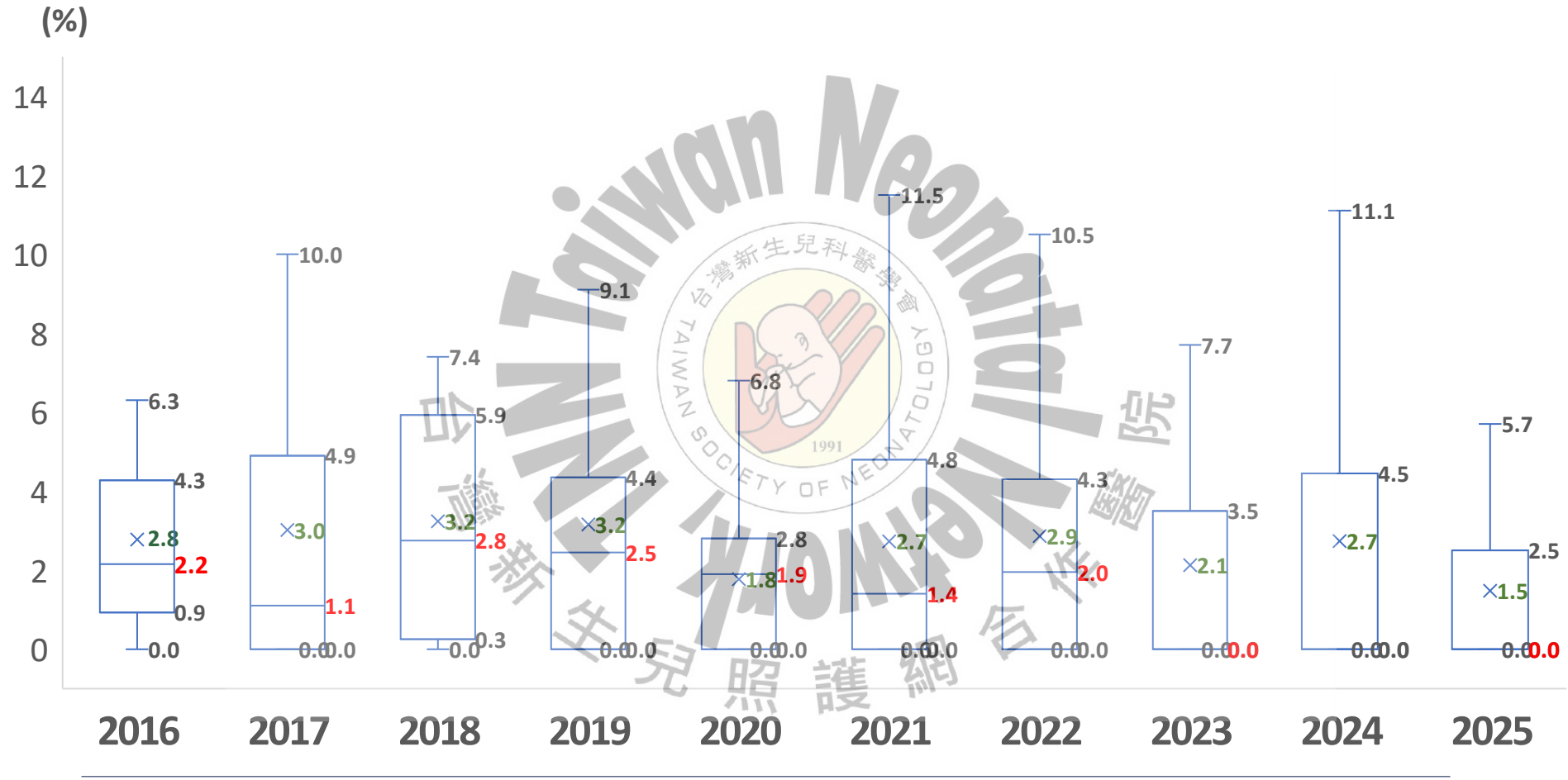
個案曾以
1.剖腹手術
2.腹腔鏡手術
3.腸切除術
4.放置腹腔內引流管
其中一種治療壞死性腸炎NEC、疑似壞死性腸炎、小腸穿孔(bowel perforation)

If one or more of the following procedures:
1.laparotomy
2.laparoscopy
3.bowel resection
4.intraperitoneal drain placement was performed
for necrotizing enterocolitis, suspected necrotizing enterocolitis, or bowel perforation.



各年度NEC Surgery使用率

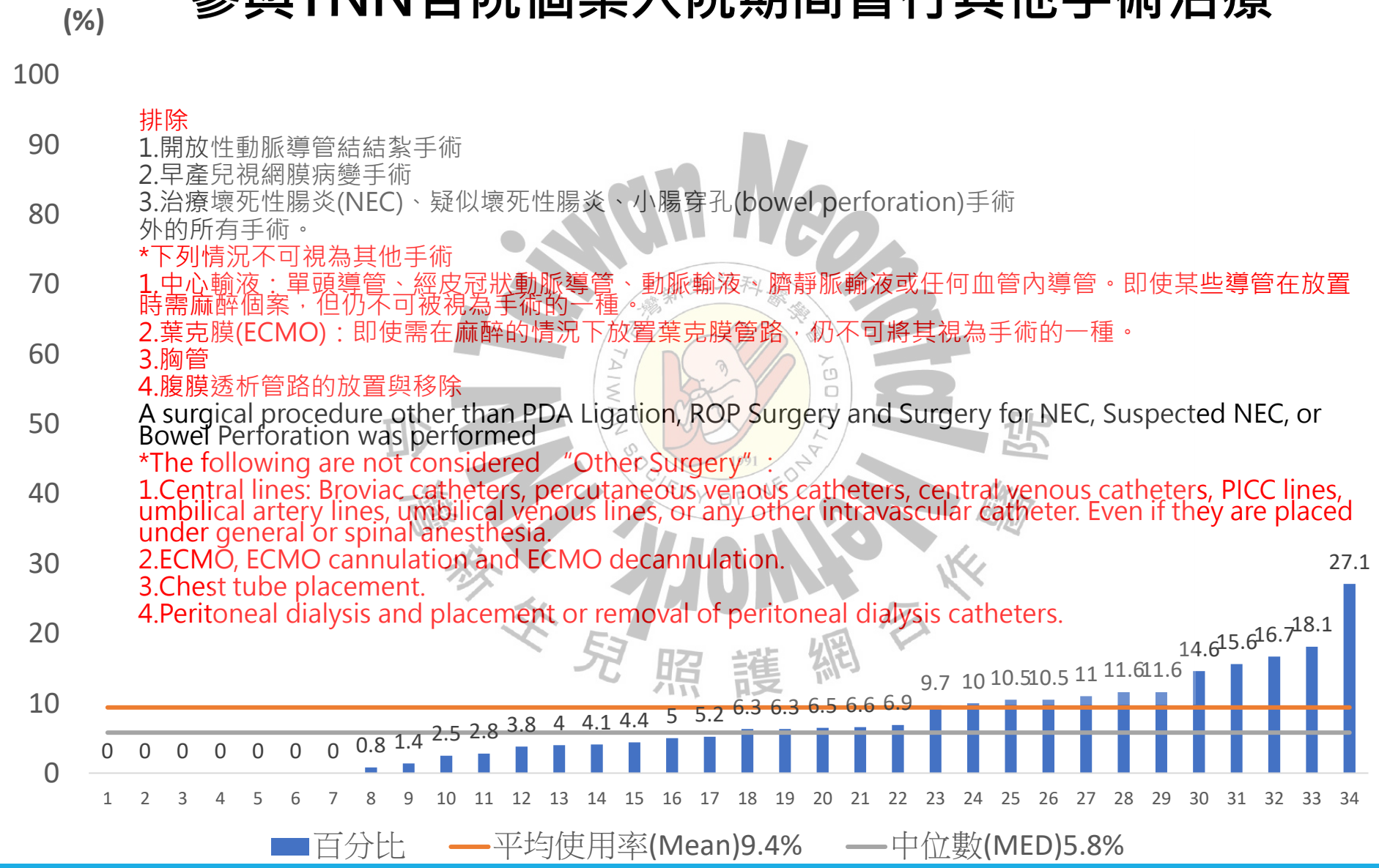
—中位數(MED)　　x平均數(Mean)



2016-2025年(NEC Surgery)個案入院期間曾行手術治療壞死性腸炎

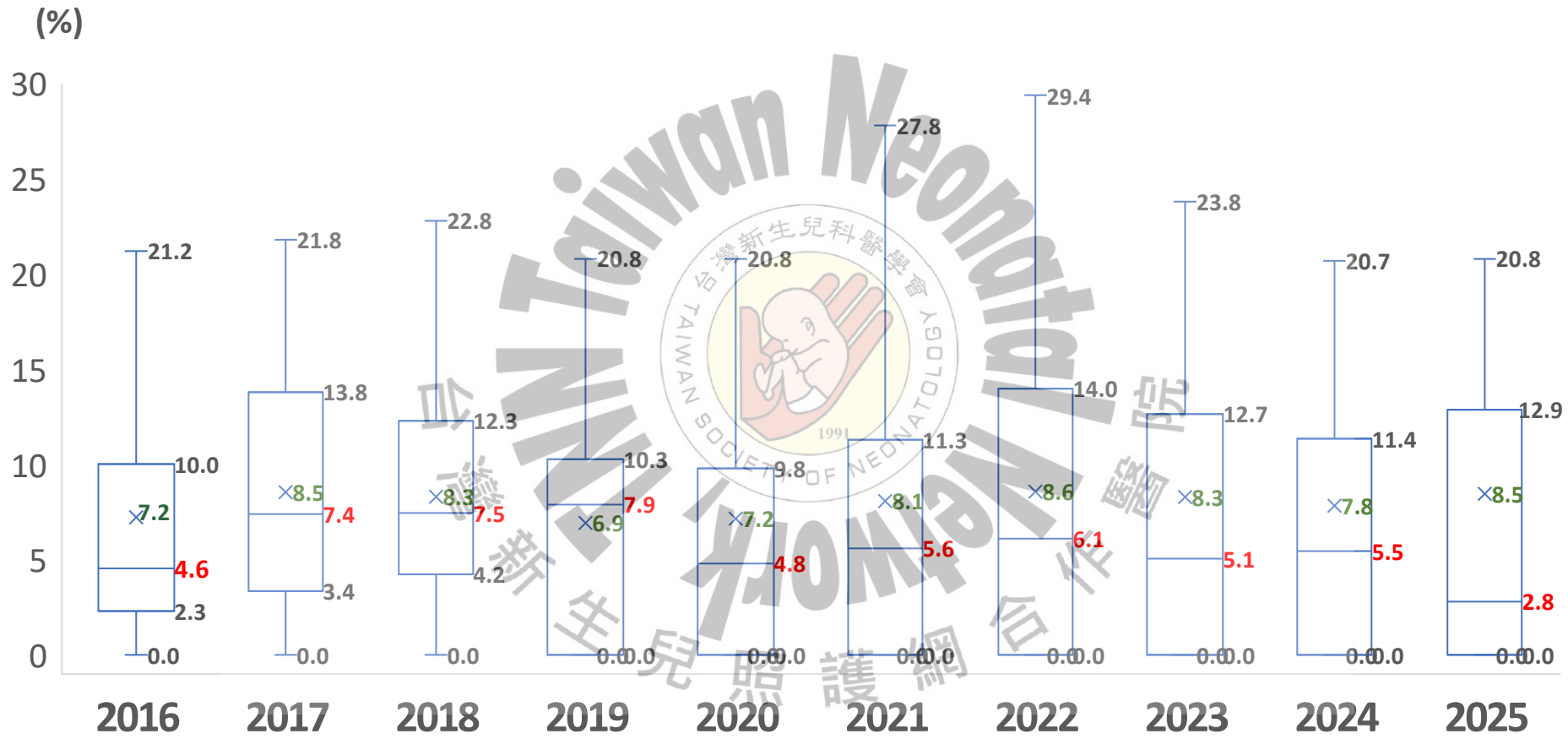
*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年(Other Surgery)
參與TNN各院個案入院期間曾行其他手術治療



各年度Other Surgery使用率

—中位數(MED)　　x平均數(Mean)



2016-2025年(Other Surgery)個案入院期間曾行其他手術治療

*極端值未顯示於圖表中(Outliers are not displayed in the chart)

TNN 2016-2025:
At Discharge Home

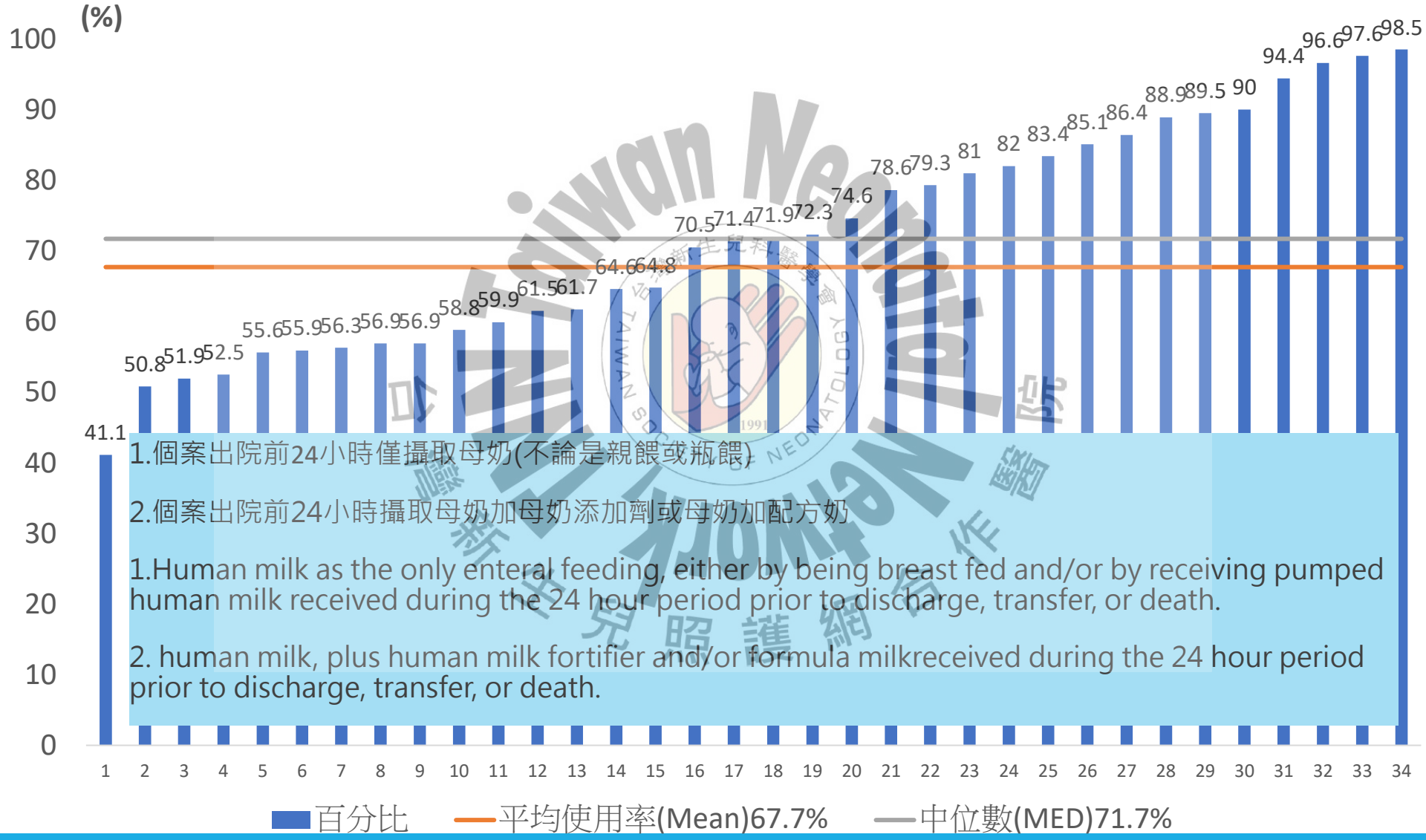
AT BIRTH

KEY PERFORMANCE MEASURES

PROCEDURES AND INTERVENTIONS

AT DISCHARGE HOME

2016-2025年(Any Human Milk)
參與TNN各院個案出院時有喝母奶



1.個案出院前24小時僅攝取母奶(不論是親餵或瓶餵)

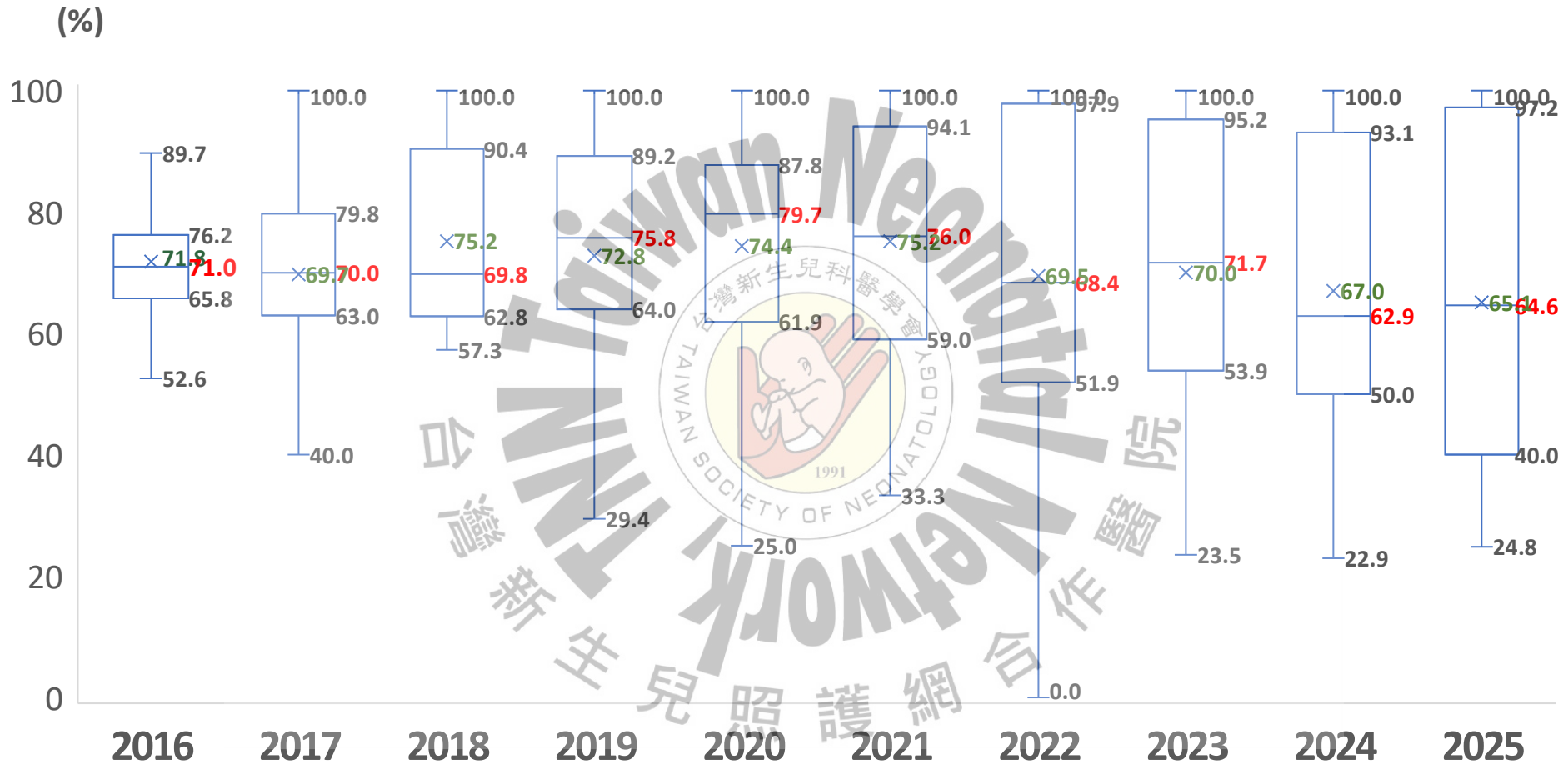
2.個案出院前24小時攝取母奶加母奶添加劑或母奶加配方奶

1.Human milk as the only enteral feeding, either by being breast fed and/or by receiving pumped human milk received during the 24 hour period prior to discharge, transfer, or death.

2. human milk, plus human milk fortifier and/or formula milkreceived during the 24 hour period prior to discharge, transfer, or death.

各年度Any Human Milk使用率

—中位數(MED)　　x平均數(Mean)



2016-2025年(Any Human Milk)個案出院時有喝母奶

*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2016-2025年(Oxygen at Discharge)
參與TNN各院個案出院時有攜帶氧氣

1.個案出院返家或轉院時攜帶氧氣，。

2.個案滿一周歲時仍在住院，而在生日當天有用氧。

3.個案在出院前死亡，而在死亡當天有用氧。

符合上述其一，納入統計

*若個案在出生內12小時內死亡，不納入統計。

*氧氣濃度21%即為空氣，故給予21%氧氣並不算給氧。故以任何方式給予空氣，則視為未曾給予氧氣。

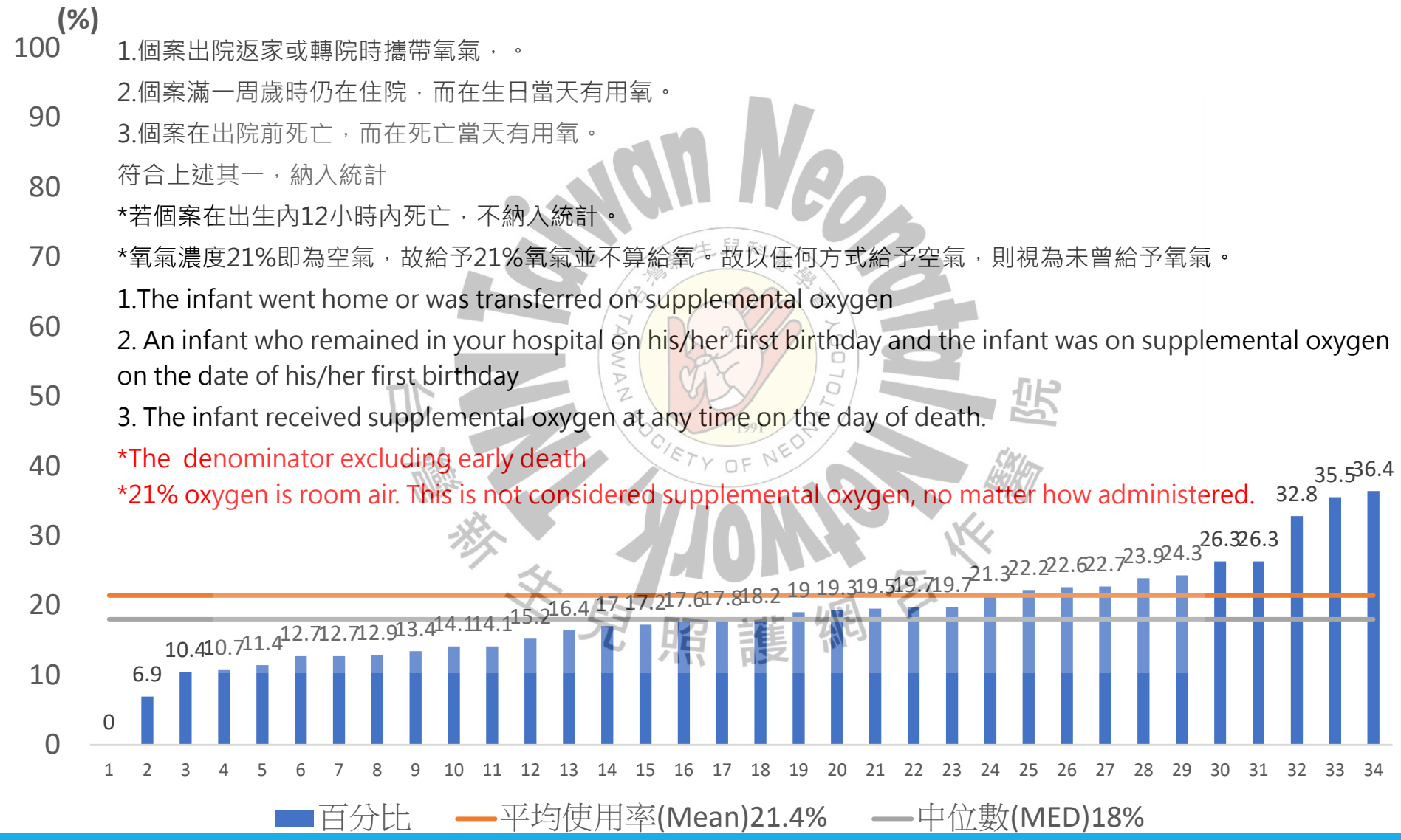
1.The infant went home or was transferred on supplemental oxygen

2. An infant who remained in your hospital on his/her first birthday and the infant was on supplemental oxygen on the date of his/her first birthday

3. The infant received supplemental oxygen at any time on the day of death.

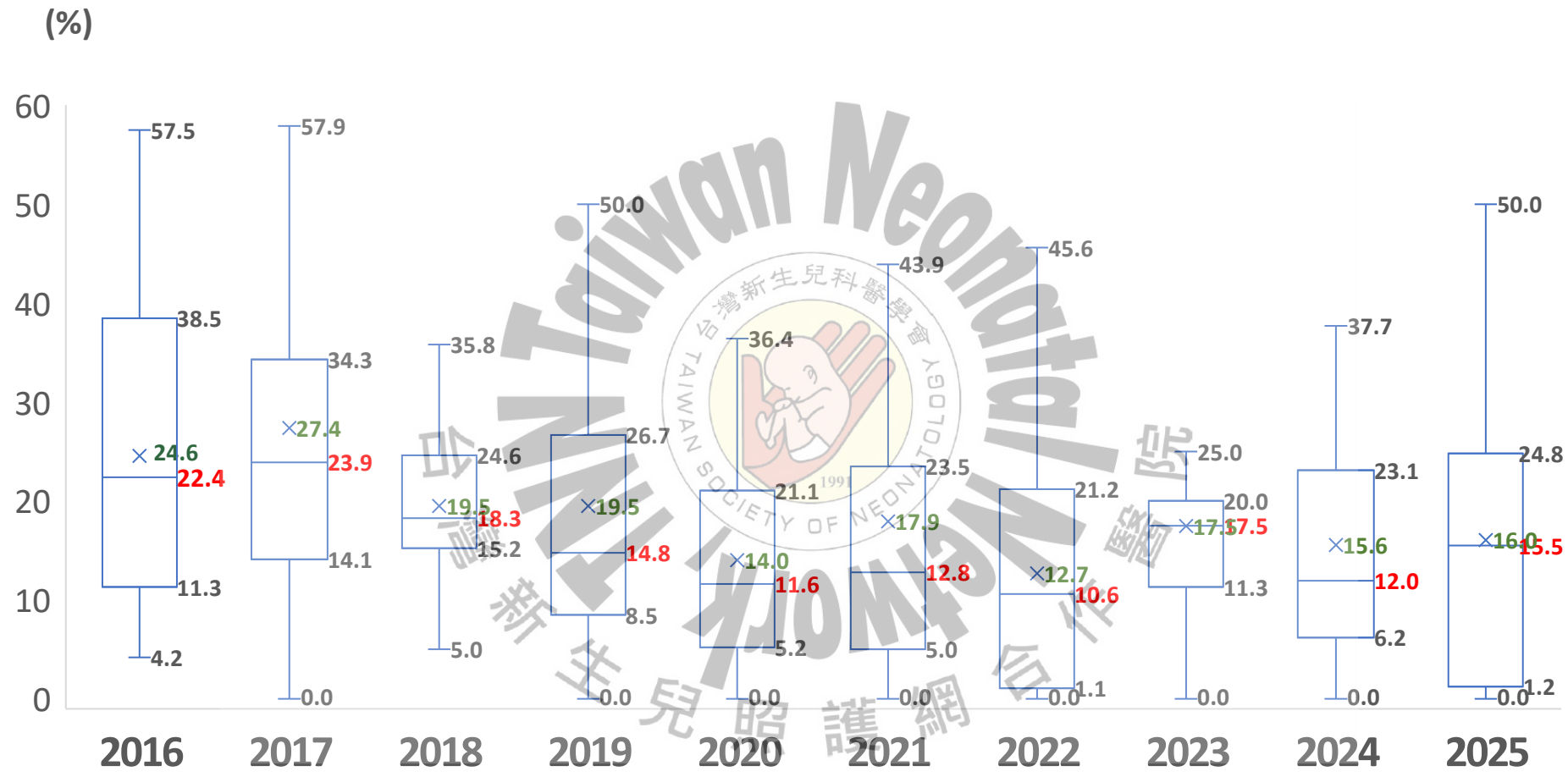
*The denominator excluding early death

*21% oxygen is room air. This is not considered supplemental oxygen, no matter how administered.



各年度Oxygen at Discharge使用率

—中位數(MED)　　x平均數(Mean)

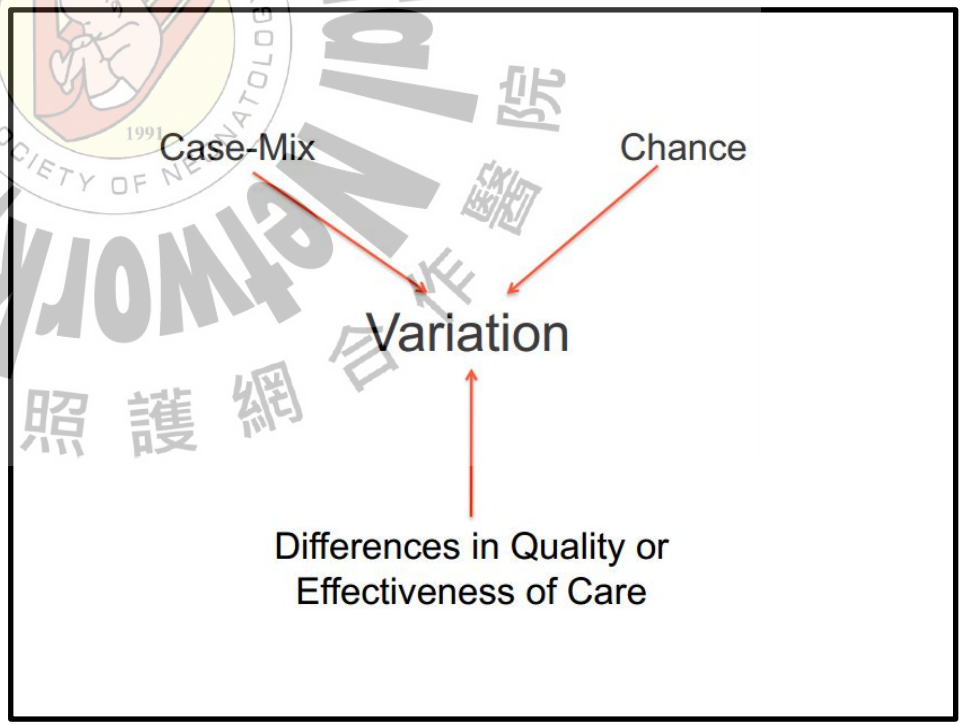


2016-2025年 (Oxygen at Discharge)個案出院時有攜帶氧氣

*極端值未顯示於圖表中(Outliers are not displayed in the chart)

Variability

- Risk (**Case Mix**)
- Chance (**Sampling Variability**)
- Quality of care

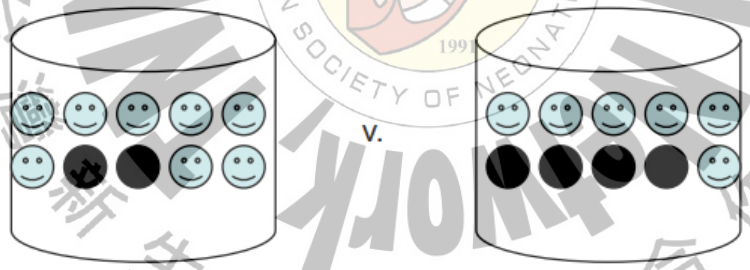


Risk adjustment

Fair comparisons

What is Risk Adjustment?

Sorting of patients into risk strata to facilitate fair comparison between groups

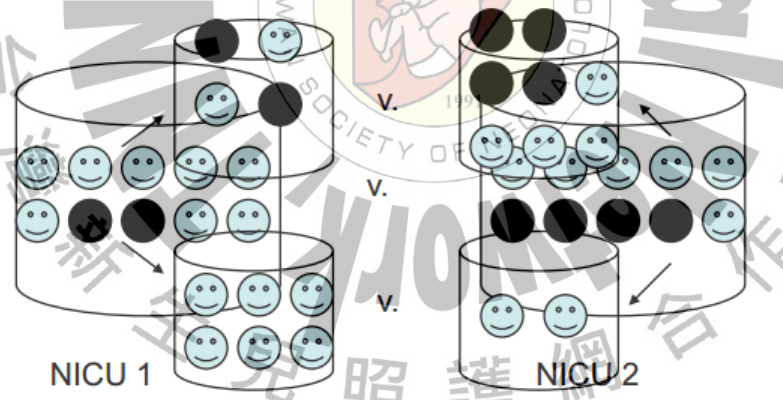


NICU 1 v. NICU 2

Taiwan Neonatal Network 台灣新生兒照護網 台灣新生兒醫學會 TAIWAN SOCIETY OF NEONATOLOGY

What is Risk Adjustment?

Sorting of patients into risk strata to facilitate fair comparison between groups



Risk Adjustment

- Gestational age in completed weeks and its squared term
- Small for gestational age (SGA, Yes or No), defined as being in the 10th percentile or less for birth weight, given the infant's gestational age
- APGAR score at 1 minute (0 to 10)
- Infant gender (Male or Female)
- Vaginal delivery (Yes or No)
- Birth location (Inborn or Outborn)
- Birth defect (Yes or No)

Shrunken Estimate

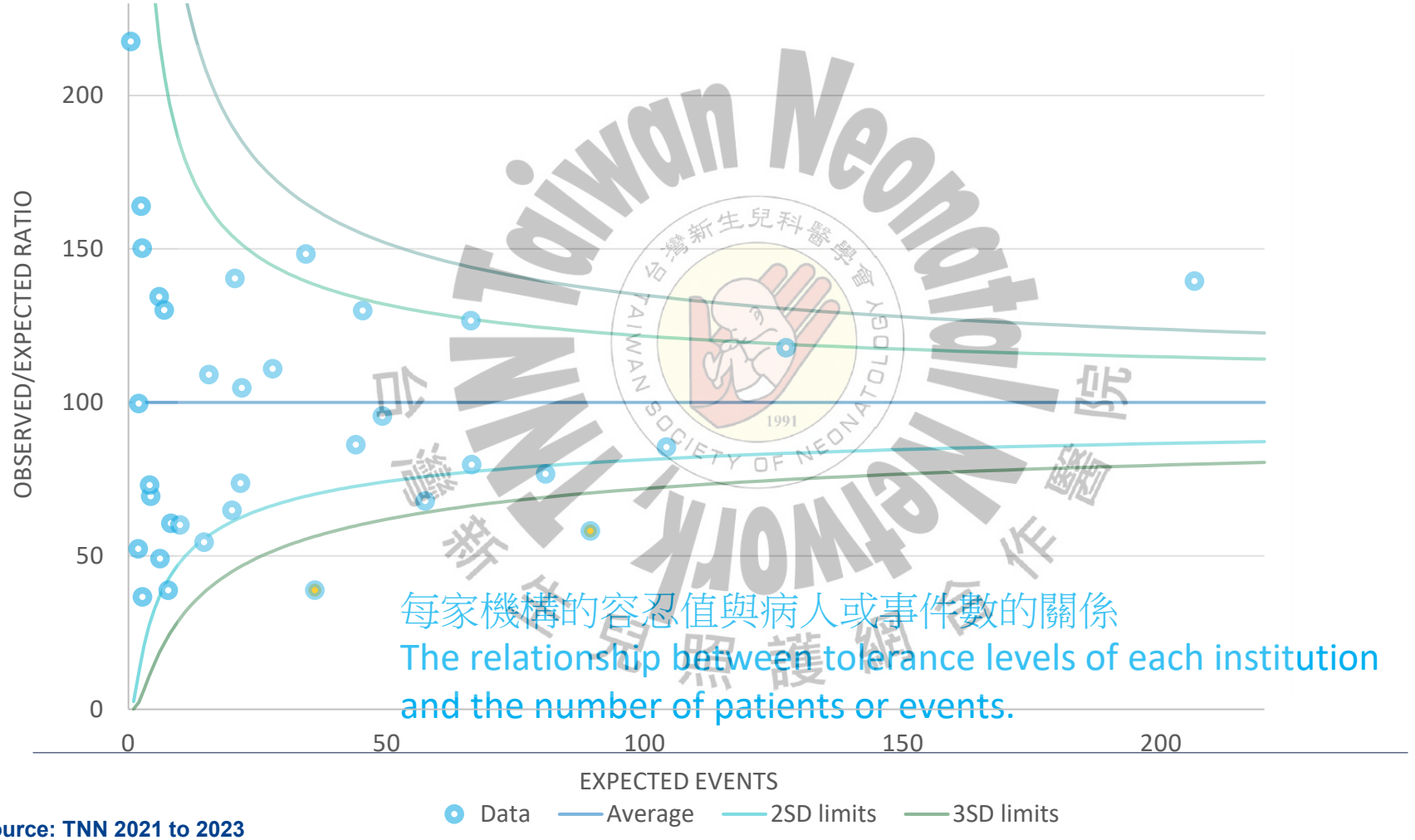
- **Weighted average of**
  - **Hospital value**
  - **Population mean value**
- **Moves hospital performance value closer to population mean *in inverse proportion to the number of cases (ie the imprecision) ie:***
  - **small hospital: population mean weighted more heavily**
  - **large hospital: hospital performance mean weighted more**
- **Why?**
  - **More stable over time (filter out random variation)**
  - **Doesn't penalize small hospitals**

Process for Interinstitutional Comparisons

- **Risk adjust → Derive "Expected" or "Predicted"**
- **Apply shrunken estimators**
- **Determine standardized morbidity/mortality ratio**
  - **Ratio or difference observed to expected: O/E or O-E**
- **Describe percentiles**
- **Test:**

$$\frac{\text{OBSERVED MORBIDITY}}{\text{PREDICTED MORBIDITY}} = 1\ ?$$

2016-2025 年度指標
Mortality & Morbidity



每家機構的容忍值與病人或事件數的關係
The relationship between tolerance levels of each institution and the number of patients or events.

Source: TNN 2021 to 2023

Variation

Utilization Management

Differences in Quality or Effectiveness of Care

Evidence-Based Medicine

Quality Improvement

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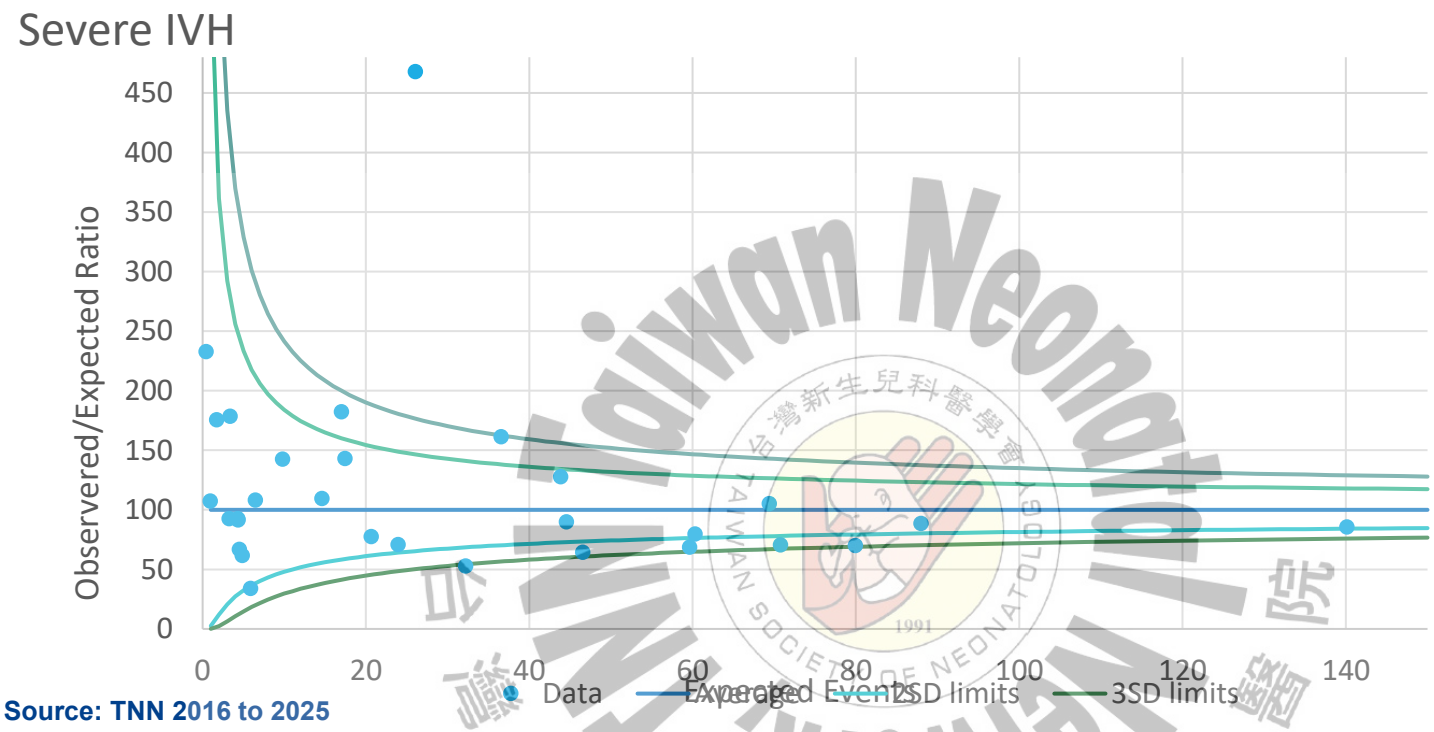
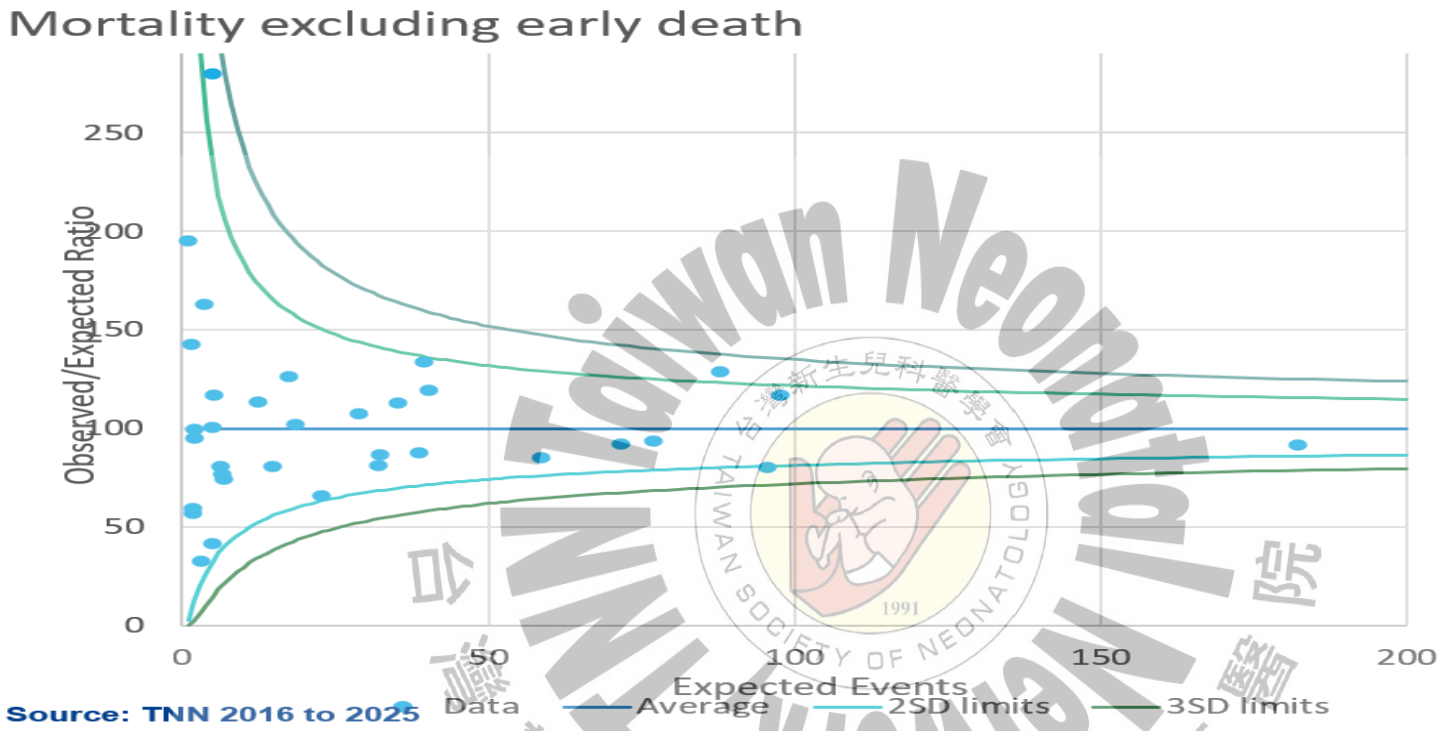
新生兒照護網絡 醫療合作 防治

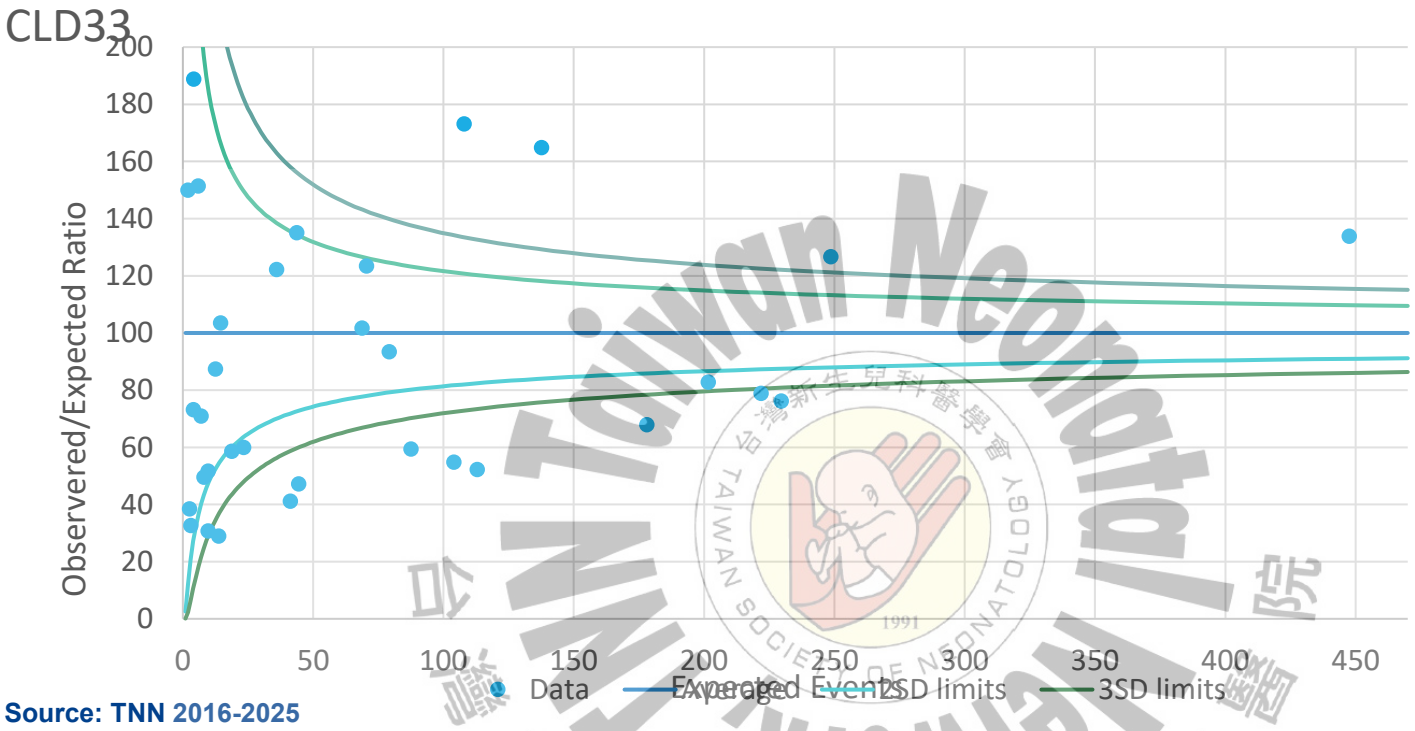


Source: TNN 2016 to 2025

2016-2025 年度指標
Severe IVH



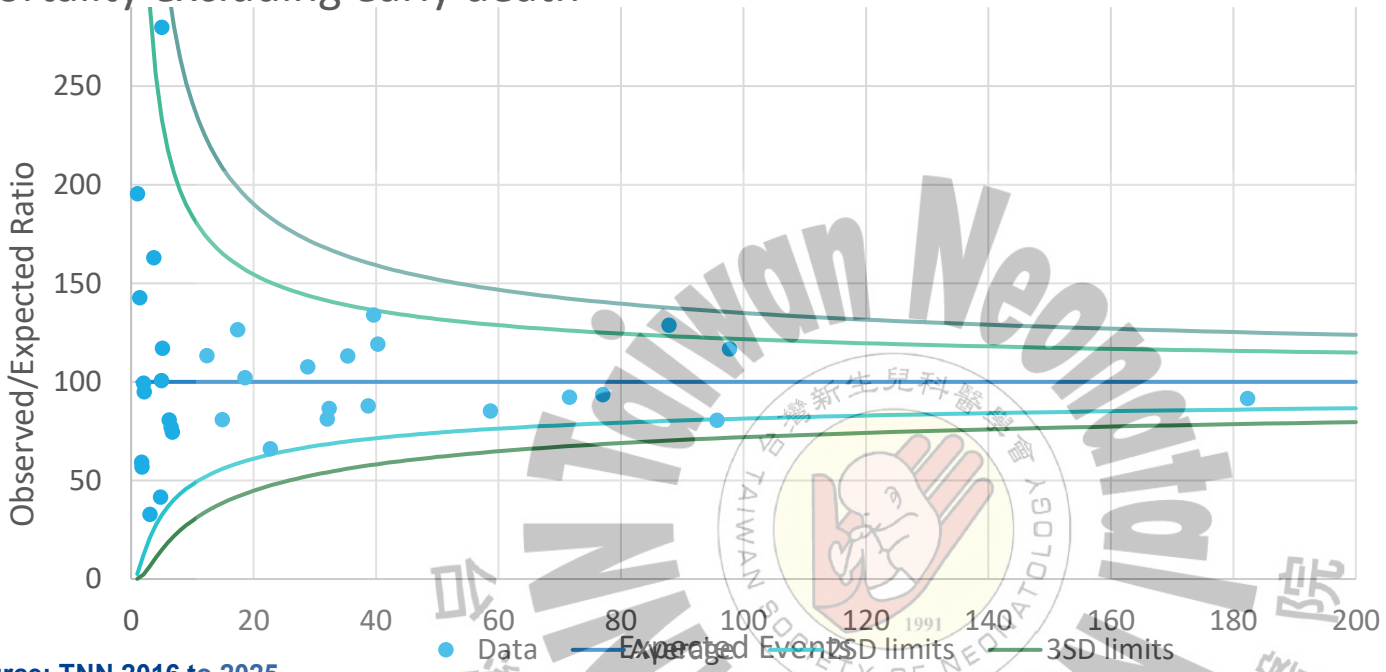
2016-2025 年度指標
Mortality excluding early death



Source: TNN 2016-2025

2016-2025 年度指標
Chronic Lung Disease<33wks

Mortality excluding early death



Source: TNN 2016 to 2025

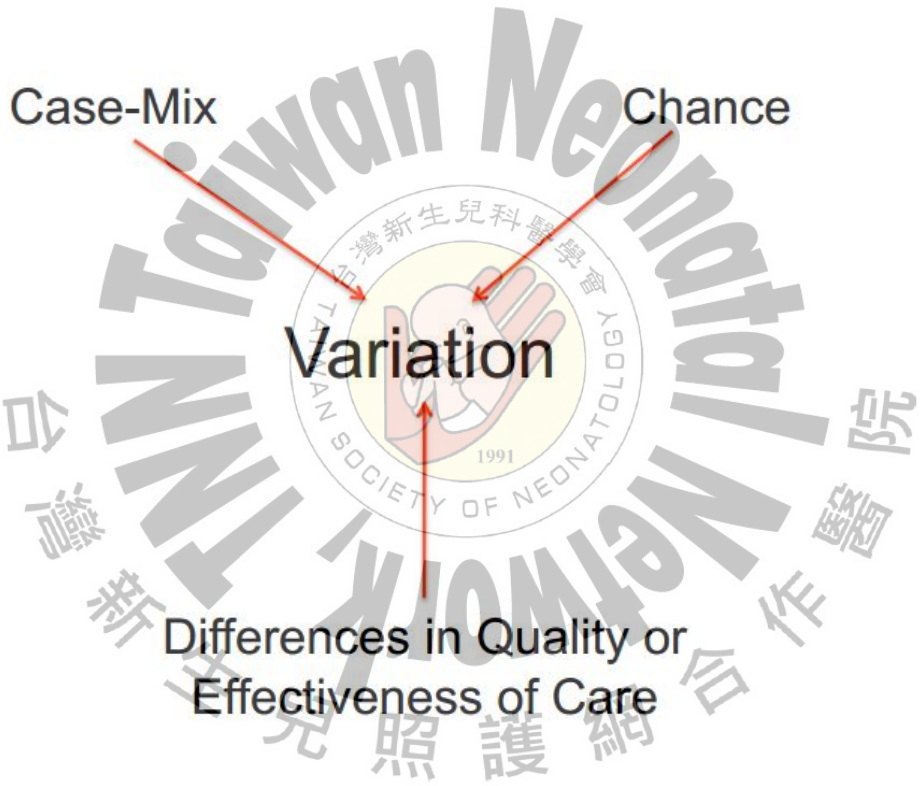
2016-2025 年度指標 M&M

感謝台灣新生兒醫療網絡TNN合作醫院(依筆畫續)

1. 三軍總醫院(Tri-Service General Hospital)
2. 中山醫學大學附設醫院 (Chung Shan Medical University Hospital)
3. 中國醫藥大學兒童醫院 (China Medical University Children's Hospital)
4. 天主教耕莘醫療財團法人耕莘醫院 (Cardinal Tien Hospital)
5. 台中榮民總醫院 (Taichung Veterans General Hospital)
6. 台北市立萬芳醫院-委託財團法人台北醫學大學辦理(Taipei Municipal Wangfang Hospital-Managed by Taipei Medical Unverisity)
7. 台北市立聯合醫院和平婦幼院區 (Taipei City Hospital, Heping Fuyou Branch)
8. 台北榮民總醫院 (Taipei Veterans General Hospital)
9. 台北醫學大學附設醫院Taipei Medical University Hospital
10. 台灣基督長老教會馬偕醫療財團法人-馬偕兒童醫院 (Mackay Children's Hospital)
11. 台灣基督長老教會馬偕醫療財團法人馬偕紀念醫院-台東院區 (Taitung Mackay Memorial Hospital)
12. 台灣基督長老教會馬偕醫療財團法人馬偕紀念醫院-淡水馬偕紀念醫院 (Mackay Memorial Hospital)
13. 台灣基督長老教會馬偕醫療財團法人馬偕紀念醫院-新竹院區 (Hsinchu Mackay Memorial Hospital)
14. 台灣基督長老教會新樓醫療財團法人台南新樓醫院(Sin-Lau Hospital,the Presbyterian Church in Taiwan)
15. 永和耕莘醫院(Yonghe Cardinal Tien Hospital)
16. 光田醫療社團法人光田綜合醫院
17. 佛教慈濟財團法人台北慈濟醫院 (Taipei Tzu Chi Hospital)
18. 佛教慈濟財團法人花蓮慈濟醫院 (Hualien Tzu Chi Hospital)
19. 亞東紀念醫院(Far Eastern Memorial Hospital)
20. 奇美醫療財團法人奇美醫院 (Chi Mei Medical Center)
21. 林口長庚紀念醫院 (Chang Gung Memorial Hospital, Linkou)
22. 財團法人台北國泰綜合醫院 (Cathay General Hospital)
23. 高雄長庚紀念醫院 (Kaohsiung Chang Gung Memorial Hospital)
24. 高雄榮民總醫院 (Kaohsiung Veterans General Hospital)
25. 高雄醫學大學附設中和紀念醫院 (Kaohsiung Medical University Chung-Ho Memorial Hospital)
26. 國立台灣大學附設醫院雲林分院(National Taiwan University Hospital Yunlin Branch)
27. 國立臺灣大學醫院附設兒童醫院 (National Taiwan University Children's Hospital)
28. 國立臺灣大學醫院附設醫院新竹分院 (National Taiwan University Hospital Hsin-Chu)
29. 國立成功大學醫學院附設醫院 (National Cheng Kung University Hospital)
30. 新光醫療財團法人新光吳火獅紀念醫院 (Shin Kong Wu Ho-Su Memorial Hospital)
31. 義大醫療財團法人義大醫院 (E-Da Hospital)
32. 彰化基督教兒童醫院 (Changhua Christian Children's Hospital)
33. 澄清醫院中港分院Cheng Ching Hospital Chung Kang Branch
34. 衛生福利部桃園醫院(Taoyuan General Hospital. Ministry of Health and Welfare)
35. 戴德森醫療財團法人嘉義基督教醫院(Ditmanson Medical Foundation Chia-Yi Christian Children's Hospital

Together We can！！

The 2024 Taiwan Neonatal Network (TNN) Annual Conference


Case-Mix
Chance
Variation
Differences in Quality or
Effectiveness of Care

Variability

- Risk (**Case Mix**)
- Chance (**Sampling Variability**)
- Quality of care

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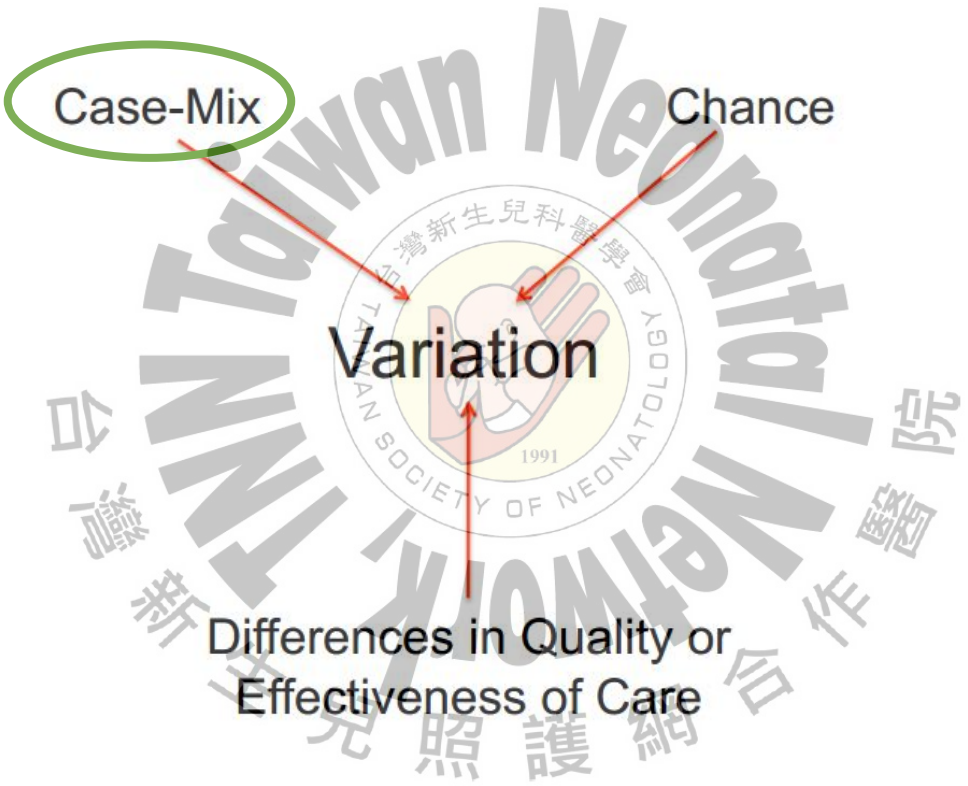
台灣新生兒照護網合作醫院
TAIWAN SOCIETY OF NEONATOLOGY 1991



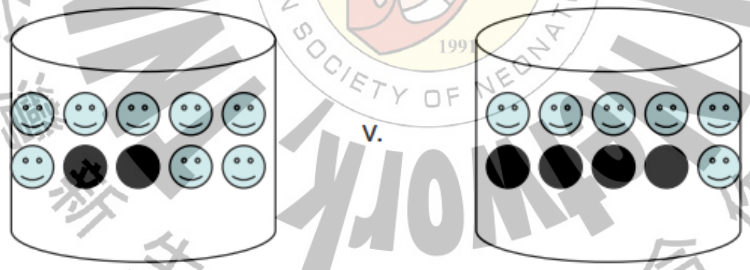
Taiwan Neonatal Network
台灣新生兒照護網
台灣新生兒科醫學會
TAIWAN SOCIETY OF NEONATOLOGY
1991
台灣醫院合作

Risk adjustment

Fair comparisons

What is Risk Adjustment?

Sorting of patients into risk strata to facilitate fair comparison between groups



NICU 1 v. NICU 2

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What is Risk Adjustment?

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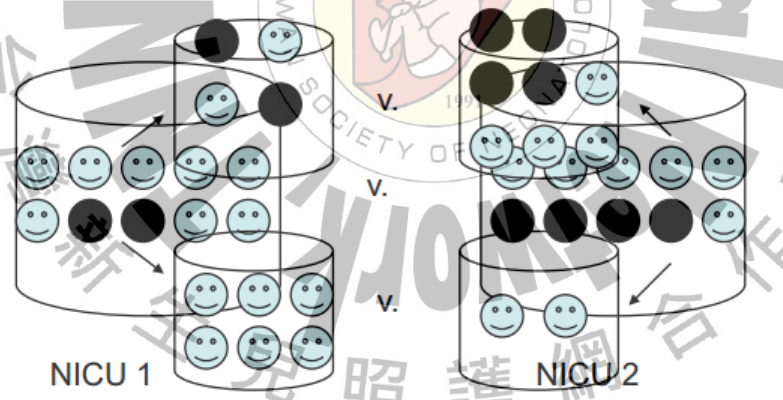

Risk adjusters

- **Birthweight, gestational age, plurality, intrauterine growth, birth defects, and sex** are risk factors that are commonly used as risk adjusters to control for institutional differences in case mix in order to make fair comparisons across NICUs.

- They are highly predictive of morbidity and mortality and are not under the control of the clinician.

Risk Adjustment

- Gestational age in completed weeks and its squared term
- Small for gestational age (SGA, Yes or No), defined as being in the 10th percentile or less for birth weight, given the infant's gestational age
- APGAR score at 1 minute (0 to 10)
- Infant gender (Male or Female)
- Vaginal delivery (Yes or No)
- Birth location (Inborn or Outborn)
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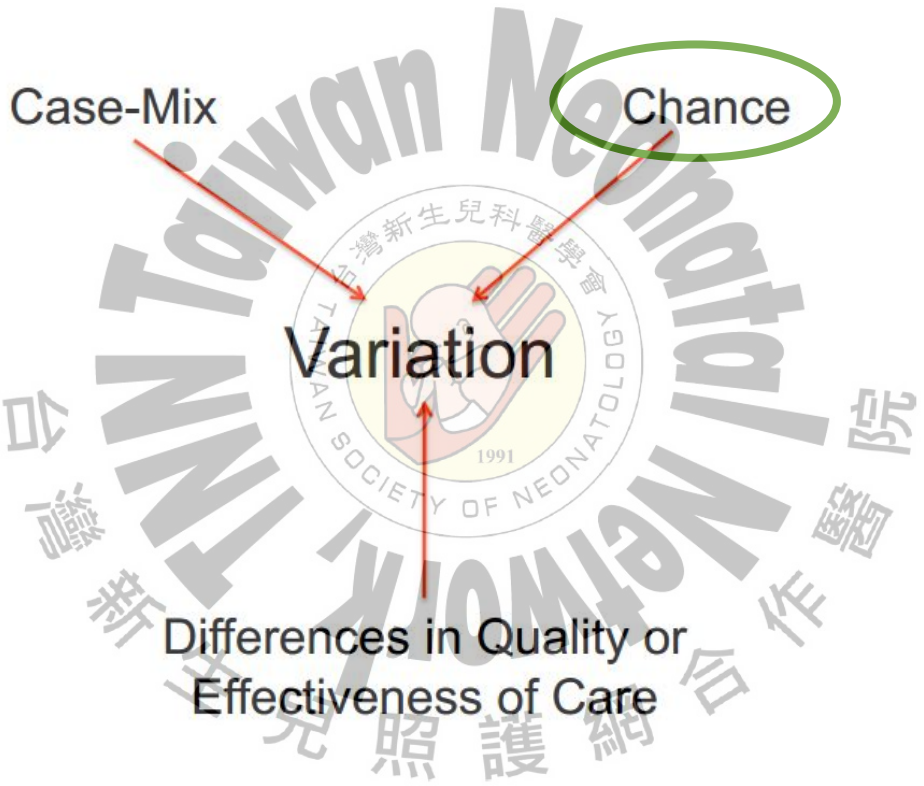
Taiwan Neonatal TNN Network
台灣新生兒照護網合作醫院
台灣新生兒科醫學會 TAIWAN SOCIETY OF NEONATOLOGY 1991



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Shrunken Estimate

- **Weighted average of**
  - **Hospital value**
  - **Population mean value**
- **Moves hospital performance value closer to population mean *in inverse proportion to the number of cases (ie the imprecision) ie:***
  - **small hospital: population mean weighted more heavily**
  - **large hospital: hospital performance mean weighted more**
- **Why?**
  - **More stable over time (filter out random variation)**
  - **Doesn't penalize small hospitals**

Taiwan Neonatal Network