

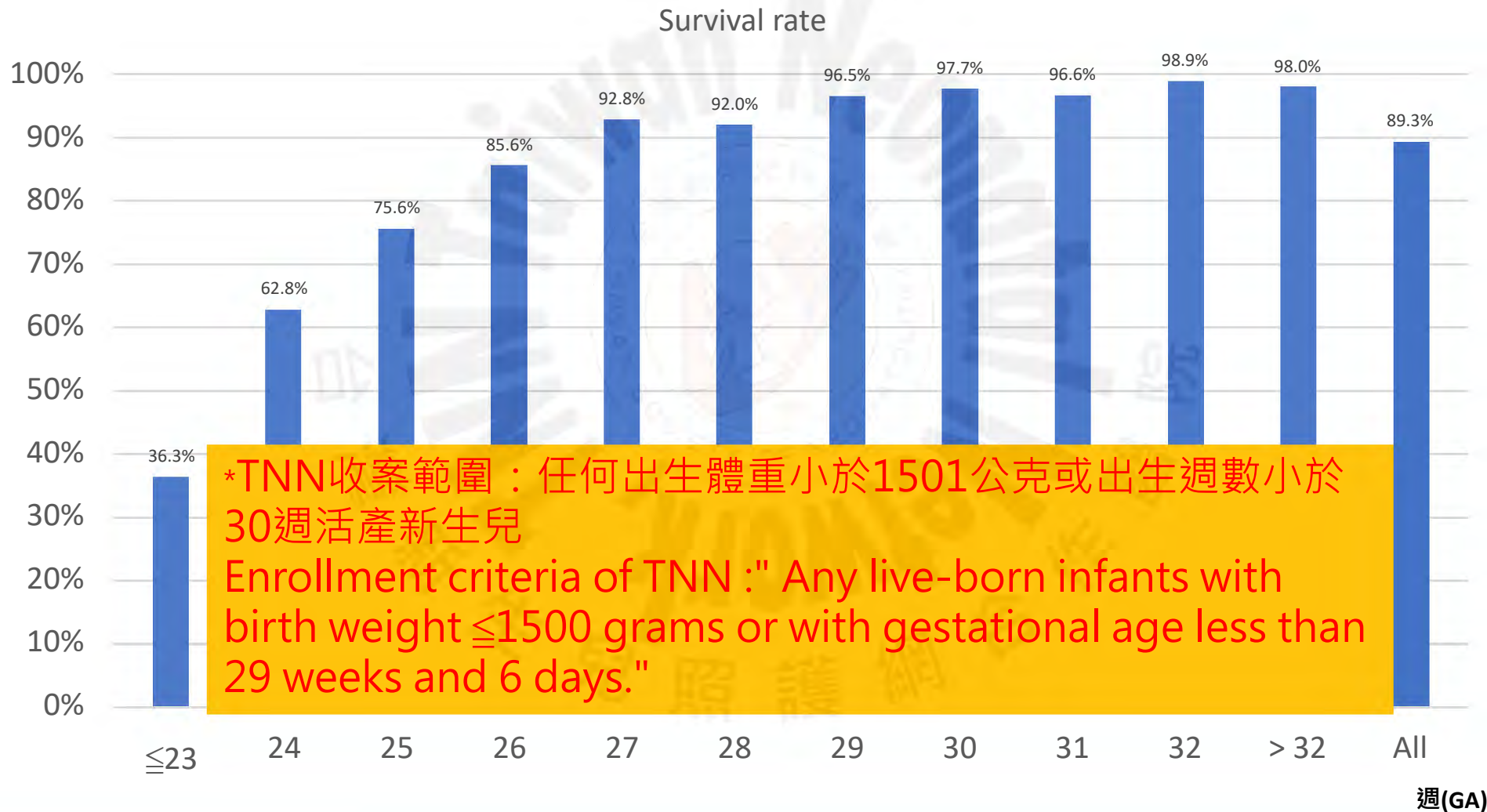


Annual Report

2024年台灣新生兒醫療聯合網絡年度報告

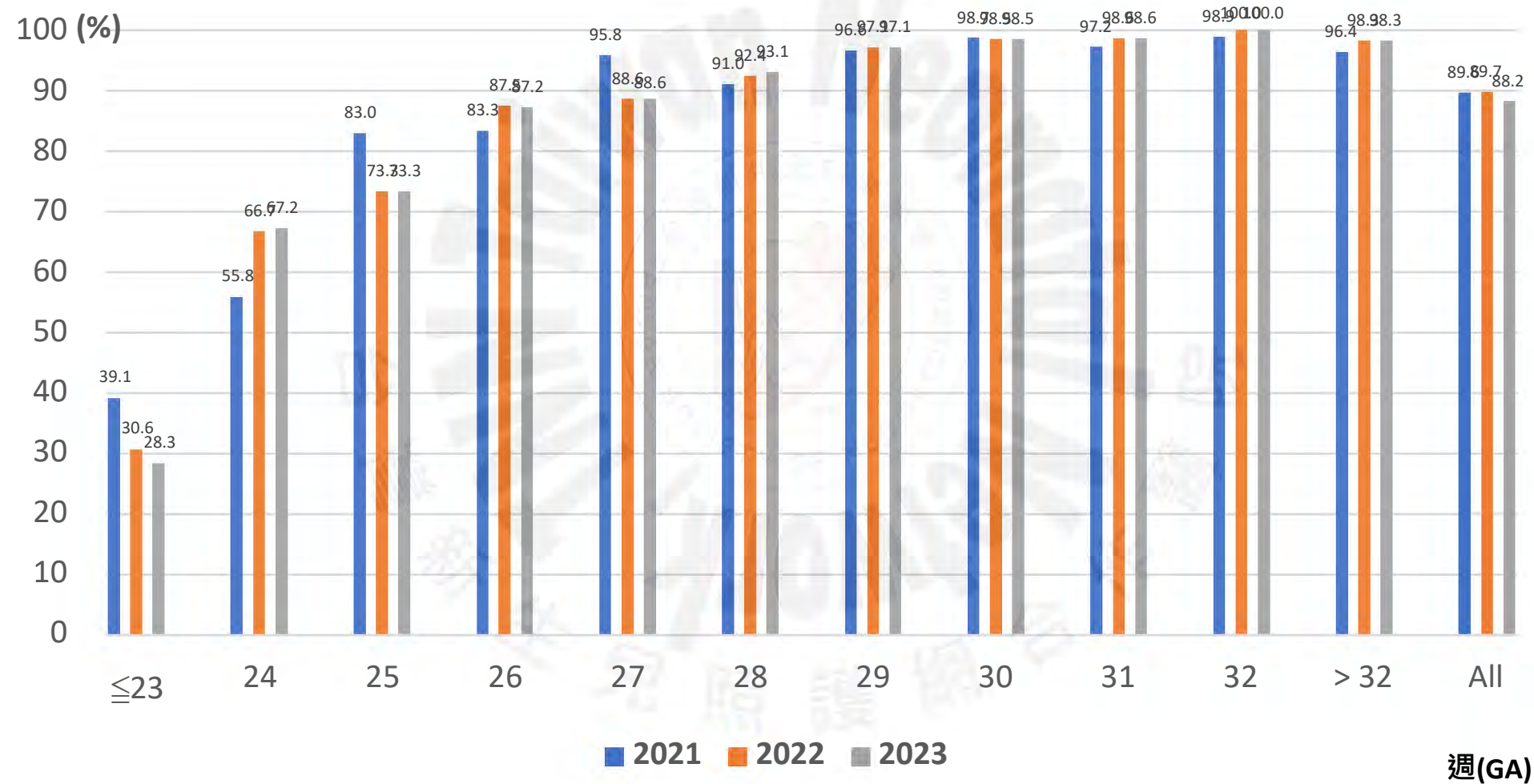
TNN2021-2023年新生兒週數別存活率

Survival rate of TNN in 2021-2023



TNN2021-2023年新生兒週數別存活率

Survival rate of TNN in 2021-2023

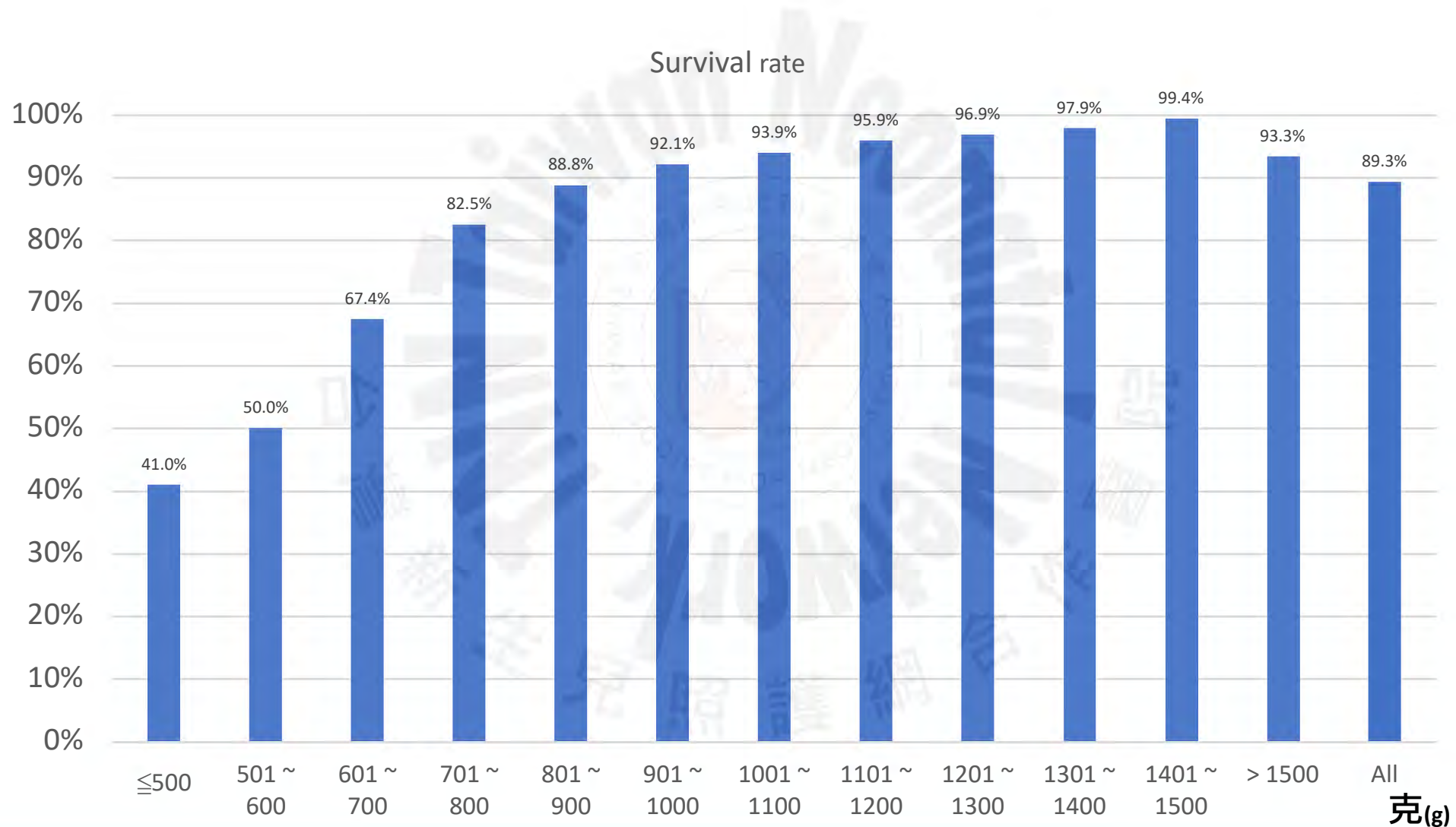


N= 3469

Survival rate by gestational age

TNN Year 2021-2023 新生兒體重別存活率

Survival rate of TNN in 2021-2023

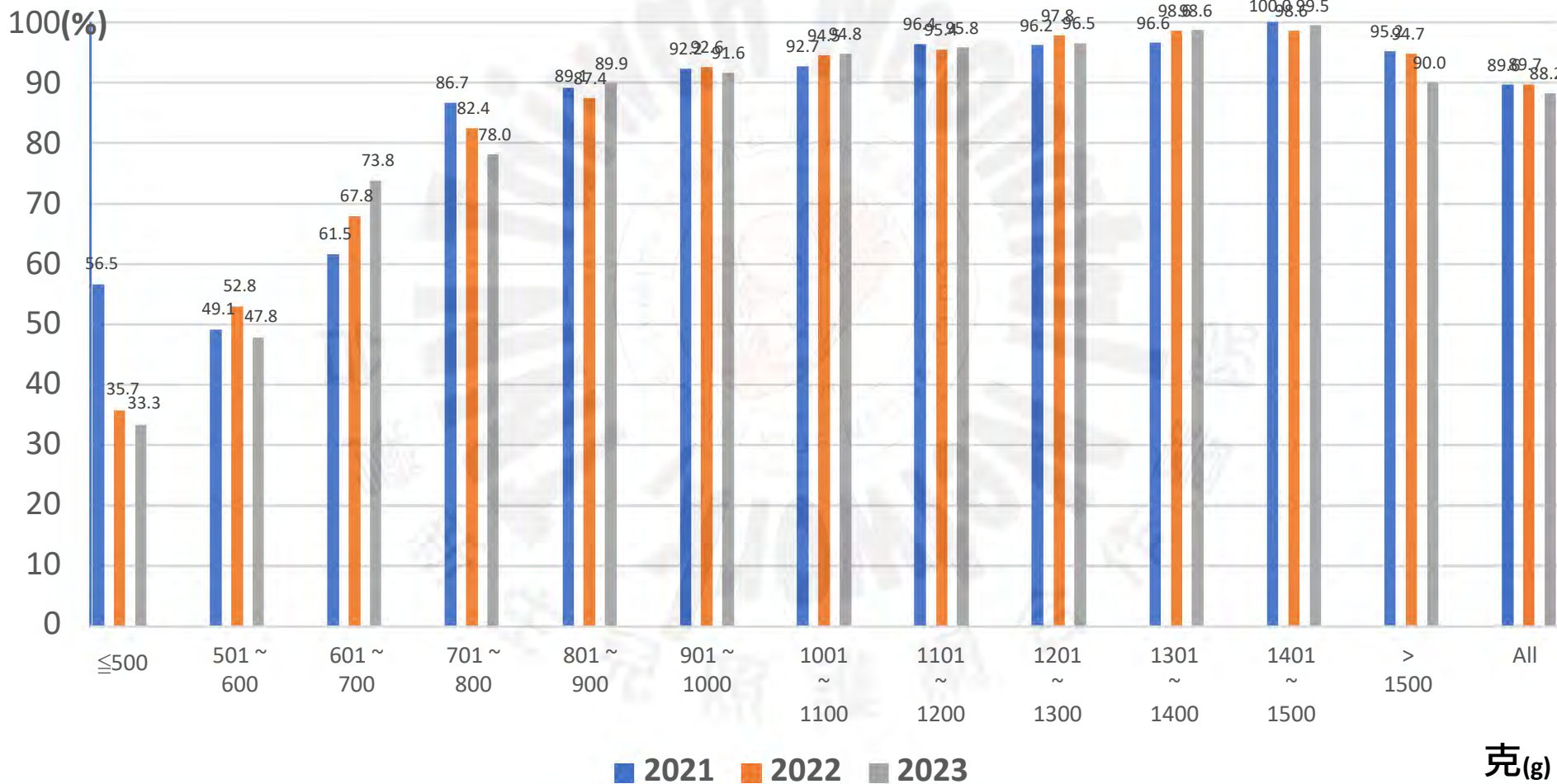


N= 3469

Survival rate according to birth weights

TNN2021-2023 新生兒體重別存活率

Survival rate of TNN in 2021-2023



N= 3469

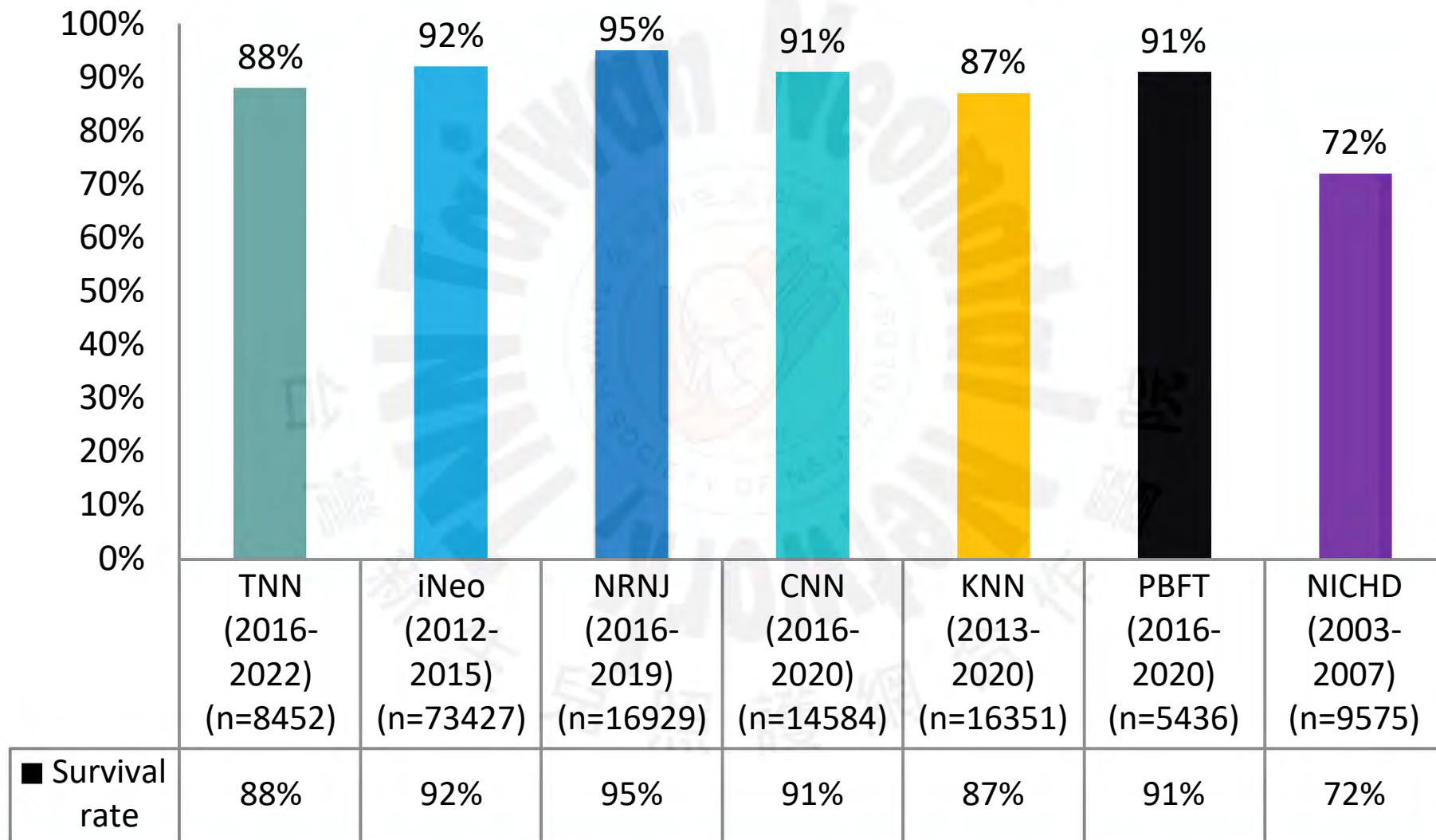
Survival rate by birth weights

克(g)

各國新生兒照護系統名稱	縮寫
Taiwan Neonatal Network	T N N
Premature Baby Foundation Network of Taiwan	P B F T
Canadian Neonatal Network	C N N
Institute of Child Health Development Neonatal Research Network	N I C H D N R N
Neonatal Research Network of Japan	N R N J
The International Network for Evaluation of Outcomes	i-Neo
Korean Neonatal Network	K N N

<1500克(VLBW)新生兒各國照護系統存活率

Survival Rates in Various Neonatal Network Systems of VLBW



*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

TNN2022-2023採區間化含部分1500 g個案

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

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	母乳
Oxygen	出院帶氧

TNN 2021-2023



At Birth



Key Performance
Measures



Procedures and
Interventions



At Discharge
Home

TNN 2021-2023: **At Birth**



AT BIRTH



KEY PERFORMANCE
MEASURES

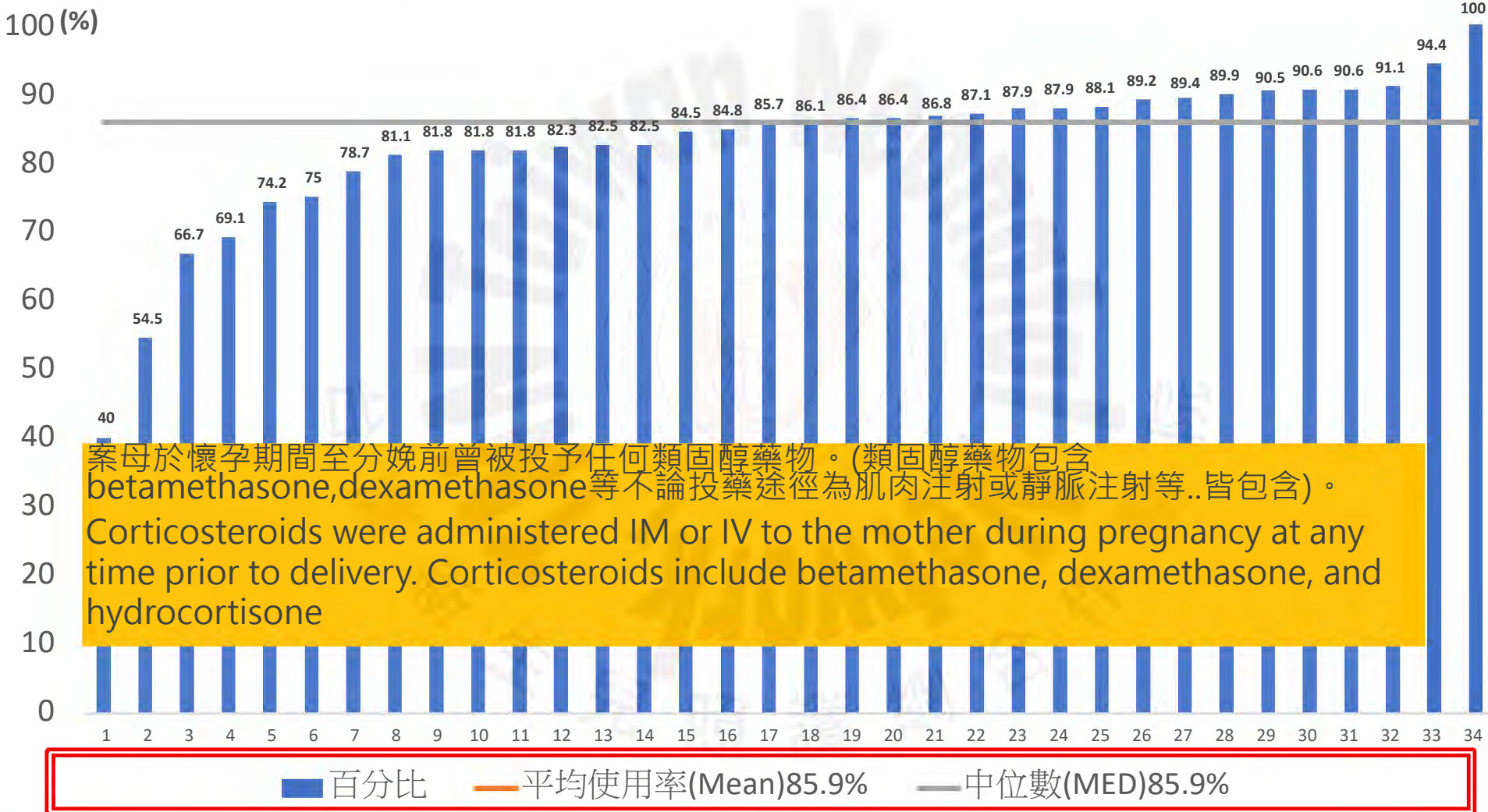


PROCEDURES AND
INTERVENTIONS



AT DISCHARGE
HOME

2021-2023年(Antenatal steroids) 參與TNN各院案母孕期使用類固醇比例



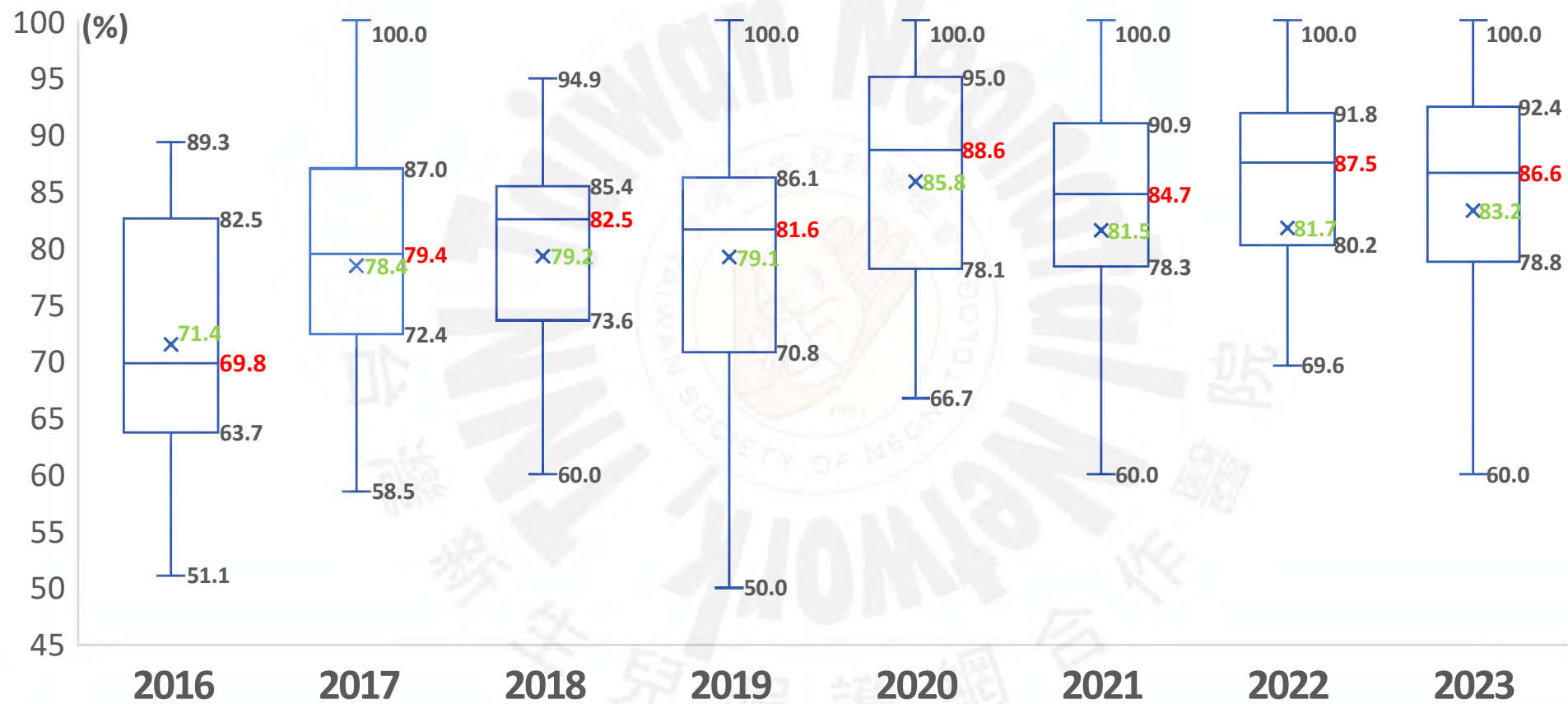
Ranking No., Not Hospital ID

*NO.34醫院僅有2021、2023年度資料(Hospital No.34 only have data for the years 2021 and 2023)
 NO.8、9醫院僅有2022-2023年度資料(Hospital No.8、9 only have data for the years 2022-2023)
 NO.3、10、11醫院僅有2023年度資料(Hospital No.3、10、11 only have data for the years 2023)

各年度Antenatal steroids使用率

—中位數(MED)

x平均數(Mean)



2016-2023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)

2021-2023年(Multiple gestation) 參與TNN各院案母於懷孕期間為多胞胎妊娠

100 (%)

母體在懷此個案的孕期間監測到子宮內有兩個以上的胎兒
Two or more live fetuses were documented at any time during the pregnancy which resulted in the birth of the infant

90

80

70

60

50

40

30

20

10

0

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34

■ 百分比

— 平均發生率(Mean)30.2%

— 中位數(MED)29.3%

*NO.7醫院僅有2021、2023年度資料(Hospital No.7 only have data for the years 2021 and 2023)
NO.3、18醫院僅有2022-2023年度資料(Hospital No.3、18 only have data for the years 2022-2023)
NO.2、4、64醫院僅有2023年度資料(Hospital No.2、4、34 only have data for the years 2023)

66.7

51.6

40.7

39.7

37.1

36.4

36

34.3

33.3

32.5

32.4

31

31

30.7

30.5

30

29.7

28.8

28.4

28.1

27.9

27.8

25.1

25

24.4

21.9

21

20

19.7

19.4

18.2

18.2

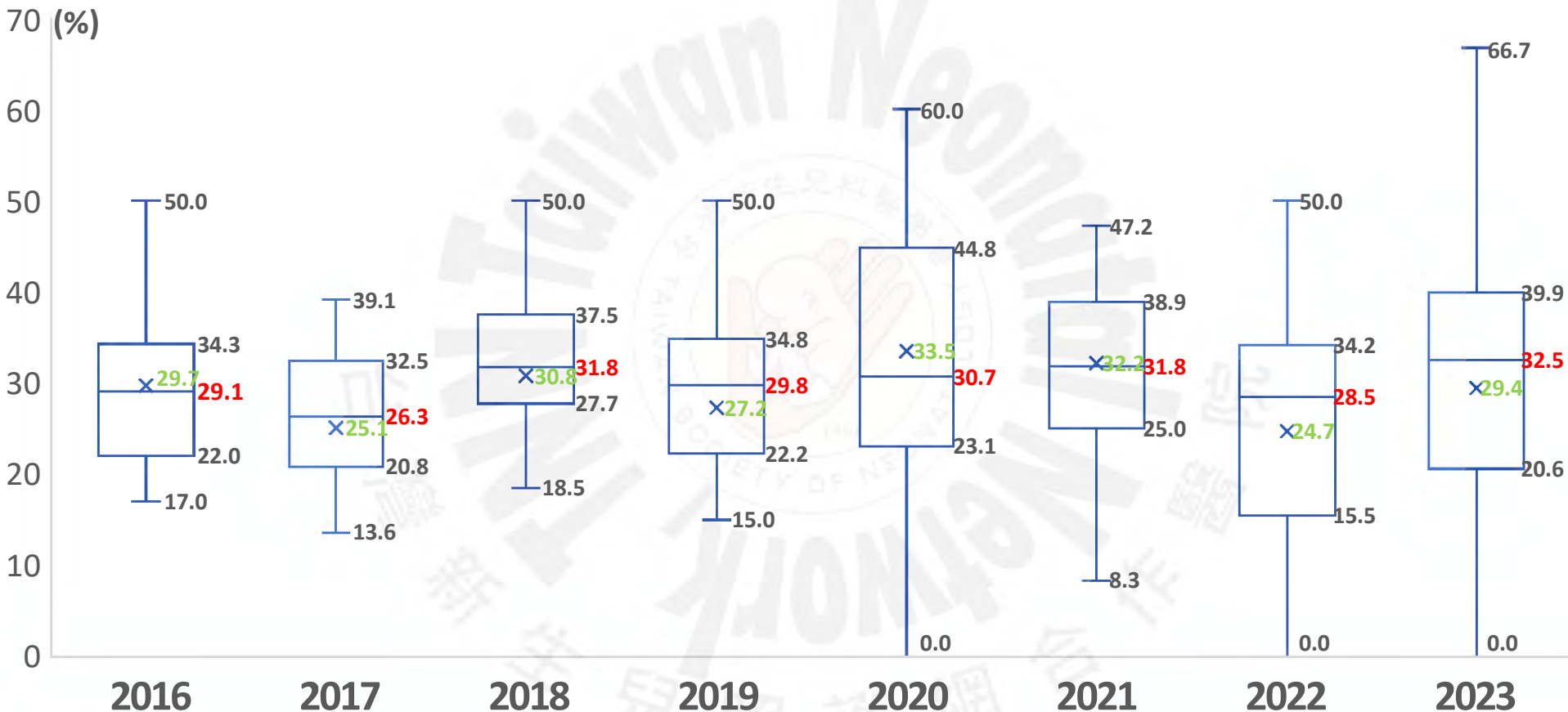
9.1

4.5

各年度Multiple gestation發生率

—中位數(MED)

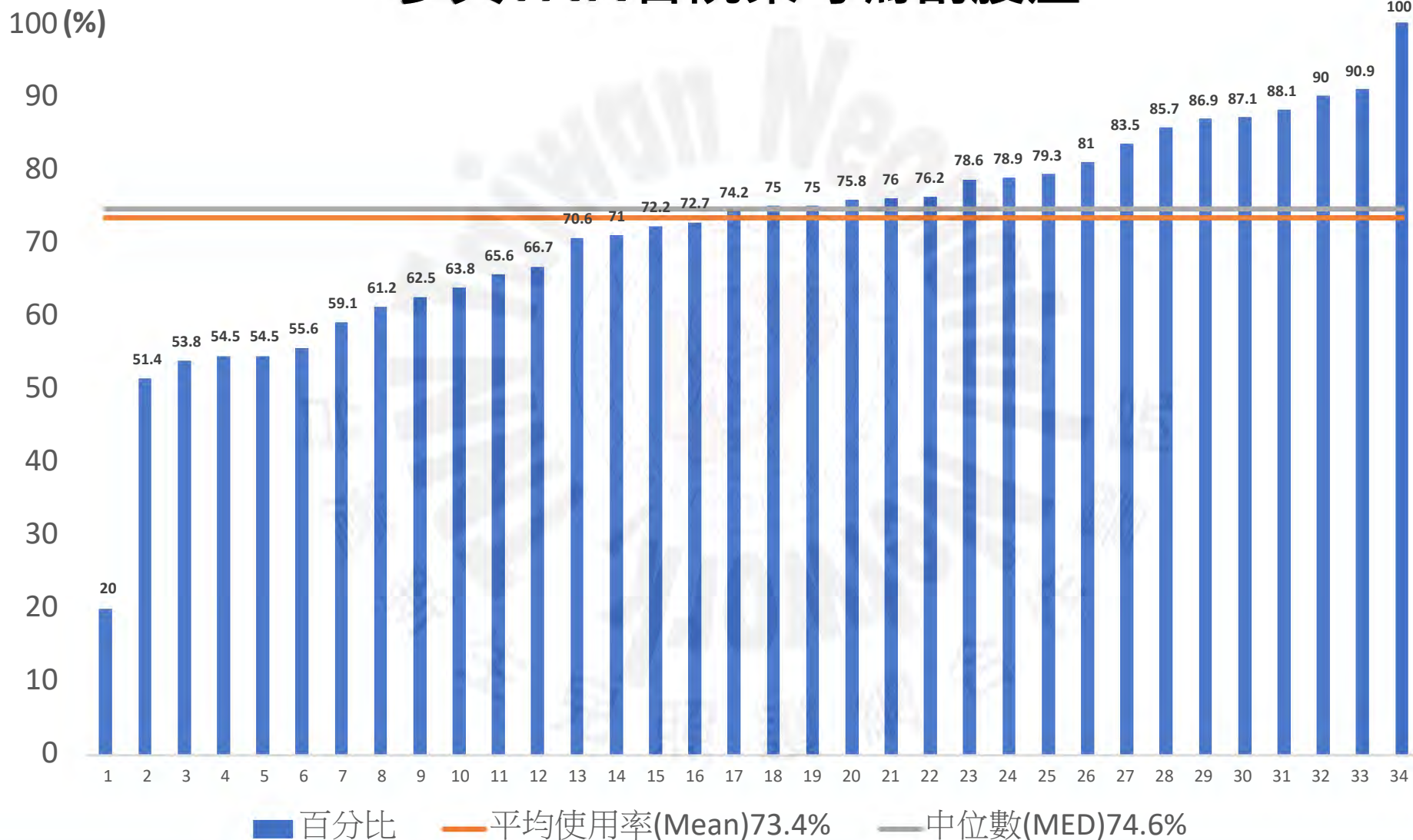
x平均數(Mean)



2016-2023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)

2021-2023年(Cesarean section) 參與TNN各院案母為剖腹產

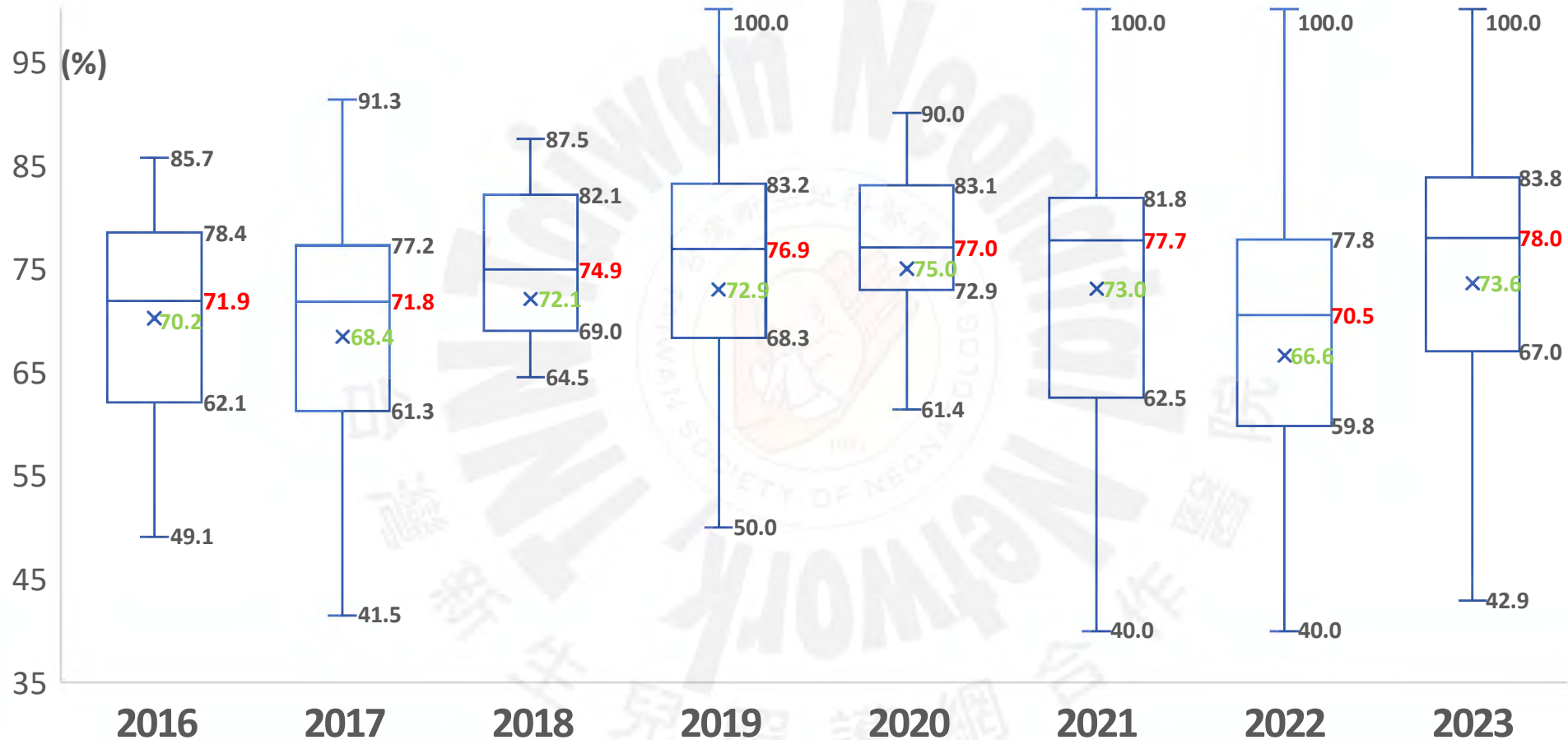


*NO.1醫院僅有2021、2023年度資料(Hospital No.1only have data for the years 2021 and 2023)
NO.2、5醫院僅有2022-2023年度資料(Hospital No.2、5only have data for the years 2022-2023)
NO.16、33、34醫院僅有2023年度資料(Hospital No.16、33、34 only have data for the years 2023)

各年度Cesarean section使用率

—中位數(MED)

x平均數(Mean)



2016-2023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)

2021-2023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

100 (%)

90

80

70

60

50

40

30

20

10

0

個案有符合下述所列舉的任一先天重大缺陷診斷，則納入統計。

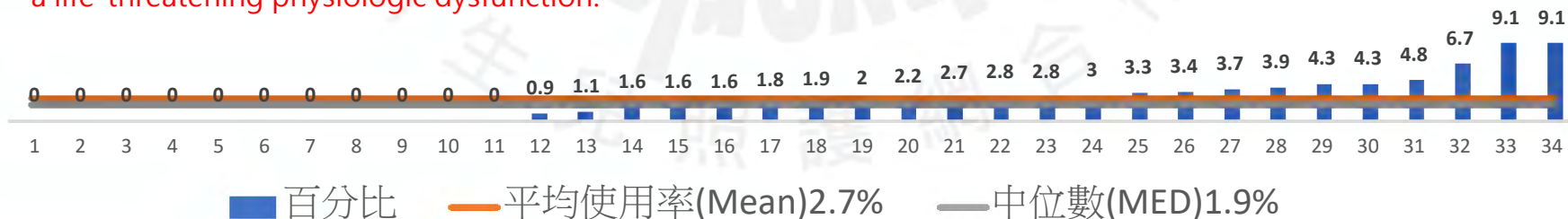
- 1.其他致命性缺陷(Other lethal or life threatening birth defects, which are not listed above)
- 2.其他染色體異常(Other chromosomal anomaly)
- 3.骨骼發育異常(Skeletal Dysplasia)
- 4.先天性代謝缺陷(Inborn Error of Metabolism)
- 5.其他致命性中樞神經系統異常(Other lethal or life threatening central nervous system defects not listed above)
- 6.其他致命性鬱血性心臟病(Other lethal or life threatening congenital heart defects not listed above)
- 7.其他致命性消化系統缺陷(Other lethal or life-threatening gastro-intestinal defects not listed above)
- 8.其他致命性泌尿系統異常(Other lethal or life-threatening Genito-Urinary defects not listed above)
- 9.其他致命性肺泡畸形(Other lethal or life threatening pulmonary malformation)

*先天致命性重大缺陷定義

1. 此重大缺陷可能導致死亡。
2. 出院前須以手術或其他專門性醫療業務來治療此缺陷

To be considered lethal or life threatening, the defect must either:

- 1.be the primary cause of death, or
2. be treated prior to discharge with specific surgical or medical therapy to correct a major anatomic defect or a life-threatening physiologic dysfunction.



*NO.6醫院僅有2021、2023年度資料(Hospital No.6 only have data for the years 2021 and 2023)

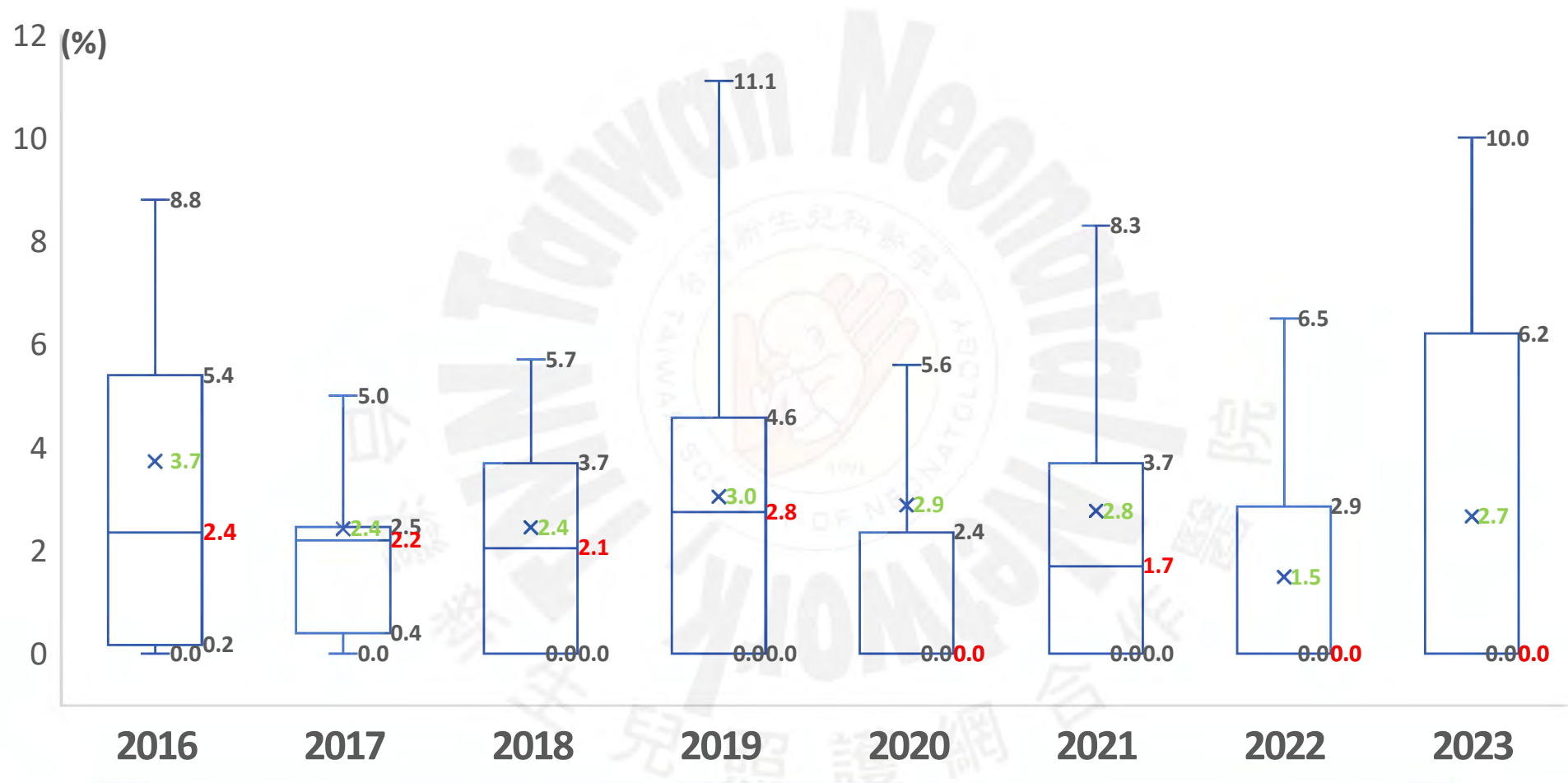
NO.9、21醫院僅有2022-2023年度資料(Hospital No.9、21 only have data for the years 2022-2023)

NO.10、11、34醫院僅有2023年度資料(Hospital No.10、11、34 only have data for the years 2023)

各年度Any major birth defect罹病率

—中位數(MED)

x平均數(Mean)



2016-2023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)

2021-2023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

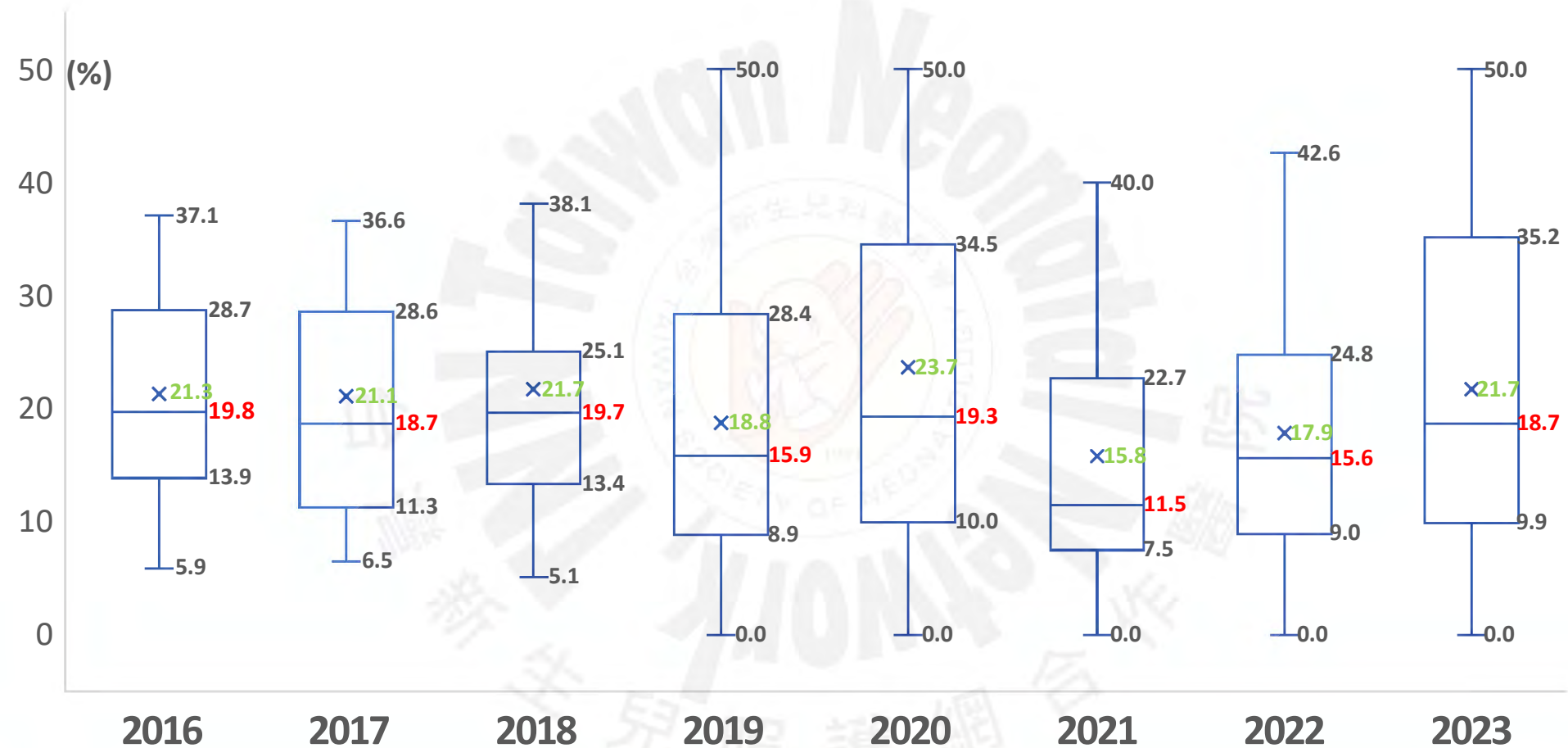


*NO.20醫院僅有2021、2023年度資料(Hospital No.20 only have data for the years 2021 and 2023)
NO.12、26醫院僅有2022-2023年度資料(Hospital No.12、26 only have data for the years 2022-2023)
NO.1、2、32醫院僅有2023年度資料(Hospital No.1、2、32 only have data for the years 2023)

各年度APGAR at 1 Min<4發生率

—中位數(MED)

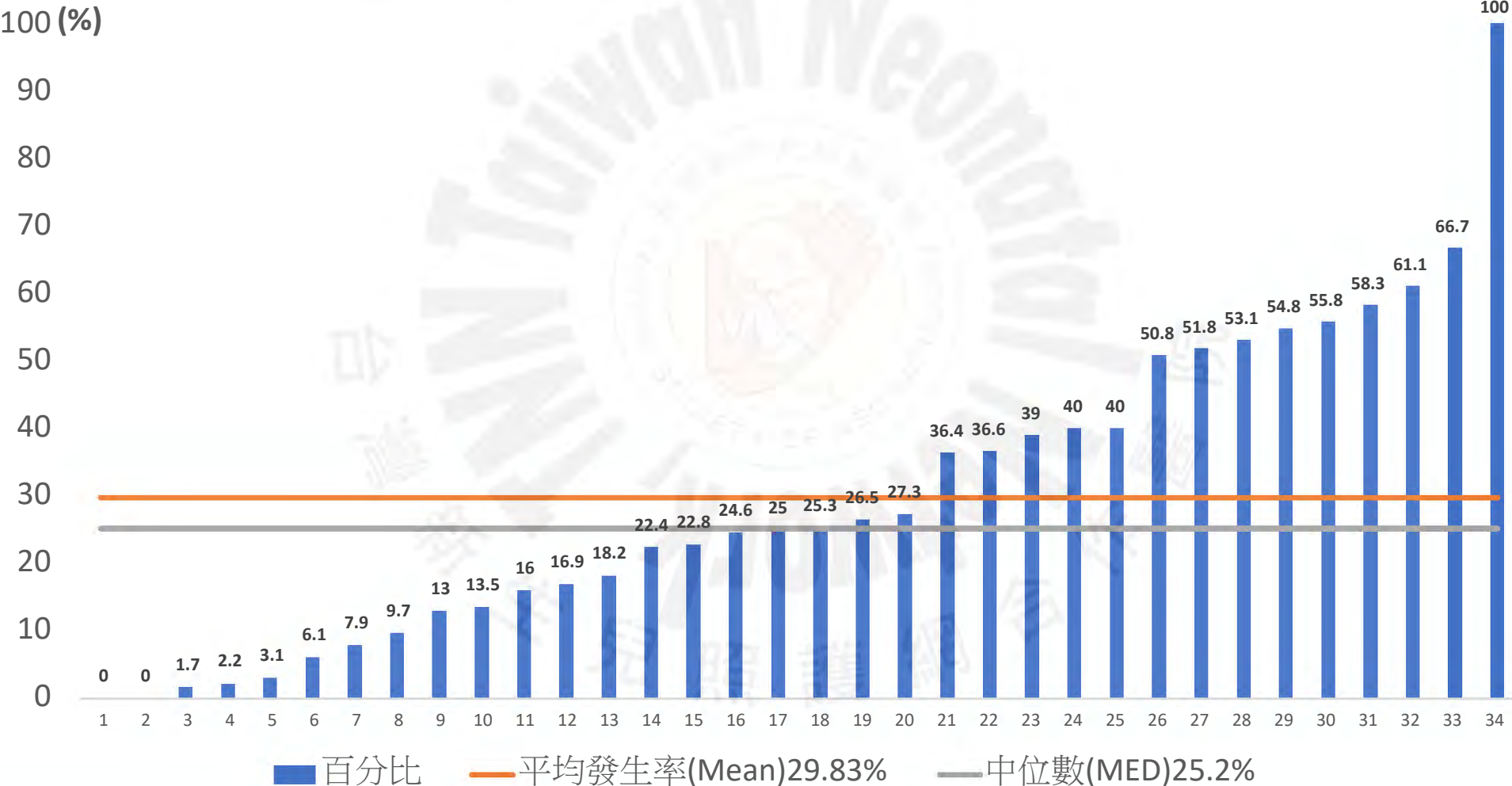
x平均數(Mean)



2016-2023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)

2021-2023年(Admission Temperature <math> < 36\text{ }^\circ\text{C}</math>) 參與TNN各院中的個案 入NICU第一小時所測得溫度小於36 °C

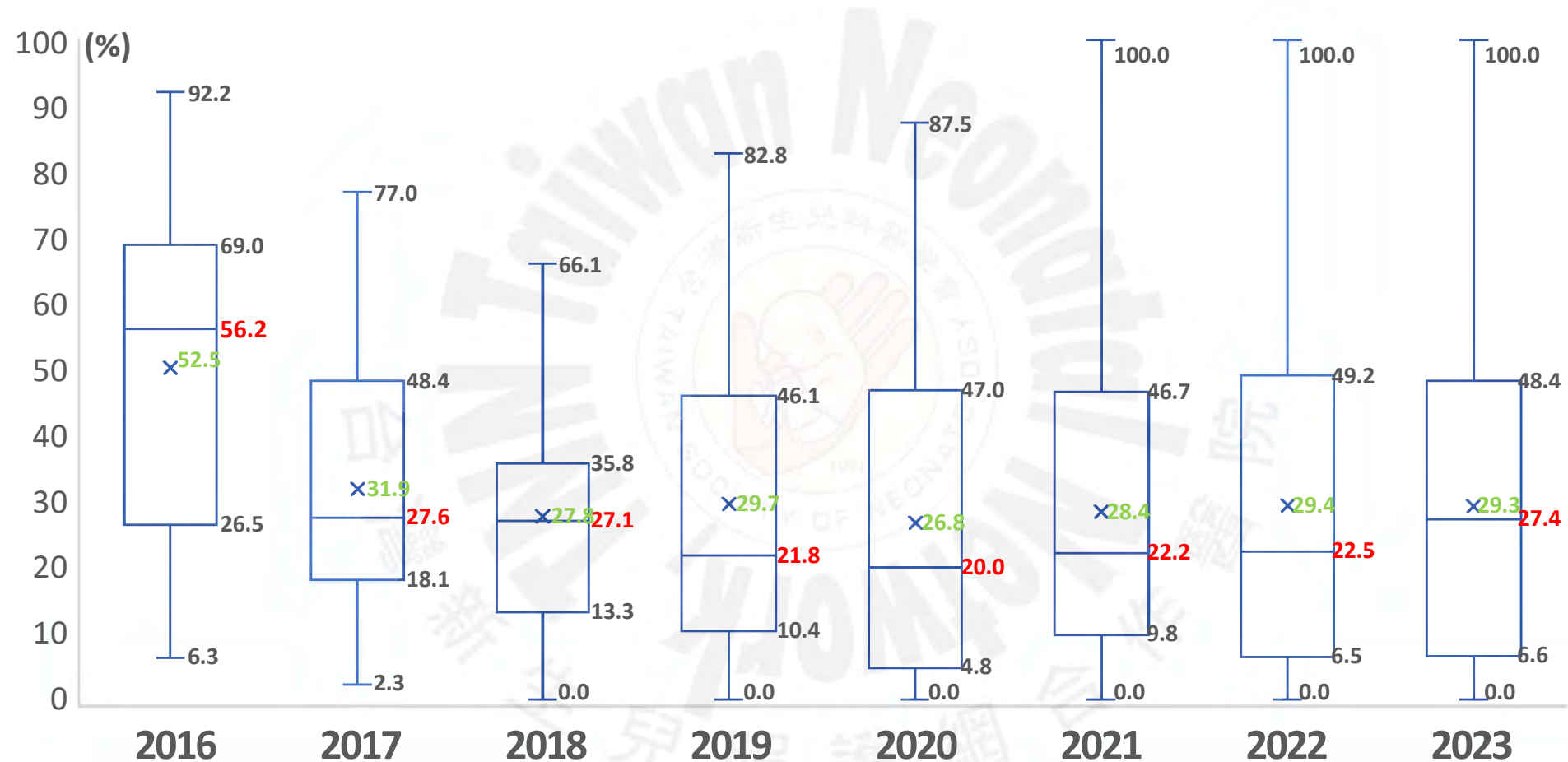


*NO.2醫院僅有2021、2023年度資料(Hospital No.2 only have data for the years 2021 and 2023)
 NO20、24醫院僅有2022-2023年度資料(Hospital No.20、24 only have data for the years 2022-2023)
 NO.17、25、33醫院僅有2023年度資料(Hospital No.17、25、33 only have data for the years 2023)

各年度Admission Temperature<36°C發生率

—中位數(MED)

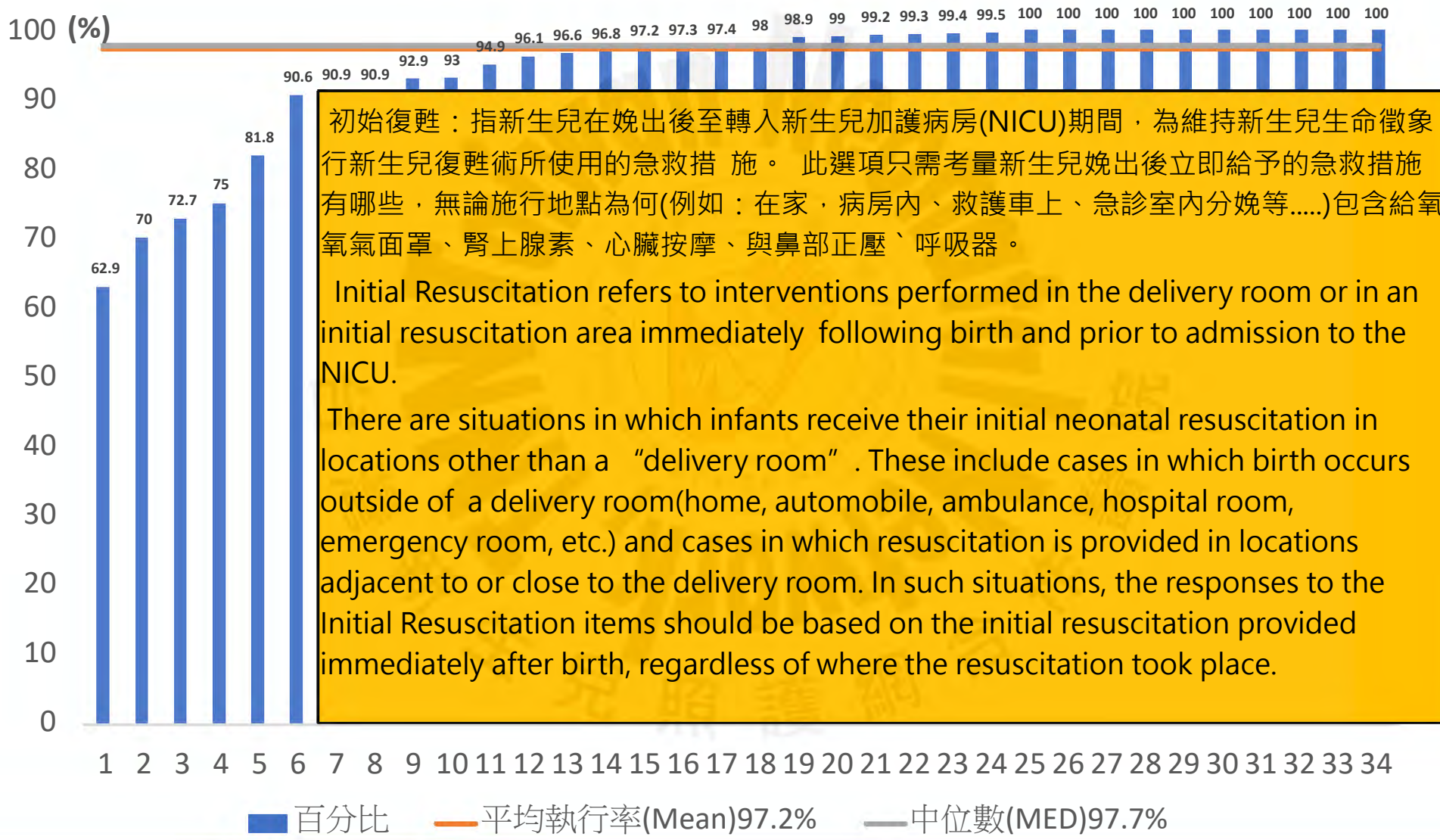
x平均數(Mean)



2016-2023年(Admission Temperature<36°C) 個案入NICU < 1 h所測得溫度小於36°C

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

2021-2023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.

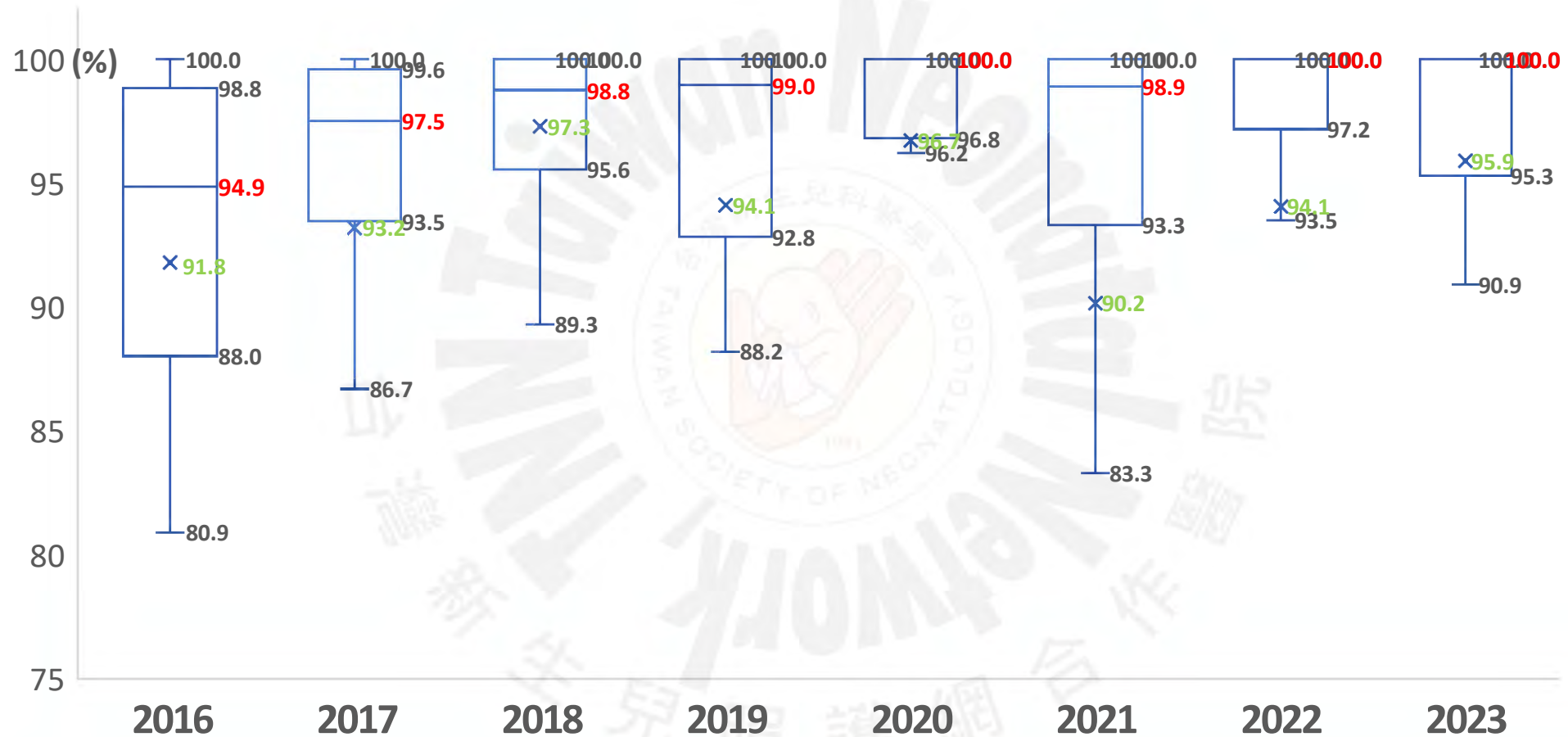
There are situations in which infants receive their initial neonatal resuscitation in locations other than a "delivery room". These include cases in which birth occurs outside of a delivery room(home, automobile, ambulance, hospital room, emergency room, etc.) and cases in which resuscitation is provided 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.

*NO.31院僅有2021、2023年度資料(Hospital No.31 only have data for the years 2021 and 2023)
 NO.32、33醫院僅有2022-2023年度資料(Hospital No.32、33 only have data for the years 2022-2023)
 NO.3、8、34醫院僅有2023年度資料(Hospital No.3、8、34 only have data for the years 2023)

各年度Any Resuscitation執行率

—中位數(MED)

x平均數(Mean)



2016-2023年(Any Resuscitation)個案有行初始復甦

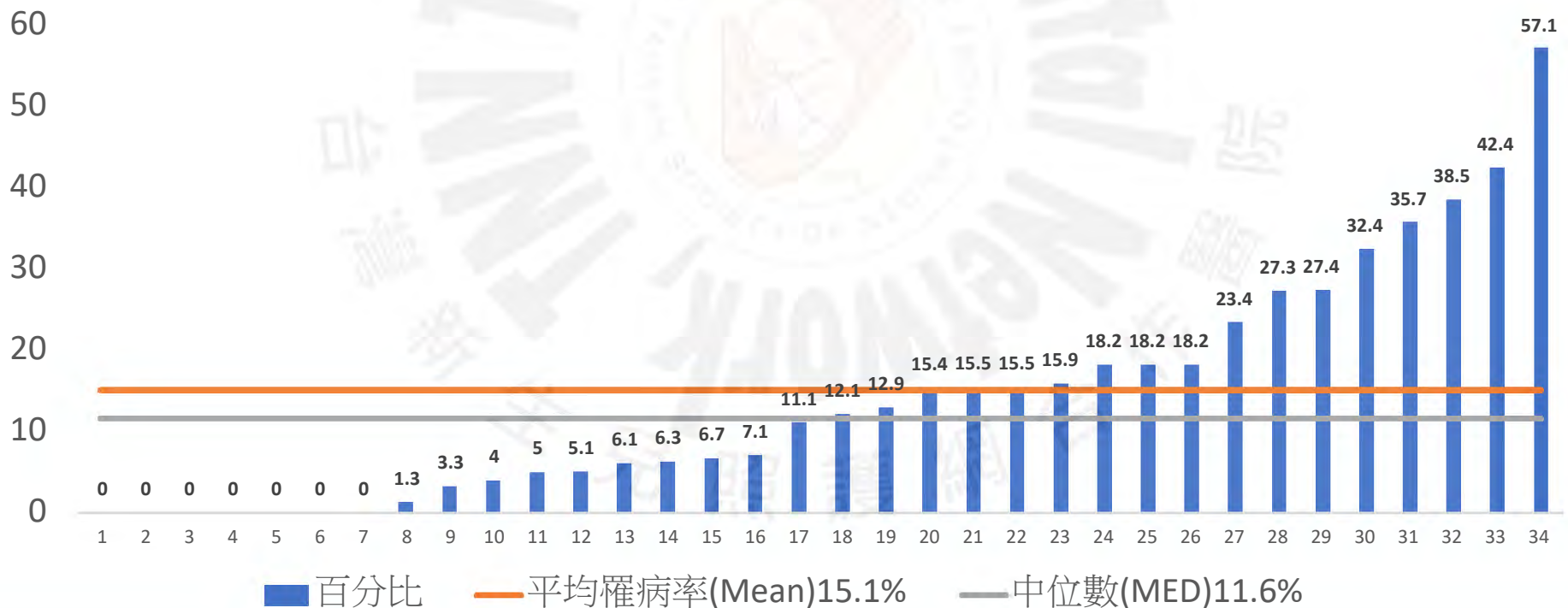
*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2021-2023年(Chorioamnionitis) 案母診斷有絨毛膜羊膜炎

100 (%)

個案或案母的病歷內有標明絨毛膜羊膜炎(Chorioamnionitis)此診斷

A diagnosis of chorioamnionitis was recorded in the maternal or infant medical record.

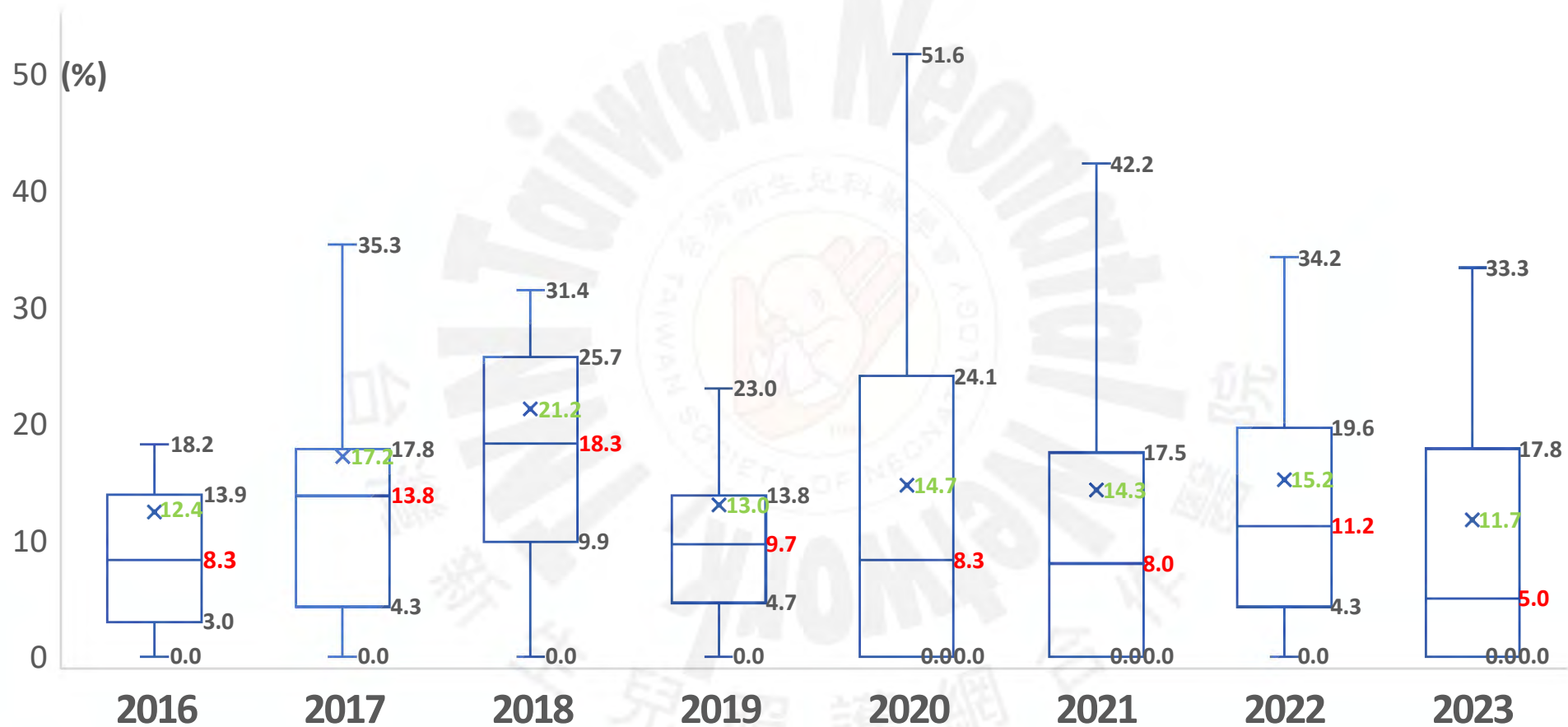


*NO.5醫院僅有2021、2023年度資料(Hospital No.5 only have data for the years 2021 and 2023)
NO.25、30醫院僅有2022-2023年度資料(Hospital No.25、30 only have data for the years 2022-2023)
NO.7、26、28醫院僅有2023年度資料(Hospital No.7、26、28 only have data for the years 2023)

各年度Chorioamnionitis罹病率

—中位數(MED)

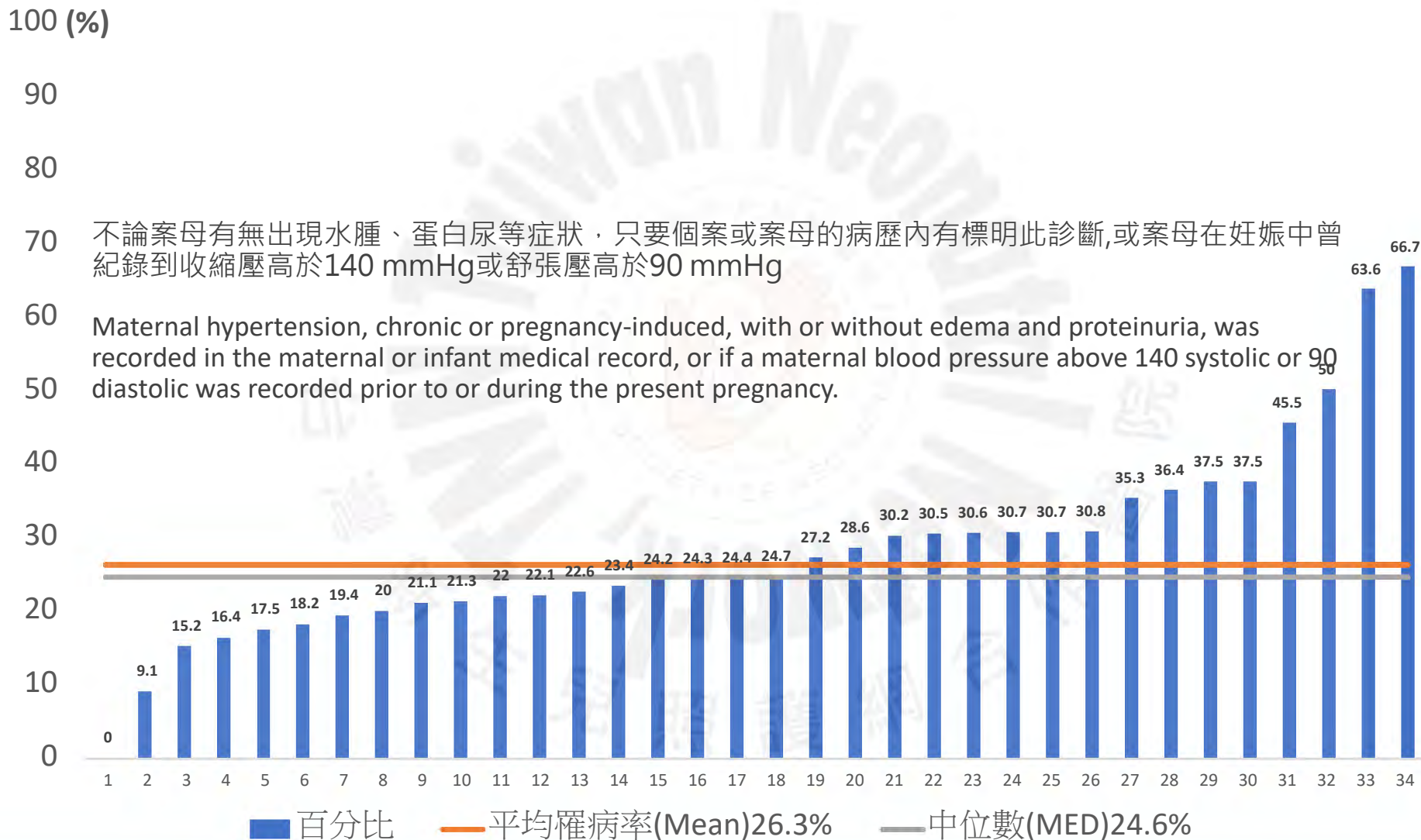
x平均數(Mean)



2016-2023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)

2021-2023年(Maternal Hypertension) 參與TNN各院案母診斷有妊娠高血壓



*NO.1醫院僅有2021、2023年度資料(Hospital No.1 only have data for the years 2021 and 2023)

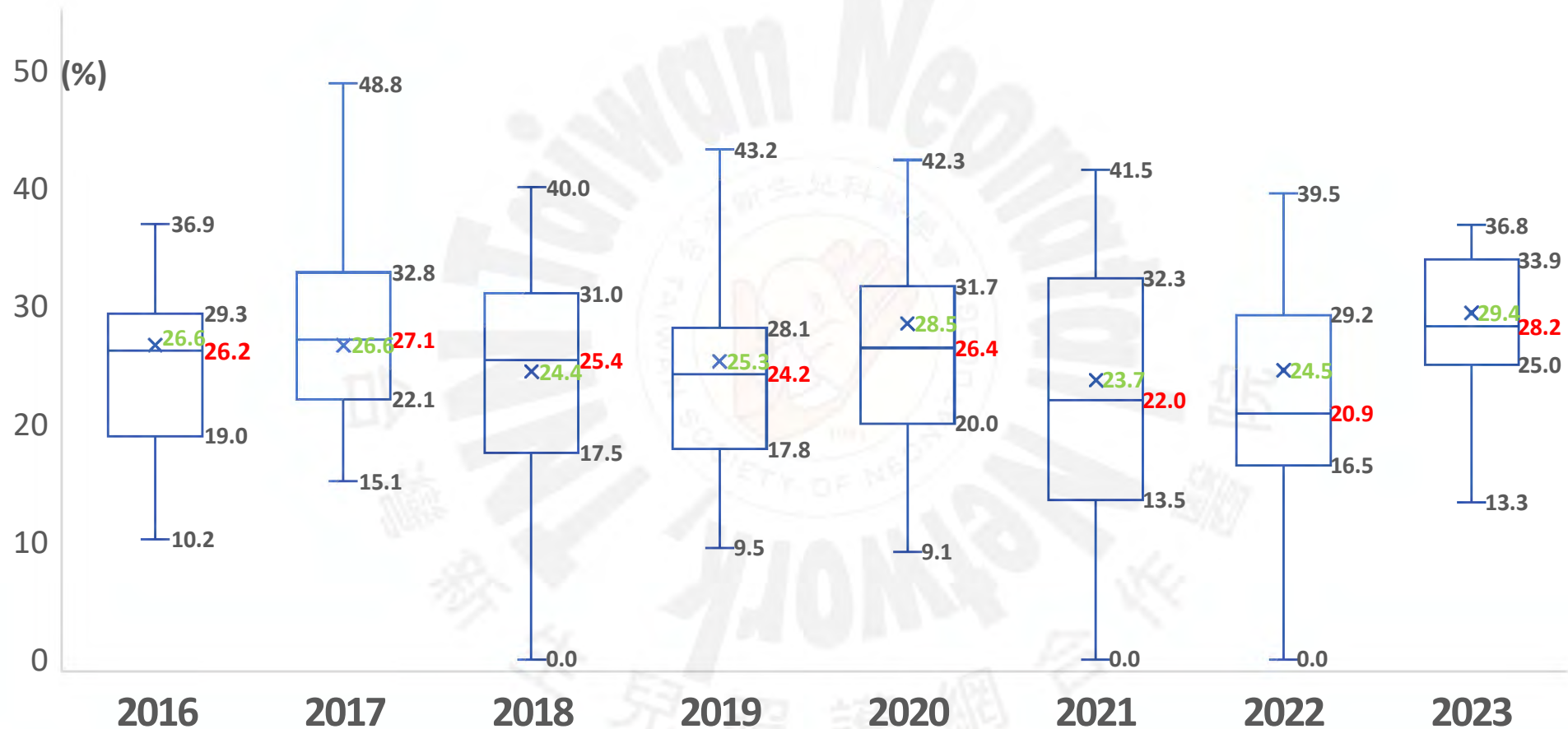
NO.2、16醫院僅有2022-2023年度資料(Hospital No.2、16 only have data for the years 2022-2023)

NO.28、33、34醫院僅有2023年度資料(Hospital No.28、33、34 only have data for the years 2023)

各年度Maternal Hypertension罹病率

—中位數(MED)

x平均數(Mean)



2016-2023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 2021-2023: Key Performance Measures



AT BIRTH



KEY PERFORMANCE
MEASURES

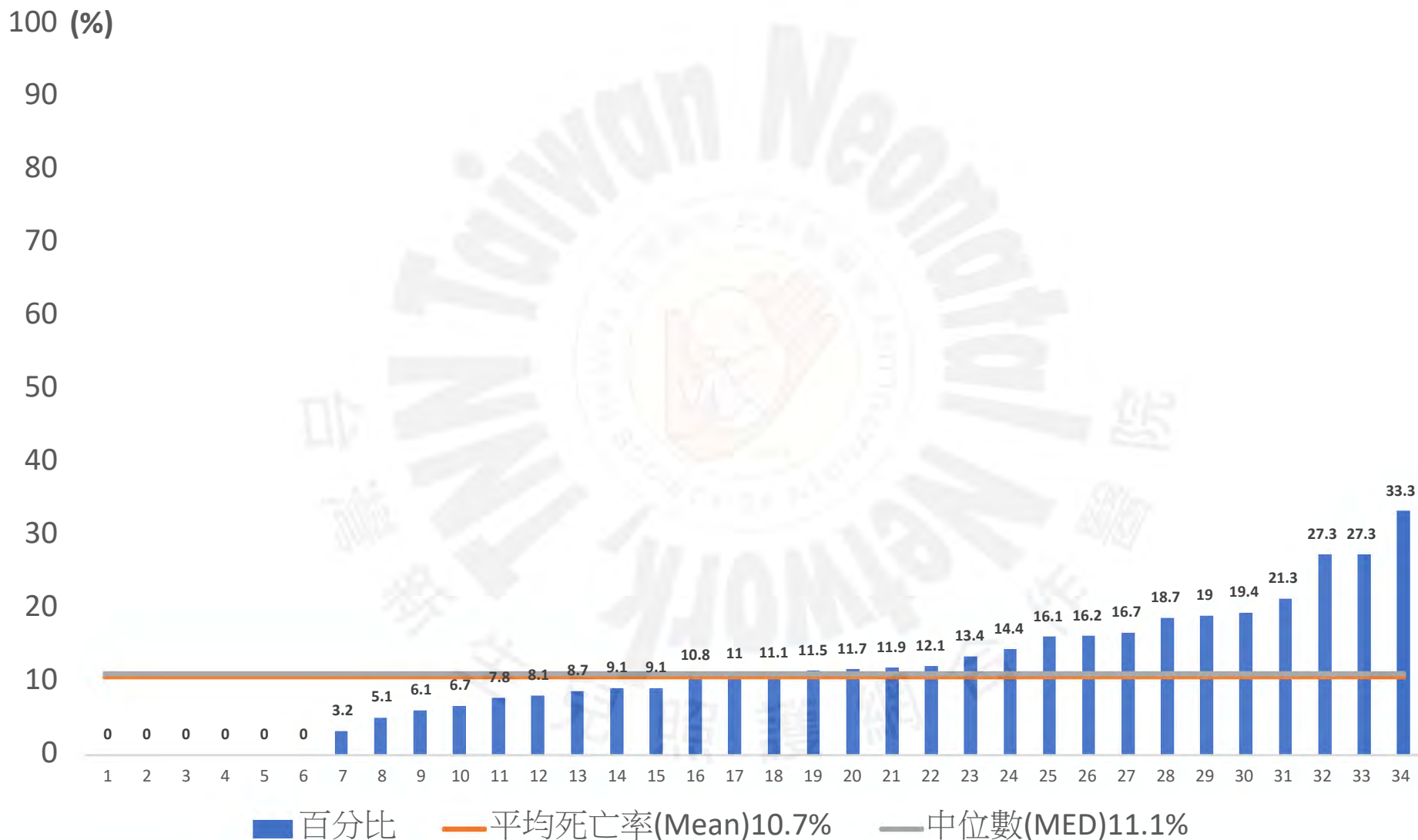


PROCEDURES AND
INTERVENTIONS



AT DISCHARGE
HOME

2021-2023年(Mortality) 參與TNN各院死亡率

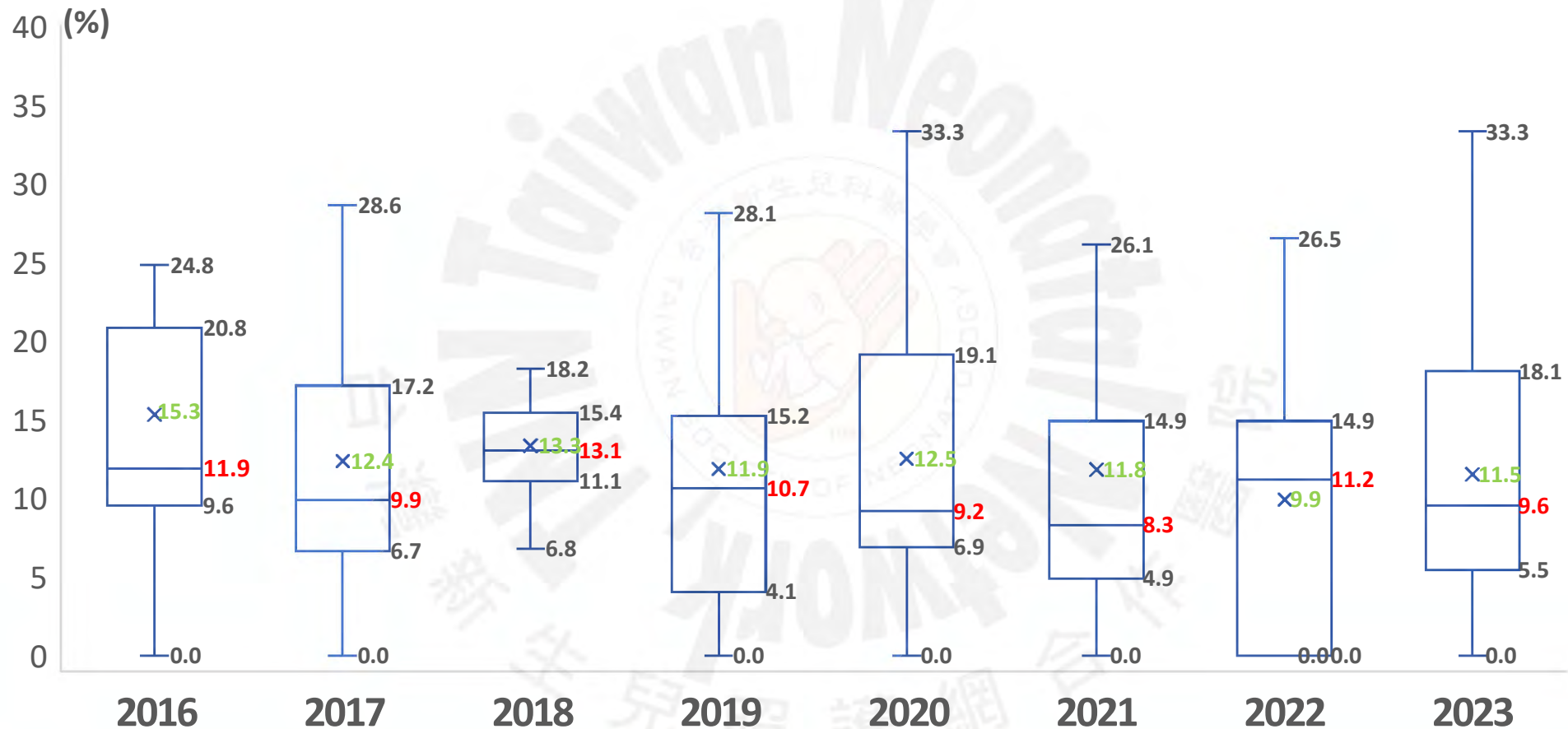


*NO.4醫院僅有2021、2023年度資料(Hospital No.4 only have data for the years 2021 and 2023)
NO.14、26醫院僅有2022-2023年度資料(Hospital No.14、26 only have data for the years 2022-2023)
NO.6、15、34醫院僅有2023年度資料(Hospital No.6、15、34 only have data for the years 2023)

各年度Mortality死亡率

—中位數(MED)

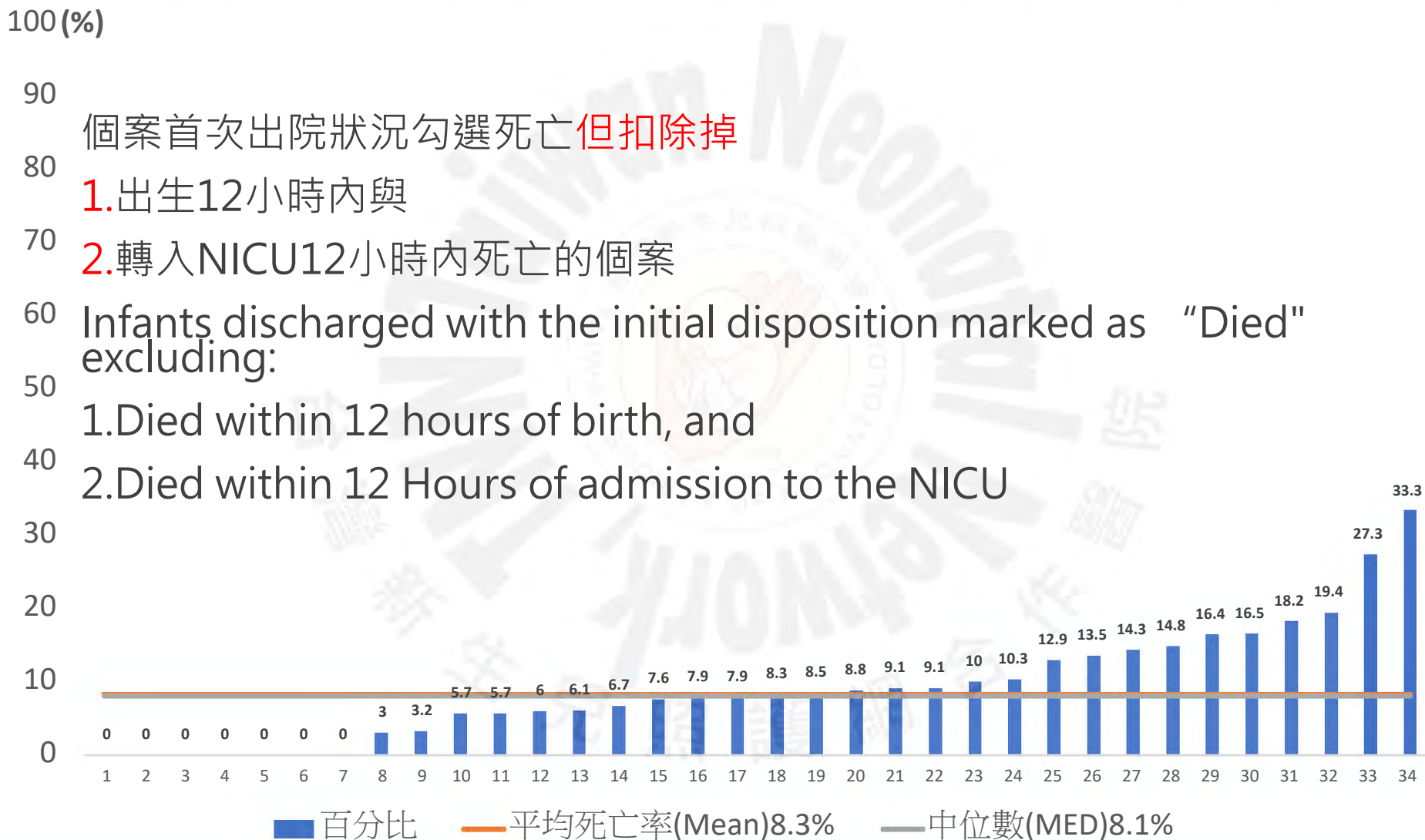
x平均數(Mean)



2016-2023年(Mortality) 死亡率

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

2021-2023年(Mortality excluding early death) 參與TNN各院個案死亡率(排除早期死亡個案)

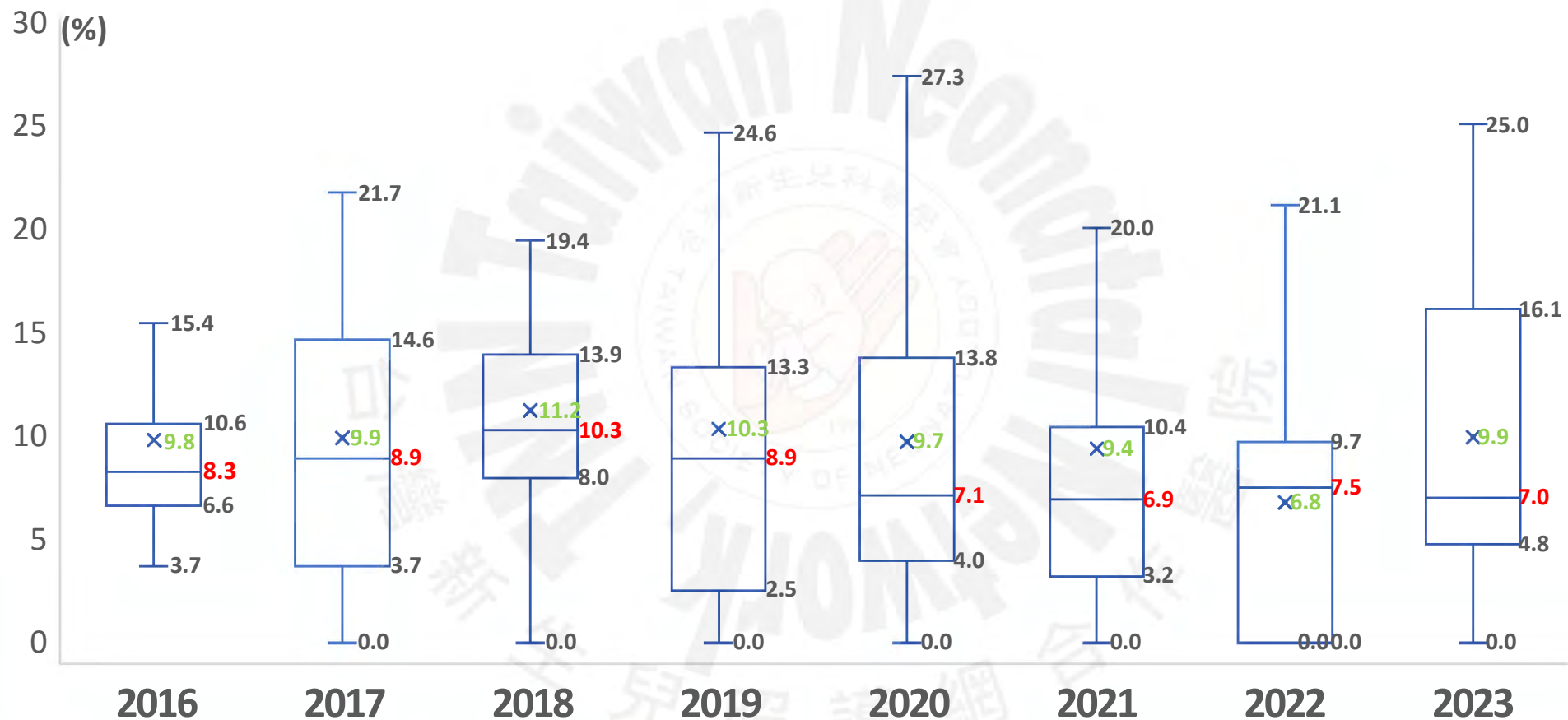


*NO.4醫院僅有2021、2023年度資料(Hospital No.4 only have data for the years 2021 and 2023)
NO.22、26醫院僅有2022-2023年度資料(Hospital No.22、26 only have data for the years 2022-2023)
NO.6、7、34醫院僅有2023年度資料(Hospital No.6、7、34 only have data for the years 2023)

各年度Mortality excluding early death死亡率

—中位數(MED)

x平均數(Mean)



2016-2023年(Mortality excluding early death) 死亡率(排除早期死亡個案)

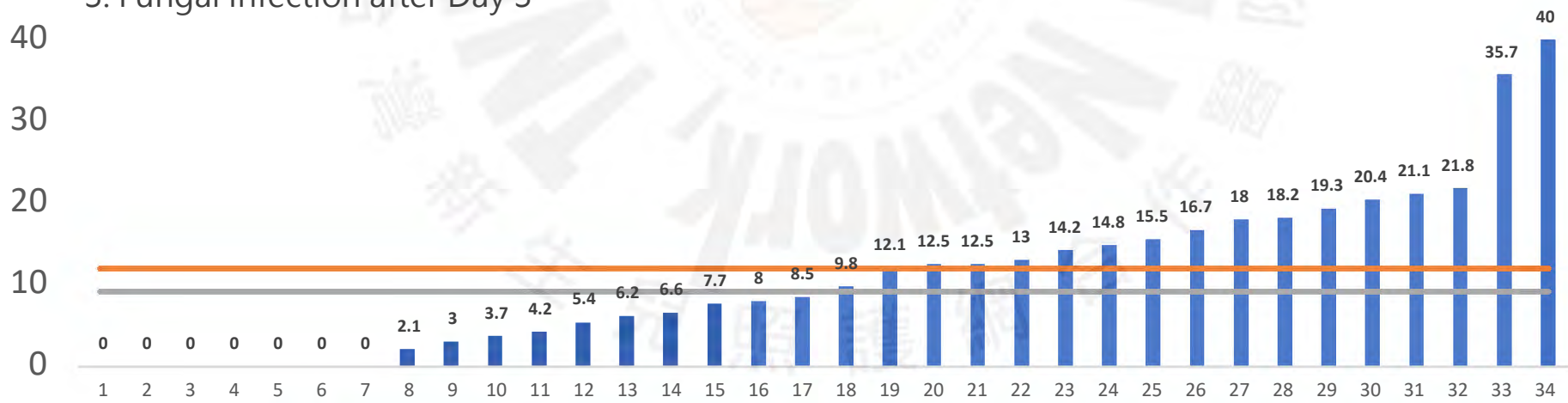
*極端值未顯示於圖表中(Outliers are not displayed in the chart)

2021-2023年(Any late infection) 參與TNN各院個案入院期間診斷有遲發性感染

100(%)

- 90 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

- 60 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



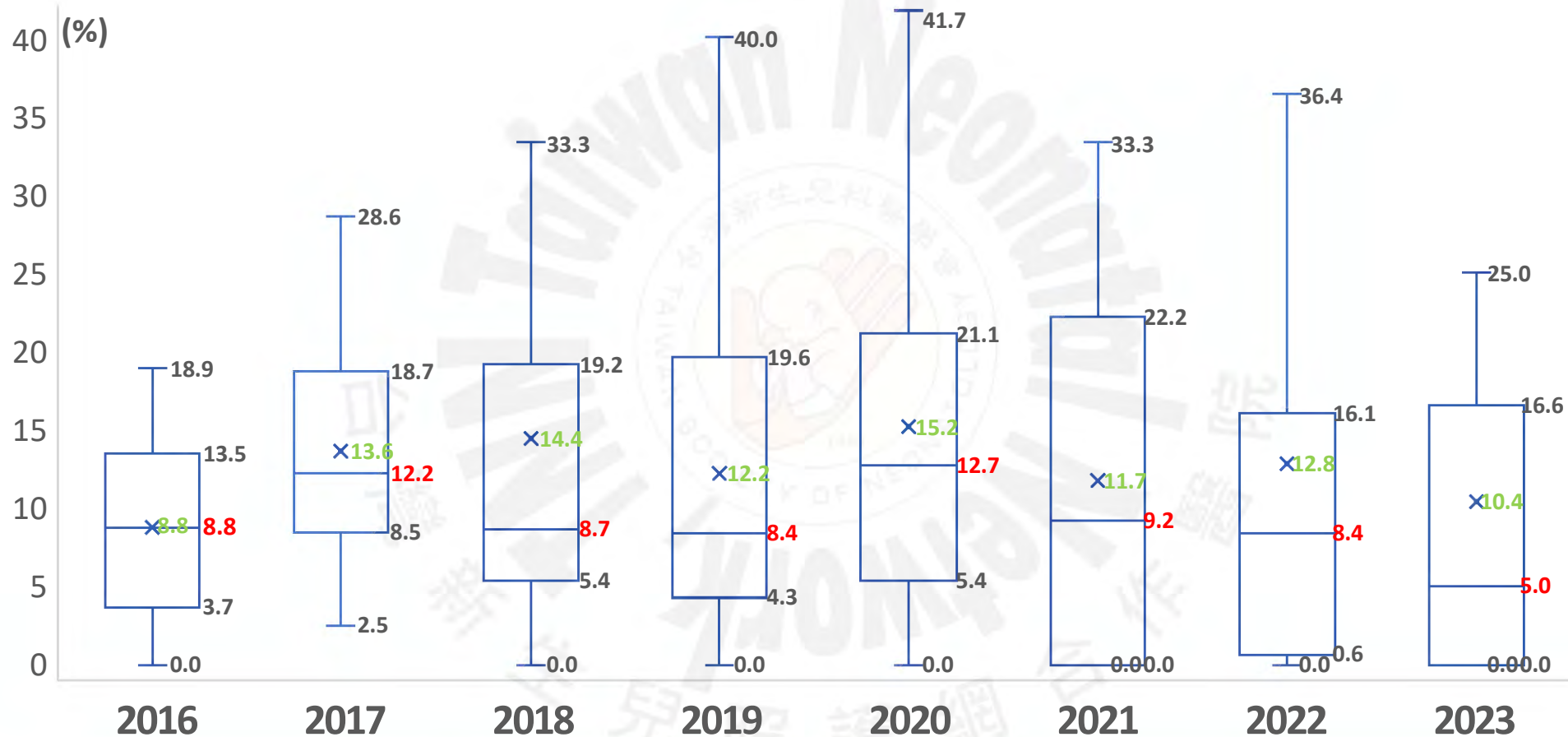
■ 百分比 — 平均罹病率(Mean)12% — 中位數(MED)9.2%

*NO.3醫院僅有2021、2023年度資料(Hospital No.3only have data for the years 2021 and 2023)
 NO.5、19醫院僅有2022-2023年度資料(Hospital No.5、19 only have data for the years 2022-2023)
 NO.6、7、28醫院僅有2023年度資料(Hospital No.6、7、28only have data for the years 2023)

各年度Any late infection罹病率

—中位數(MED)

x平均數(Mean)



2016-2023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)

2021-2023年(Pneumothorax) 參與TNN各院個案入院期間曾診斷有氣胸

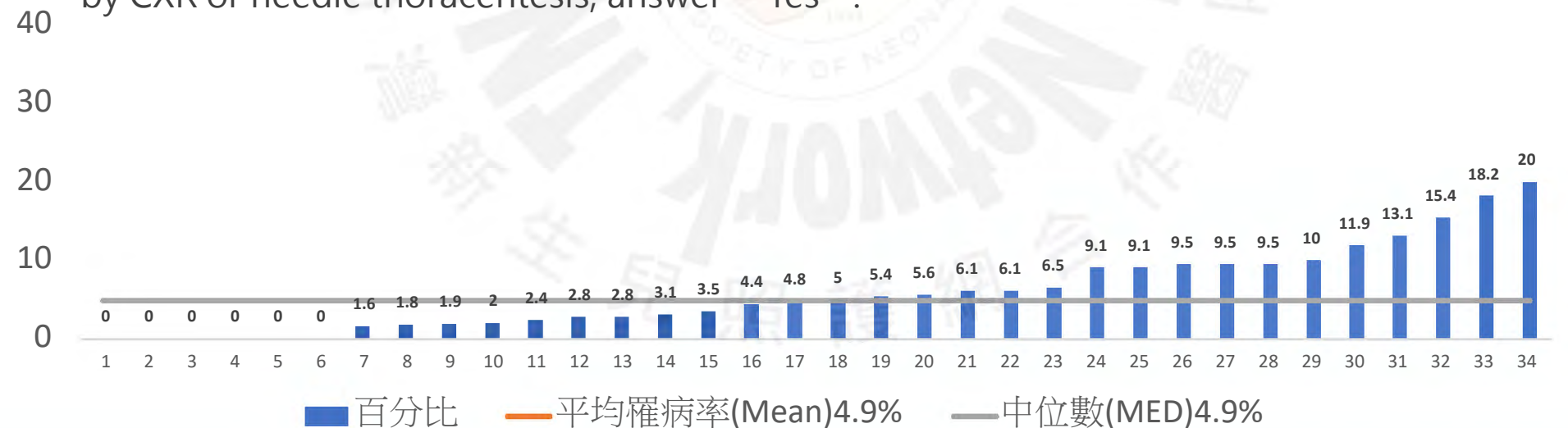
100 (%)

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" .

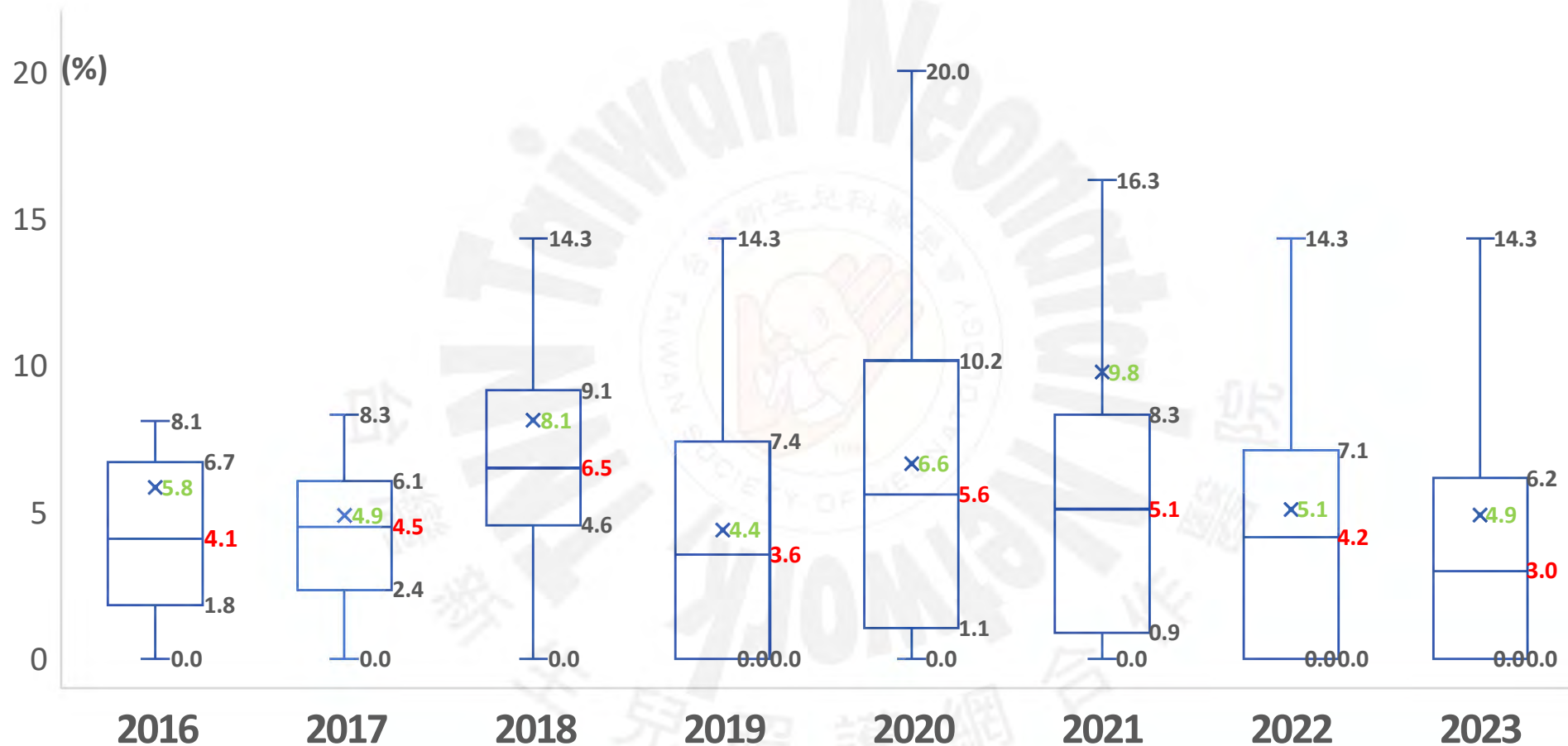


*NO.34醫院僅有2021、2023年度資料(Hospital No.34 only have data for the years 2021 and 2023)
NO.19、25醫院僅有2022-2023年度資料(Hospital No.19、25 only have data for the years 2022-2023)
NO.4、5、6醫院僅有2023年度資料(Hospital No.4、5、6 only have data for the years 2023)

各年度Pneumothorax罹病率

—中位數(MED)

x平均數(Mean)



2016-2023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)

2021-2023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

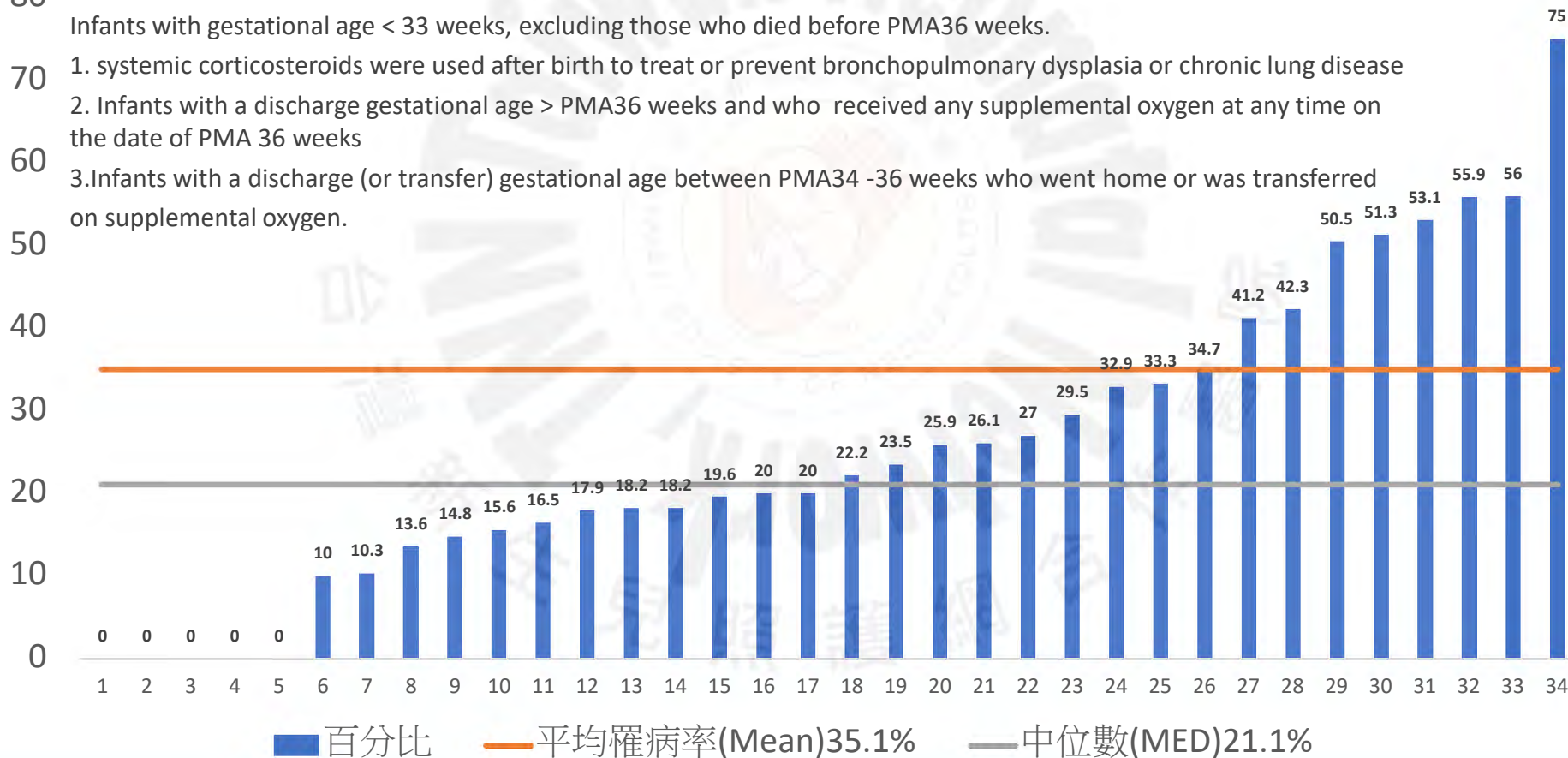
100 (%)

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.

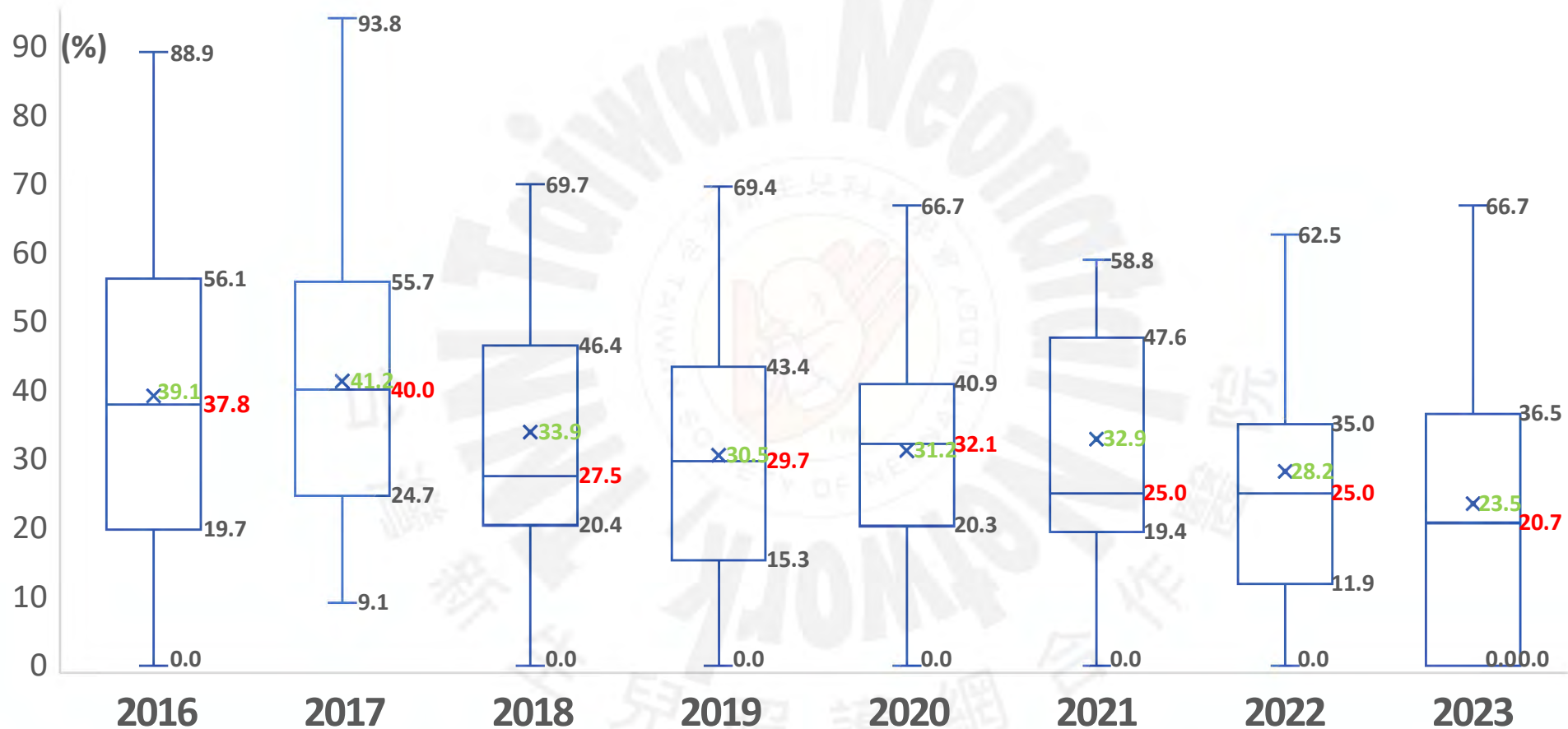


*NO.34醫院僅有2021、2023年度資料(Hospital No.34 only have data for the years 2021 and 2023)
NO.9、18醫院僅有2022-2023年度資料(Hospital No. 9、18 only have data for the years 2022-2023)
NO.4、5、6醫院僅有2023年度資料(Hospital No. 4、5、6 only have data for the years 2023)

各年度Chronic Lung Disease<33wks罹病率

—中位數(MED)

x平均數(Mean)



2016-2023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)

2021-2023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

100(%)

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 \geq 第三級

第三級：腦室出血且心室擴張

第四級：腦實質內出血

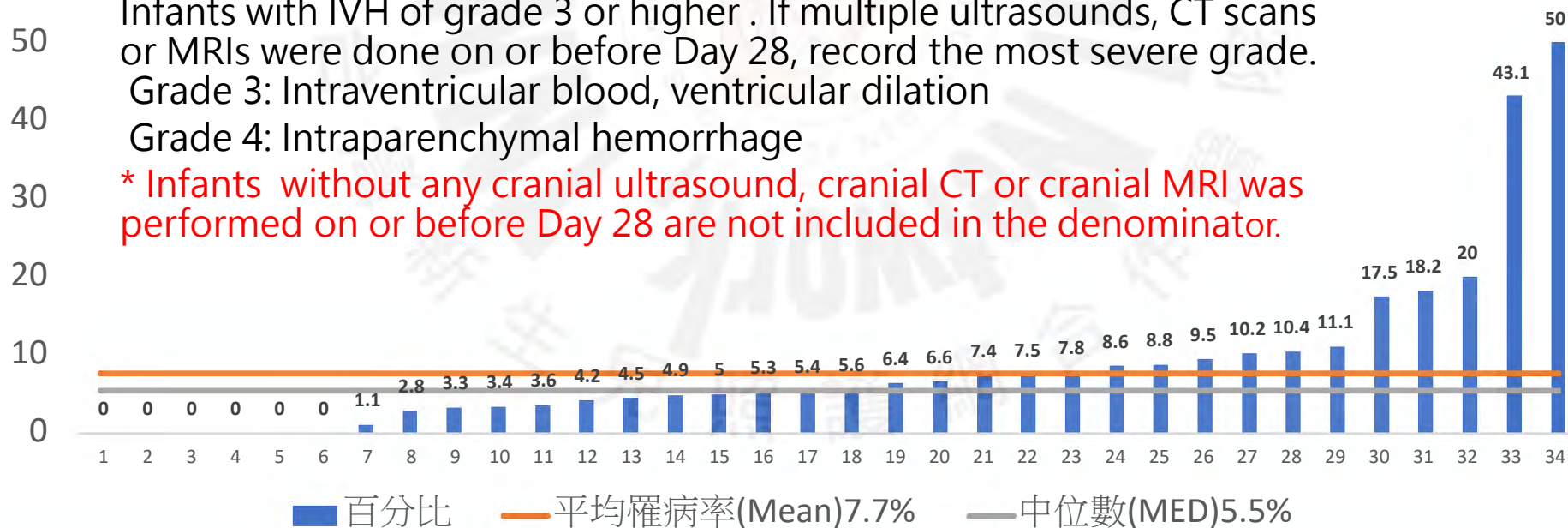
*未曾進行腦部超音波、腦部斷層掃描(cranial CT)或腦部核磁共振(cranial MRI)的個案，不納入分母統計。

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.

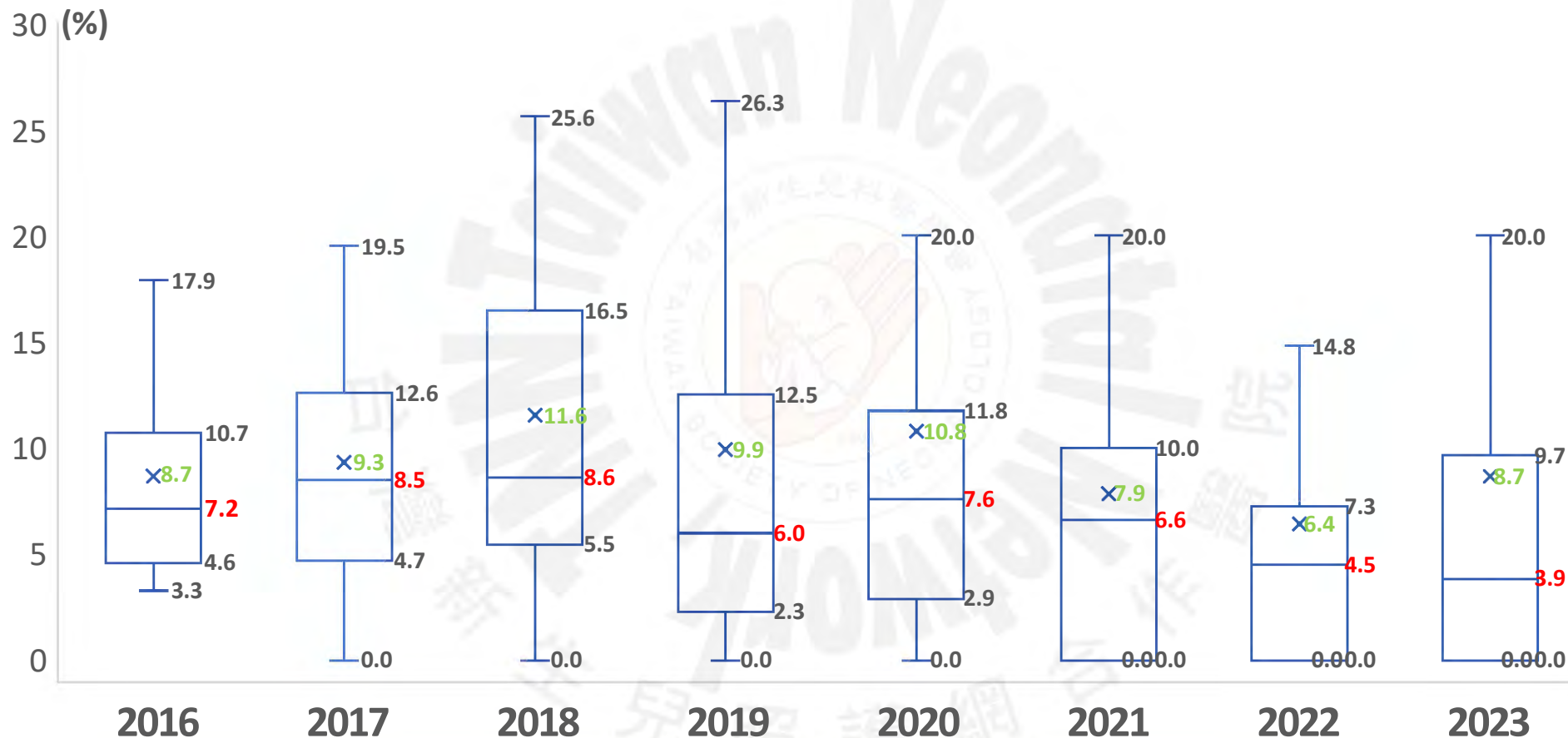


*NO.2醫院僅有2021、2023年度資料(Hospital No.2 only have data for the years 2021 and 2023)
NO.4、8醫院僅有2022-2023年度資料(Hospital No.4、8 only have data for the years 2022-2023)
NO.5、6、34醫院僅有2023年度資料(Hospital No.5、6、34 only have data for the years 2023)

各年度Severe IVH罹病率

—中位數(MED)

x平均數(Mean)



2016-2023年(Severe IVH)

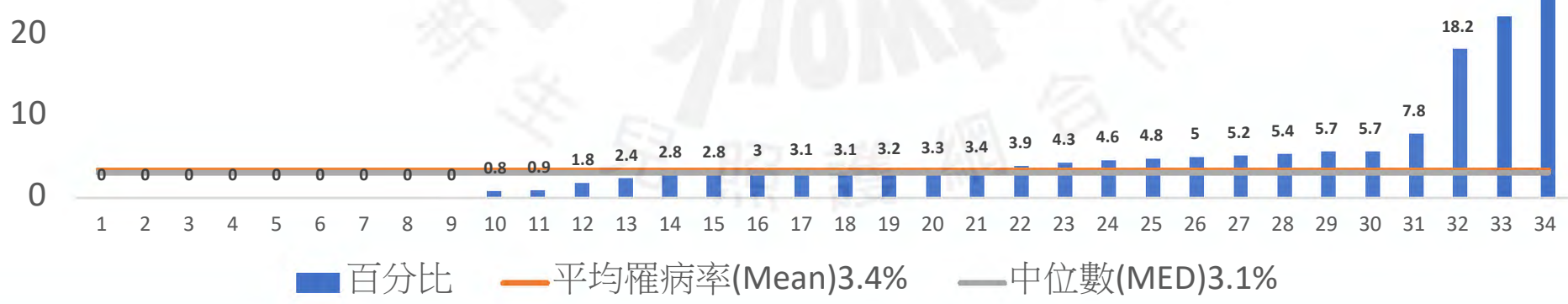
個案腦部攝影診斷發現嚴重級數的腦室周圍與腦室內出血

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

2021-2023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

100 (%)

- 90 個案住院期間經腦部超音波、腦部斷層掃描(cranial CT)或腦部核磁共振(cranial MRI)發現腦部有此病變。
- *在超音波檢查下，有「強度回音區」的變化但並無發現囊泡，則不可視為囊泡狀腦室周圍白質軟化(Cystic PVL)。
- 80 *在前腦實質內出血區域所發生的穿孔性腦病變(porencephalic cyst)不可視為囊泡狀腦室周圍白質軟化(Cystic PVL)。
- *腦部斷層掃描(cranial CT)或腦部核磁共振(cranial MRI)所發現的腦室先天異常不可視為囊泡狀腦室周圍白質軟化(Cystic PVL)，除非影像中發現許多小的囊泡
- 70 *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。
- 60 The infant has evidence of cystic periventricular leukomalacia on a Cranial Ultrasound, CT, or MRI scan obtained at any time.
- 50 *Periventricular echogenicity on ultrasound without cysts should not be coded as cystic periventricular leukomalacia.
- 40 * A porencephalic cyst in the area of previously identified intraparenchymal hemorrhage should not be coded as cystic periventricular leukomalacia.
- 30 *Periventricular abnormalities on CT or MRI should not be coded as cystic periventricular leukomalacia unless multiple small periventricular cysts are identified.
- * Infants without any cranial ultrasound, cranial CT or cranial MRI was performed on or before *Day 28 are not included in the denominator.

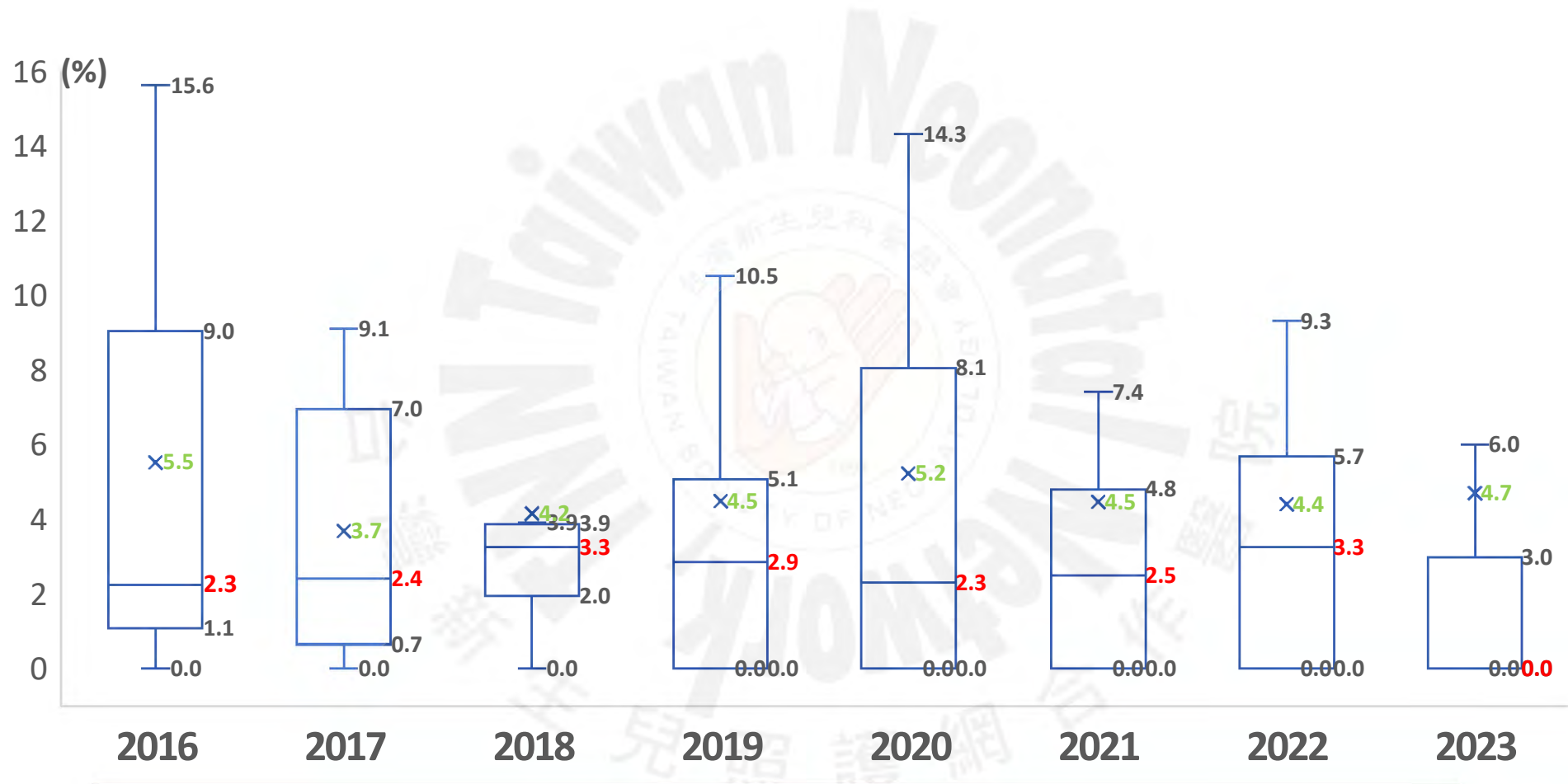


*NO.34醫院僅有2021、2023年度資料(Hospital No.34 only have data for the years 2021 and 2023)
 NO.6、15醫院僅有2022-2023年度資料(Hospital No.6、15 only have data for the years 2022-2023)
 NO.7、8、9醫院僅有2023年度資料(Hospital NO.7、8、9 only have data for the years 2023)

各年度Cystic PVL罹病率

—中位數(MED)

x平均數(Mean)



2016-2023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)

2021-2023年(NEC) 參與TNN各院個案診斷壞死性腸炎

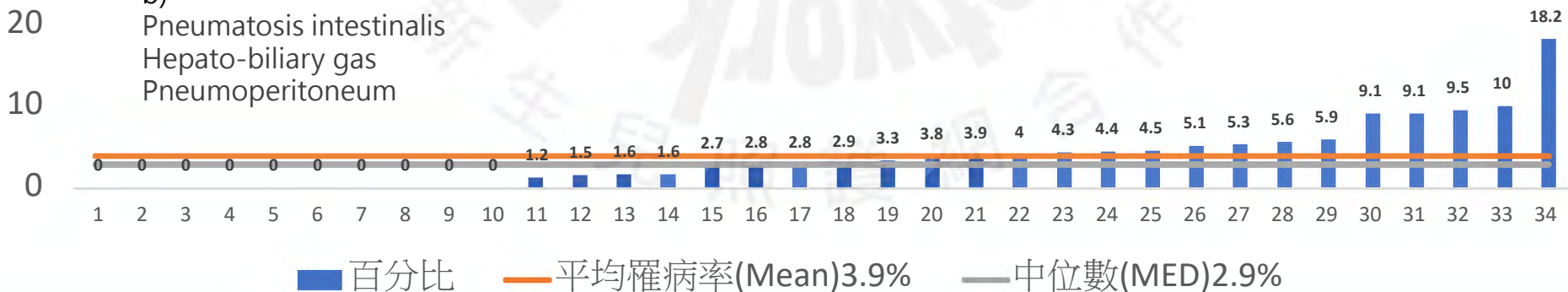
100(%)

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

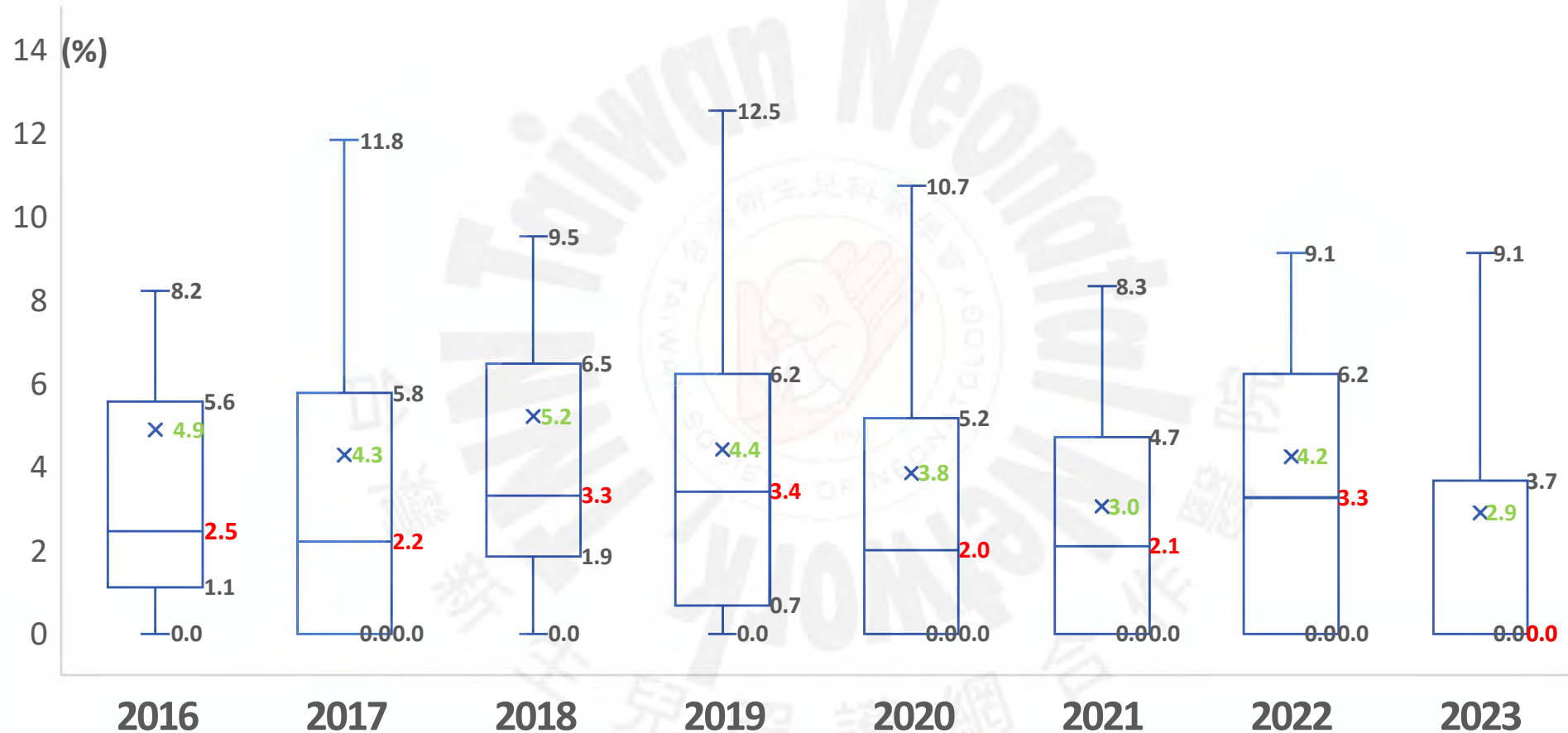


*NO.5醫院僅有2021、2023年度資料(Hospital No.5 only have data for the years 2021 and 2023)
 NO.15、30醫院僅有2022-2023年度資料(Hospital No.15、30 only have data for the years 2022-2023)
 NO.9、10、31醫院僅有2023年度資料(Hospital No.9、10、31 only have data for the years 2023)

各年度NEC罹病率

—中位數(MED)

x平均數(Mean)



2016-2023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)

2021-2023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

100 (%)

90

80

70

60

50

40

30

20

10

0

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 \geq 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

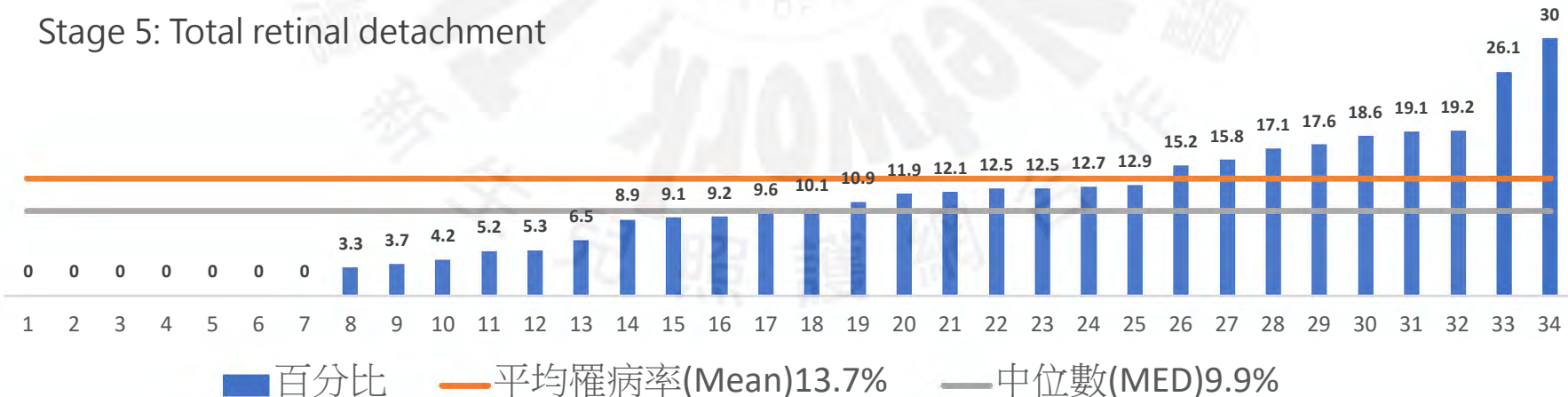
級數5：視網膜完全剝離

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

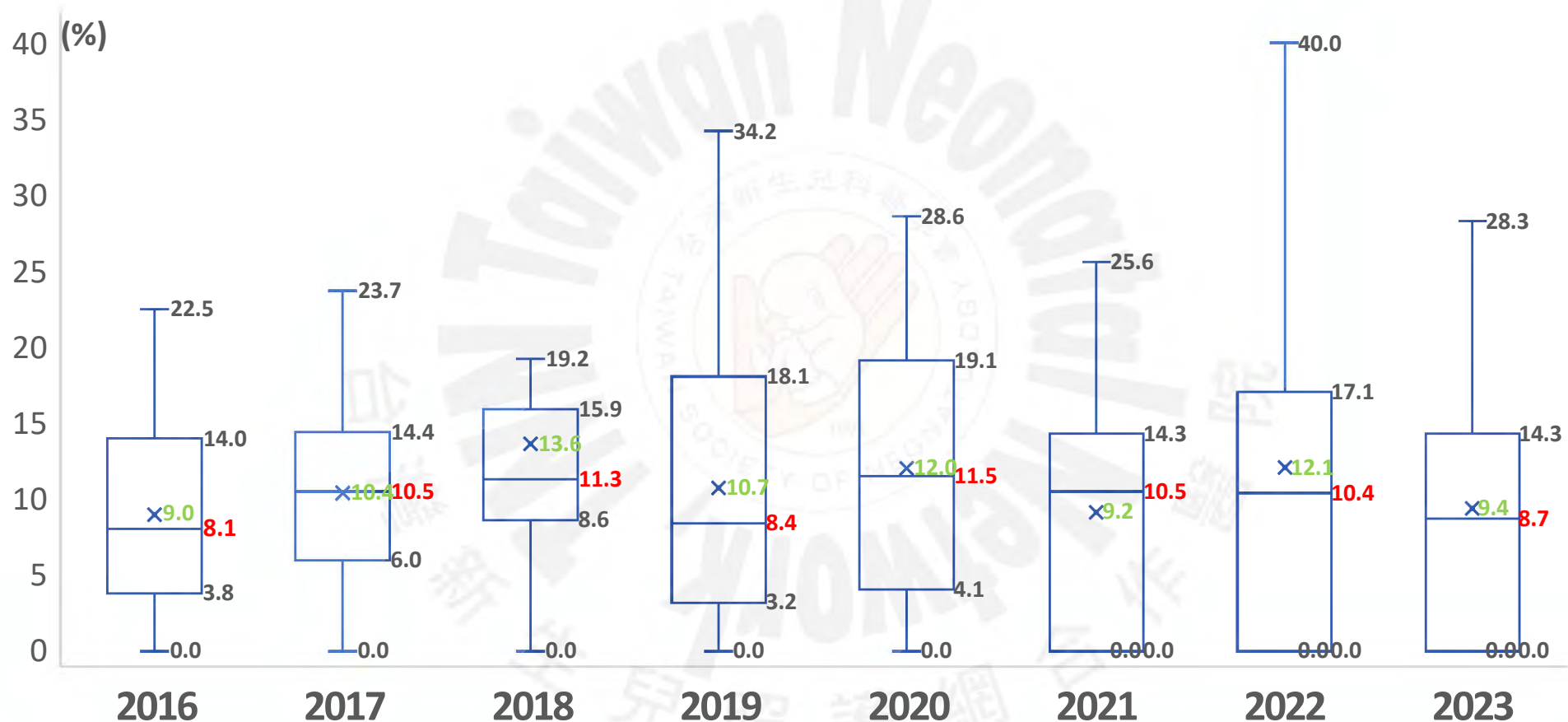


*NO.5醫院僅有2021、2023年度資料(Hospital No.35 only have data for the years 2021 and 2023)
 NO.6、34醫院僅有2022-2023年度資料(Hospital No.6、34 only have data for the years 2022-2023)
 NO.7、15、23醫院僅有2023年度資料(Hospital No.7、15、23 only have data for the years 2023)

各年度Severe ROP罹病率

—中位數(MED)

x平均數(Mean)



2016-2023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)

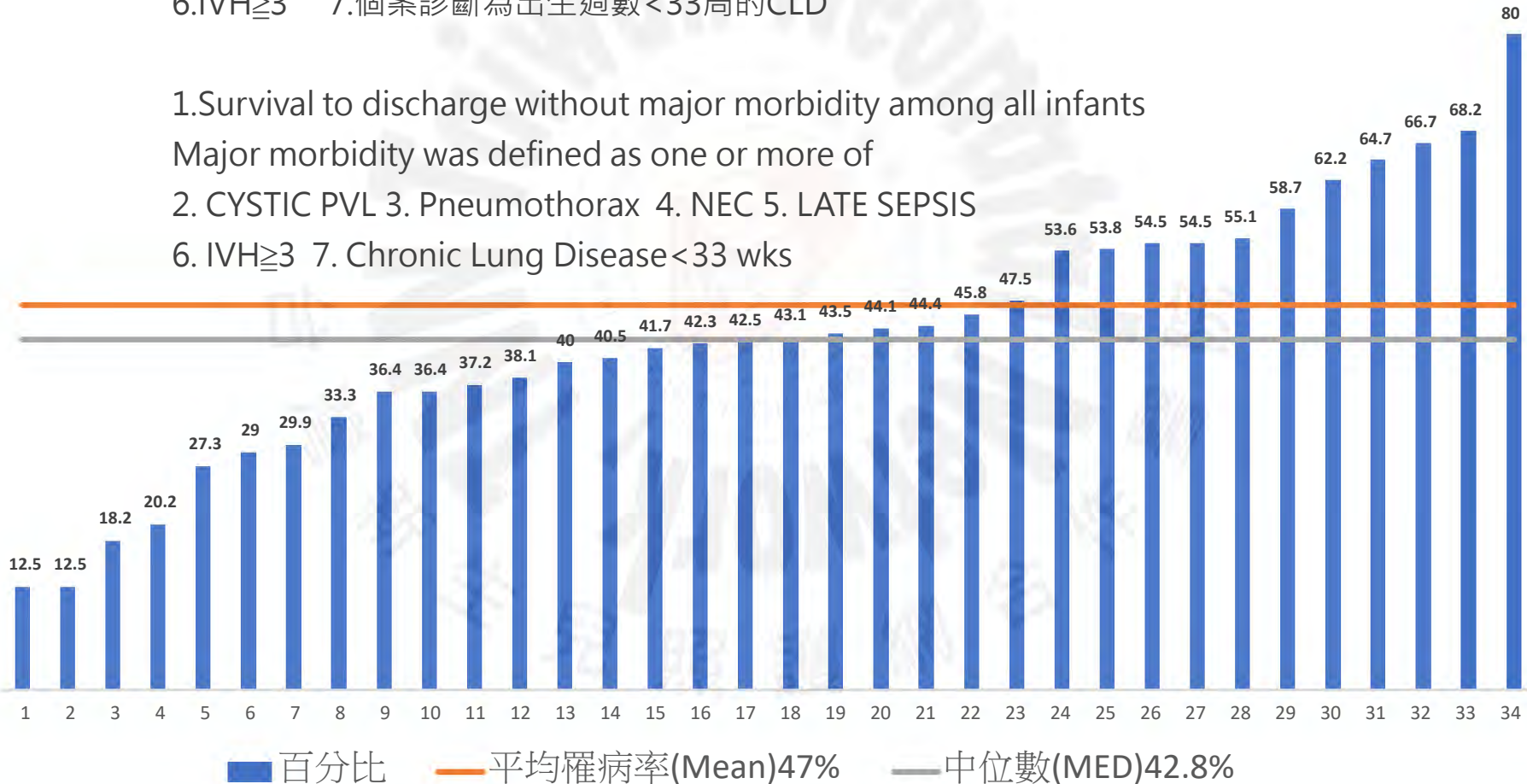
2021-2023年(Death or Morbidity) 參與TNN各院死亡率與罹病率

100 (%)

個案

- 1.首次出院狀況為死亡 2.CYSTIC PVL 3.氣胸 4.NEC 5.LATE SEPSIS
6.IVH \geq 3 7.個案診斷為出生週數<33周的CLD

- 1.Survival to discharge without major morbidity among all infants
Major morbidity was defined as one or more of
2. CYSTIC PVL 3. Pneumothorax 4. NEC 5. LATE SEPSIS
6. IVH \geq 3 7. Chronic Lung Disease<33 wks

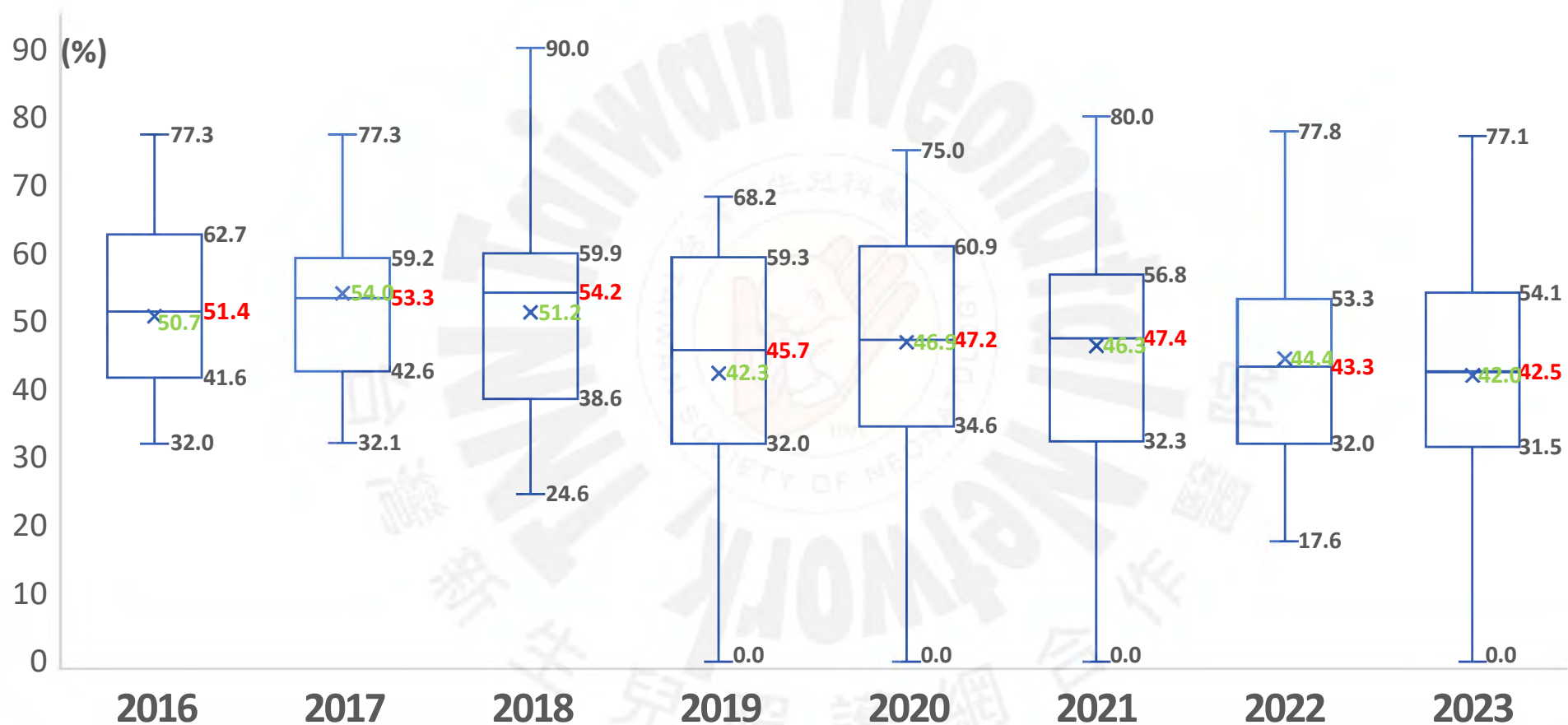


*NO.34醫院僅有2021、2023年度資料(Hospital No.34 only have data for the years 2021 and 2023)
NO.10、14醫院僅有2022-2023年度資料(Hospital No.10、14 only have data for the years 2022-2023)
NO.3、5、32醫院僅有2023年度資料(Hospital No.3、5、32 only have data for the years 2023)

各年度Death or Morbidity發生率

—中位數(MED)

x平均數(Mean)



2016-2023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 2021-2023: Procedures and Interventions



AT BIRTH



KEY PERFORMANCE
MEASURES

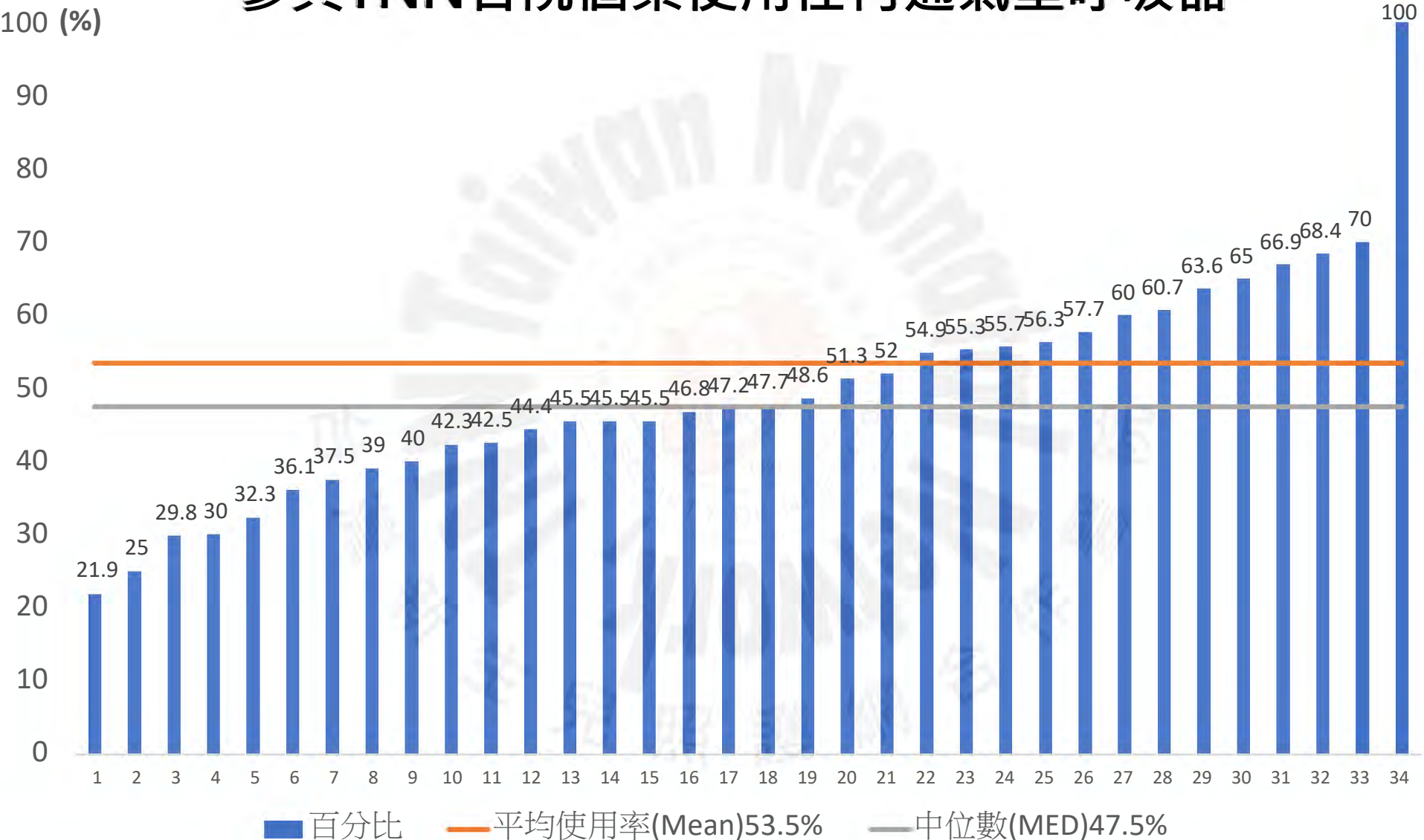


PROCEDURES AND
INTERVENTIONS



AT DISCHARGE
HOME

2021-2023年(Any ventilation) 參與TNN各院個案使用任何通氣型呼吸器

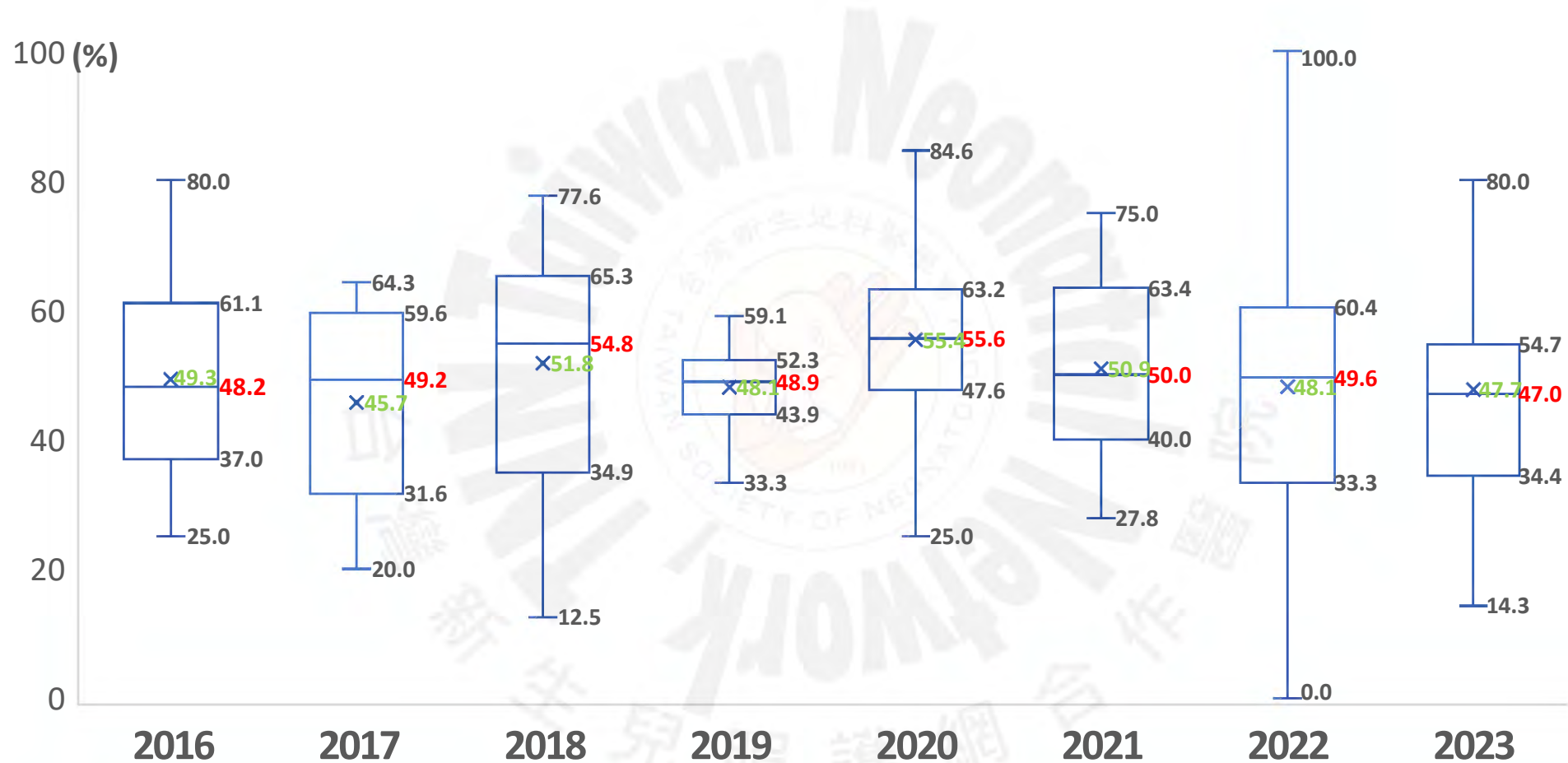


*NO.27醫院僅有2021、2023年度資料(Hospital No.27 only have data for the years 2021 and 2023)
 NO.14、17醫院僅有2022-2023年度資料(Hospital No.14、17 only have data for the years 2022-2023)
 NO.15、33、34醫院僅有2023年度資料(Hospital No.15、33、34 only have data for the years 2023)

各年度Any ventilation使用率

—中位數(MED)

x平均數(Mean)

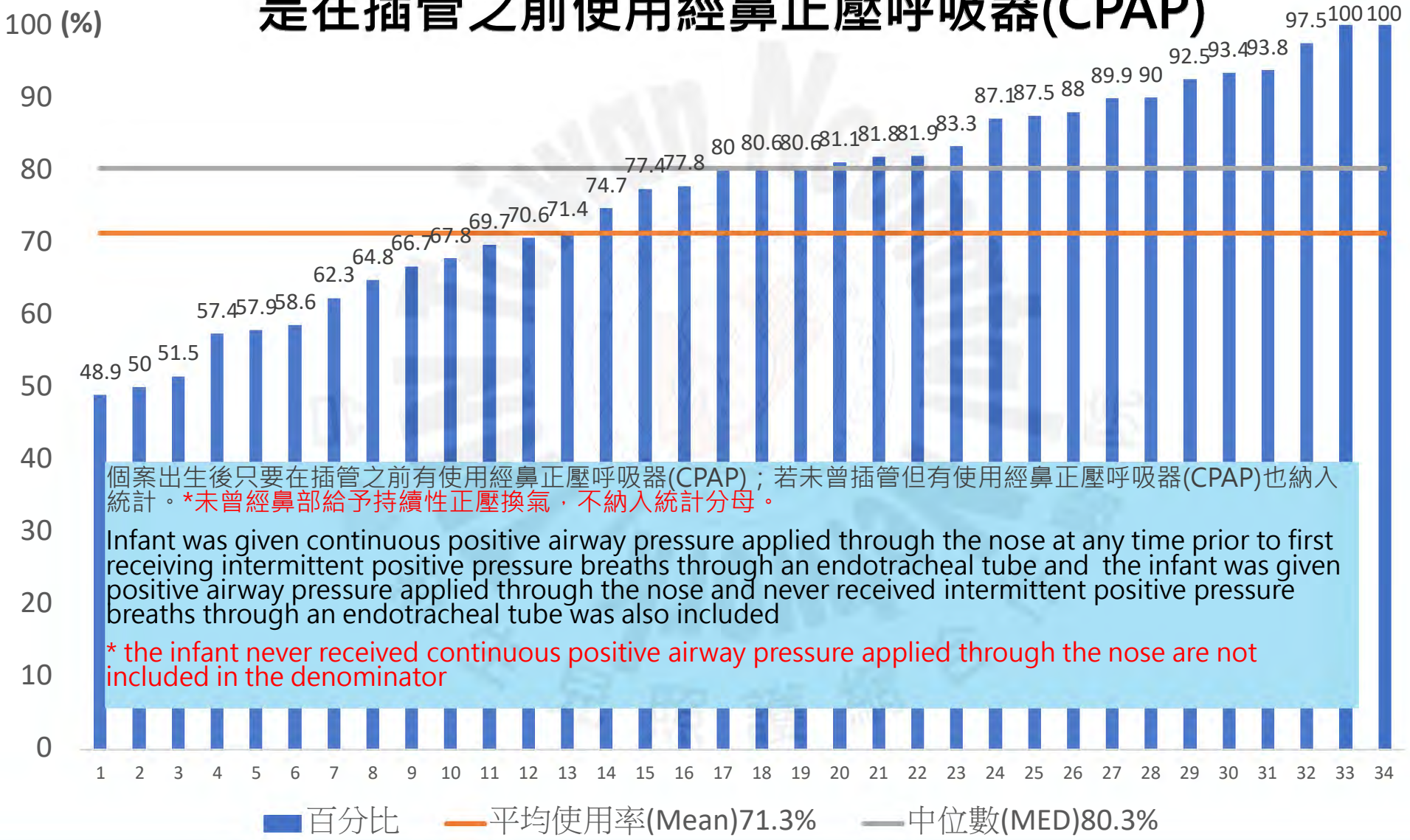


2016-2023年(Any ventilation)個案使用任何通氣型呼吸器

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

2021-2023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)

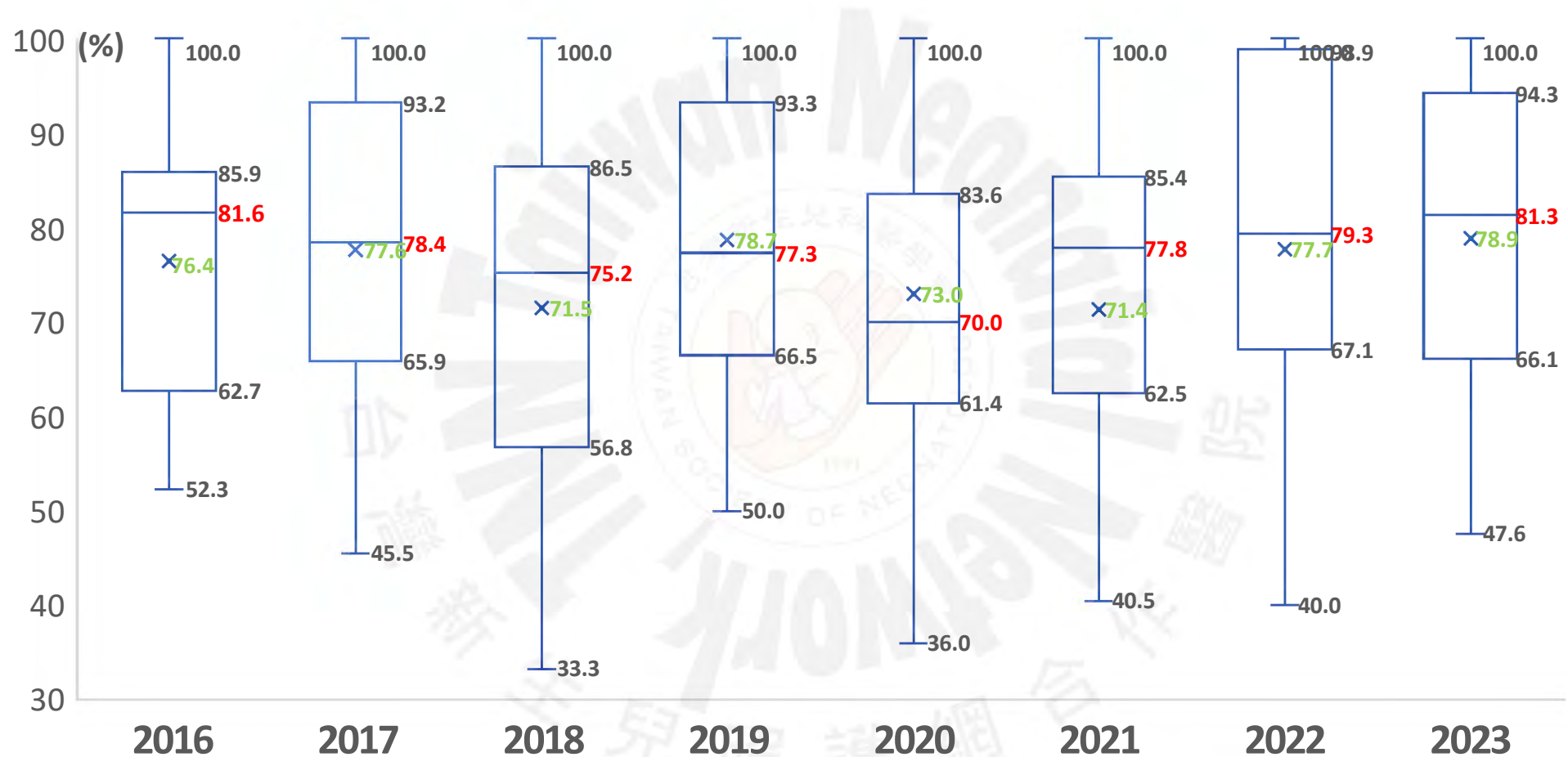


*NO.9醫院僅有2021、2023年度資料(Hospital No.9only have data for the years 2021 and 2023)
NO.28、31醫院僅有2022-2023年度資料(Hospital No.28、31only have data for the years 2022-2023)
NO.2、21、34醫院僅有2023年度資料(Hospital No.2、21、34only have data for the years 2023)

各年度Nasal CPAP before ETT Ventilation使用率

—中位數(MED)

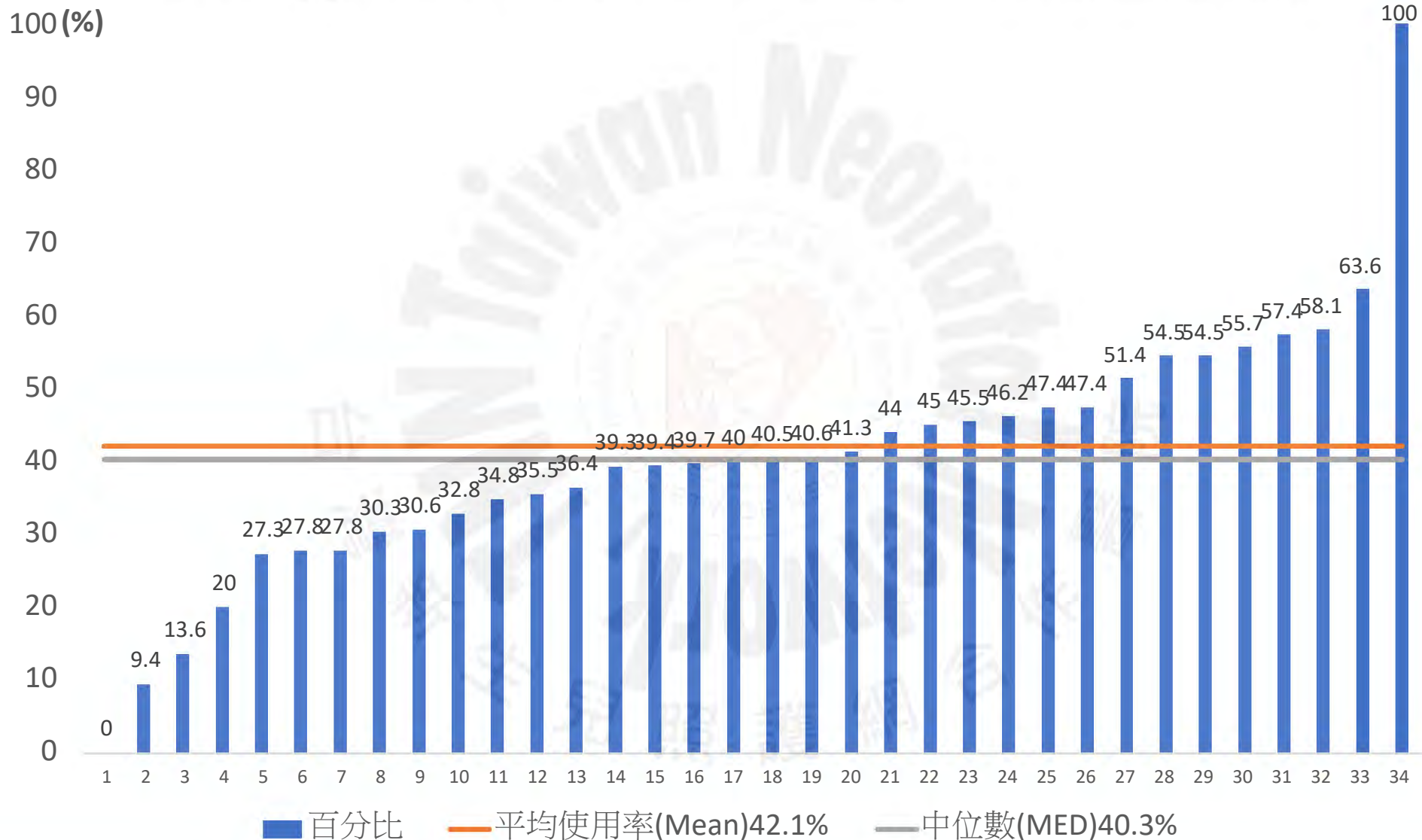
x平均數(Mean)



2016-2023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)

2021-2023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

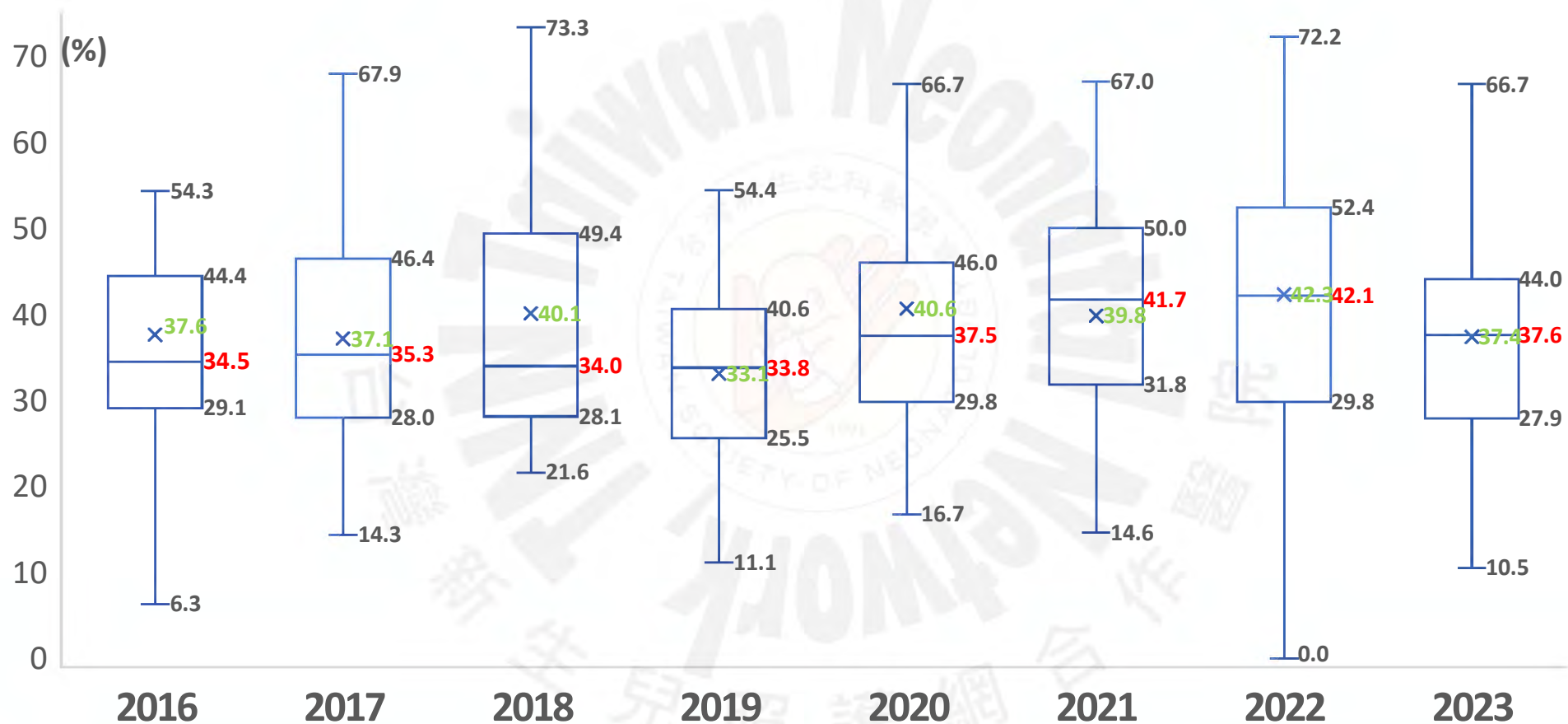


*NO.17醫院僅有2021、2023年度資料(Hospital No.17 only have data for the years 2021 and 2023)
 NO.27、29醫院僅有2022-2023年度資料(Hospital No.27、29 only have data for the years 2022-2023)
 NO.17、33、34醫院僅有2023年度資料(Hospital No. 17、33、34 only have data for the years 2023)

各年度Surfactant使用率

—中位數(MED)

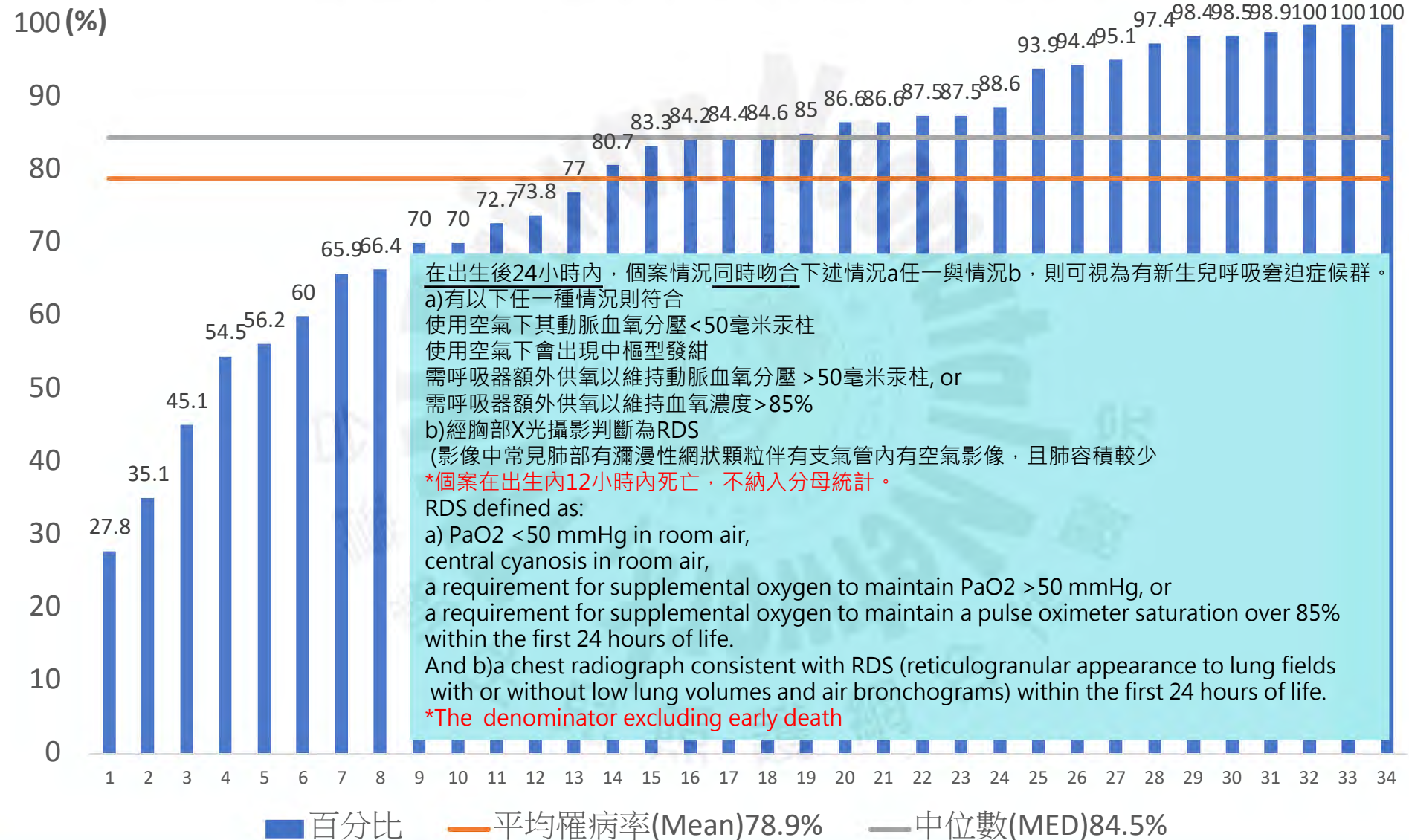
x平均數(Mean)



2016-2023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)

2021-2023年參與TNN各院個案 診斷有新生兒呼吸窘迫症候群(RDS)

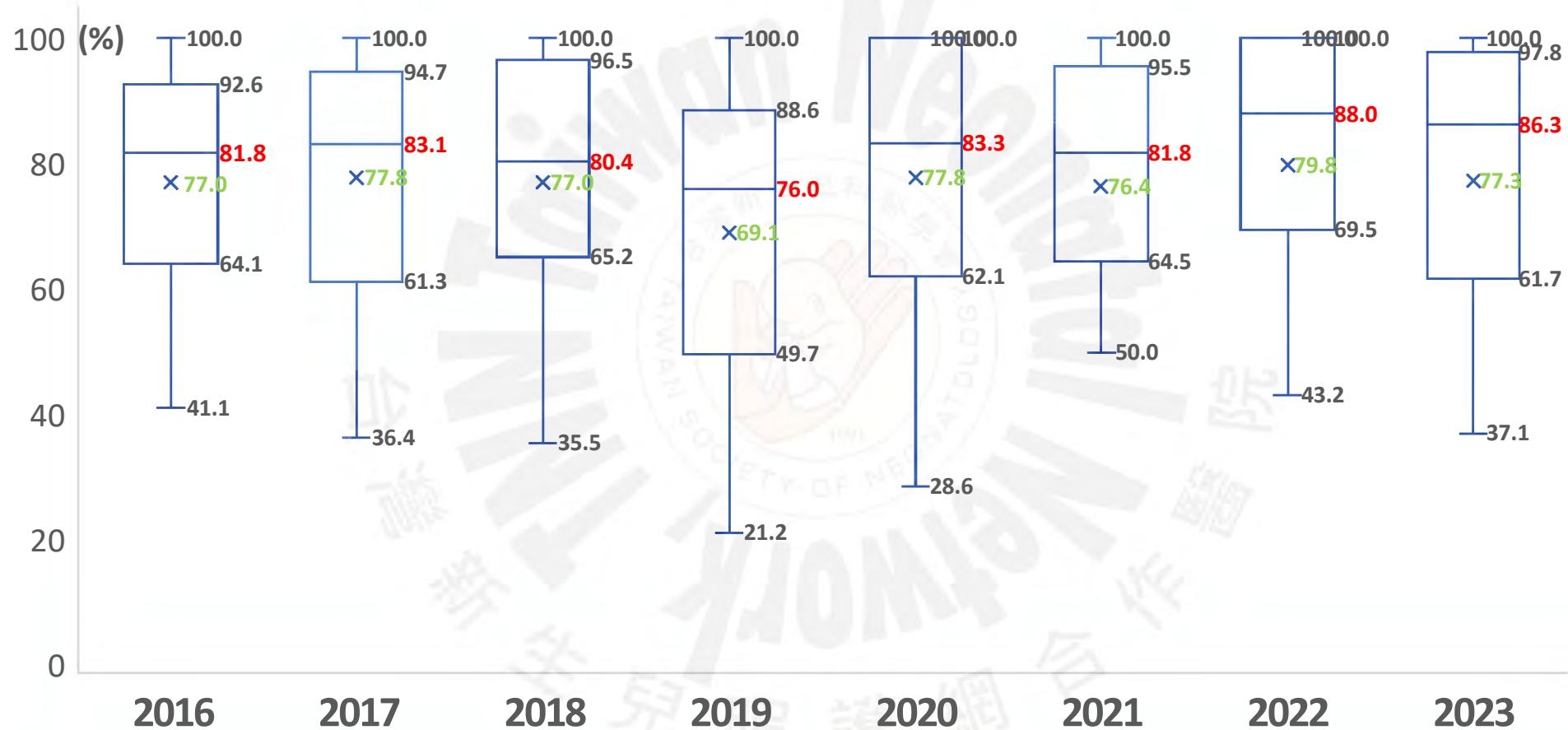


*NO.6醫院僅有2021、2023年度資料(Hospital No.6only have data for the years 2021 and 2023)
 NO.26、32醫院僅有2022-2023年度資料(Hospital No.26、32 only have data for the years 2022-2023)
 NO.4、33、34醫院僅有2023年度資料(Hospital No.4、33、34only have data for the years 2023)

各年度RDS罹病率

—中位數(MED)

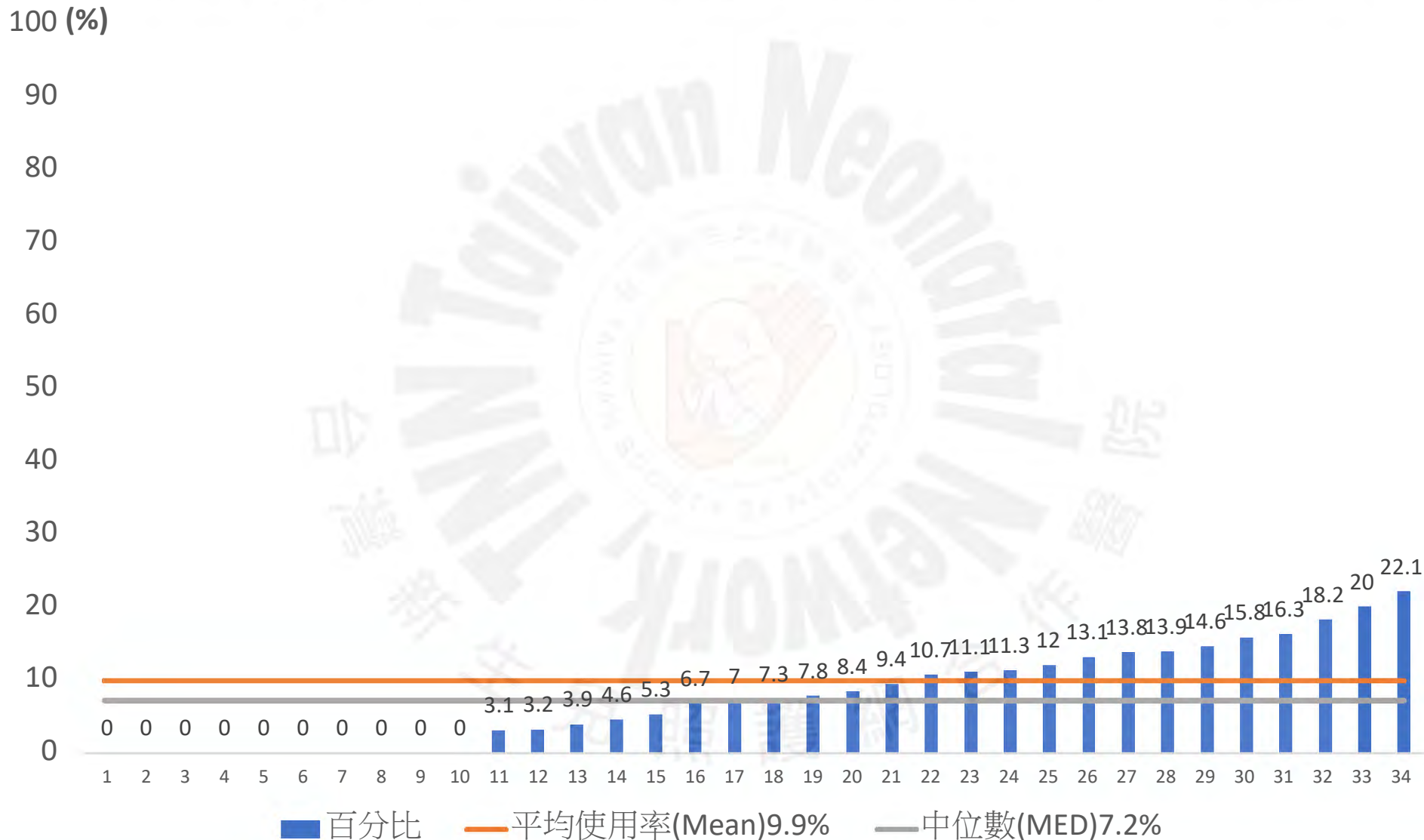
x平均數(Mean)



2016-2023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)

2021-2023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

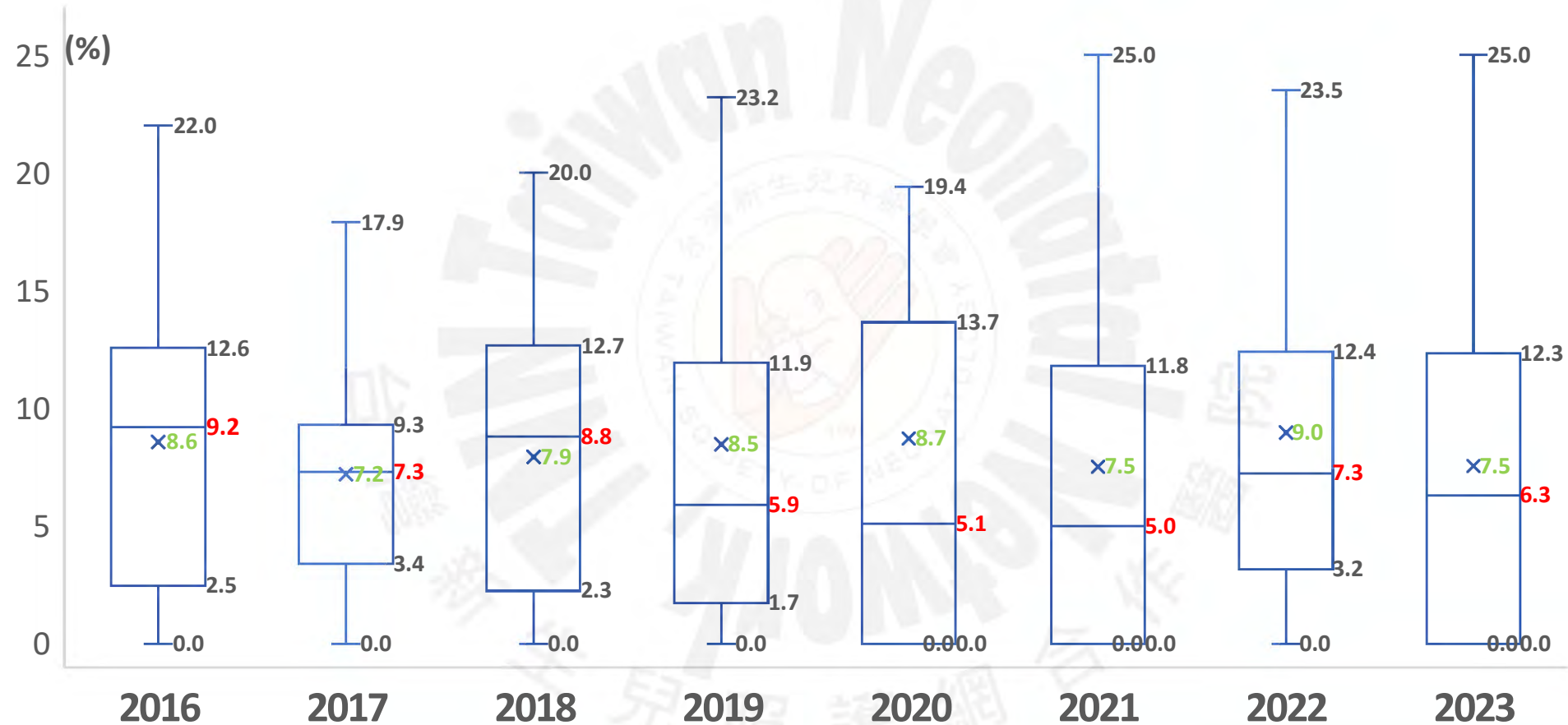


*NO.6醫院僅有2021、2023年度資料(Hospital No.6only have data for the years 2021 and 2023)
 NO.23、32醫院僅有2022-2023年度資料(Hospital No.23、32 only have data for the years 2022-2023)
 NO.8、9、10醫院僅有2023年度資料(Hospital No. 8、9、10only have data for the years 2023)

各年度Inhaled Nitric Oxide使用率

—中位數(MED)

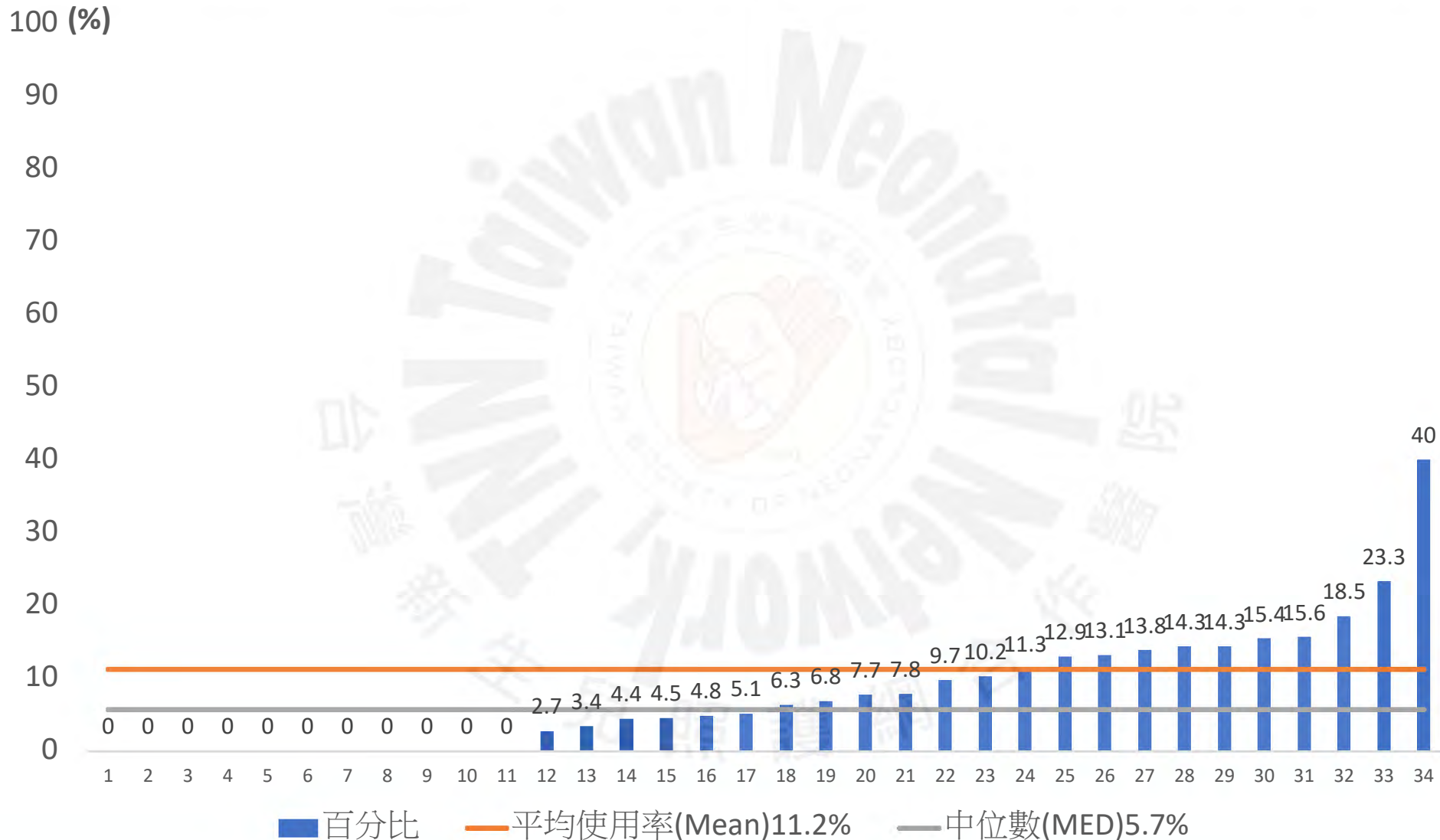
x平均數(Mean)



2016-2023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)

2021-2023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

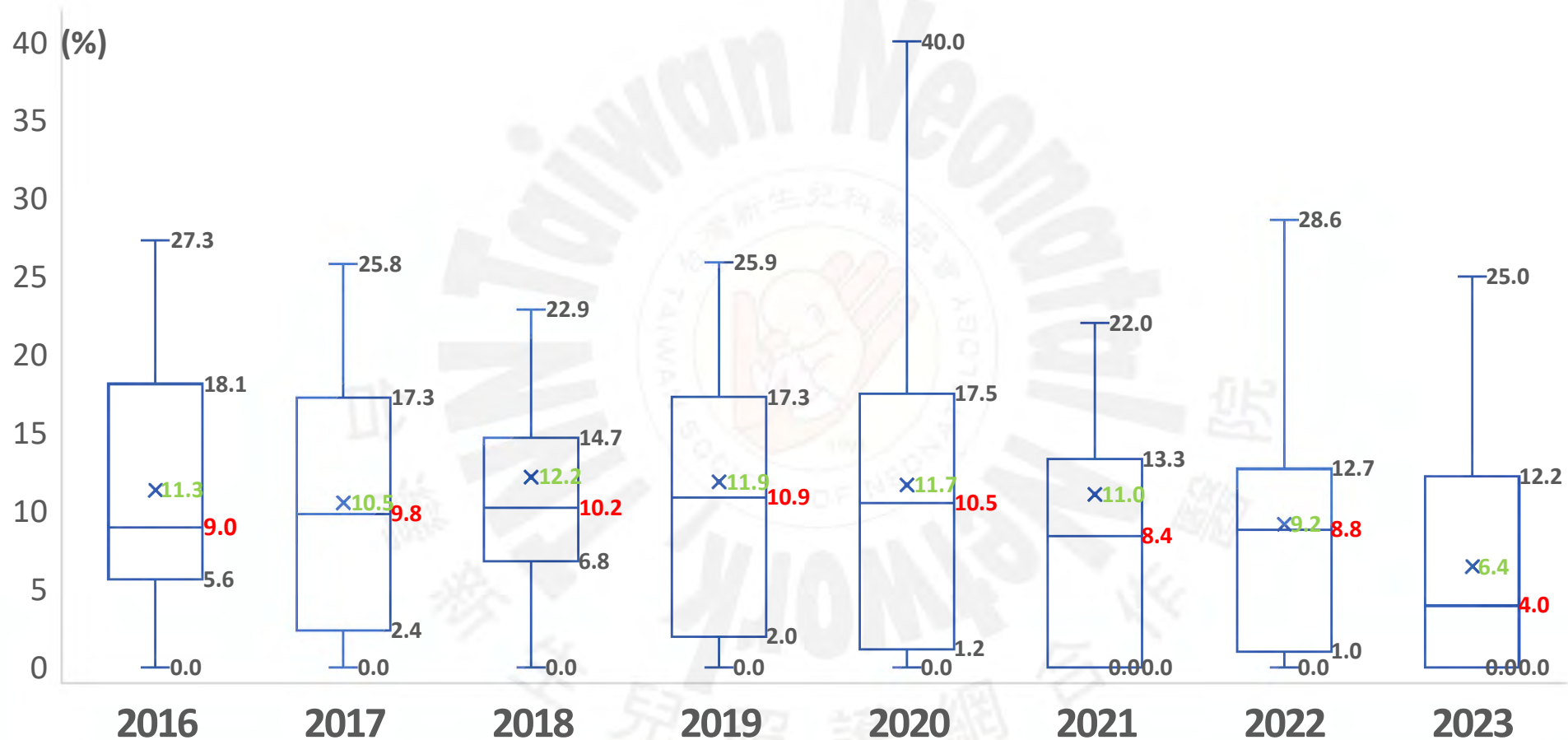


*NO.34醫院僅有2021、2023年度資料(Hospital No.34 only have data for the years 2021 and 2023)
 NO.8、12醫院僅有2022-2023年度資料(Hospital No.8、12 only have data for the years 2022-2023)
 NO.9、10、11醫院僅有2023年度資料(Hospital No.9、10、11 only have data for the years 2023)

各年度PDA Ligation使用率

—中位數(MED)

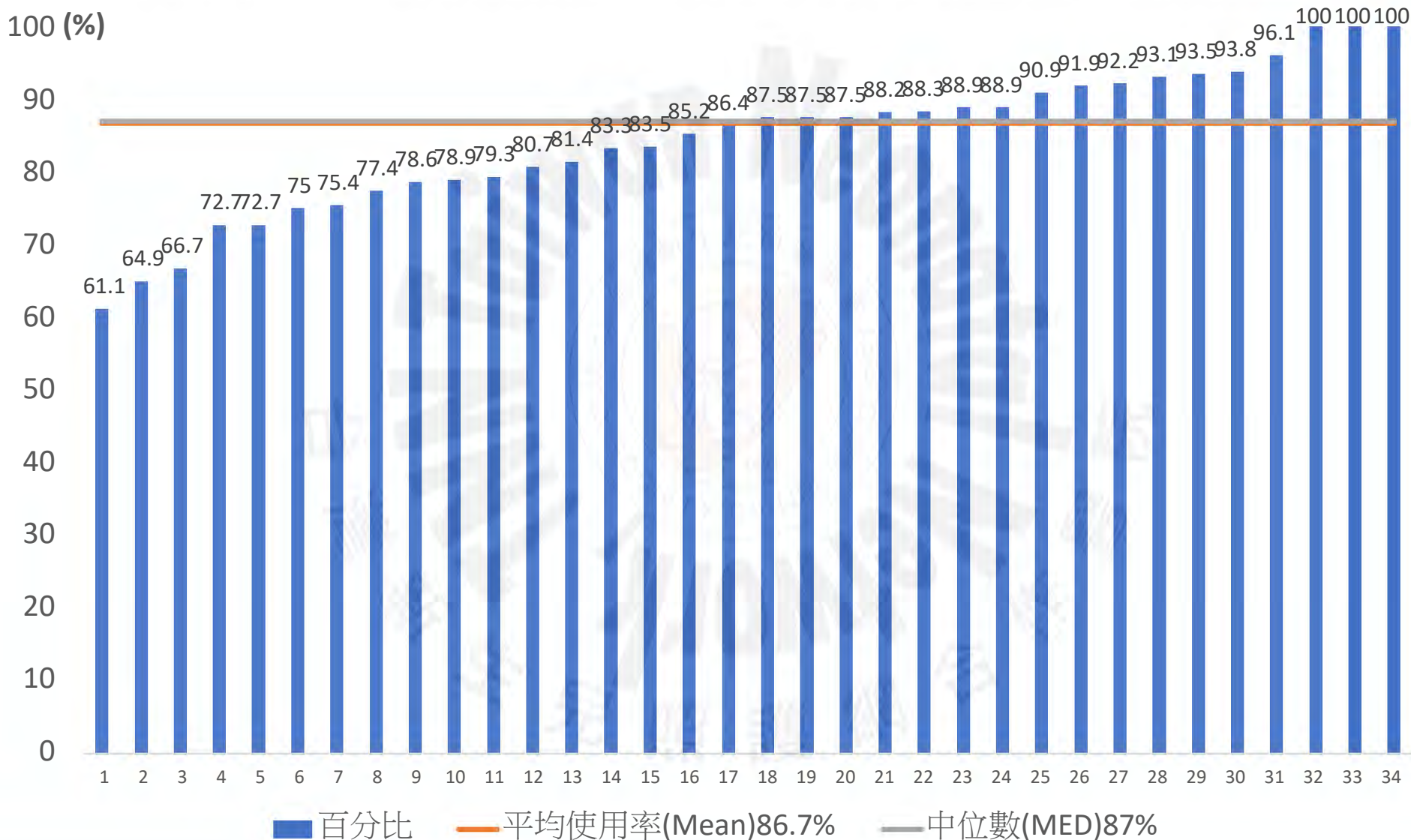
x平均數(Mean)



2016-2023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)

2021-2023年(Any ROP Exam) 參與TNN各院個案入院期間曾行視網膜眼底檢查

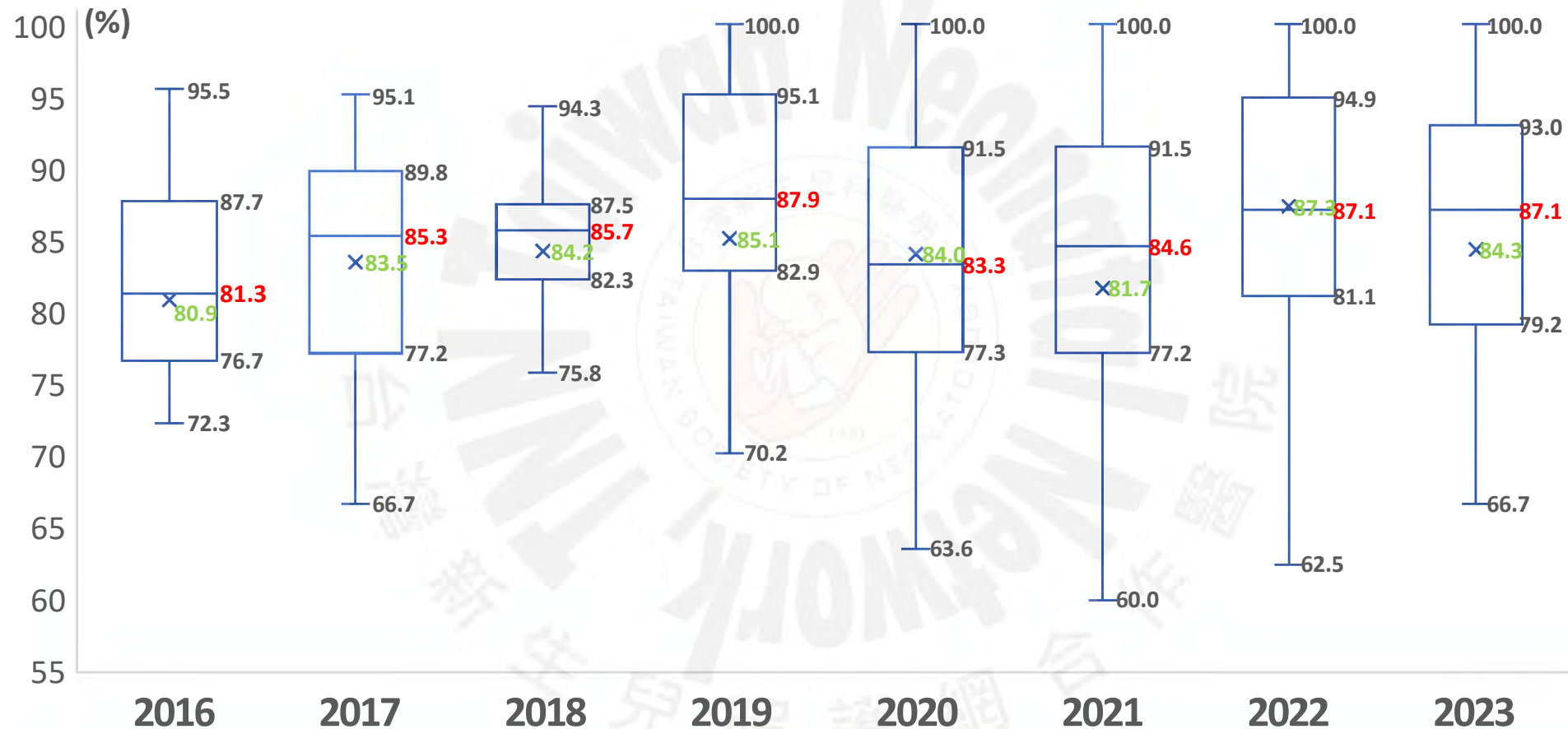


*NO.33醫院僅有2021、2023年度資料(Hospital No.33only have data for the years 2021 and 2023)
 NO.2、25醫院僅有2022-2023年度資料(Hospital No.2、25only have data for the years 2022-2023)
 NO.3、5、34醫院僅有2023年度資料(Hospital No.3、5、34only have data for the years 2023)

各年度Any ROP Exam執行率

—中位數(MED)

x平均數(Mean)



2016-2023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)

2021-2023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

100 (%)

90

80

70

60

50

40

30

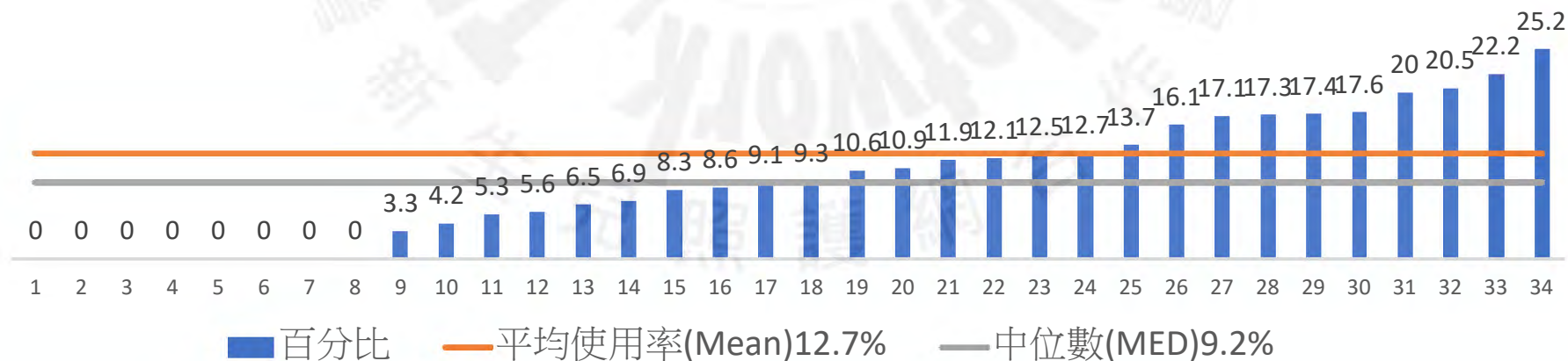
20

10

0

不論單眼注射或雙眼注射，個案曾以癌思停(Avastin)或其他抗血管內皮細胞生長因子 (Anti-VEGF)治療早產兒視網膜病變(ROP)

The infant received bevacizumab (Avastin) or other anti-vascular endothelial growth factor (Anti-VEGF) drug in one or both eyes for the treatment of retinopathy of prematurity (ROP).

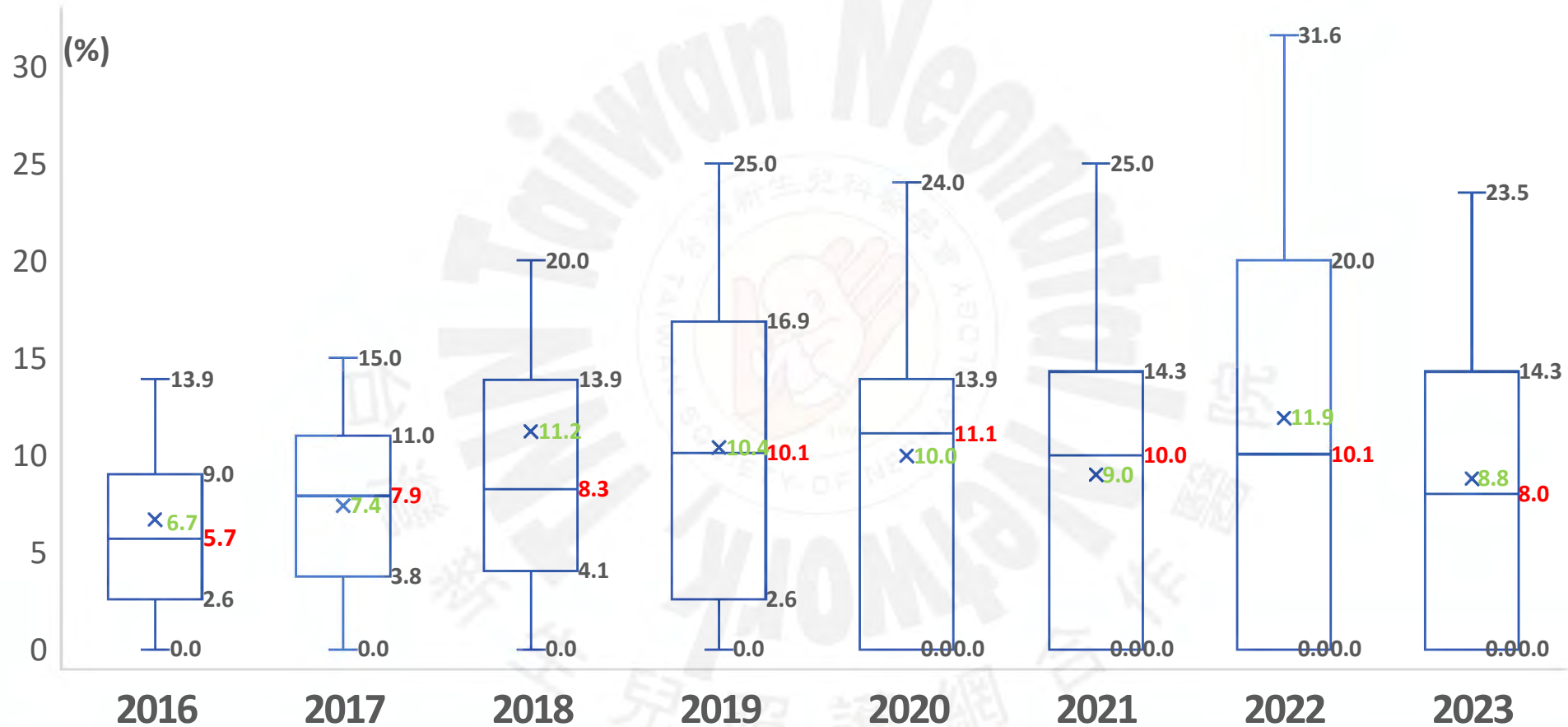


*NO.5醫院僅有2021、2023年度資料(Hospital No.5only have data for the years 2021 and 2023)
 NO.7、31醫院僅有2022-2023年度資料(Hospital No.7、31only have data for the years 2022-2023)
 NO.8、17、23醫院僅有2023年度資料(Hospital No. 8、17、23only have data for the years 2023)

各年度ANTI-VEGF使用率

—中位數(MED)

x平均數(Mean)



2016-2023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)

2021-2023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

100(%)

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.

90

80

70

60

50

40

30

20

10

0

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34

60.5

7.4

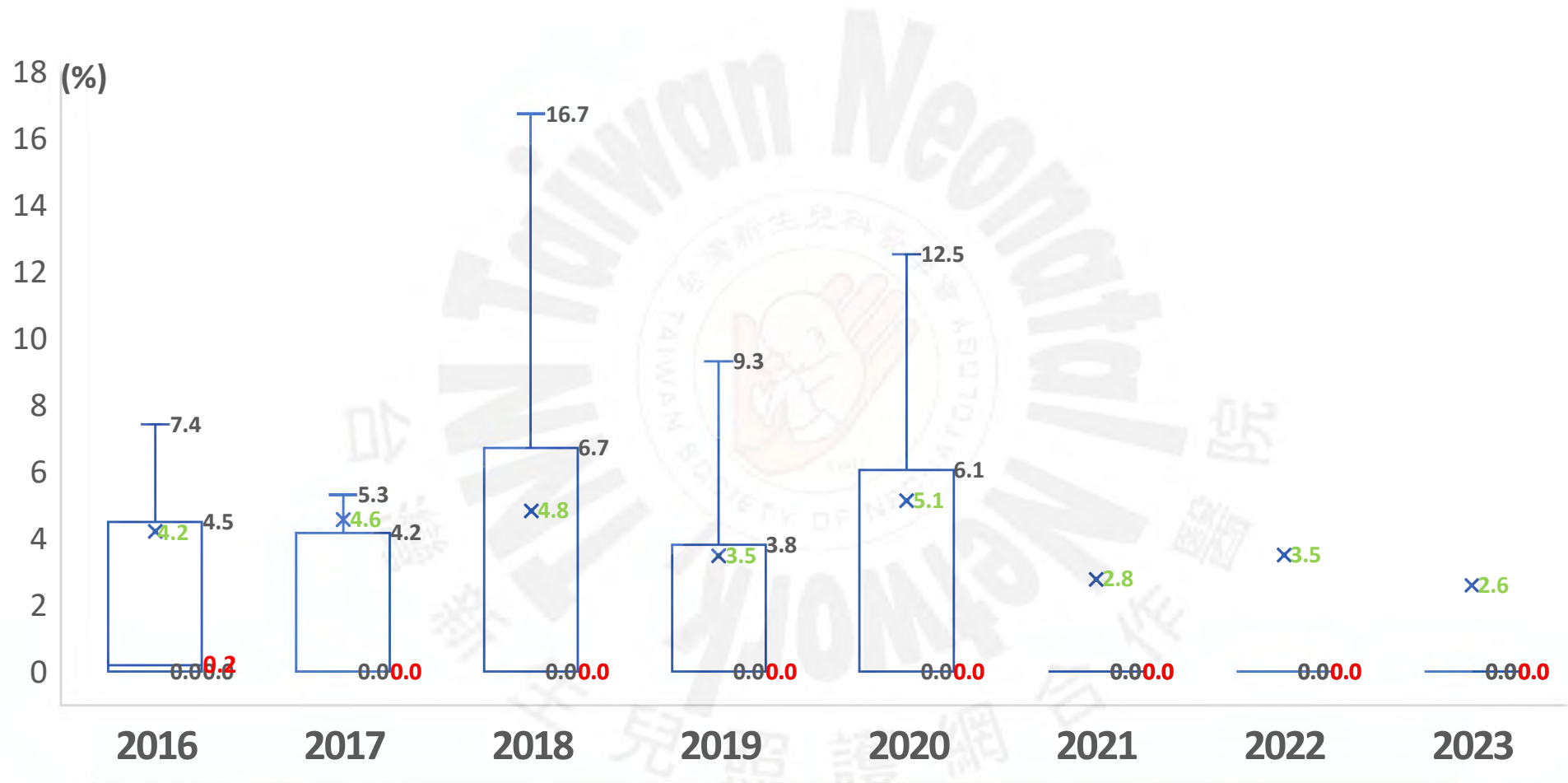
■ 百分比 — 平均使用率(Mean)3.5% — 中位數(MED)0%

*NO.16醫院僅有2021、2023年度資料(Hospital No.16 only have data for the years 2021 and 2023)
NO.19、20醫院僅有2022-2023年度資料(Hospital No.19、20 only have data for the years 2022-2023)
NO.21、22、23醫院僅有2023年度資料(Hospital No.21、22、23 only have data for the years 2023)

各年度ROP Surgery使用率

—中位數(MED)

x平均數(Mean)



2016-2023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)

2021-2023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

100(%)

90

80

70

60

50

40

30

20

10

0

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.



■ 百分比

— 平均使用率(Mean)3.6%

— 中位數(MED)2.7%

*NO.6醫院僅有2021、2023年度資料(Hospital No.6only have data for the years 2021 and 2023)

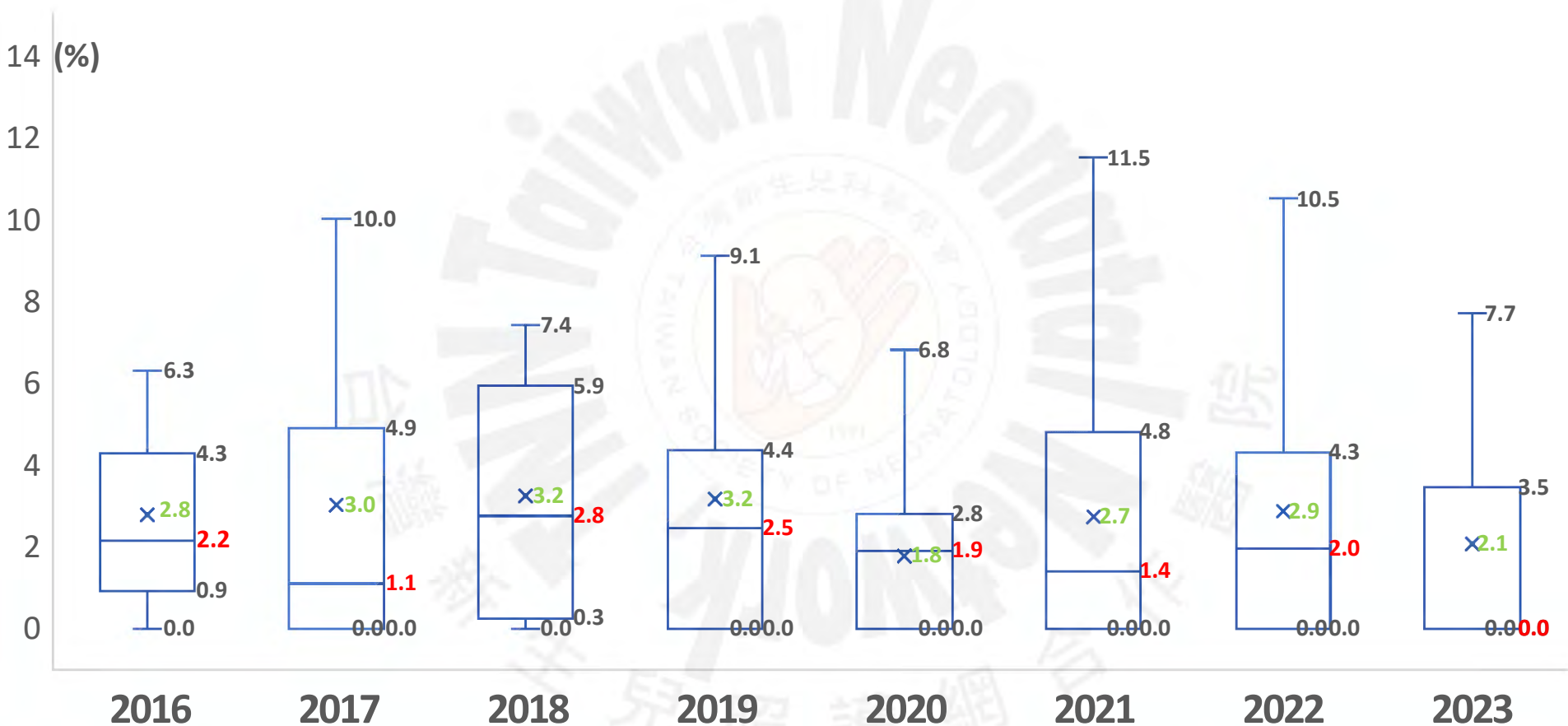
NO.10、18醫院僅有2022-2023年度資料(Hospital No.10、18only have data for the years 2022-2023)

NO.11、12、13醫院僅有2023年度資料(Hospital No.11、12、13only have data for the years 2023)

各年度NEC Surgery使用率

—中位數(MED)

x平均數(Mean)



2016-2023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)

2021-2023年(Other Surgery) 參與TNN各院個案入院期間曾行其他手術治療

100(%)

90
80
70
60
50
40
30
20
10
0

排除

- 1.開放性動脈導管結紮手術
- 2.早產兒視網膜病變手術
- 3.治療壞死性腸炎(NEC)、疑似壞死性腸炎、小腸穿孔(bowel perforation)手術外的所有手術。

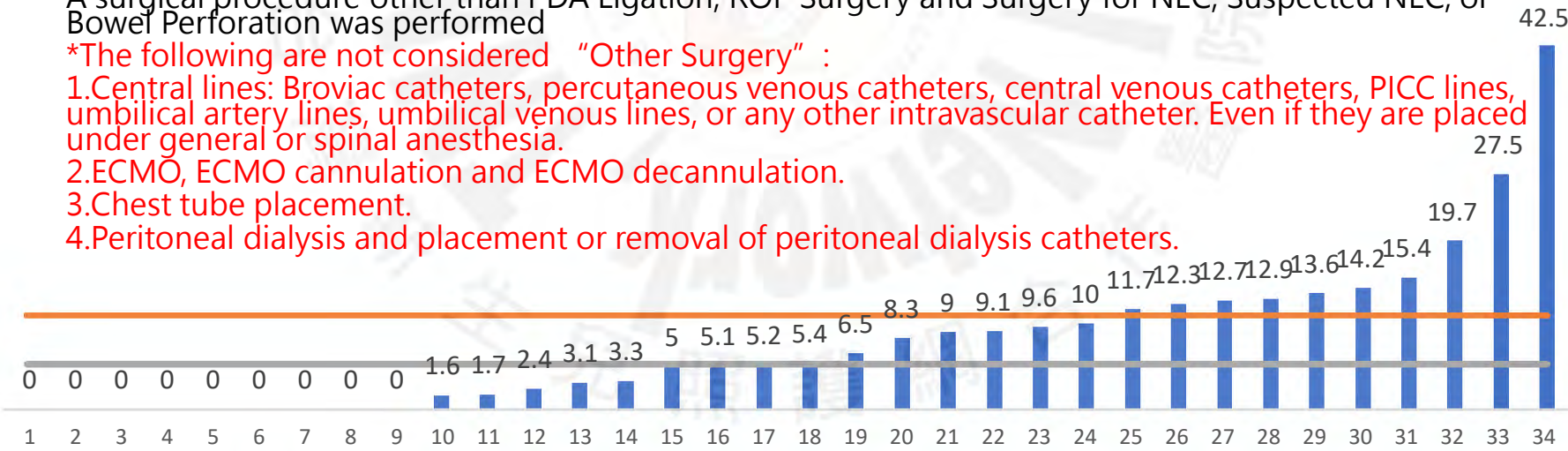
***下列情況不可視為其他手術**

- 1.中心輸液：單頭導管、經皮冠狀動脈導管、動脈輸液、臍靜脈輸液或任何血管內導管。即使某些導管在放置時需麻醉個案，但仍不可被視為手術的一種。
- 2.葉克膜(ECMO)：即使需在麻醉的情況下放置葉克膜管路，仍不可將其視為手術的一種。
- 3.胸管
- 4.腹膜透析管路的放置與移除

A surgical procedure other than PDA Ligation, ROP Surgery and Surgery for NEC, Suspected NEC, or Bowel Perforation was performed

***The following are not considered "Other Surgery" :**

- 1. Central lines: Broviac catheters, percutaneous venous catheters, central venous catheters, PICC lines, umbilical artery lines, umbilical venous lines, or any other intravascular catheter. Even if they are placed under general or spinal anesthesia.
- 2. ECMO, ECMO cannulation and ECMO decannulation.
- 3. Chest tube placement.
- 4. Peritoneal dialysis and placement or removal of peritoneal dialysis catheters.



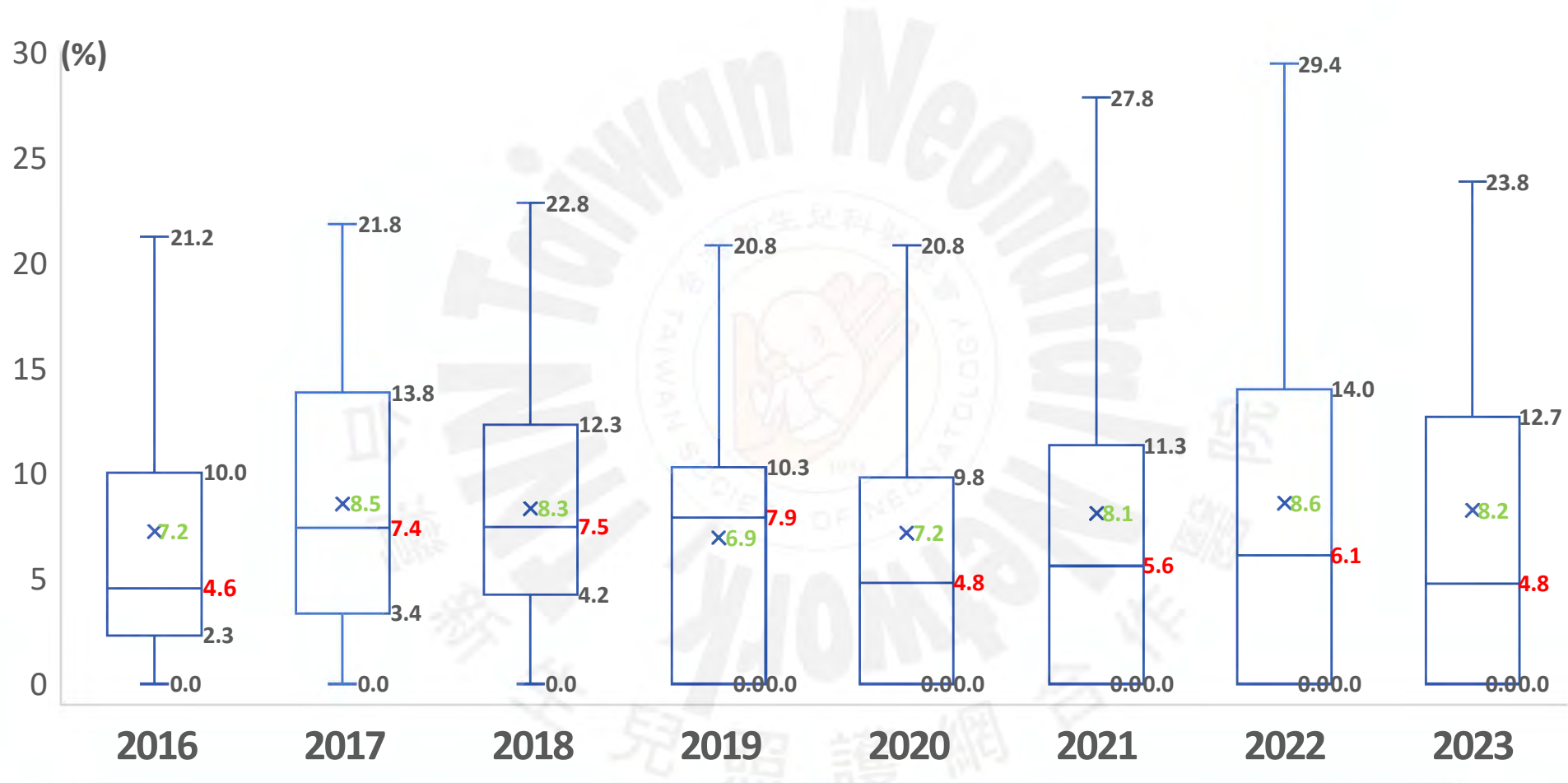
■ 百分比 — 平均使用率(Mean)11% — 中位數(MED)5.3%

*NO.6醫院僅有2021、2023年度資料(Hospital No.6 only have data for the years 2021 and 2023)
 NO.18、22醫院僅有2022-2023年度資料(Hospital No.18、22 only have data for the years 2022-2023)
 NO.7、8、9醫院僅有2023年度資料(Hospital No.7、8、9 only have data for the years 2023)

各年度Other Surgery使用率

—中位數(MED)

x平均數(Mean)



2016-2023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 2021-2023: At Discharge Home



AT BIRTH



KEY PERFORMANCE
MEASURES

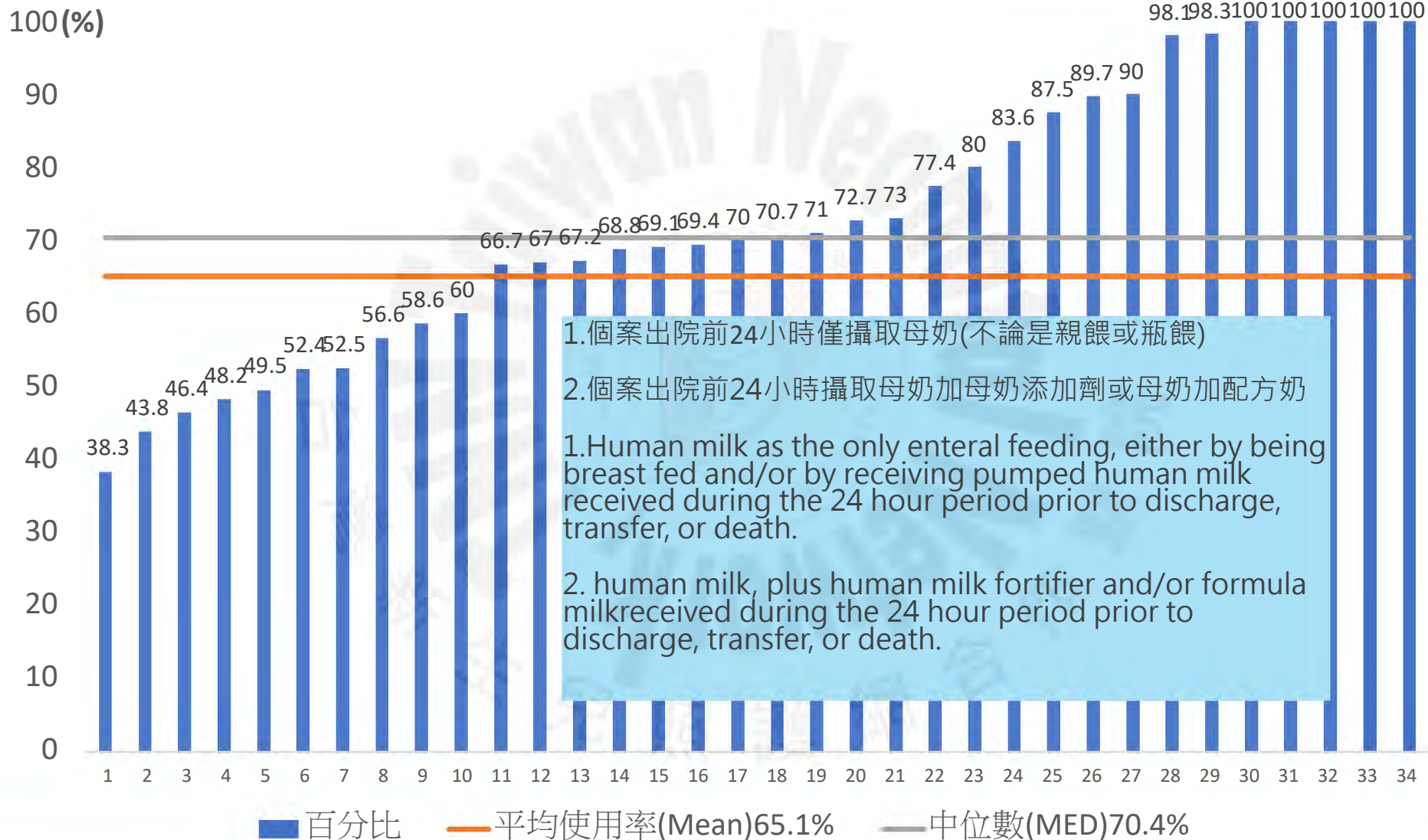


PROCEDURES AND
INTERVENTIONS



AT DISCHARGE
HOME

2021-2023年(Any Human Milk) 參與TNN各院個案出院時有喝母乳

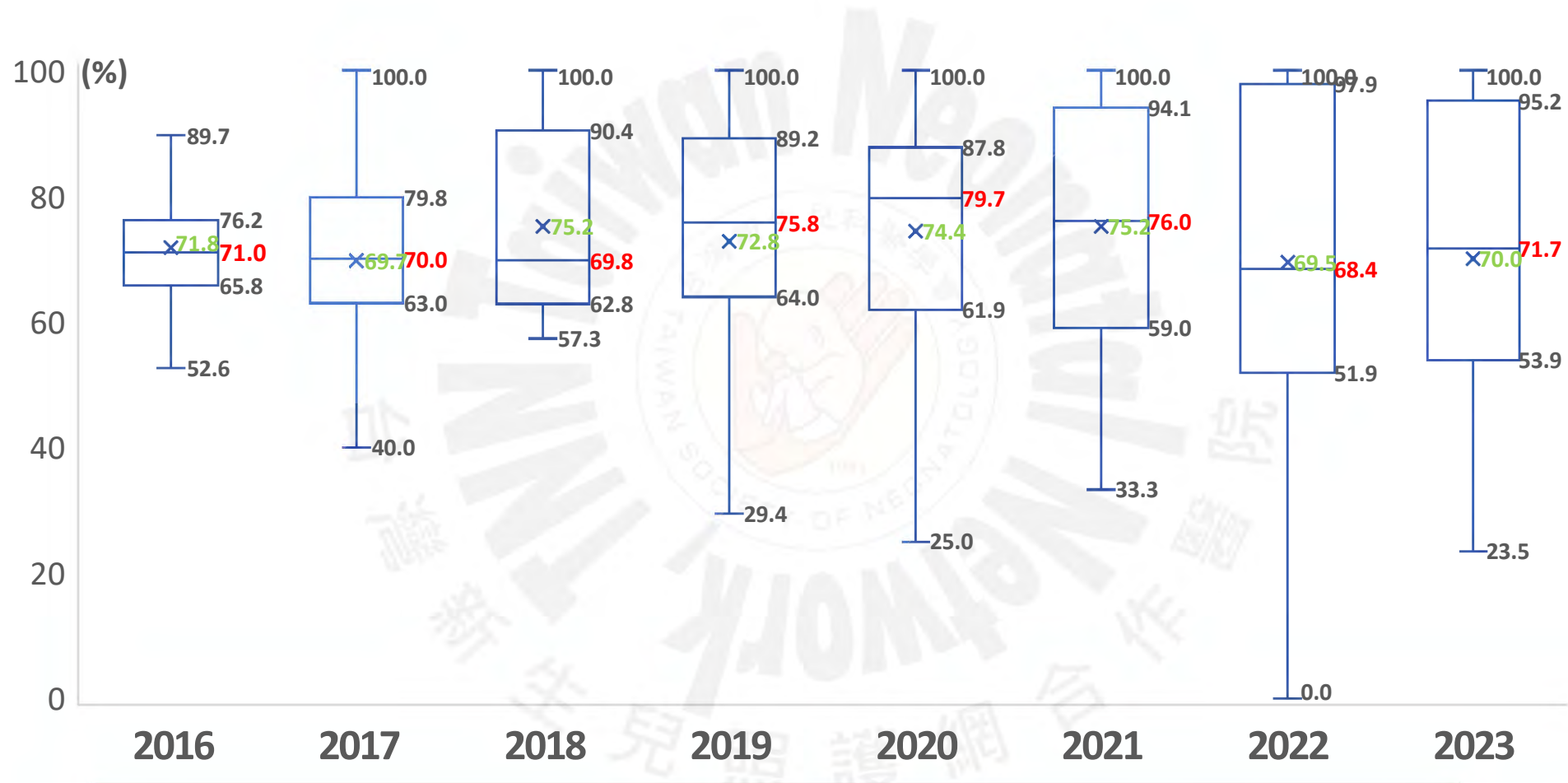


*NO.23醫院僅有2021、2023年度資料(Hospital No.23 only have data for the years 2021 and 2023)
 NO.19、33醫院僅有2022-2023年度資料(Hospital No. 19、33 only have data for the years 2022-2023)
 NO.20、27、34醫院僅有2023年度資料(Hospital No. 20、27、34 only have data for the years 2023)

各年度Any Human Milk使用率

—中位數(MED)

x平均數(Mean)



2016-2023年(Any Human Milk)個案出院時有喝母乳

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

2021-2023年(Oxygen at Discharge) 參與TNN各院個案出院時有攜帶氧氣

100(%)

- 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

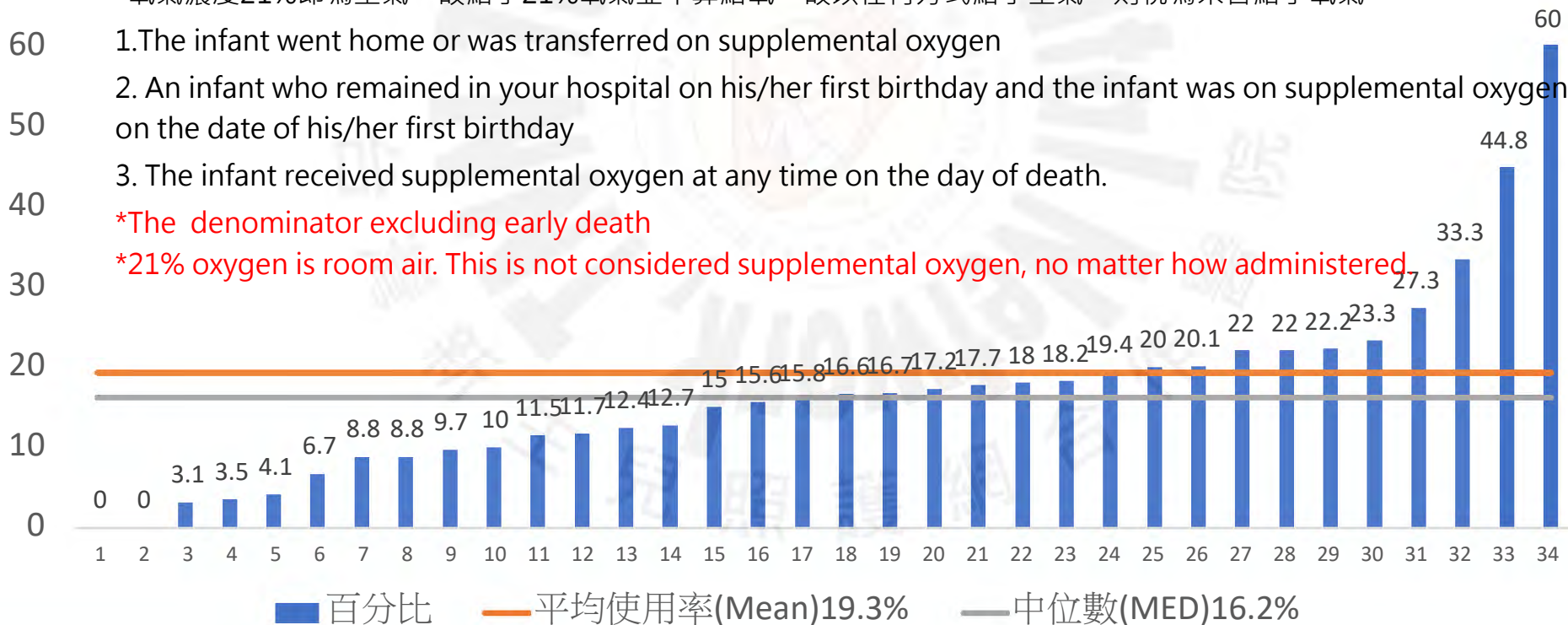
*若個案在出生內12小時內死亡，不納入統計。

*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.

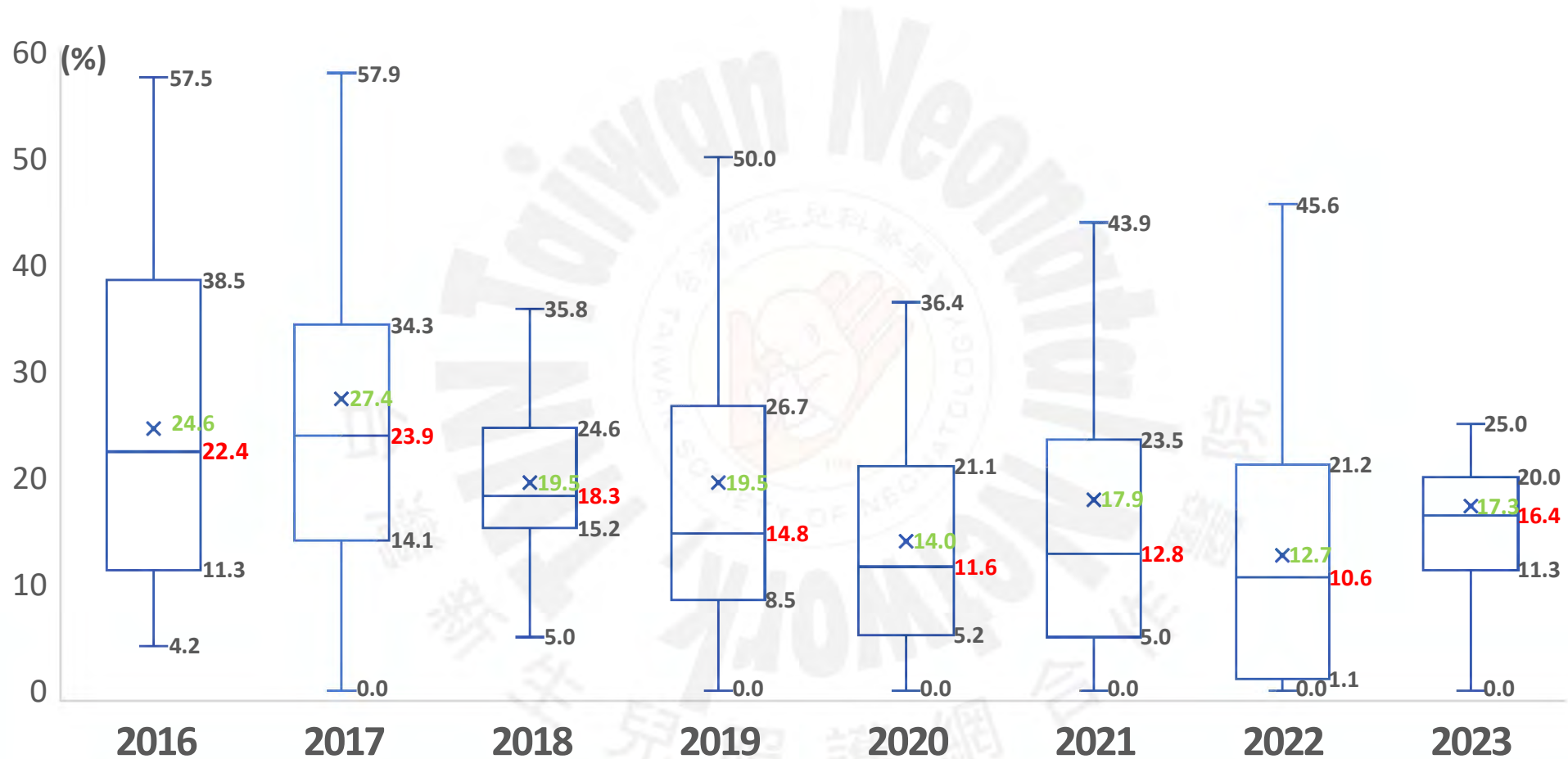


*NO.34醫院僅有2021、2023年度資料(Hospital No.34 only have data for the years 2021 and 2023)
 NO.23、29醫院僅有2022-2023年度資料(Hospital No.23、29 only have data for the years 2022-2023)
 NO.2、25、32醫院僅有2023年度資料(Hospital No.2、25、32 only have data for the years 2023)

各年度Oxygen at Discharge使用率

—中位數(MED)

x平均數(Mean)

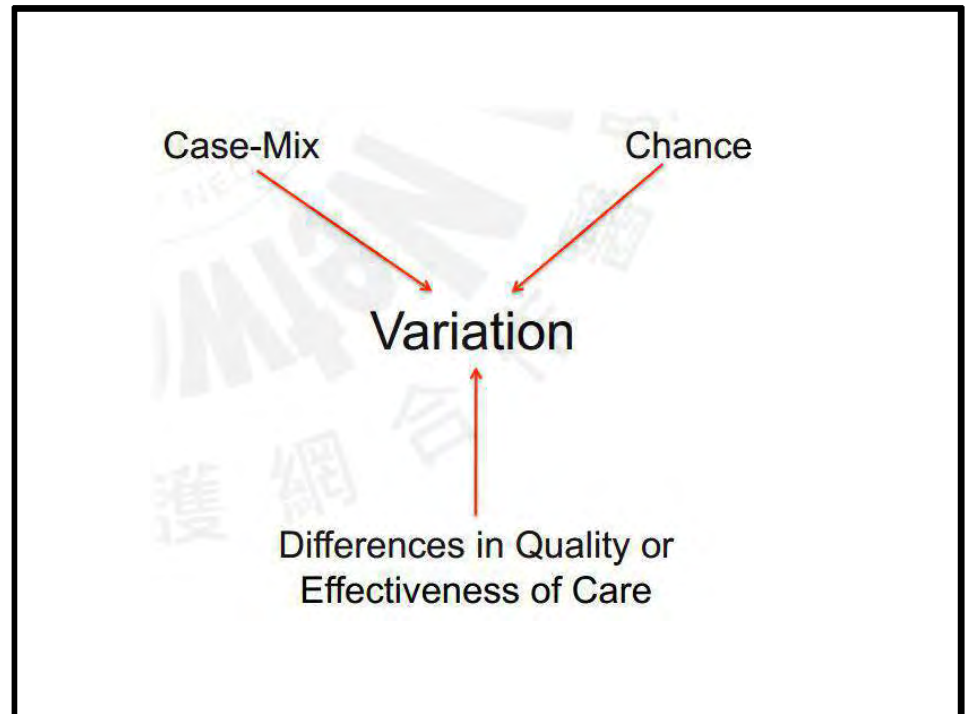


2016-2023年 (Oxygen at Discharge)個案出院時有攜帶氧氣

*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



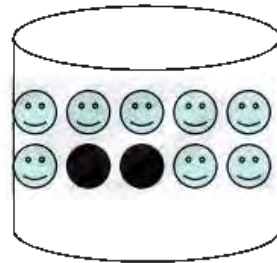


Risk adjustment

Fair comparisons

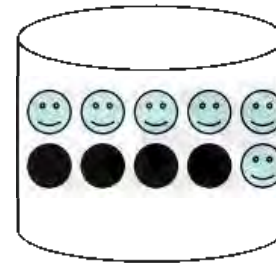
What is Risk Adjustment?

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



NICU 1

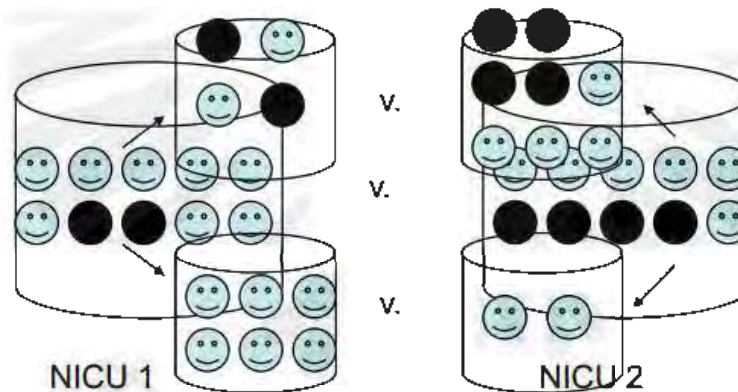
v.



NICU 2

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

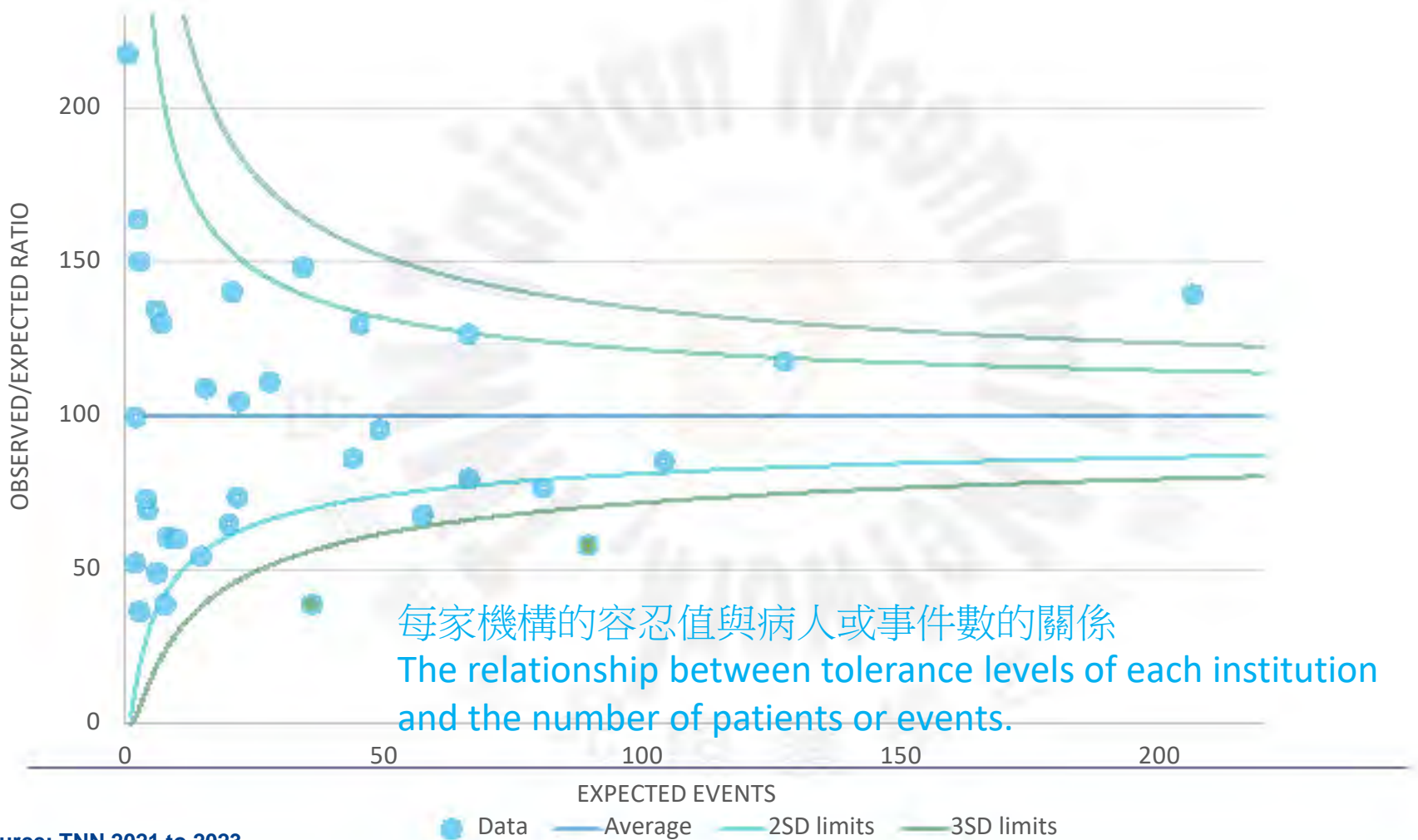
Process for Interinstitutional Comparisons

- 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:

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



2021-2023 年度指標 Mortality & Morbidity





Variation

Utilization Management

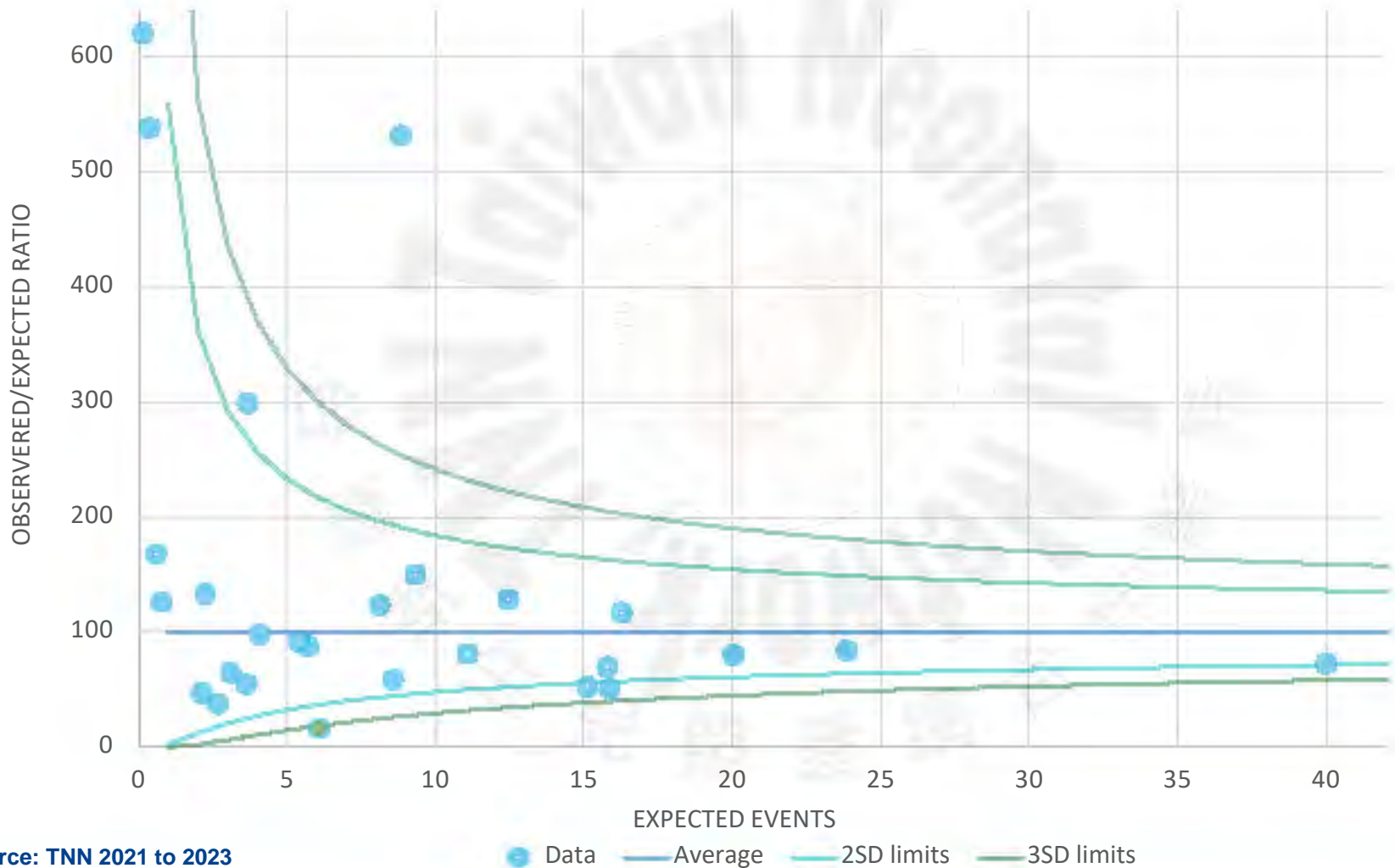
Differences in Quality or Effectiveness of Care

Evidence-Based Medicine

Quality Improvement



2021-2023 年度指標 Severe IVH

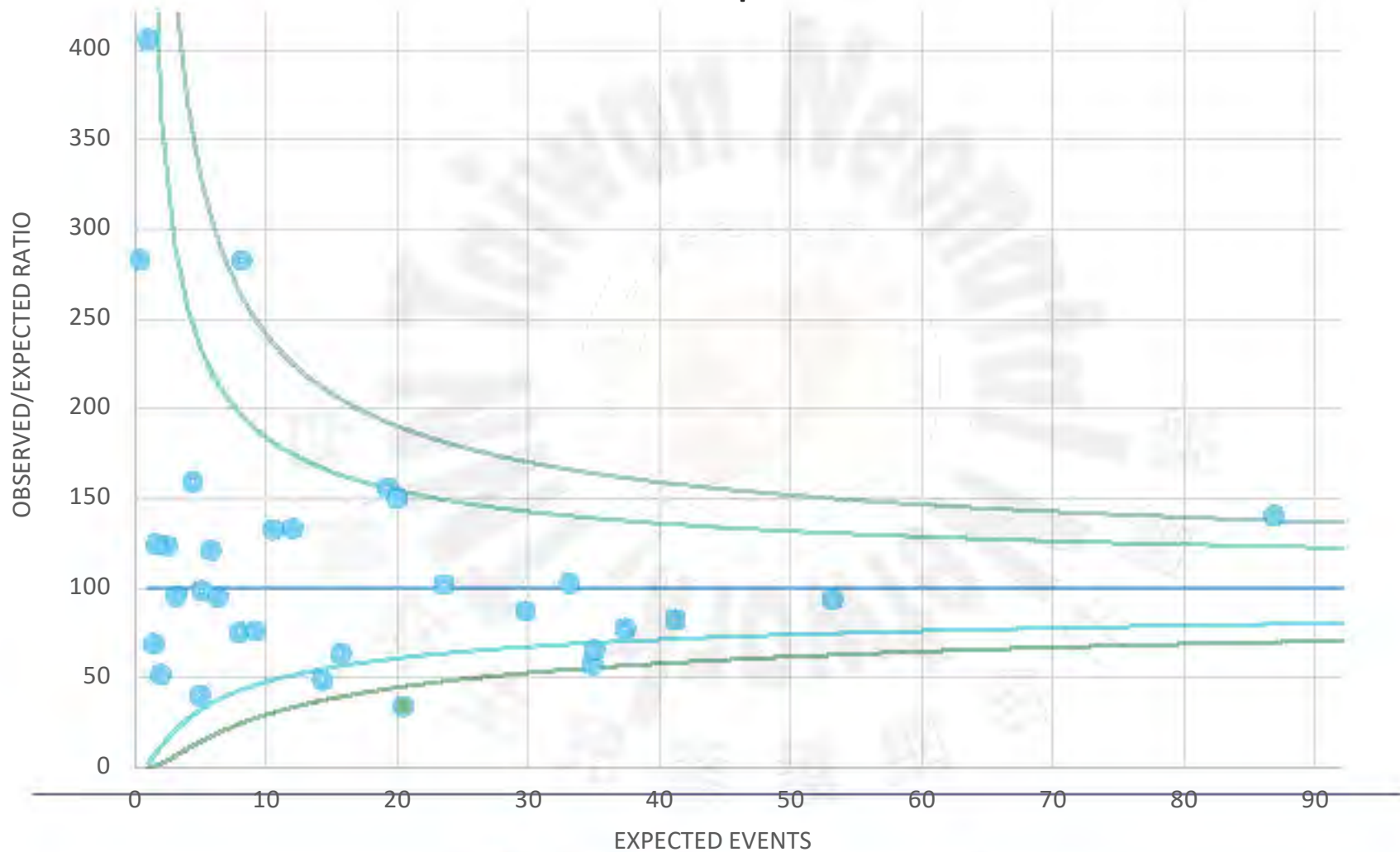


Source: TNN 2021 to 2023

● Data — Average — 2SD limits — 3SD limits

2021-2023 年度指標

Late sepsis

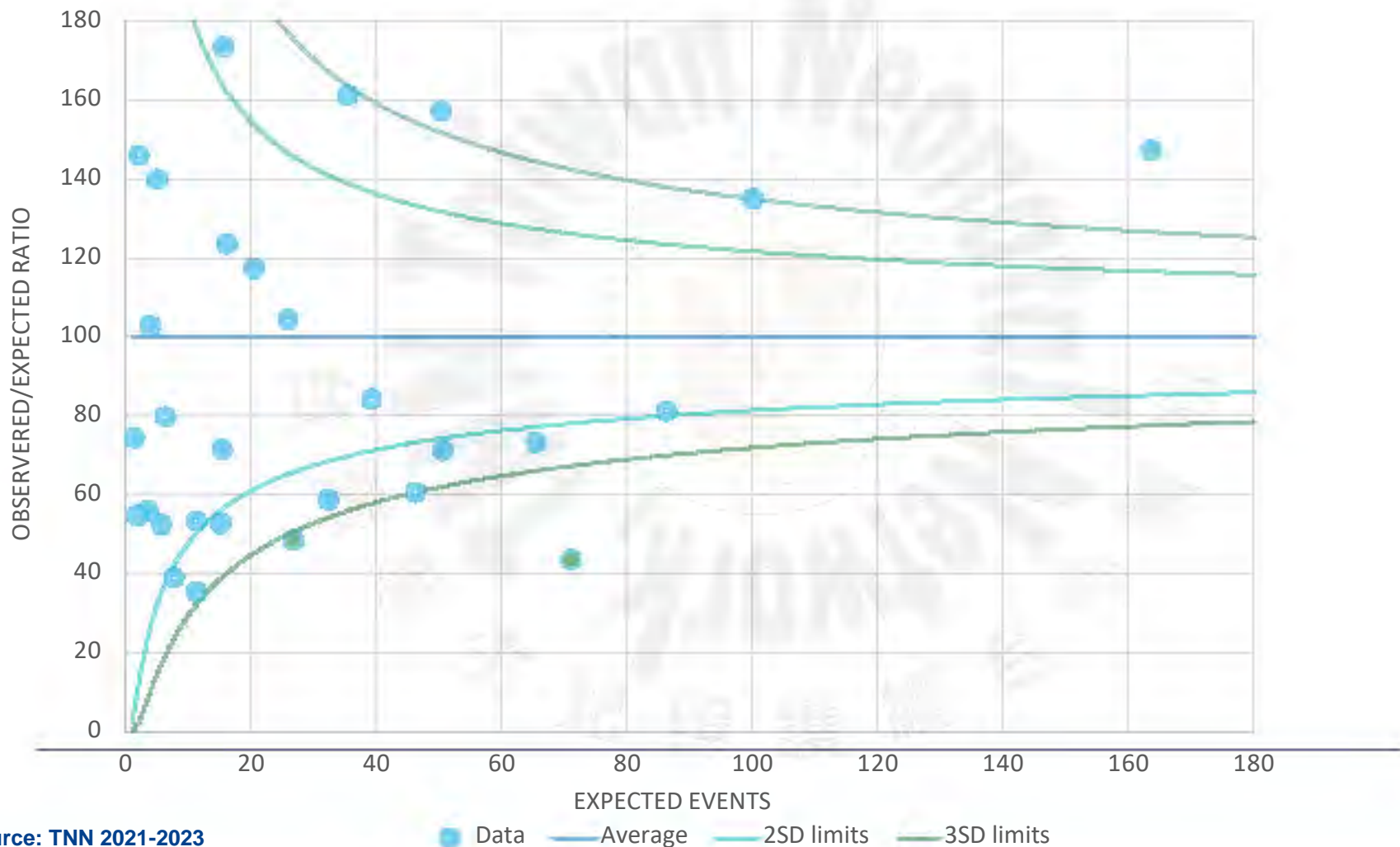


Source: TNN 2021 to 2023

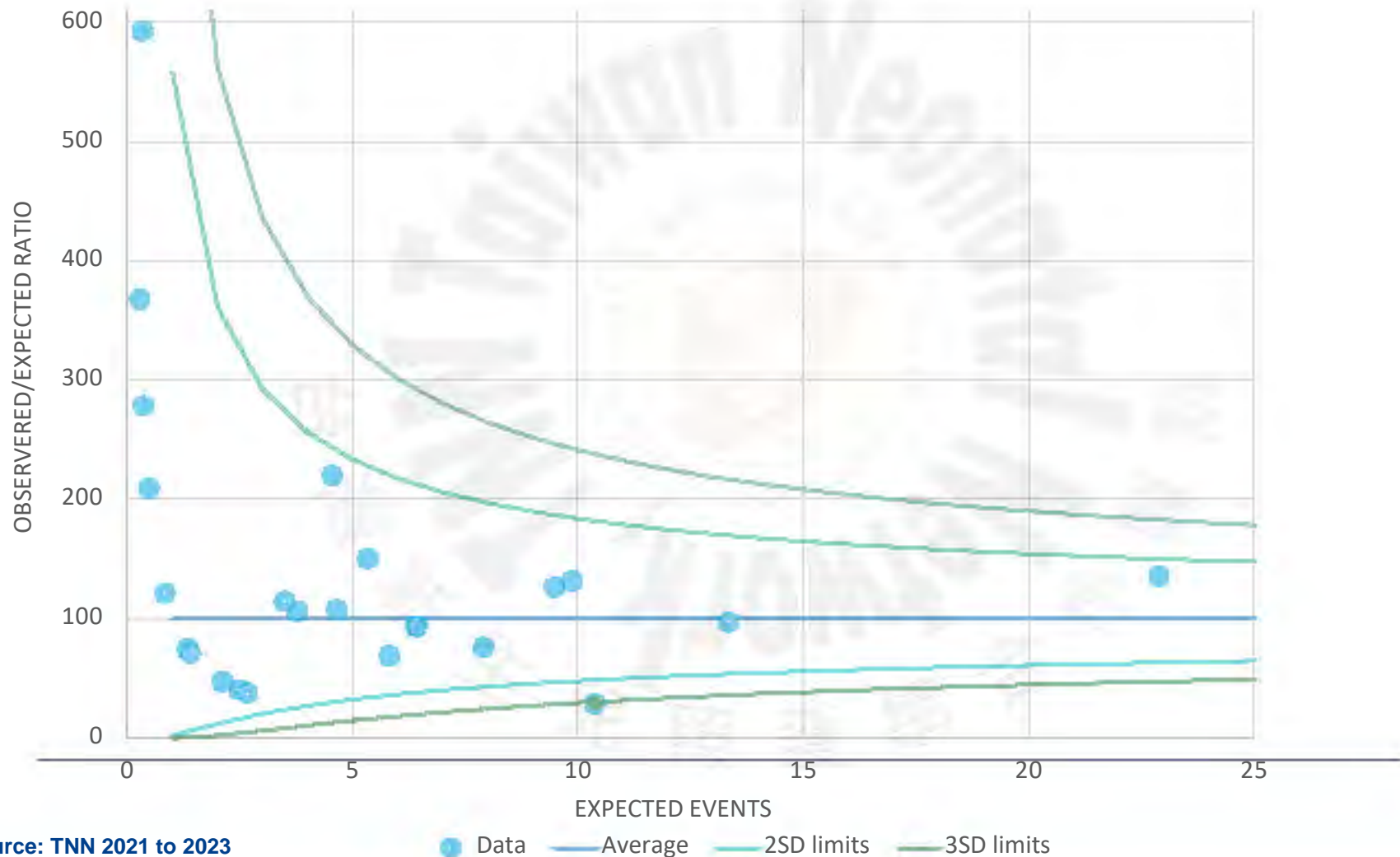
● Data — Average — 2SD limits — 3SD limits

2021-2023 年度指標

Chronic Lung Disease < 33wks



2021-2023 年度指標 NEC



Source: TNN 2021 to 2023

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 University)
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. 佛教慈濟財團法人台北慈濟醫院 (Taipei Tzu Chi Hospital)
17. 佛教慈濟財團法人花蓮慈濟醫院 (Hualien Tzu Chi Hospital)
18. 亞東紀念醫院(Far Eastern Memorial Hospital)
19. 奇美醫療財團法人奇美醫院 (Chi Mei Medical Center)
20. 林口長庚紀念醫院 (Chang Gung Memorial Hospital, Linkou)
21. 財團法人台北國泰綜合醫院 (Cathay General Hospital)
22. 高雄長庚紀念醫院 (Kaohsiung Chang Gung Memorial Hospital)
23. 高雄榮民總醫院 (Kaohsiung Veterans General Hospital)
24. 高雄醫學大學附設中和紀念醫院 (Kaohsiung Medical University Chung-Ho Memorial Hospital)
25. 國立台灣大學附設醫院雲林分院(National Taiwan University Hospital Yunlin Branch)
26. 國立臺灣大學醫院附設兒童醫院 (National Taiwan University Children's Hospital)
27. 國立臺灣大學醫院附設醫院新竹分院 (National Taiwan University Hospital Hsin-Chu)
28. 國立成功大學醫學院附設醫院 (National Cheng Kung University Hospital)
29. 新光醫療財團法人新光吳火獅紀念醫院 (Shin Kong Wu Ho-Su Memorial Hospital)
30. 義大醫療財團法人義大醫院 (E-Da Hospital)
31. 彰化基督教兒童醫院 (Changhua Christian Children's Hospital)
32. 澄清醫院中港分院Cheng Ching Hospital Chung Kang Branch
33. 衛生福利部桃園醫院(Taoyuan General Hospital. Ministry of Health and Welfare)
34. 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

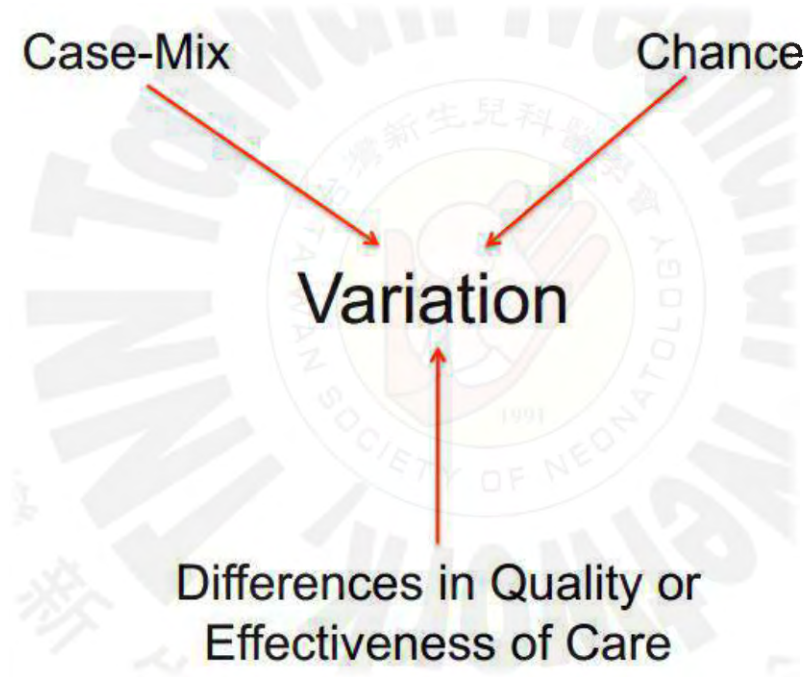


Case-Mix

Chance

Variation

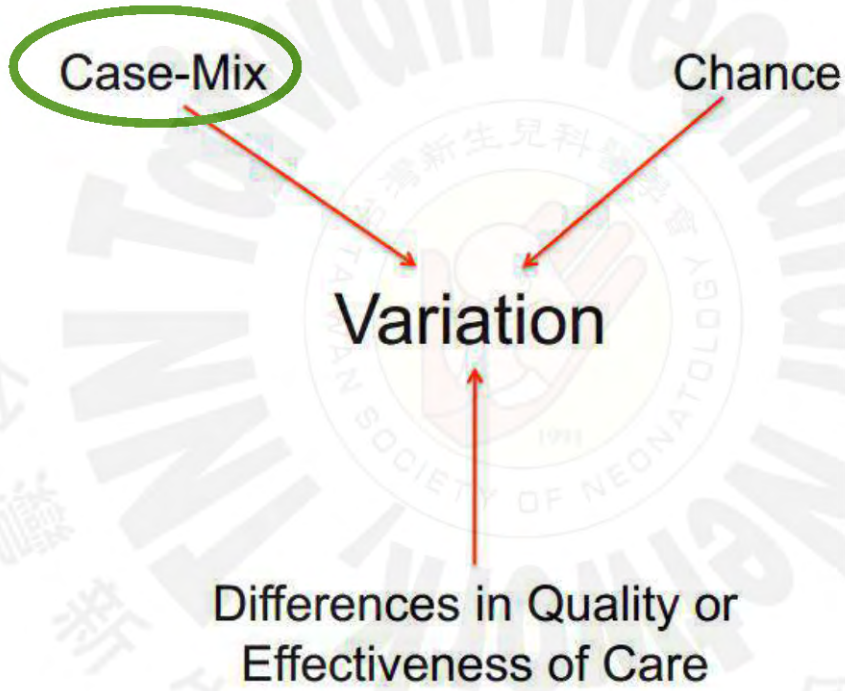
Differences in Quality or
Effectiveness of Care



Variability

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





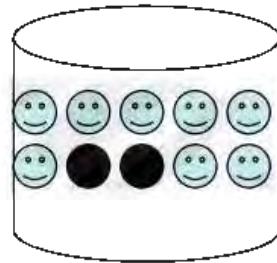


Risk adjustment

Fair comparisons

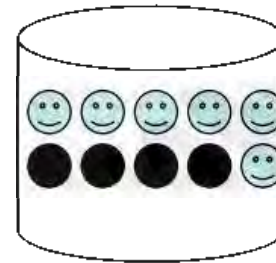
What is Risk Adjustment?

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



NICU 1

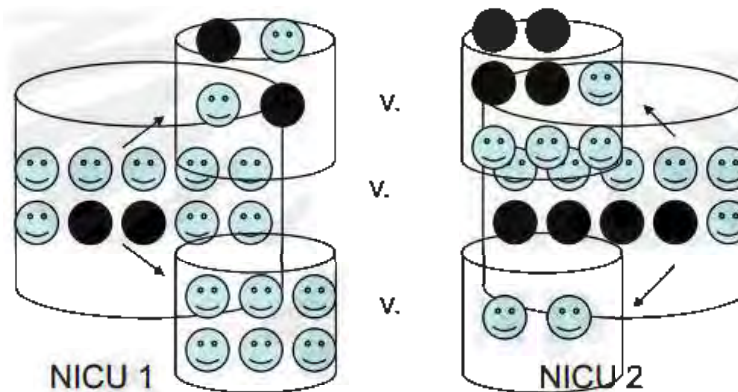
v.



NICU 2

What is Risk Adjustment?

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

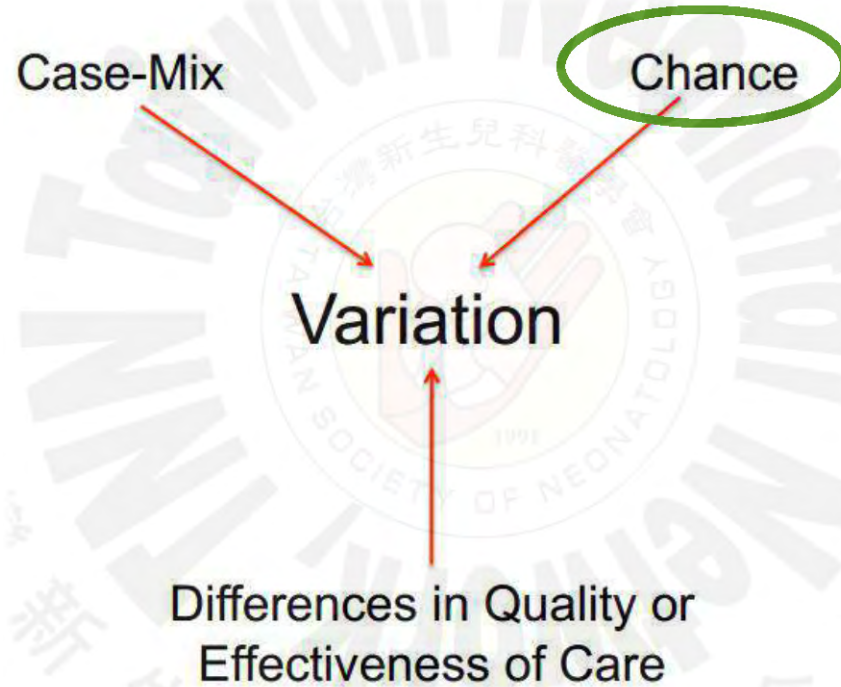


Risk adjusters

- **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)
- 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