

Challenges for institutional performance measures

Responsible Data Science in health care

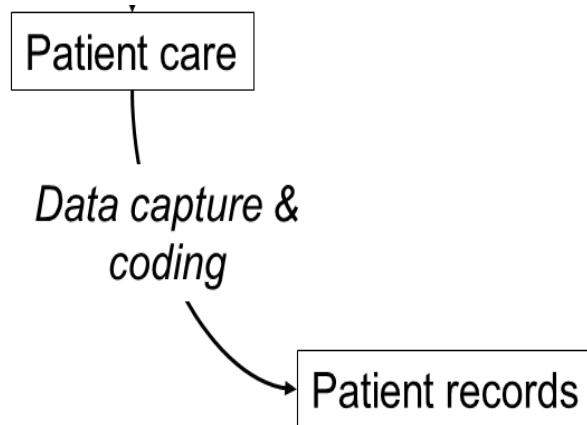
Nicolette de Keizer

Dept Medical Informatics

Academic Medical Center, Amsterdam



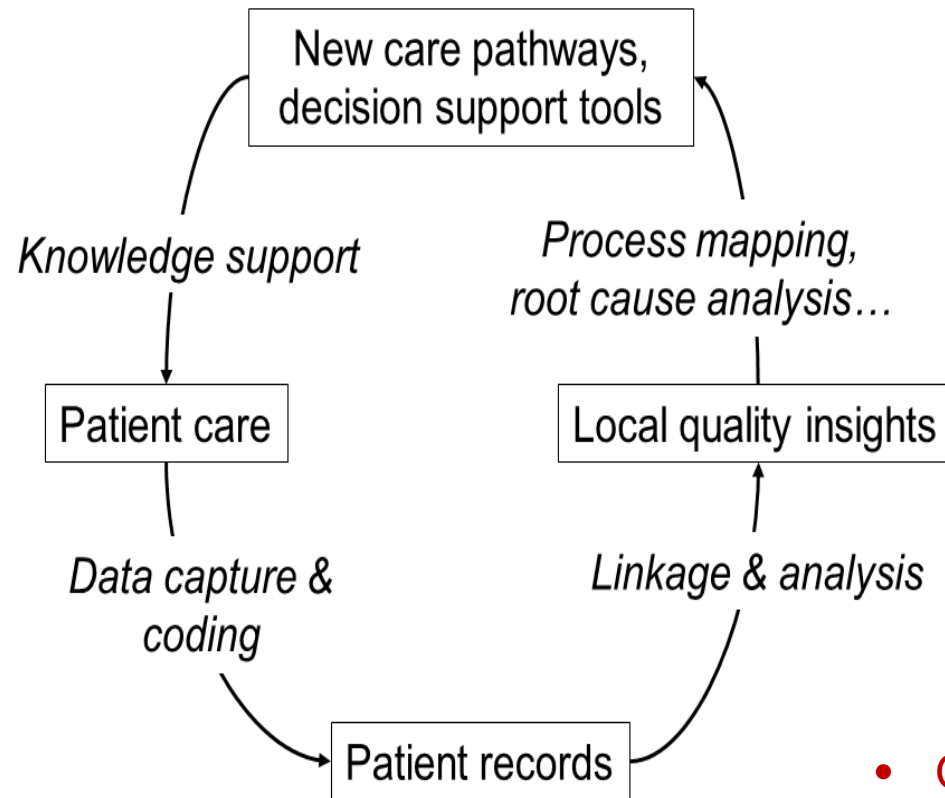
Data science in health care



Data reuse:

- Management information
- Quality assurance
- Research
- Surveillance

Learning Health System



- Quality assurance

Quality registries in health care

- > 150 registries in health care
- Aims:
 - Accountability
 - Government
 - Insurance companies
 - Patients
 - Quality assessment and improvement
 - Scientific research



Accountability



Ziekenhuis top 100

AD Ziekenhuis Top 100

Met de vierde AD Ziekenhuis Top 100 kan Nederland op hun prestaties beoordeeld van 27 kwaliteitscriteria. Die zijn opgeste

- Auto's
- Banen
- Kleintjesmarkt
- Winkelplein
- NIEUWS**

kiesBeter.nl Ziekenhuizen
wijst u de weg in de zorg

Home Gezondheid **Zorg vergelijken** Nieuws Begrippen Veelgestelde vragen

» Home » Ziekenhuizen » Bekijk kwaliteit per ziekenhuis

Zoek behandelcentrum

- » Keuzeoverzicht
- » Plaats of postcode
- » Aandoening/ behandeling
- » Specialisme/ specialisatie
- » Voorzieningen
- » Trefwoorden

Bekijk

- » Kwaliteit
- » Wachttijden
- » Prijzen

Op naam

- » Zoek een ziekenhuislocatie
- » Zoek een ziekenhuisconcern

Informatie

- » Soorten behandelcentra
- » Kwaliteit
- » Wachttijden

Bekijk kwaliteit per ziekenhuis

Zoek de naam van een ziekenhuis via het alfabet. Selecteer het ziekenhuis door de naam te selecteren. U kunt ook zoeken op postcode, zie. U kunt ook zoeken op vergoeding, vergoeding en vervoer.

Het resultaat telt 2014 ziekenhuizen

U heeft 0 zoekresultaten gevonden.

Verwijder alles

AB C D E F G H I J K L M N O P Q R S T U V W X Y Z

Stuur

NIEUWS

OPINIE

DOSSIERS

LIFES

ELSEVIER

4 uur

Partners

42

uws > Nederland > 'Beste ziekenhuizen

NEDERLAND

Beste ziekenhuizen 2006 opnieuw

woensdag 27 september 2006 10:38

Geef waardering



Tags

Gezondheidszorg

Het Onze Lieve Vrouwe Gasthuis (OLVG) in Amsterdam is het beste ziekenhuis van Nederland, blijkt uit de jaarlijkse enquête van Elsevier en onderzoeker...

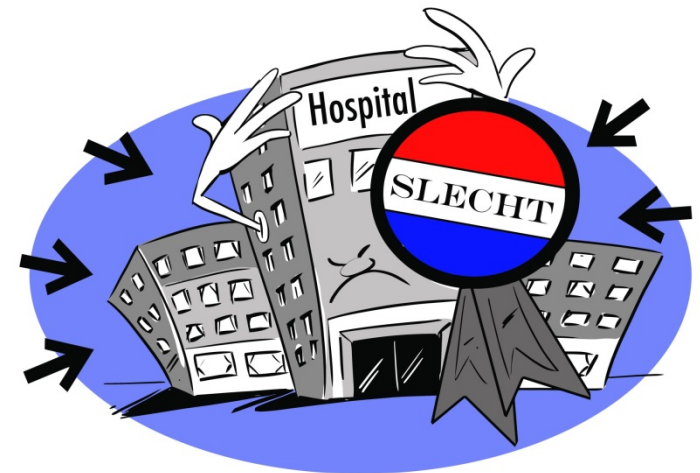
Accountability

- Is the data fair, accurate, transparent?



Accountability

- Is the data fair, accurate, transparent?
- Large consequences
 - Loss of faith
 - Demotivation
 - Loss of budget

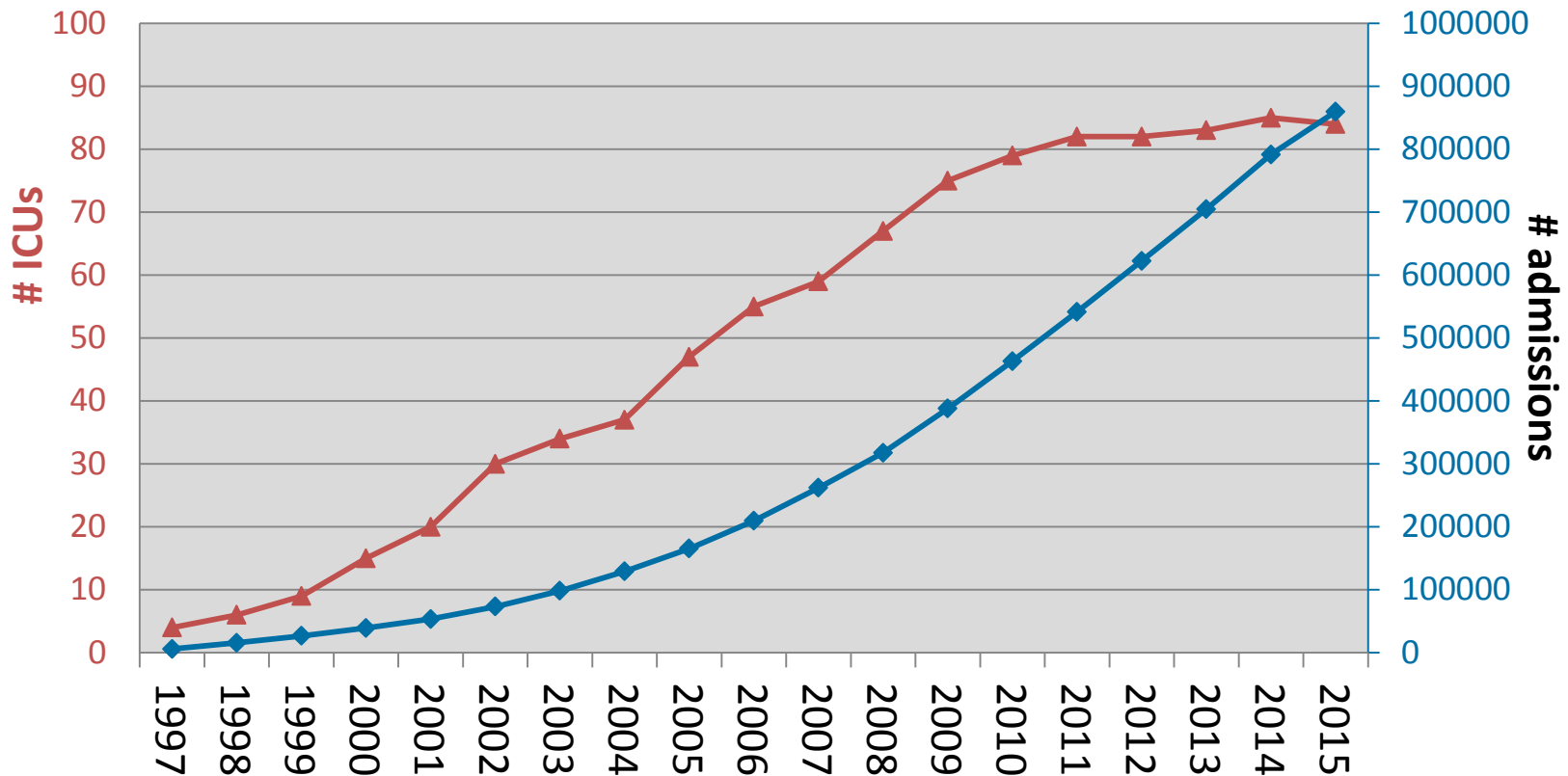


National Intensive Care Evaluation (NICE)



History and development

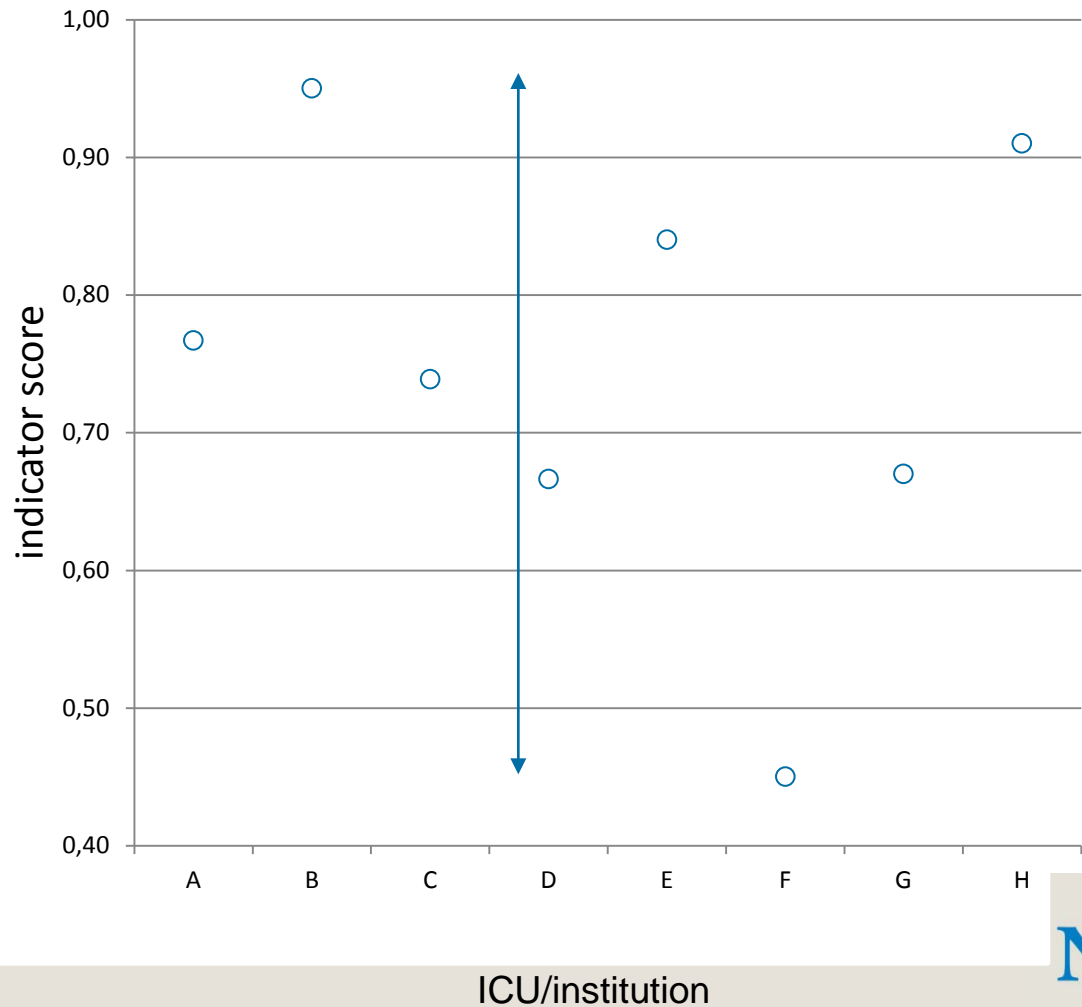
- Founded in 1996 by and for intensivists



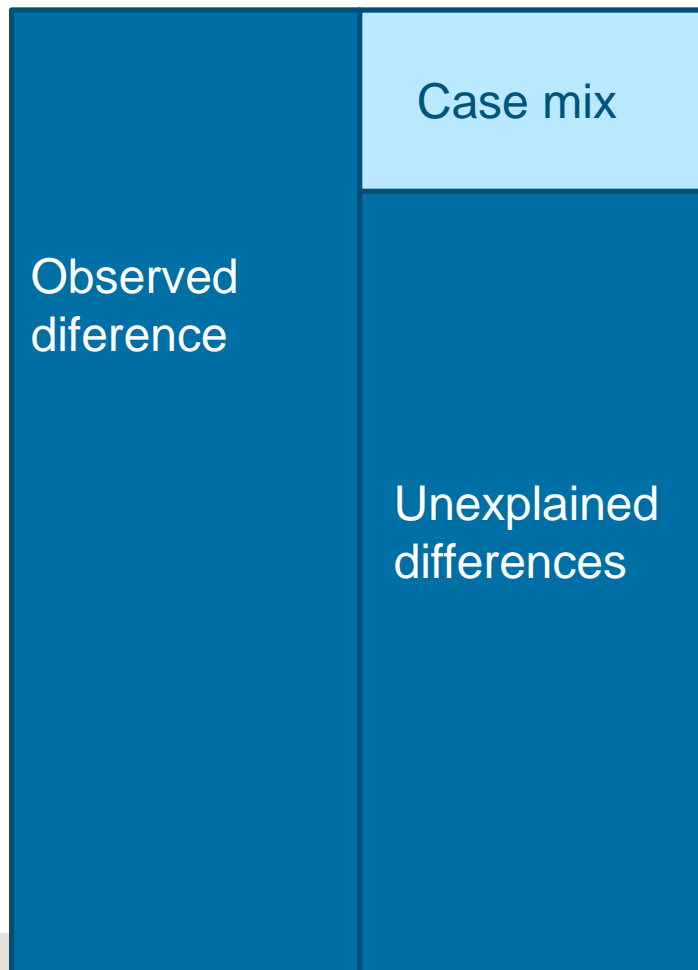
Quality assessment and improvement

○ Benchmarking

Observed
difference
=
Difference in
quality of care

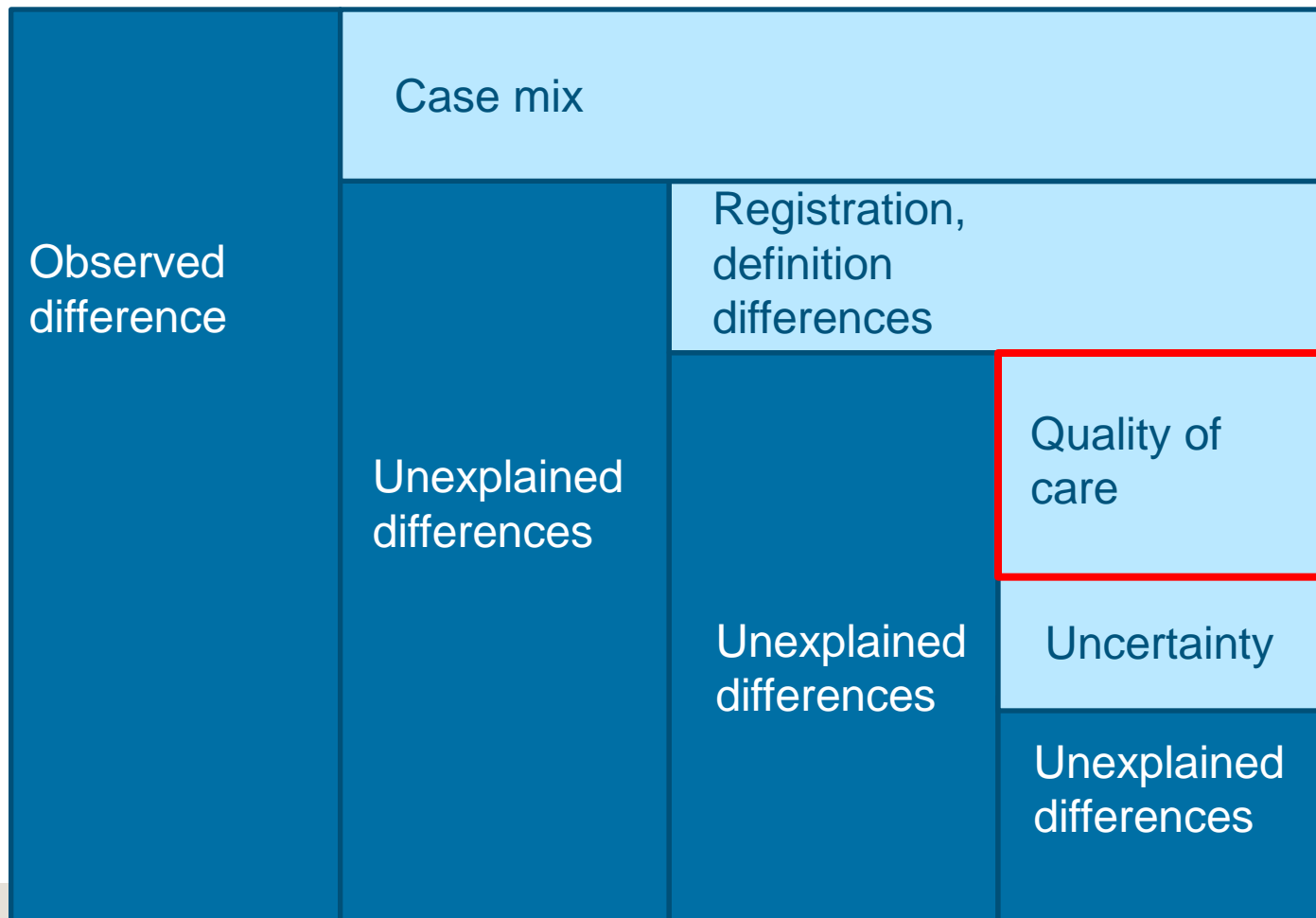


Variation



Mortality	20%	17%
Age	68	57
Comorbidity	40%	5%

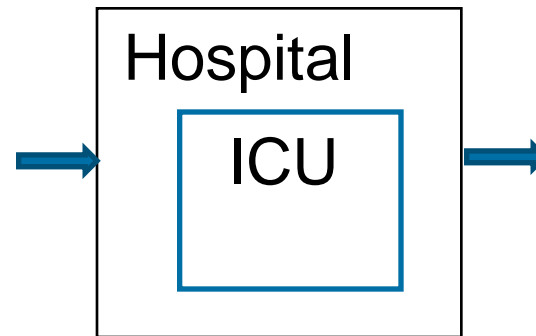
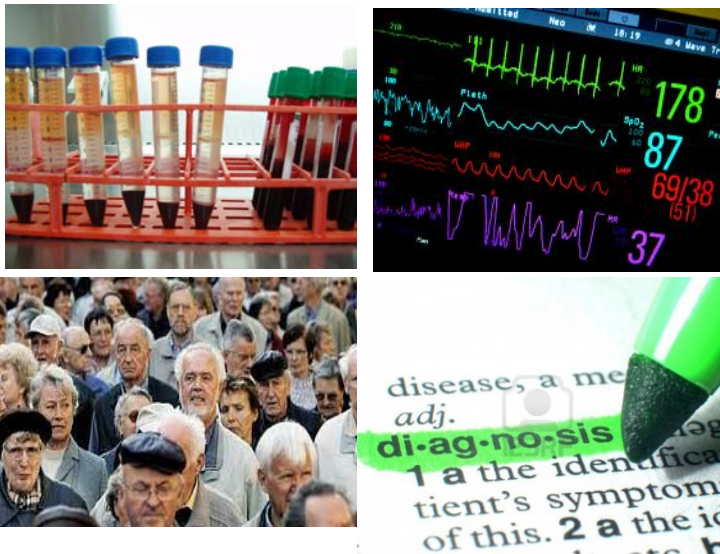
Variation



Mortality as quality indicator

Input (1st 24 hour)

Output

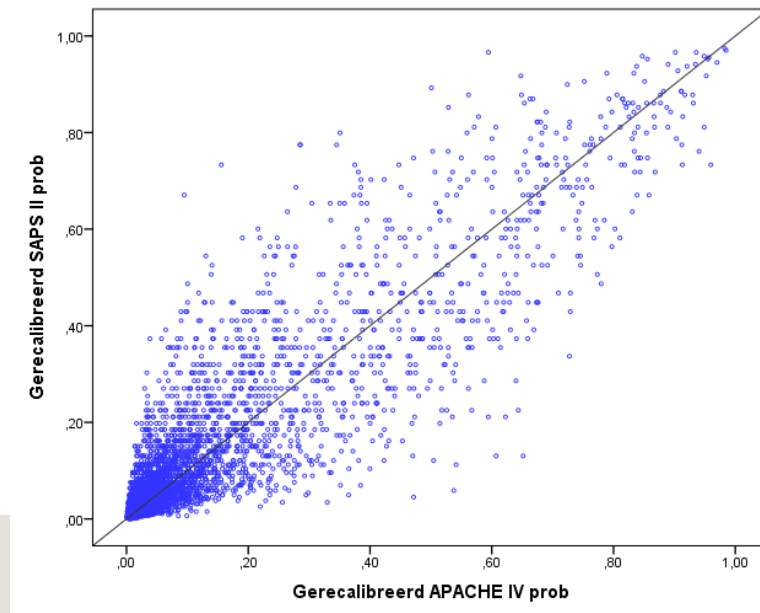


Prognostic models: APACHE II en IV, SAPSII...

Standardized Mortality Ratio (SMR)

$$\text{SMR} = \frac{\text{Observed in-hospital mortality}}{\text{Expected mortality}}$$

- Expected mortality depends on prognostic model



Ranking institutions

- A common procedure is to **rank** institutions by SMR, providing a **league table**
- The top/bottom 10% or 25% are sometimes labelled as **excellent/poor performers**

NIEUWS OPINIE DOSSIERS LIFES

Rubrieken Laatste 24 uur Partners 42

ELSEVIER ws > Nederland > Beste ziekenhuizen

Beste ziekenhuizen 20 opnieuw

Geef waardering ☆☆☆☆☆
woensdag 27 september 2006 10:38

Tags: Gezondheidszorg
Het Onze Lieve Vrouwe Gasthuis (OLVG) in Amsterdam, blijkt uit de jaarlijkse enquête...

AD
www.ad.nl

Ziekenhuis top 100

- Auto's
- Banen
- Kleintjesmarkt
- Winkelplein
- NIEUWS**

AD Ziekenhuis Top 100

Met de vierde AD Ziekenhuis Top 100 kan de patiënt alle ziekenhuizen in Nederland op hun prestaties beoordelen. Voor deze ranglijst is gebruik gemaakt van 27 kwaliteitscriteria. Die zijn opgesteld door de Inspectie voor de

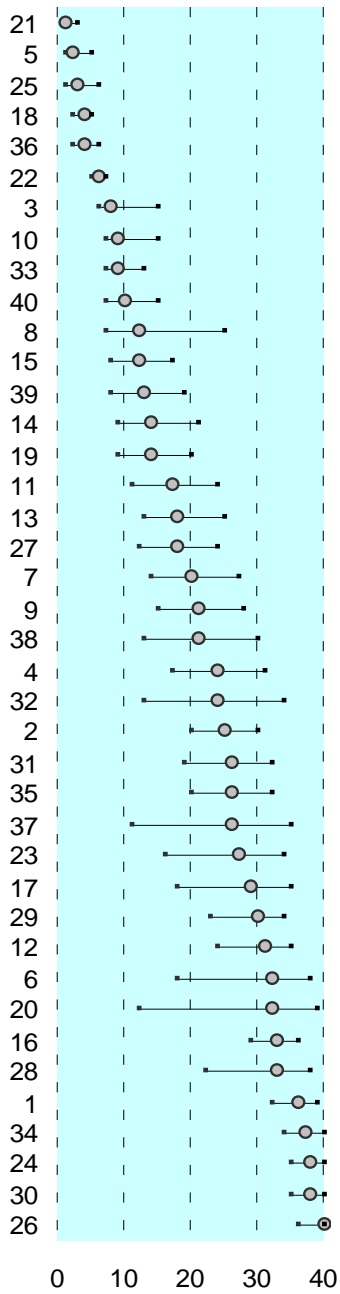
SportwereldPro
Abonneer u op AD SportwereldPro

Voorpagina

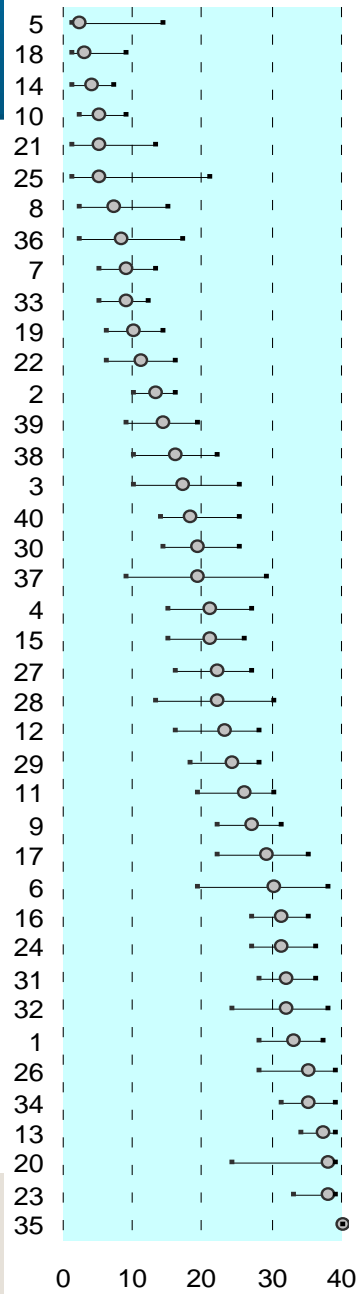
ICU ranking accurate?

- Ranks of 40 Dutch ICUs ($n=86,427$)
- SMRs based on Apache II, SAPSII, MPM₂₄II model
- Rank CIs computed by bootstrap sampling (10,000 replications)
- **Excellent performance**: with 95% certainty among top 25% institutes
- **Very poor performance**: with 95% certainty among bottom 25% institutes

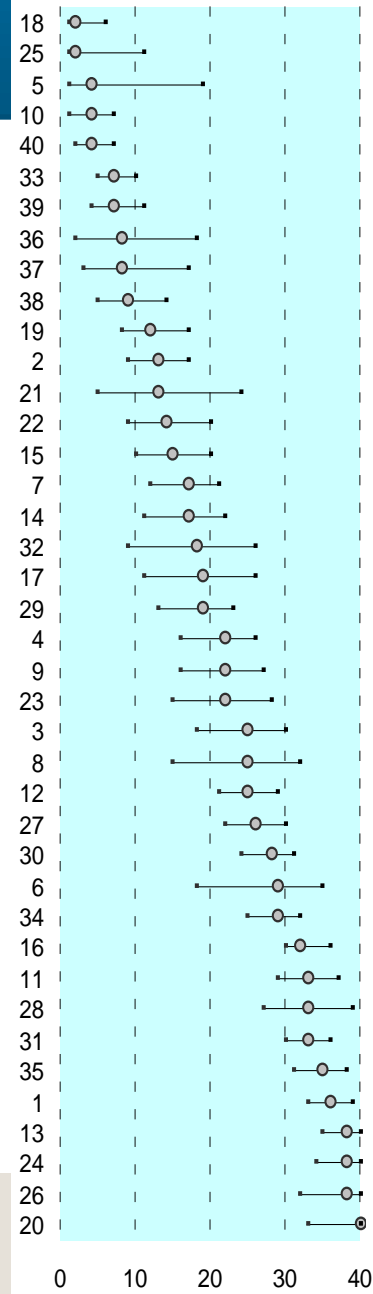
Apache II



SAPS II



MPM₂₄ II



Bakhshi-Raiez F et al. Crit Care Med 2007

Results

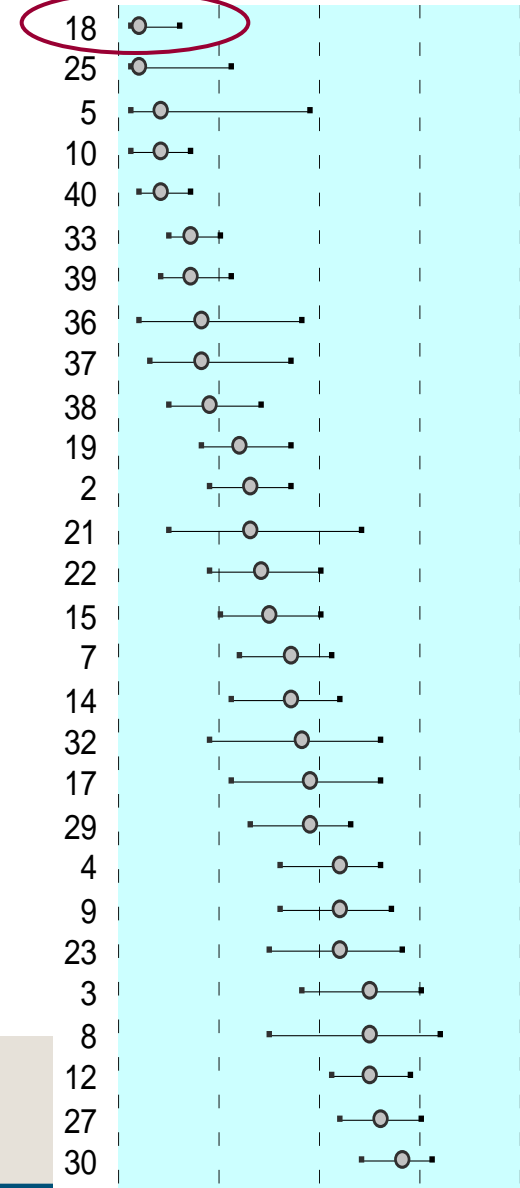
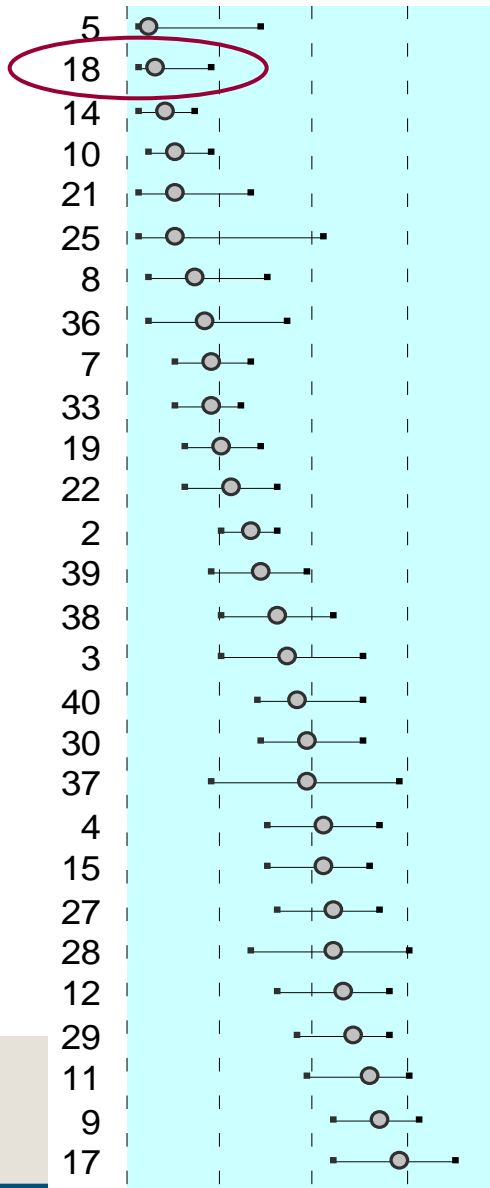
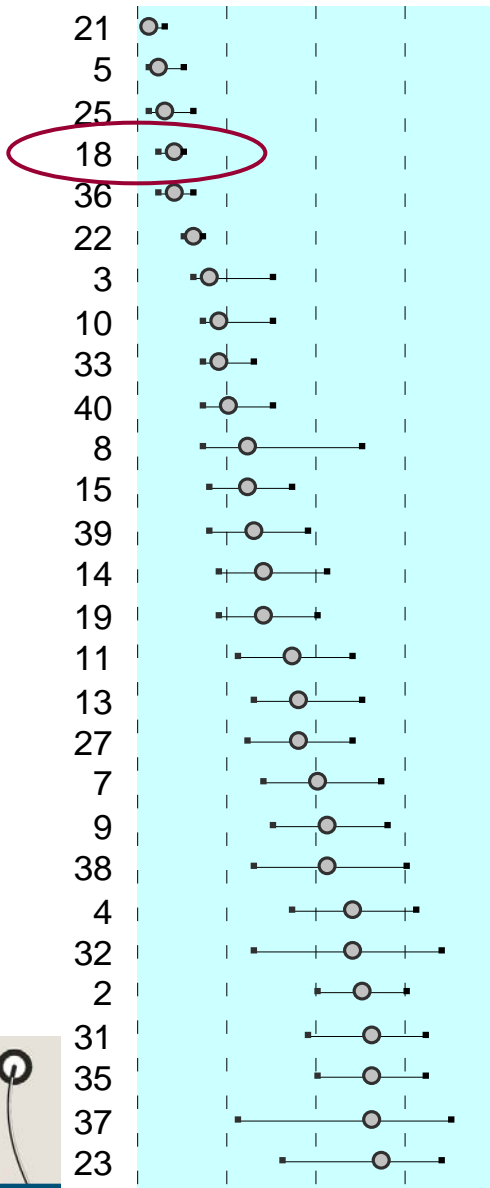
- 20 ICU significantly differ in rank (2-19 positions) by 1 or more pair of models
- 3 ICUs rated as performance outlier by one model while others excluded this possibility with 95% certainty



Apache II

SAPS II

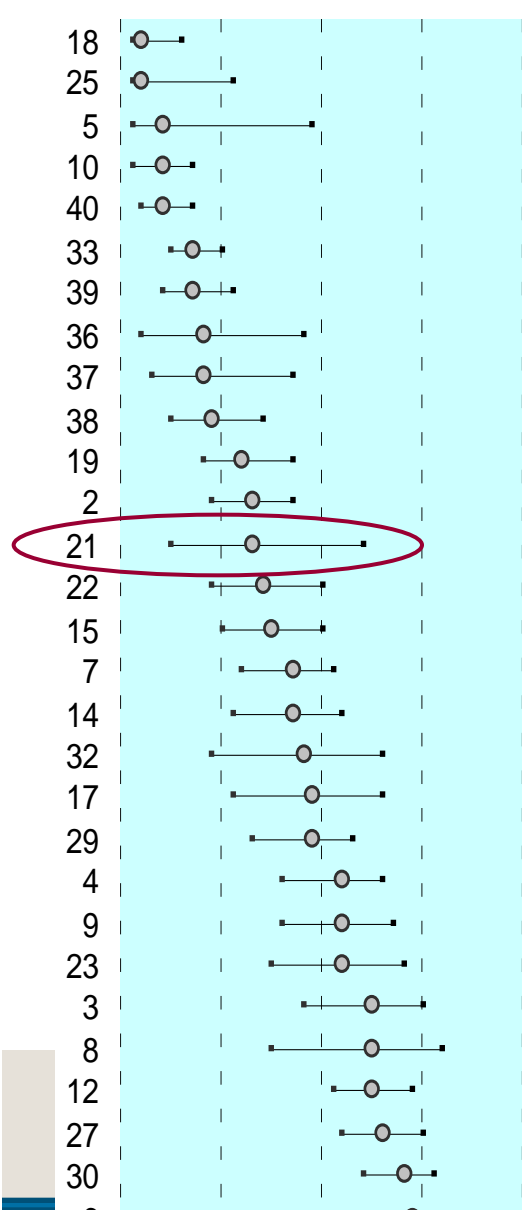
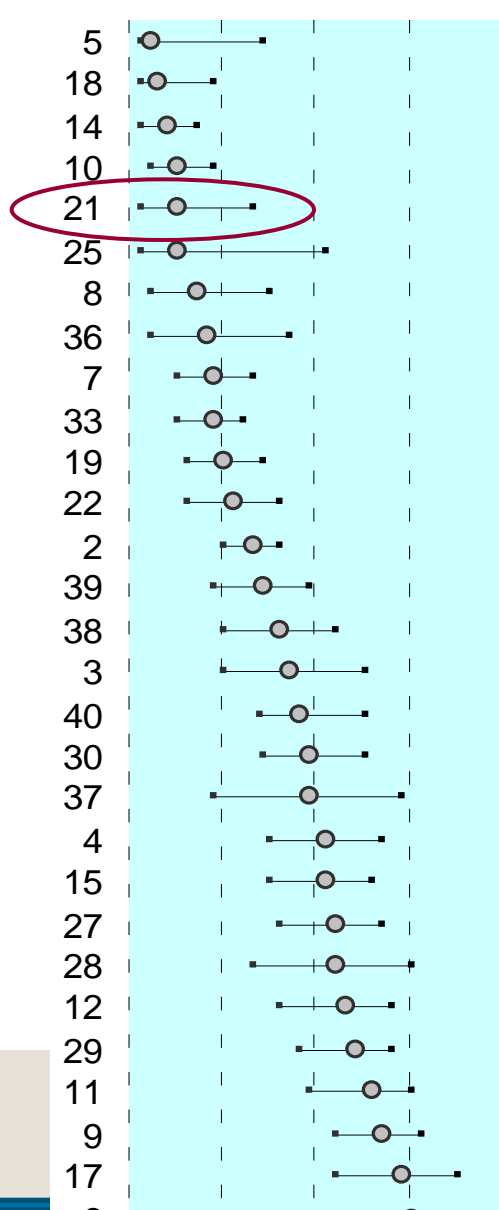
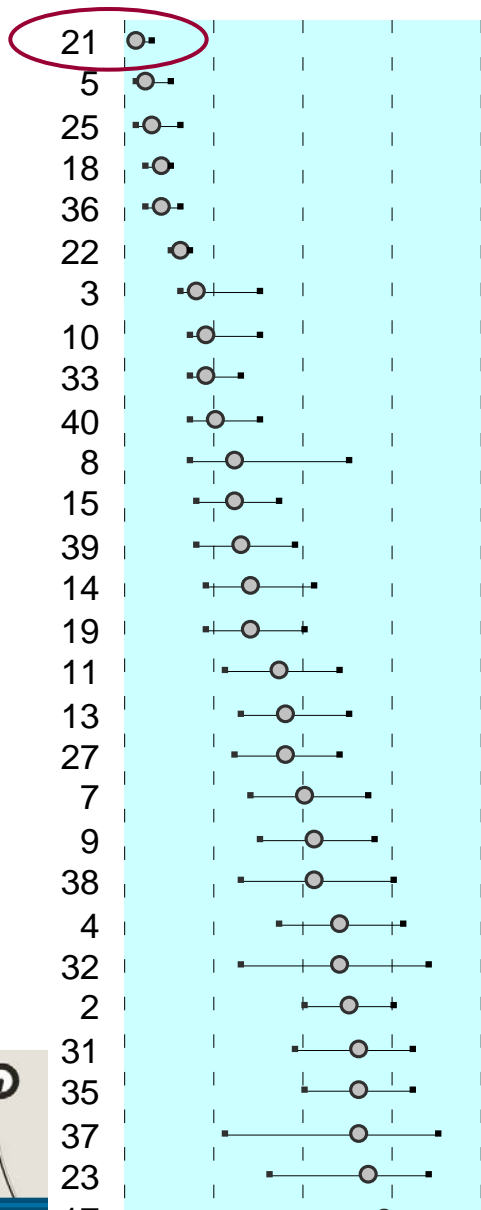
MPM₂₄ II



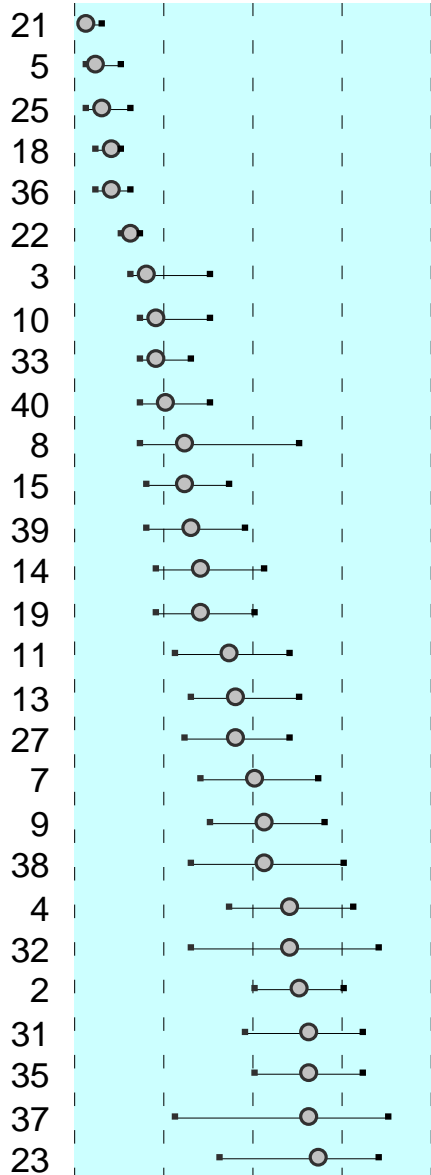
Apache II

SAPS II

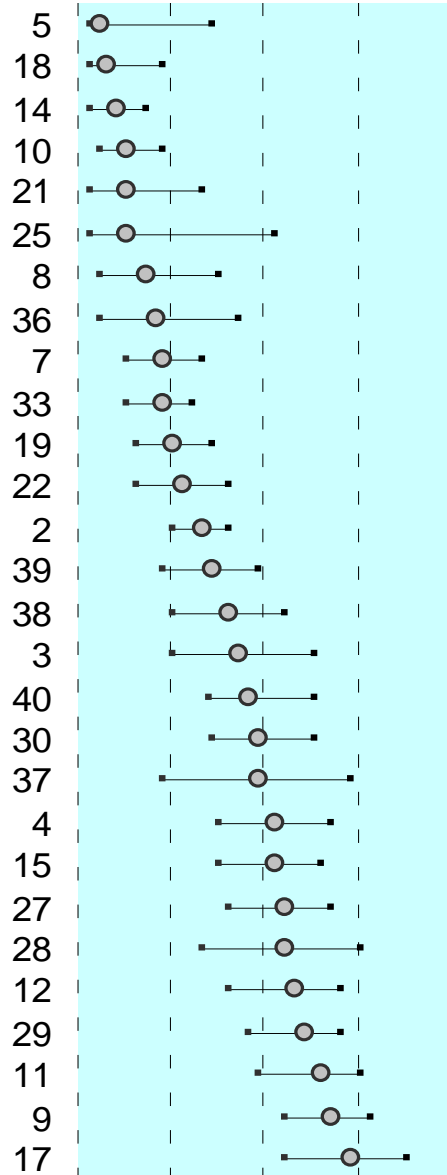
MPM₂₄ II



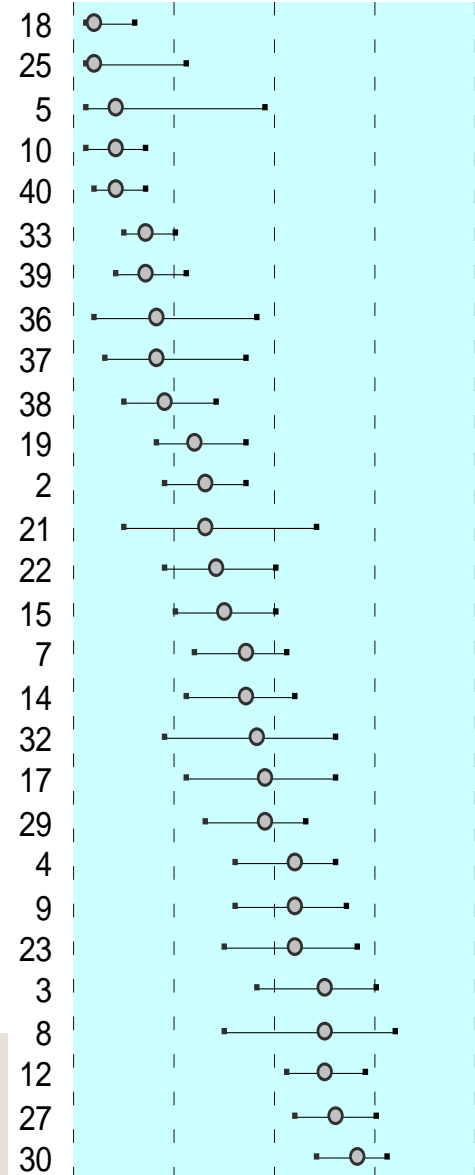
Apache II

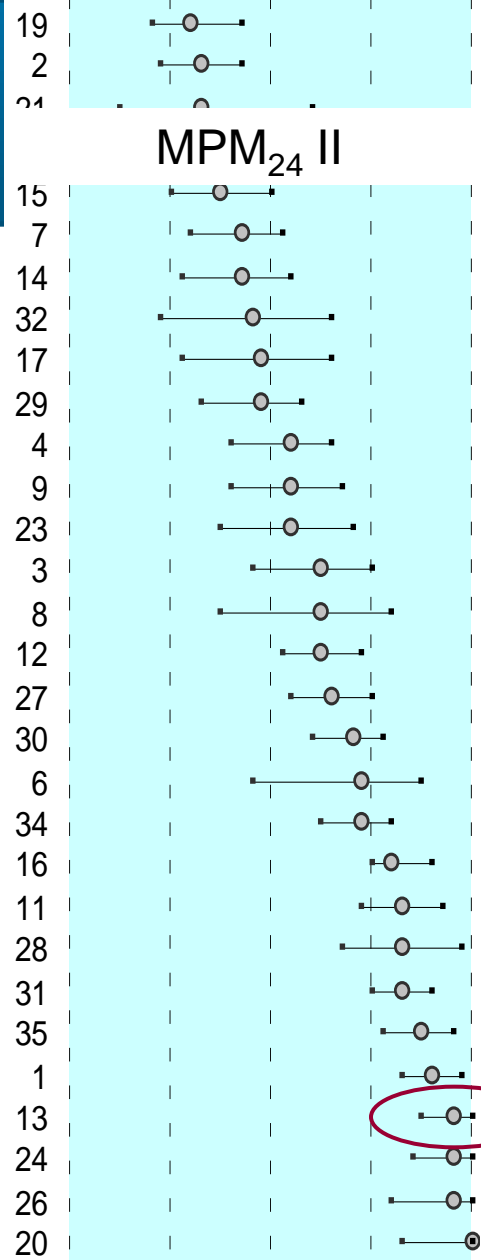
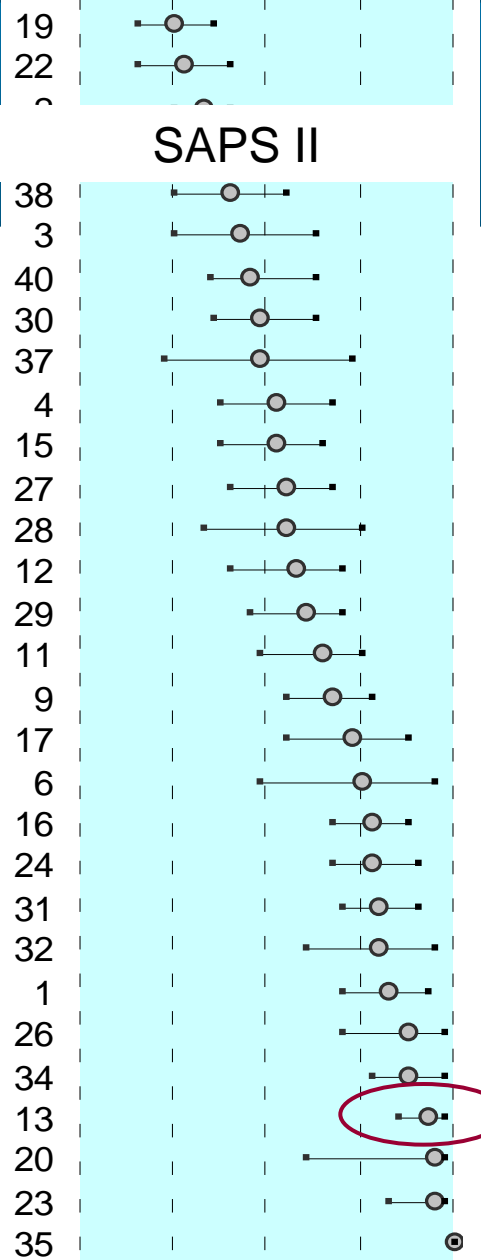
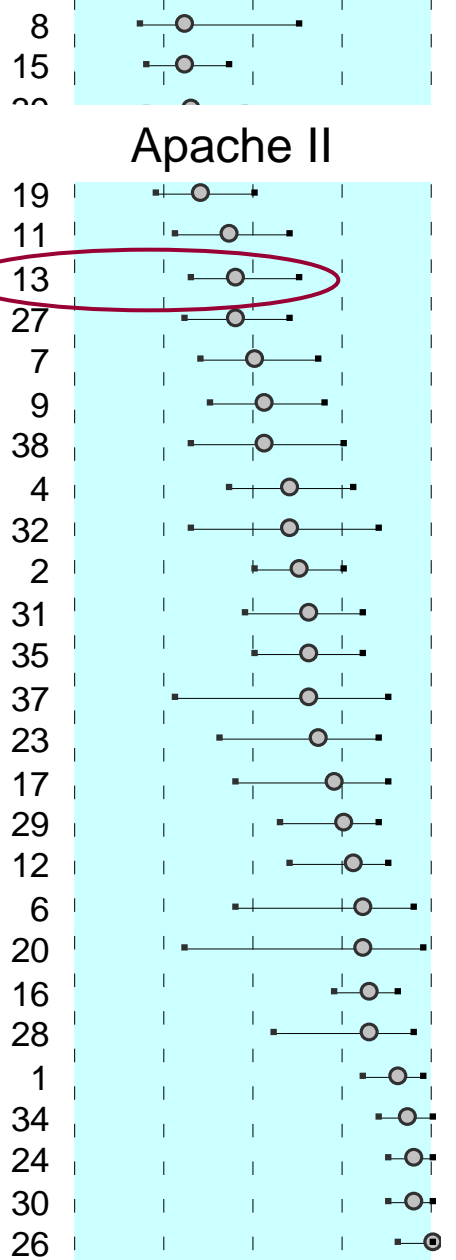


SAPS II



MPM₂₄ II



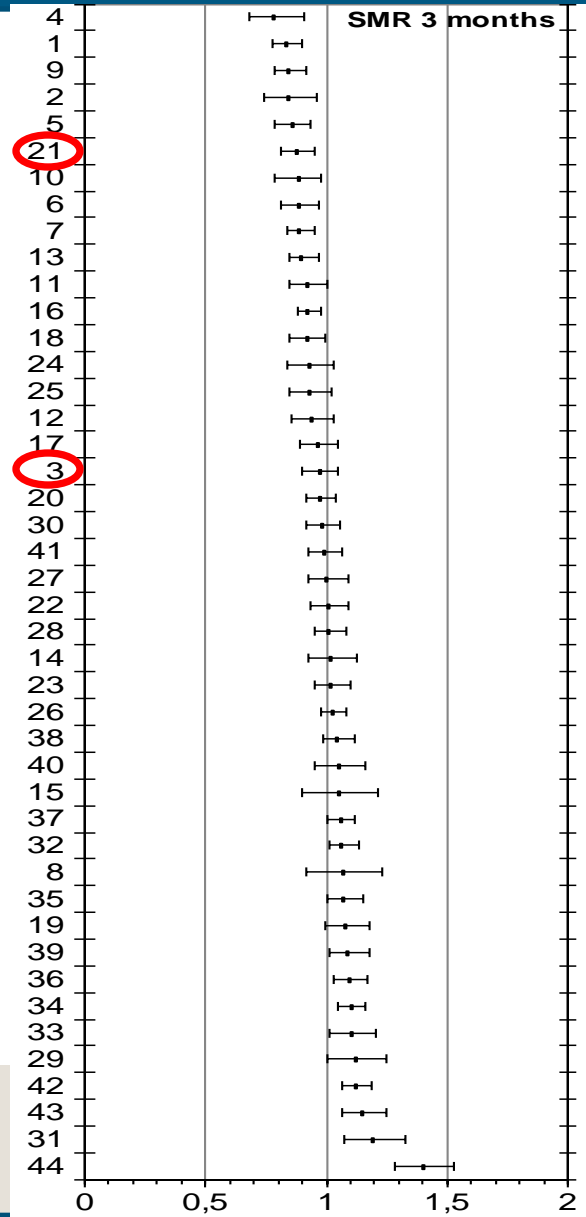
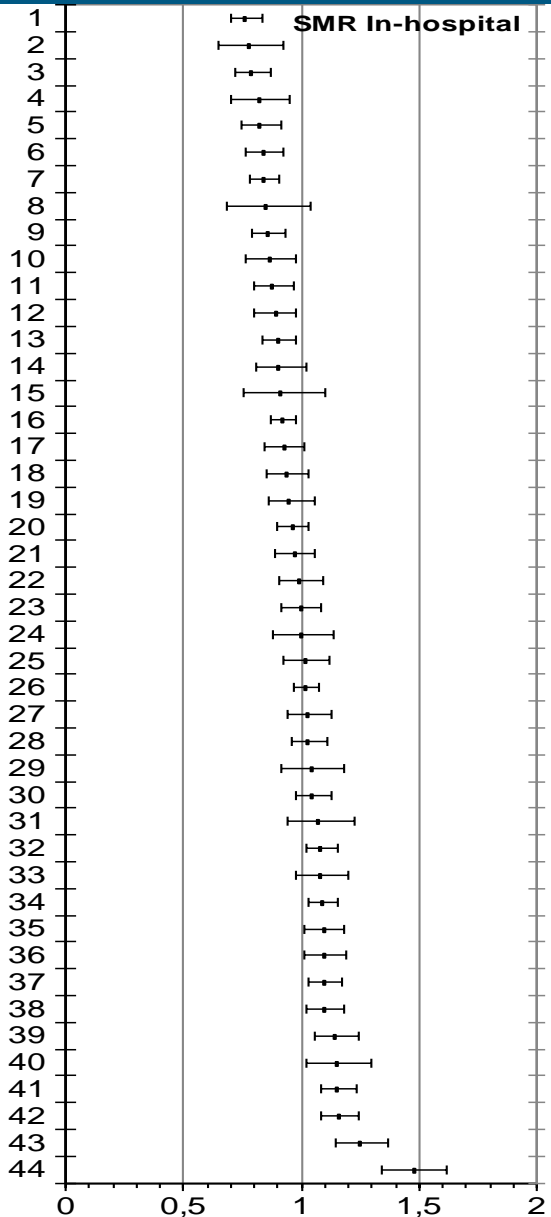


Benchmark –SMR fair?

- Benchmark on in-hospital mortality or long term mortality?
- Why choose for hospital mortality?
 - Sooner and easily available
 - Mortality not related to ICU admission
- Why choose for longterm mortality?
 - More relevant for patients
 - Less influence by discharge policy



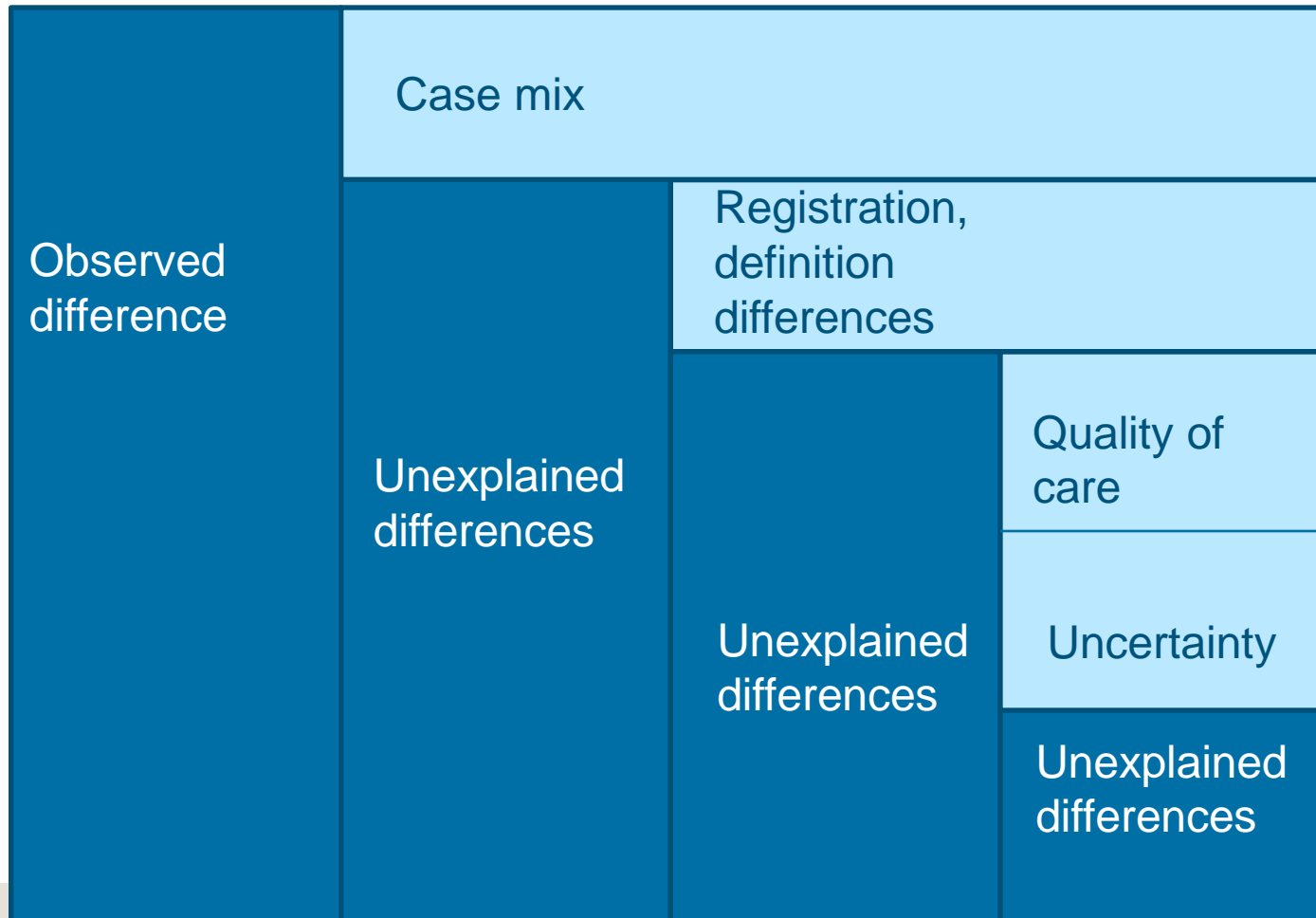
In-hospital mortality vs long term mortality



S. Brinkman et al. Intensive Care Med. 2013 Nov;39(11):1925-31

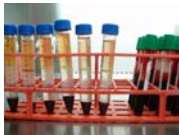


Other Challenges regarding FACT



Other Challenges regarding FACT

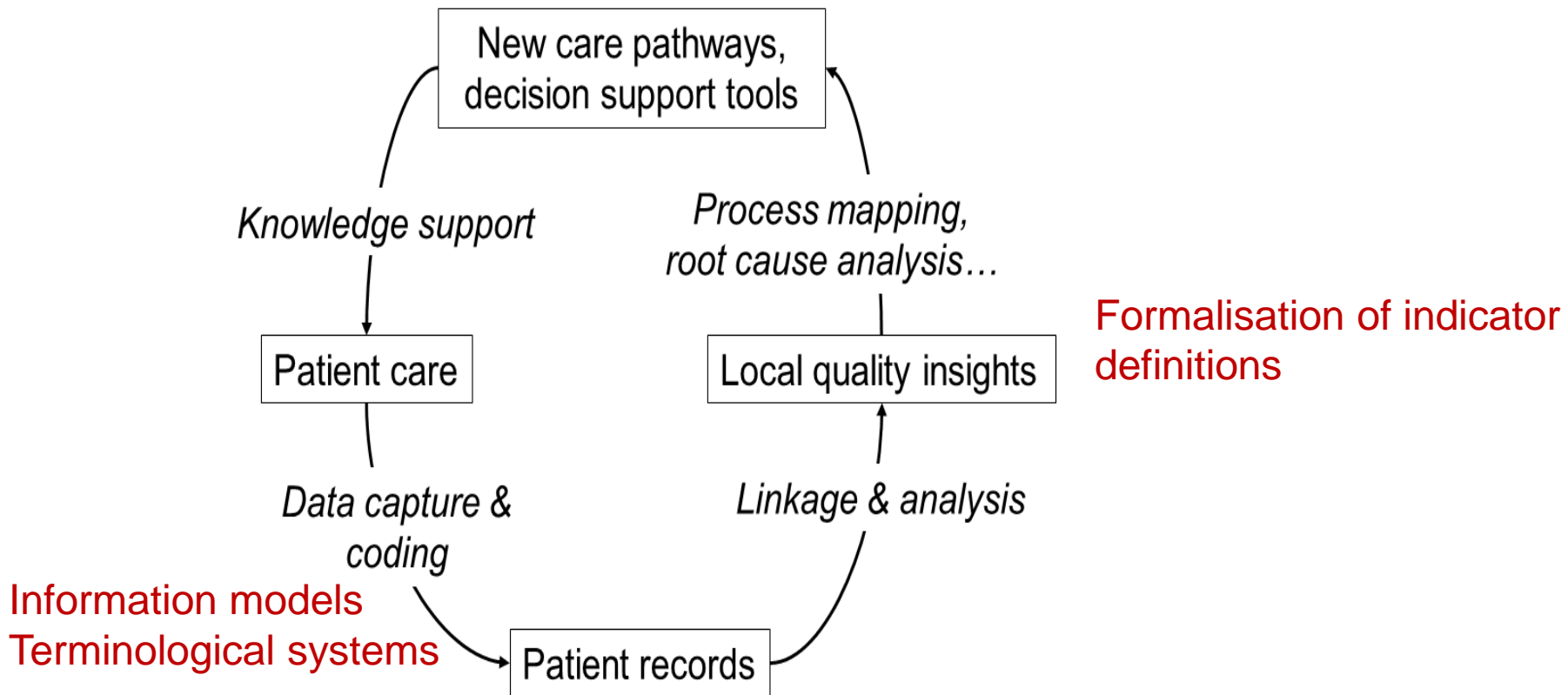
- The way of data collection influences SMR
 - Sample frequency
 - Coded data versus free text



- Interpretation and definition of QI
 - Expl IGZ: Mean duration of mechanical ventilation
 - Different types of ventilation
 - Duration in hours or calendar days
 - Mean based on all ICU patients or ventilated patients



Challenges Learning Health System



Conclusion

- Performance measurement of health facilities might be biased by
 - Data source
 - Case mix correction model
 - Definitions (of endpoints)
- Need for methods to unambiguously capture health data, formalize indicators and make health data transparent for different reuse purposes