

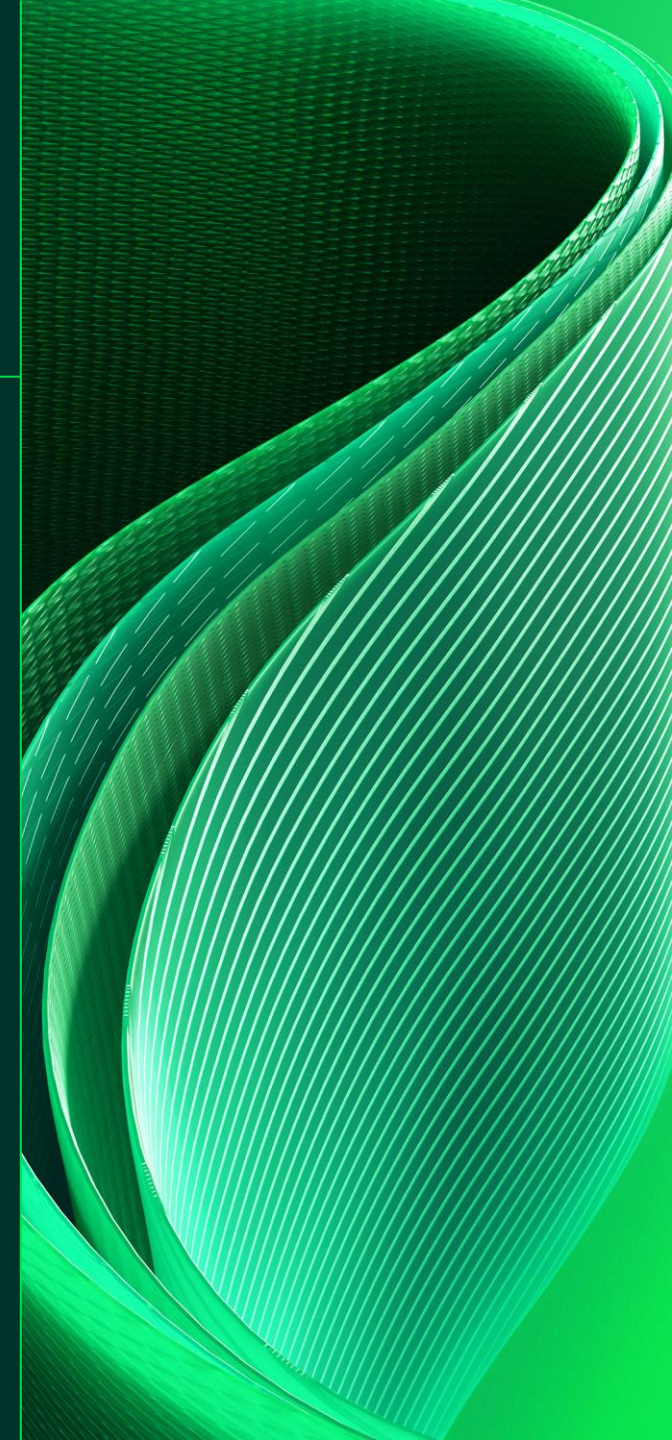


PCSI Workshop

From documentation to quality

Dr. Elric Verbruggen

May 28, 2024



Belgium

Hospital information systems (HIS)

Coding and Grouping

The screenshot shows a medical coding interface for a patient named Louise Dufour. The interface includes a header with patient information (female, 34 years old, F500003) and a navigation bar with 'Discard' and 'Save' buttons. The main content area is divided into several sections:

- Résumé médical:** Contains patient history, including hospitalization dates and medical notes.
- Codes (3):** A section for managing codes, with sub-sections for 'Diagnoses (2)' and 'Procedures (1)'. Each code entry includes a confidence level, source, date, and location, along with a 'Reject' button.
- Diagnoses (2):** Lists two diagnoses: Z51.11 (Encounter for antineoplastic chemotherapy) and C50.412 (Malignant neoplasm of upper-outer quadrant of left female breast).
- Procedures (1):** Lists one procedure: 3E03305 (Introduction of Other Antineoplastic into Peripheral Vein, Percutaneous Approach).

Benchmark portal

The screenshot shows a benchmarking portal dashboard with a grid of six main sections:

- Executive summary:** Provides a high-level overview of the data.
- Profile of the Hospital:** Displays key performance indicators such as 'Evolution of stays', 'Expected day care stays', and 'Proportion of residual DRGs'.
- Benchmarking composition:** Details the participants and statistics, including 'List of participants', 'Upload statistics', 'Representation of the 3M group', and 'Schedule norms'.
- Financing of the Hospital:** Focuses on 'JUSTIFIED AND BILLED ACTIVITY', including metrics like 'Hospital Ranking on JLOS and BLOS', 'Justified vs billed beds per bed index', and 'Share in JLOS and BLOS over time'.
- Quality and Performance Indicators:** Covers 'STANDARDIZED MORTALITY RATE (SMR)', 'POTENTIALLY PREVENTABLE READMISSIONS (PPR)', and 'POTENTIALLY PREVENTABLE COMPLICATIONS (PPC)'. It includes sub-sections for 'BED ALLOCATION', 'PHYSICIAN FEEDBACK', and 'SEVERITY OF ILLNESS'.
- Analysis of Coding:** Examines 'POA INDICATOR', 'ICD-10' codes, and 'NOSOLOGIE' (nosology) data.

Agenda

- 01 Introduction
- 02 Importance of documentation
- 03 Overview of quality measures
- 04 Standardized Mortality Rate
- 05 Potentially Preventable Complications
- 06 Potentially Preventable Readmissions
- 07 Conclusion

Belgium

The country

Size



General

- Population: 11,6 million
- Languages: Dutch, French, German
- National health insurance

3,605,613,872 €

Belgium

Hospital financing

38%

Department of Health

42%

Hospital doctors'
contributions

15%

Pharmacy procurement

Budget of Financial Means
of which 3,605,613,872 € is
APR DRG-based

02

Importance of documentation

Importance of documentation



The patient's health status

Documenting

Coding

Grouping

the patient's health status

the documentation of

the codes of

the patient's health status

the documentation of

the patient's health status

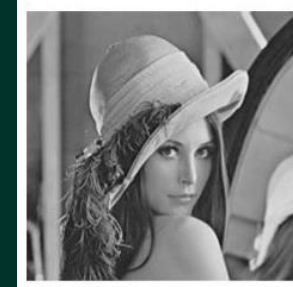
Importance of documentation

Abstraction of the reality

From **tens of thousands**
of disease combinations

to a few hundred
DRGs / severity levels

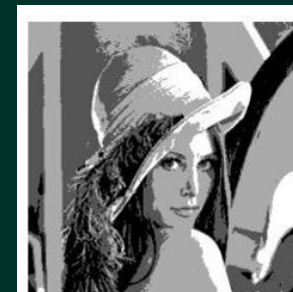
- 256 colors
(original)



- 8 colors



- 4 colors



Importance of documentation

Geriatric patient with femoral fracture

- Osteoporosis
- Heart failure Class III
- Chronic renal failure stage 2
- Hypothyroidism
- DM Type 2 with hyperglycemia
- 2nd degree AV block



Importance of documentation

Geriatric patient with femoral fracture

“cemented hemiarthroplasty for displaced transcervical fx after fall.”

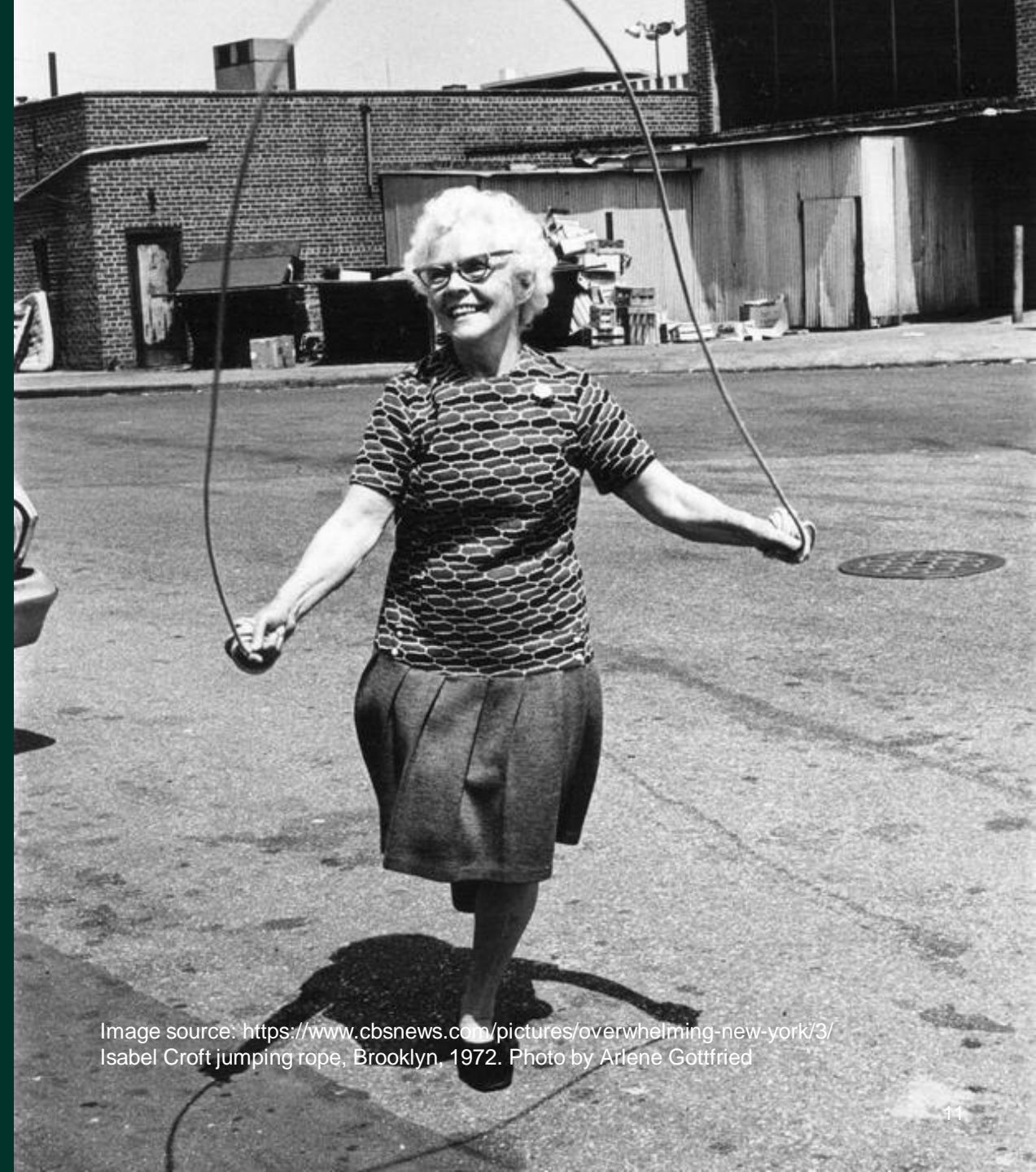


Image source: <https://www.cbsnews.com/pictures/overwhelming-new-york/3/>
Isabel Croft jumping rope, Brooklyn, 1972. Photo by Arlene Gottfried

03

Quality measures overview

Quality measures overview



Mortality

(Hospital) Standardized
Mortality Rate (SMR / HSMR)



Complications

3M Potentially Preventable
Complications (PPC)

AHRQ Patient Safety Indicators
(PSI)



Readmissions

3M Potentially Preventable
Readmissions (PPR)


Quality measures overview

Benchmark Portal in Belgian hospitals

Home


Medical Data

Executive summary




- Executive summary

Profile of the Hospital




- Evolution of stays
- Expected day care stays
- Proportion of residual DRGs

Benchmarking composition



- List of participants
- Upload statistics
- Representation of the 3M group
- Schedule norms

Financing of the Hospital



JUSTIFIED AND BILLED ACTIVITY

- Hospital Ranking on JLOS and BLOS
- Justified vs billed beds per bed index
- Norms comparison
- NPERCIZ: National Percentage of Intensive Care
- JLOS-BLOS and CMI
- Share in JLOS per bed type
- Evolution of JLOS and BLOS over time
- Impact Analysis by DRG
- Evolution of LOS and norms
- Evolution of justified activity: Explanatory parameters


BED ALLOCATION

- Gfin Analysis
- AKTSp Analysis
- Justified vs billed beds and G Potential visits

PHYSICIAN FEEDBACK

- Prorata per specialty
- Prorata per physician

Quality and Performance Indicators



- Quality square

STANDARDIZED MORTALITY RATE (SMR)

- Evolution of Standardized Mortality Rate
- Standardized Mortality Rate
- SMR per physician/specialty


POTENTIALLY PREVENTABLE READMISSIONS (PPR)

- Evolution of PPR Rate
- PPR Standard Rate
- PPR and readmissions per service line
- PPR per physician/specialty

POTENTIALLY PREVENTABLE COMPLICATIONS (PPC)

- Evolution of PPC Rate
- PPC Standardized Rate ranking
- Prevalence of PPCs

Analysis of Coding



POA INDICATOR

- Share of PoA values

ICD-10

- Non-specific coding: standardized rate
- Exhaustivity of coding
- Prevalence of ICD-10 codes per DRG
- Prevalence of ICD-10 codes

SEVERITY OF ILLNESS

- Spread over SOI levels
- CMI hospital ranking

NOSOLOGY

- List of Nosology edits
- List of triggers per Nosology edit

Quality measures overview

Benchmark Portal in Belgian hospitals



Quality and Performance Indicators

- [Quality square](#)

STANDARDIZED MORTALITY RATE (SMR)

- [Evolution of Standardized Mortality Rate](#)
- [Standardized Mortality Rate](#)
- [SMR per physician/specialty](#)

POTENTIALLY PREVENTABLE READMISSIONS (PPR)

- [Evolution of PPR Rate](#)
- [PPR Standard Rate](#)
- [PPR and readmissions per service line](#)
- [PPR per physician/specialty](#)

POTENTIALLY PREVENTABLE COMPLICATIONS (PPC)

- [Evolution of PPC Rate](#)
- [PPC Standardized Rate ranking](#)
- [Prevalence of PPCs](#)

Insights from different angles

Current rates vs. Evolution of rates

Different levels

Aggregated per year to drill-down per case

Comparison with other hospitals

Case-mix adjusted

“Which measure would you include in a P4P program and why?”

04

Standardized Mortality Rate (SMR)



3,605,613,872 €

16,000,000 €

(H)SMR in P4P

SMR

Why?

- Easy to determine
- There is a link with quality of care
- Link might not always be clear:
 - Badly treated, patient survived
 - Best care, patient died



Risk adjustment

- Reason for admission
- Comorbidities
- Age of the patient
- Procedure(s) performed
- ...



SMR

**Standardized
Mortality Rate**

Risk adjustment

ROM calculation

18 steps

Calculation after the APR DRG assignment

Using

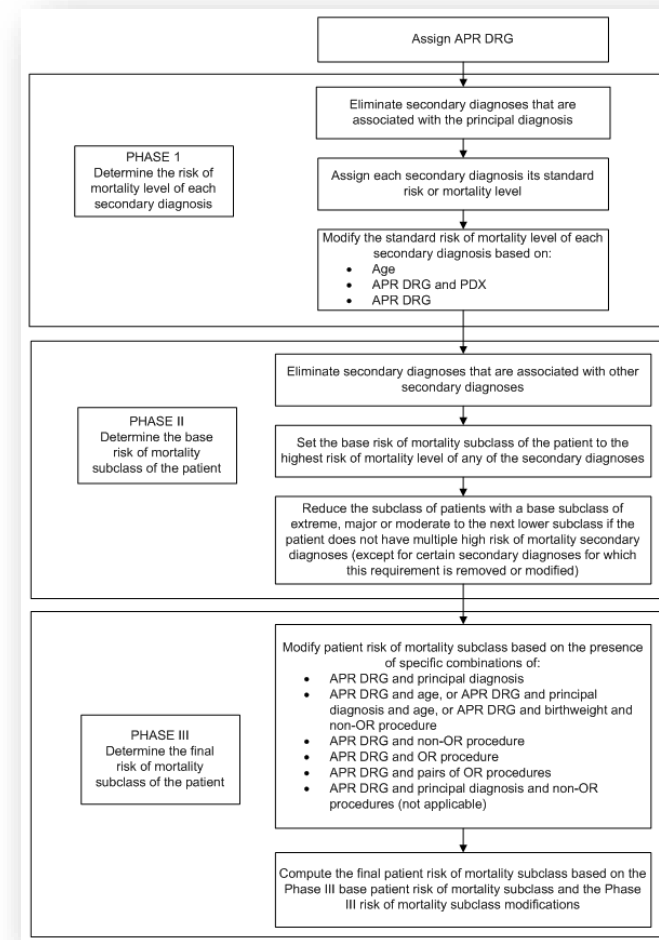
All diagnoses

Correcting for

Age, procedures, specific diagnosis combinations

Score from 1 to 4

From 'minor' to 'extreme' risk of mortality



Standardized Mortality Rate

SMR



Observed number of deaths



Expected number of deaths

Standardized Mortality Rate

Expected
rate



Benchmark

We know the number of patients per DRG/ROM
We know the number of deaths per DRG/ROM

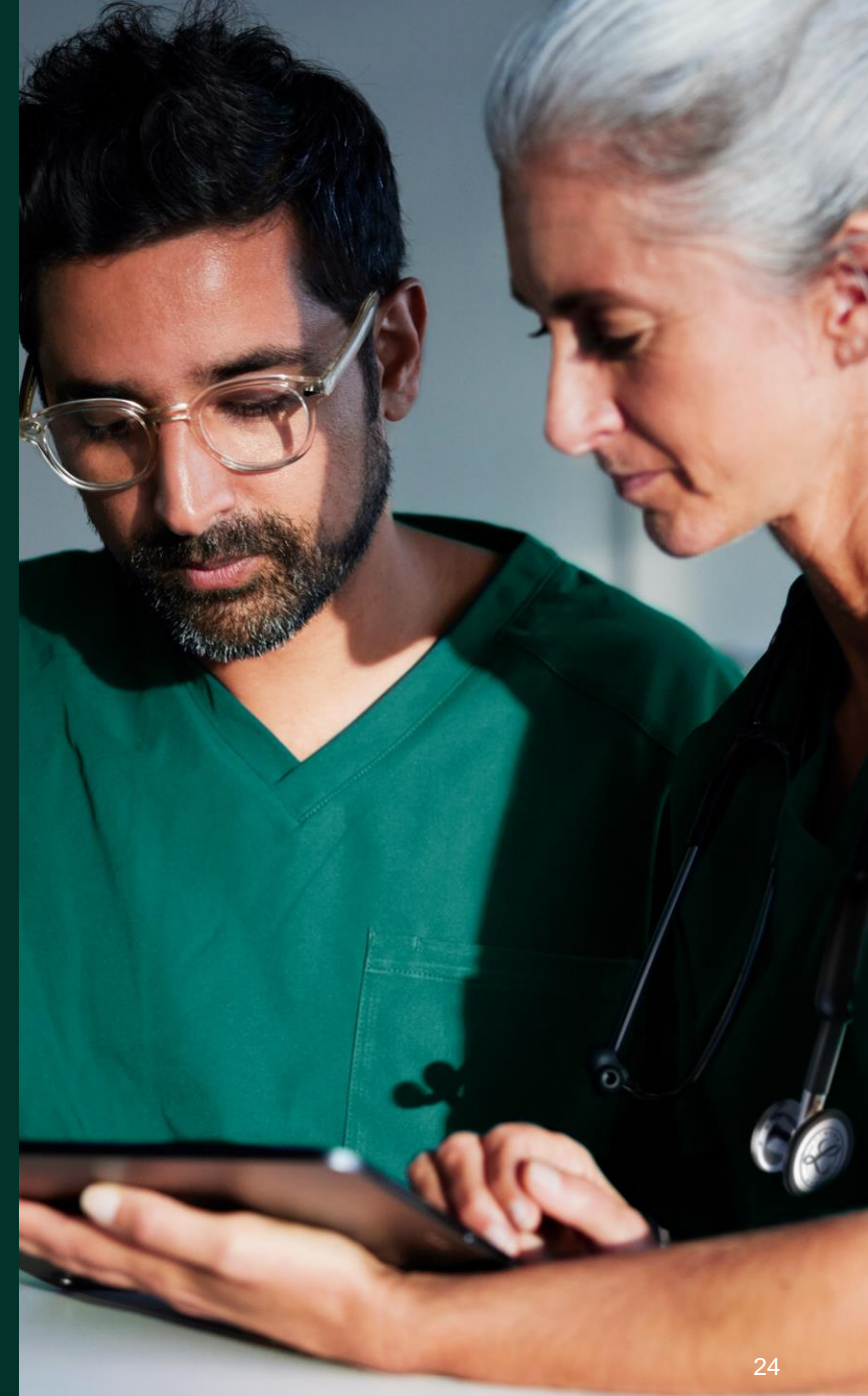
We can calculate an average number of deaths
per DRG/ROM

Hospital

Per hospital we apply this average number per
DRG/ROM to the number of patients observed in
that group. An expected number is obtained.

Expected rate - example

		Bench		Hospital A	
DRG	ROM	patients	deaths	patients	# expected
137	1	1000	50	10	0,5
...	...				
137	4	400	240	100	60
...	...				
194	4	200	10	40	2



Standardized mortality rate

SMR Calculation

For each DRG/ROM the observed number of deaths is divided by the expected number in **your** hospital

Larger than 1

Means you have a higher than expected rate

Observed number of deaths

Expected number of deaths

Standardized mortality rate

Benchmark Portal in Belgian hospitals

Quality and Performance Indicators



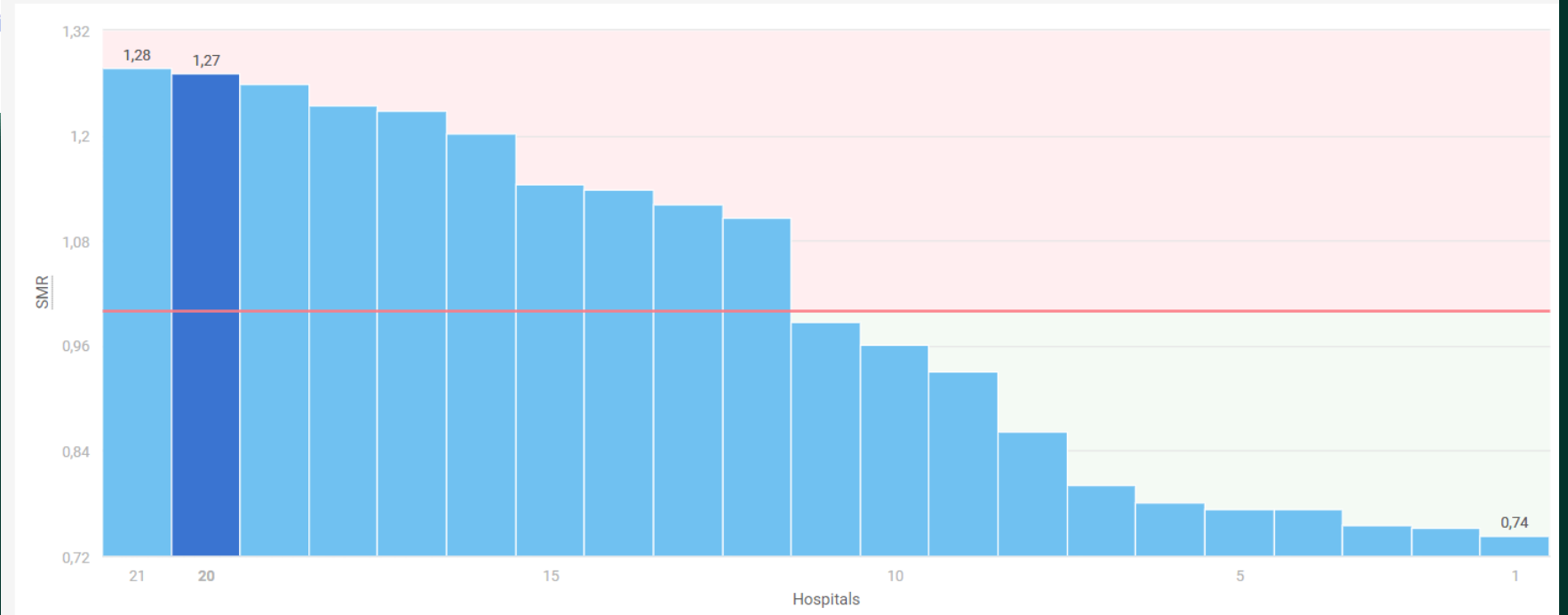
- Quality square

STANDARDIZED MORTALITY RATE (SMR)

- Evolution of Standardized Mortality Rate
- Standardized Mortality Rate
- SMR per physician/specialty

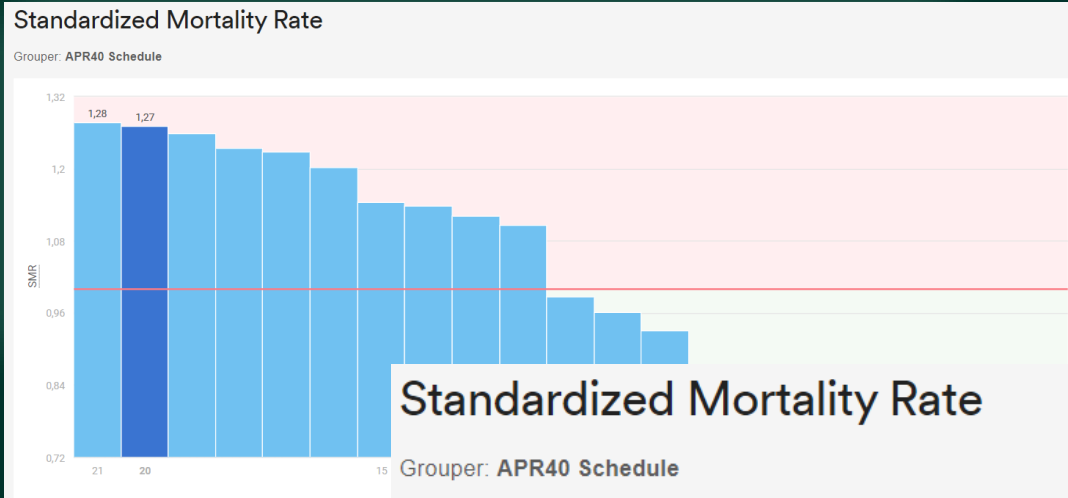
Standardized Mortality Rate

Grouper: APR40 Schedule



Standardized mortality rate

Benchmark Portal in Belgian hospitals



2023	Observed			Expected				Benchmark
	# Visits deceased	# Visits	% Visits deceased	# Visits deceased	Diff Obs-Exp	SMR=Obs/Exp	Significance	% Visits deceased
ROM 1	27	11.755	0,23%	19,80	7,20	1,364	P < 0,10	0,19%
ROM 2	107	2.225	4,81%	75,97	31,03	1,408	P < 0,01	2,95%
ROM 3	231	1.172	19,71%	170,55	60,45	1,354	P < 0,01	13,00%
ROM 4	178	410	43,41%	161,05	16,95	1,105	P < 0,10	38,65%

Standardized mortality rate

Benchmark Portal in Belgian hospitals

Standardized Mortality Rate

Grouper: APR40 Schedule

2023	Observed			Expected				Benchmark
	# Visits deceased	# Visits	% Visits deceased	# Visits deceased	Diff Obs-Exp	SMR=Obs/Exp	Significance	% Visits deceased
ROM 1	27	11.755	0,23%	19,80	7,20	1,364	P < 0,10	0,19%
ROM 2	107	2.225	4,81%	75,97	31,03	1,408	P < 0,01	2,95%
ROM 3	231							
ROM 4	178							

Standardized Mortality Rate. Drill down

Selected period: 2023

Stay Number	Patient Number	Stay type	Discharge Date	Period	DRG	SOI	Service Line	Age in Years	Discharge Destination
948232061454	64734476	H	15/04/2023	2023	720 - SEPTICEMI...	2	165 - Infectious Di...	87	8 - Decea...
792937535352	X912492	H	29/10/2023	2023	240 - DIGESTIVE ...	3	267 - Oncology	76	8 - Decea...
400546865287	X767973	H	22/08/2023	2023	240 - DIGESTIVE ...	2	267 - Oncology	81	8 - Decea...
912398279969	87881291	H	10/03/2023	2023	240 - DIGESTIVE ...	3	267 - Oncology	72	8 - Decea...
741152230945	69882383	H	24/07/2023	2023	281 - MALIGNAN...	2	267 - Oncology	96	8 - Decea...

“How would you act on this information?”

How would you act on this information

- Hospital director

- Ministry of Health / Payer

Standardized mortality rate

Benchmark Portal in Belgian hospitals



Quality and Performance Indicators

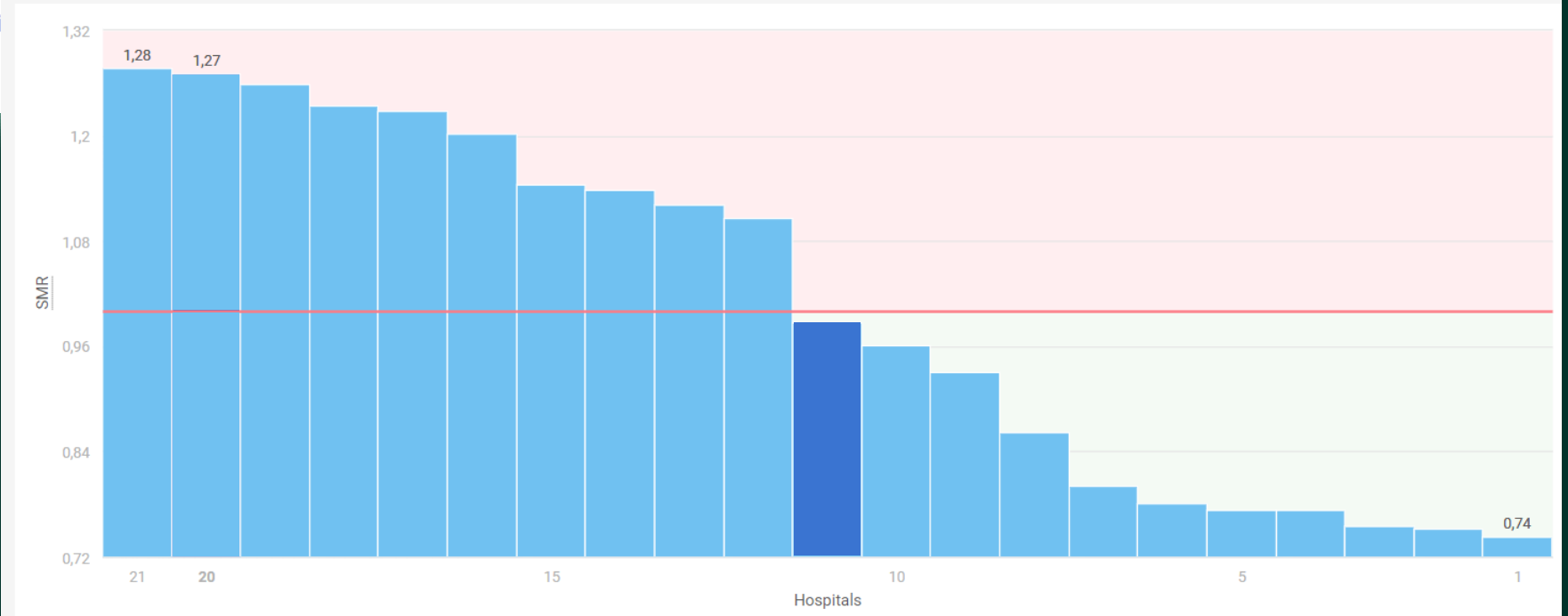
- Quality square

STANDARDIZED MORTALITY RATE (SMR)

- Evolution of Standardized Mortality Rate
- Standardized Mortality Rate
- SMR per physician/specialty

Standardized Mortality Rate

Grouper: APR40 Schedule



“How would you act
now?”

How would you act now?

“What limitations do you see?”

Limitations of the (H)SMR

- Social determinants of health
- 30-day mortality
- No detailed parameters (ejection fraction, BNP)
- Differences in coding practices
- Case mix adjustment is not always perfect (acuity)
- Financing: penalize or help bad performers?



05

Potentially Preventable Complications

PPC

Basics

- Based on **POA flag**
- **Potentially** preventable
- 57 items (complications)



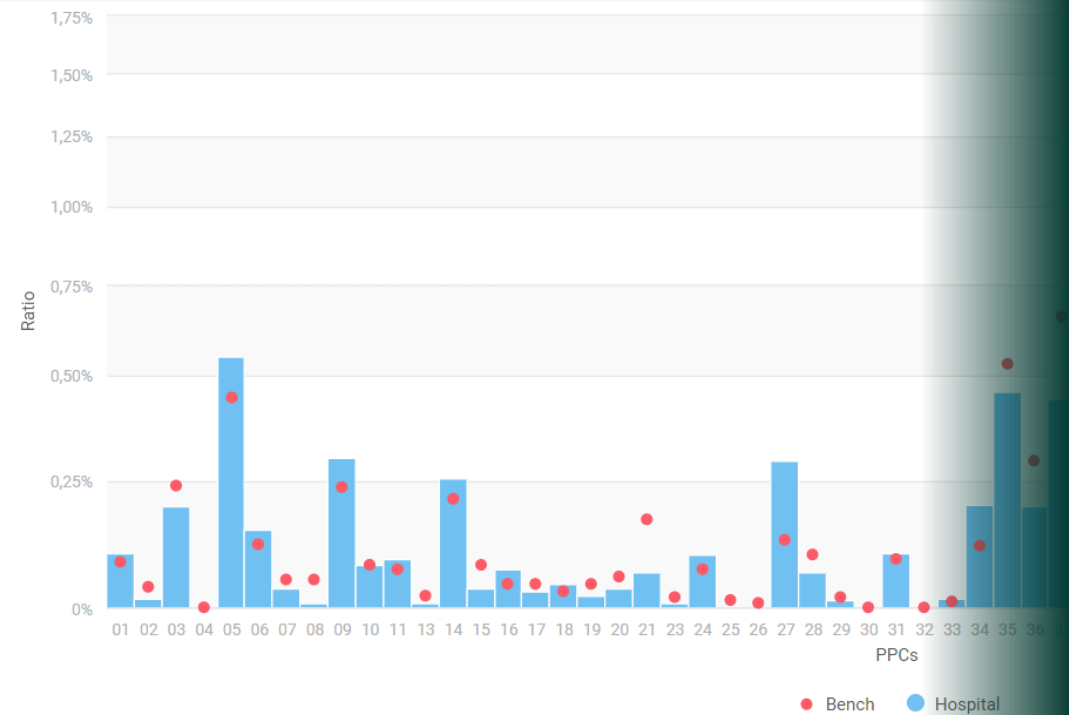
PPC

Use on Benchmark Portal

- 57 items in 8 categories
- Examples:
 - Post-operative hemorrhage
 - Deep wound infection
 - Urinary tract infection

Prevalence of PPCs

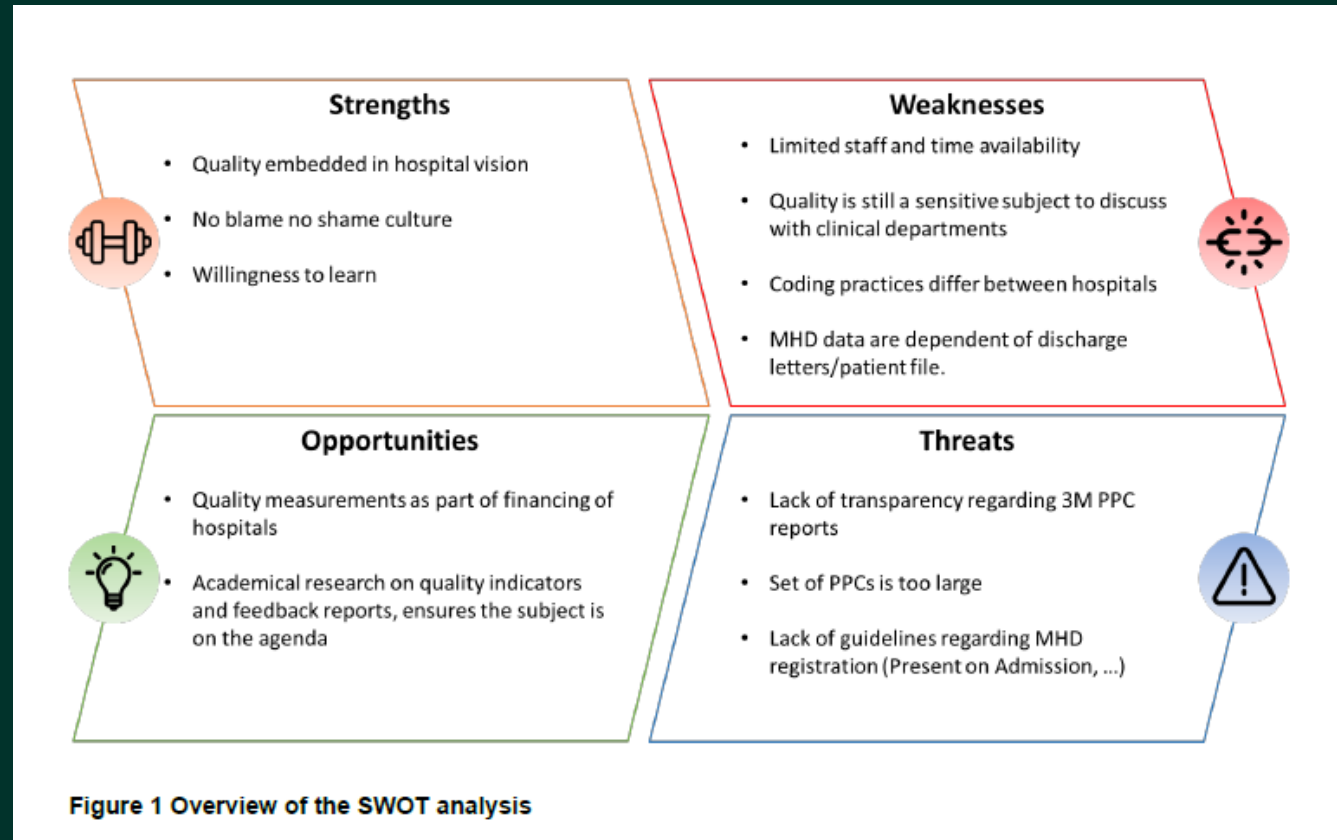
Group: APR40 Schedule



“What risks and benefits do you see?”

PPC use in Belgian hospitals

SWOT analysis



Source: Dr. Van Wilder, A., Sarah Mertens, Internal presentation: implementing PPCs in clinical practice, 2023

PPC

Algorithm

- Step 1: identify exclusion criteria
- Step 2: initial identification of possible complications
- Step 3: final PPC assignment



PPC

Algorithm

- Transplants
- Major trauma
- Metastatic malignancy
- Birth injuries

01

**Identify global
exclusions**

PPC

Algorithm

- Not present on admission (**POA = N**)
- List of \pm 5000 ICD-10 codes
 - Diagnoses with **significant impact**
 - **Not** an inevitable, **natural** or expected consequence
 - **Not redundant** with diagnoses that were present on admission

02

Identify admissions
with candidate
conditions

PPC

Algorithm

- **Specific exclusion criteria**
 - Age
 - Procedures / diagnoses
 - ...
- Apply **hierarchy**

03

Final PPC assignment

05

Potentially Preventable Readmissions



PPR

Properties

- Less dependent of coding
- **Reason** for readmission **not always clear.**
- Focus on **“why readmitted”** not on “preventability”



PPR

Basics

- Readmissions within a specific **timeframe**
- There is a **plausible clinical link** between the two admissions



PPR

Algorithm

- **Step 1:** identify exclusion criteria
- **Step 2:** apply time interval and classify admissions
- **Step 3:** identify PPRs and determine final classification



PPR

Algorithm

- Malignancies
- Chemo- and radiotherapy
- Neonates with (serious) complications

01

Identify Excluded Admissions and Non-events

PPR

Algorithm

- 15 days
- Classification
 - Initial admission
 - Readmission
 - Only admission



02

**Determine preliminary
classification of
remaining admissions**

PPR

Algorithm

- **Plausible clinical link** between initial admission and readmission?
- Based on a **DRG matrix**
- Example:
 - Pneumonia after femoral fracture: **YES**
 - Femoral fracture after pneumonia: **NO**

03

Identify PPRs and determine final classification of admissions

PPR

Other features

- Multiple readmissions are possible: **chain**
- Terminates a chain:
 - Death
 - Left against medical advice
 - Transfer to other hospital



PPR

Types

- Readmission for a **continuation or recurrence** of earlier admission
- Medical readmission for an acute medical condition that resulted from care during the Initial Admission
- Readmission for a surgical procedure to address a **complication**

