

Defining and developing clinical indicators for quality measurements

“I am called eccentric for saying in public that hospitals, if they wish to be sure of improvement, must find out what their results are. Must analyze their results to find their strong and weak points. Must compare their results with those of other hospitals... Such opinions will not be eccentric a few years hence.” E.A. Codman, MD, 1917.



DEFINITIONS

Clinical indicators are:

- **Measures that assesses a particular health care process or outcome**
- **Quantitative measures that can be used to monitor and evaluate the quality of important governance, management, clinical and support functions that affect patient outcomes.**
- **Measurement tools or flags that are used as guides to monitor, evaluate and improve the quality of patient care, clinical support services and organizational functions that affect patient outcomes.**

CHARACTERISTICS

The use of indicators should follow scientific principles.

They should be:

- **Based on agreed definitions**
- **Specific and sensitive**
- **Valid and reliable**
- **Have discrimination ability**
- **Relate to identifiable events (relevant to clinical practice)**
- **Permit useful comparisons**
- **Be evidence based**

Types of indicators

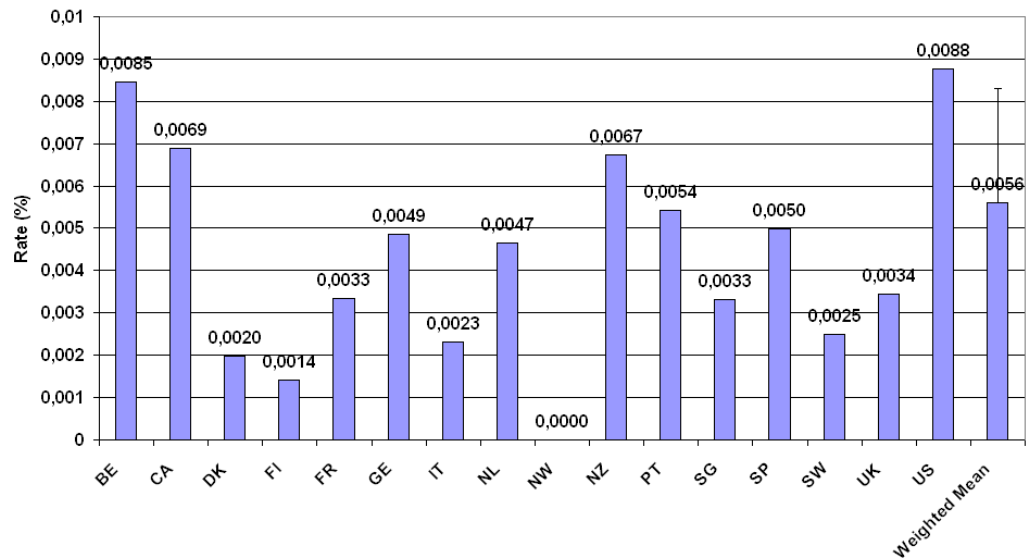
- Rate-based (e.g. readmission within 30 days after hospital discharge)
- Sentinelle (e.g. patients with schizophrenia committing suicide during hospital admission)
- Structure, process, outcome
- Generic vs. Disease specific
- Composite indicators

Patient safety OECD

Area	Indicator name
Hospital-acquired infections	Decubitus ulcer (PSI 3)
	Infection due to medical care (PSI 7)
Operative and post-operative complications	Complications of anaesthesia (PSI 1)
	Iatrogenic pneumothorax (PSI 6)
	Postoperative hip fracture (PSI 8)
	Postoperative respiratory failure (PSI 11)
	Postoperative pulmonary embolism (PE) or deep vein thrombosis (DVT) (PSI 12)
	Postoperative sepsis (PSI 13)
	Accidental Puncture or Laceration (PSI 15)
Sentinel events	Foreign body left in during procedure (PSI 5)
	Transfusion reaction (PSI 16)
Obstetrics	Birth trauma – injury to neonate (PSI 17)
	Obstetric trauma – vaginal delivery with instrument (PSI 18)
	Obstetric trauma – vaginal delivery without instrument (PSI 19)
	Obstetric trauma - caesarean section (PSI 20)

Foreign body left in during procedure (PSI 5), n=16

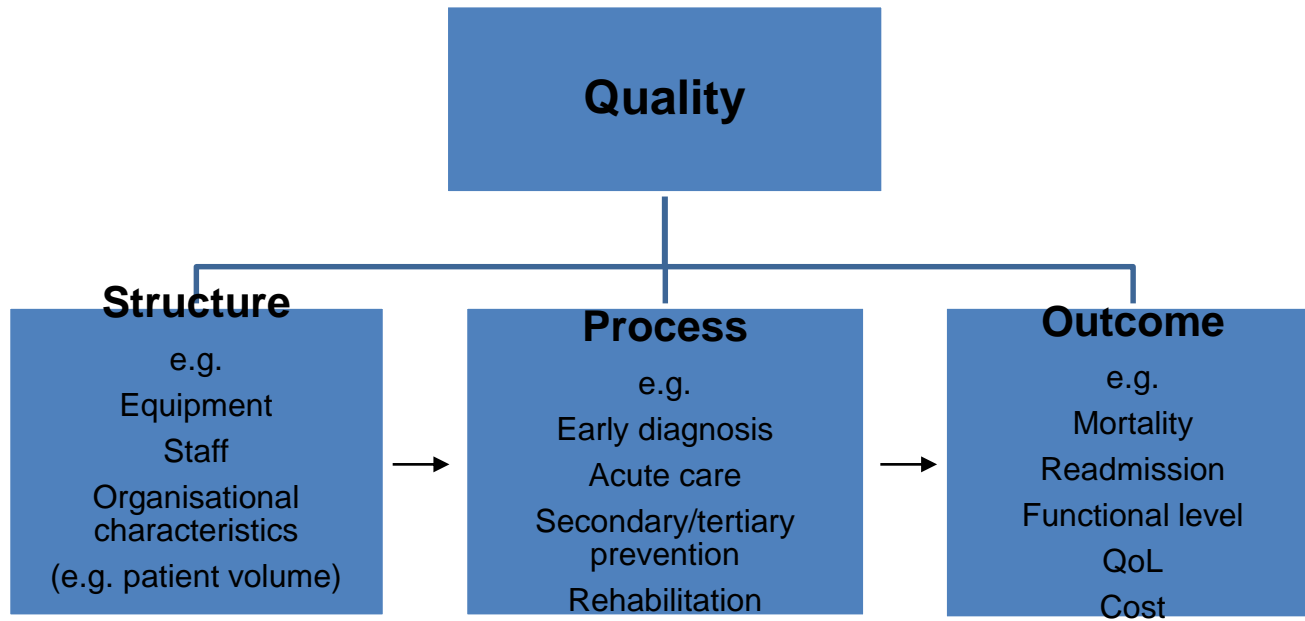
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Quality of care dimensions

- Related to
 - Structure of health care- denotes the attributes of the settings in which care occurs (what do we have)
 - Process of health care- denotes what is actually done for the patient- what do we do
 - Outcome of health care- the effect of care on the health care of patients- what did we achieved

The Donabedian model



Modified from *JAMA*. 1988;260:1743-8)

Structure indicators:

Examples

- Proportion of specialists in the hospital department
- Number of physiotherapists in the hospital department
- Access to technology/equipment
- Proportion of clinical guidelines which have been updated within the last 2 years
- Number of nurses per 1.000 discharges

Examples of process and outcome indicators

Indicator-concept	Indicator	Type	Standard
Pain	Proportion of patients who receive systematic pain assessment at rest and during mobilisation using a pain scale	Proces	>= 90%
Early mobilisation	Proportion of patients who are mobilised within 24 hours of the operation	Proces	>= 80%
Osteoporosis prophylaxis	Proportion of patients who were evaluated for pharmacological osteoporosis treatment	Proces	>=90%
Survival	Proportion of patients who are alive 30 days after admission	Outcome	>=90%
Reoperation	Proportion of patients with a hemi- or total alloplasty who are reoperated within 2 years	Outcome	<=10%

INDICATOR	TYPE	STANDARD	TIME
Proportion of patients admitted to a stroke unit	Process	≥ 90%	Second day of hospitalization
Antipatelet Therapy: Proportion of patients with acute ischemic stroke without atrial fibrillation, where platelet inhibitor treatment is not contraindicated, treated with platelet inhibitor	Process	≥ 95%	Second day of hospitalization
Oral anticoagulant therapy: Proportion of patients treated with anticoagulants	Process	≥ 95%	14 th day of hospitalization
Proportion of patients who undergo a CT/MRI scan	Process	≥ 80%	First day of hospitalization
Proportion of patients assessed by a physiotherapist	Process	≥ 90%	Second day of hospitalization
Proportion of patients assessed by an occupational therapist	Process	≥ 90%	Second day of hospitalization
Proportion of patients who have their nutritional status evaluated	Process	≥ 90%	First day of hospitalization
Proportion of patients assessed by dysphagia bedside screening in order to determine the extent of aspiration and the severity of swallow dysfunction	Process	≥ 90%	First day of hospitalization
Proportion of patients who undergo ultrasound/CT-angiography of their carotids artery	Process	≥ 90%.	Fourth day of hospitalization
30 days mortality	Outcome	< 15%	30 days after hospitalization

Process vs. outcome indicators:

ANALYSIS

Use of process measures to monitor the quality of clinical practice

Outcomes of care are a blunt instrument for judging performance and should be replaced, say **Richard J Lilford, Celia A Brown, and Jon Nicholl**

Healthcare organisations are increasingly scrutinised by external agencies, such as the Health Care Commission in England and Medicare in the Unites States. Such agencies increasingly concern themselves with the quality of care and not just measures of throughput, such as waiting times and the average length of hospital stay. Measures of clinical quality are also likely to be used increasingly to monitor the performance of individual doctors.¹ But how should quality be measured? The intuitive response is to measure the outcomes of care—after all, patients use the service to improve their health

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It is a myth that the problem of poor correlation between quality and outcomes can be solved by statistical adjustment for risk (the risk adjustment fallacy).⁶ Risk adjustment does not remove the problems of bias in rankings for two reasons:

Firstly, risk adjustment cannot allow for case mix variables that have not been measured (perhaps because they are unknown) and are therefore omitted from the statistical model. Nor can it allow for differences in definitions (or in how the same definitions are applied) to either numerators or denominators.

SELECT INDICATORS AND STANDARDS

Process or outcome indicators? |

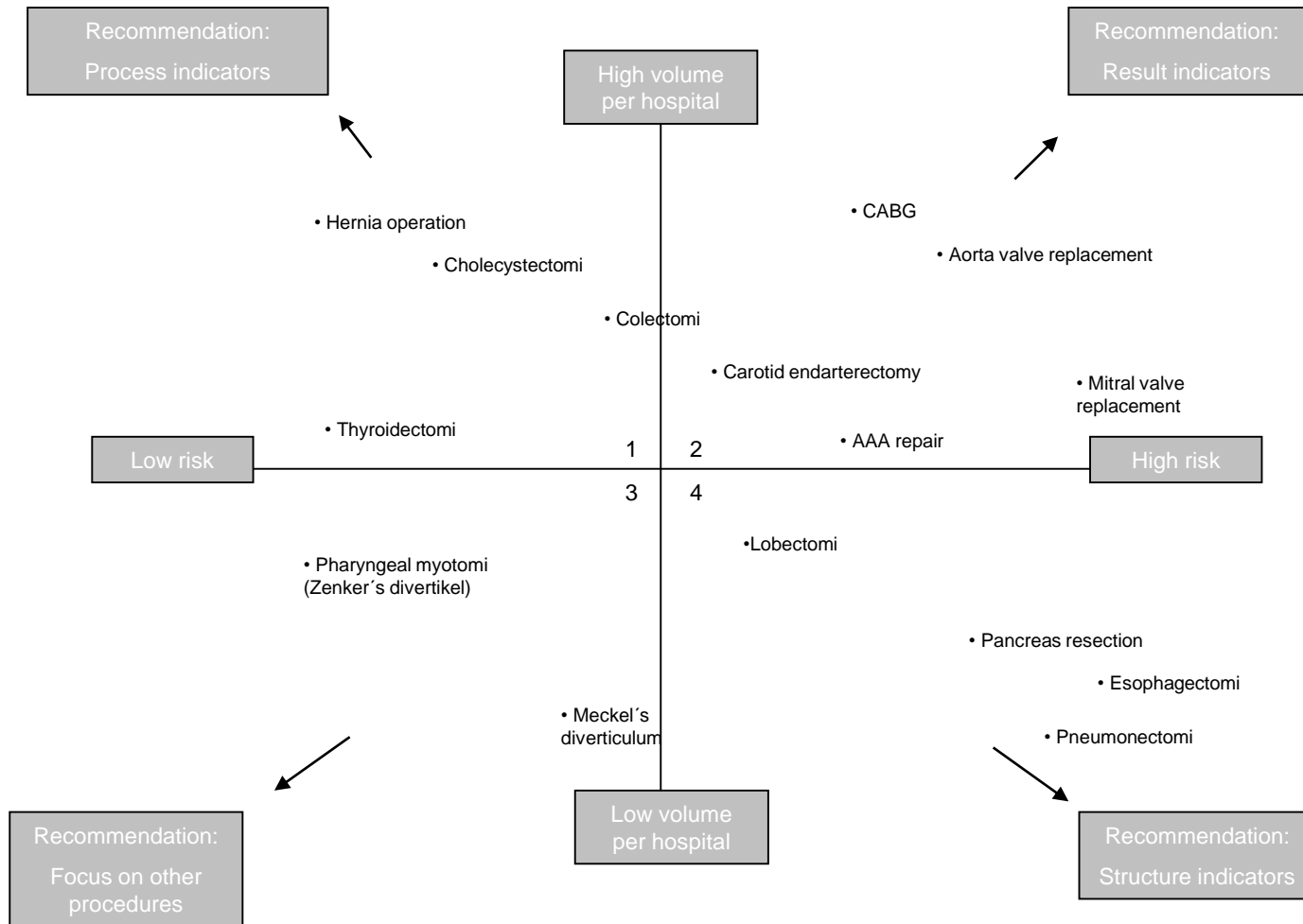
- ***Process* denotes what is actually done in giving and receiving care**
- **Outcome denotes the effects of care on the health status of patients and populations**
- **A good process increases the likelihood of a good outcome**
- **The process of care do not signify quality until their relationship to desirable outcomes have been established**

SELECT INDICATORS AND STANDARDS

Process or outcome indicators? II

- **It is necessary to have established a relationship between a particular process and outcome**
- **The scientific literature can establish the linkage between process and outcome**
- **Clinical indicators should be evidence based to confirm this linkage**

Recommendations for choice of indicators



Steps in the development and implementation of quality monitoring

1. Indicators development
 1. Planning phase
 2. Establishment of clinical indicators, standards and prognostic factors
 3. Implementation
2. Indicator monitoring
 1. Data collection, data analyses and feedback
 2. Clinical audit and initiatives for quality improvement
 3. Public release of data
3. Updating of indicators

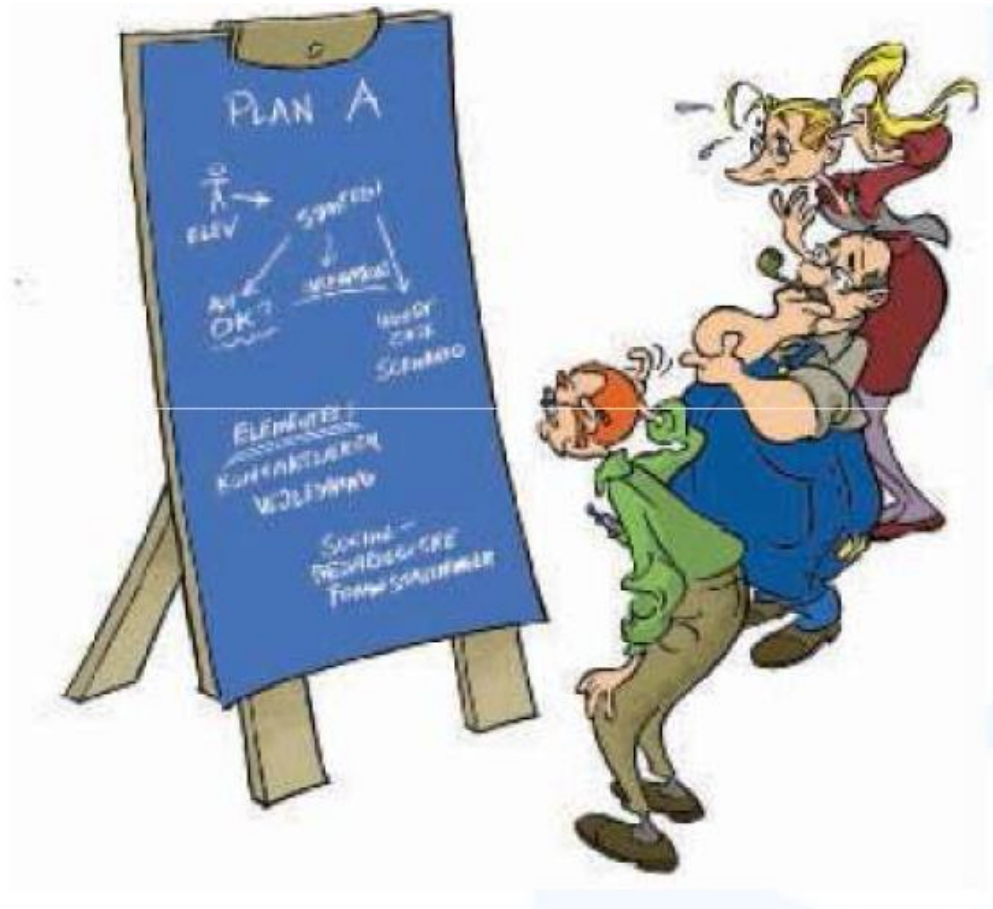
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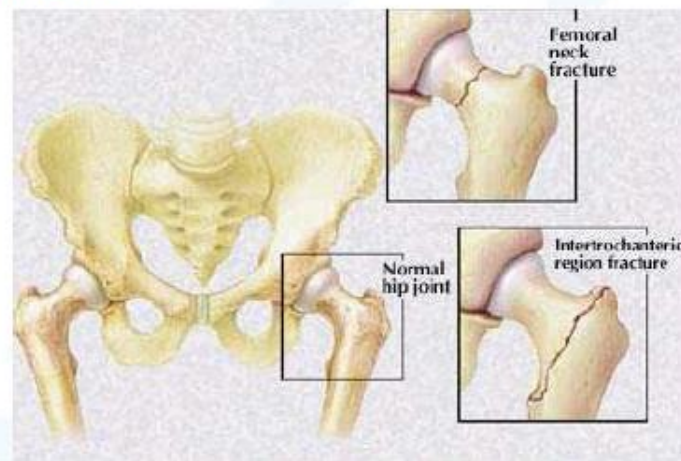
Manual for the Development of Disease-specific Quality Indicators,
Standards and Prognostic Factors under The Danish National
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Indicators development-planning phase



Criteria for selection for quality monitoring

- Major disease:
 - High prevalence
 - Large use of resources
 - Older and comorbid patients
- Unexplained variation in the prevalence of hip fracture, as well as variation in the treatment
- Suitable for quality monitoring and improvement



Indicator project group

- Multidisciplinary team of health care professional involved in the treatment of hip fracture patients
- The 13 members are appointed by the relevant scientific associations
- Represent different geographical areas and types of hospitals
- Two chairpersons
- The project manager
- The documentalist
- The clinical epidemiological expertise

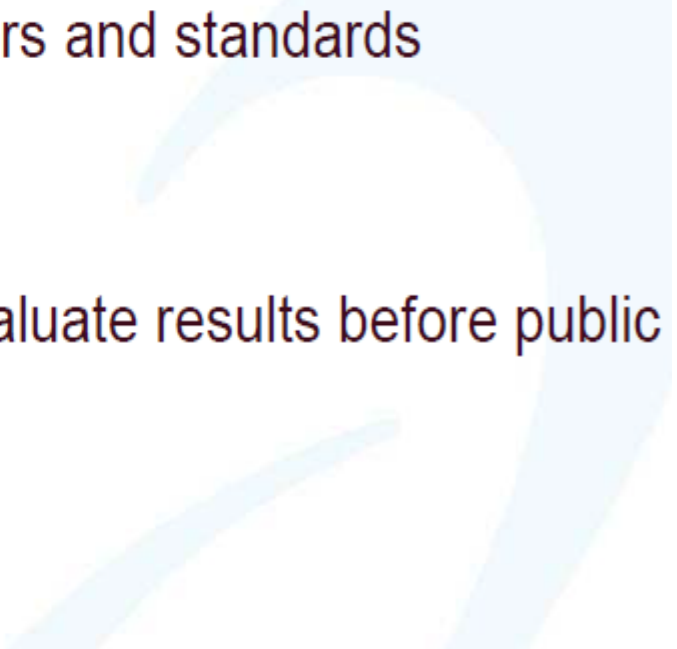
The clinical epidemiologist duties

- Identification of prognostic factors
- Epidemiological analyses
- Design the clinical indicators
- Algorithm specifications
- Data definition
- Data validity assessment

Establishment of clinical indicators



Basic principals for establishment of clinical indicators

- Healthcare professionals develop indicators and standards
(indicator set)
 - Healthcare professionals interpret and evaluate results before public disclosure
(clinical audit)
- 

Establishment of clinical indicators

2. Evidence-based literature review



1. Selection of potential Indicators



3a. Test of indicator set



4. Final version of indicator set



5. Regional implementation conferences



6. Implementation



Establishment of clinical indicators



1. Selection of potential indicators for patient pathways

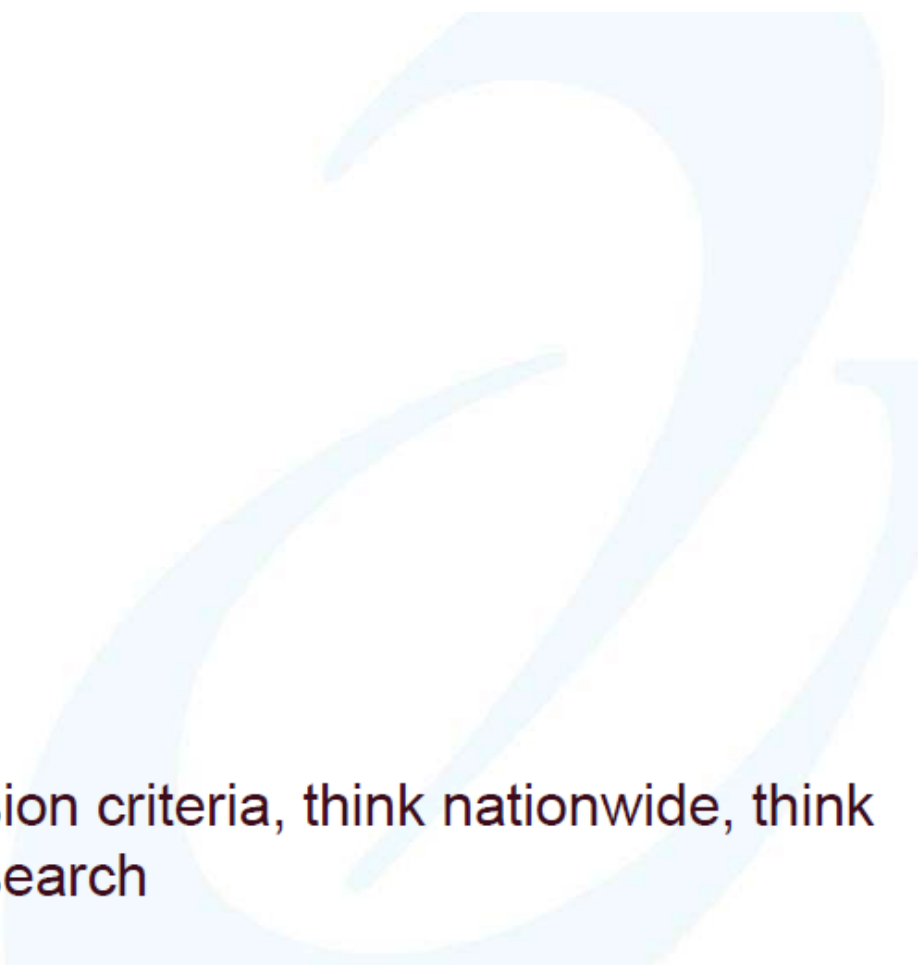
- Describe a standardized patient course for hip fracture
- Inclusion criteria
- Bruttolist of indicators
- Selection of preliminary indicator set



12-13 weeks



Bruttolist of indicators

- Walking ability
 - Activity of daily living
 - Mobilisation
 - Basis mobility
 - Pain
 - Mortality
 - Reoperation
-
- Be specific: when, how, inclusion criteria, think nationwide, think benchmarking more than reasearch
- 

2. Evidence-based literature review

Publication type	Level of evidence	Strength of recommendation
Meta-analyses, systematic reviews Randomized controlled trials (RCT)	Ia Ib	A
Controlled trials without randomization Cohort studies	IIa	B
Case-control studies	III	C
Multiple time series Expert opinions or consensus	IV	D

6 weeks

RISK ADJUSTMENT

Process indicators

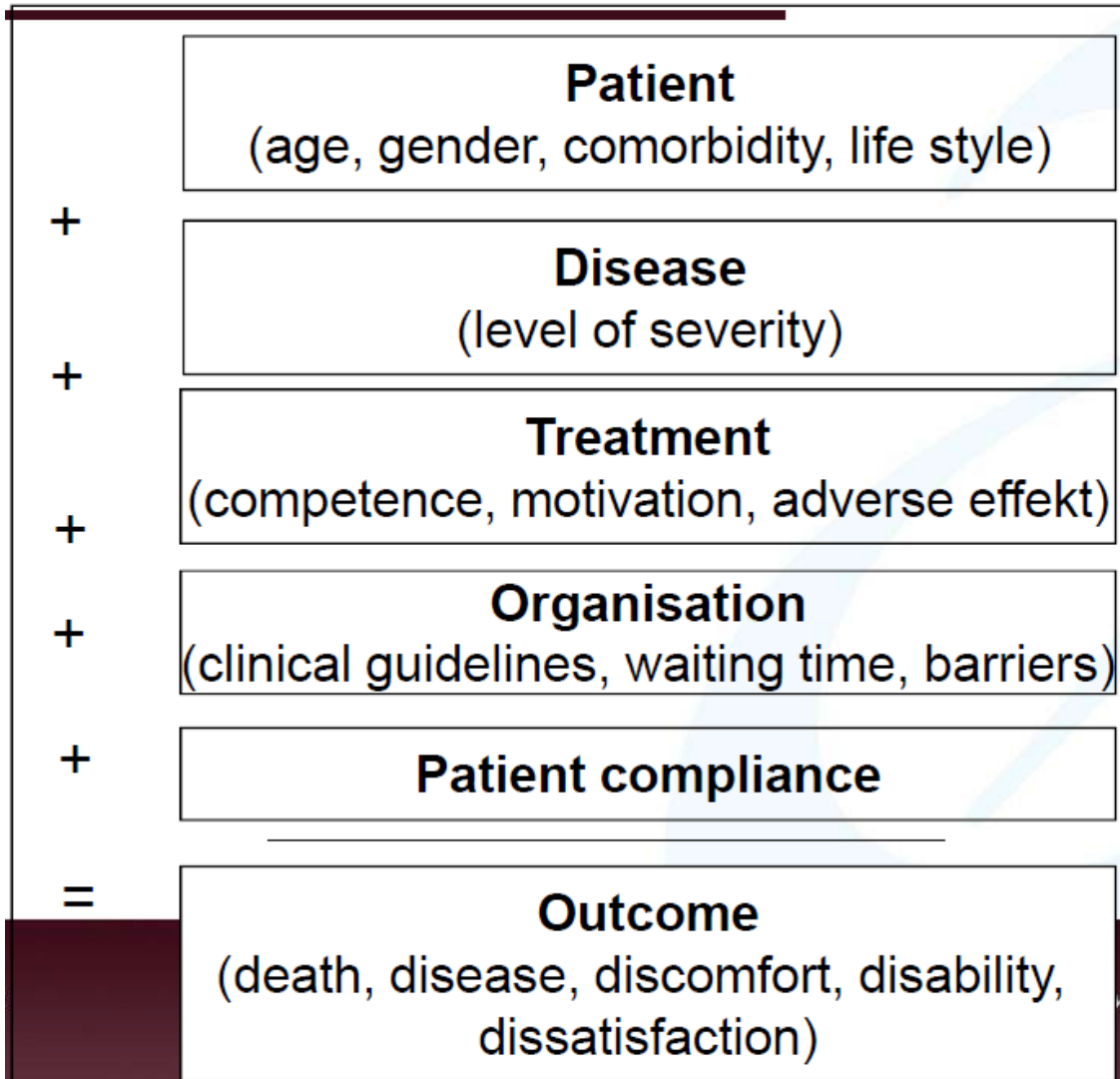
- **For some process indicators risk adjustment plays a smaller role**
- **For other process measures risk adjustment may reveal that patient factors are influencing a measure**
- **The more closely an indicator measures the actual process of care delivered rather than patient adherence or other factors the less risk adjustment will be needed**

RISK ADJUSTMENT

Outcome indicators

- **Multiple factors contribute to health care outcomes**
- **The adequacy of controls for differences in case mix and other covariates are important when using outcome indicators**
- **Prognostic factors should be identified from the scientific literature**

Prognostic factors



Selected prognostic factors for hip fracture

- Alcohol consumption
- Smoking
- Body Mass Index
- Marital status
- Housing
- Comorbidity before hip fracture
- Hip fracture position
- Surgery delay
- Baseline mobility prior hip fracture

Process cont. -Finalising of documents

1. Indicator form
2. Documentalist report
3. Data definition with list of variables
4. Indicator algorithms
5. Registration form

Collection of data

Data sources:

- Medical records
- Hospital/Regional IT systems (Lab.,billing, adm.)
- National Patient Registry, Citizen registry
- All data from each patient are linked to the civil registration number

Registration form for each patient:

- Paper form
- Electronic form

Validation of data

Validation of data is carried out at 3 levels:

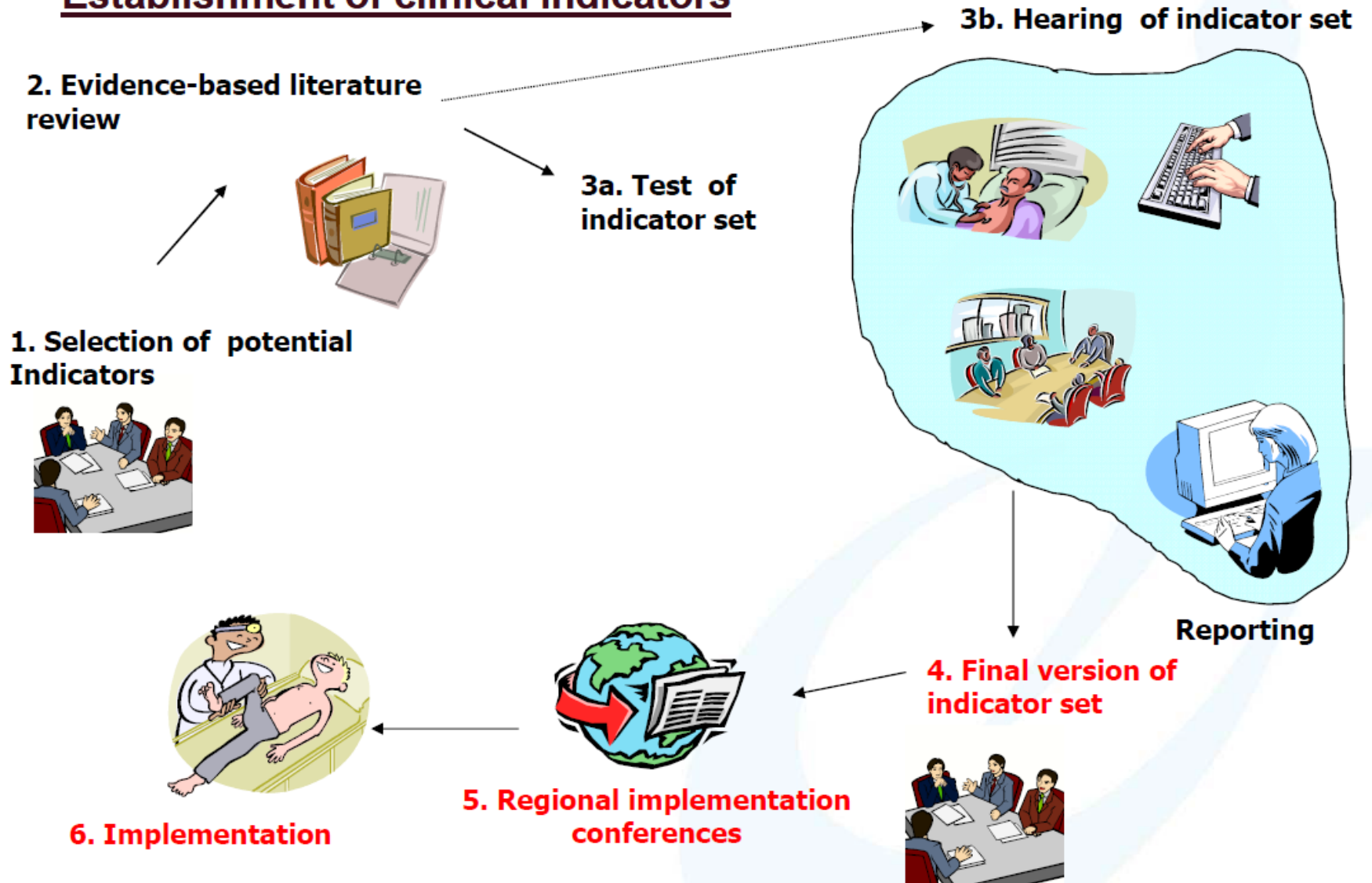
- **Data registration: Interrater reliability**
- **Completeness of patient inclusion: Linkage of data from the National patient registry and data from the project database/a part of the feed back system**
- **Completeness - data reporting: validation by screen /a part of the feed back system**

3a. Test phase

- Selection of test departments
- Testing of the indicator set and logistics of registration
- Patient identification
- Data collection
- Rescoring of medical records
- Testing the completeness of database
- Preparation of standard report
- Evaluation of the results from the test phase
- **8-10 weeks**



Establishment of clinical indicators



Process Indicators in the Danish Indicator Project

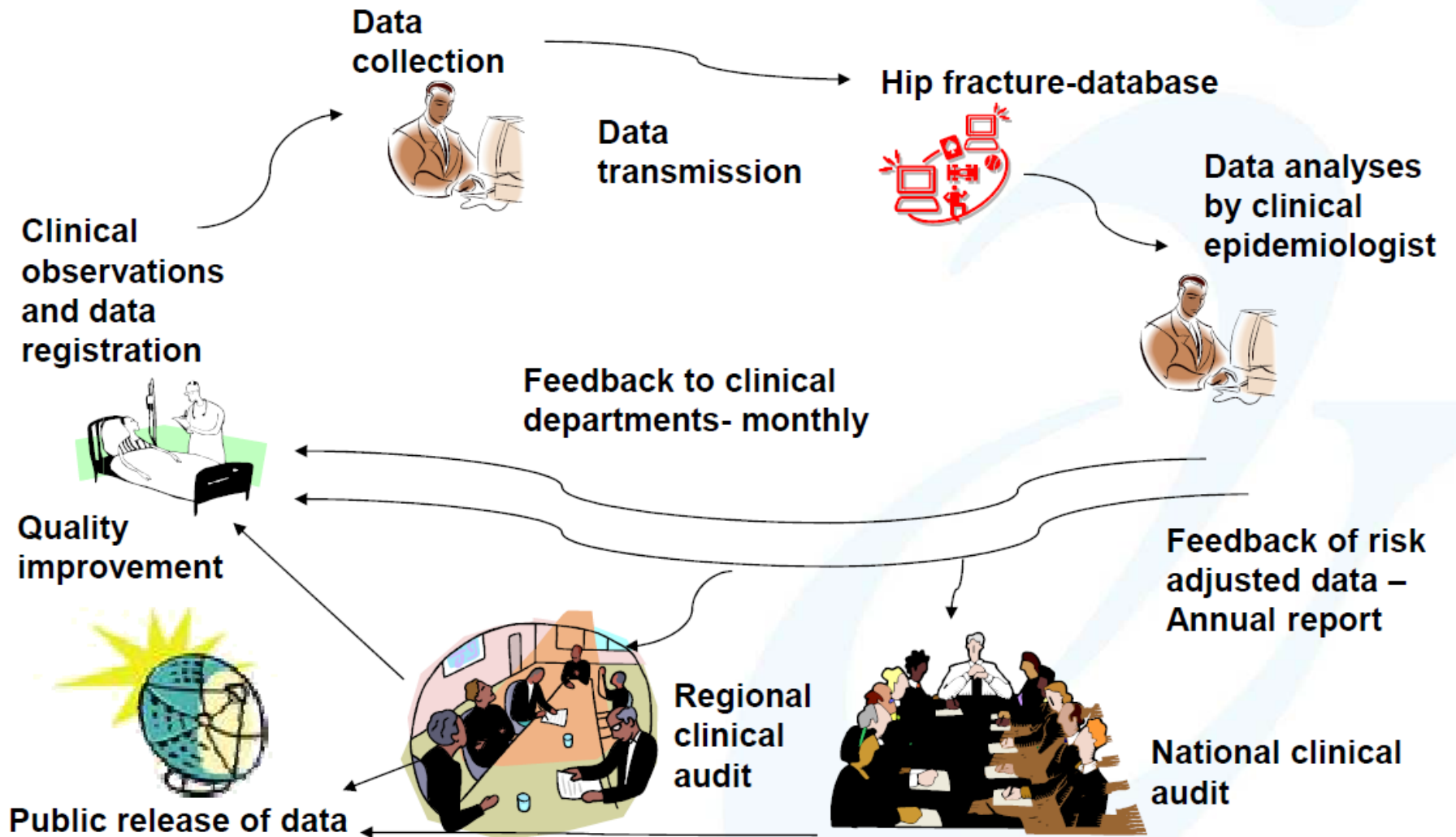
- **Heart Failure**
 - **Echocardiography**
 - **New York Heart Association Classification**
 - **Exercise training**
 - **Medicamentary treatment**
 - **Patient education**

Process Indicators in the Danish Indicator Project

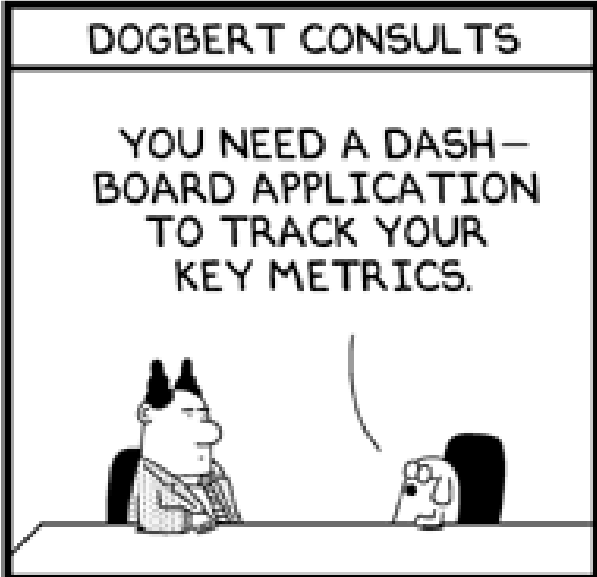
Schizophrenia

- Diagnostic Proces**
- Contact person**
- Medication**
- Side effects**
- Family Intervention**
- Psycho education**
- Planned outpatient treatment at discharge**
- Prevention of Suicide**

Clinical indicators monitoring



Reporting indicators



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Clinical audit: External Professional Pressure

The audit process is organized

- **Nationally**
- **Regionally / locally**

**.....regularly conducted once a year and furthermore
in case of special requirement – with the aim of
INTERPRETATION**

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Indicator development- main point

- Manual for the development of quality indicators, standards and prognostic factors
- Time schedule
- Indicators should be based on scientific evidence or consensus among health professionals
- Healthcare professionals develop indicators and standards, interpret and evaluate the results
- Multidisciplinary project group