



VBHC IN PUBLIC HEALTH SYSTEMS – TRACKING OUTCOMES AND COSTS AT A POPULATION LEVEL

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AGENDA

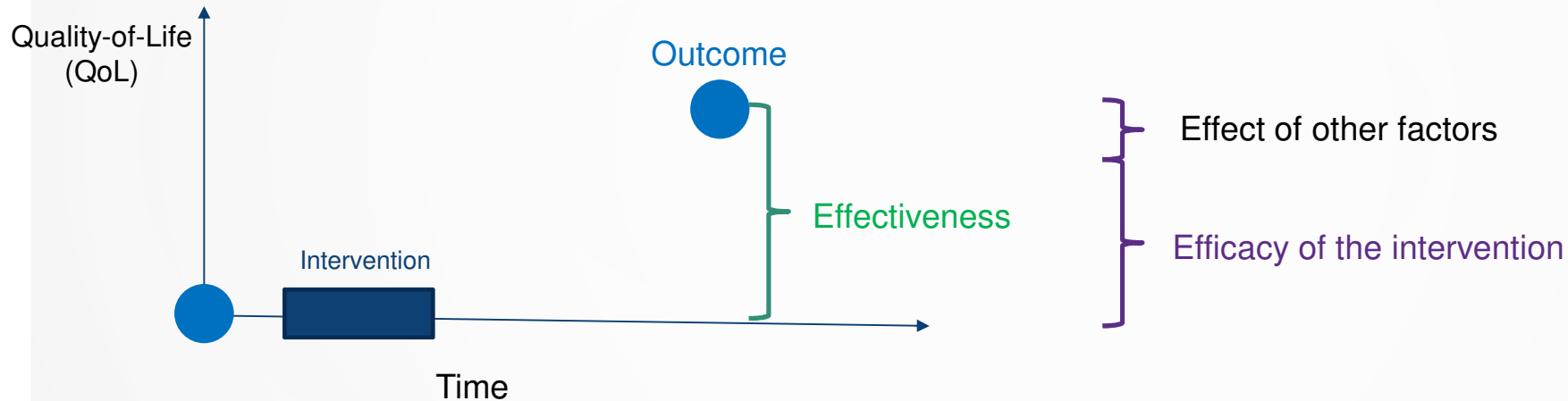
- VBHC, Effectiveness and Outcomes
- How to define goals at a population level?
- What can we know of a population health? How is that related to the health services?
- Outcomes-Based Segmentation Model for Health Authority
- Cost assessment



VBHC, EFFECTIVENESS AND OUTCOMES



EFFECTIVENESS AND OUTCOMES IN REAL-WORLD SETTING



Benchmarking outcomes of interventions in specific patient groups gives a proxy of relative effectiveness



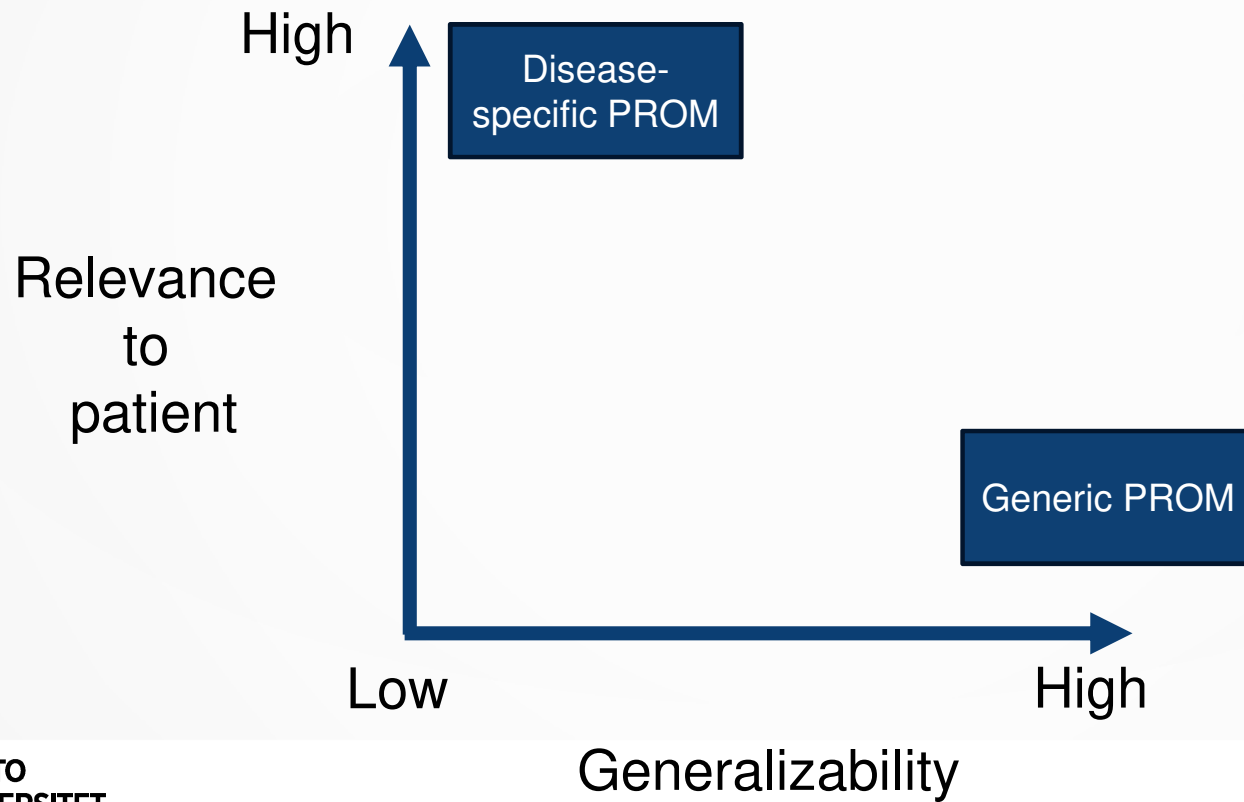
VBHC: FOCUS ON OUTCOMES AND COSTS

$$\text{VALUE} := \frac{\text{patient-relevant outcomes}}{\text{costs per patient to achieve these outcomes}}$$

- Measuring the costs and outcomes for **every single patient**
- Focus on **patient-relevant** outcomes
- Use outcomes/cost-information **for managerial decisions and development**
- Develop **value-based reimbursement** methods or **incentives**



VBHC AT A POPULATION LEVEL – WHAT IS THE PROBLEM?





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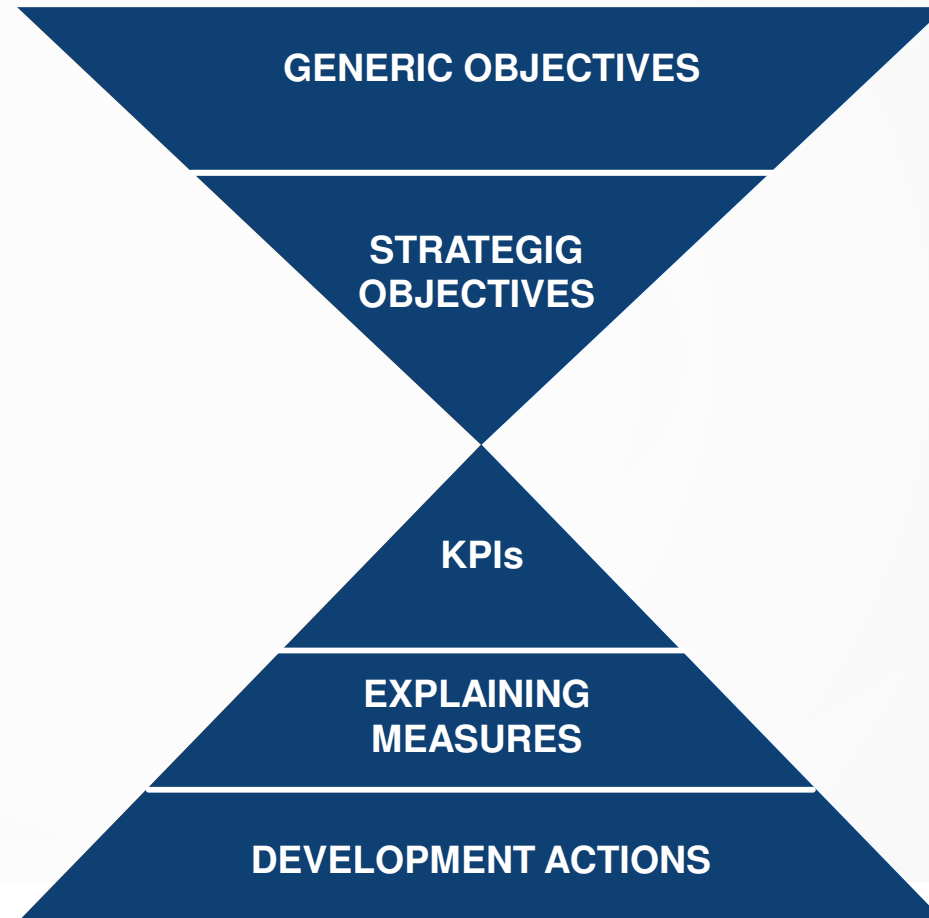
- VBHC has followed the logic of measuring outcomes per diagnosis group.
- The approach of segmenting based on standard sets developed by the International Consortium for Health Outcomes Measurement (ICHOM, www.ichom.org) is problematic at the population level:
 1. it divides the population into numerous segments
 2. multimorbid cases have not been taken into account
 3. the segments are not mutually exclusive and
 4. the standard set groups do not cover the whole population.



PRIORITY SETTING IS ESSENTIAL: CLEAR GOAL AND FOCUS

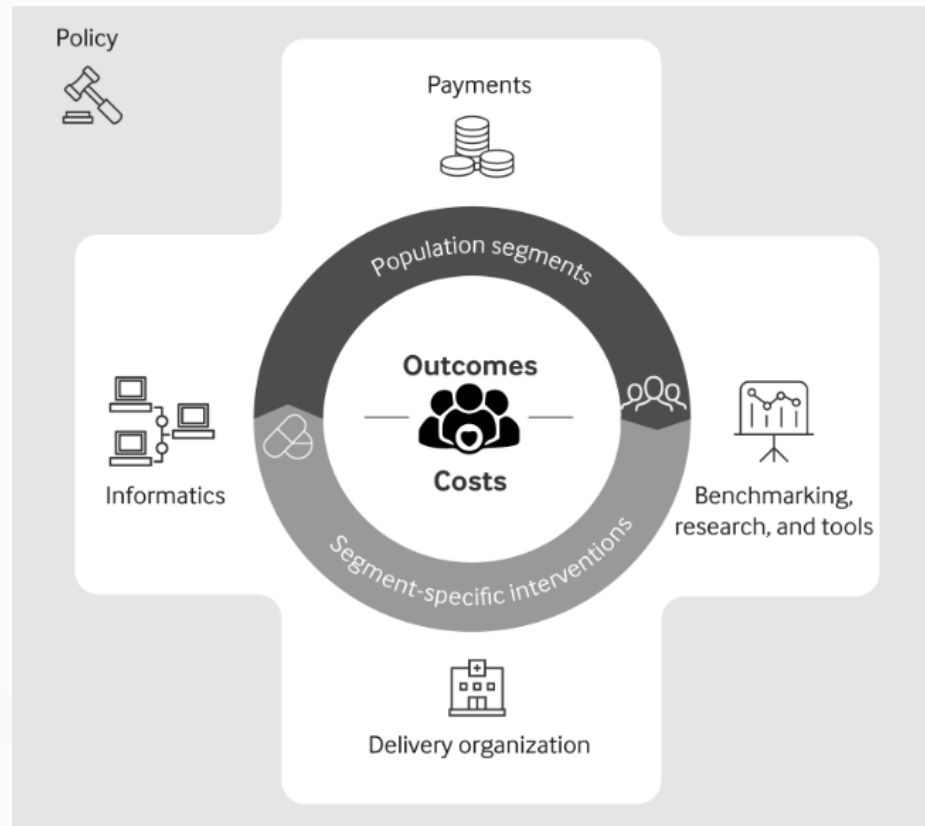
“In any field, improving performance and accountability depends on having a shared goal that unites the interests and activities of all stakeholders. In health care, however, stakeholders have myriad, often conflicting goals, including access to services, profitability, high quality, cost containment, safety, convenience, patient-centeredness, and satisfaction.”

Porter M, NEJM 2010





THE NEED FOR SEGMENTATION HAS ALSO BEEN RECOGNIZED IN VBHC





OUTCOMES-BASED SEGMENTATION MODEL FOR HEALTH AUTHORITY



SEGMENTATION AND VALUE-BASED SEGMENTATION MODEL

- **Segmentation** refers to stratifying a customer population into groups sufficiently homogeneous enabling the arrangement of a set of services to meet their expected needs
- **Value-based segmentation** refers to stratifying customer population based on expected outcomes and managing the segments based on both needs and whether outcomes are met

VBHC segmentation enables the tracking of outcomes with respect to expectations and resources used trying to achieve the outcomes



HOW SEGMENTATION CAN BE UTILIZED IN THE MANAGEMENT OF SERVICES?

- The ambition is to divide the population into mutually exclusive, homogeneous groups to enable the targeting of services to meet their expected needs
 - Eg. the relevance of outcome measurement increases if using individualised measures, but the management has to have a view of the whole patient population and thus requires generic measures
 - Segmentation can be a tool to enable outcome assessment in population level but maintaining the relevance in terms of expected outcomes of the patients
- Different purposes: segmentation logic can be e.g. need-based (Lynn et al. 2007, Vuik 2017), demand-supply based (Lillrank 2010), or value-based (Torkki et al. 2023 under review)
- Methodology depends on objectives: segmentation models can be developed using 1) data-driven, 2) expert-driven or 3) combined methodology
 - Data-driven reveals the patient clusters based on outcomes materialized in real-world (“ex post”), whereas expert-driven segments patients based on the experts’ view on how the patient should be treated in the service system and what are the expected outcomes (“ex ante”)



EARLIER SEGMENTATION MODELS FOCUS ON NEEDS, COST HARMONIZATION ETC.

Table 1 Population-level segmentation models

Segmentation model	Segmentation principle	Segments	Value-based logic	Mutually exclusive segments
Lynn <i>et al</i> (2007)	(1) The set of population segments must be limited if the healthcare system is to offer a sensible array of integrated services for each segment and to make those services available almost everywhere. (2) The set of population segments should include everyone; that is, at every point in his or her life, every person should fit into one of these categories. (3) The people in each population segment must have sufficiently similar healthcare needs, rhythms of needs and priorities to make the segment useful for planning, but each segment must be different enough to justify separate consideration. Planners must be able to structure the supports, service arrays and care delivery arrangements so that they will meet the needs of anyone in that segment reasonably well, even though they may be mismatched to other segments.	Healthy, maternal and infant health, acutely ill, chronic conditions, normal functions stable, but serious disability, short period of decline before dying, limited reserve and exacerbations, frailty, with or without dementia	Limitedly	No
Vuik <i>et al</i> (2016b)	Clustering analyses based on care utilisation	Very low use, low primary care, high emergency care, specialist care, high primary care, very high needs, emergency high needs, low emergency high needs, home care	No	Yes (cannot be defined ex ante)
Brommels (2020)	(1) The production logic of the professional service is related to how well the health problem is structured and supported by specific medical knowledge; (2) the service distribution channel (service distributed in physical proximity or at a distance using e-health tools) and (3) the capability and interest of patients to self-manage their health and disease.	Healthy persons, persons with incidental needs, persons with chronic conditions, persons with multiple health problems and illnesses, persons needing precise elective interventions, persons needing qualified accident and emergency services and tertiary care patients	Limitedly	No
Adjusted clinical groups	Age, sex and all medical diagnoses	Hierarchical logic: 264 expanded diagnostic clusters, 27 major expanded diagnosis clusters and six resource utilisation bands: non-users, healthy users, low morbidity, moderate morbidity, high morbidity and very high morbidity	No	Yes

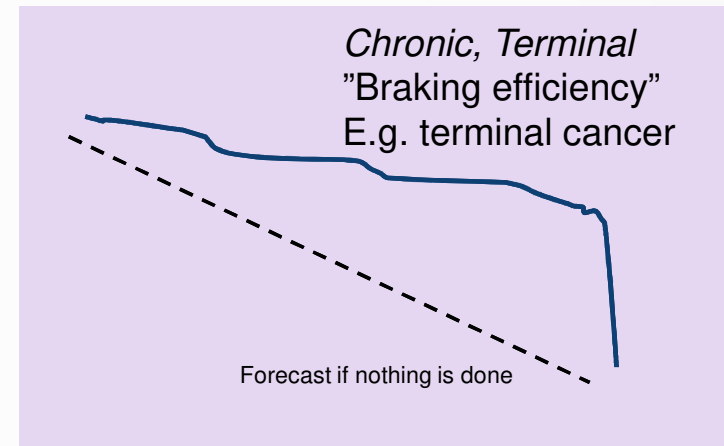
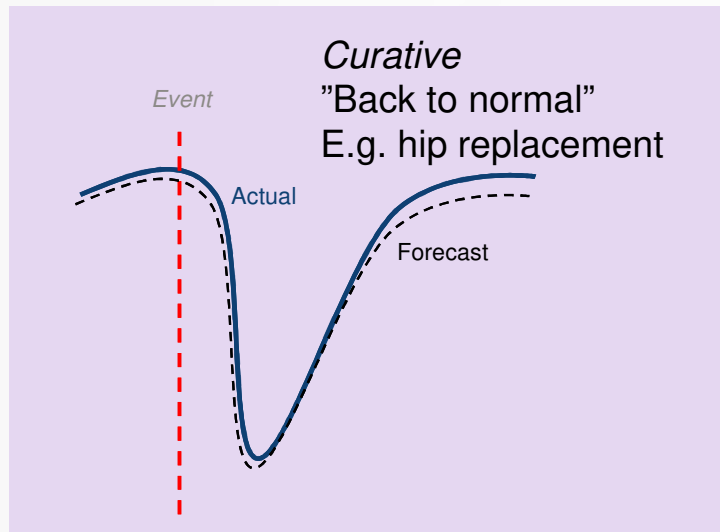
Table 1 Continued

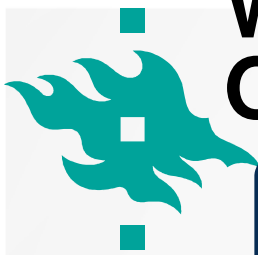
Segmentation model	Segmentation principle	Segments	Value-based logic	Mutually exclusive segments
Clinical research groups	Clinical and demographical characteristics	Non-users healthy/non-user (concurrent), healthy/non-user (prospective), significant acute (concurrent), significant acute (prospective), single minor chronic, multiple minor chronic, single dominant or moderate chronic, dominant or moderate chronic, pair dominant/moderate chronic, triplets malignancy under active treatment catastrophic	No	Yes
Lombardy	(1) The set of population segments must be limited. (2) The set of segments must include everyone, so that at every point in his/her life, every person fits into only one segment. (3) When a subject meets the criteria for several segments, he is assigned to the first segment in the order established. (4) Individuals in each segment must have similar healthcare needs and priorities to make the segment useful for planning, but each segment must be different enough to justify separate considerations.	Maternity, infancy, elderly, one CD, several CDs, possible CD, acute event, healthy and unknown	Limitedly	No
British Columbia Health System Matrix	(1) The set of population segments must be limited if the healthcare system is to offer a sensible array of integrated services for each segment and to make those services available almost everywhere. (2) The set of population segments should include everyone, that is, at every point in his or her life, every person should fit into one of these categories. (3) The people in each population segment must have sufficiently similar healthcare needs, rhythms of needs and priorities to make the segment useful for planning, but each segment must be different enough to justify separate consideration.	End of life, frail in care (in residential care), cancer, frail with high complex chronic conditions (HCC), high complex chronic conditions (without HCC), frail in the community, maternity and healthy newborns, mental health and substance use, medium complex chronic conditions, low complex chronic conditions, child and youth major <18 years, adult major age 18+, healthy non-user	Limitedly	No



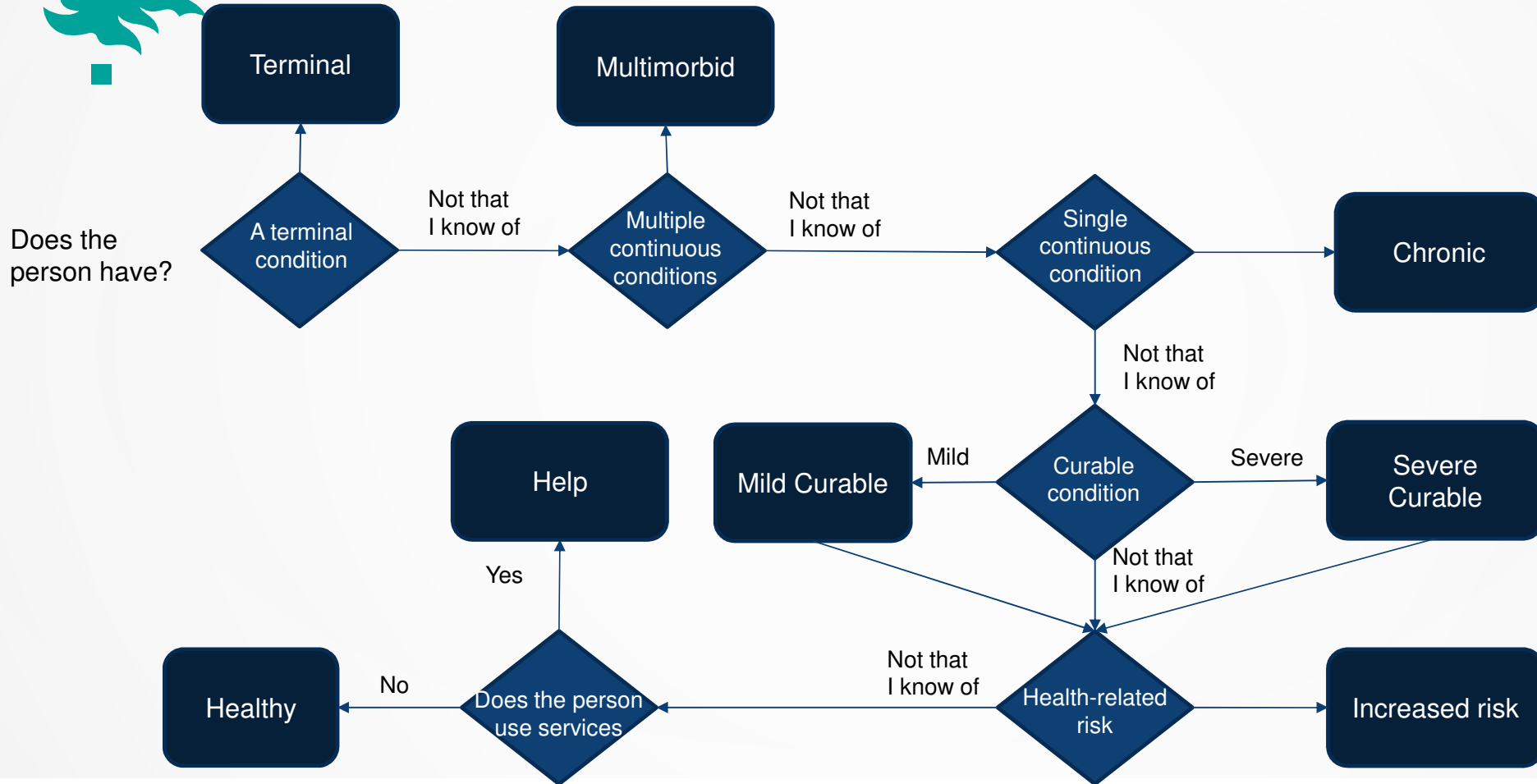
SEGMENTING PATIENTS BASED ON EXPECTED OUTCOMES?

What are the relevant goals in different health problems?





WHAT DO WE KNOW OF THE HEALTH STATUS OF THE INDIVIDUALS?





PATIENT-RELEVANT OUTCOME GOALS BY SEGMENT

Table 2 Goals and outcome measurement logic for each segment

Segment	Outcome goal	Outcome measurement logic
Healthy	Keep healthy	Routine surveys concerning health behaviour and health status
Help	Help to find valuable services	Routine surveys considering health behaviour and health status
Increased risk	Mitigate the risk	Risk-specific measures
Mild curable without risk	Solve the health problem	Light generic assessment if problem is solved (PROM)
Mild curable with risk	Solve the health problem Mitigate the risk	Light generic assessment if problem is solved (PROM) Risk-specific measures
Severe curable without risk	Recover from episodes of illness or injury	Health condition-specific measurement sets
Severe curable with risk	Recover from episodes of illness or injury Mitigate the risk	Health condition-specific measurement sets Risk-specific measures
Single chronic	Maintain (or improve) health status and functioning	Health condition-specific measurement sets
Multimorbid	Maintain (or improve) health status and functioning	Assessment of health status and functioning and possibly health condition-specific sets
Terminal	Quality of death	Further research is required

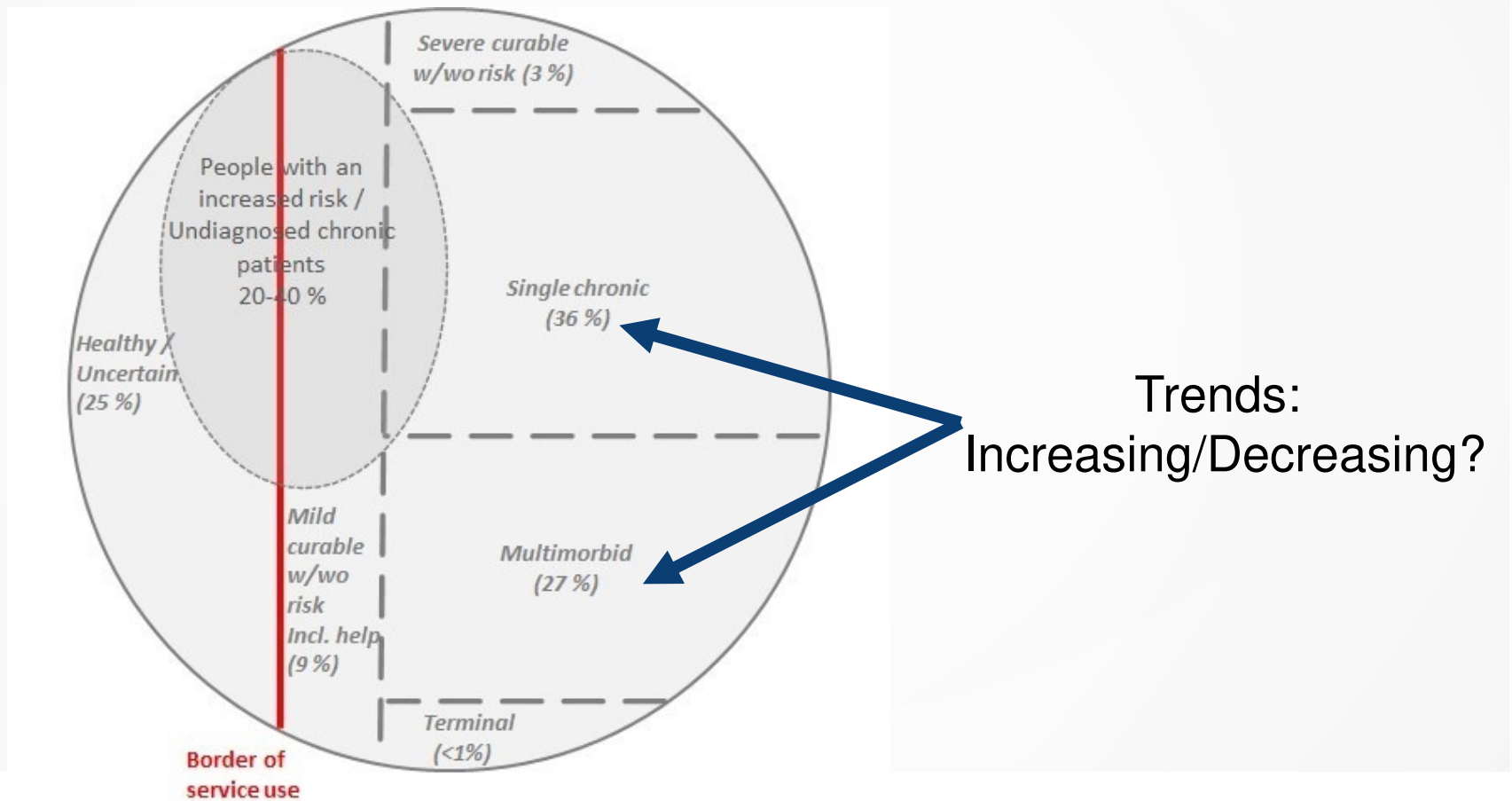
PROM, Patient Reported Outcome Measure.

Torkki P, et al. *BMJ Open* 2023;13:e077250. doi:10.1136/bmjopen-2023-077250

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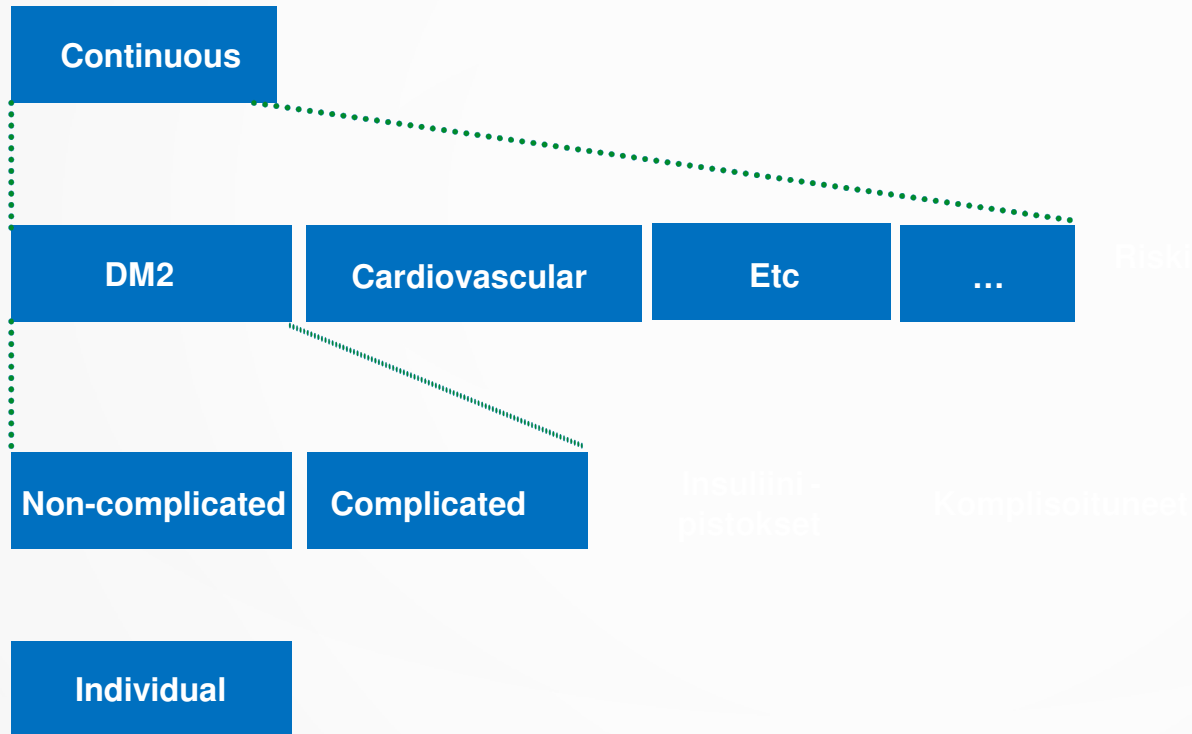


FIRST STEP IS TO QUANTIFY THE VOLUMES OF THE SEGMENTS?





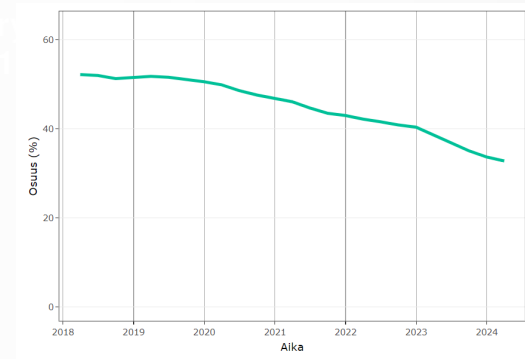
THE SUBSEGMENTS ARE REQUIRED TO ANALYZE THE OUTCOMES IN MORE DETAIL



% of patients having good Treatment Balance

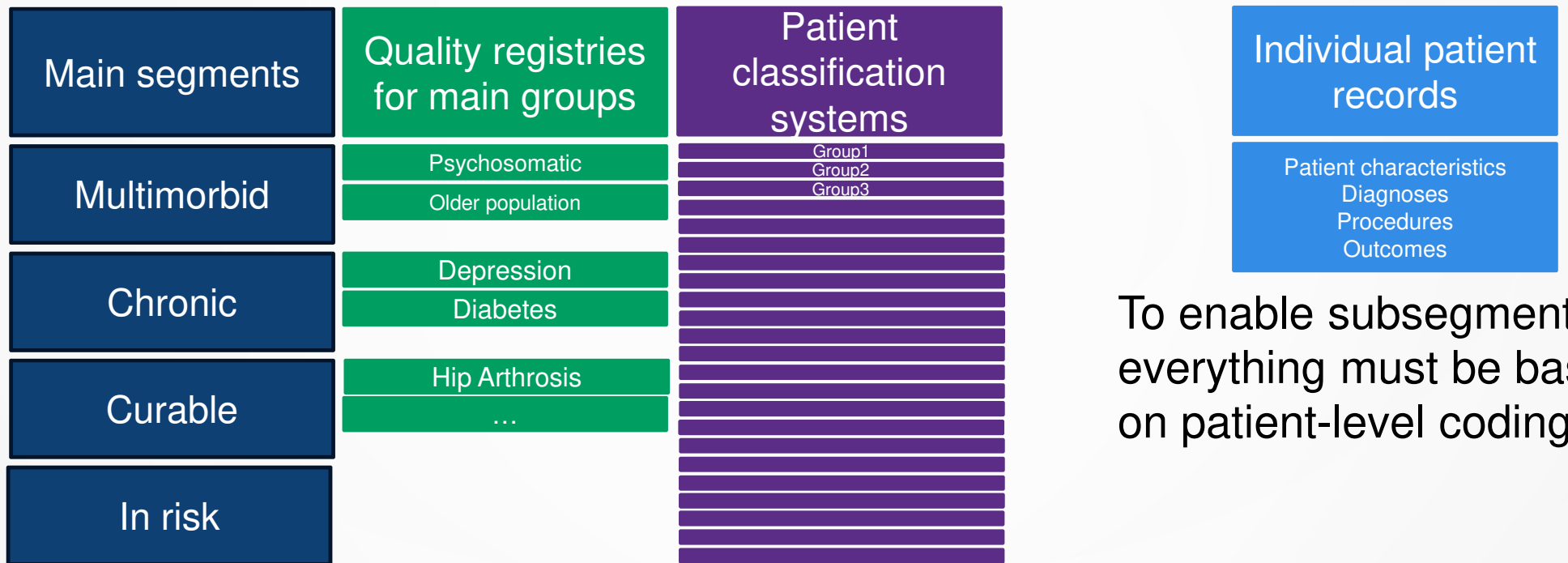
60%

LDL <2,6





HOW TO BUILD THE SYSTEM FOR ASSESSING OUTCOMES IN PRACTICE?



To enable subsegments, everything must be based on patient-level coding



HOW CAN WE GENERALIZE THE KPIS AND STRATEGIC LEVEL OBJECTIVES?

Segment	Outcome goal
Healthy	Keep healthy
Help	Do we find? Do we react?
Increased risk	Can we support rapid recovery?
Mild curable	Is the number increasing? Good Balance of Care?
Severe curable	Is the number increasing? Good Balance of Care?
Single chronic	Maintain (or improve) health status and functioning
Multimorbid	Maintain (or improve) health status and functioning
Terminal	Quality of death



WHY IS THIS IMPORTANT?

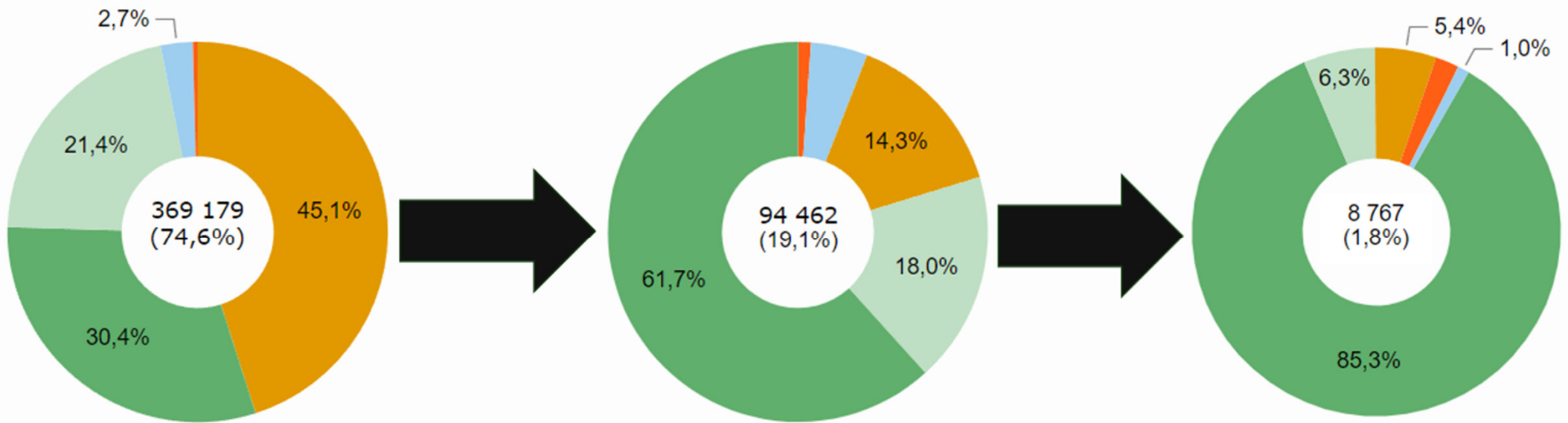


USE OF SERVICES DIFFER BETWEEN SEGMENTS

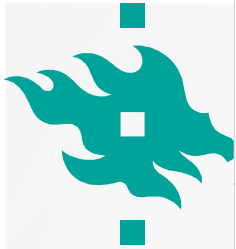
Patients

Healthcare contacts

Over 10 doctor visits / year



Terminal Multimorbid Chronic Severe curable Mild curable and help



Patient-level coding enables subsegmenting

HELSINGIN YLIOPISTO
HELSINGFORS UNIVERSITET
UNIVERSITY OF HELSINKI



Laaketieteellinen tiedekunta

Multimorbid Use of services



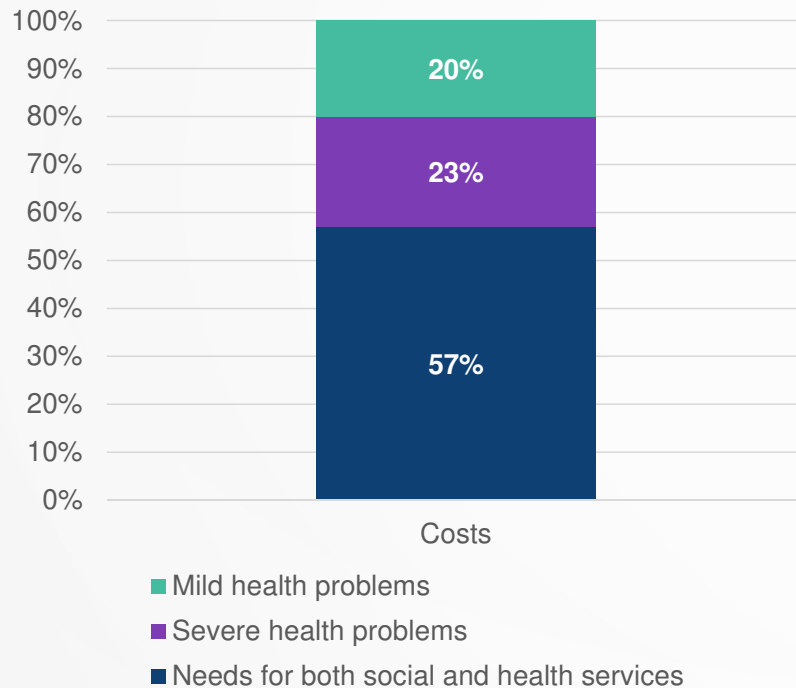
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TRACKING COSTS



HOW ARE THE TOTAL (SOCIAL AND HEALTH) COSTS DISTRIBUTED IN THE POPULATION?



90 % of the population -> 20 % of costs

5 % of the population -> 23 % of costs

- Cancer, complicated diabetes or CVD, other expensive treatments

5 % of the population -> 57 % of costs, e.g.:

- Older population with chronic diseases,
- Mental health issues with substance abuse
- Young people with mental health problems

Is it about unit costs, service use or both?



WE HAVE TO FOCUS ON COST PER PATIENT

Not only cost per service



VBHC APPROACH

- Systematic measurement of outcomes for each patient
- Costs over full cycle of care – not only unit costs of specific treatment



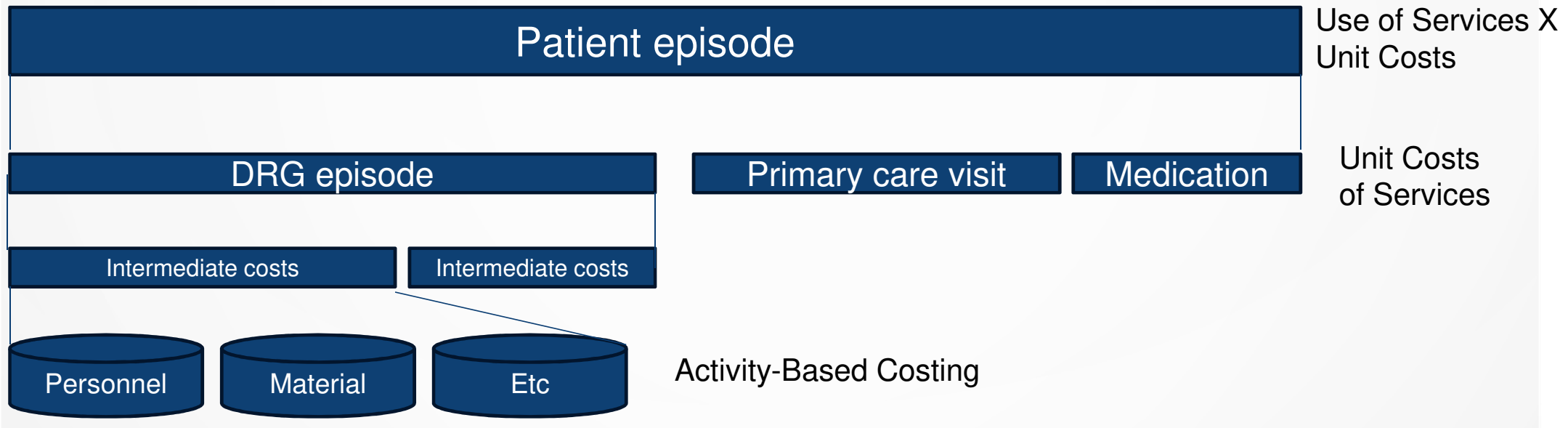


WHAT ASPECTS SHOULD BE FOCUSED IN COST ASSESSMENT?

- Many systems have problems in tracking costs over full cycle of care
 - Fragmented systems
 - Current patient classification systems may focus too much on hospital costs
- The case-mix is changing: more aged people with chronic or multimorbid situation and also requiring some other societal services
 - Case-mix should consider societal factor more widely and also from episode perspective
 - The significance of indirect costs may currently be underestimated



PRACTICALLY THE TRADITIONAL APPROACHES TO ESTIMATE COSTS CAN BE USED IN POPULATION LEVEL



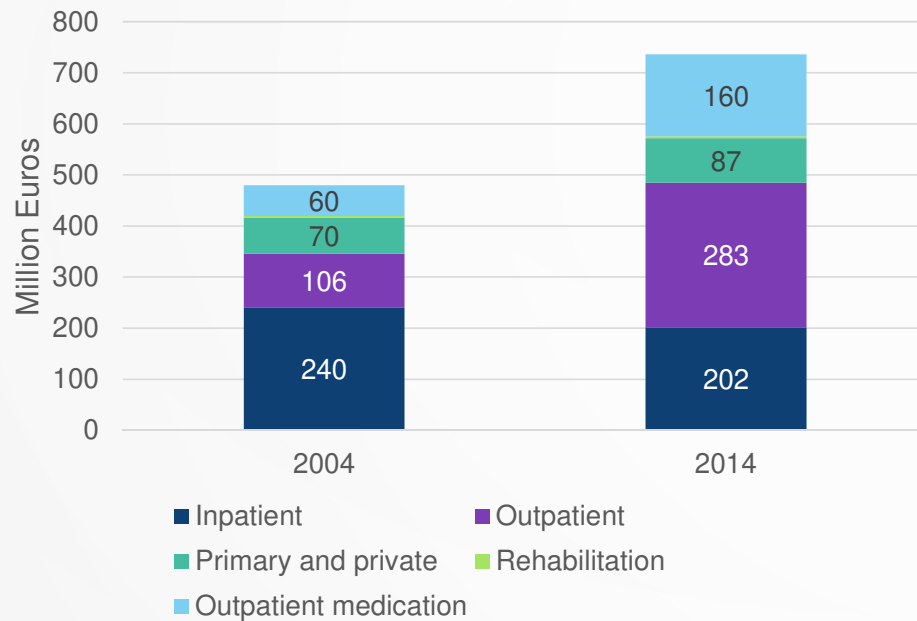


WHY ARE TOTAL COSTS ESSENTIAL?

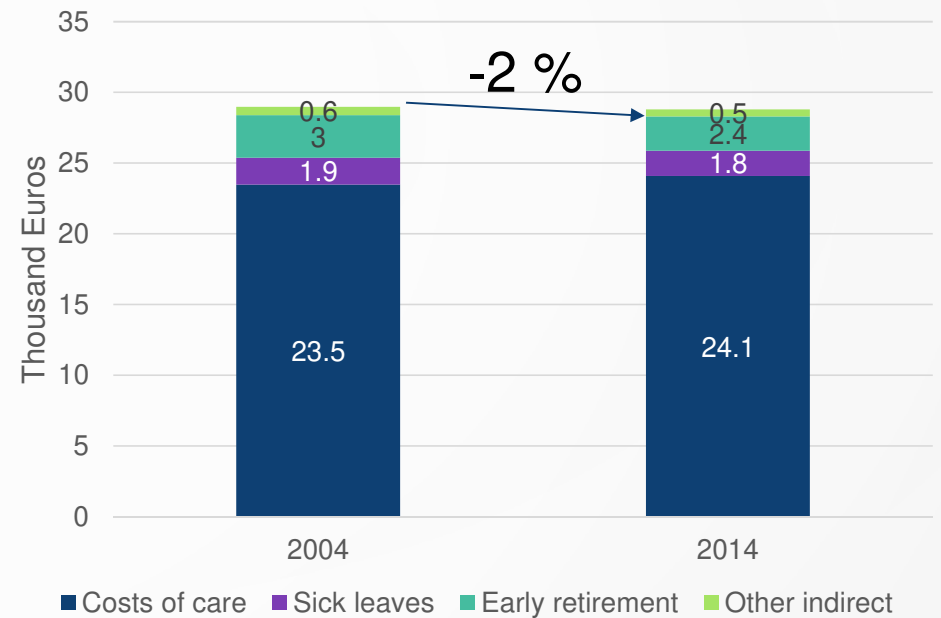


COSTS OF CANCER IN FINLAND 2008-2014

Nominal costs



Real costs per cancer patient





COSTS AND OUTCOMES OF CANCER

ACTA ONCOLOGICA 301

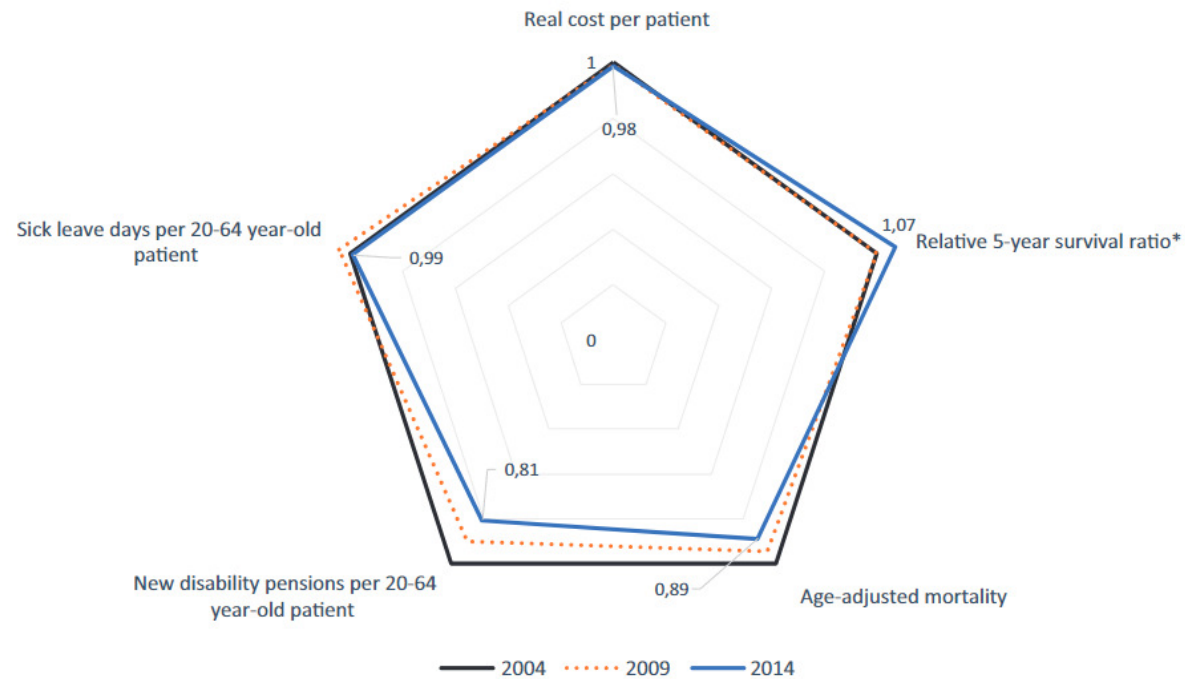


Figure 3. The costs of cancer and the outcome measures of care for 2004, 2009 and 2014. 2004 = 1. *Survival ratio year means the observation year.



HEALTHCARE SERVICES SHOULD BE CONSIDERED AS INVESTMENTS NOT AS COSTS



SUMMARY: TRACKING OUTCOMES AND COSTS IN POPULATION LEVEL



Clear goals and priority setting



Segmentation and patient classification models required to get both comprehensive picture and to find explanations



The performance should be assessed by using outcomes and costs of patient groups and episodes – not only for single services



Cost assessment should focus on developing feasible methods for assessing the costs over full cycle of care