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Harnessing casemix data: positive spillover effects for health system performance and responsiveness

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Why?

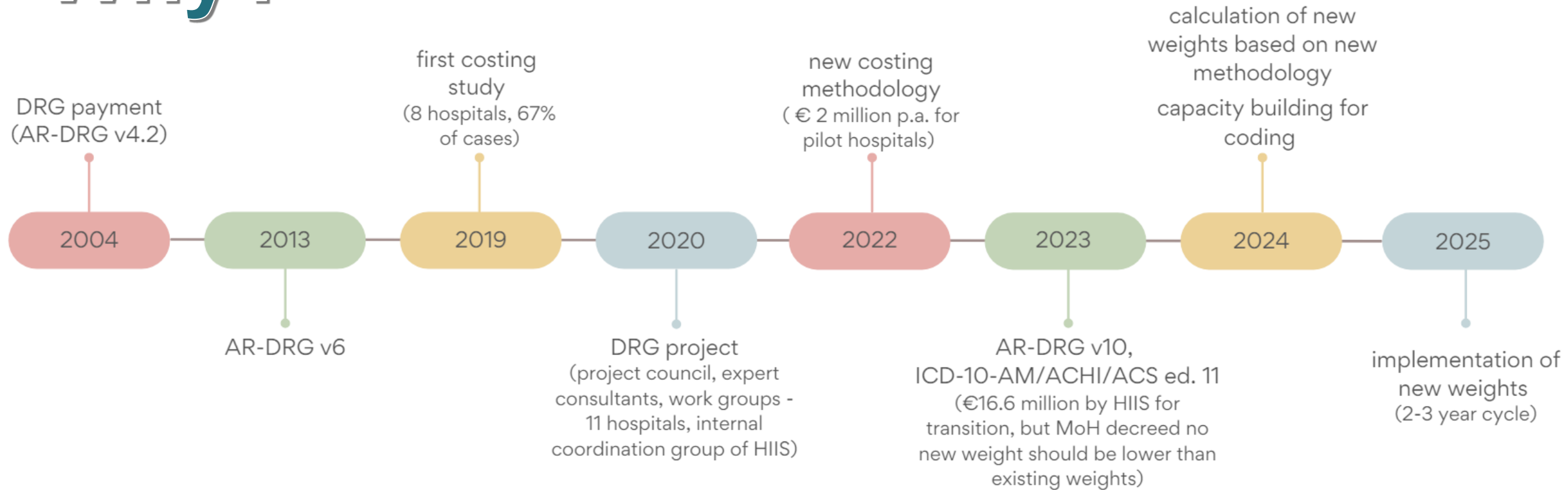
DRG-based casemix payment is proving to be a challenge in Slovenia and one of the key reasons lies in the fact that key stakeholders do not recognize the full value of casemix.

How?

→ by systemizing the potential benefits of using casemix data to improve the coordination of public healthcare systems making them more **responsive** to changing patient needs, **adaptive** to technological advancements and **resilient** under increasing financial and human resource constraints

→ by illustrating 6 examples of valuable insights provided by using casemix data that go beyond payment models

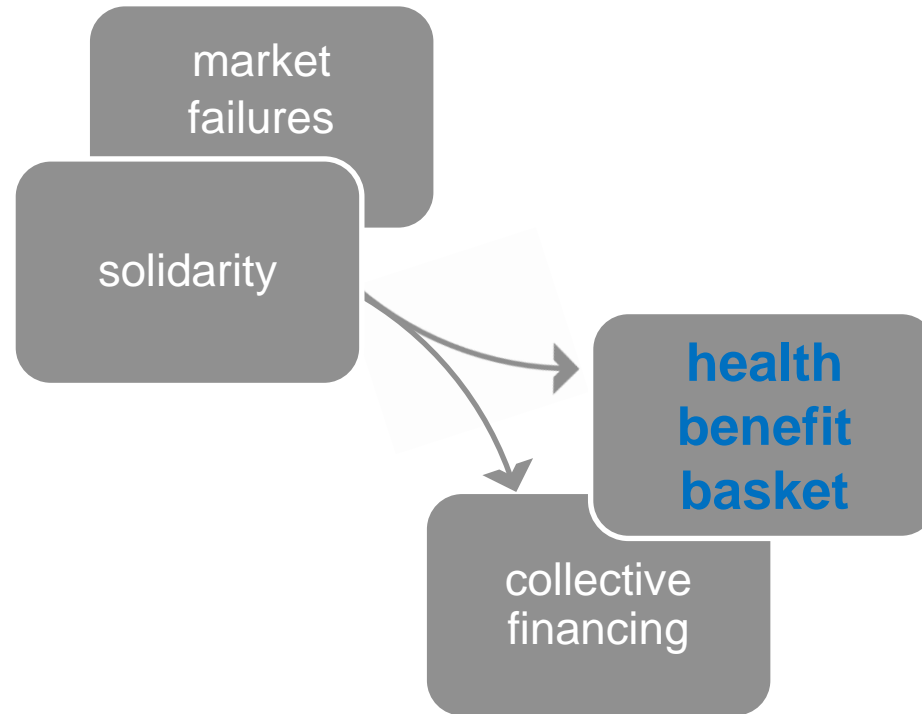
Why?



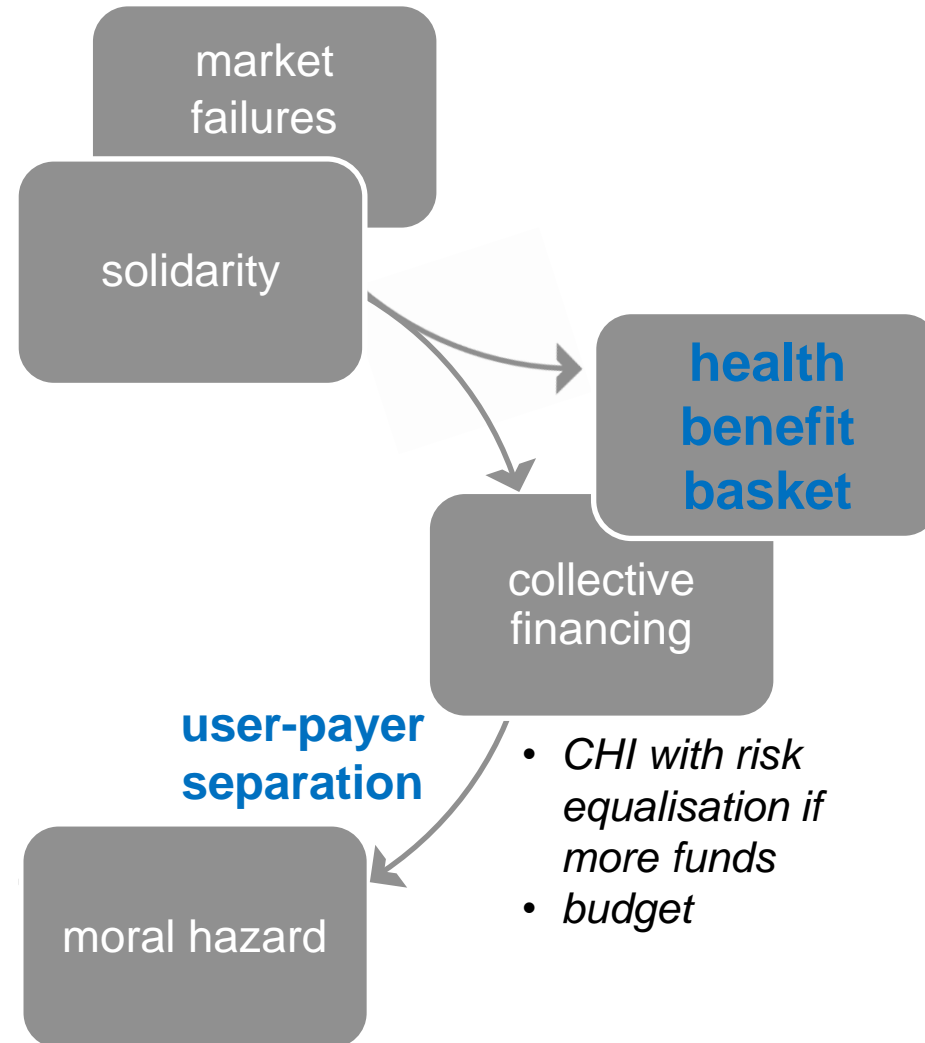
Paving the way for the future:

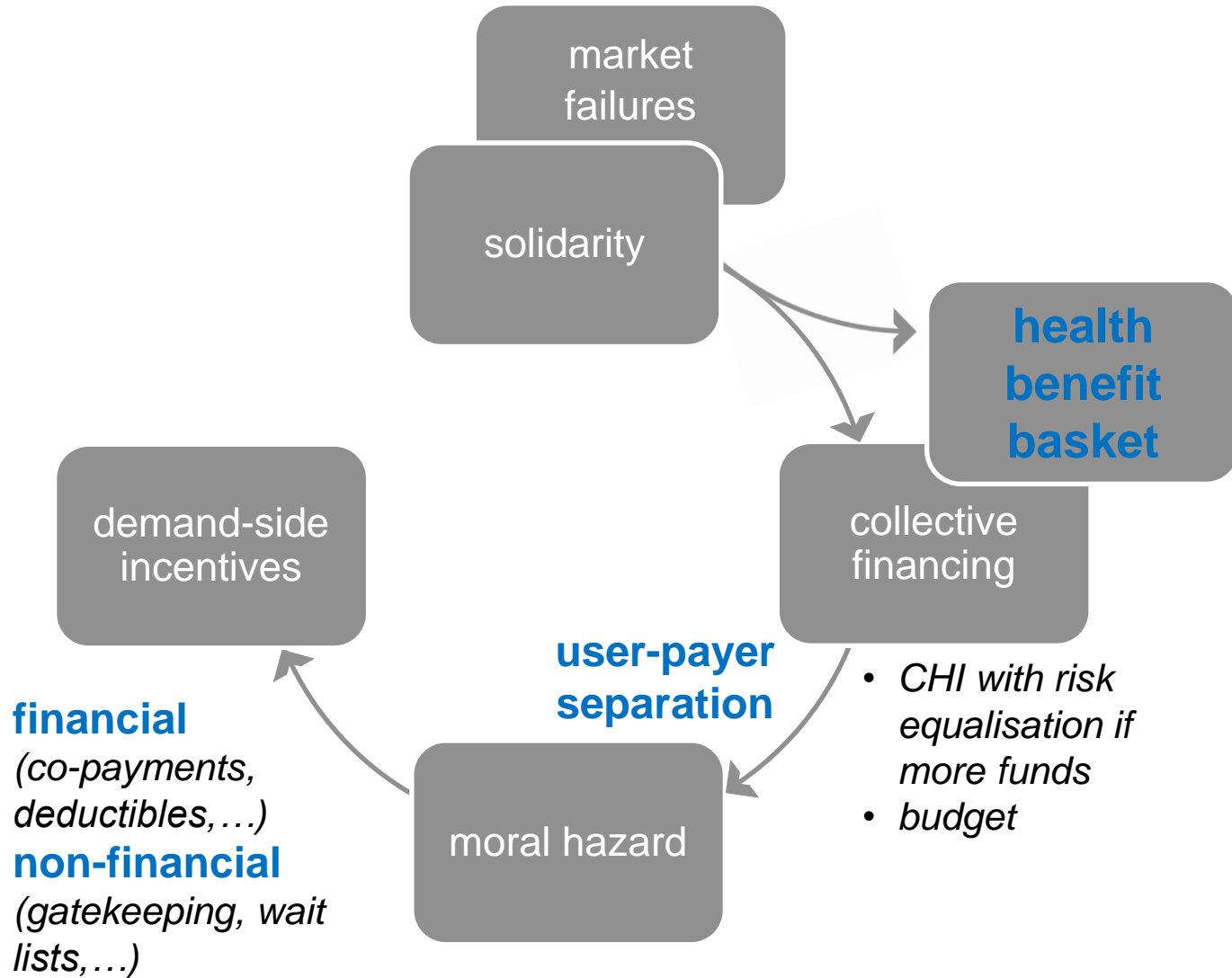
- infrastructure (sound methodologies, binding for all stakeholders, regular updates of classifications, IT support,...)
- professionalisation of coding
- DRG project → DRG competency centre

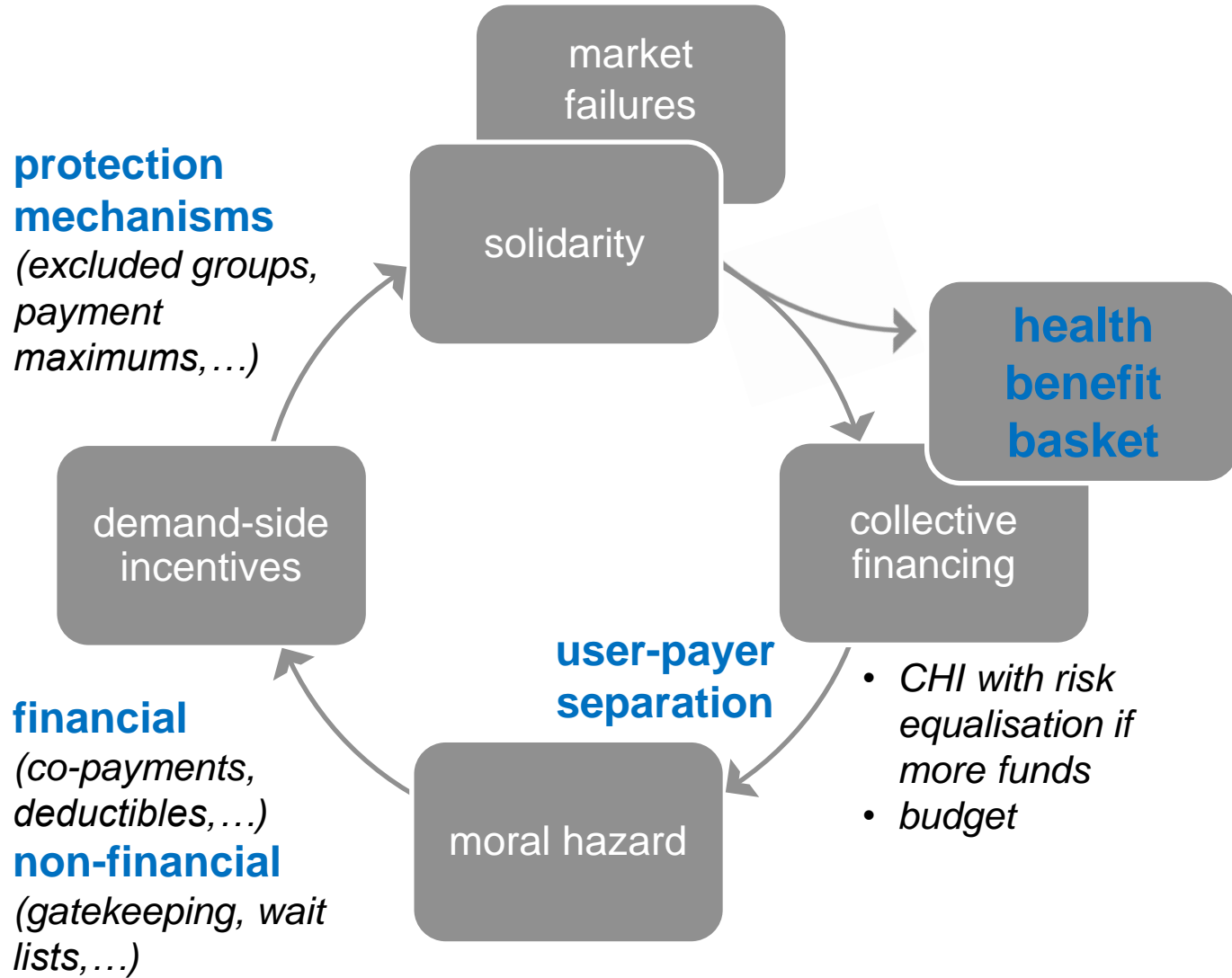
**Coding and data
collection perceived as
a foe not a friend!**

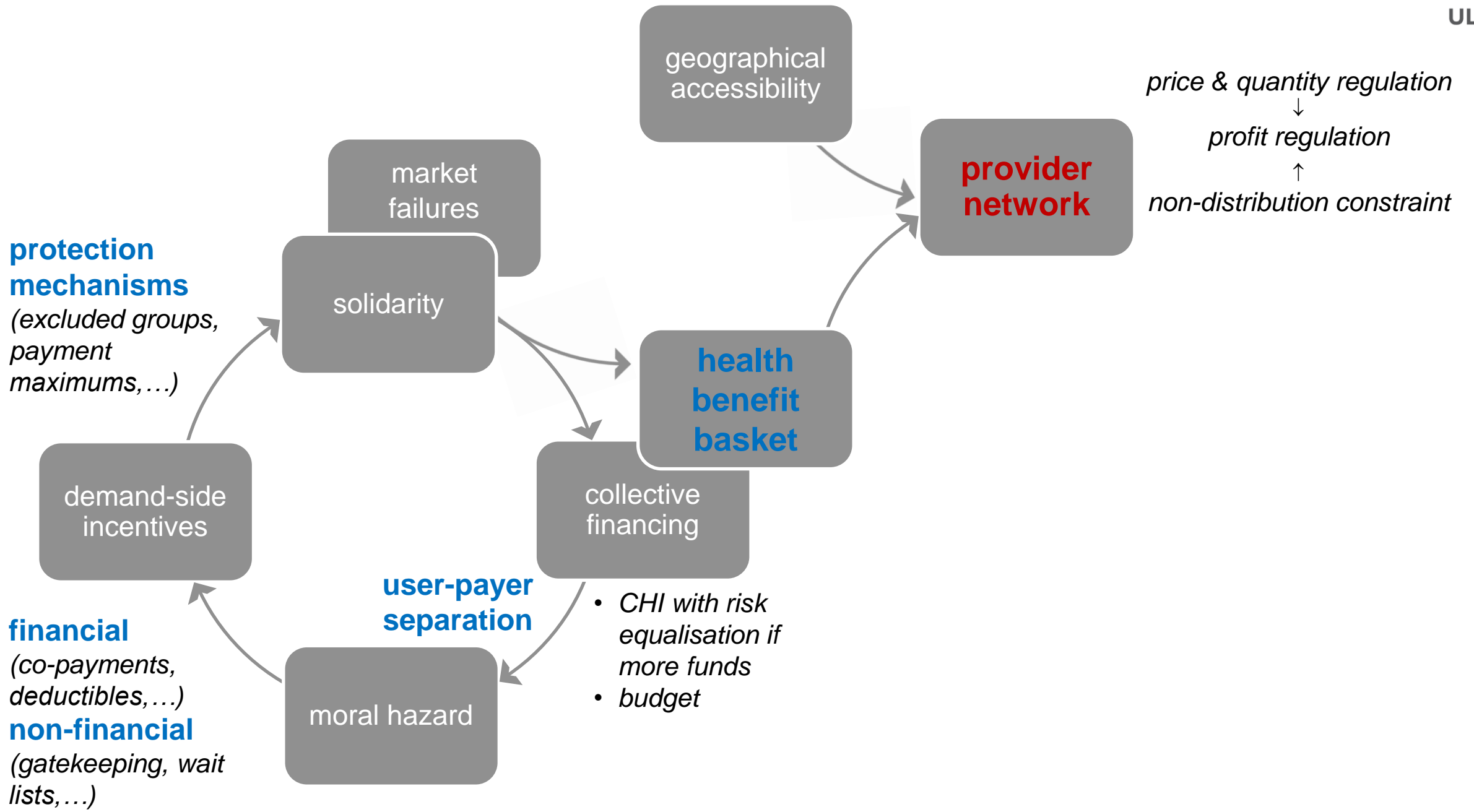


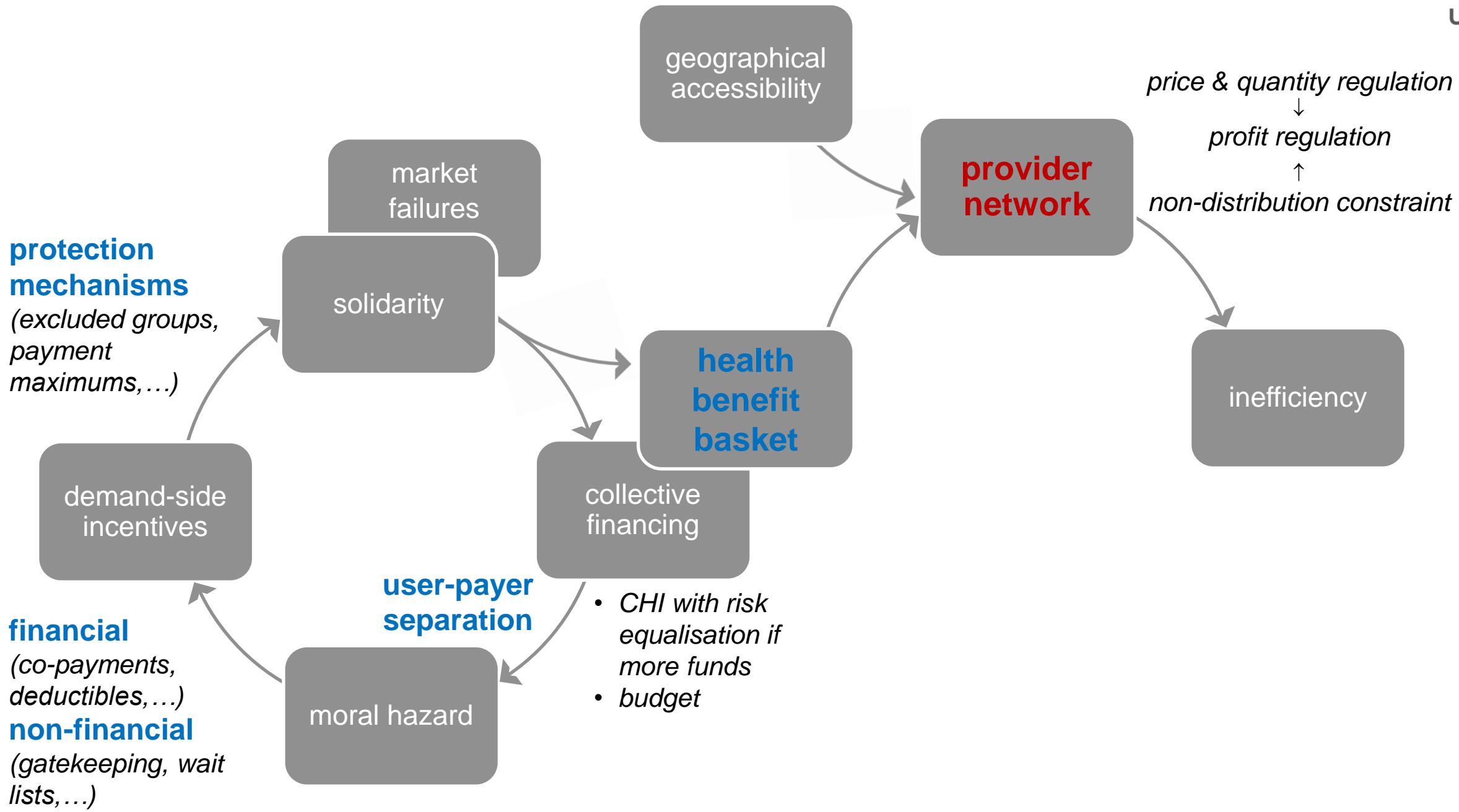
- *CHI with risk equalisation if more funds*
- *budget*

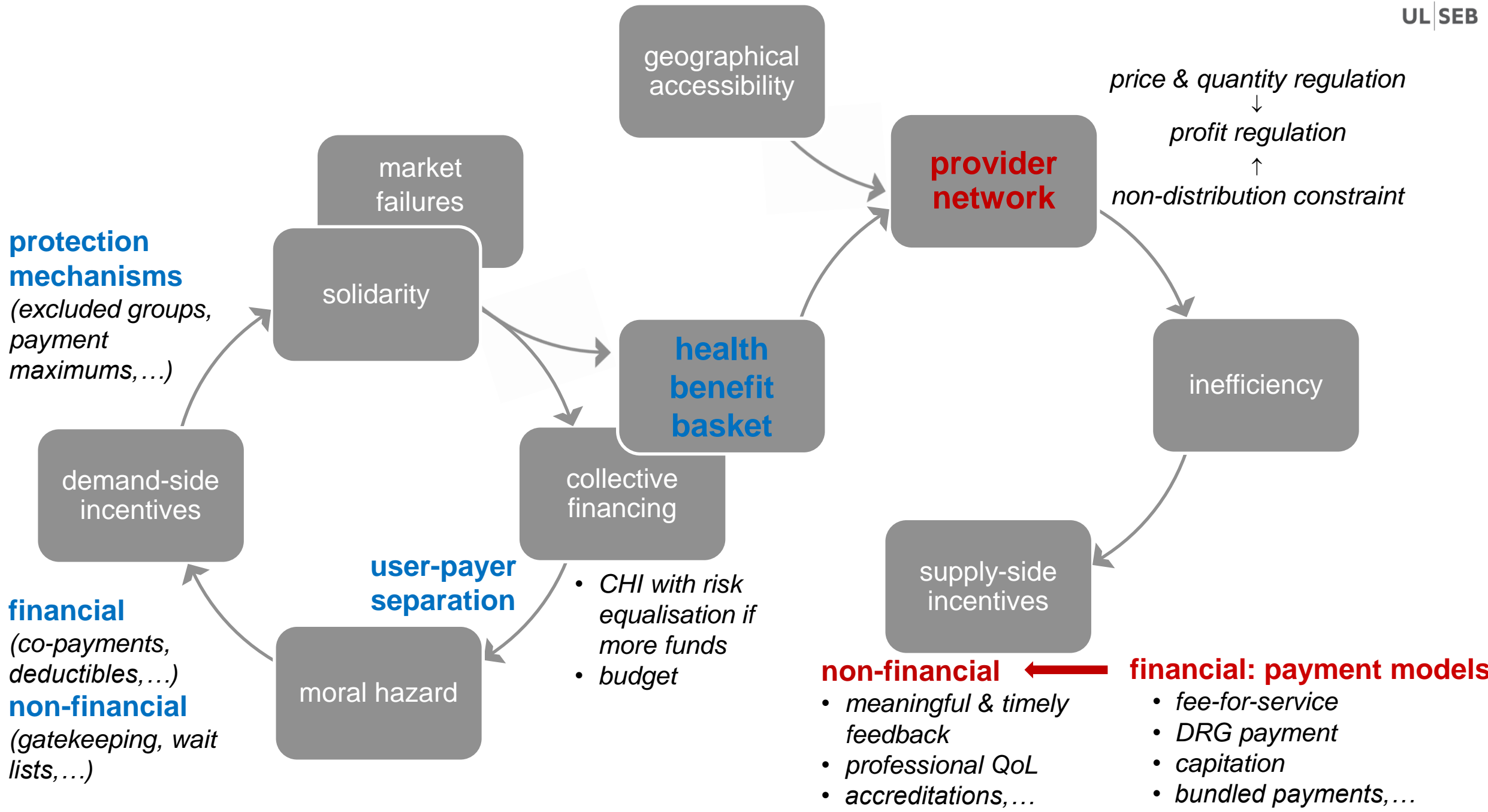


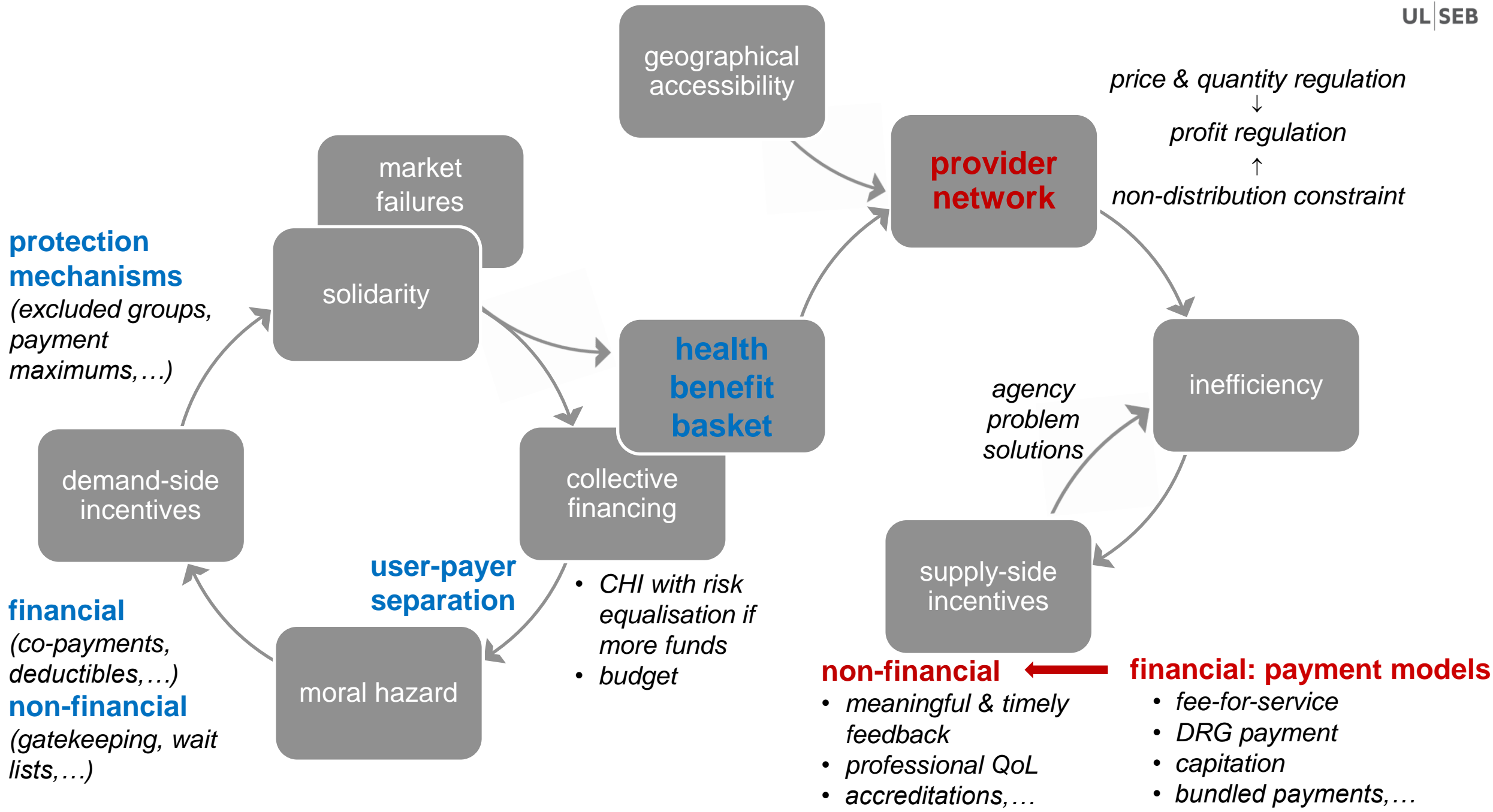












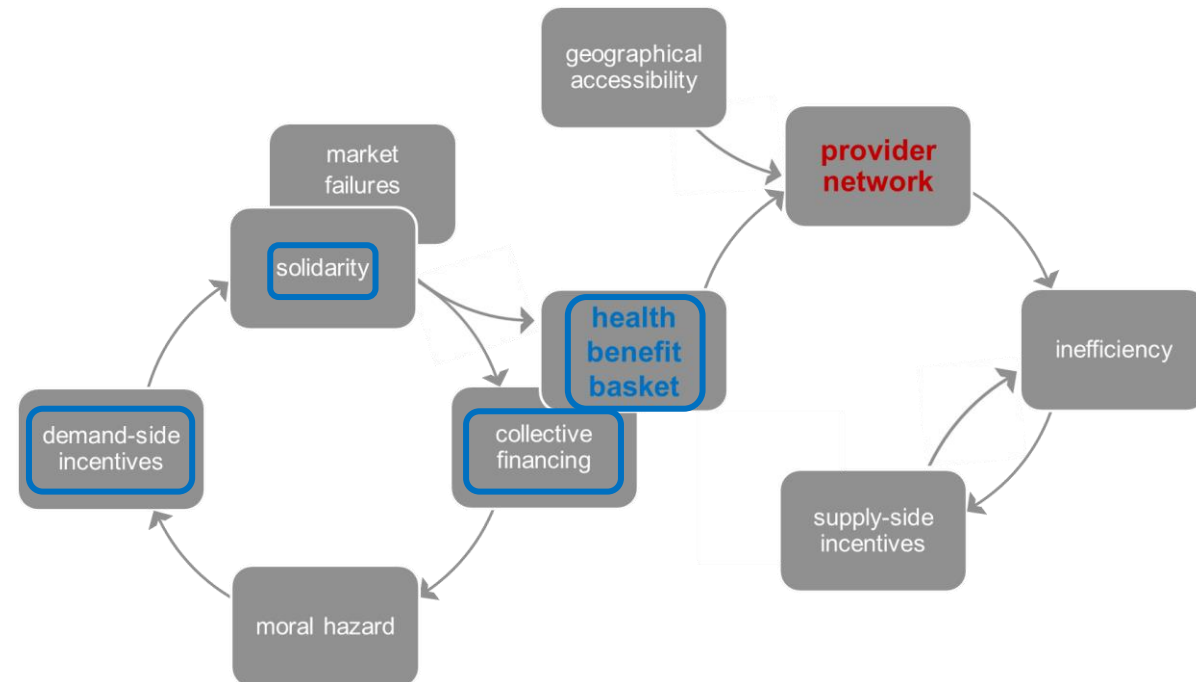
to inform disease-based **expenditure planning** based on projected healthcare utilisation patterns at the population level

to contribute to evidence-informed decision-making about the **structure of the benefit basket**

to design, monitor and evaluate both financial and non-financial **demand-side incentives**

to design, monitor and evaluate **patient protection mechanisms**

3 studies: diabetes, COPD & myocardial infarction



to **continuously evolve the provider network** and transition from siloed to disease-centred organisation

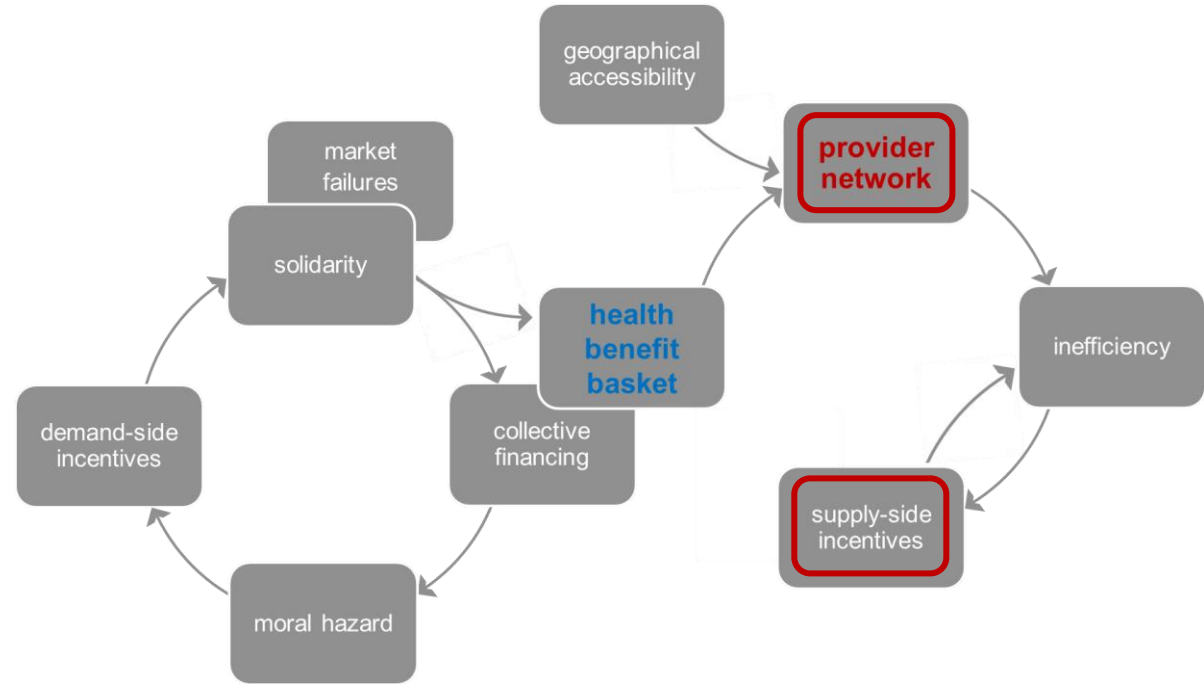
to set and monitor **inclusion conditions** for providers

to create **non-financial supply-side incentives**

to design and continuously up-date **payment models**

to study the **effect of incentives** imbedded in payment models on the behaviour of providers

3 studies: heart diseases

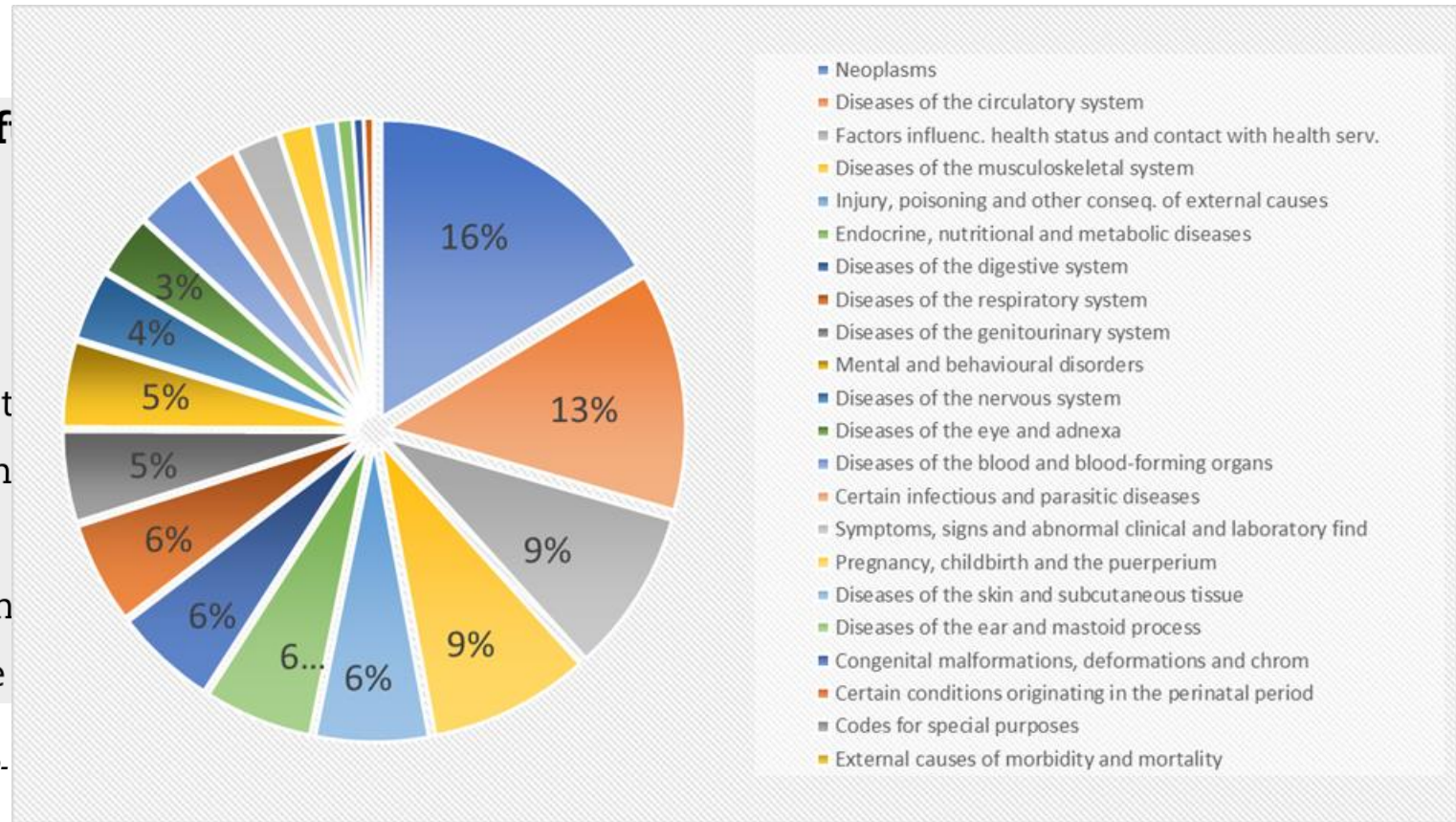


Example 1: Informing disease-based expenditure planning (case of diabetes)

Box 5.1. The classification of health care f

- HC.1 Curative care
- HC.2 Rehabilitative care
- HC.3 Long-term care (health)
- HC.4 Ancillary services (non-specified by funct
- HC.5 Medical goods (non-specified by function
- HC.6 Preventive care
- HC.7 Governance and health system and finan
- HC.9 Other health care services not elsewhere

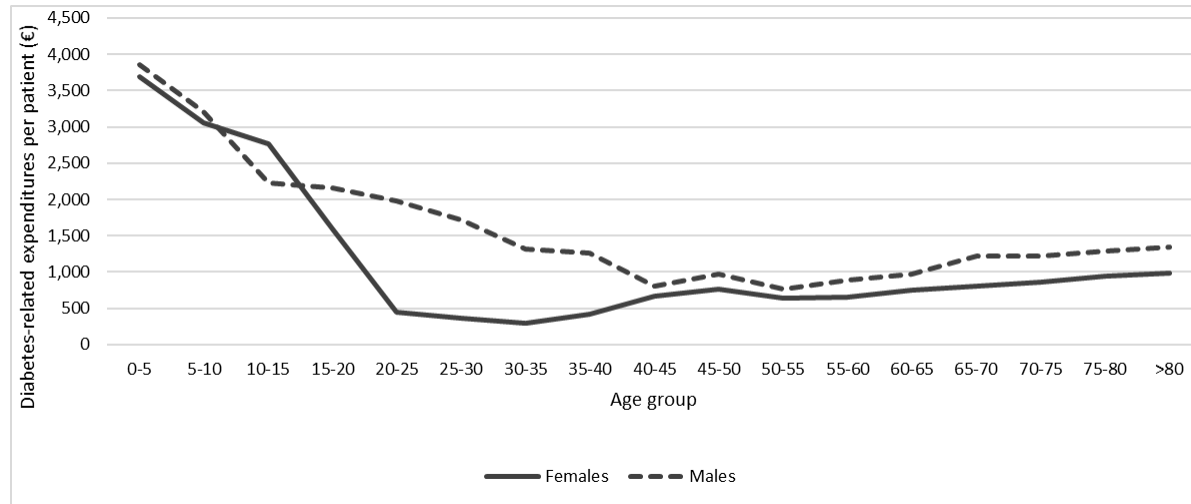
A System of Health Accounts 2011:
<https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-05-19->



Janša K. (2024). Expenditures by diagnosis 2019-2023. Internal materials of HIIS.

Example 1: Informing disease-based expenditure planning (case of diabetes)

Average annual overall direct diabetes-related healthcare expenditures per patient by five-year age group and gender based on 2019 data.

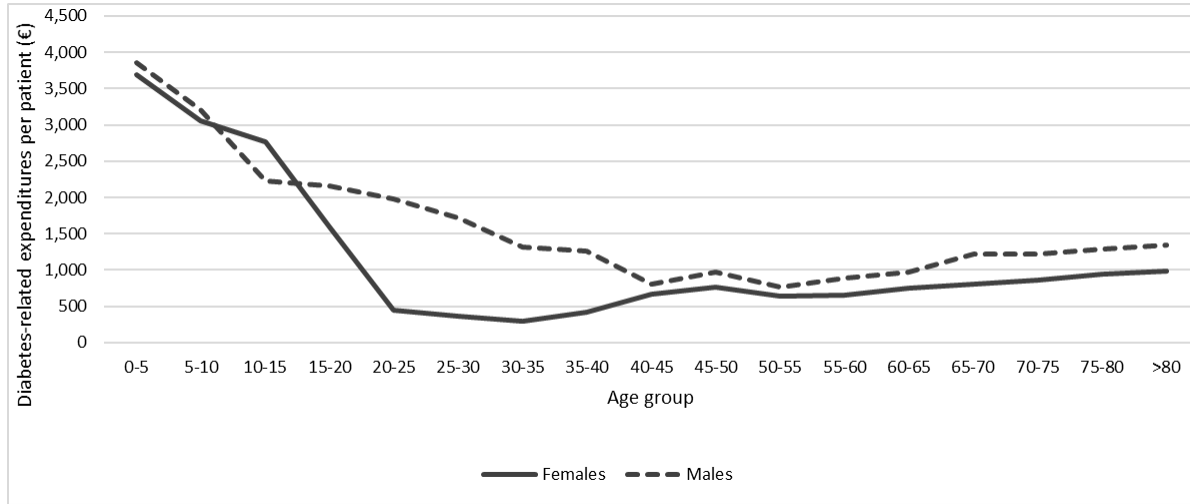


Projections of direct healthcare expenditures:

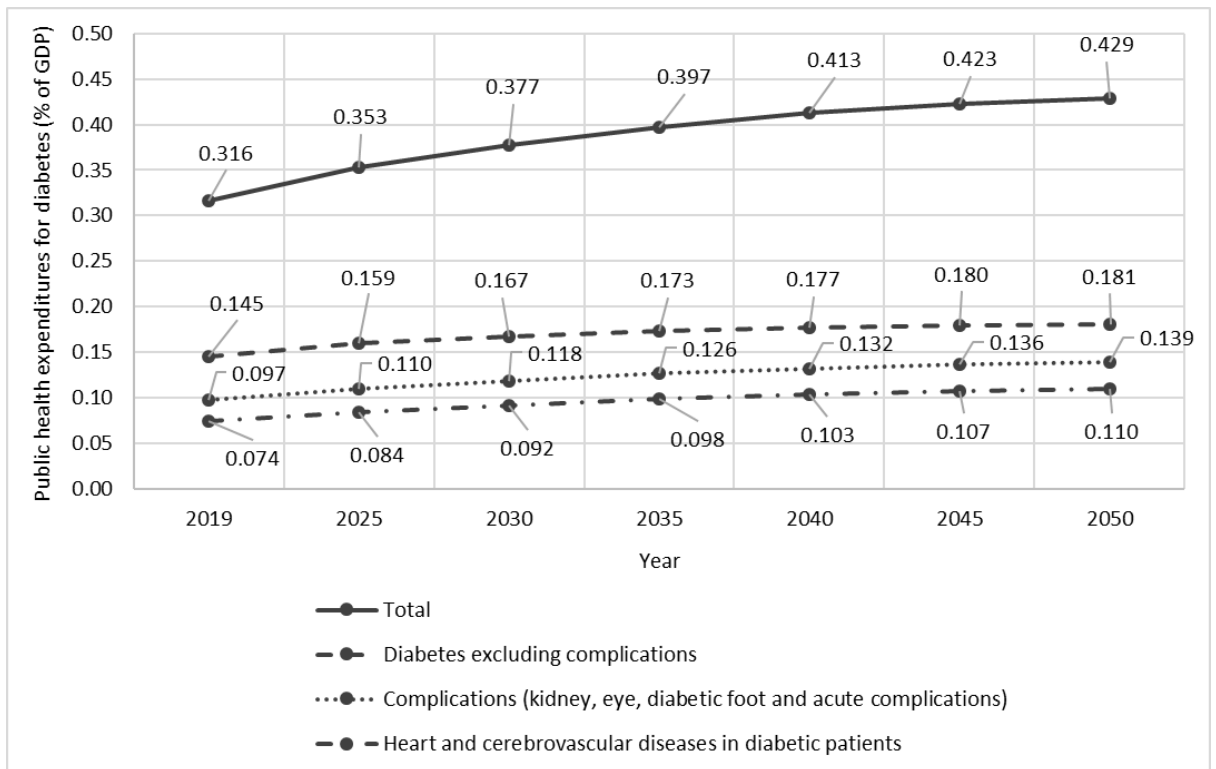
- expenditures by sex, age, types of healthcare services and medical conditions in 2019
 - diabetes excluding complications
 - acute complications of diabetes
 - diabetic kidney complications
 - diabetic eye complications
 - diabetic foot complications
 - diabetes and heart diseases
 - diabetes and cerebrovascular diseases
- methodology of the Ageing WG reference scenario

Example 1: Informing disease-based expenditure planning (case of diabetes)

Average annual overall direct diabetes-related healthcare expenditures per patient by five-year age group and gender based on 2019 data.



Projections of direct healthcare expenditures due to diabetes for different groups of medical conditions in Slovenia based on 2019 data and the Ageing WG reference scenario



7.5 % contribution to the projected growth of public health expenditures (2019-2050: +1.5 % points of GDP)

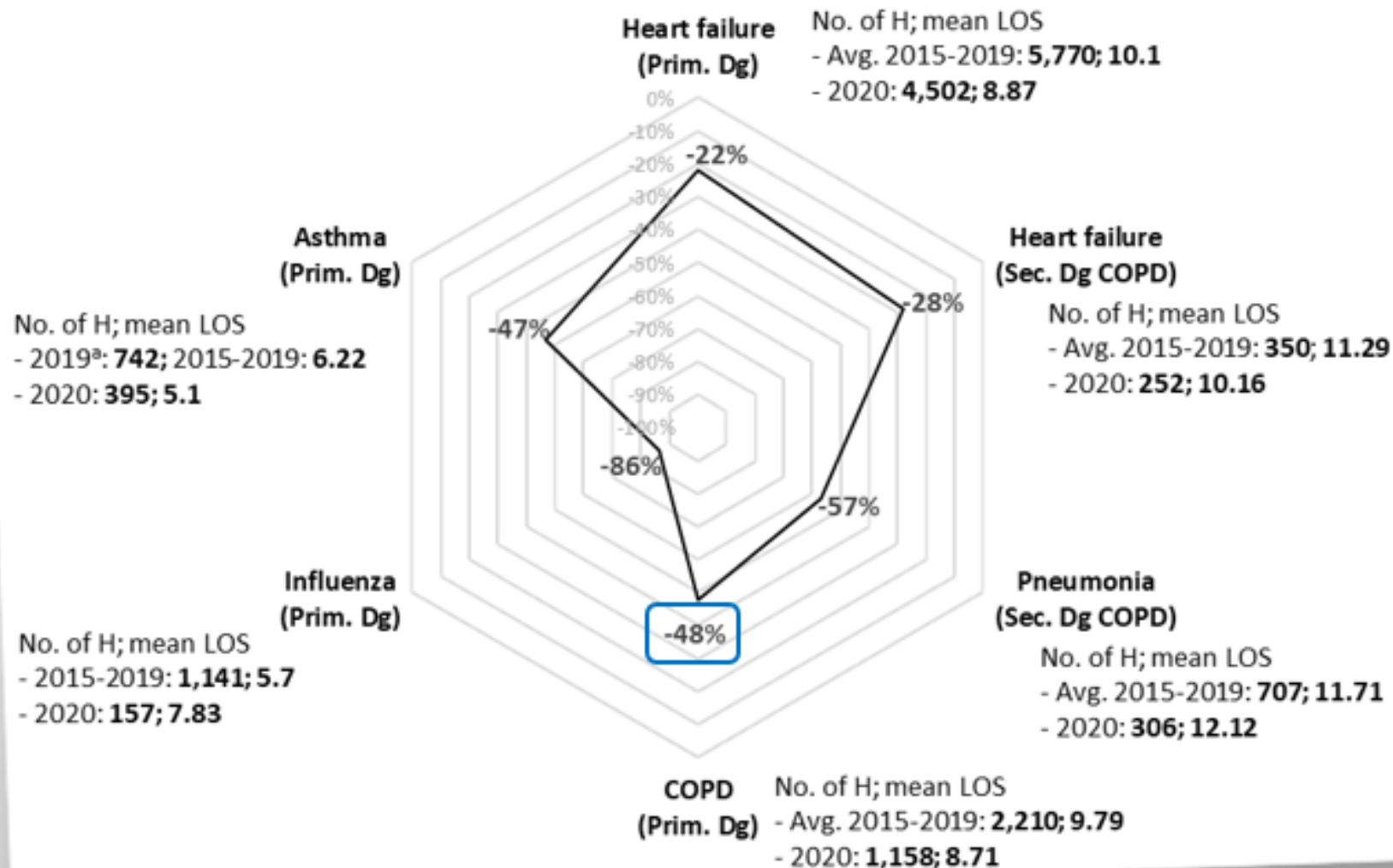
Example 2: Informing decision-making about the structure of the benefit basket (case of COPD)

Data: routinely collected data on hospitalisations, medication use, and general patient information from the HHS from February 2015 until February 2021 (COVID-19 epidemic March 2020)

Results:

- The numbers of **severe AECOPD** were reduced by 48% in 2020
- The proportion of frequent exacerbators (≥ 2 AECOPD hospitalisations per year) was reduced by 9% in 2020, with a 30% reduction in repeated severe AECOPD in frequent exacerbators and a 34% reduction in persistent frequent exacerbators (≥ 2 AECOPD hospitalisations per year for 2 consecutive years) from 2019

Example 2:



Age-standardised hospitalisation rates per 100,000 population	2015	2016	2017	2018	2019	2020
	110.4	116.4	103.9	110.3	99.3	52.9

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- The numbers of **moderate AECOPD** were reduced by 34% in 2020.
- The risk of two or more moderate AECOPD decreased by 43% in 2020.
- In 2020, non-COVID **mortality** decreased (-15%) and no excessive mortality was observed in the COPD population.

42% reduction of acute care expenditures



exacerbations

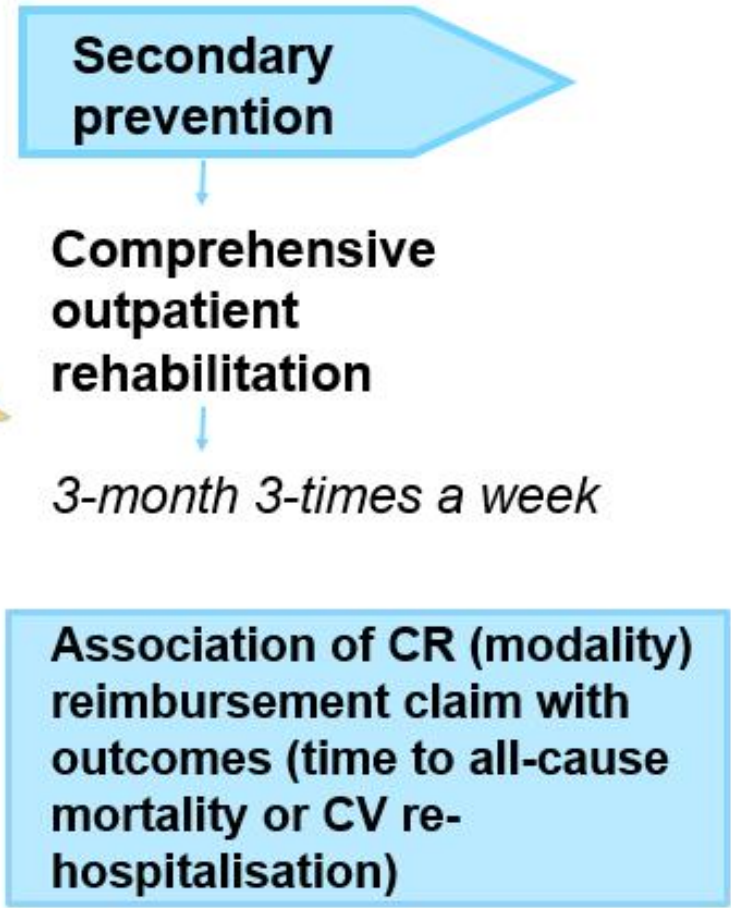
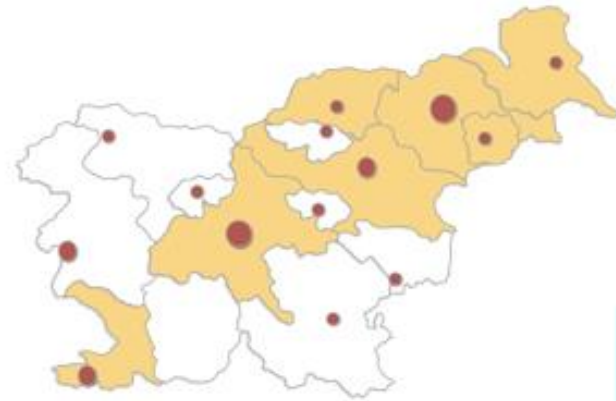
vs.

RVI prevention and control, targeted behaviour modifications,...

Example 3: Informing decision-making about the structure of the benefit basket and continuously evolving the provider network (MI)



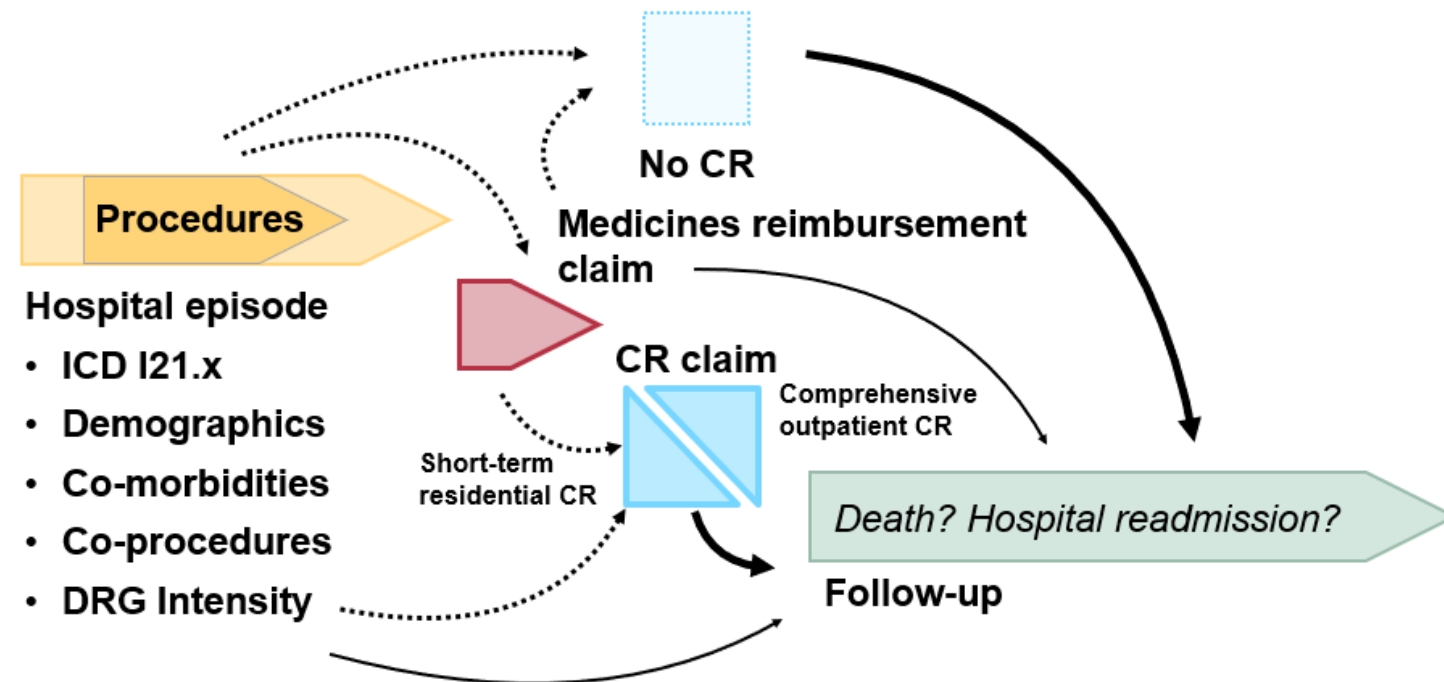
- < 2017 → **short-term residential CR**
- ≥ 2017 → **comprehensive outpatient CR**
 - Risk assessment and monitoring
 - Exercise training
 - Risk factors control
 - Psychosocial support
 - Patient empowerment
 - Pharmacotherapy supervision



Example 3: Informing decision-making about the structure of the benefit basket and continuously evolving the provider network (CR)

Data: Data on all patients hospitalised for myocardial infarction in Slovenia between 2015 and 2021 (n=15,639) were retrospectively obtained from the HHS by linking the national hospital database, the medicines and CR reimbursement claims, and the national mortality registry, using anonymized unique patient identifiers. Of the eligible patients, **nearly a third attended CR.**

Methods: interrupted time series analysis with segmented regression (impact on nation-wide CR uptake) and Cox proportional hazards regression model with inverse probability of treatment weights, by propensity score (impact of CR participation on clinical outcomes (all-cause mortality and/or CV hospitalisations))



Example 3: Informing decision-making about the structure of the benefit basket and continuously evolving the provider network (CR)

Results:

- Comprehensive outpatient CR programmes initiation in 2017 was associated with an increase in trend **of nationwide CR uptake**, which was partially reversed by the coronavirus pandemic outbreak.
- Participation to either CR modality was **associated with a significant risk reduction for composite outcomes and all-cause mortality**.
- **Risk reduction for CV hospitalisations** was only significant for comprehensive outpatient CR.

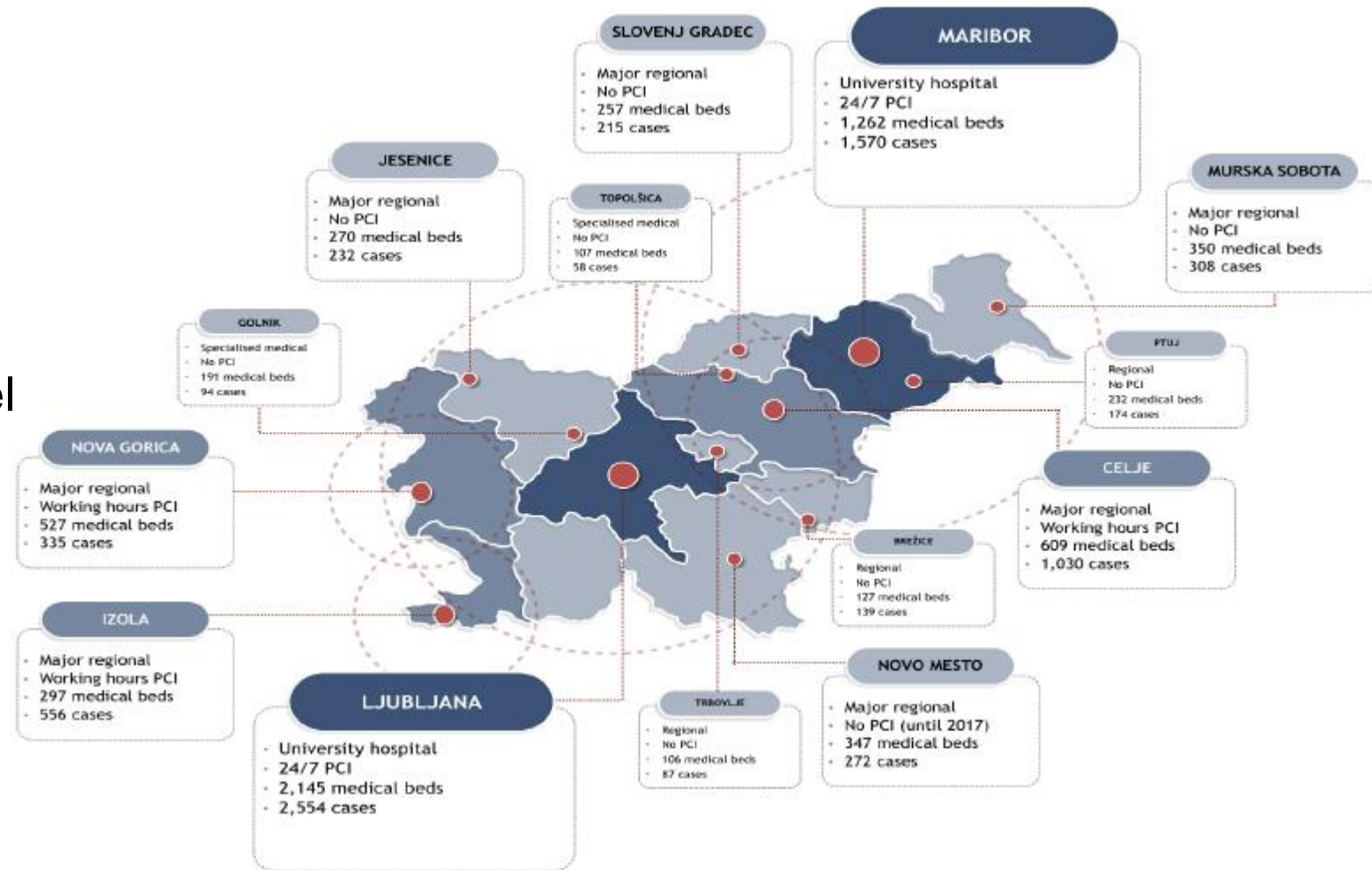
fund outpatient
CR and extend
the network of
comprehensive
outpatient CR
centres

Example 4: Continuously evolving the provider network (AMI)

Data: routinely collected patient-level data on hospitalisations, medication use, and mortality from the HIIS in the 2015-2017 period

Methods:

- 7,624 patients hospitalised because of AMI in 14 hospitals; 14 patient-level variables and two hospital-level (size and PCI coverage) variables were measured
- 30-day mortality, uptake of reperfusion, uptake of secondary prevention, and LoS
- random intercept logistic regression modelling, negative binomial regression



Example 4: Continuously evolving the provider network (AMI)

Results:

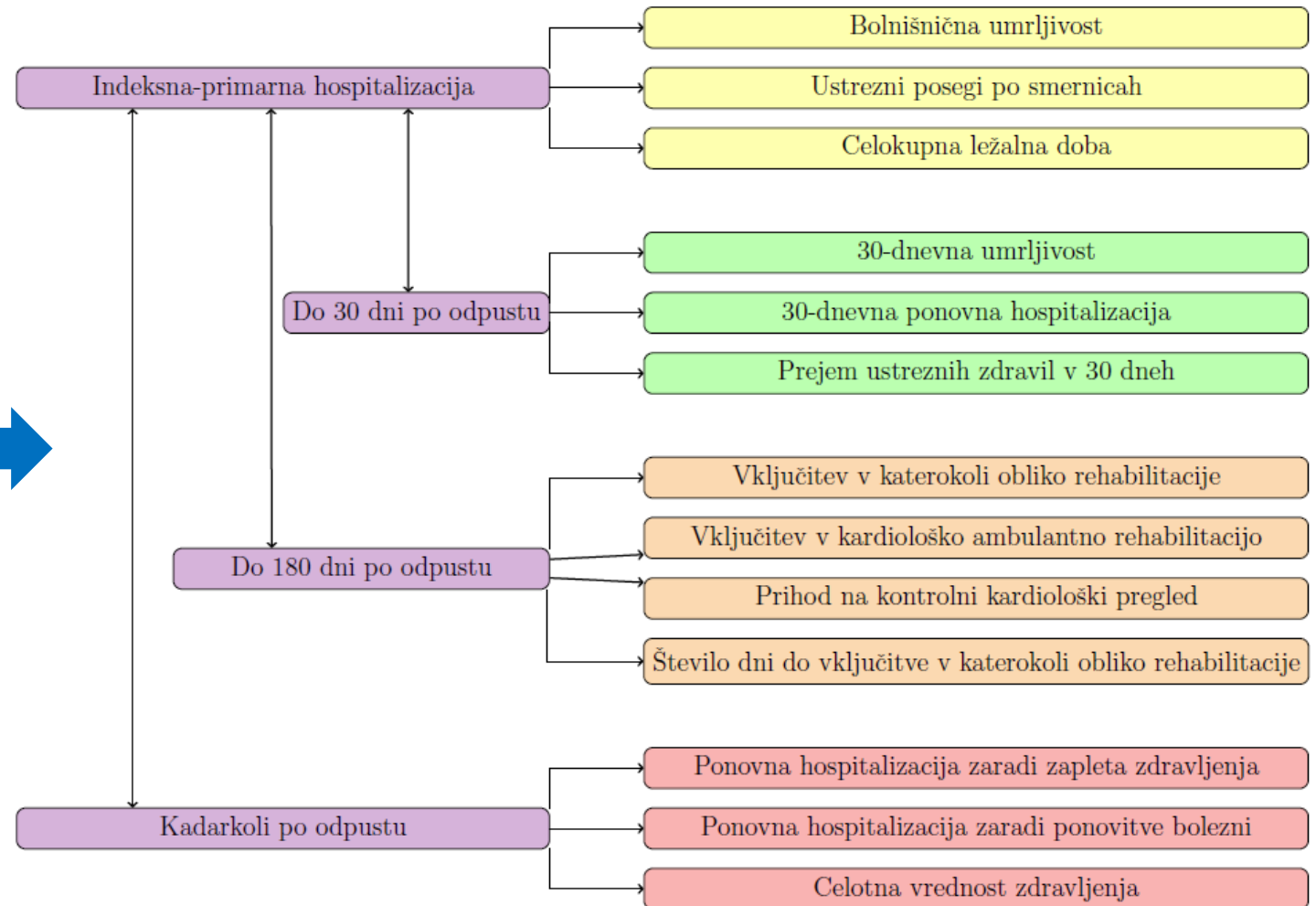
- **between-hospital variation of 6% for 30-day mortality**, with patient and hospital characteristics explaining 4% of the total variation
- **at hospital-level, neither size nor PCI availability were significantly associated with mortality**
- reperfusion uptake was associated with hospital size and 24/7 PCI availability
- **secondary prevention was only associated with hospital size**; secondary preventive medication uptake ranged from 30.7% to 87.3% in high- and low-performing hospitals, respectively; discharge from high-adherence hospitals was associated with significantly lower all-cause mortality and re-infarction rates

constant monitoring
of KPIs for the
network to make
adjustments and/or
mobilise the
internal motivation
of medical staff for
quality
improvements

Example 5: Creating non-financial supply-side incentives (dashboards with quality indicators for coronary artery disease)

Quality and efficiency indicators derived from administrative claims data based on expert opinion from 5 groups:

1. mortality,
2. rehospitalizations,
3. process (during hospitalisation) indicators,
4. process (after discharge) indicators,
5. financial indicators



Example 5: Creating non-financial supply-side incentives (dashboards with quality indicators for coronary artery disease)

Data: Data on all patients with an index admission for coronary artery disease in Slovenia between 2015 and mid 2021 (n=36,122) were retrospectively obtained from the HHS

Methods:

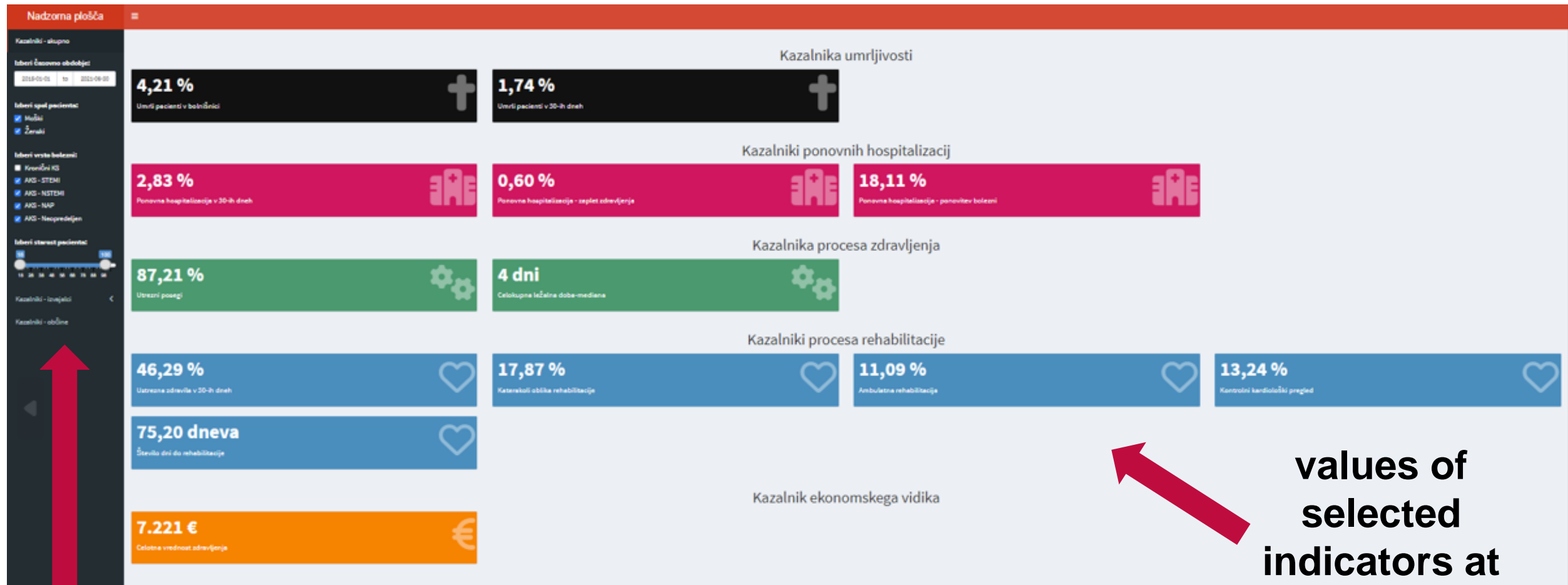
- hierarchical logistic/Poisson regression modelling:
 - level 1 - patient characteristics (sex, age, no. of procedures, type of coronary artery disease, no. of secondary diagnosis, type of secondary diagnosis)
 - level 2 - hospital characteristics (size and type)
 - level 3 - community of residence characteristics (17 indicators → 3 factors using exploratory factor analysis)
- training (to investigate which characteristics predict outcomes) and test datasets

Results: dashboards on 3 levels

provide feedback to medical teams as a non-financial incentive to improve care;

when linked with other relevant data a tool for supervision of providers

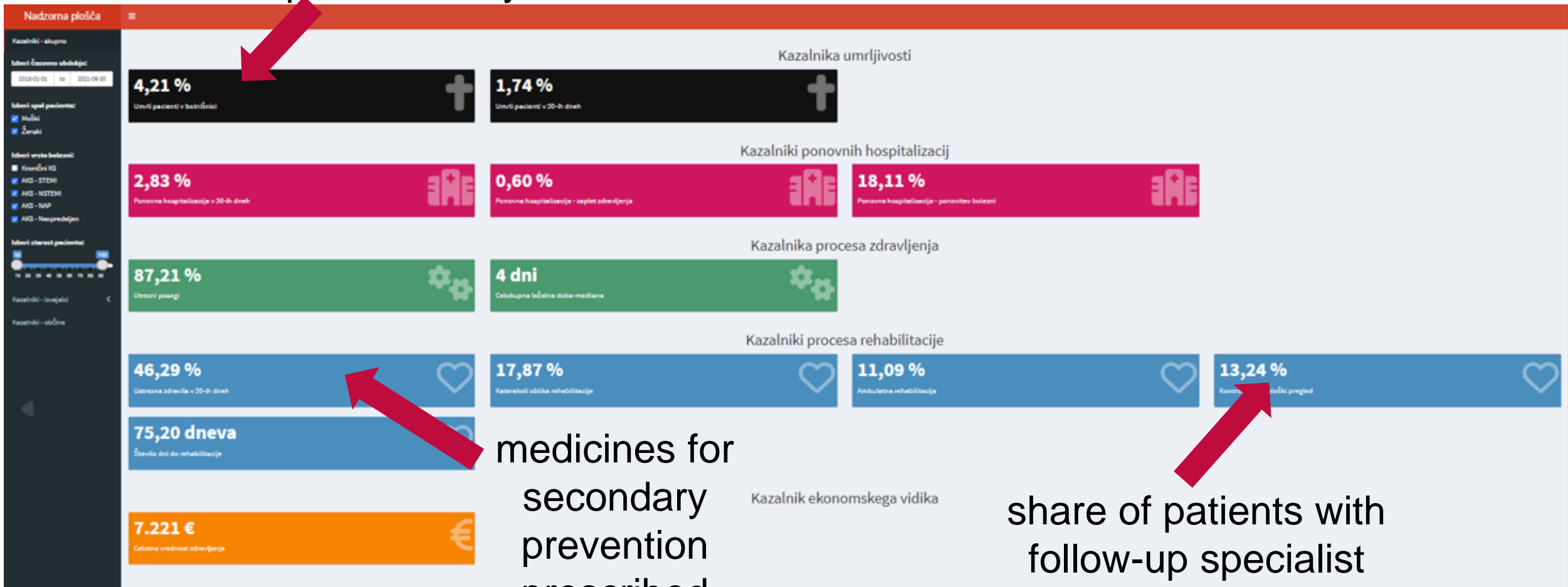
Example 5: Creating non-financial supply-side incentives (dashboards with quality indicators for coronary artery disease)



1.1.2015-30.6-2020; both sexes; acute coronary syndrome; age: 18-100

Example 5: Creating non-financial supply-side incentives (dashboards with quality indicators for coronary artery disease)

in-hospital mortality



medicines for secondary prevention prescribed within 30 days

share of patients with follow-up specialist visit within 6 months

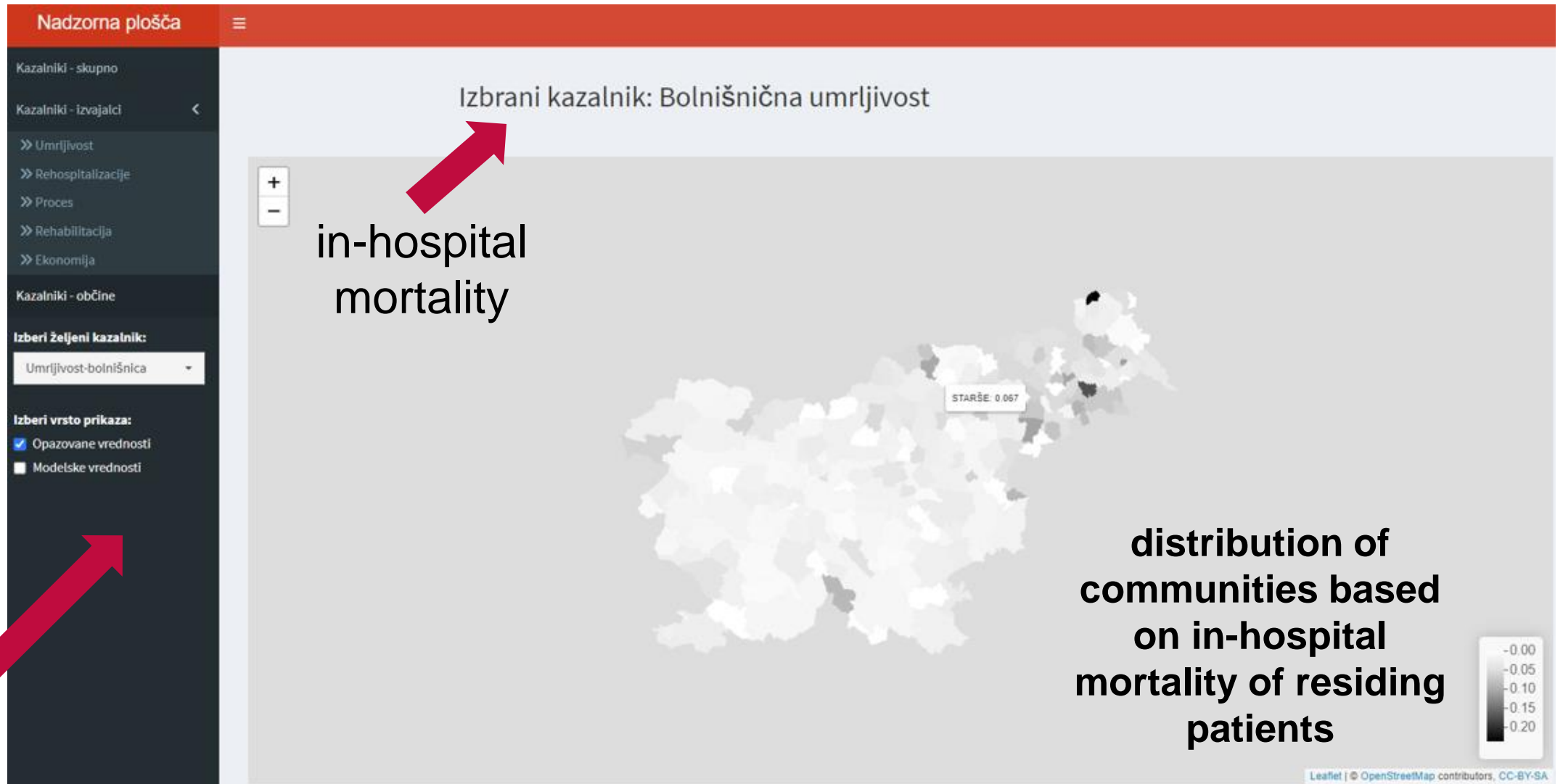
Example 5: Creating non-financial supply-side incentives (dashboards with quality indicators for coronary artery disease)

comparison between hospitals; deviations of observed values from modelled values for individual hospitals to control for differences in characteristics



1.1.2015-30.6-2020; both sexes; acute coronary syndrome; age: 18-100

Example 5: Creating non-financial supply-side incentives (dashboards with quality indicators for coronary artery disease)



coronary artery disease; actual (not modelled values)

Code

Cost

Analyse

Fund

Code

- lack of needed infrastructure
- variability in coding capacity
- data collection overload and low motivation

- professionalisation of coding
- controls with other high quality (high conformance, completeness, plausibility, and conceptual validity) administrative data of HHS (e.g. coded secondary diagnoses vs. medicines uptake data)
- regular updates of classifications, IT support

Cost

- focus on charges not costs
- insufficient monitoring of costs per patient
- lacking process-oriented organisation

- sound internationally comparable costing methodology
- IT support for per patient costing

Analyse

- insufficient analytical capacities
- easy to link with other administrative databases as well as registries with additional relevant health outcome measures (clinical, PROMs,...)

- capacity building
- weight calculation methodology
- improve feed-back loops and use casemix data for purposes beyond DRG payment

Fund

- dated payment models
- soft budget constrains
- weak response to embedded incentives

- establishing a DRG competency centre
- resolving the agency problems