Strengthening the evidence-base of integrated care for people with multi-morbidity in Europe using Multi-Criteria Decision Analysis (MCDA) – The SELFIE project

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on behalf of the SELFIE consortium

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SELFIE partners in SELFIE (sept 2015-sept 2019)

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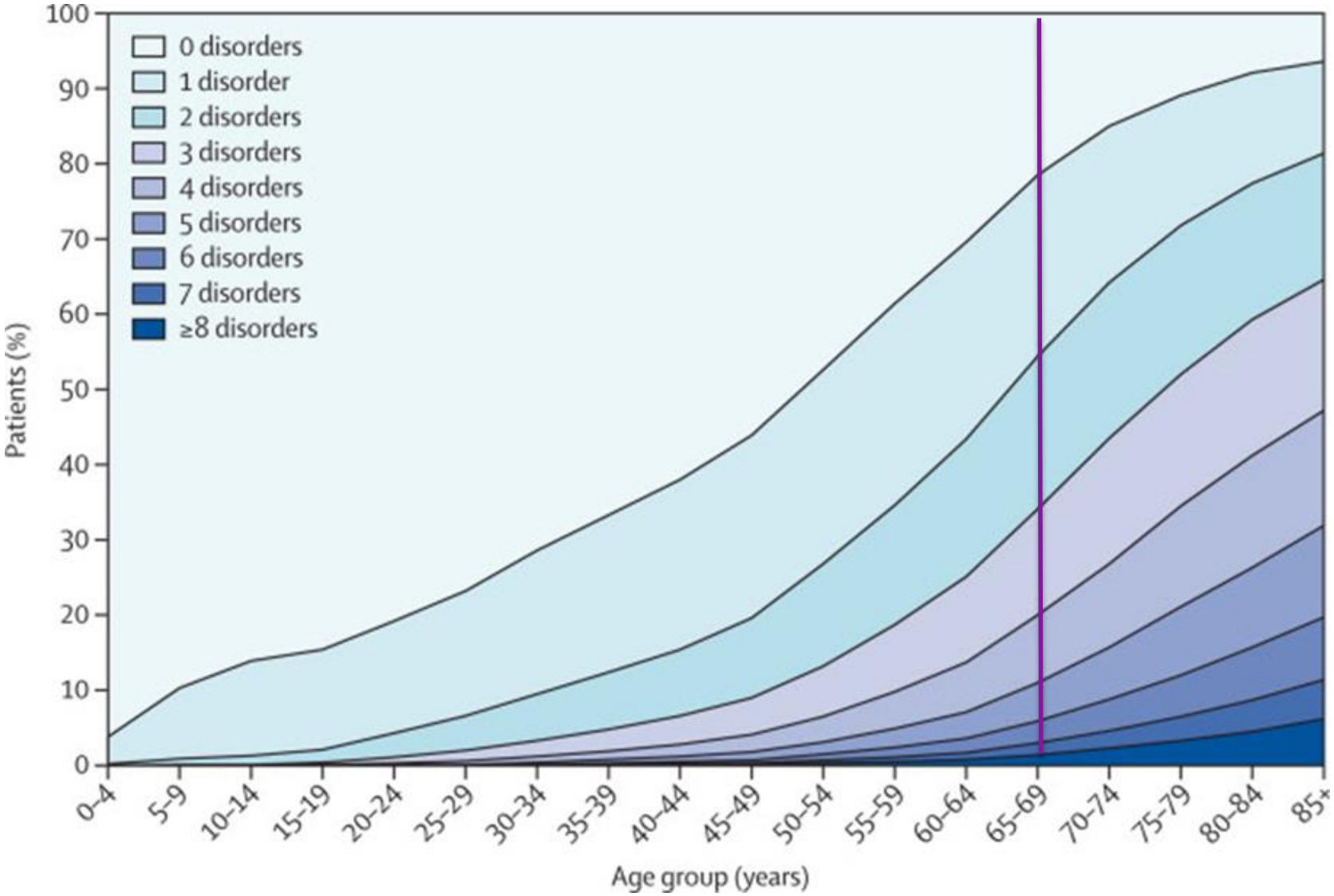
5. Syreon Research Institute, **Hungary**
6. Dept of Economics, University of Bergen, **Norway**
7. IDIBAPS Barcelona, **Spain**
8. Centre of Health Economics, University of Manchester, **UK**

Background: multi-morbidity (MM)



Barnett et al., Lancet 2012; 380(9836): 37-43

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Need for a pro-active person-centered integrated approach

- Fragmentation in / duplication of services
- Provided by multiple professionals
- Working in different sectors
- Mostly following single-disease guidelines
- Conflicting treatment goals
- Unforeseen treatment interactions
- Overly demanding appeals on an individual's self-management capability

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One of the aims of SELFIE

Contribute **empirical evidence** about the impact of promising integrated care programmes for persons with MM using '**multi-criteria decision analyses**' (MCDA)

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Definition MCDA

- A method to aid decision-making that makes the impact that multiple criteria have on a decision, ánd their relative importance, explicit

X

- Engages stakeholders in a dialogue about decision criteria and their importance

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Why MCDA

- **The complexity of integrated care programmes for MM**
  - Multiple, interacting, interventions in one programme
  - Target multiple levels (individuals, groups, organisations, system)
  - Context matters
  - A variety of intended outcomes grouped by Triple Aim (Health, Experience, Costs)
  - That are impacted by the behavior of those delivering and receiving the interventions
  - Continuously adapted and improved

- **Need to adopt a more holistic, person-centered understanding of 'value' when evaluating the added benefit of these programmes**

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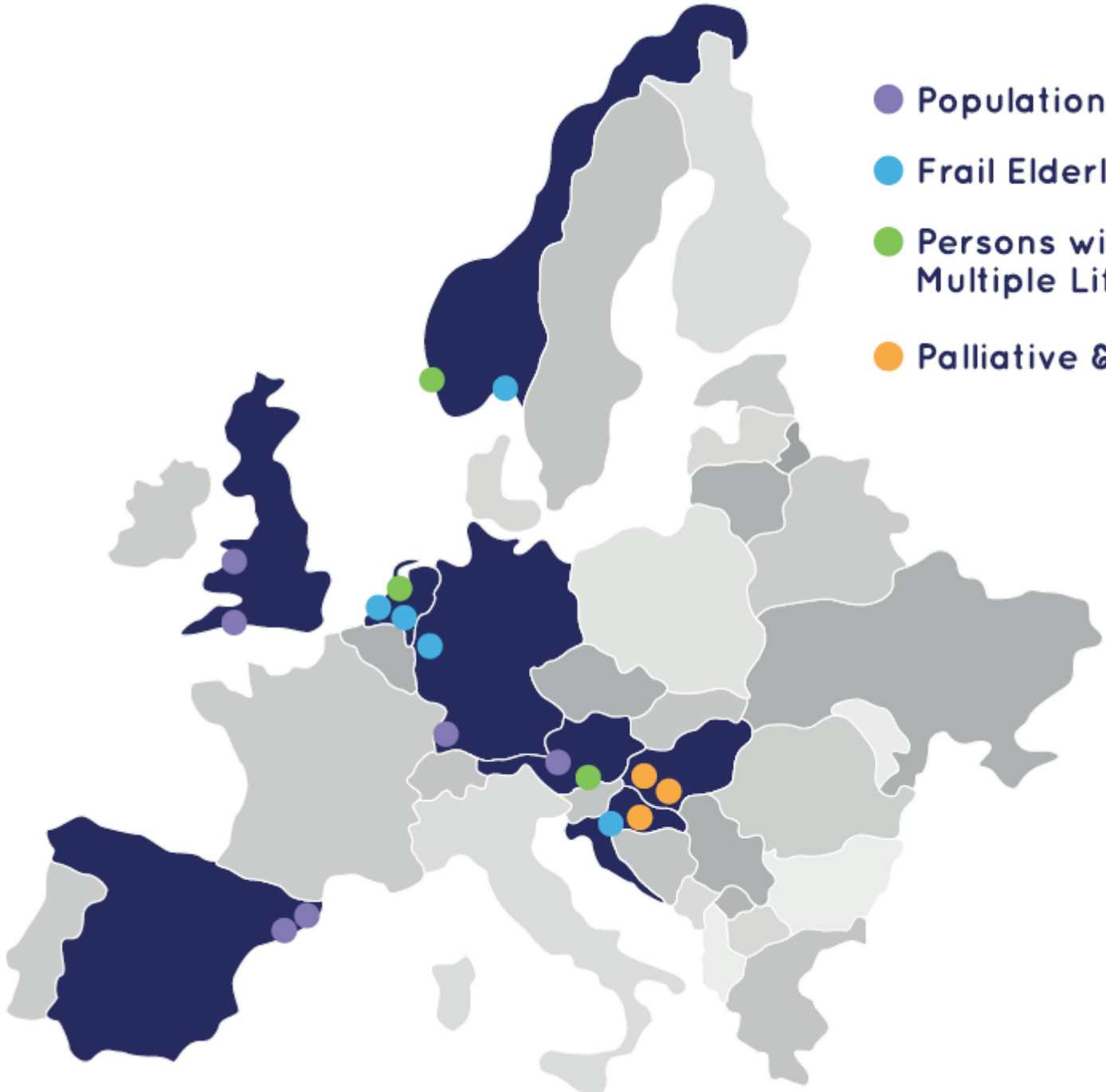

- Population Health Management
- Frail Elderly
- Persons with Problems in Multiple Life Domains
- Palliative & Oncology Patients

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The 7 steps of MCDA

1. Understanding the programmes and the decision-context — **Thomas Czypionka**
2. Identify and structure decision criteria
3. Determine the performance on these criteria — **Kamrul Islam**
4. Determine the weights of the criteria — **Maaike Hoedemakers**
5. Create an overall value score
6. Perform sensitivity analyses
7. Interpret results. — **Maureen Rutten-van Mölken**

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A comparative analysis of 17 integrated care programmes for multi-morbidity and their decision context – An overarching analysis

Thomas Czypionka

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EuHEA conference, Maastricht, July 11-14, 2018

The 7 steps of MCDA

1. Understanding the programmes and the decision-context } **Thomas Czypionka**
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Contents

- Introduction
- 4 Programmes introduced
  - Salford Integrated Care Programme
  - Proactive Primary Care Approach for Frail Elderly (U-PROFIT)
  - OncoNetwork
  - Better Together in Amsterdam North (BSiN)
- Results of overarching analysis
- Conclusions of overarching analysis

Introduction: Background information WP2

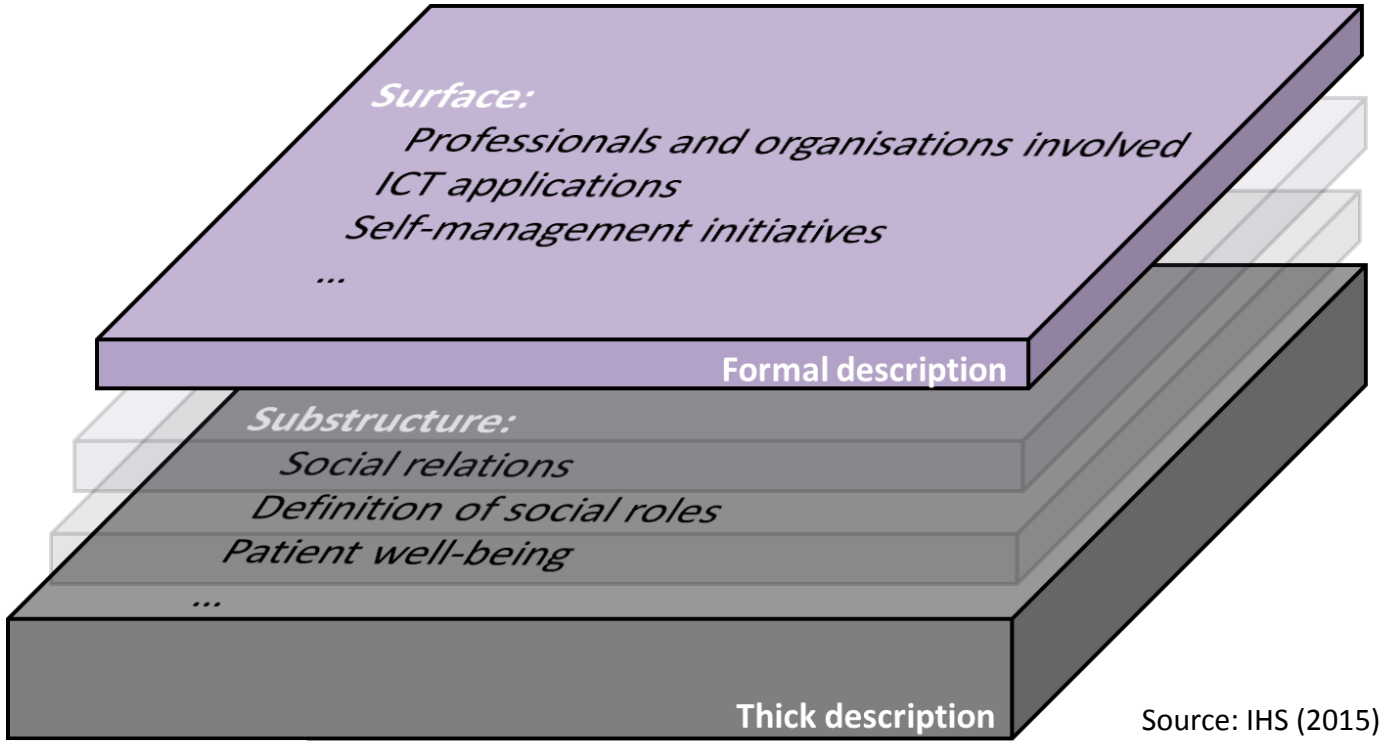
- Aim of WP2 of SELFIE: **comprehensively describe** 17 programmes selected in WP1, guided by conceptual framework
- Methodological approach: **thick description**
- Information gathered by means of **two complementing approaches**:
  1. Document analysis of programme documents
  2. Qualitative interviews with 10-20 relevant stakeholders

Programme manager(s)	Informal caregivers
Programme initiator(s)	Clients
Representatives of sponsor/payer organisations	Other stakeholders
Medical and social staff	

- Result: **individual reports on the 17 programmes** prepared by SELFIE partners

Introduction: Background information WP2

- Qualitative approach to investigate **implicit social practices**
- Origins in philosophy (Ryle, 1949) and anthropology (Geertz, 1973)
- Covers **several levels of depth of analysis**:



Source: IHS (2015)

Introduction: Selected programmes

Programme type	Programme name	Country
Population health management	Área Integral de Salut, Barcelona Esquerra (Ais-Be)	Spain
	Gesundes Kinzigtal	Germany
	Health Network Tennengau	Austria
	Salford Integrated Care Programme / Salford Together	United Kingdom
	South Somerset Symphony Programme	United Kingdom
Frail elderly	Badalona Serveis Assistencials	Spain
	Care Chain Frail Elderly	Netherlands
	Casaplus	Germany
	GeroS	Croatia
	Learning Networks	Norway
	Proactive Primary Care Approach for Frail Elderly (U-PROFIT)	Netherlands
Palliative & oncology patients	**OncoNetwork**	Hungary
	Palliative Care Consult Service	Hungary
	Palliative Care System	Croatia
Persons with problems in multiple life domains	**Better Together in Amsterdam North (BSiN)**	Netherlands
	Medically Assisted Rehabilitation Bergen	Norway
	Sociomedical Centre Liebenau	Austria

Salford Integrated Care Programme (SICP) / Salford Together, UK

- SICP is a **Primary and Acute Care Systems (PACS) Vanguard** site located in the North of England
- Aims to **better integrate care across care sectors** ➔to **improve the physical, mental, social health and wellbeing** of the local population of **people 65+ with long-term conditions**
- Consists of **three broad interventions**:
  1. **Multidisciplinary groups (MDGs)** meetings once a month to discuss case management of the highest-risk patients; MDGs are composed of GPs, mental health professionals, social workers, geriatrists, nurses from the same neighbourhood
  2. **Community assets approach** involves utilising the knowledge and life experiences of older people in Salford; making their lives better by listening and valuing their views and enabling them to influence the improvement of services and build stronger communities; assets range from health resources, volunteers, parks and green spaces, churches, leisure centres and local clubs
  3. **Centre of contact (CoC)** is a centralised hub (predominantly for telephone callers) to support older people to manage their long-term conditions; it helps with navigating services, self-management, offers post discharge support, health coaching
- **Financing**: PACS Vanguard sites **received additional start-up funding** and recognition from NHS England from March 2015 as demonstrators of envisioned new models of care

Proactive Primary Care Approach for Frail Elderly (U-PROFIT), NL

- **Nurse-led intervention** for **frail elderly (>60) living at home**
- Overarching aims: transitioning from **reactive to proactive elderly care**, preserving **daily functioning**, **improving quality of care** and **health** to **reduce costs**
- Care process consists of **two steps**:
  1. **Screening that makes use of routinely collected data in EMRs (U-PRIM)** – allows to identify potentially frail elderly on the basis of polypharmacy, multi-morbidity and/or lack of GP consultations
  2. **Elderly care nurse-led programme (U-CARE)** – individualised care plan based on holistic assessment and preferences of the patient, care provided in collaboration with GP and other relevant disciplines
- Main role in programme: **primary care centres** collaborating with home-care organisations, nursing homes and municipality (currently 8 primary care centres)
- **Elderly care nurses** in primary care centres: background as practice nurse or district nurse, special training to act as case managers and care coordinators
- **Financed** via **3 sources**: (1) implementation grant from Organisation for Health Research Development, (2) health insurance Zilveren Kruis Achmea, (3) internal investments by primary care centers

OncoNetwork, HU

- **Local hospital-based initiative** in Somogy county aimed at **improving clinical outcomes for cancer patients** via timely access to quality-assured, unfragmented healthcare
- Hungarian healthcare system characterised by **severe coordination deficits** – OncoNetwork seeks to overcome these deficits
- Focus on **timely diagnosis and therapy initiation**: diagnostics must be completed within 30 days upon entry, therapy must be initiated within a further 2 weeks
- **OnkoNetwork administrators**: non-physician assistant or administrator background, coordinating role, take on administrative tasks form department physicians
- **Supervisor physicians**: mediating role between OnkoNetwork administrators and department physicians
- **Tailored IT system** for individual patient path monitoring and management has been developed as part of OnkoNetwork
- **Financing:** no specific coverage or reimbursement from external sources – low operational costs are financed from hospital's budget

Better Together in Amsterdam North (BSiN), NL

- Targets **persons with complex needs in multiple life domains** in a **socio-economically deprived area**
- Alliance of **12 providers** from **primary healthcare**, **secondary healthcare**, **mental health services**, **welfare** and **social security** sectors
- Providers from involved organisations identify potential clients – needs assessment using **Self-Sufficiency Matrix** (domains: finances, daily activities, housing, relationships at home, mental health, physical health, addiction, activities of daily living, social network, social participation, justice)
- Development of **individualised care plan** together with client, progress **routinely monitored** by case manager – typical case management trajectory takes six months to one year
- **Case manager**: professionals from different organisations and sectors who receive specific training
- Entire process is supported by **ICT portal** that includes documents and tools for enrolment, triage and case management
- **Financing**: structural financing via predominant health insurer in the region (Zilveren Kruis Achmea) and municipality of Amsterdam

Results of overarching analysis

Some of the themes that emerged in overarching analysis:

- Assessment of clients' needs
- Holistic care approach
- Continuity of care
- Client involvement
- Self-management
- Communication between professionals

Results of overarching analysis

Assessment of clients' needs

- For persons with complex needs, comprehensive needs assessment is particularly crucial
- Different forms of assessment (standardised questionnaires, home visits etc.) – importance of personal contact was stressed

U-PROFIT:

"…the GP saw my mother during an office visit, but at that consultation my mother is a different woman than when she's at home, at home you see the chaos…" [programme manager quoting informal caregiver]

Holistic care approach

- Care should be person-centred rather than condition-centred
- Holistic approach recognises interconnectedness of physical health, mental health and social situation

OncoNetwork:

"The whole individual is treated and not only the cancer disease." [non-physician staff]

BSiN:

"[…] that you have a forty year old woman in the practice who has three children and visits the practice with all kinds of vague complaints, asthma, headaches, tired, not well, worries. And the case manager visits her and then it turns out that [she] lives there with her mother and her sister and two children in house that is way too small and actually the big problem is the living situation. How do you solve that? And in addition to all the other things. But then it crystallizes into one action point, housing needs to be worked on." [case manager]

Results of overarching analysis

Continuity of care

- Continuous caring relationship with professionals and seamless service provision particularly important for persons with complex needs
- Existence of a single contact point is highly valued
- In many programmes, non-physician professionals play central role for patients

South Somerset:

"It doesn't matter what is wrong with me, I can discuss it with them. If I need a doctor's appointment, they can make one at the surgery for me and they can…if it's something to do with, say, the diabetes and they think I need a review, they will arrange all of that for me. So it is, as they have said, one body of people I can go to that has access to everything I need." [client]

U-PROFIT:

"[…] patients are open in a really different way towards the nurses than towards us [GPs]. Often much more is said, they dare to say much more, because then you don't bother the GP even though you [the GP] think they can really say more, they just don't." [physician]

Results of overarching analysis

Client involvement

- Involvement of clients in all stages of the care process, so that clients actively contribute to (planning of) treatment
- Shared decision-making and joint goal-setting as central aspects

South Somerset:

"So, I guess it's about, […] what are their goals, are their goals realistic. So, say you've got somebody that's got COPD, and they used to do aerobics, you know, is that still feasible, or actually, do they need to set some new goals. And then, it's about working with them on how they can achieve those goals." [physician]

U-PROFIT:

"[Living at home longer is] what everyone essentially wants. That's what the government really wants, but most older people too. And that only works if you link up with what someone finds important." [project manager]

Results of overarching analysis

Self-management

- Persons with complex needs face particular challenges when managing their conditions and navigating through the care system
- Self-management considered a means of empowerment, but patients' abilities and personal situation have to be taken into account

South Somerset:

"What we have to make sure we don't do is become another service that people become reliant on. So we don't want to create dependency, we want to create people that learn to manage their conditions...and what we've had to be careful of is that this new model, and this service, doesn't try and plug gaps. And then, you know, plug gaps in other services that aren't there, or they don't have the provision there, and then we become another service which is overwhelmed and can't cope." [project manager]

South Somerset:

"Perhaps some people who are in the last few months of life, it's not the best time to start changing and shifting from a culture of dependency and biomedical to trying to encourage self-management, but for some people, it's exactly the right thing in the last few months of life. They finally get some control over something, so it's really difficult to do any sweeping generalisations." [programme initiator]

Results of overarching analysis

Communication between professionals

- Integrated care typically involves multi-disciplinary teams, so communication between professionals is highly important (e.g. case conferences, “huddles”)
- Communication between different professions can be challenging

South Somerset:

“[…] and that’s where they discuss all their patients who are ten on the Symphony scale so the ones they’re most worried about. […] so they tend to be discussed on a daily basis. […] So the huddle is a key thing and tends to happen early in the day.” [programme initiator]

OncoNetwork:

“There was a need for administrators who overview the full care process, with a supportive role but also with some power; and it became evident early that communication between non-physicians and physicians is not ideal in this context, so we need a supervisor physician role also.” [programme initiator]

Conclusions of overarching analysis

- Several **common topics** can by identified among the programmes, and **insights** about these gained by the means of thick description
- Aspects of **personal relationships** between clients and professionals/among professionals are central to success
- **Person-centeredness** emphasised in all programmes – manifests itself in various ways
- Identified aspects and experiences can be **valuable for future implementation efforts**
- Insights can be harnessed to **formulate the decision context for MCDA**

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Importance of Triple Aim outcome measures: do patients, partners, professionals, payers and policy makers differ in opinion?

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EuhEA Maastricht, 11-14 July 2018

The 7 steps of MCDA

1. Understanding the programmes and the decision-context
2. Identify and structure decision criteria
3. Determine the performance on these criteria
4. Determine the weights of the criteria } Willemijn Looman
5. Create an overall value score
6. Perform sensitivity analyses
7. Interpret results

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Aim

- To investigate if different stakeholders think differently about the importance of outcomes used to measure the impact of integrated care.
  - Patients with multi-morbidity
  - Partners (informal caregivers)
  - Professionals
  - Payers
  - Policy makers

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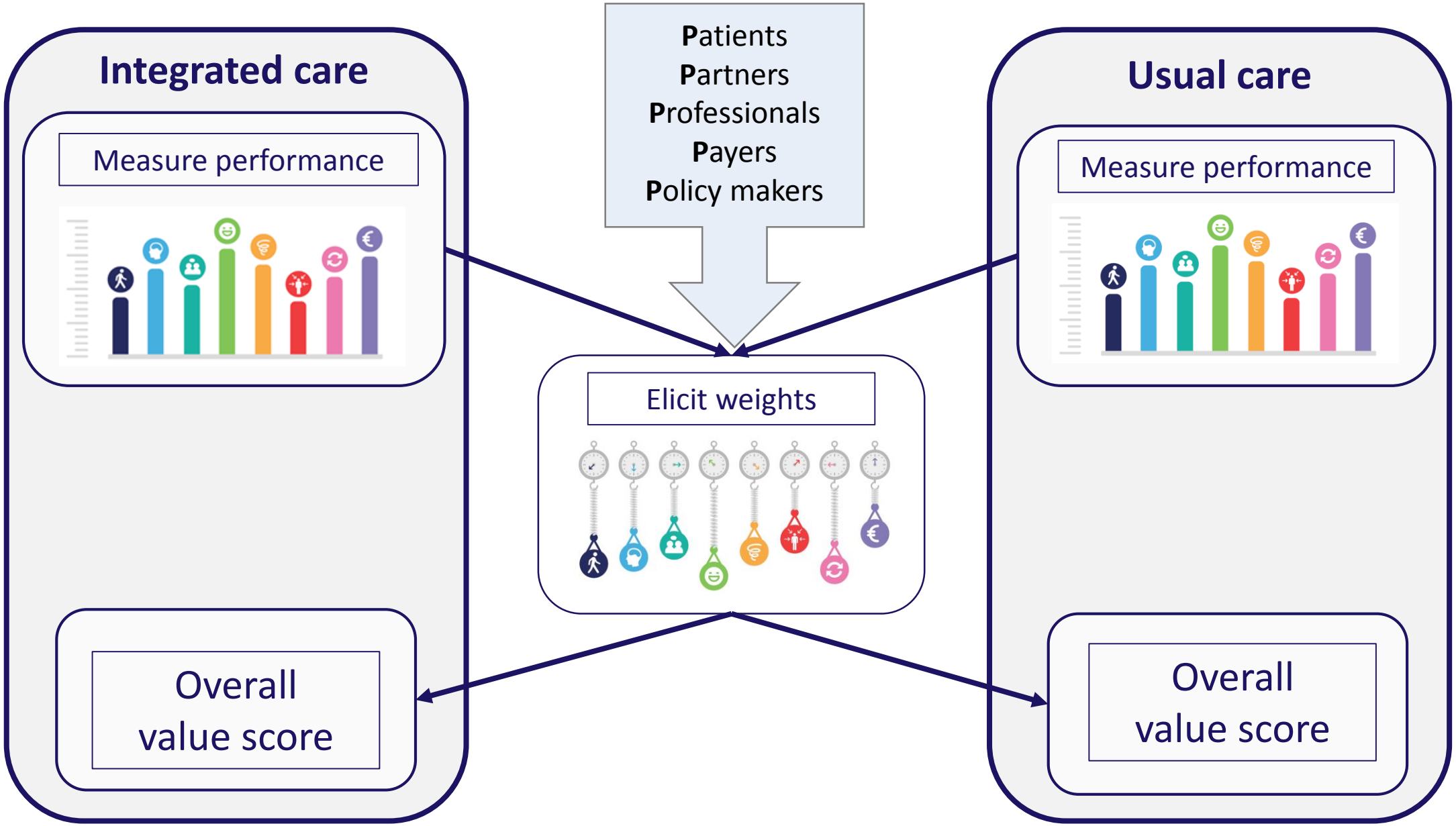
Value-based method of MCDA



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Core set of outcomes covering the Triple Aim

- Physical functioning
- Psychological well-being
- Social relationships & participation
- Enjoyment of life
- Resilience
- Person-centeredness
- Continuity of care
- Total health- and social care costs

Programme-specific outcomes

	Programme-specific outcomes			
	Population health management	**Frail elderly**	**Palliative and oncology**	**Problems in multiple life domains**
Health & well-being	Activation & engagement	Autonomy	Mortality	Financial independence
			Pain and other symptoms	
Experience		Burden of medication	Compassionate care	
		Burden of informal caregiving	Timely access to care	
			Preferred place of death	
			Burden of informal caregiving	
Costs	Ambulatory care sensitive hospital admission	Long-term institution admissions		Contacts with the justice system
	Hospital re-admissions	Falls leading to hospital admissions		

Weight-elicitation methods

- MCDA method:
  - Multi-Attribute Value-based Method: weights for criteria are determined separately from performance

- Weight-elicitation method:
  - Discrete Choice Experiment (DCE): Core set of outcomes
  - Swing Weighting (SW): Core set of outcomes + programme-specific outcomes

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Weight-elicitation methods (1): DCE

- Discrete Choice Experiment:
  - Comparing two integrated care programmes
  - No opt-out

  - Core set of outcomes

  - 8 countries, 5 stakeholder groups = 40 DCEs
  - N=150 per stakeholder group

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Weight-elicitation methods (1): DCE

- Design:
  - Bayesian D-efficient design
  - 8 criteria, 3 levels → attribute level overlap (4/3/3 criteria overlap)
    - Best level enjoyment of life and worst level psychological well-being were never presented together
  - 3 blocks of 6 choice tasks
  - 10 different sub-designs
  - Questionnaire was pilot-tested with persons with multi-morbidity
  - Priors based on literature for first 50 respondents > then design update

- Analysis:
  - Conditional logit, scale heterogeneity multinomial logit, mixed logit, Bayesian mixed logit

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Discrete Choice Experiment to elicit weights for core set of outcomes

	Care programme A	Care programme B
Physical functioning	**Severely** limited in physical functioning and activities of daily living	**Severely** limited in physical functioning and activities of daily living
Psychological well-being	**Seldom or never** being stressed, worried, listless, anxious, and down	**Always or mostly** being stressed, worried, listless, anxious, and down
Social relationships & participation	Having **a lot** of meaningful connections with others	Having **some** meaningful connections with others
Enjoyment of life	Having **some** pleasure and happiness in life	Having **some** pleasure and happiness in life
Resilience	**Fair** ability to recover, adjust, and restore equilibrium	**Fair** ability to recover, adjust, and restore equilibrium
Person-centeredness	**Not or barely** person-centred	**Somewhat** person-centred
Continuity of care	**Fair** collaboration, transitions, and timeliness	**Fair** collaboration, transitions, and timeliness
Total health- and social care costs	**8500 euros** per participant per year	**5000 euros** per participant per year
Which care programme do you prefer?	○	○

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Weight-elicitation methods (2): SW

- Swing weighting:
  - Core set of outcomes + programme-specific outcomes
  - SMARTER

  - Worst to best
  - Number of criteria differs per country

  - Rank Order Centroid

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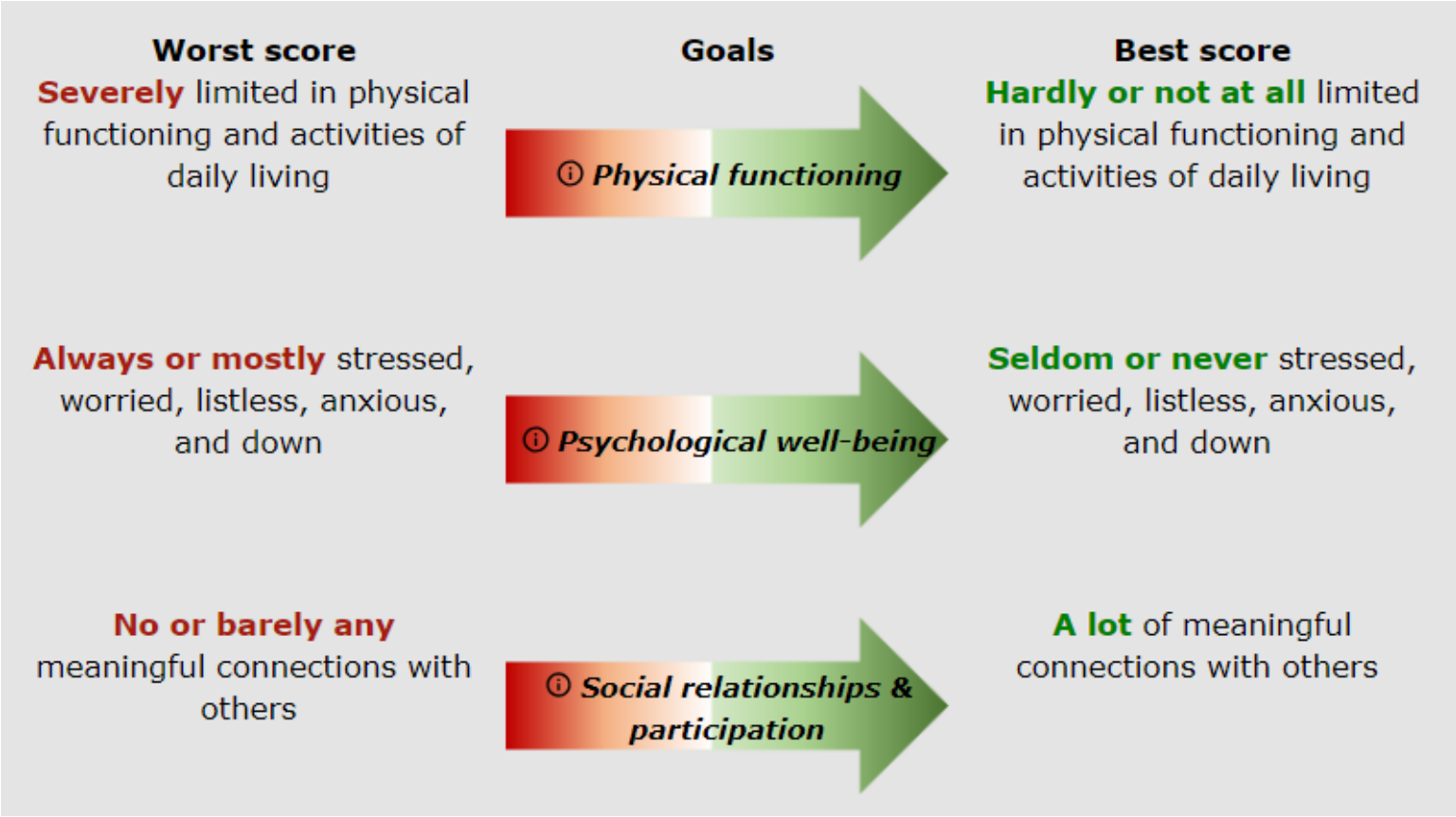
Swing weighting to elicit weights for core set + programme-specific outcomes

- "If you could change one outcome from worst to best, which would that be?"



- Continue doing so for all outcomes, until none are left

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Response online DCE questionnaire currently analysed

	Patients	Partners	Professionals	Payers	Policy makers
Austria	168	188	142	…	…
Croatia	173	172	…	…	…
Germany	166	215	179	…	…
Hungary	192	166	168	…	…
The Netherlands	159	161	156	100	151
Norway	158	161	91	122	185
Spain	150	151	139	…	…
United Kingdom	164	235	161	181	…

… = recruitment ongoing

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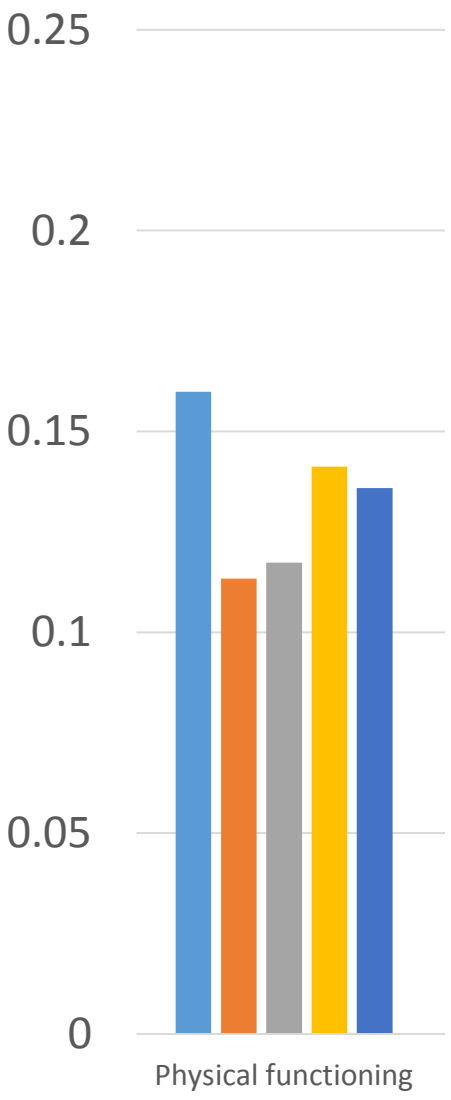
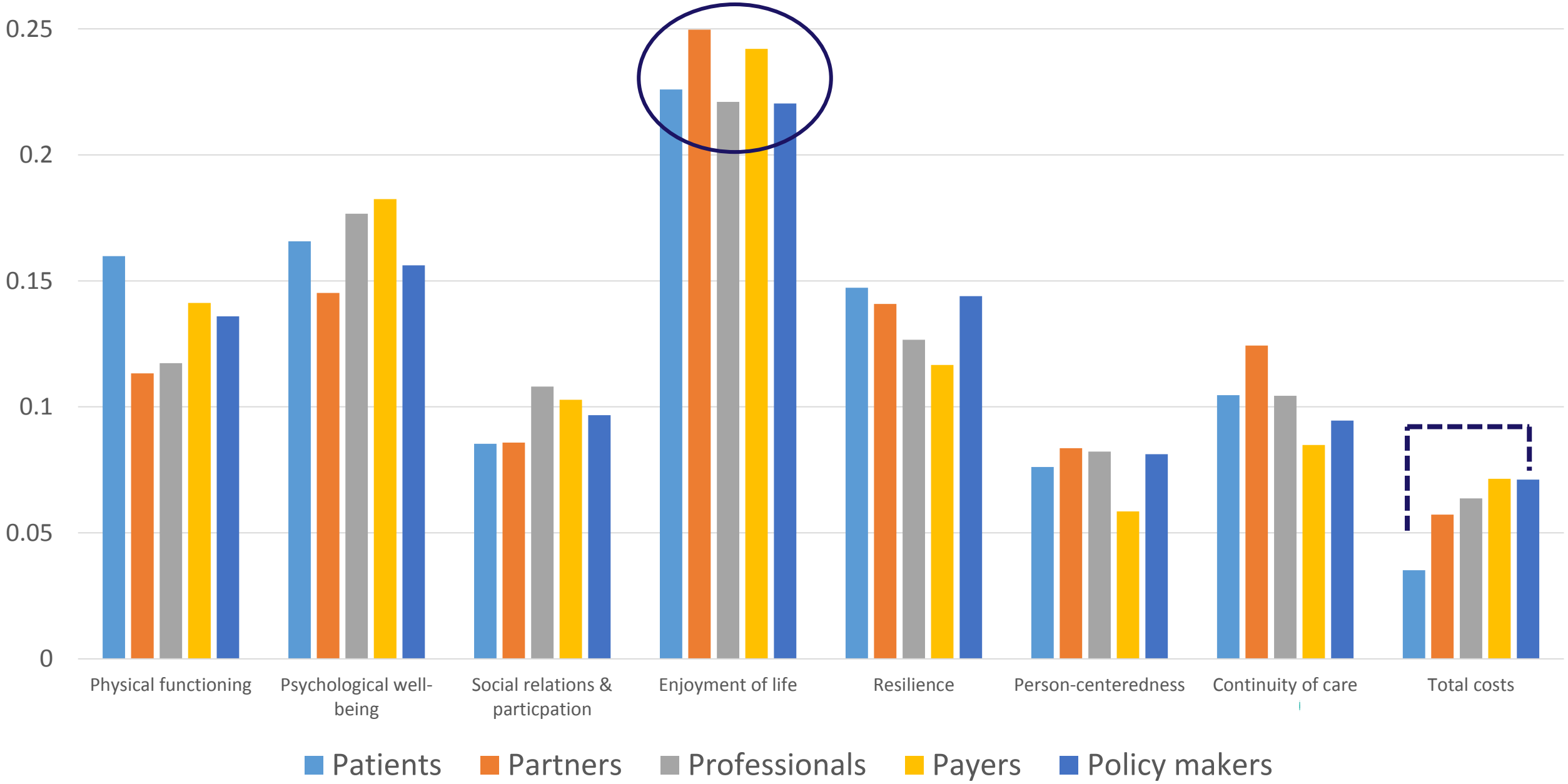
Comparing relative DCE weights between Dutch stakeholders

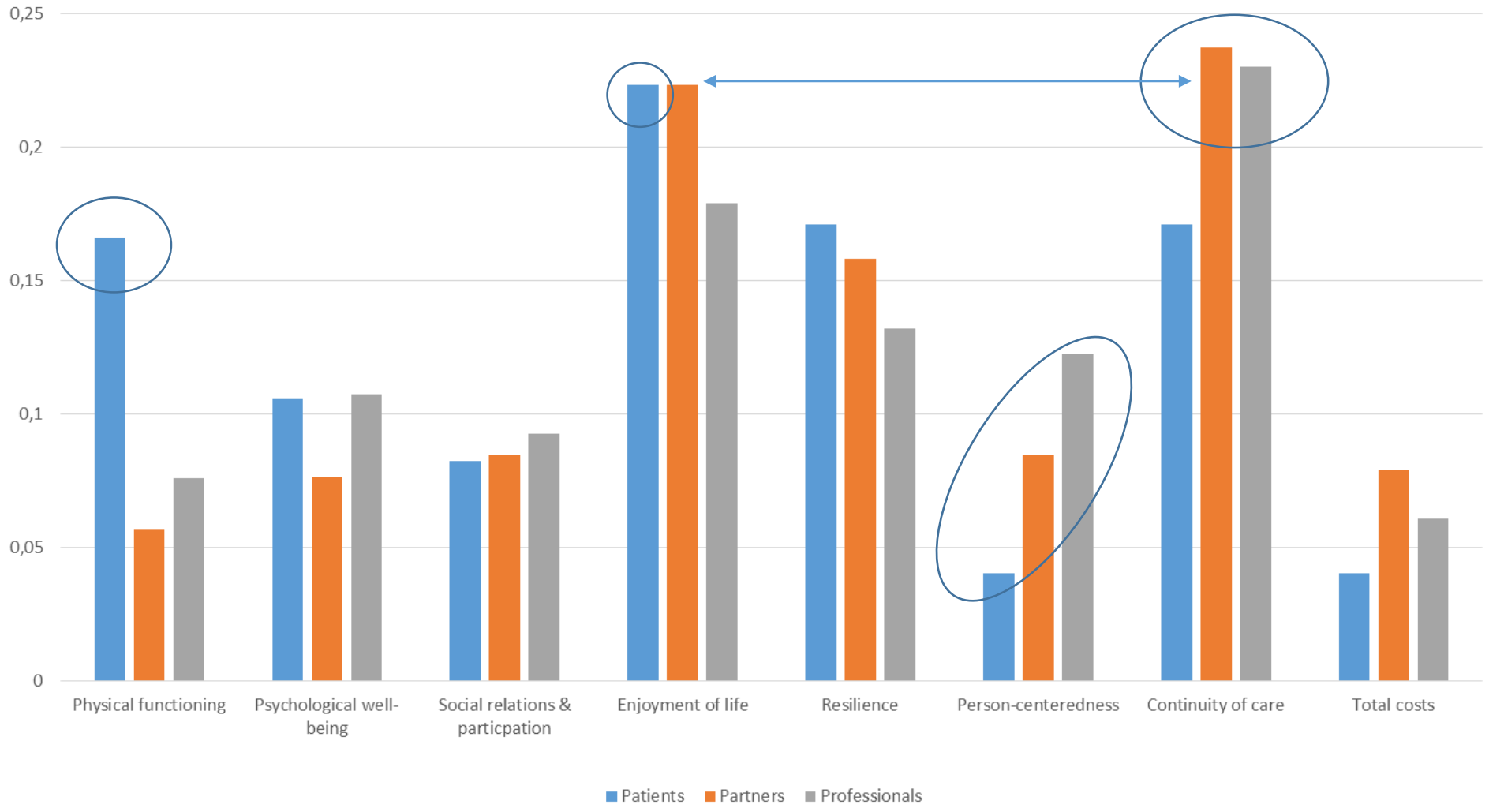


Patients Partners Professionals Payers Policy makers

Comparing relative DCE weights between Dutch stakeholders



Comparing relative DCE weights between German stakeholders



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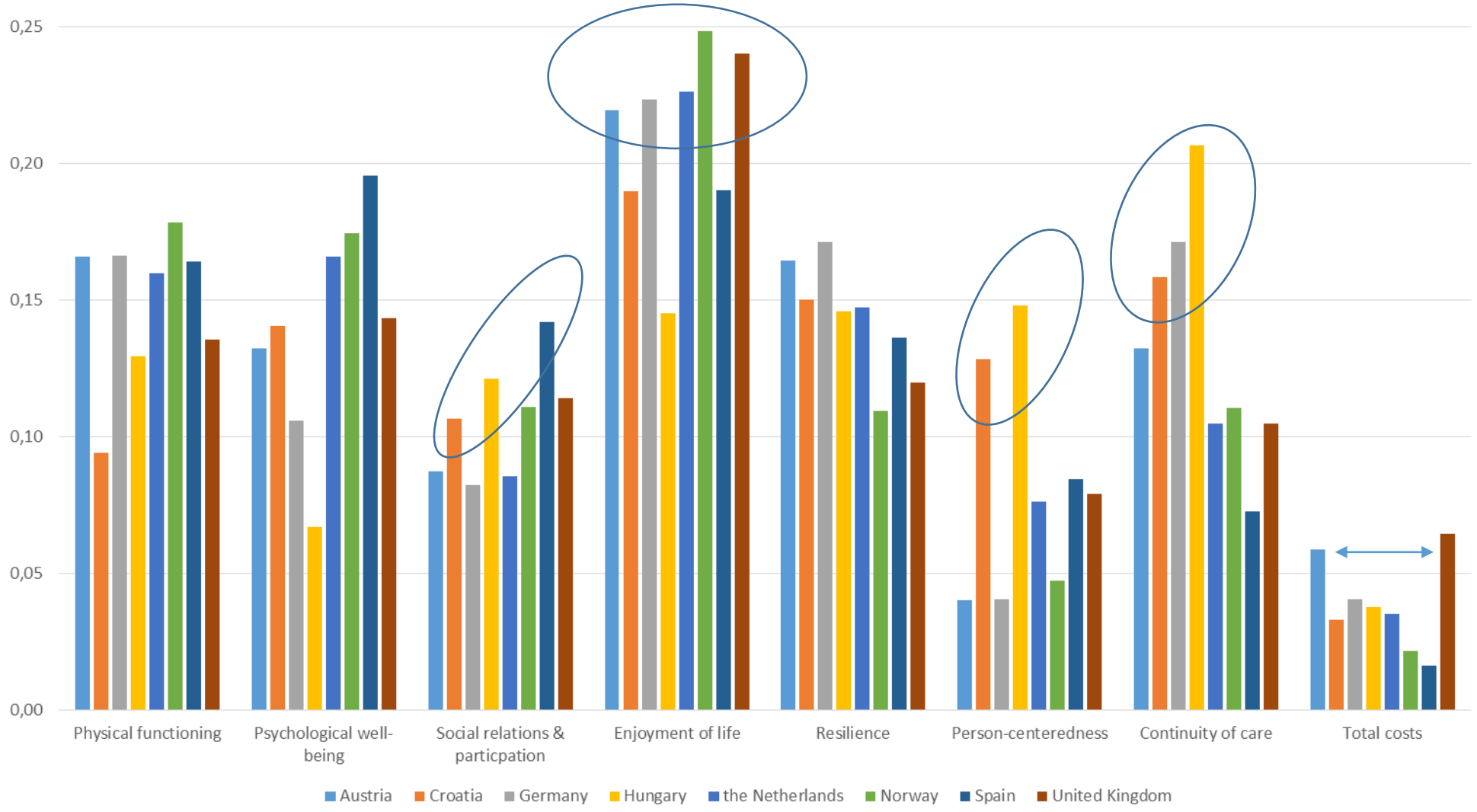
Comparing weights of Patients between countries



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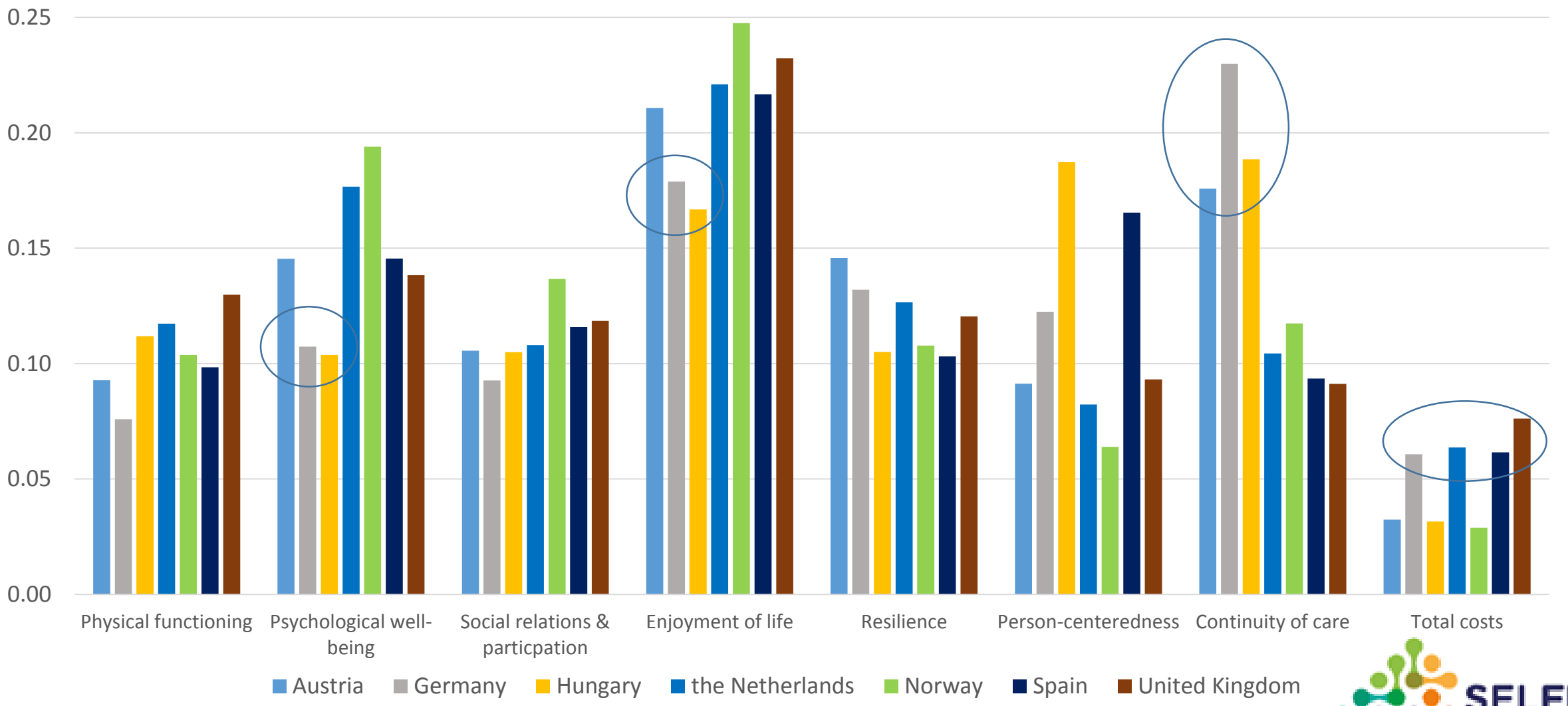
Comparing weights of Professionals between countries?



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DCE vs SW Patients Croatia

Ranking DCE weights		Ranking SW weights
Enjoyment of life	1	Physical functioning
Continuity of care	2	Autonomy
Resilience	3	Psychological well-being
Psychological well-being	4	Pain and other symptoms
Person-centeredness	5	Enjoyment of life
Social relations & participation	6	Resilience
Physical functioning	7	Timely access to care
Total costs	8	Person-centeredness
	9	Social relations & participation
	10	Continuity of care
	11	Burden of medication
	12	Compassionate care
	13	Burden of informal caregiving
	14	Total costs
	15	Long-term institution admissions
	16	Preferred place of death
	17	Falls

Core set criterion outside top 8

Programme-type specific criterion in top 8

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DCE vs SW Patients Germany

Ranking DCE weights		Ranking SW weights
Enjoyment of life	1	Physical functioning
Resilience	2	Autonomy
Continuity of care	3	Psychological well-being
Physical functioning	4	Enjoyment of life
Psychological well-being	5	Activation & engagement
Social relations & participation	6	Resilience
Person-centeredness	7	Social relations & participation
Total costs	8	Burden of medication
	9	Continuity of care
	10	Burden of informal caregiving
	11	Person-centeredness
	12	Avoidable hospital admissions
	13	Hospital re-admissions
	14	Long-term institution admissions
	15	Falls
	16	Total costs

Core set criterion outside top 8

Programme-type specific criterion in top 8

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Top 3 Patient preferences across countries: DCE vs SW

		AU		DE		HR		HU		NL		NO		ES		UK	
		DCE	*SW*	*DCE*	*SW*	*DCE*	*SW*	*DCE*	*SW*	*DCE*	*SW*	*DCE*	*SW*	*DCE*	*SW*	*DCE*	*SW*
Core set	Physical functioning	2	1		1		1		2	3	1	2	1	3	3	3	1
	Psychological well-being		2		3		3			2	3	3		1	2	2	2
	Social relationships & participation																
	Enjoyment of life	1	3	1		1				1	2	1	3	2		1	3
	Resilience	3		2		3		3									
	Person-centeredness							2									
	Continuity of care			3		2		1									
	Total costs																
Prog-spec	Autonomy				2		2						2		1		
	Pain and other symptoms								1								
	Life expectancy								3								

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Conclusions and implications

- Most stakeholders valued enjoyment of life as very important and costs as much less important
- More than 2-fold difference in weights between stakeholders in some outcomes (e.g. costs in NL, patient-centeredness in Germany)

Underlines relevance MCDA from different perspectives to explicate the impact of these differences on the overall value scores of Integrated Care and Usual Care

- In most countries the patients' top-3 in the DCE usually includes enjoyment of life, physical functioning and either resilience or psychological wellbeing
- In Croatia, Germany, and Hungary continuity of care enters the patients' top-3
- Of the programme-specific outcomes, autonomy, was in the patients' top 3 of most important outcomes in 2 of the 3 countries that included it in the weight-elicitation study

Programmes that improve these outcomes get a higher value score

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Thanks for your attention!

Questions?

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Quasi-experimental studies and natural experiments to evaluate the performance

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Paper presented at the 12th European Conference on Health Economics (EuHEC)
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The 7 steps of MCDA

1. Understanding the programmes and the decision-context
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7. Interpret results.

Kamrul Islam

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Outline of the Presentation

Step 2: *Identification and Decision criteria in Selecting of SELFIE Outcomes*

- Core outcomes
- Programme-specific outcome
- Instruments used to measure outcomes

Step 3 : *Measuring performance*

- Statistical Analyses : Quasi-experimental approaches
  - Examples of SELFIFE Programmes Study designs
    - Difference-in-Differences (Diff-in-Diff)
    - Regression Discontinuity (RD)
    - Matching methods-propensity score matching (PSM)

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Step 2: Identify and structure decision criteria

A long-list of potentially relevant outcomes obtained from **four sources**:

- Literature review
- National workshops
  - with representatives from the 5P's in the eight countries
- Eight focus groups with individuals with multi-morbidity
  - one in each country
- Review of outcomes currently being used in the 17 selected programmes

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Selected SELFIE Programmes from Eight countries

Country	The programme
Austria	Health Network Tennengau (HNT)
	Sociomedical Centre Liebenau (SMC)
Croatia	Palliative Care Model
	GeroS Model
Germany	The GK model
	The Casaplus program
Hungary	The OnkoNetwork
	The palliative care consult service (PCCS)
The Netherlands	U-PROFIT
	The Care Chain for Frail Elderly (CCFE)
	The BSiN programme
Norway	The Learning Network
	MAR Bergen
Spain	Barcelona-Esquerra (AISBE)
	Badalona Serveis Assistencials (BSA)
The UK	Salford Integrated Care Programme (SICP)
	The 'South Somerset Symphony Programme'

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Step 2: Decision criteria

- Relevance to multi-morbidity in different contexts and population groups
- Relevance across the 17 integrated care programmes
- Non-redundancy,
  - i.e., there is little overlap between them;
- Preference independence
  - i.e., the weight of one outcome can be elicited independently from the performance score of another outcome;
- Operationalisability
  - e.g., preferring original, and widely accepted performance measures over
- Self-constructed scales, avoiding proxies;
- Sensitivity to short-term intervention effect

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Core set of outcomes covering the Triple Aim

- Physical functioning
- Psychological well-being
- Social relationships & participation
- Enjoyment of life
- Resilience
- Person-centeredness
- Continuity of care
- Total health- and social care costs

This selection was largely driven by focus groups in patients with multi-morbidity in 8 countries
Focus group paper: Leijten et al, BMJ Open (forthcoming)

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Programme-specific outcomes

	Programme-type specific outcomes
	Population health management
Health & well-being	Activation & engagement
Experience	
Costs	Ambulatory care sensitive hospital admission
	Hospital re-admissions

Programme-specific outcomes

	Programme-type specific outcomes	
	Population health management	**Frail elderly**
Health & well-being	Activation & engagement	Autonomy
Experience		Burden of medication
		Burden of informal caregiving
Costs	Ambulatory care sensitive hospital admission	Long-term institution admissions
	Hospital re-admissions	Falls leading to hospital admissions

Programme-specific outcomes

	Programme-type specific outcomes		
	Population health management	**Frail elderly**	**Palliative and oncology**
Health & well-being	Activation & engagement	Autonomy	Mortality
			Pain and other symptoms
Experience		Burden of medication	Compassionate care
		Burden of informal caregiving	Timely access to care
			Preferred place of death
			Burden of informal caregiving
Costs	Ambulatory care sensitive hospital admission	Long-term institution admissions	
	Hospital re-admissions	Falls leading to hospital admissions	

Programme-specific outcomes

	Programme-type specific outcomes			
	Population health management	**Frail elderly**	**Palliative and oncology**	**Problems in multiple life domains**
Health & well-being	Activation & engagement	Autonomy	Mortality	Financial independence
			Pain and other symptoms	
Experience		Burden of medication	Compassionate care	
		Burden of informal caregiving	Timely access to care	
			Preferred place of death	
			Burden of informal caregiving	
Costs	Ambulatory care sensitive hospital admission	Long-term institution admissions		Contacts with the justice system
	Hospital re-admissions	Falls leading to hospital admissions		

Measuring outcomes

In quasi-experimental studies comparing intervention group with control group

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Instruments recommended to measure the core set of outcomes

	Outcome	Instrument
Health & well-being	Physical functioning	SF-36 (physical functioning domain) or Katz-15 for ADL
	Psychological well-being	MHI-5
	Social participation/relationships	IPA (social life and relationships domain)
	Resilience	BRS
	Enjoyment of life	ICECAP-O (item on enjoyment and pleasure) or Q-LES-Q (item on life satisfaction)
Experience	Person-centeredness	P3CEQ (experience of person-centered care domain)
	Continuity of care	NCQ (Team and cross boundary continuity domain) + CPCQ (item on waiting for appointment/treatment)
Costs	Total health- and social care costs	Based on iMTA Medical Consumption Questionnaire

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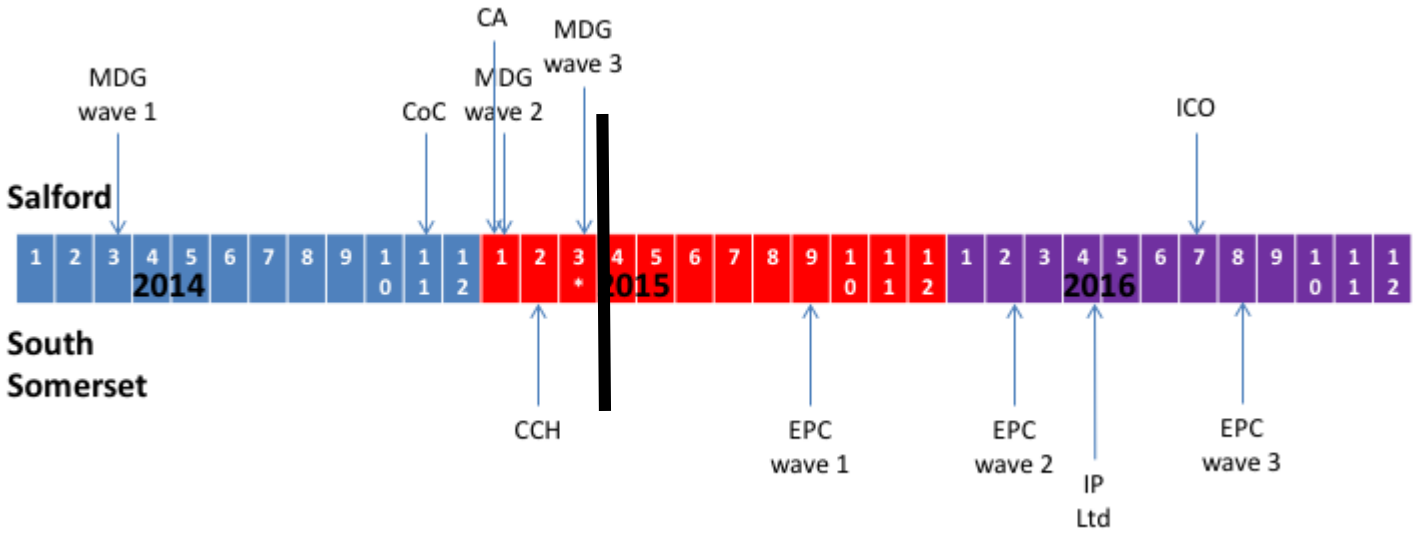
Study Design: Population Health Management

Salford Integrated Care Programme (SICP) / Salford Together



Service delivery: MDG = Multi-disciplinary group; CoC = Centre of Contact; CA = Community Assets; CCH = Complex Care Hub; EPC = Enhanced Primary Care.
Organisational: ICO = Integrated Care Organisation; IP Ltd = formation of a Ltd company of Integrated GP Practices. * = Vanguard status awarded to both sites.

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Study Design: Population Health Management

Part 1: GP Patient surveys (GPPS) data

Intervention and control group

- Intervention group: multimorbid individuals living in Salford (N=5 305)
- Control group: multimorbid individuals living in England outside of Salford (N= 742 473).

Period

- Pre-period covers survey years 2012 to the first semester of 2015.
- Post-period includes the surveys from the 2nd semester of 2015 and year 2016.

Statistical analysis

- **Use a difference-in-difference (DiD) approach** to allow drawing causal inference of SICP on the health and healthcare outcomes

Part 2: HES data

Intervention and control group: same as Part 1

Period

- Pre period financial year 2009/2010 to 2014/2015.
- Post-period is the financial year 2015/2016

Statistical analysis

- Adopt a **lagged dependent variable (LDV) approach**
  - does not require assumptions of parallel trends (as required for DiD)

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Study Design: Frail elderly:

Proactive Primary Care Approach for Frail Elderly (U-PROFIT)

Intervention group:

Frail elderly ≥ 75 living at home, identified by screening with U-PRIM who participate in U-PROFIT care programme.

Control group

Frail elderly just below 75 from the same GP practices living at home, identified by screening with U-PRIM who do not participate in U-PROFIT.

Time

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2016				T0 Intervention								
2017				T1 Intervention								
						T0 Control						
2018						T1 Control						

Number of respondent

	Intervention group	Control group
Baseline	322	134
12 months follow-up	177	

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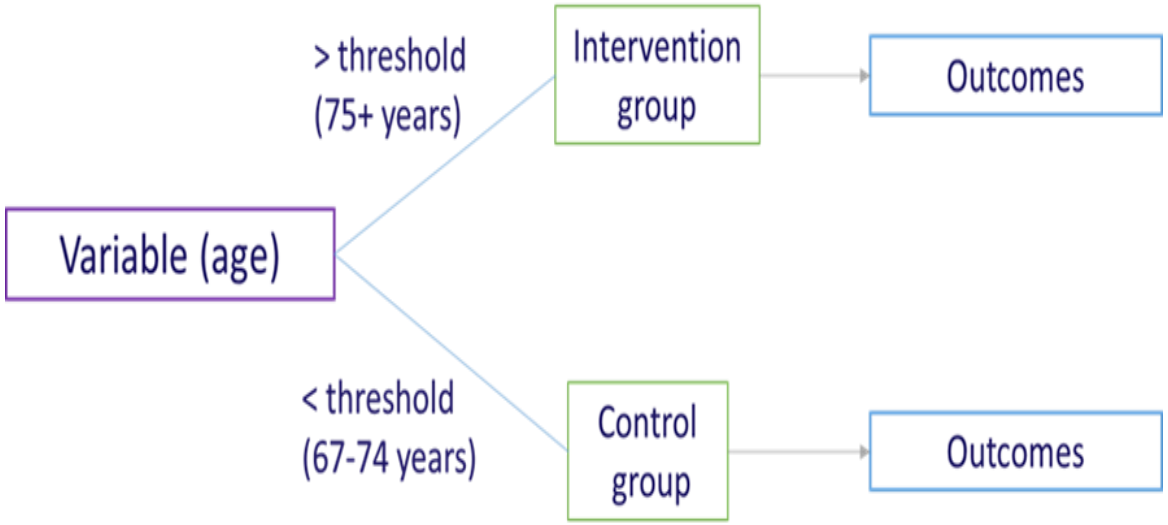
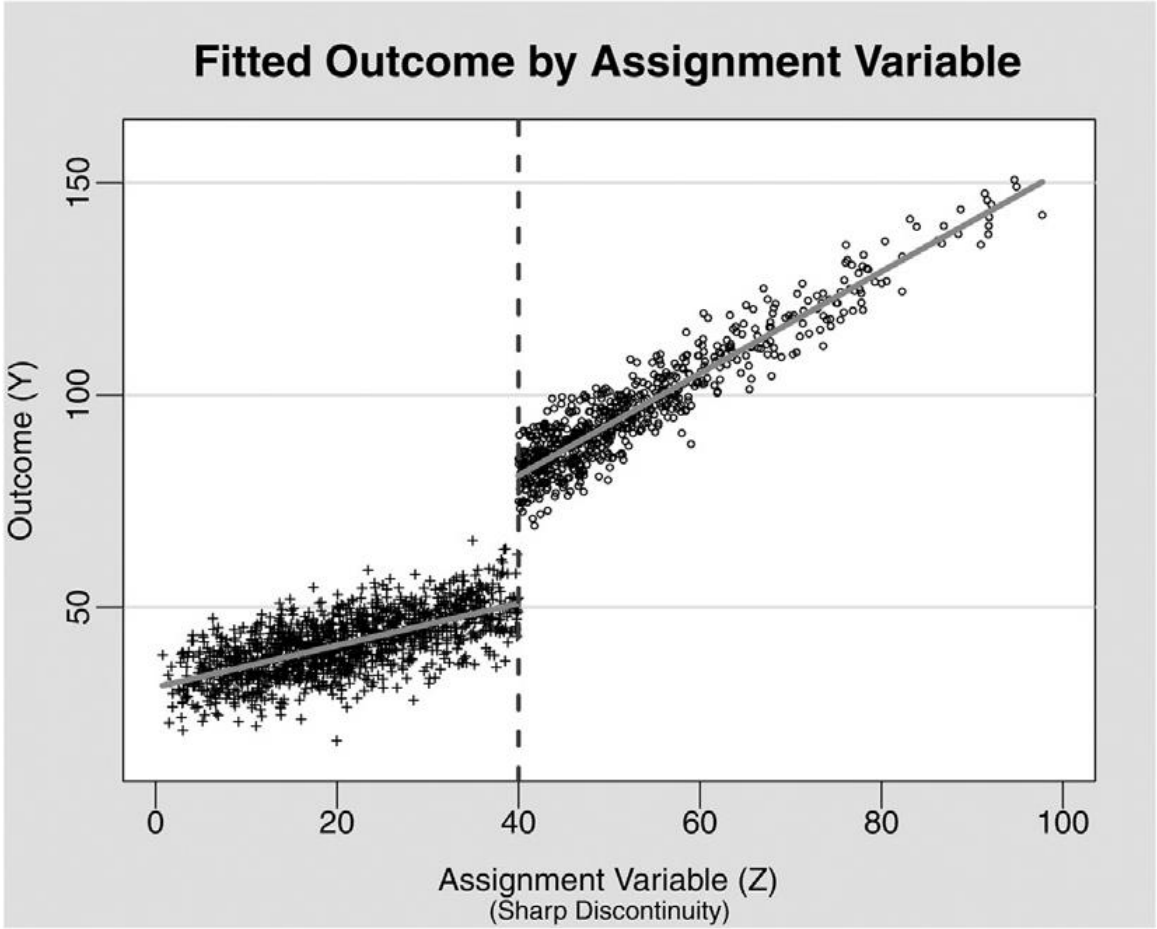
Study Design 1: Prospective – Regression Discontinuity (RD)

- Statistical analysis:
  - Graphical analyses
  - Local linear regression





Study design 2: Re-analysis cluster-RCT + claims data

Claims data will be available:

- 2 years before trial (Q4 2008 - Q3 2010)
- Year of trial (Q4 2010 - Q4 2011)
- 3 years after trial (Q1 2012 - Q4 2015)

Linear mixed models – intention-to-treat
-Intervention
-Time

-Intervention*Time
with 35 GP practices as clusters.

Number of respondents:

	Intervention 1: U-PRIM	Intervention 2: U-PRIM & U-CARE	Control group
Baseline - 2010	790	1446	856
Estimated n in 2015#	*545*	*1033*	*597*

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Study Design: Palliative and Oncology: *Onko Network*

Population

- The target population of OnkoNetwork consists of adult patients with new suspect or new diagnosis of solid tumours in the catchment area of the Kaposi Mór General Hospital at Kaposvár

Intervention Group

Prospective Quasi-experimental Design:

- Newly admitted to the hospitals that implemented OnkoNetwork.
- Patients with a new “C” or “D” ICD code were identified and contacted at hospital admission for their informed consent to study inclusion.

Before-After Design

- Cohort of individuals suspected of solid tumour in the year after implementing OnkoNetwork.
- All patients with a new “C” or “D” ICD code (except for haematology codes) were identified in the medical system of the hospital and enrolled into the retrospective analysis.

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Study Design

Prospective sub-study

Prospective quasi-experimental study

- **Propensity score matching (PSM) follow-up with 3 measurements**
- PSM based on T0 data demographics
- Mixed effect repeated measures analysis of the matched populations

Prospective sub-study: outcome data by time points

		Currently available (digitized, to be cleaned)	Expected by Sept 2018
Program	T0	297	297
	T1	154	154
	T2	62	~100
Control	T0	358	358
	T1	229	229
	T2	75	~100

Retrospective sub-study

- Timeliness of care criteria is covered
- life expectancy at 3 months: by cancer types (lung, stomach, pancreas)
- Comparison of cohort before and cohort after Onkonetwork
- No follow-updata
- PSM and multivariate regression analyses

Retrospective sub-study: outcome data by time points

MCDA criteria	Subgroup	Cohort	Total N	N after exclusions	N after PSM
Timeliness of care	All cancers	Program	3535	---	---
		Control	3908	---	---
Life expectancy at 3 months	Lung	Program	539	---	---
		Control	698	---	---
	Stomach	Program	105	---	---
		Control	98	---	---
	Pancreas	Program	123	---	---
		Control	85	---	---

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Study Design: Problems in multiple life domains

Better Together in Amsterdam North (BSiN)

Intervention

6 months intensive case management:

- 1-1-1 one person, one plan, and one case manager
- Plan based on: goals, action points, and evaluations
- Case manager co-ordinates with other care providers
- Case managers attend monthly meetings with each other

Intervention group

- Residents of Amsterdam with limited self-sufficiency in multiple life domains referred for participation in BSiN.
- Persons with a score of three or lower on at least three of the 11 life domains of the Self Sufficiency Matrix (SSM) are assigned to case management

Control group

- Individuals with low self-sufficiency identified from “Amsterdam health monitor”

Sample size

- Interviews held at 3 time points
- Every 6 months
- Intervention
  - T0: 60
  - T1: 56
  - T2:---
- Control
  - T0: 167
  - T1: 97
  - T2:---

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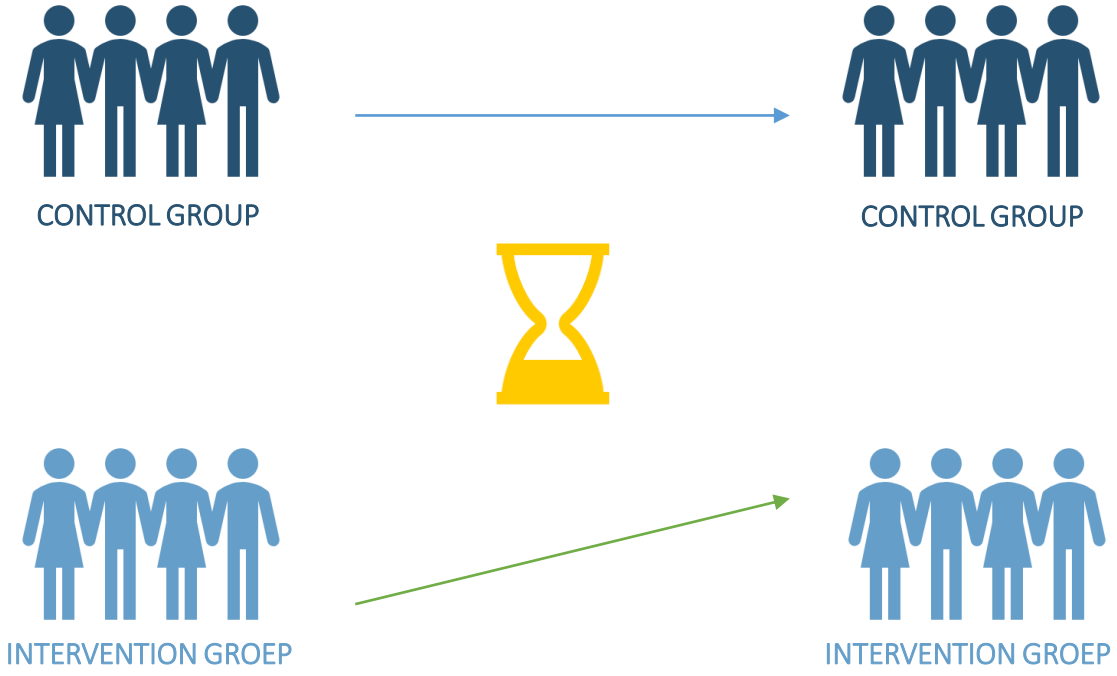
Methods - analysis

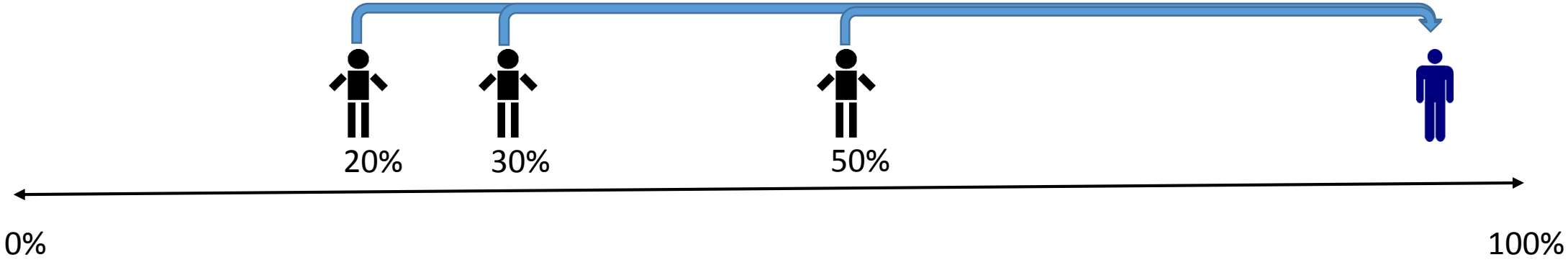
- Mixed effects model (weighed by propensity score – no covariate adjustment)



* Graphic designed by TNO

Methods - PSM

- Propensity score matching with Kernel weighting



Probability of being in intervention group given background

Weights trimmed at 0.1 and 10

Discussion

- Generating scientifically rigorous evaluation is particularly challenging for complex interventions
- 17 SELFIE programmes use **eight core-sets of outcomes** obtained from **four sources**
- Most SELFIE programmes identify comparable control groups and outcomes and they are usually measured at least twice over time
- For causal inference SELFIE use quasi-experimental study design
  - **such as, Diff-in-Diff, RD, PSM**
- Several evaluations **apply IPW in which the PS are used to weigh the outcomes** estimated by repeated measurements regression equations

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Multi-criteria Decision Analysis (MCDA) of integrated care

Maureen Rutten-van Mölken, Apostolos Tsiachristas, Maaike Hoedemakers, Milad Karimi, Willemijn Looman, Kamrul Islam, Jan Erik Askildsen, on behalf of the SELFIE consortium

EuHEA, Maastricht, July 11-14, 2018

The 7 steps of MCDA

1. Understanding the programmes and the decision-context
2. Identify and structure decision criteria
3. Determine the performance on these criteria
4. Determine the weights of the criteria
5. Create an overall value score
6. Perform sensitivity analyses
7. Interpret results.

Maureen Rutten-van Mölken

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Methods

- Multi-attribute value-based method of MCDA
- Calculate overall weighted value score for both groups

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Measuring outcomes

In quasi-experimental studies comparing intervention group with control group

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Estimate performance score

- Estimate treatment effect model on IPW weighted data

$$y = \beta_0 + \beta_1(time) + \beta_2(treatment) + \beta_3(time \times treatment) + \beta_4(covariates) + e$$

- Predict absolute performance scores for both groups

- Standardise performance to same scale (e.g. 0-1)

$$S_{aj} = \frac{y_{aj}}{\left(y_{aj}^2 + y_{bj}^2\right)^{1/2}}$$

$y = predicted\ mean\ performance\ score\ on\ natural\ scale$

$a = alternative\ a\ (i.e. integrated\ care)$

$b = alternative\ b\ (i.e. control\ group)$

$j = criterion/outcome$

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Performance integrated care vs usual care

			Unstandarized		Standardized	
	Instrument	Scale	Integrated	Usual	Integrated	Usual
Health/wellbeing						
	SF-36 Phys	0-100 (best)	65	70	0,68	0,73
	MHI-5	0-100 (best)	60	50	0,77	0,64

Performance integrated care vs usual care

			Unstandarized		Standardized	
	Instrument	Scale	Integrated	Usual	Integrated	Usual
Health/wellbeing						
	SF-36 Phys	0-100 (best)	65	70	0,68	0,73
	MHI-5	0-100 (best)	60	50	0,77	0,64
	IPA	0-28 (worst)	15	17	0,34	0,25
	ICECAP-O	1-4 (best)	4	3	0,80	0,60
	BRS	6-30 (best)	25	20	0,78	0,62
Experience						
	P3CEQ	0-18 (best)	16	10	0,85	0,53
	NCQ + CPCQ	1-5 (best)	5	4	0,78	0,62
Cost						
	iMCQ		8000	6000	0,20	0,40

Estimate relative weights

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Relative DCE weights from different stakeholders

	Weight Patients	Weight Payers
Health/wellbeing		
	0,16	0,14
	0,17	0,18
	0,09	0,10
	0,23	0,24
	0,15	0,12
Experience		
	0,08	0,06
	0,10	0,08
Cost		
	0,04	0,07

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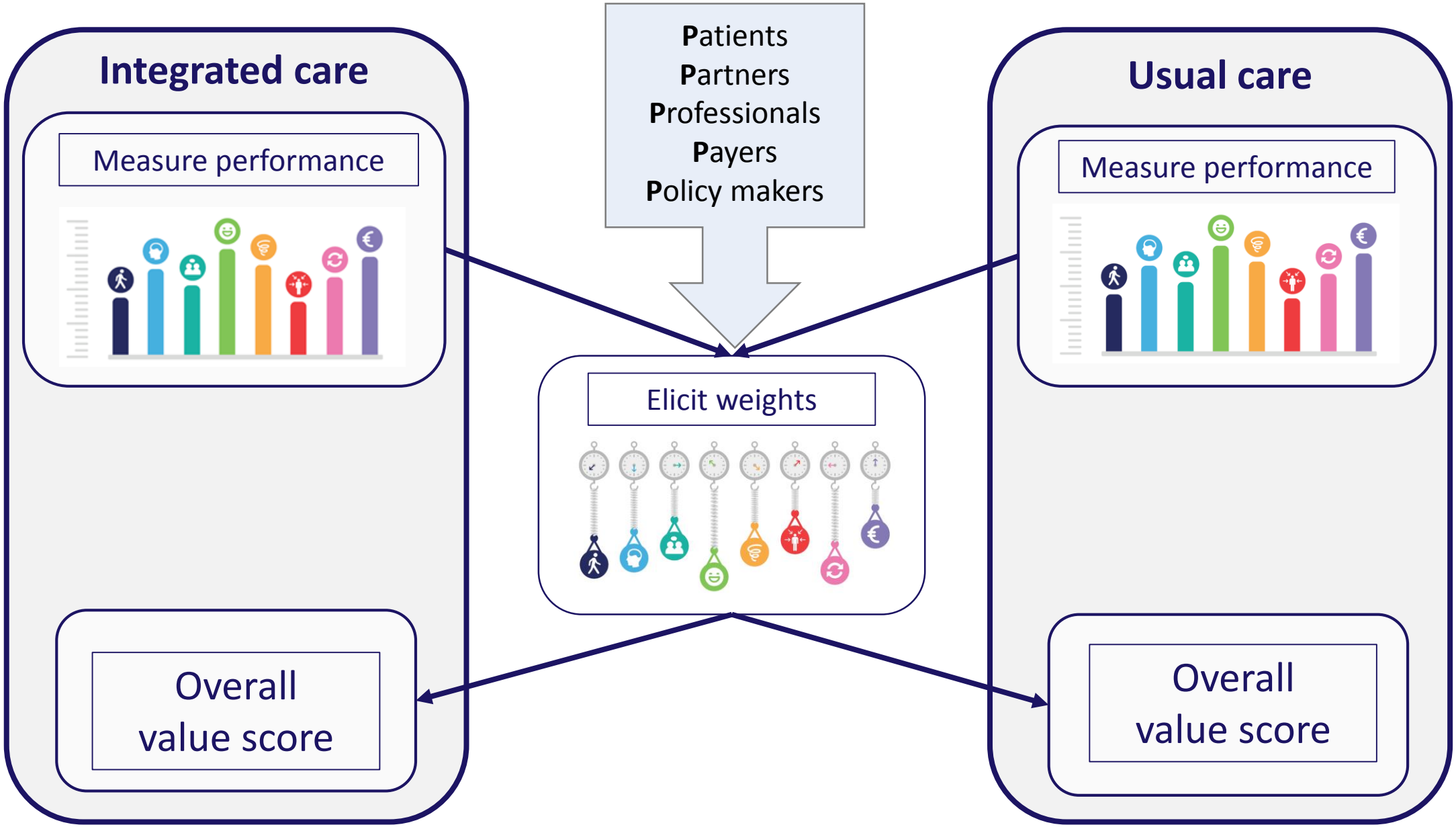
Combine performance and weights in a linear additive model



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Partial value score

	Standardized		Weight	Partial value	
	Integrated	Usual	Patients	Integrated	Usual
Health/wellbeing					
	0,68	0,73	0,16	0,11	0,12

Total value score

	Standardized		Weight	Partial value	
	Integrated	Usual	Patients	Integrated	Usual
Health/wellbeing					
	0,68	0,73	0,16	0,11	0,12
	0,77	0,64	0,17	0,13	0,11
	0,34	0,25	0,09	0,03	0,02
	0,80	0,60	0,23	0,18	0,14
	0,78	0,62	0,15	0,12	0,09
Experience					
	0,85	0,53	0,08	0,06	0,04
	0,78	0,62	0,10	0,08	0,07
Cost					
	0,20	0,40	0,04	0,01	0,01
Total value score				**0,71**	**0,59**

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Repeat with weights from different stakholders

					Partial value		Partial value	
	Standardized		Weight	Weight	Patients		Payers	
	Integrated	Usual	Patients	Payers	Integrated	Usual	Integrated	Usual
Health/wellbeing								
	0,68	0,73	0,16	0,14	0,11	0,12	0,10	0,10
	0,77	0,64	0,17	0,18	0,13	0,11	0,14	0,12
	0,34	0,25	0,09	0,10	0,03	0,02	0,03	0,03
	0,80	0,60	0,23	0,24	0,18	0,14	0,19	0,14
	0,78	0,62	0,15	0,12	0,12	0,09	0,09	0,07
Experience								
	0,85	0,53	0,08	0,06	0,06	0,04	0,05	0,03
	0,78	0,62	0,10	0,08	0,08	0,07	0,06	0,05
Cost								
	0,20	0,40	0,04	0,07	0,01	0,01	0,01	0,03
Total value score					**0,71**	**0,59**	**0,68**	**0,57**

SA: Swing Weights instead of DCE weights

					Partial value		Partial value	
	Standardized		DCE weight	Swing weight	Patients: DCE		Patients: Swing	
	Integrated	Usual	Patients	Patients	Integrated	Usual	Integrated	Usual
Health/wellbeing								
	0,68	0,73	0,16	0,23	0,11	0,12	0,16	0,17
	0,77	0,64	0,17	0,17	0,13	0,11	0,13	0,11
	0,34	0,25	0,09	0,11	0,03	0,02	0,04	0,03
	0,80	0,60	0,23	0,17	0,18	0,14	0,14	0,10
	0,78	0,62	0,15	0,12	0,12	0,09	0,09	0,07
Experience								
	0,85	0,53	0,08	0,08	0,06	0,04	0,07	0,04
	0,78	0,62	0,10	0,07	0,08	0,07	0,06	0,05
Cost								
	0,20	0,40	0,04	0,05	0,01	0,01	0,01	0,02
Total value score					**0,71**	**0,59**	**0,69**	**0,59**

PSA: Estimate joint uncertainty

- In outcomes and weights
- By bootstrapping or Monte-Carlo simulations

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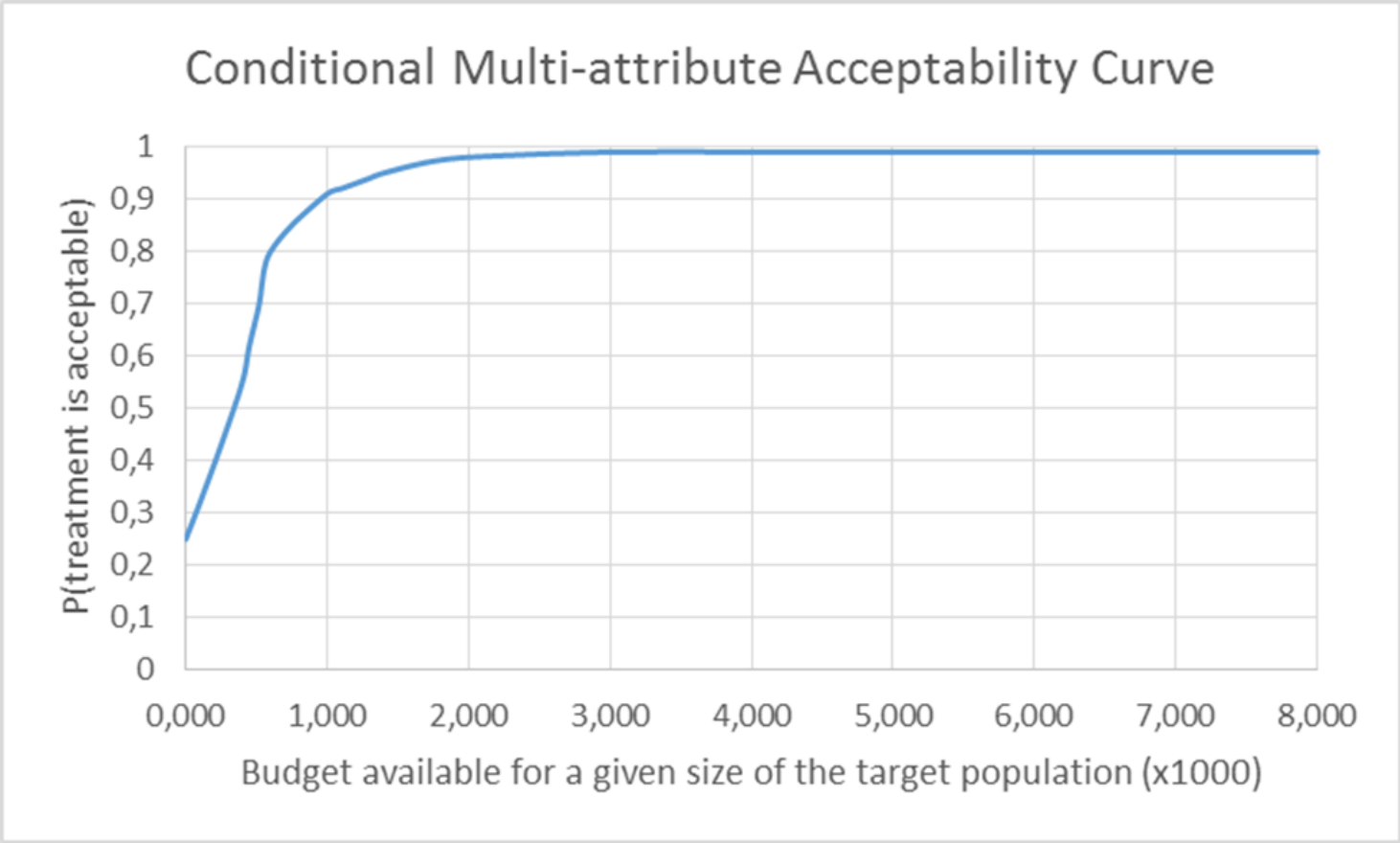
Conditional Multi-attribute Acceptability Curve (CMAC)



P(intervention) acceptable:

- Diff in overall value > 0
- Size target population x mean costs pp < available budget

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Discussion MCDA

Advantage:

- Better evidence-informed decision making
- Wider range of outcomes
- Multiple perspectives
- Improve transparency, consistency and accountability of decisions
- As costs are traded-off against the other criteria in the analysis, it makes their relative contribution to the decision making process explicit

Disadvantage:

- New composite measure of benefit
- Comparable across disease/interventions?
- As costs are traded off against the other criteria, we don't have an estimate of opportunity costs of one unit of additional benefit

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