

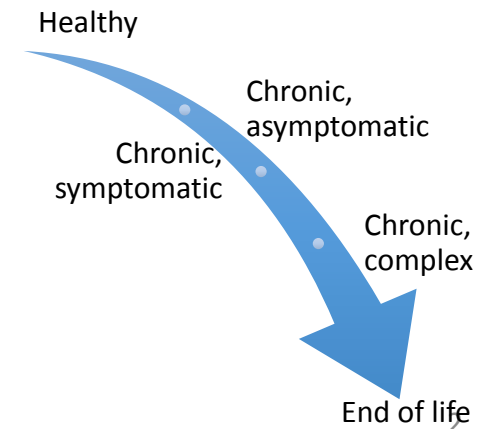


Population Segmentation: Identifying and meeting healthcare needs

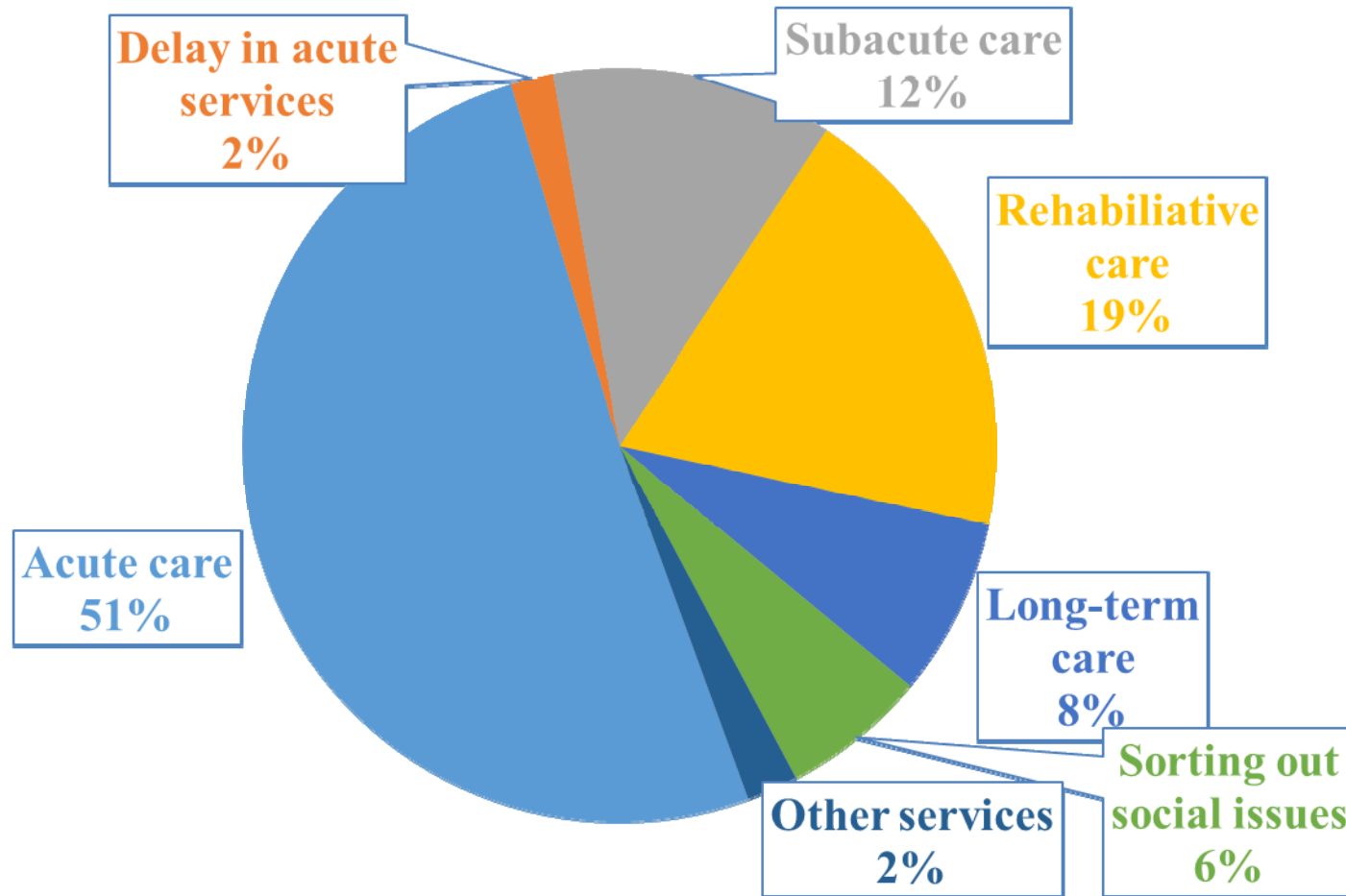
27th March 2017

Why segment the population?

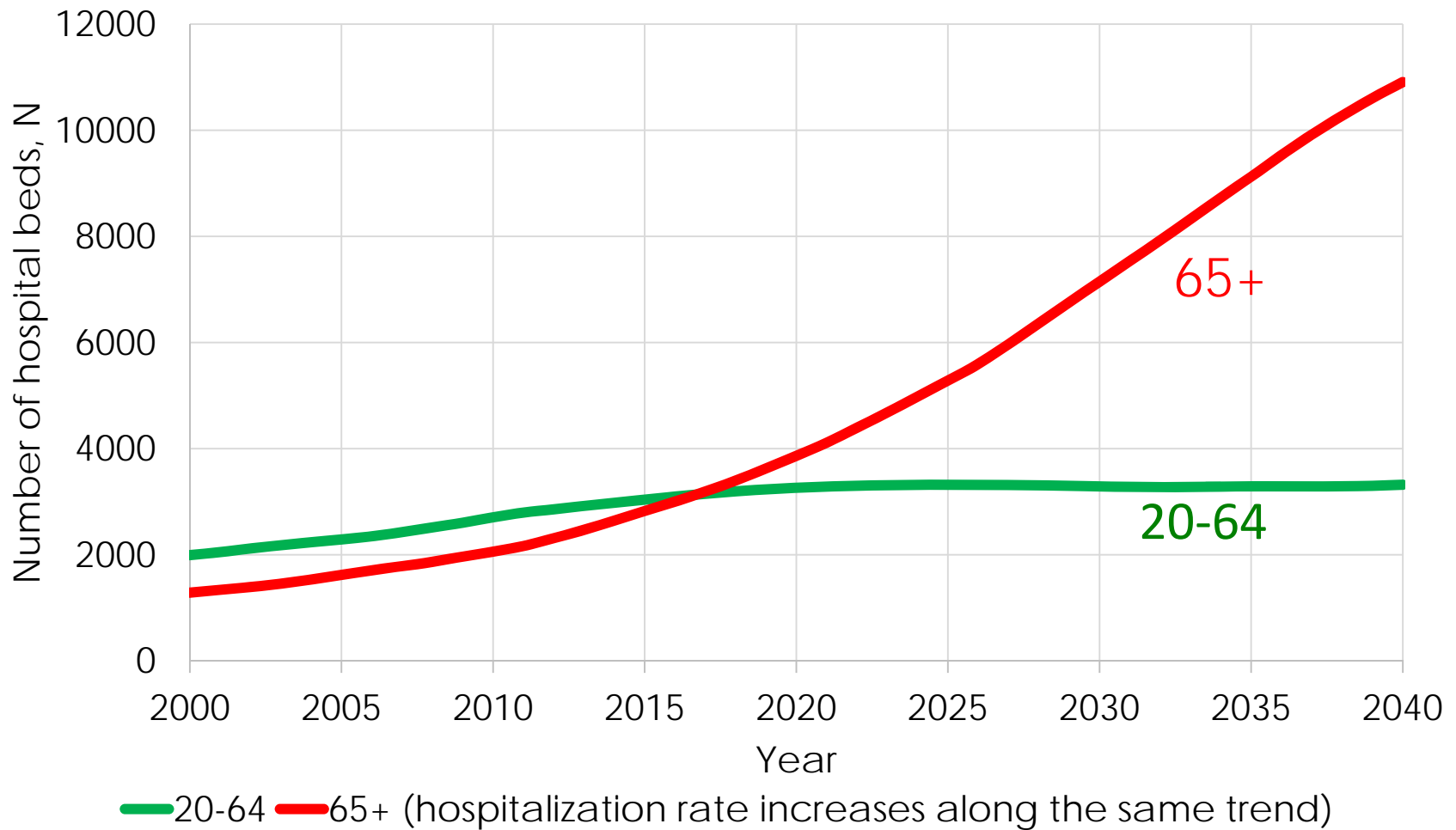
- The population is getting more complex
 - System is designed for a relatively young population
- This mismatch induces system stress
 - Inefficiencies: PCPs making referrals to specialists, specialists trying to provide primary care
 - ↑ use of acute services (triple undesirable)



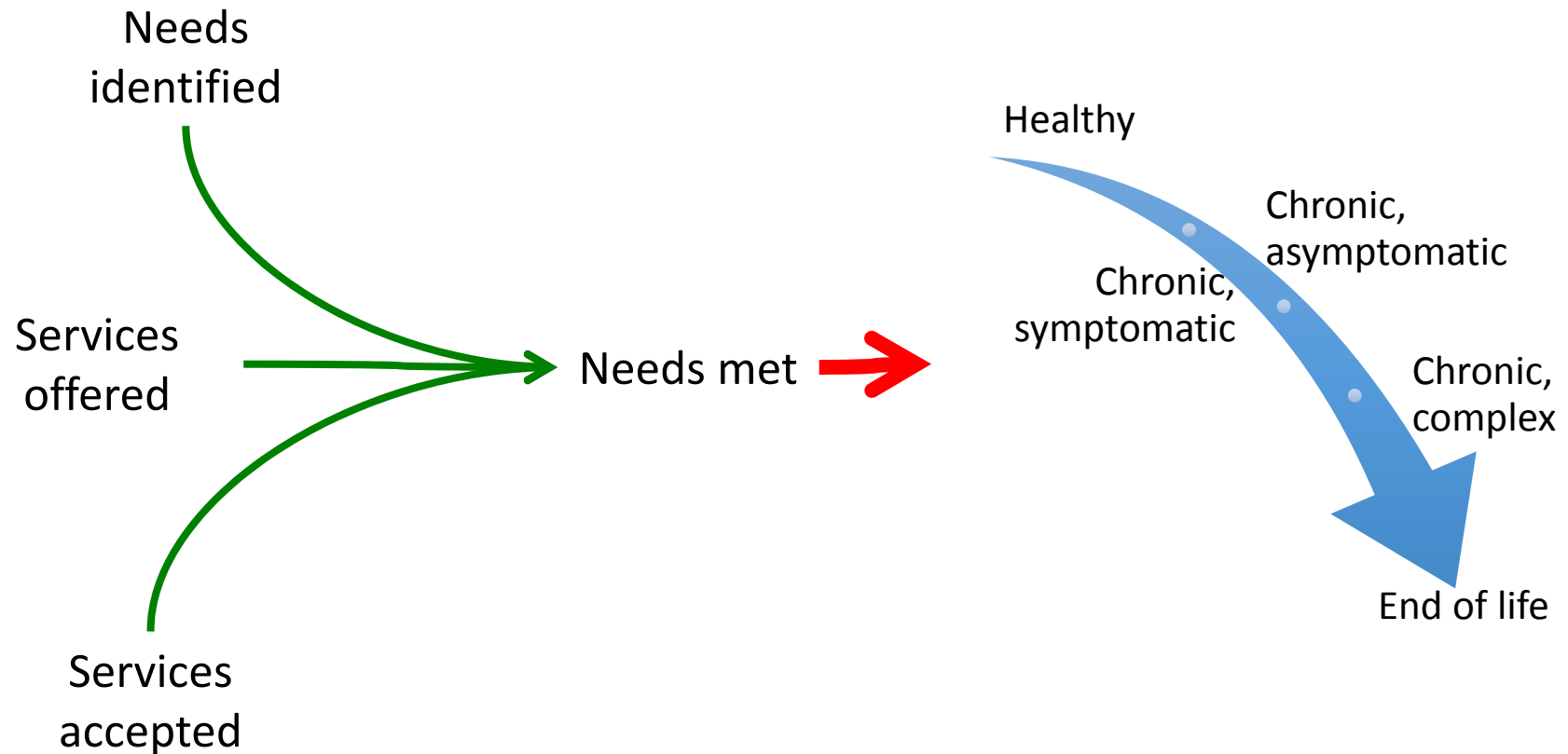
Service mismatch: Many beds filled with people not needing acute care



System stress: acute hospital bed demand

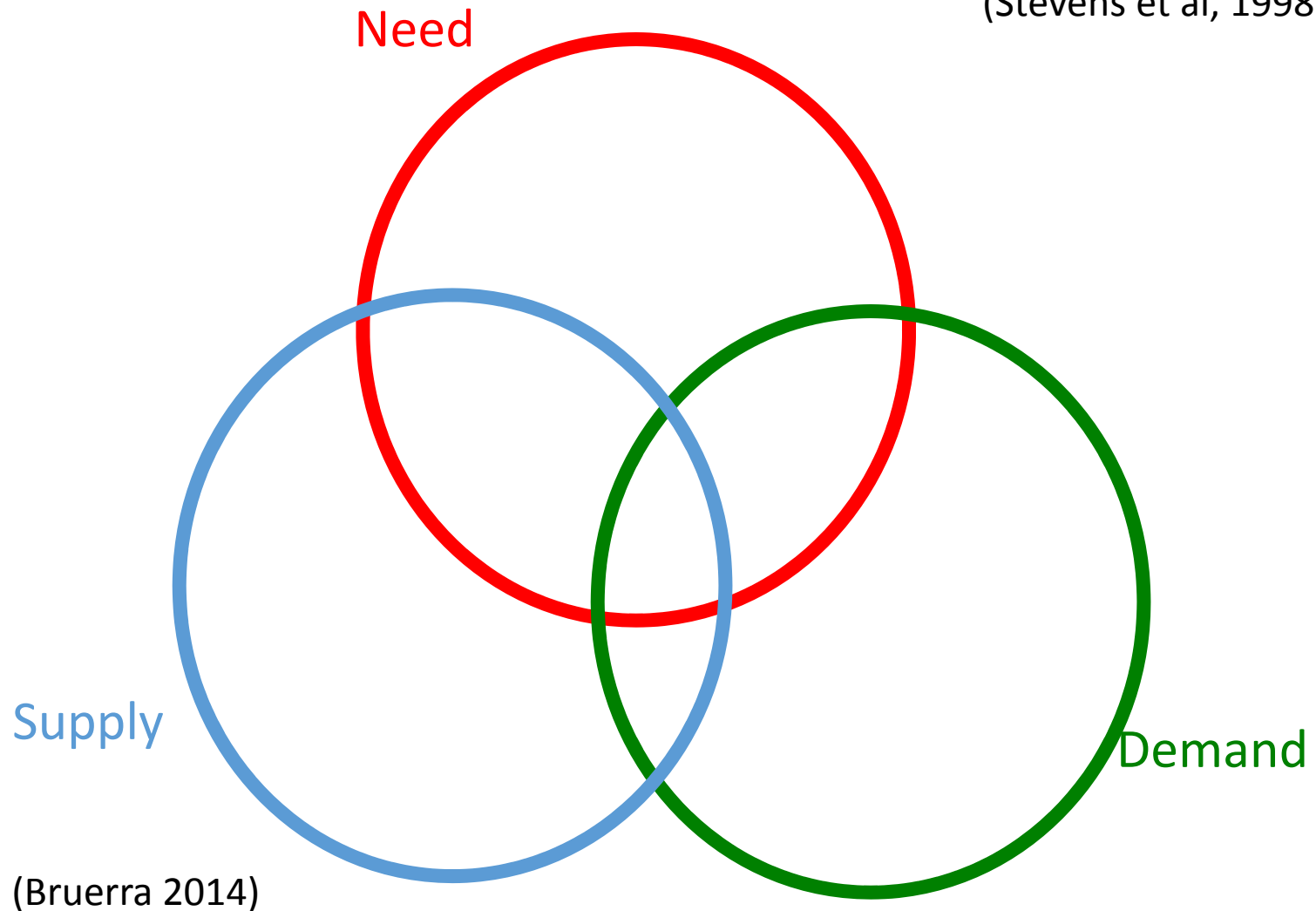


What is a policymaker to do? Efficiently match needs to services.



Healthcare need = capacity to benefit from healthcare

(Stevens et al, 1998)



Segments

- I. Healthy, at risk
- II. Stable chronic conditions(s)
- III. Complex chronic conditions
 - I. Long course of decline
 - II. Limited reserve and serious exacerbations

Typical service needs

- Physician-level services & procedures
- Patient self management & education
- Home services (non-medical)
- Befriending services
- Care coordination
- Medication adherence
- Caregiver support & education
- Day care
- Skilled nursing services
- Monitoring of symptoms, signs, and biomarkers and prompt follow-up
- Hospice care (palliative care)

Needs exist in a context

- Disease-centered needs
 - Based on the presence of conditions, singly and in combination
 - Usually takes advantage of EMR data
 - Problems:
 - Need depends on more than presence of a disease
 - 40% of expenditures are attributable to health-related social needs
 - Reinforces existing modes of service
- Patient needs-centered
 - Considers the patient holistically
 - Accounts for clinical and social features
 - Problem:
 - **Not operationalized**



Healthcare providers can communicate patient healthcare need information to policymakers through a tool which needs to be practical and comprehensive

Healthcare Provider



Patient healthcare need segmentation tool

Healthcare Policymakers



Population healthcare need based segments should be parsimonious

Needs to be simple yet comprehensive



Development of a health and social service need based population segmentation tool

Literature Review

- After over 8,000 papers
- No suitable validated instrument
- Found Bridges to Health Segmentation scheme
- Identified complicating factors

The Simple Segmentation Tool (SST)

Medical Global Impression

1. Healthy
2. Chronic condition(s), asymptomatic
3. Chronic condition(s), moderately/seriously symptomatic
4. Limited reserve and serious exacerbations
5. Long course of decline
6. Short period of decline before dying

Simple Segmentation Tool (SST) V2 30 August 2016

Patient initials: _____ Sex: _____ Age: _____ Ward / room / bed number: ____/____/____

Evaluator name: _____ Date of evaluation: _____ Study ID: _____

Global Impression of patient (Circle (0-1))	Complicating factors	Level (Circle (0-1))
I Healthy	A. Acute but curable or self-limited condition 0 = no acute but curable or self-limited condition 1 = acute condition likely to recover 2 = acute condition with uncertain prognosis	0 1
II Chronic condition(s), asymptomatic	B. Functional assessment, ADL/IADL 0 = no deficit 1 = moderate deficit (1 ADL/IADL) 2 = high deficit (2 or more ADL/IADL)	
III Chronic condition(s), stable but moderately/seriously symptomatic	C. Skilled nursing type task needs 0 = none 1 = moderate (1 task) 2 = high (2 or more tasks)	
IV Limited reserve and serious exacerbations	D. Organization of care 0 = patient regularly sees no more than 1 doctor 1 = patient has multiple doctors but no known significant advice confusion 2 = patient experiences significant confusion about advice from multiple doctors	
V Long course of decline	E. Activation in own care 0 = ready, understands and interested in treatment; active cooperation and participative 1 = unsure but willing to cooperate, can be expected to provide at least a moderate level of self-care 2 = major disconnect, unaware/no insight, may be defiant and can't be expected to provide even a modest level of self-care	0 1 2
VI Short period of decline before dying	F. Disruptive behavioral issues 0 = none 1 = 1 or more, not significantly affecting care 2 = 1 or more, significantly affecting care	0 1 2
	G. Social support in case of need 0 = high support (adequate: all 3 tasks) 1 = moderate support (any: 1-2 tasks) 2 = low support (none)	0 1 2
	H. Hospital admissions in last 6 months 0 = none 1 = 1 to 2 2 = 3 or more	0 1 2
	I. Polypharmacy 0 = fewer than 5 prescription medications 1 = 5 to 8 prescription medications 2 = 9 or more prescription medications	0 1 2

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Complicating Factors

- A. Acute illness
- B. Functional status
- C. Skilled nursing tasks
- D. Organization of care
- E. Activation in own care
- F. Disruptive behaviour
- G. Social support
- H. Recent hospitalization
- I. Polypharmacy

SST pilot study results

- **Validation of the SST**
 - *Inter-rater reliability: moderate to good*
 - Doctor-doctor: Cohen's Kappa 0.6
 - Doctor-nurse: Cohen's Kappa 0.7
 - *Convergent validity: correlated in an expected manner with following instruments*
 - Clinical Frailty Scale
 - SF12
 - *Predictive validity: adverse events trend in an expected manner for the following outcomes*
 - ED visits
 - Hospital readmission
- **Obtained feedback for further improvement of the SST**



Time to Emergency Department visit as a function of pilot study reference doctor Global Impression ratings

Global Impression Category

Healthy
(N = 20)

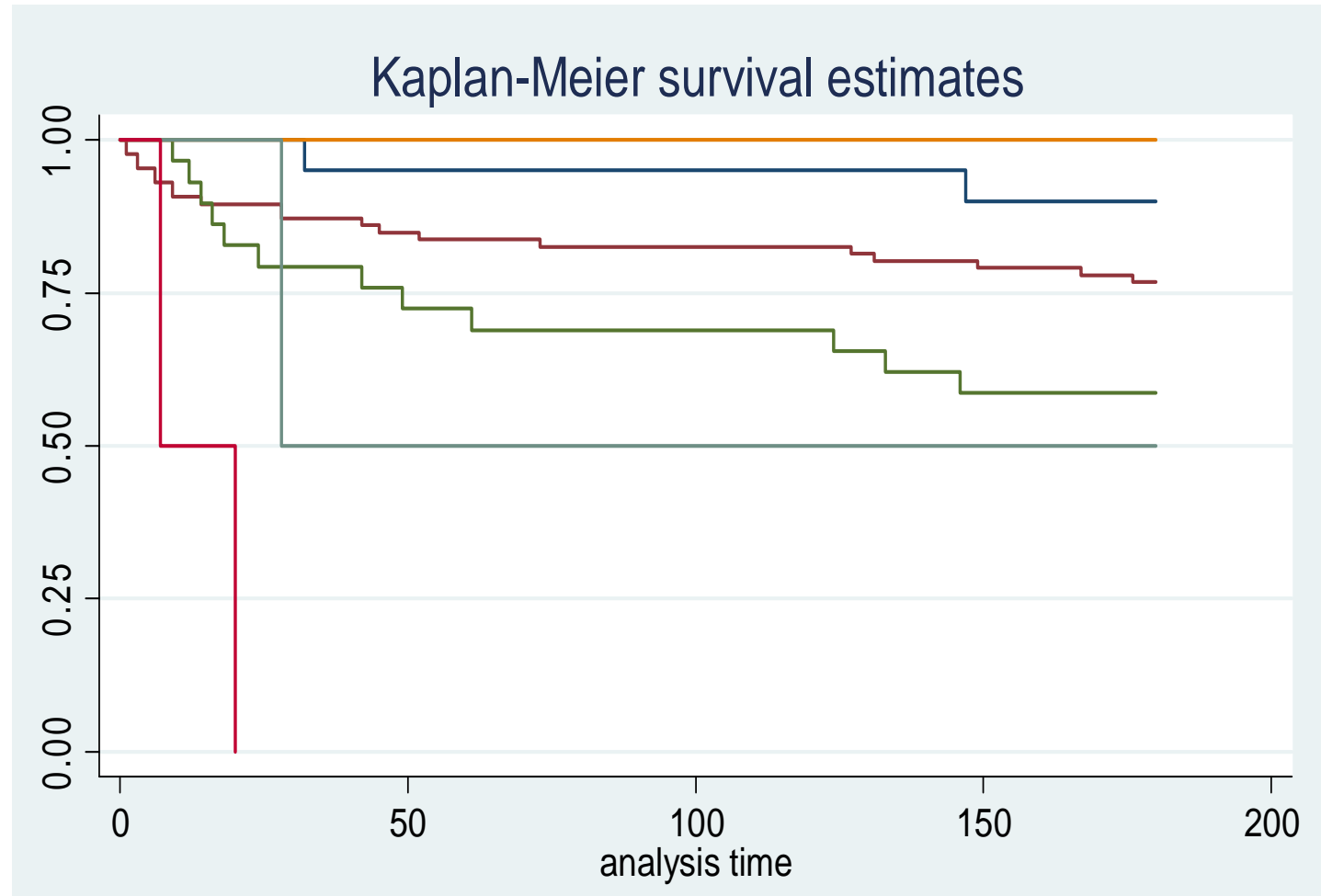
Chronic,
Asymptomatic
(N = 86)

Chronic,
Symptomatic
(N = 29)

Long course of
decline
(N = 1)

Limited Reserve with
Serious exacerbation
(N = 2)

Short period of
decline before dying
(N = 2)



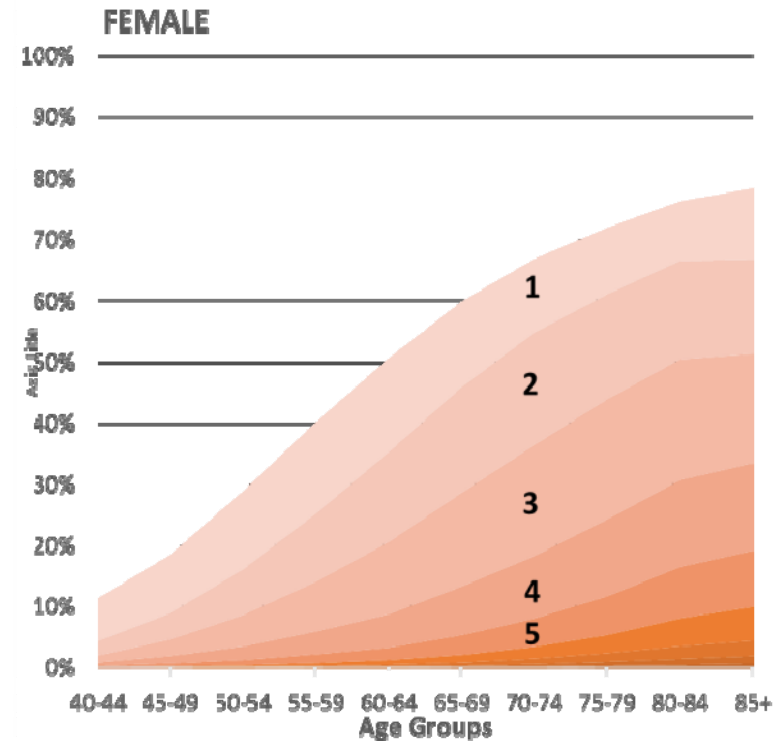
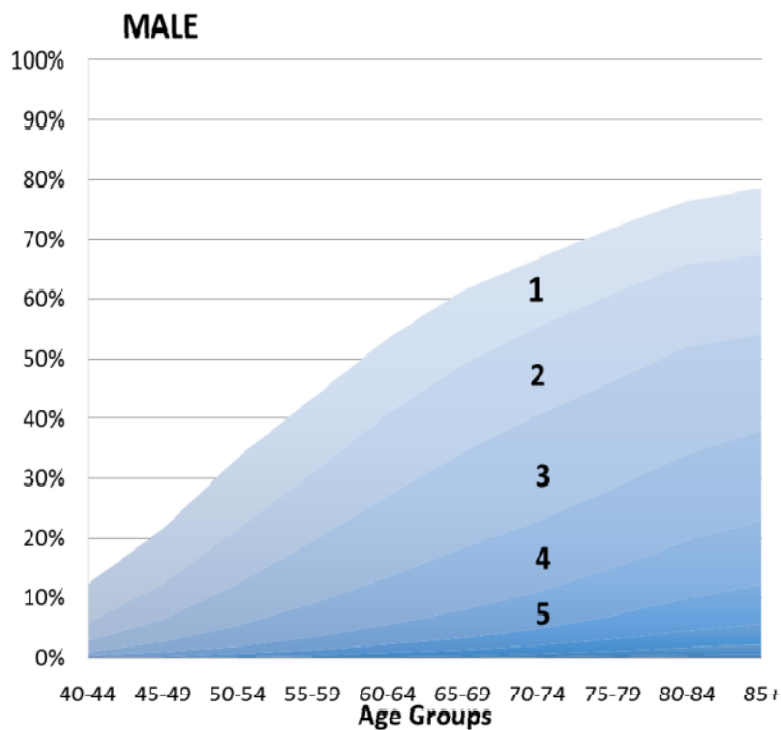
Summary

- The SST is a relatively short population segmentation instrument with reasonable performance characteristics
- Future work includes
 - Test validity in more complex patients (medicine inpatients)
 - Construction of groupings (segments) based on combinations of health and social service needs and associating each segment with typical “packages” of services
 - Test how SST-based segments predict responsiveness to healthcare interventions.



Thank you!

Proportion with Multiple Chronic Conditions



People are living longer with chronic conditions