

# Clustering people

based on functioning and health

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## Introduction

- › To cluster information on functioning and health of elderly people
  - › Aimed at policymakers and health-care (capacity) planners
  - › Information is summarized/reduced.
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- › A new approach: clustering elderly people based on functioning and health, using easy accessible information (Health Interview Surveys)
  - › Using an advanced statistical technique: Latent Class Analysis

## Data

- › Data:
  - › Health Interview Survey 2009 (Statistics Netherlands)
  - › Health Interview Survey 2001 (Statistics Netherlands)
    - › Data on functioning (ADL) and health (chronic diseases, perceived health)
    - › 65 years and over
  
- › And (results not shown here):
  - › Health interview survey 2004 (Statistics Netherlands)
  - › Local health interview surveys 2008, 2012 (from 3 community health authorities)
  - › HIS Elderly in Institutions 2004 (SCP)

## Methods:

- › Latent Class/Cluster Analysis (LCA)\*:
  - › Finding homogeneous subgroups in a sample
  - › Clustering individuals using probability-based classification
  
- › 10 models are fitted, starting with 1 cluster up to 10 clusters
  
- › Bayesian Information Criterion (BIC) is used for selecting best fitting model
  
- › Number of variables in model is reduced, using  $R^2 (>0.2)$

\* (Vermunt & Magidson, 2002)

## Indicators (variables) in initial model (1):

- › Perceived health
  
- › Chronic diseases/disorders
  - › Eczema
  - › Cancer
  - › CVA (attack)
  - › Heart infarct
  - › Migraine
  - › Heart failure
  - › COPD
  - › Intestinal problems
  - › Rheumatic Arthritis
  - › Osteo arthritis
  - › Dizziness
  - › Incontinence

## Indicators (variables) in initial model (2):

### › Functioning

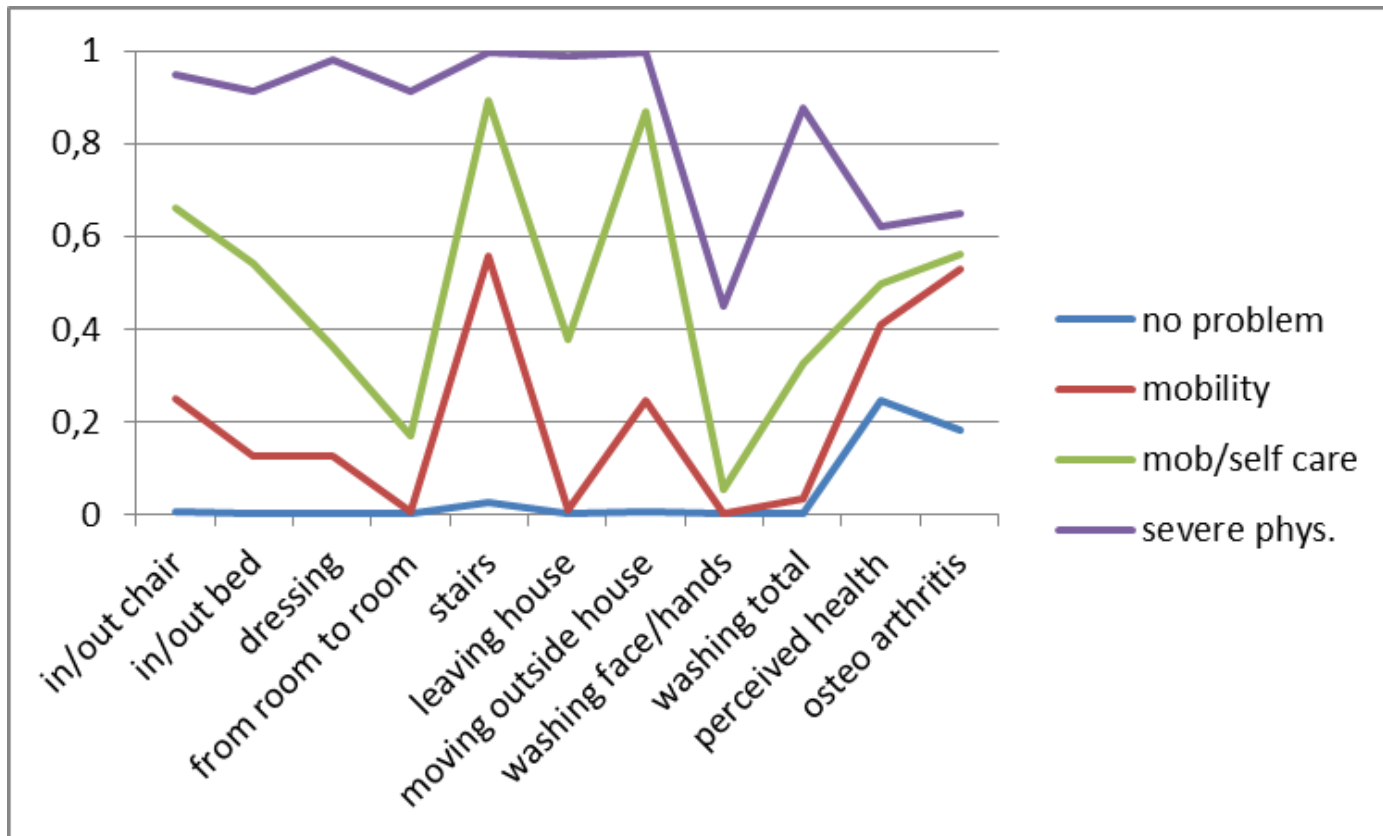
- › Eating/drinking
- › Washing face and hands
- › In and out of a chair
- › In and out of bed
- › Washing complete body
- › Dressing and undressing
- › Moving from one room to another
- › Entering and leaving the house
- › Walking stairs
- › Moving outside

## Results

- › 4 cluster model fitted best (BIC)
- › Reduction of indicators from 23 to 11
  - › Osteo arthritis
  - › Perceived health
  - › Washing of face and hands
  - › In and out of a chair
  - › In and out of bed
  - › Washing complete body
  - › Dressing and undressing
  - › Moving from one room to another
  - › Entering and leaving the house
  - › Walking stairs
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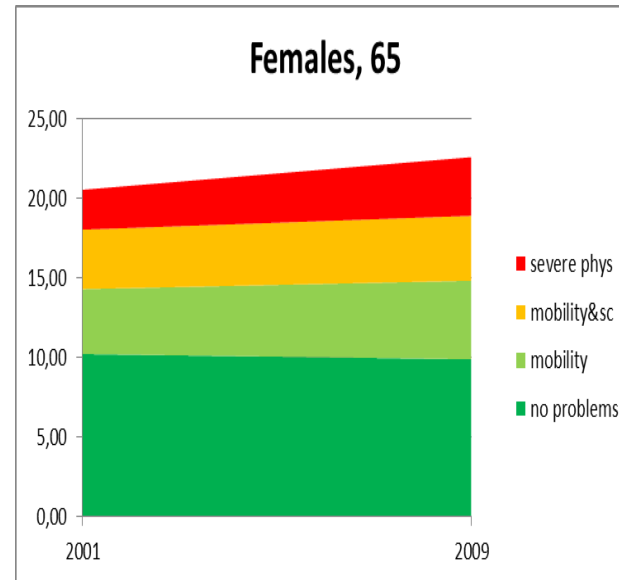
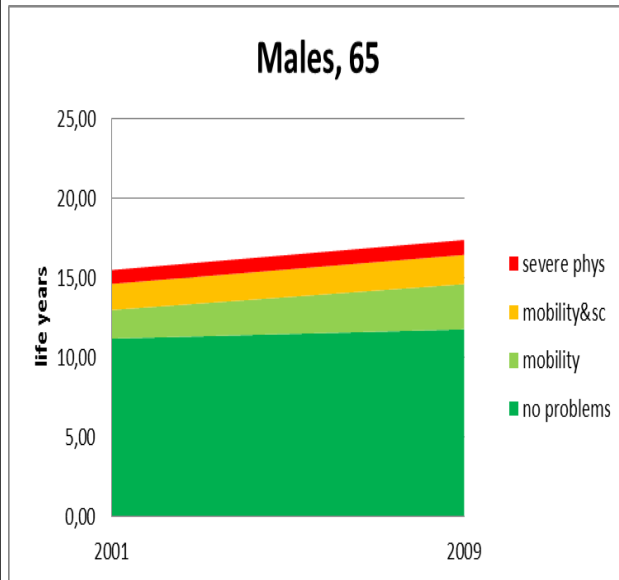
## Probabilities of having problems per indicator for 4 clusters



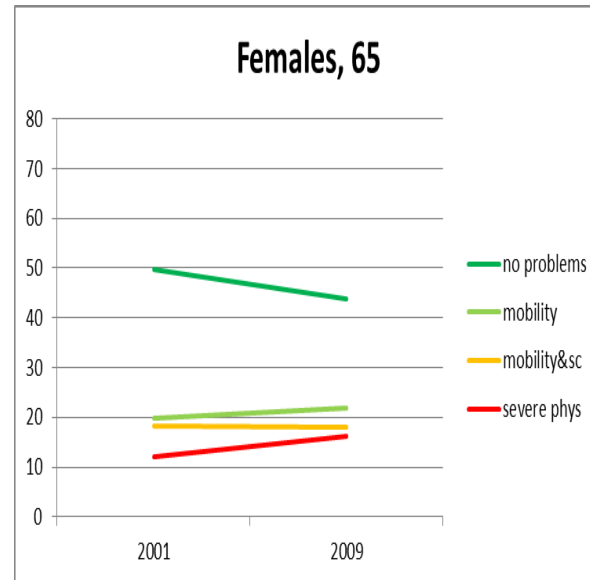
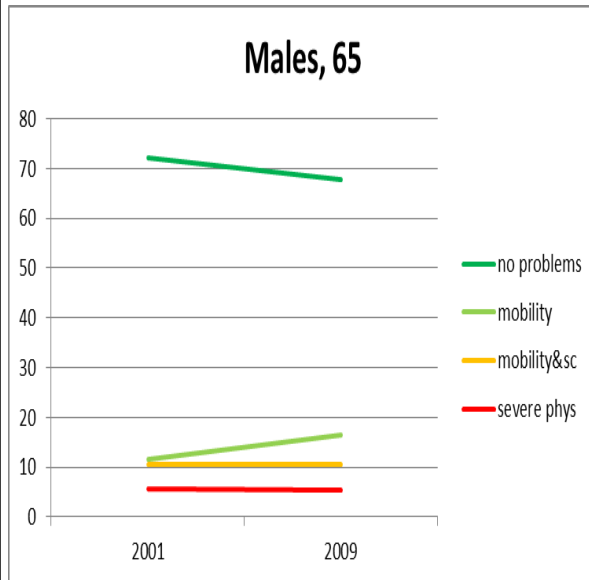
## Characteristics of each cluster

- › Cluster 1: no/minor functioning problems
- › Cluster 2: mainly mobility problems
- › Cluster 3: problems in mobility and self care
- › Cluster 4: severe problems in functioning on all indicators
  
- › For policy and care-planning purposes:
  - › Missing: mental problems
    - › So we added a cluster 5: severe dementia
    - › Assumption: physical functioning is independent of severe dementia.

# Life expectancy with and without functioning problems (2001-2009)(absolute number of years)



# Life expectancy with and without functioning problems (2001-2009)(percentages of total LE)



## Conclusive remarks

- › Clustering elderly based on health and functioning indicators reveals 4 distinctive clusters.
- › Indicators are ADL and perceived health (not chronic diseases)
- › These clusters seem robust as they are found in different health interview surveys over different years.
- › These clustering method seems very useful for planning and policy purposes.
- › Surprisingly, the clusters contain almost no information on chronic diseases, but information on functioning and on perceived health. This seems to be in line with the approach for a new health definition, started by Machteld Huber et al., a few years ago.