Multimorbidity Clusters among Older Australians

Results from a Population-Based Survey

Lucy Busija, Catherine Connaughton, Marita McCabe, Geoff Nicholson, Kerrie Sanders, Gemma Tatangelo

Institute for Health & Ageing

ACU AUSTRALIAN CATHOLIC UNIVERSITY

Multimorbidity

- Co-occurrence of two or more diseases within one person *without defining an index disease* (van den Akker, 2001)
- Estimated prevalence (Britt, 2008):
  - 29% of all primary care patients
    - 83% of primary care patients aged 75 years+
- Associated with
  - Decreased health-related quality of life (Fortin, 2006)
  - Increased healthcare use (Foguet-Boreu, 2014)
  - Increased mortality (John, 2014)

Which conditions co-occur?

- Past studies: between 3 and 6 clusters
  - Cornell, 2007: 6 clusters
    - Metabolic, obesity, liver, neurovascular, stress, dual diagnosis
      - USA primary care patients (N=1,327,328)
  - Schafer, 2010: 3 clusters
    - Metabolic, mental/somatoform, neuropsychiatric
      - German adults 65+ years (N=86,176)
  - Garin, 2015: 3 clusters
    - Cardio-respiratory, metabolic, mental-articular
      - Adults 50+ years from 8 countries (N=41,909)

Which conditions co-ocure?

- Australian-based studies
  - Holden, 2011
    1. MSK, bladder problems, irritable bowel
    2. Respiratory and allergies
    3. Back/neck pain, migraine, other chronic pain, arthritis
    4. Metabolic, fatigue
    5. Metabolic, fatigue, arthritis
    6. Irritable bowel, ulcer, heartburn, other chronic pain
    - Working-age Australians (N=78,000)
  - Islam, 2014
    1. Respiratory, MSK, depression
    2. High blood pressure, diabetes
    3. Cancer
    - Australian adults 50+ years (N=4,574)

Background

- No consistent findings on the number and type of morbidity patterns
- Generalisability of the identified patterns?
  - Differences in study methodology
    - Statistical methods applied
    - Case identification methods
  - Applicability to older individuals?

- Aim:
  - To examine multimorbidity patterns among community-dwelling older Australians (70+ years)

Methods

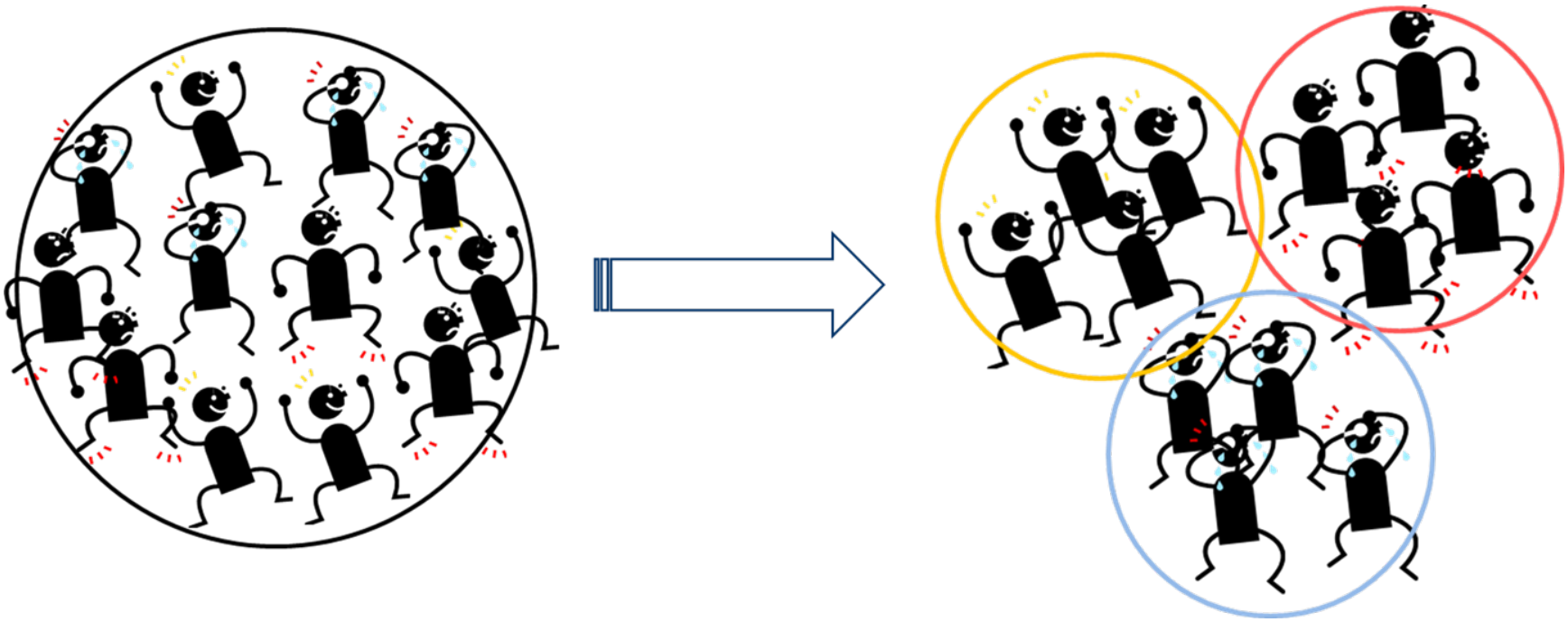
- Data source
  - 2007 National Survey of Health and Wellbeing
    - Australian Bureau of Statistics
    - Face-to-face interviews
- Measures
  - Physical health conditions
    - Self-report of prior diagnosis
  - Mental health conditions
    - DSM-IV lifetime diagnoses
      - The WHO Mental Health Composite International Diagnostic Interview (WHO CIDI, Robins 1988)

Methods: Statistical analyses

- Latent class analysis (LCA)
  - Exploratory technique
  - Aims to identify as yet unobserved subgroups (latent classes) within a larger population
    - Number and composition is not known in advance
    - A number of solutions with different number of classes need to be examined to identify one that represents the observed data best
      - Solutions with 2-6 classes were examined

Methods: Statistical analyses

Figure 1: Schematic representation of latent class analysis



Methods: Statistical analyses

- Criteria for optimal class enumeration:
  - Bayesian information criterion (BIC)
    - Weight of evidence favouring one solution over others
    - Lower values = better model
  - Entropy
    - Amount of non-overlap in class allocation
    - Higher values = better model
  - Likelihood ratio tests
    - Significance of the contribution from k+1 class
    - $p<.05$ favours model with more classes
  - Clinical meaningfulness of classes
    - Minimum 100 observations per class

Results

- Participants (N = 1,269)
  - Median age 76 years (range 70-85)
  - 55.0% females
  - 47.6% partnered, 37.4% widowed
  - 85.7% from English-speaking background
  - 80.3% did not complete high school
  - 56.2% with BMI in overweight or obese range
  - 50.5% current or past smokers

Results

Table 1: Frequency of health conditions in the study sample

	Condition	***N***	***%***		***Condition cont.***	***N***	***%***
1	Heart disease	715	(56.3)	10	Stroke	122	(9.6)
2	Arthritis	695	(54.8)	11	Thyroid disorders	107	(8.4)
3	Back pain	411	(32.4)	12	Ulcer	104	(8.2)
4	Cancer	319	(25.1)	13	Depression	100	(7.9)
5	Diabetes	199	(15.7)	14	Renal problems	89	(7.0)
6	Asthma	183	(14.4)	15	Migraine	89	(7.0)
7	Hayfever	153	(12.1)	16	Anxiety	85	(6.7)
8	Hernias	133	(10.5)	17	Anaemia	46	(3.6)
9	Sinusitis	128	(10.1)	18	Psychosis	40	(3.2)

Results

Table 2: Results of class enumeration search

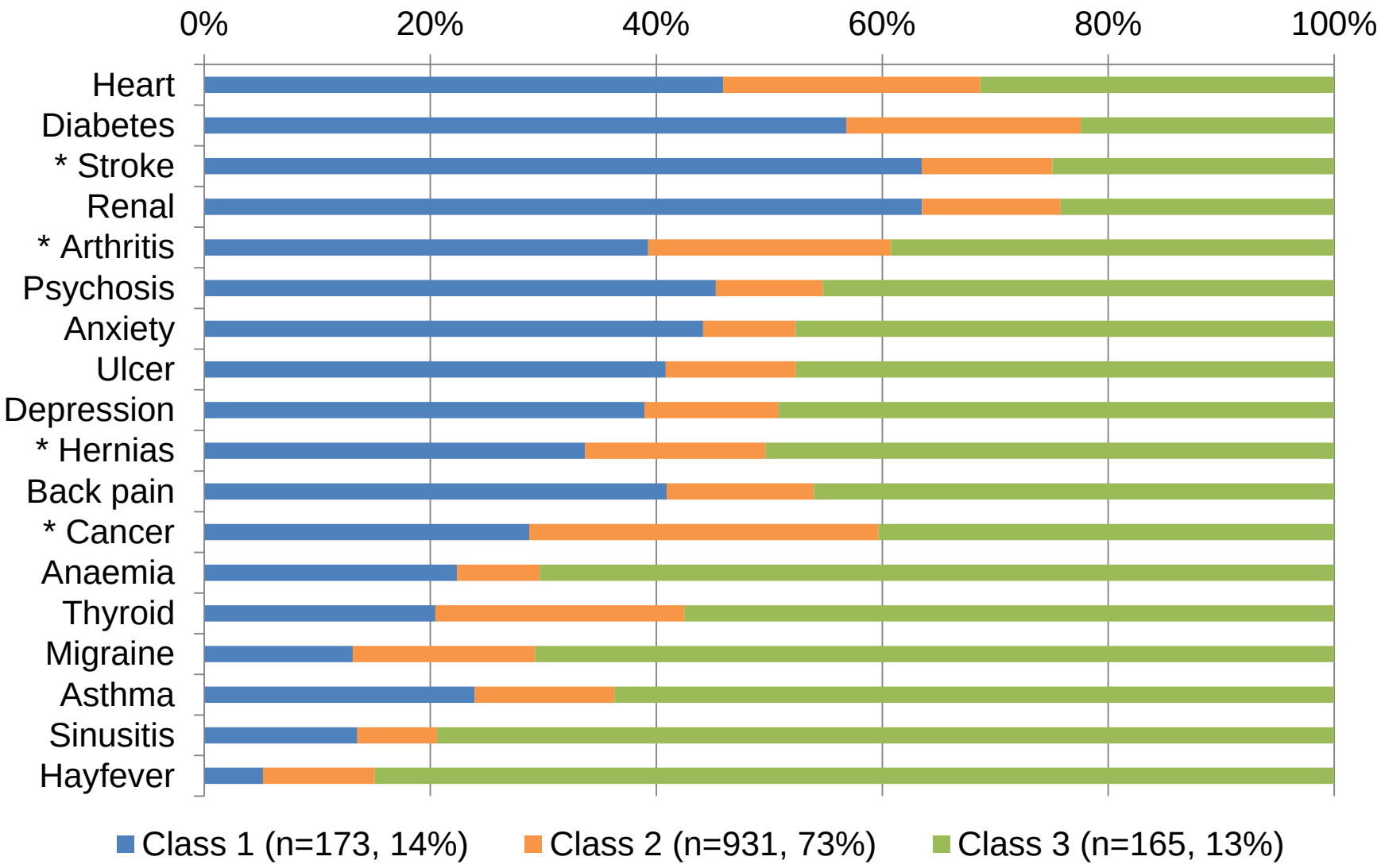
Number of classes	Bayesian Information criterion	Entropy	Likelihood Ratio Tests p-value		Smallest class N
			Lo-Mendell-Rubin	Bootstrapped	
1	18654	N/A	N/A	N/A	1269
2	**18206**	0.66	**<.001**	<.001	335
3	18258	**0.69**	.064	<.001	187
4	18351	0.59	.648	<.001	107
5	18441	0.66	.226	<.001	23
6	18535	**0.70**	.241	<.001	21

Results

- 2 class solution
  - Class 1 (74%): ‘healthy’
  - Class 2 (26%): ‘unhealthy’

- 3 class solution
  - Class 1 (14%): renal, stroke, diabetes, arthritis, heart
  - Class 2 (73%): ‘healthy’
  - Class 3 (13%): cancer, back pain, hayfever, migraine, anaemia, thyroid, sinusitis, hernias, ulcer, asthma, mental disorders

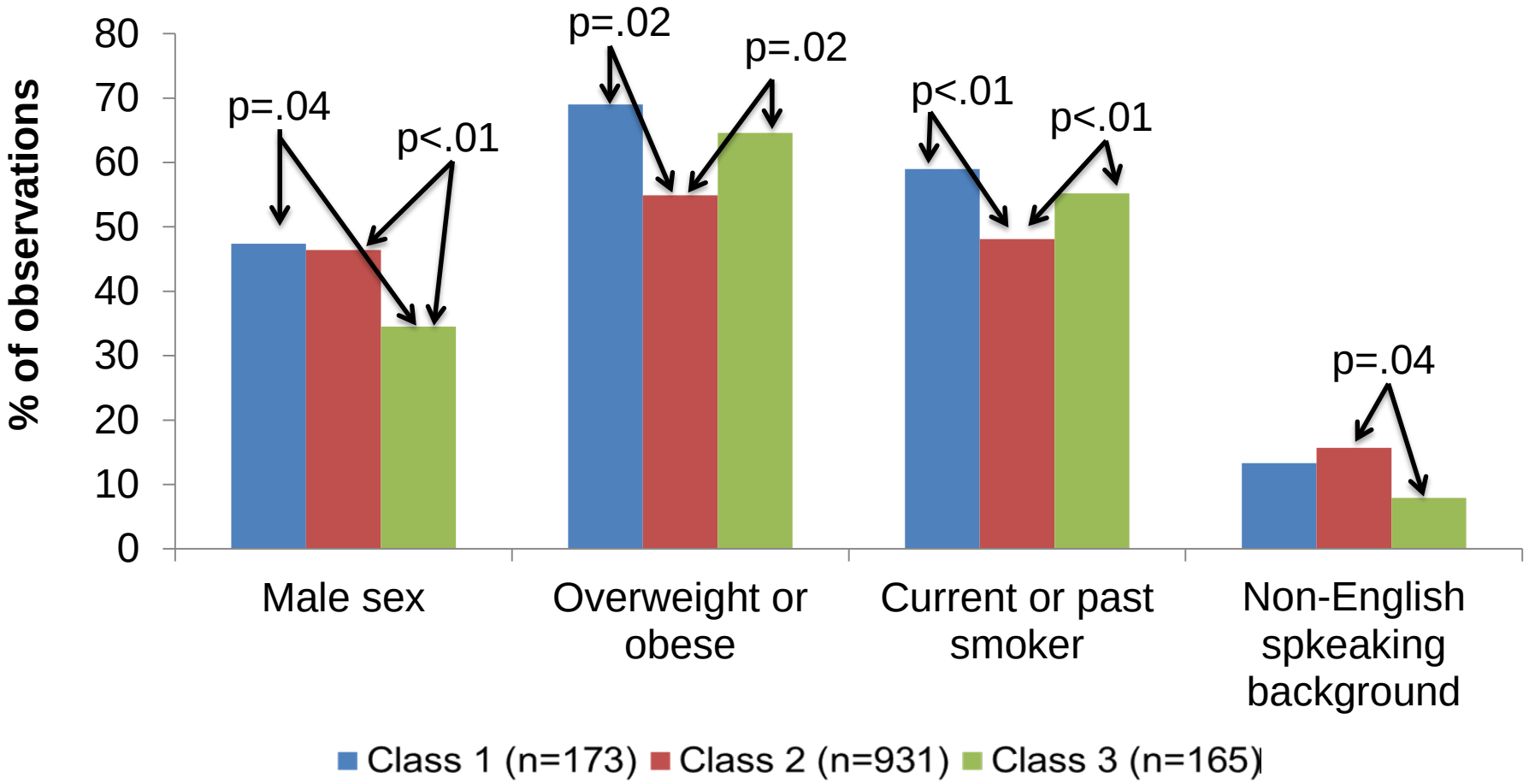
Figure 2: Latent class solution with 3 classes



Note: * p<.05 for class 1 vs class 3

Results

Figure 3: Demographic characteristics of the identified classes



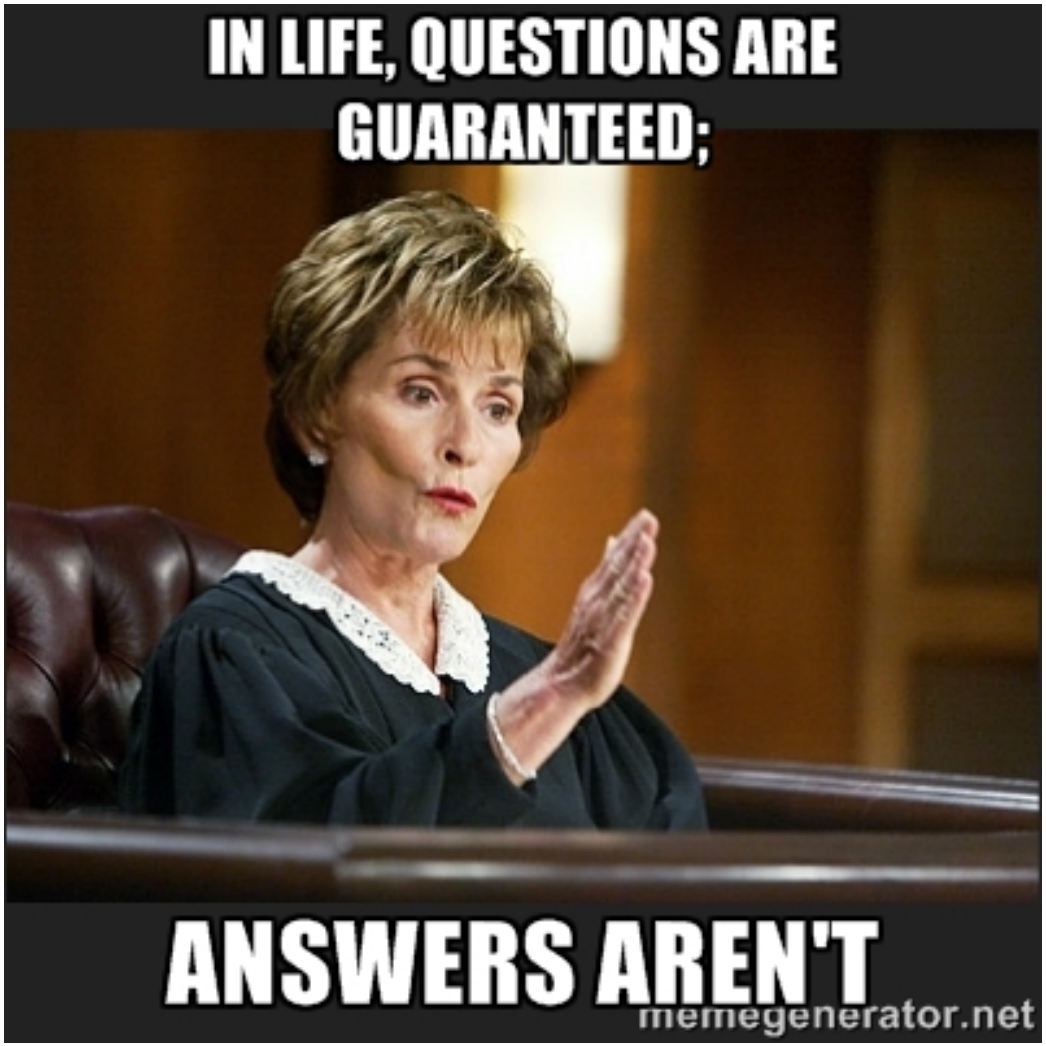
Note: No significant differences on education, primary language, or age.

Discussion

- Implications
  - The first Australian study to profile morbidity patterns in older individuals
    - Potential insights into common aetiology?
    - Increased potential to improve prognosis
- Limitations
  - Self-reported diagnoses of physical conditions
  - Cross-sectional data
    - Cannot determine ‘causal’ links between conditions

Conclusions

- Three main clusters of morbidity among older Australians
  - Metabolic, cancer/allergies, ‘healthy’
- Further studies are needed to confirm the identified clusters in the target population
- Results can be used to develop targeted interventions aimed at the specific multimorbidity subgroups



Lucy.Busija@acu.edu.au