

# CES-P&CH

# Research findings

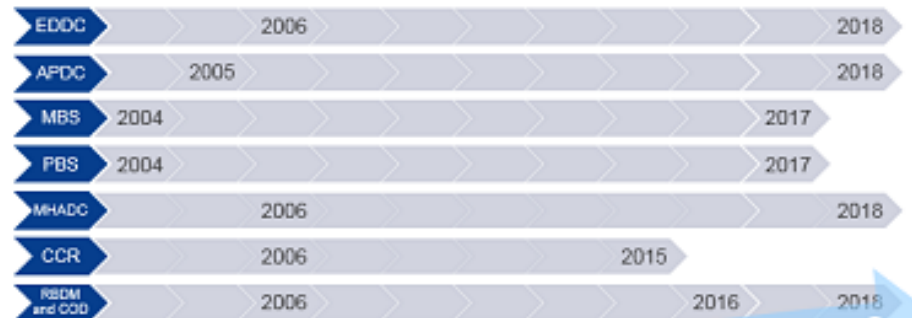
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# Linkage Resource

- **Cohort:** over 250k NSW residents (45 and Up Study); 30,645 in CES (20,337 in SES and 10,308 in Sydney)
- **Resource:** 10 datasets; over 172.7 mil records in NSW and 20.7 mil recodes for CES; 2006 onwards.



## Longitudinal data within the resource







ed from figure in Bureau of Health Information. Data Matters –  
; data to unlock information. The use of linked data in healthcare  
mance assessment. Sydney (NSW). 2015; BHI

Link to CES-P&CH web page:

<https://cphce.unsw.edu.au/research/health-system-integration-and-primary-health-care-development/central-and-eastern-sydney>

# Research Projects

Research Projects	Reports	Presentation	Journal articles	Inform policy and Practice
	✓	✓✓✓	✓✓✓	
	✓	✓✓	✓	
	✓	✓✓✓	✓	
	✓	✓	✓	



Impact of care  
plans on health  
outcomes

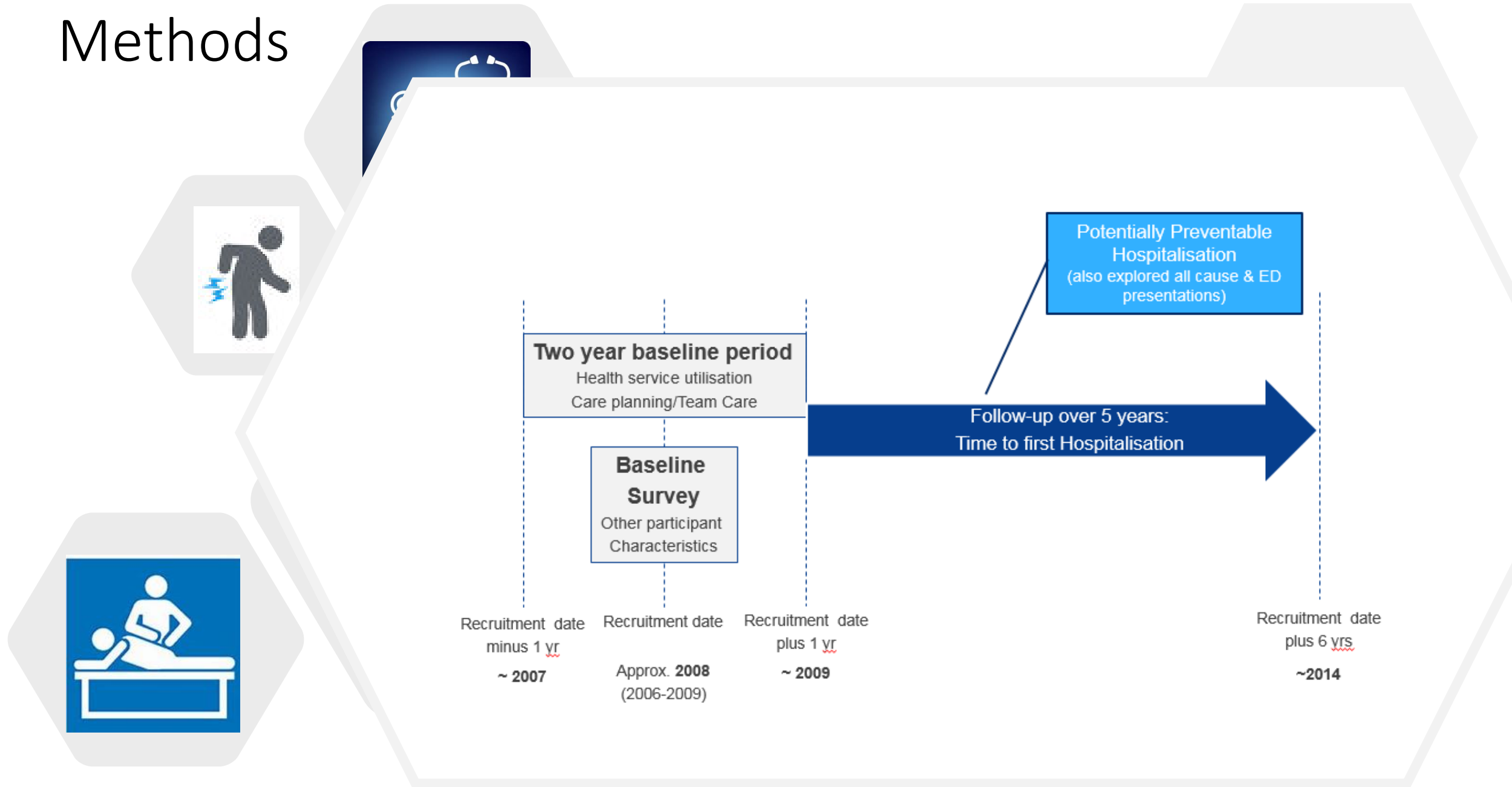


## Rational/Gaps

- Rapid uptake for chronic disease management
- Little evidence on:
  - patient characteristics
  - impact on longer term patient outcomes e.g. in preventing hospitalisations.



# Methods

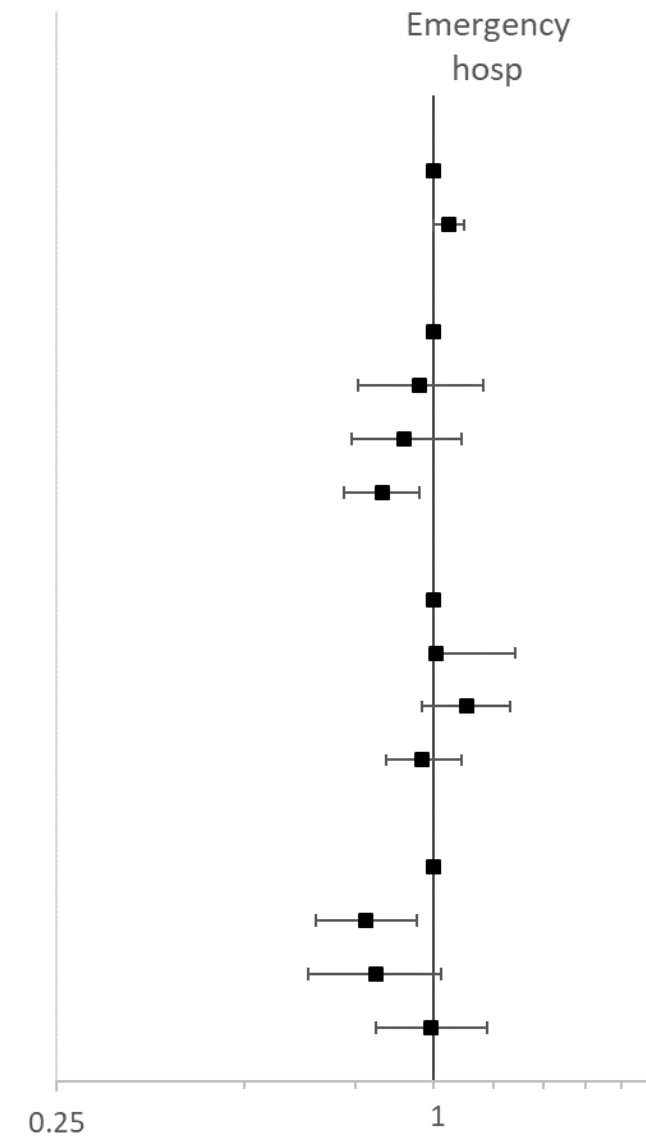
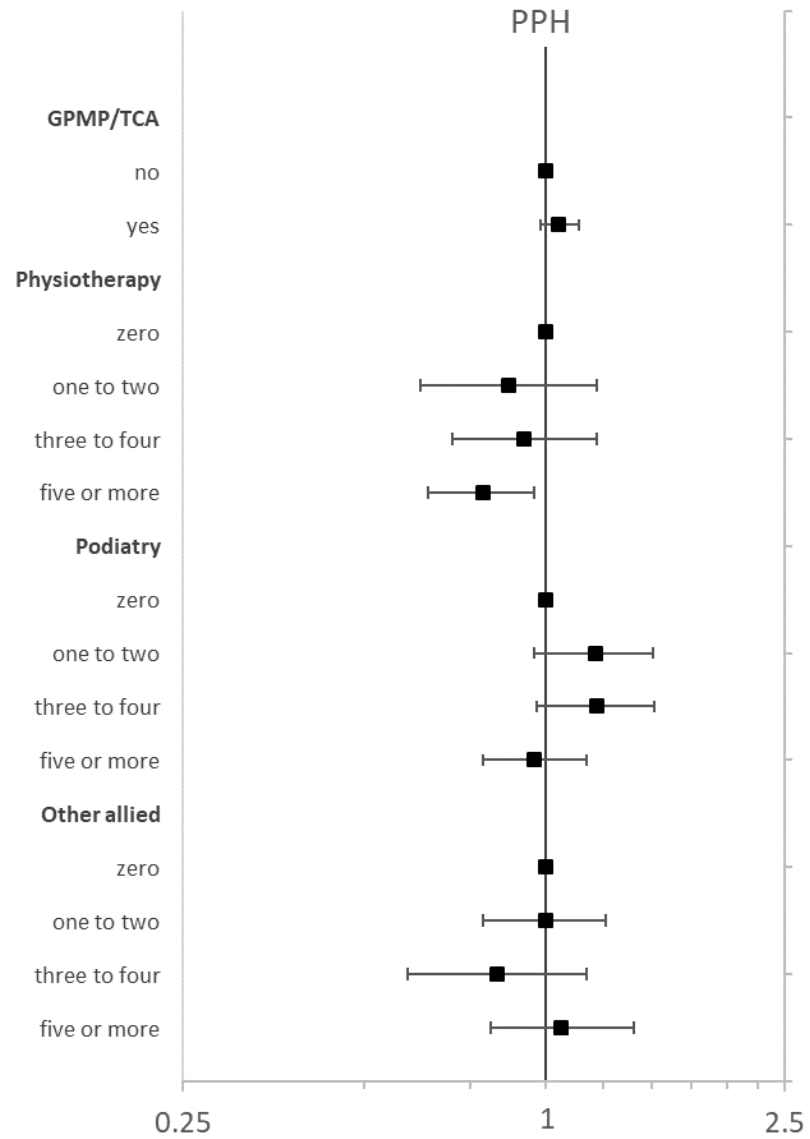


# Results



Domain	Characteristics of those using GPMP/TCA
Socio-demographic	Male, Older, Language other than English, Born overseas, Lower Education, Lower Household income, Not working, No private health cover
Health risk factors	Current smoker, Overweight/Obese, Being treated for high BP, Being treated for high Cholesterol
Health status	More physical limitations (SF36), Self reported poorer health, More chronic conditions, Needs help for a disability
Healthcare utilisation (within the baseline period)	More GP visits, saw a specialist, bulk-billed most or all of the time

# Results





# Summary

## Care Plans

- Within the two-year health service utilisation baseline period 22% (5771) of CES participants had at least one claim
- Having at least one claim for a GPMP and/or TCA was closely related to the sociodemographic and health needs of participants with higher EHs and PPHs in the 5 years that followed.
- Use of GPMPs and/or TCAs in the CES area appears well-targeted towards those with chronic and complex care needs.
- No evidence to suggest that the use of GPMPs and /or TCAs has prevented hospitalisations in the CES region.

## Allied Health Services

- Of the eligible participants, 43% (2460) had at least one allied health service item claim in the subsequent 12 months
- Allied health services were reported as physiotherapy, podiatry and other allied health services.
- The highest rates of allied health service use were among participants aged 85 years and over (49%).
- After controlling for confounding factors, a significant difference was found between having claimed for five or more physiotherapy services and EHs (HR: 0.83; 95% CI: 0.72–0.95) and PPHs (HR: 0.79; 95% CI: 0.64–0.96) in sub 5 years



Impact of GP follow-up after hospitalisation on re-admissions



## Rational/Gaps

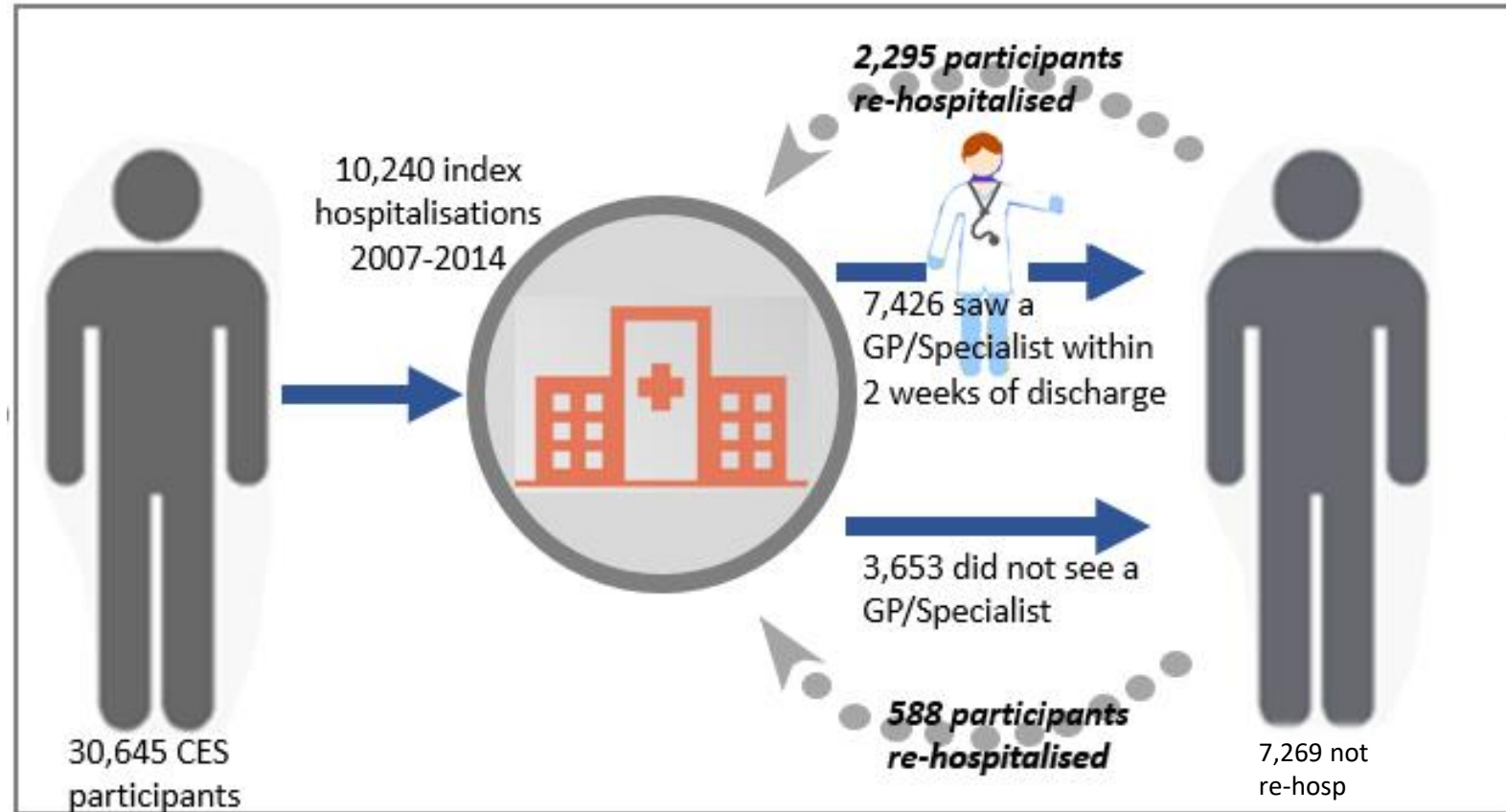
Varied evidence on impact on re-hospitalization

Determine the characteristics

Determine impact on re-hospitalisation in the next 12 months

# Methods

- Compared characteristics of participants using generalised linear models
- Time to subsequent hospitalisation was compared using Cox proportional hazards regression models stratified by prior frequency of GP use



NOTE: 6,587 (64.3%) saw a GP within 2 weeks of hospital discharge and of those 2017 were re-hospitalised; and 3653 did not see a GP and of those 866 were re-hospitalised.

# Results

- Significant associations

Domain	Characteristics of those seeing GP
Socio-demographic	Male Older Lower Household income No private health cover
Health risk factors	Some alcohol consumption Underweight
Health status	Not having reported cancer
Healthcare utilisation	More GP visits Not seeing a specialist Not hospitalised

# Results

- Cox proportional hazards model



Saw a GP within two weeks of discharge from index hospitalisation

(A) Weighted model

(B) Doubly Robust model

HR (95% CI)

HR (95% CI)

All

1.00 (0.90-1.11)

0.97 (0.88-1.08)

Infrequent GP users

0.86 (0.74-1.01)

**0.83 (0.70-0.97)\***

Frequent GP users

1.04 (0.91-1.18)

1.02 (0.90-1.17)



# Results

## by ICD-AM chapter

### Index hospitalisations by first re-hospitalisations –top ten principal diagnosis chapters (International Classification of Diseases - Australian Modification)

Index Admission		Total	Saw a GP*	Re-hospitalised			
				Total re-hospitalised	Same chapter as index (% of all)	Among those that saw a GP	Among those that did not see a GP
Cpt	Chapter heading	n	n (%)	n (%)	n (%)	n (%)	n (%)
2	Neoplasms	1438	713 (49.6)	464 (32.3)	185 (39.9)	271 (38.0)	193 (26.6)
3	Endocrine system	242	142 (58.7)	50 (20.7)	10 (20.0)	31 (21.8)	19 (19.0)
4	Mental, behavioural and neurological disorders	234	147 (62.8)	82 (35.0)	48 (58.5)	<b>46 (31.3)</b>	<b>36 (41.4)</b>
5	Circulatory system	1729	1426 (82.5)	555 (32.1)	236 (42.5)	<b>450 (31.6)</b>	<b>105 (34.7)</b>
6	Respiratory system	635	512 (80.6)	229 (36.1)	85 (37.1)	<b>183 (35.7)</b>	<b>46 (37.4)</b>
7	Digestive system	1170	769 (65.7)	307 (26.2)	103 (33.6)	226 (29.4)	81 (20.2)
8	Musculoskeletal system and connective tissue	866	474 (54.7)	179 (20.7)	59 (33.0)	118 (24.9)	61 (15.6)
9	Genito-urinary system	1064	515 (48.4)	223 (21.0)	69 (30.9)	139 (27.0)	84 (15.3)
10	Symptoms, signs	660	502 (76.1)	215 (32.9)	29 (13.5)	169 (33.7)	46 (29.1)
11	Injury, poisoning and other external causes	1086	660 (60.8)	253 (23.3)	71 (28.1)	164 (24.9)	89 (20.9)

# Summary

- Within two weeks of discharge 64.3% participants saw a GP
- Seeing a GP within two weeks of discharge was associated with:
  - Lower rates of re-hospitalisation (HR:0.83;95%CI:0.70-0.97) for infrequent GP users (less than 7 visits in year)
  - Same rate (HR:1.02;95%CI:0.90-1.17) for frequent GP users (8 plus visits)
- Impact of seeing a GP on subsequent hospitalisation was protective but differed depending on patient care needs

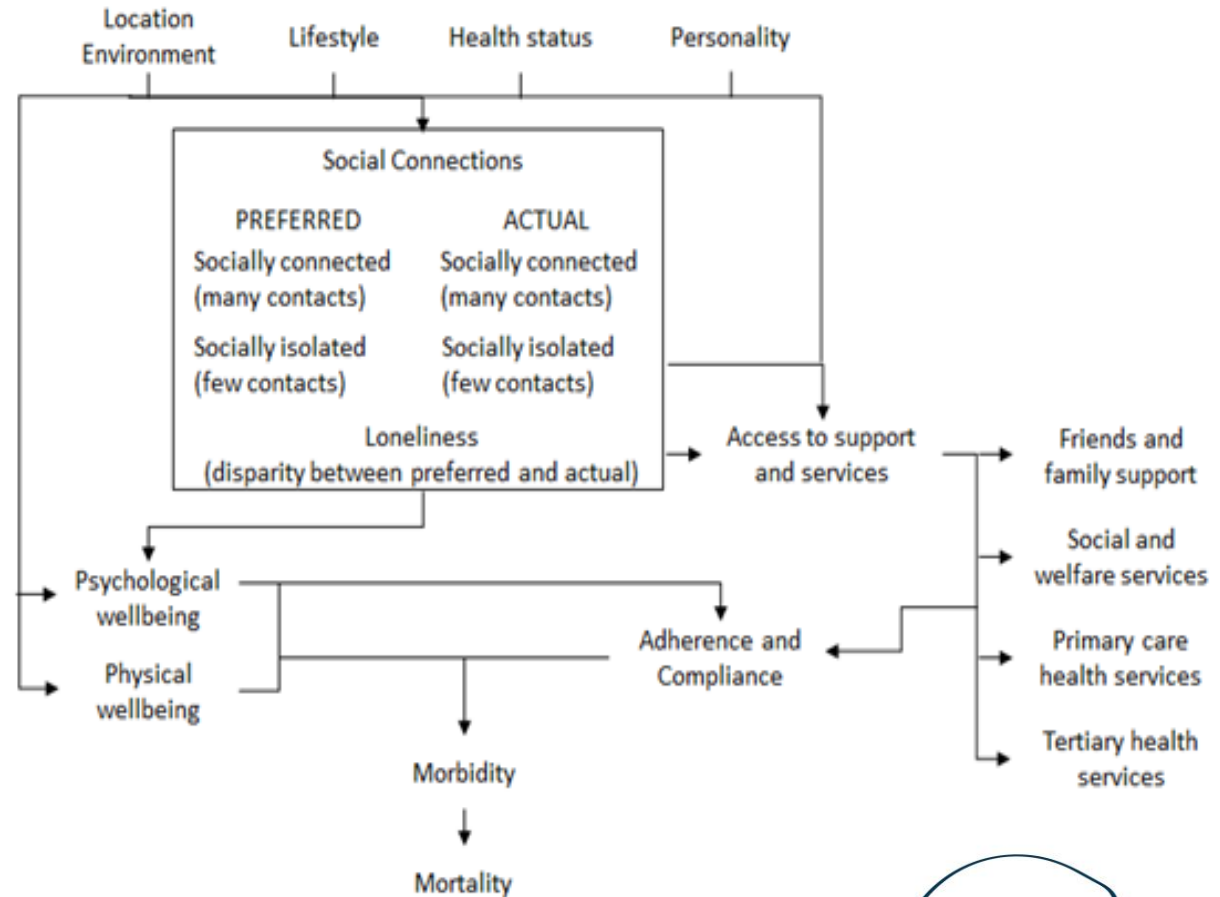


Association between  
social isolation and  
health service use

# Rational/Gaps

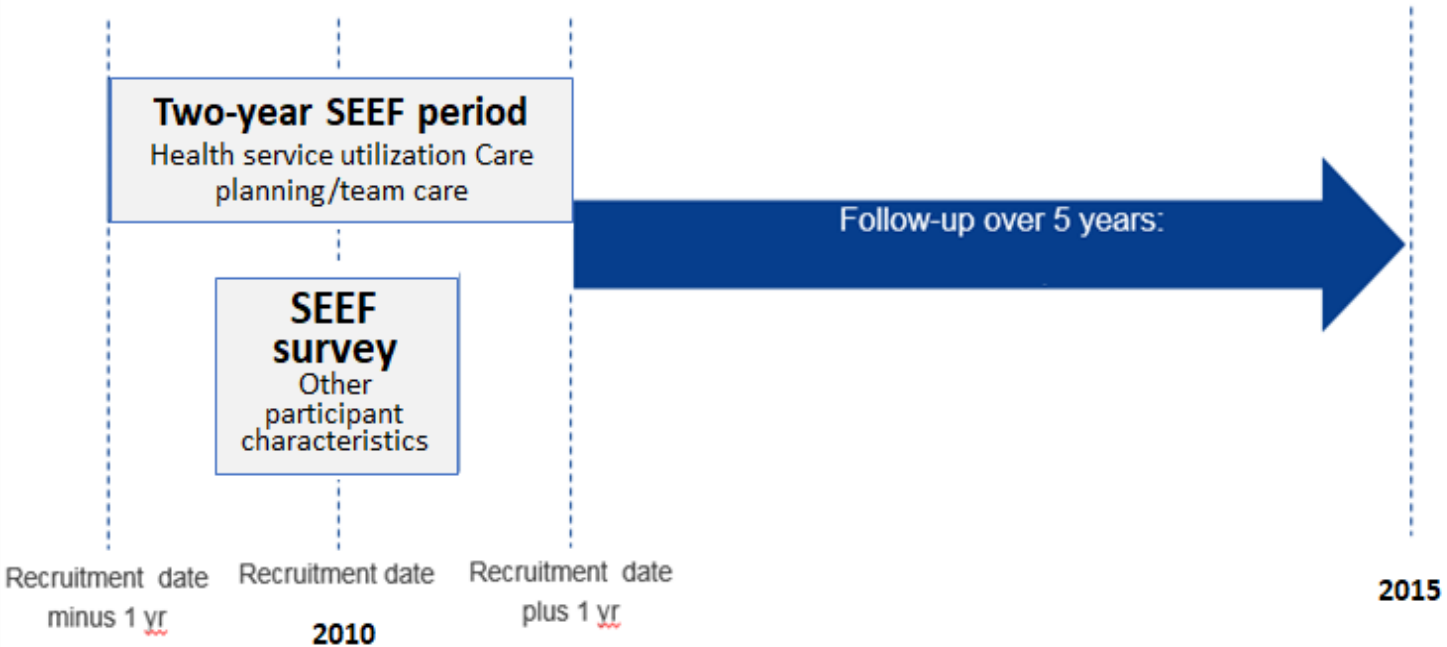
identified as a potential risk factors for poor health outcomes and inappropriate or inadequate service use

understanding relationships between social isolation, loneliness and living alone



# Methods

- Used the social interaction subscale of the Duke Social Support Index
- Lowest 20% defined as social isolation
- PR and 95% CI calculated using generalised linear model with Poisson family and log link function
- PRs were adjusted for the potential confounders which were found to be associated with social isolation or living alone at  $p < 0.20$



# Factors associated with living alone and social isolation

Characteristic		Living alone	Social Isolation
<b>Demographic</b>	More likely	<ul style="list-style-type: none"> <li>• Older age</li> <li>• Being female</li> </ul>	
	Less likely	<ul style="list-style-type: none"> <li>• Higher income</li> </ul>	<ul style="list-style-type: none"> <li>• Aged between 60 and 84 years</li> <li>• Being female</li> <li>• Having school certificate or higher (compared to no schooling)</li> <li>• Having private health insurance</li> </ul>
<b>Social and medical factors</b>	Less likely	<ul style="list-style-type: none"> <li>• Being a parent</li> <li>• Live in safe area</li> <li>• Eating adequate fruit and vegetable</li> <li>• Consume alcohol</li> <li>• Treatment for high blood pressure</li> <li>• Fall in 12 months prior</li> </ul>	<ul style="list-style-type: none"> <li>• Living alone</li> <li>• Being a parent</li> <li>• Undertaking adequate physical activity</li> <li>• Eating adequate fruit and vegetable</li> <li>• Consuming alcohol</li> <li>• Needing help for their daily activities</li> </ul>
	More likely	<ul style="list-style-type: none"> <li>• Full time work</li> <li>• Undertaking adequate physical activity</li> <li>• Needed help with daily activities</li> <li>• Self-reported asthma</li> <li>• Self-reported cancer</li> </ul>	<ul style="list-style-type: none"> <li>• Full-time worker</li> <li>• Current smoker</li> <li>• Self-reporting poor quality of life</li> <li>• Self-reporting heart disease</li> <li>• Self-reporting anxiety</li> </ul>



# Service use and mortality

Service use/Mortality	Not socially isolated N=4963 n (%)	Socially isolated N=1213 n (%)	Crude PR (95% CI)	Adj. PR (95% CI)
High GP use (>13 visits/ year)	761 (15.3)	201 (16.6)	1.08 (0.92, 1.26)	0.92 (0.76, 1.10)
High Hospital use (1+ ED visits/ year)	341 (6.9)	88 (7.3)	1.06 (0.83, 1.33)	0.86 (0.64, 1.12)
High ED use (1+stays/year)	311 (6.3)	100 (8.2)	1.32 (1.05, 1.64)	0.99 (0.75, 1.30)
Died within 5 years of enrolment	323 (6.5)	111 (9.2)	1.41 (1.13, 1.74)	0.94 (0.72, 1.22)

Service use/Mortality	Do not live alone N=4865 n (%)	Live alone N=1263 n (%)	Crude PR (95% CI)	Adj. PR (95% CI)
High GP use (>13 visits/ year)	677 (13.9)	274 (21.7)	1.56 (1.5, 1.79)	0.92 (0.72, 1.18)
High Hospital use (1+ ED visits/ year)	292 (6.0)	134 (10.6)	1.77 (1.44, 2.16)	1.09 (0.76, 1.57)
High ED use (1+stays/year)	280 (5.8)	128 (10.1)	1.76 (1.42, 2.16)	1.21 (0.83, 1.79)
Died within 5 years of enrolment	296 (6.1)	133 (10.5)	1.73 (1.41, 2.12)	1.05 (0.72, 1.55)

# Care plans

Use of GPMP/TCA/Allied Health	Not socially isolated	Socially isolated	Crude PR (95% CI)	Adj. PR (95% CI)
	N=4963 N (%)	N=1213 N (%)		
Any GPMP/TCA	1382 (27.8)	358 (29.5)	1.06 (0.94, 1.19)	0.99 (0.86, 1.13)
Any GPMP/TCA reviews	621 (12.5)	177 (14.6)	1.17 (0.98, 1.37)	1.10 (0.90, 1.34)
Any allied health services	1015 (20.5)	259 (21.4)	1.04 (0.91, 1.19)	0.97 (0.82, 1.13)

Service use/Mortality	Do not live alone	Live alone	Crude PR (95% CI)	Adj. PR (95% CI)
	N=4865 n (%)	N=1263 n (%)		
Any GPMP/TCA	1248 (25.7)	473 (37.5)	1.46 (1.31, 1.62)	0.90 (0.75, 1.09)
Any GPMP/TCA reviews	567 (11.7)	219 (17.3)	1.49 (1.27, 1.74)	0.88 (0.67, 1.16)
Any allied health services	930 (19.1)	331 (26.2)	1.37 (1.21, 1.55)	0.91 (0.73, 1.13)

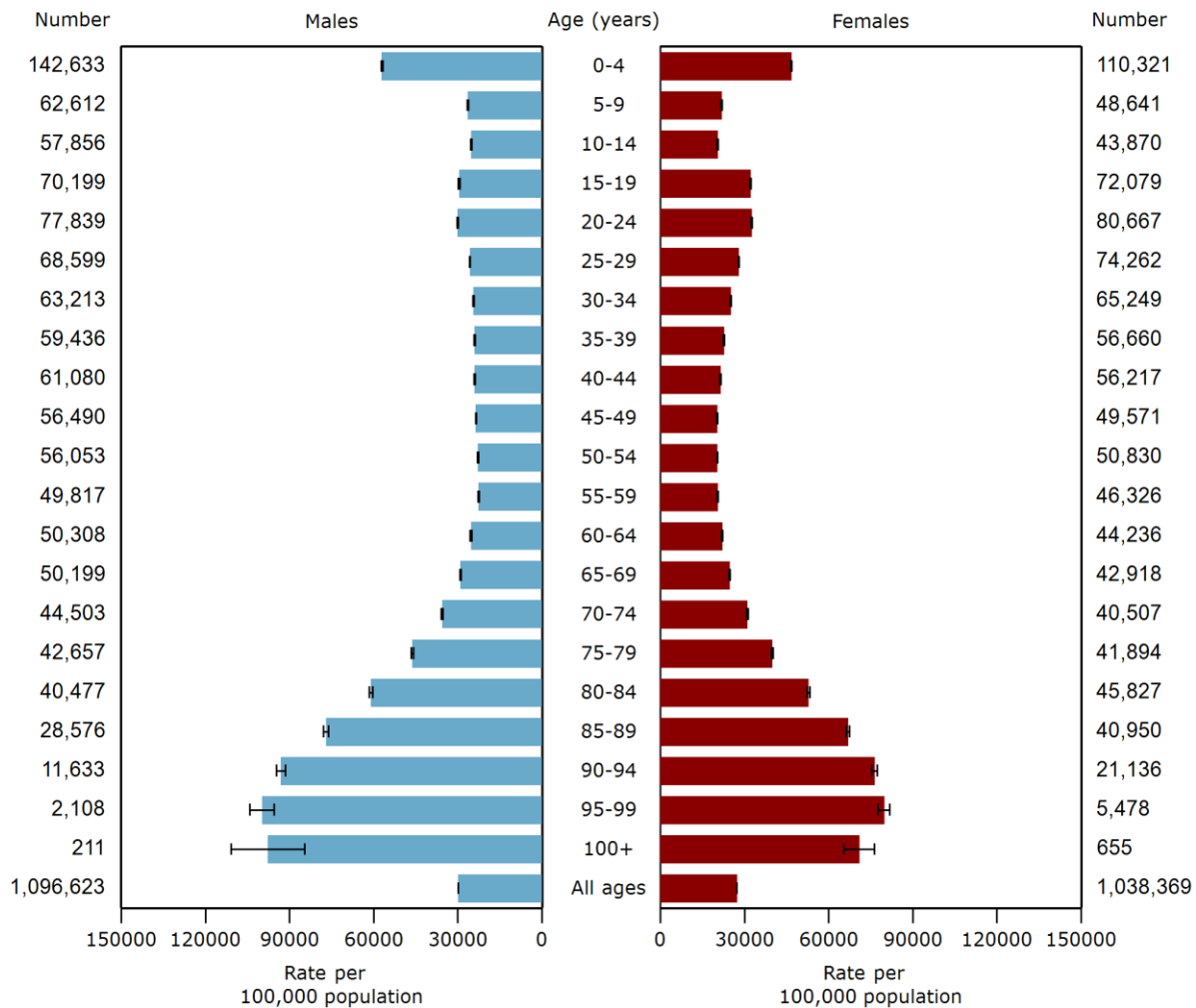
# Summary

- Overall, 1,213 (19.6%) of the cohort were classified as socially isolated and 20.5% of the cohort lived alone. Only 3.6% of the cohort were both socially isolated and lived alone.
- No difference in high service use for those socially isolated or living alone
- No difference in mortality for those socially isolated or living alone
- Loneliness may be more important as outcome for interventions than either living alone or isolation, as has been noted elsewhere



Predictors for  
high service use  
in older people





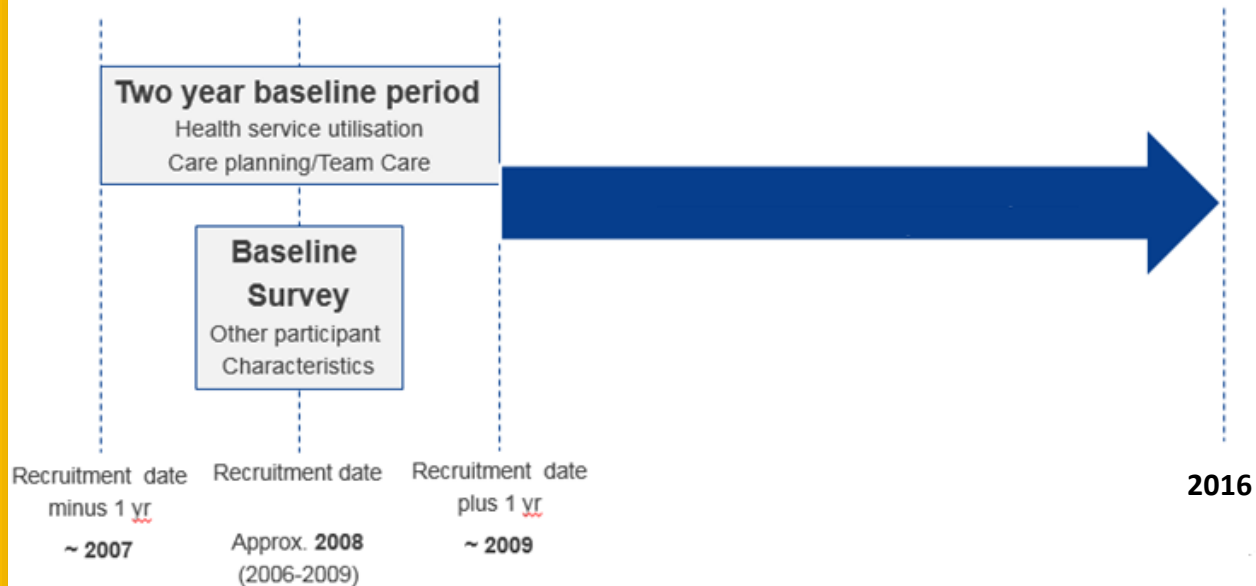
Source: Health Statistics New South Wales [Internet]. Sydney: NSW Ministry of Health, [cited 11/10/2018]. Available from: [www.healthstats.nsw.gov.au](http://www.healthstats.nsw.gov.au).

# Predictors/Gaps

Patients aged over 75 years: 12.4% of all ED presentations, 6.7% of the population

Explore predictors of service to inform planning and the provision of quality cost effective care





- Descriptive analysis calculated proportion service use (within +/- 1 year of baseline survey)
- PR and 95% CI calculated using generalised linear model with Poisson family and log link function
- PRs were adjusted for the potential confounders which were found to be associated with social isolation or living alone at  $p < 0.20$
- Mortality calculated over 8-year period

## Methods





# Characteristics





Service Use	Associations (adjusted models)	
	More likely	Less likely
<b>High GP use (10 plus)</b>	speaking language other than English at home private health insurance, health care concession treated for high blood pressure at least one fall in 12 months cardiovascular disease and diabetes	educational qualification university or higher household income $\geq$ \$40,000 consuming 1-13 drinks of alcohol a week
<b>High Specialist use (7 plus)</b>	private health insurance being an ex-smoker at least one fall in 12 months osteoporosis, cardiovascular disease, diabetes, cancer	aged >90 years speaking language other than English at home reporting good health
<b>ED use (2 or more)</b>	at least one fall in last 12 months cardiovascular disease	private health insurance adequate physical activity and reporting good health consuming 1-13 drinks of alcohol a wee
<b>Hosp use (1 or more)</b>	being an ex-smoker at least one fall in 12 months cardiovascular disease	speaking language other than English at home health care concession adequate physical activity consuming 1-13 drinks of alcohol a week reporting good quality of life

# Summary

- The main predictors for high service use in over 75 years in CES included being an ex-smoker, having PHI, having HCC, recent fall, self reported osteoporosis, CVD or cancer
- Analysis shows high health service use is appropriately occurring for people with chronic conditions such as diabetes, CVD, osteoporosis and cancer.
- However, high services use (for GPs and specialists) is also being predicted based on the persons ability to pay (i.e. participants with PHI or HCC)
- Frequent ED use appears predictive of high subsequent health service use and mortality.

# Summary

# Research Projects

Research Projects		Evidence	Application
	<b>Impact of care plans on health outcomes</b>	<ul style="list-style-type: none"> <li>Well-targeted towards those with chronic and complex care needs</li> <li>Physiotherapy appear to reduce hospitalisations</li> </ul>	<ul style="list-style-type: none"> <li>Targeting services to need</li> <li>Evidence for expanding number of allied health services per year</li> </ul>
	<b>Impact of GP follow-up after hospitalisation on re-admissions</b>	<ul style="list-style-type: none"> <li>Difference between high and low GP users</li> <li>30% reduction in 12-month re-hospitalisation</li> </ul>	<ul style="list-style-type: none"> <li>More liaison pre/post hospitalization</li> <li>Explore other Innovative models of care</li> </ul>
	<b>Understanding the needs of older people who experience loneliness</b>	<ul style="list-style-type: none"> <li>No difference in high service</li> <li>No difference in mortality</li> <li>Loneliness may be more important measure</li> </ul>	<ul style="list-style-type: none"> <li>Understand perceptions</li> <li>Impact over time</li> </ul>
	<b>Predictors for high service use in older people</b>	<ul style="list-style-type: none"> <li>High services use (except for ED) based on the ability to pay</li> <li>ED use higher as age</li> <li>ED use predictor of mortality</li> </ul>	<ul style="list-style-type: none"> <li>Understand differences between perceptions and reality</li> <li>Exploring options to meet service needs</li> </ul>

# Acknowledgments

The Central and Eastern Sydney Primary and Community Health Cohort/Resource (CES-P&CH) is funded by a consortium of South Eastern Sydney Local Health District, Sydney Local Health District, and the Central and Eastern Sydney Primary Health Network.

This research was completed using data collected through the 45 and Up Study ([www.saxinstitute.org.au](http://www.saxinstitute.org.au)). The 45 and Up Study is managed by the Sax Institute in collaboration with major partner Cancer Council NSW, and partners the National Heart Foundation of Australia (NSW Division), NSW Ministry of Health, NSW Government Family & Community Services—Ageing, Carers, and the Disability Council NSW, and the Australian Red Cross Blood Service. We thank the many thousands of people participating in the 45 and Up Study

# Publications

- Welberry H, Barr ML, Comino EJ, Harris-Roxas BF, Harris E, Dutton S, Jackson T, Donnelly D, Harris MF. Do general practice management and/or team care arrangements reduce avoidable hospitalisations in Central and Eastern Sydney, Australia? BMC Health Services Research 2019; 19:811 <https://doi.org/10.1186/s12913-019-4663-3>
- Barr ML, Welberry H, Comino EJ, Harris-Roxas BF, Harris E, Lloyd J, Whitney S, O'Connor C, Hall J, Harris MF. Understanding the use and impact of allied health services for people with chronic health conditions in Central and Eastern Sydney, Australia: a five-year longitudinal analysis. Primary Health Care Research & Development 2019; 20(e141): 1–9. DOI: [10.1017/S146342361900077X](https://doi.org/10.1017/S146342361900077X)
- Barr ML, Welberry H, hall J, Comino EJ, Harris E, Harris-Roxas BF, Jackson T, Donnelly D, Harris MF. General practitioner follow-up after hospitalisation in Central and Eastern Sydney, Australia: access and impact on health services Australian Health Review 2020; <https://www.publish.csiro.au/AH/justaccepted/AH19285>
- Stewart G, Jackson T, Clinch K, Barr M, Blunden L-A, Harris-Roxas B, Welberry H, Comino E, Lloyd J, Harris E, Harris M. Understanding the predictors of services use in older people to plan for and provide quality cost-effective care. International Journal of Integrated Care. 2019;19(4):161. DOI: <http://doi.org/10.5334/ijic.s3161> .
- Blunden L-A, Lloyd J, Barr M, Welberry H, Comino E, Harris-Roxas B, Jackson T, Donnelly D, Harris E, Harris M. Understanding the medical determinants and health service needs of older people who experience loneliness in Sydney, Australia. International Journal of Integrated Care. 2019;19(4):160. DOI: <http://doi.org/10.5334/ijic.s3160> .

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