

# Demand at the ED front door: Is the 4 hour target the answer?

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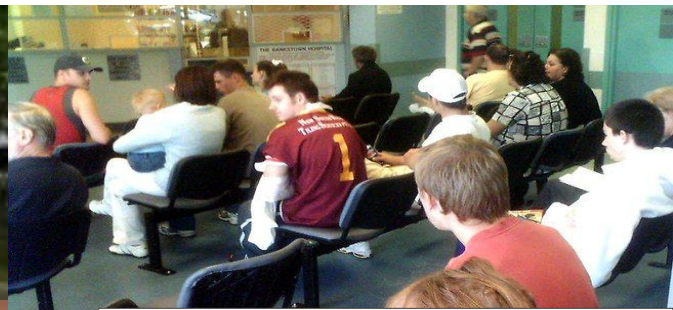
Doctoral scholar

Andrea Curtis, Damien Jolley, Just Stoelwinder,  
John McNeil, Peter Cameron

# Background



Increasing demand for  
emergency department (ED) services  
world wide



- ↓ Access
- ↓ Quality of care
- ↓ Patient safety

# Aims

- ❑ To measure the increase in presentations
  - ❑ volume
  - ❑ age-specific rates
- ❑ To describe trends in ED utilisation
- ❑ To examine changes in ED length of stay



# Methods

## Design and Setting

Longitudinal population-based retrospective analysis of routinely collected data: Victorian Emergency

Minimum Dataset (VEMD)

## Outcome Measures

- Presentation numbers
- Presentation rates/1000 persons
- ED Length of Stay (LOS)



# Methods

## **Inclusion Criteria**

- metropolitan Melbourne public hospital EDs

## **Exclusion Criteria**

- Specialist maternity and Eye & Ear hospitals

## **Time period**

- 1999/2000 to 2008/2009

# Methods

## □ Categorisation of factors

Variable	VEMD categories
Referral Source	Self/family/friends Local medical Officer / Specialist
Arrival Mode	Emergency Ambulance / Helicopter Arrival by private vehicle or community service
Triage Category	ATS categories 1, 2, 3, 4, 5
Primary Clinical Diagnosis	ICD-10-AM diagnoses (external causes, illness)
ED Length of Stay (LOS)	<4 hours ≥ 4 hours
ED Disposition	Discharge home Admission to hospital (incl. Short Stay Unit) Left at Risk (before seen or without approval of clinical staff)



# Methods

- ❑ Annual age & gender specific presentation rates per 1000 persons
- ❑ Log-linear regression to model effects of age & gender
- ❑ Descriptive statistics to compare trends over time



## Results – adjusted for population changes

- 32.2% rise in rate of presentation

(95% CI 29.2% to 35.2%)

- average annual increase of 3.6%

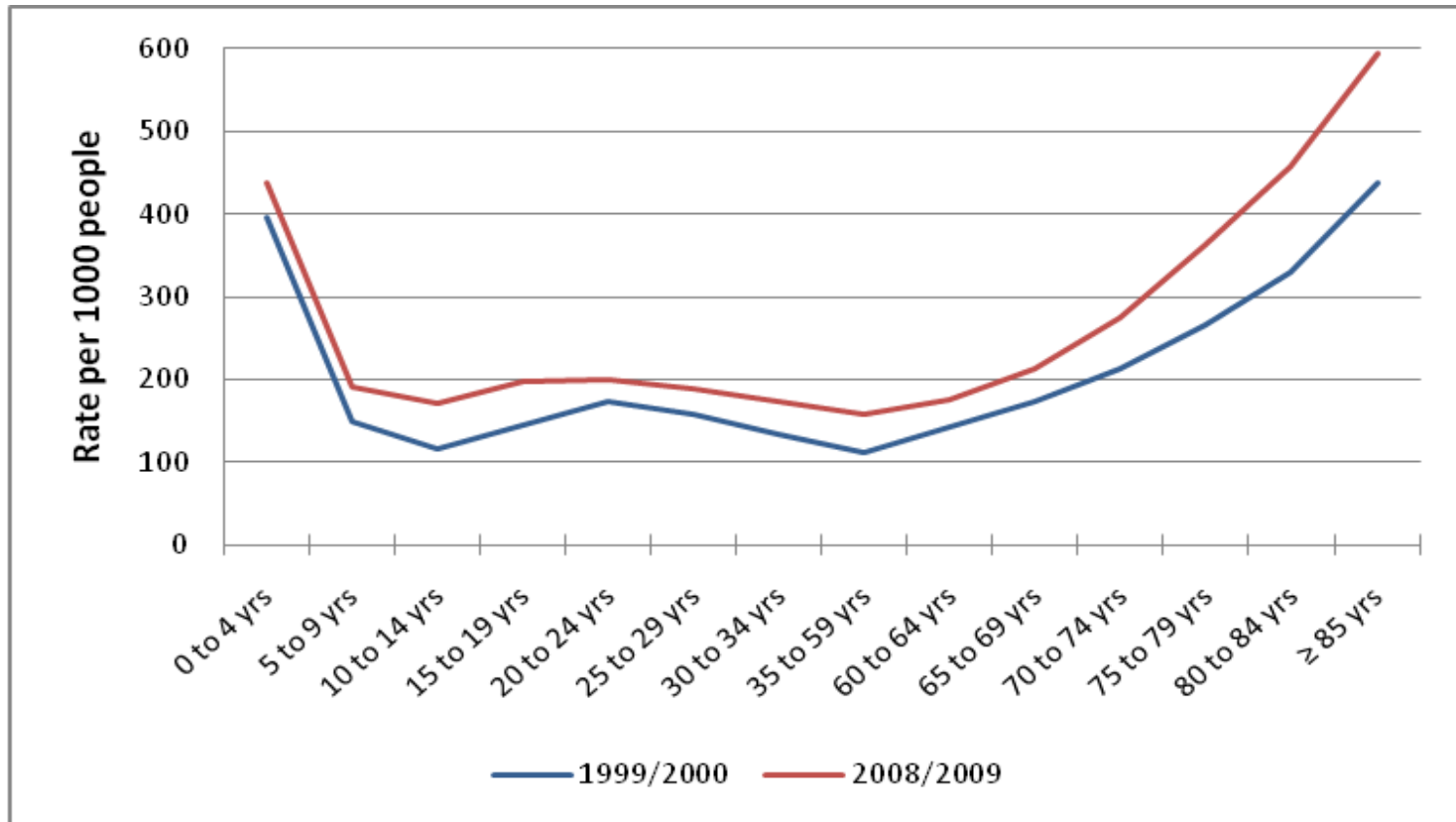
(95% CI 3.4% to 3.8)

- Females 14.2% less likely

(95% CI 13.1% to 15.4%)

- Likelihood of presentation rose with  
increasing age (excl >5yr olds)

# Presentation rates per 1000 people by age group



## Adjusted log-linear model looking at effects of age

Age group	1999/2000 – 2008/2009	95% CI (p<0.03.900)
0 – 4 yrs	3.2	3.1 to 3.3
5 – 9 yrs	1.3	1.26 to 1.34
10 – 14 yrs	1.05	1.02 to 1.09
15 – 19 yrs	1.26	1.22 to 1.3
20 – 34 yrs	1.3	1.28 to 1.33
35 – 59 yrs	1.0	*
60 – 69 yrs	1.4	1.4 to 1.5
70 – 74 yrs	1.8	1.8 to 1.9
75 – 79 yrs	2.3	2.3 to 2.4
80 – 84 yrs	2.9	2.8 to 3.0
≥ 85 yrs	3.9	3.8 to 4.0

Using 35-59 yr age group as comparator

# Results - trends

	1999/2000	2008/2009	% change
<b>No. EDs</b>	16	18	<b>12</b>
<b>No. presentations</b>	550,662	853,940	<b>55</b>
<b>Total population (million)</b>	3.38	4.02	<b>19</b>
<b>Age (median)</b>	31 yrs	34 yrs	<b>10</b>
<b>Arrival mode</b>			
<b>Emergency ambulance</b>	123,247	197,442	<b>60</b>
<b>Walk-In</b>	415,560	619,798	<b>49</b>
<b>ED Discharge Destination</b>			
<b>Home</b>	371,559	533,518	<b>44</b>
<b>Hospital Ward</b>	122,242	141,550	<b>16</b>
<b>Short Stay Observation Unit*</b>	9,609	77,877	<b>710</b>
<b>Left at risk</b>	30,640	56,308	<b>84</b>
<i>* Coded from 2001/2002</i>			



≥ 85 years age group – in 2008/2009

❑ 3.9 times as likely as 35-59 year age group

❑ Absolute numbers more than doubled

❑ More likely to arrive by emergency ambulance

❑ More acutely unwell

❑ 75% ED LOS ≥4 hours

❑ 61% required admission to a hospital ward

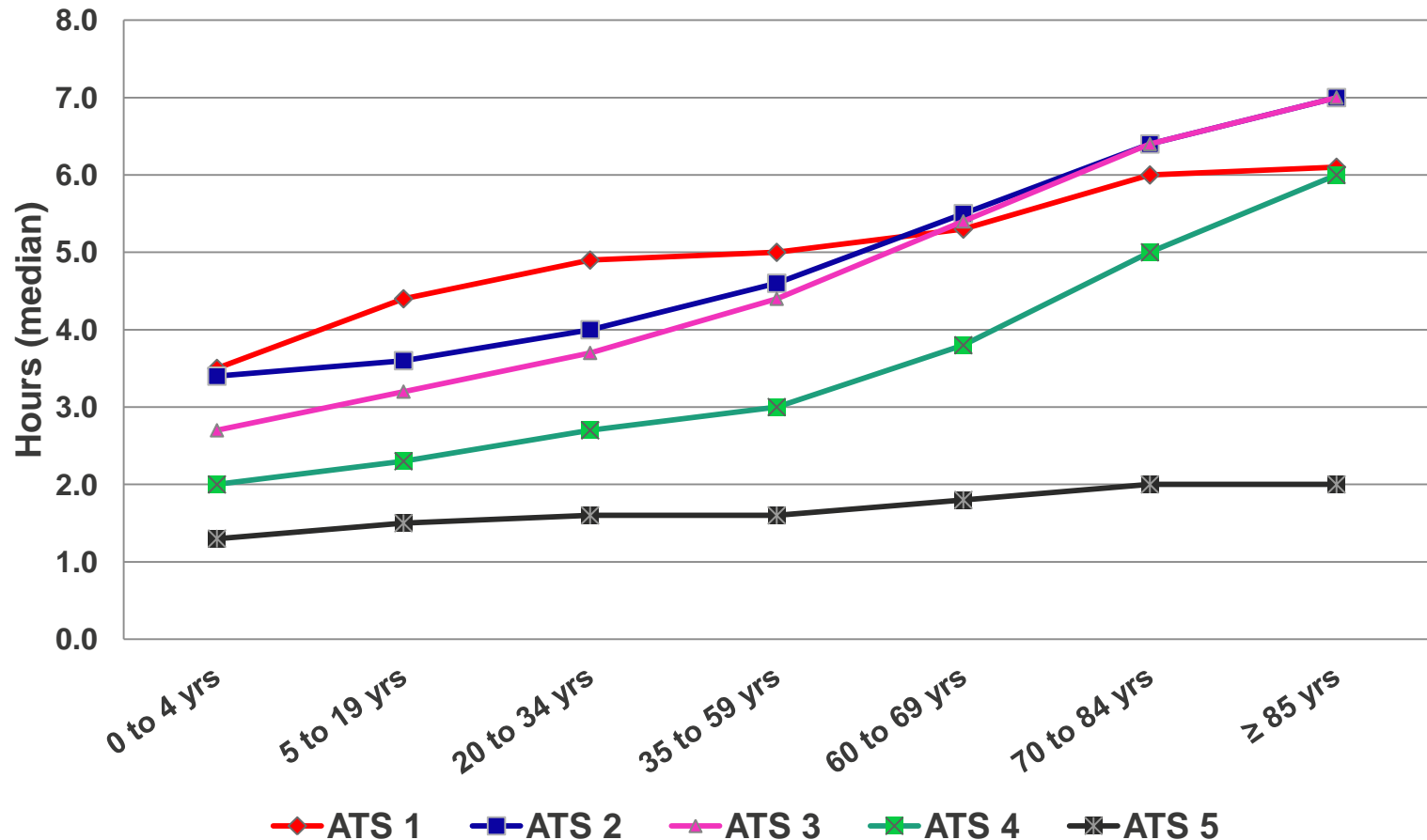
# Results: ED LOS

- ❑ Almost 40% of all patients remained in ED  $\geq 4$  hours in 2008/2009
- ❑ ED LOS  $\uparrow$  over time for more acute patients (ATS 1, 2 & 3)
- ❑ ED LOS  $\uparrow$  across all age groups

## ED LOS<4hrs & median LOS by triage

Year	1999/2000			2008/2009		
	No.	% <4 hrs	ED LOS median hrs	No.	% <4 hrs	ED LOS median hrs
<b>Overall</b>	<b>550,662</b>	<b>62.1</b>	<b>3.1</b>	<b>853,940</b>	<b>60.6</b>	<b>3.3</b>
<b>ATS 1</b>	6,596	51.3	3.9	7,352	37.3	5.2
<b>ATS 2</b>	37,135	43.1	4.6	87,753	41.5	4.8
<b>ATS 3</b>	164,507	52.0	3.9	280,433	47.8	4.2
<b>ATS 4</b>	276,213	65.4	2.9	398,642	68.5	2.8
<b>ATS 5</b>	64,672	84.8	1.8	77,447	88.2	1.6

# ED median LOS(hours) for all presentations by age group





# Strengths and Limitations

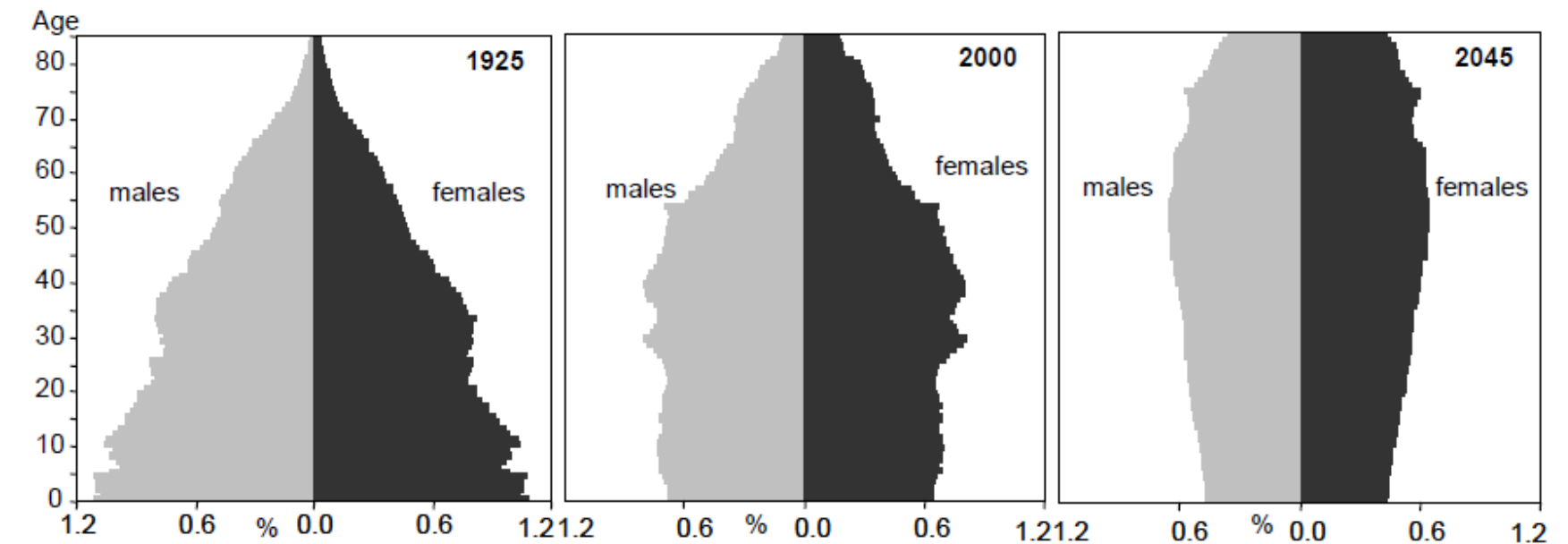
- ❑ Population-based study of >7 million presentations
- ❑ Routinely collected metropolitan data
  - data quality and consistency
  - not generalisable to non-urban regions
  - not all elements of demand identifiable by administrative data

# In summary

- ❑ Persistent rise in number & rate of presentations over 10 years, after adjustment for population change
- ❑ Disproportionately driven by older age groups
- ❑ ED LOS ↑ ATS 1, 2 & 3
- ❑ ED LOS ↑ with age

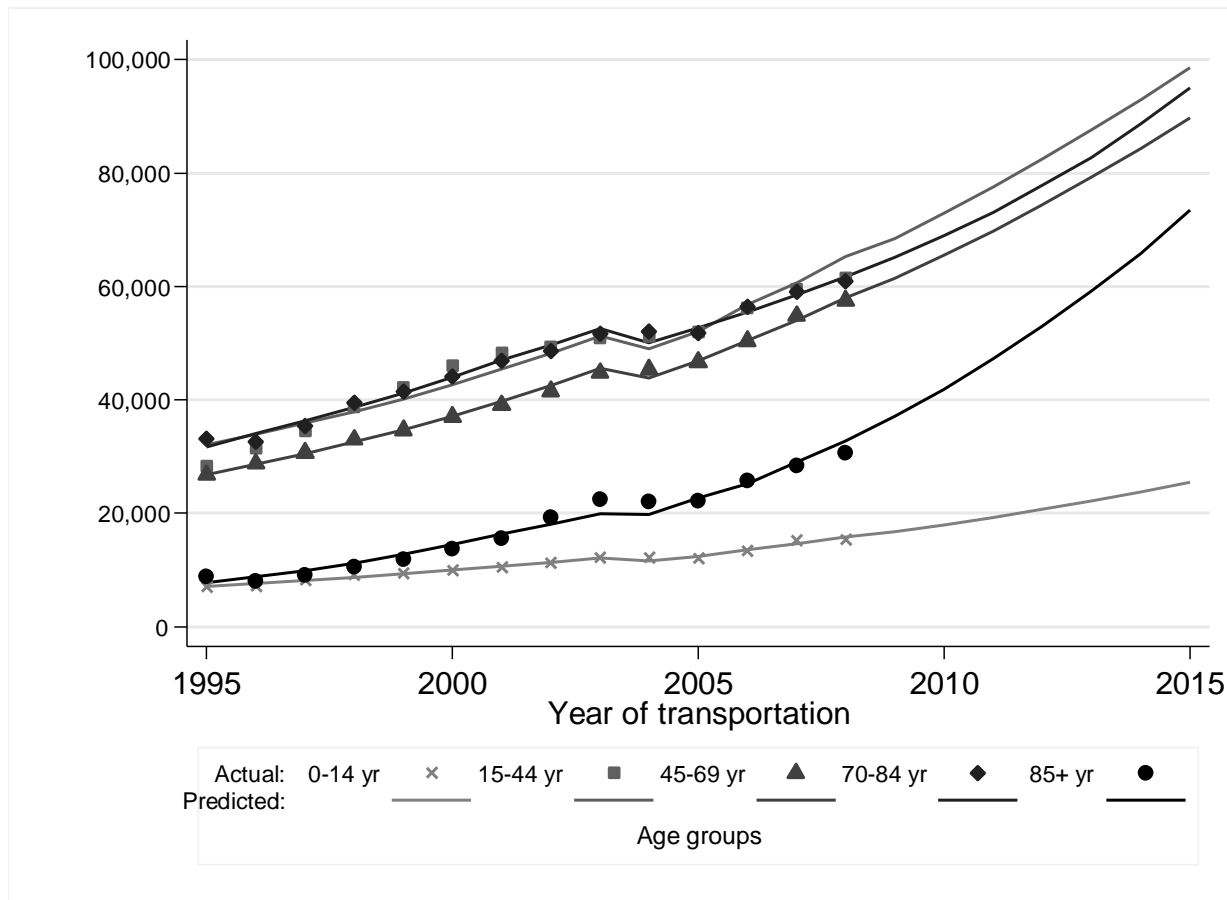
# Population Ageing

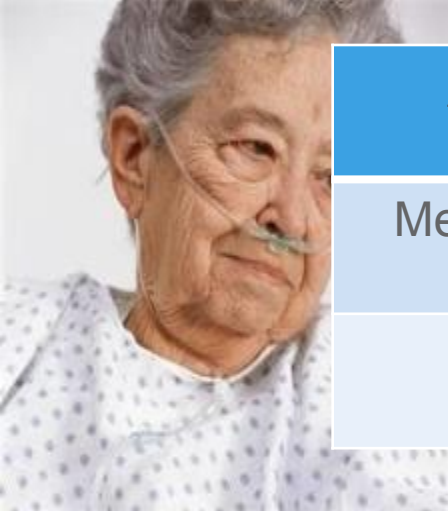
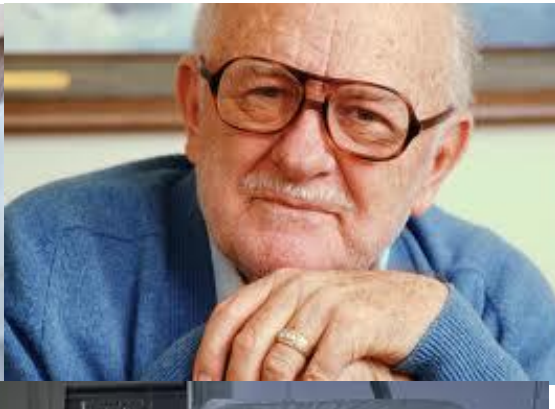
Figure 1 **From pyramid to coffin**  
Changing age structure of the Australian population, 1925-2045



*Economic Implications of an Ageing Australia:  
Productivity Commission Research Report 2005. Canberra*

# Emergency Ambulance Transportations by age group 1995-2015





Aged $\geq$ 70 years	2000	2009	2000-2009 % change
Melbourne's population	296,123	360,737	22%
Metropolitan ED presentations	82,357	141,775	72%





# Questions for you

- Have ED models of care changed ?
  - ↑ demand
  - improved technology in diagnostics
  - community / patient expectations for care
  
- Are the proposed 4 hour targets achievable given these trends ?

→ significant redesign of the whole system required

