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# Systematic review of trends in emergency department attendances: an Australian perspective

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## ABSTRACT

Emergency departments (EDs) in many developed countries are experiencing increasing pressure due to rising numbers of patient presentations and emergency admissions. Reported increases range up to 7% annually. Together with limited inpatient bed capacity, this contributes to prolonged lengths of stay in the ED; disrupting timely access to urgent care, posing a threat to patient safety. The aim of this review is to summarise the findings of studies that have investigated the extent of and the reasons for increasing emergency presentations. To do this, a systematic review and synthesis of published and unpublished reports describing trends and underlying drivers associated with the increase in ED presentations in developed countries was conducted. Most published studies provided evidence of increasing ED attendances within developed countries. A series of inter-related factors have been proposed to explain the increase in emergency demand. These include changes in demography and in the organisation and delivery of healthcare services, as well as improved health awareness and community expectations arising from health promotion campaigns. The factors associated with increasing ED presentations are complex and inter-related and include rising community expectations regarding access to emergency care in acute hospitals. A systematic investigation of the demographic, socioeconomic and health-related factors highlighted by this review is recommended. This would facilitate untangling the dynamics of the increase in emergency demand.

Emergency departments (EDs) in developed countries are experiencing increased workloads due to a continuing increase in patient presentations and rising emergency admissions. This is compounded by the challenge of accessing limited numbers of hospital inpatient beds in a timely manner. The emergency care pathway is multifaceted, with patients presenting to an ED via emergency ambulances, self-referral or referral by a healthcare or community service provider. Patients are triaged on arrival at the ED; however, timely care is reliant on resources within the ED and hospital efficiency and capacity to manage patient flow.

The UK, New Zealand, Canada and the USA report increased ED attendances, with current rates ranging from 3% to 6% annually.<sup>1–5</sup> The number of emergency attendances across Australia has risen by 73%, from 4.1 million in 2003–2004 to 7.1 million in 2007–2008. This represents an increase from 202 to 321 presentations per 1000 persons<sup>6</sup>; with state average annual increases ranging up to almost 7%.<sup>7,8</sup> (table 1).

In an environment with less inpatient bed availability, rising ED presentations and emergency patients requiring admission causes access block, leading to diminished ED performance and overcrowding.<sup>9–11</sup> This also results in increased waiting times, an increased burden in caring for patients awaiting admission, patients leaving without being seen and ED blockage, resulting in ambulance diversion and diminished capacity to respond to other calls.<sup>12</sup>

Such disruption to the provision of timely care poses a threat to patient safety,<sup>11,13</sup> with evidence of associated adverse events,<sup>12,14,15</sup> and estimates of an annual 20–30% excess ED mortality rate directly attributable to overcrowding and access block.<sup>16</sup> In addition, prolonged length of stay in the ED has been associated with subsequent increased inpatient length of stay<sup>17,18</sup> and protracted patient flow throughout the wider hospital system.

Rising demand and overcrowding in the ED was initially described in the early 1980s in the USA and UK. However, major concerns were not raised until 10 years later, prompting investigation of the trends and characteristics of attendees.<sup>19</sup> This review aims to synthesise the peer-reviewed literature and unpublished reports to identify the key factors associated with the increase in presentations to EDs.

## METHOD

### Inclusion criteria

Peer-reviewed articles and audit reports dating back to 1995 were included if they were published in English and described factors associated with the rise in adult presentations to EDs in developed countries.

### Search strategy

An English-language Medline search was conducted via OVID and PubMed, a database of the US National Library of Medicine to identify relevant literature from January 1995 to January 2010. Combinations of key words included: ‘emergency medical services’ [MeSH Terms] OR (‘emergency’ [All Fields] AND ‘medical’ [All Fields] AND ‘services’ [All Fields]) OR ‘emergency medical services’ [All Fields] OR (‘emergency’ [All Fields] AND ‘service’ [All Fields]) OR ‘emergency service’ [All Fields] AND ‘hospitals/utilization’. This search generated 521 articles. The titles were initially screened for relevance to this paper, and abstracts of ambiguous titled papers were scrutinised for analyses of key factors associated with rising ED attendances (where available). This search was supplemented by a web-based search through Google and Google Scholar; alongside manual searches of relevant journals and grey literature including reports on hospital emergency

**Table 1** Rise in presentations to emergency departments (EDs)

Australia	2007/08	20% of total population visited an ED, with 28% admitted to hospital National average of 321 presentations per 1000 persons
	2003/04	National average of 202 presentations per 1000 persons <sup>6</sup>
	1999/00–2005/06	Average annual increase of 5.3% <sup>7</sup>
	2004/05–2006/07	Average annual increase of 6.9% <sup>8</sup>
New Zealand	2003/04–2007/07	National average growth of 20% in presentations <sup>2</sup>
UK	2008/09	18% of the total population visited an ED, with 20% admitted to hospital
	2002/03–2008/09	Average annual increase of 5.9% <sup>1</sup>
Switzerland	1996–1999	Average annual increase of 5.9% <sup>5</sup>
Canada	1993–1999	increase in ED presentations by 27.5% <sup>3</sup>
USA	1996–2006	National growth of 32% Average annual increase of 3.2%
	1990–1999	National average of 405 visits per 1000 persons <sup>4</sup> Total number of visits to California EDs increased by 27% <sup>9</sup>

services from Australia, New Zealand, the UK) and the USA. Finally, the references of the chosen articles and audit reports were scanned in an attempt to ensure that relevant papers had not been overlooked by the initial search.

### Assessment of quality

The aim of this review was to synthesise evidence from the peer-reviewed and grey literature published and unpublished work about the factors associated with increased utilisation of EDs. The search identified cohort and cross-sectional studies and audit reports that analysed administrative databases, medical records, surveys or interviews. These publications were critically appraised and publications lacking a description of their methods, and letters or opinions were excluded.

### Synthesis

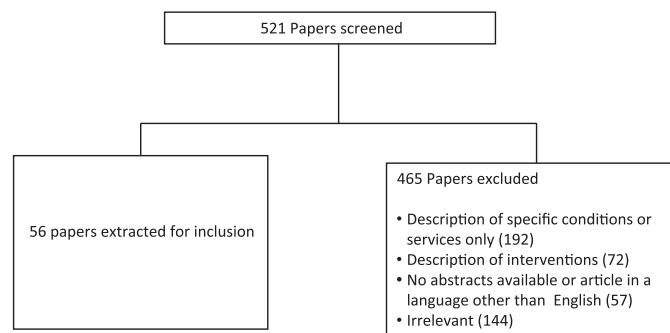
The acquired publications were systematically examined and categorised into major factors associated with increased presentations. The data were synthesised by narrative summaries, then analysed thematically to identify and describe the main factors attributed to the rise in ED utilisation.

### Limitations

The search was limited to publications from 1995 as it was believed the underlying factors would be dynamic in nature, therefore anything older would no longer apply. In addition, the search strategy was limited to two large electronic databases – Ovid MEDLINE and PubMed; however, this was supplemented by extensive web-based and manual searches. This review was based largely on observational studies; hence the identified factors cannot be considered as causal but as associations. These associations will vary in different regions and countries, so may not be generalisable. Sources of bias must be taken into consideration. Publication bias is likely, as positive associations are more likely to be reported and published; and observer bias is also possible as the majority of published studies are conducted by emergency physicians, who may be influenced by prior perceptions, experience and knowledge.

## FINDINGS AND DISCUSSION

This process produced 56 peer-reviewed articles from the Medline search (figure 1), with the supplementary search

**Figure 1** Medline search findings.

generating a number of additional articles and audit reports in which a variety of major factors were described as contributing to the ongoing rise in ED attendances.

### Ageing

ED attendances are increasing in per capita terms, indicating a rise that is faster than population growth. This may partly be explained by ageing of the population, with the current proportion of people aged over 65 years in the UK, USA and Australia at around 13% of the population. It is projected that this will increase to 25% over the next 25 years; with the proportion of those aged over 85 years rising from 1.5% to 5% of the population in these countries.<sup>20–22</sup>

Several studies across the world report the fastest growth in ED presentations among patients aged over 65 years.<sup>23–29</sup> In the UK in 2004, a 3.8-fold increase of ED patients aged 80+ years was reported compared with 1990 levels.<sup>24</sup> Older people present with more complex clinical conditions, consume more resources, have longer lengths of stay in the ED and are more likely to be admitted to hospital.<sup>23 24 30 31</sup> They also have a higher rate of return visits to the ED.<sup>30</sup>

### Loneliness and lack of social support

Studies from the USA have observed increased ED visits to be linked with loneliness, vulnerability and lack of access to family support.<sup>32–34</sup> Among older people without a family network, one study found that the likelihood of ED usage increased sevenfold.<sup>35</sup> Possible contributory factors include an increase in dual career and dual income families coupled with increased geographic mobility of the workforce over the past 20 years. This may contribute to the fragmentation of the extended family unit, affecting the capacity to care for and support older relatives.<sup>36</sup> Additionally, government policies encourage older people to remain living in their own homes; with the majority of Australians aged over 65 years doing so.<sup>37</sup> Of those living in private dwellings, 62% live alone,<sup>38</sup> and over the next 15 years it is projected this will continue to increase.<sup>37</sup> Based on the above study findings, this could be expected to increase ED usage in the future.

### Mainstreaming of psychiatric care and frequent attendees

Government policies across the developed world have encouraged mainstreaming of care from long-stay psychiatric hospitals to community-based settings. Along with other countries, Australia commenced de-institutionalisation of mental health patients in the mid-1990s.<sup>39</sup> This is thought to have contributed to increased ED presentation by patients with mental health problems, with a study noting a tenfold rise in such presentations to their ED over the 10-year period to 2003.<sup>40</sup> Other studies in Australia, the UK, New Zealand and Europe have reported

a high incidence of psychiatric illness and substance abuse among repeat attendees in the last decade.<sup>41–45</sup>

De-institutionalisation is likely to have a direct association with an increased propensity to use an ED for healthcare, with access to stable housing and community-based primary care recognised as being problematic for this group of people.<sup>46–49</sup>

### Organisation of service delivery, access to primary care and co-payments

Several studies, including some from countries providing universal insurance, cite limited access to a primary care physician (PCP) or General Practitioner (GP) as patients' reasons for attending an ED.<sup>8 28 50–53</sup> In Australia, this is likely to be a consequence of reduced availability of and access to GPs, arising from medical workforce shortages and changes in healthcare practice, including a decline in the rate of home and nursing home visits<sup>54–56</sup> (facilities providing nursing care for residents). It is also possible that a gradual shift in GPs charging co-payments for consultations may have an impact, as there are no out-of-pocket expenses for ED consultations.<sup>57</sup> In the USA, a study reported that although the majority of their study cohort had a PCP, 60% of patients used the ED following unsuccessful attempts to source care from their PCP.<sup>58</sup>

In terms of after-hours access to GPs, the UK saw changes to the General Medical Services contract in 2004, which enabled GPs to 'opt out' of such care.<sup>59</sup> As a consequence, such arrangements have been shown to cause an increase in after-hours presentations to EDs.<sup>60</sup> Additionally, a study in Holland demonstrated that easier access to after-hours urgent primary care decreased attendances to the ED.<sup>61</sup>

These findings lend support to an association between the changes in accessibility of GPs or PCPs to increased demand.

### Health promotion and health awareness

Community awareness to seek early medical attention for certain conditions has been heightened by health promotion activities, along with popular media coverage over the past 20 years. The effectiveness of such campaigns has been demonstrated with an increase in ED presentations by those aged over 75 years following a health screening programme in the UK.<sup>62</sup> In addition, stroke presentations increased to Canadian EDs following a media campaign.<sup>63</sup> Improved health awareness from media campaigns possibly increases care expectations for immediate care, particularly when patients perceive there is an urgent need for medical attention.<sup>57</sup>

### Convenience

Accessibility and convenience as a 'one-stop shop'<sup>8 57</sup> that provides 'total care' with relevant diagnostics, delivered by a specialist team trained in emergency medicine, has been cited as a reason for using the ED in Europe, New Zealand and Australia.<sup>51 64–67</sup>

Emergency medicine developed as a speciality in the late 1970s at varying rates around the world,<sup>68–70</sup> whereas urgent care was previously provided by casualty departments staffed by general medicine doctors. This was when emergency presentations commenced increasing inexorably, which could suggest an association between demand and the availability of access to specialised care. Reports of patient beliefs that GPs are not trained or equipped to manage their situation,<sup>57</sup> together with heightened community expectation and accessibility to specialist emergency healthcare, could lend support to this theory; however, this has not been studied in depth.

### Appropriateness of use and risk aversion

The phenomenon of 'inappropriate' or unnecessary ED attendances is increasingly recognised as an important contributing factor to increased ED demand, with several studies investigating this in recent years. However, there is debate about whether it is inappropriate attendance or inappropriate health system design or response.<sup>71</sup>

In the USA in the early 1990s, inadequate primary care at nursing homes contributed to inappropriate transfer to EDs, with suggestion of the possibility of ED referral to avoid possible legal problems.<sup>56</sup> Other studies from the USA and Canada estimated approximately 40% of such presentations to be inappropriate, stating that patients could have been managed in their facility.<sup>72 73</sup> In an environment of increasing litigation related to medical care, it is conceivable that nursing homes could unavoidably be risk-averse if there is no on-site medical care, and this may contribute to a reduced threshold for transfers to the ED.

Conversely, more recent studies from Canada and Australia determined that 85% of nursing home transfers were appropriate.<sup>74 75</sup> Nevertheless, the Australian study identified evidence of primary care doctor involvement in only 25% of referrals, and a lack of clinical support for nursing home staff in general. Primary care involvement may have prevented these transfers.<sup>76</sup> A decline in primary healthcare visits to nursing homes<sup>77</sup> may be a factor, indicating that nursing homes may lack necessary supportive medical and nursing expertise.<sup>76</sup>

Self-referred patients are another group scrutinised in terms of 'appropriateness'. ED physicians generally agree that older self-referred patients are appropriate attendees, as they present with serious acute medical problems, usually requiring inpatient admission.<sup>27 30 31 78 79</sup> However, a significant proportion of younger self-referred patients are often described as 'inappropriate' and 'non-urgent', with treatment in the primary care setting thought to be more suitable.<sup>34 80 81</sup> One US national study described the greatest proportion of total healthcare visits for 20–29-year-olds being to an ED, having risen from 19% to 22% over the 10 years to 2006.<sup>82</sup> These visits were classified as non-urgent and less likely to require admission. The authors correlated the rise to the decline in primary care utilisation by young adults; attributing lack of health insurance coverage as a likely contributor.

However, defining what is an inappropriate or unnecessary presentation is difficult, as clinicians and patients may hold different viewpoints and it is also dependent on system design.<sup>83 84</sup> Appropriateness of presentation has been mostly defined from the clinician's perspective; however, patient perspectives have recently been explored, with the majority of patients perceiving that they require urgent care.<sup>50 52 53 79 85 86</sup>

### Increased emergency ambulance utilisation

Demand for emergency ambulances throughout the developed world is also rising.<sup>87</sup> Fifteen per cent of ED presentations arrive by ambulance in the USA; with 25% doing so in Australia.<sup>4 88</sup> In the UK, the number of requests for emergency ambulances is rising by an average of 6.5% per year, 60% resulting in transportation.<sup>89</sup> With utilisation of emergency ambulances having also increased across the developed world, it would seem logical to assume that an increase in emergency ambulance transportations is another contributing factor, the ED being a universal destination point for transported patients in most countries.

### CONCLUSION

The multiple factors associated with increasing ED presentations are complex and inter-related. These include demographic changes, changes in the organisation and delivery of care,

improved access to specialist emergency treatment, heightened health awareness and rising community expectations.

A contributing factor appears to be ageing of the population, as older people have an increased risk of more frequent acute illnesses as well as complications from age-related chronic diseases. In addition, the evidence suggests that social and health support mechanisms for older people are becoming increasingly fragmented, with changes in family structures, alongside reduced access to primary care, whether patients are living independently in a nursing home. As the older proportion of the population continues to rise, there will be a persistent increase in demand for emergency care and hospital admission unless initiatives are put in place. Practical strategies to manage this demand in the community and outpatient setting are essential. Further investigation into the impact of older people on rising emergency demand is recommended to help identify the underlying causes and will help target the planning of appropriate models of care for this age group.

Systematic investigation of the other demographic, socio-economic and health-related factors highlighted by this review is also recommended. This would facilitate untangling the dynamics of the increase in emergency demand. Analysis of standardised data with common definitions would help quantify the relative contributions of underlying factors across countries, which would assist in understanding international variations and influences. This will provide health policy makers with the information required, to enable appropriate and responsible development of strategies for the future management of emergency services.

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**Ethics approval** This study was conducted with the approval of the Monash University.

**Contributors** The manuscript forms the foundation of a doctoral research project. JL undertook the search of the peer-reviewed and grey literature. She collated the articles and synthesised the literature for this manuscript. In their capacity as supervisors and mentors, AC, PC, JS, MC and JM raised issues for discussion pertaining to the first author's interpretations of the findings of this review, and contributed to preparation of the final manuscript.

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