



Impact of providing after hours care on acute care utilisation: a rapid review

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An ***Evidence Check*** Review
brokered by the Sax Institute for the
NSW Department of Health



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Suggested Citation:

Fry, M. Impact of providing after-hours care on acute care utilisation: An *Evidence Check* rapid review brokered by the Sax Institute (<http://www.saxinstitute.org.au>) for the Workforce Development and Leadership Unit, NSW Department of Health; 2008.

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EXECUTIVE SUMMARY

Introduction

A rapid review was commissioned by NSW Health in mid-August 2008 to examine the impact of after hours care on acute care utilisation. The scope of the review included a focus on national and international studies of after hours care service models and their impact on acute care and ambulance services. The review was conducted in the context of the Area of Need Program and the new co-location of after hours primary care clinics with Hospital emergency departments.

The review addressed the following questions:

1. Do after hours primary care services reduce demand for hospital emergency care and ambulance services? If so by how much?
2. What models of after hours primary care have been shown to be most effective in reducing emergency department utilisation and ambulance services? why?
3. Are there any differences in the impacts of after hours care on acute utilisation and ambulance services whether the services are provided in rural, regional or metropolitan areas?
4. What factors have been identified as barriers or facilitators of implementation after hours care?

Extensive research had been undertaken in many countries, particularly in the United Kingdom and also in the United States of America, Ireland, Canada, Denmark, Sweden, and to a lesser degree Australia. The literature covered the period from 1970-2008. The evidence demonstrated a positive impact on acute service utilisation patterns. However, there was limited research on the impact on ambulance services or rural and regional services.

Much of the evidence presented was old and/or lacked a strong research design. The majority of studies vary in settings and methodology (heterogeneous samples, short sample periods, descriptive in nature; conducted within a single site; and/or measured a single outcome such as patient satisfaction). There were few relevant randomised control trials (6). The evidence was largely based on quasi experimental (time series), before-and-after or comparative studies, (22). Study results often noted an impact on acute services but failed to show a statistical difference. The relevant literature was largely international, so results may need to be interpreted cautiously, given geographical, cultural and social differences. This said the findings are relevant to the Australian context.

Result of the literature review

Question 1:

Despite mixed findings within the literature and methodological issues the evidence suggested that after hour primary care models reduced demand for acute services. It is difficult to quantify the reduction however a range of between 10 and 53% was supported. Models demonstrated a positive impact on GP workload, hospital admissions, and costs. The models did not exclusively provide after hours care and so the impact for this time period was often difficult to determine.

Question 2:

The review identified six practice-based service models: Minor Injuries Units; Walk in Centres; Telephone Triage and Advice services; GP Co-operatives services; Primary Care Health Centres; and, Ambulance Services ('see and treat' and 'treat and refer'). The models were not mutually exclusive from each other, Emergency Departments or General Practitioner clinics.

Question 3:

The comparative research on rural, regional and metropolitan based models was minimal. Research was focused on metropolitan based after hours care services. Conclusions cannot be drawn on the impact of after hours care between rural, regional or metropolitan areas. However, telephone triage advice centres, Minor Injury Units, Walk in Centres and expanded ambulance crew roles provided primary health care services that were previously unavailable in geographically isolated areas.

Question 4:

Six key barriers and seven facilitating factors were identified. The barriers included: service delivery speed; gate keeping practices of Medical Practitioners; Australian Triage Scale failures to accommodate primary health care patients; medical record system segregation between primary health and acute services; patient expectations; and financial barriers. The seven key facilitating factors included: integration, collaboration and identified outcome benefits; geographical location; non-appointment system and waiting times; incentive for increasing services in areas of need; Nurse Practitioner role; Medical Benefits Scheme; and, media campaigns that influence patient behaviour.

Summary of key findings

- After hours services did have a significant impact on acute care utilisation
- There is a wide range of after hours care models beyond traditional General Practitioners and Emergency Departments
- Telephone Triage Advice Centres, Minor Injury Units and Walk in Centres were the most effective models due to ease of access, convenience and prompt service delivery

- The evidence of impact was stronger for services co-located or streamed with emergency departments
- Extended ambulance paramedic 'see and treat' and 'treat and refer' protocols could reduce ED activity
- Nurse Practitioner primary health care service models are used extensively and service large patient numbers while delivering safe patient outcomes and high patient satisfaction
- A collaborative and integrative relationship between emergency staff, GPs, Nurse Practitioners and other primary health care clinicians enhanced primary care delivery
- After hours care services can reduce costs if duplication of services is minimised
- General Practitioners employed in Emergency Departments reduced costs and eased the workload of emergency physicians

The Area of Need program has been in place in NSW for a number of years, yet significant GP shortages remain in rural and regional Australia. At the same time demand for acute care services is growing. There is scope to reform the delivery of primary health care services through the introduction of alternative models such as telephone triage and advice centres and the use of nurses to deliver primary health care in either Walk in Centres, Minor Injury Units or primary care centres. These may improve access and availability of services in rural and regional Australia and reduce demand for acute care and ambulance services. The application of such new models within Australia requires significant cultural, social, legal and health care agency staff role.

REVIEW STRATEGY

A comprehensive search strategy was undertaken. No date or language restrictions were initially applied. An unrestricted combination of search terms were used (See Table 1). The MeSH term strategy is provided in Table 2. Key words were combined with Emergency Department, Accident and Emergency Departments, ambulance, primary care and after hours care. A restricted search was undertaken for systematic reviews and randomised controlled trials. Hand-searching of reference lists from significant articles was also undertaken and electronic links to additional related materials were accessed.

398 potentially relevant studies were identified and reviewed. 132 were found to be relevant and included in the reference list. Of these, 28 are considered to be the most relevant to NSW Health and have been summarized in the tabulated reference list. After hour care studies which had outcome measures that examined the impact on emergency care, ambulance services, primary care and hospital were examined. Studies identified included randomized control trials, before and after, quasi experiments (time series), intervention, and descriptive methodology. There were two relevant literature reviews and three systematic reviews identified. Three reports were identified that directly related to the review. These reports were rescinded by the Commonwealth Government of Australia, Department of Ageing on the 22 August 2006. The reason the documents were rescinded remained unclear. A full bibliography is available from the author.

Databases accessed

The following databases were searched for from 1970–2008. Medline, CINAHL, EMBASE, the Cochrane Database of Systematic Reviews, PubMed, MIDIRS, Science Direct and Proquest. Literature was allocated to several categories: systematic reviews, randomised controlled trials or quasi-randomised, prospective cohort studies (non-randomised) and descriptive studies. Where no randomised controlled trials were available, non-randomised research designs were included. Studies were initially selected for relevancy by reviewing title and abstracts. The review was supplemented with a manual search of the relevant manuscript reference lists. Grey literature and citations were reviewed. The grey literature included: conference presentations, project reports, government reports, and health care organizational agency reports.

Definition of after hours care model

After hours primary care was defined as: a consultation conducted on a public holiday, Saturday, not between 8am to 12noon, or Sunday or any time other than 8am and 6pm on a week day not being a public holiday. The review identified six after hours care models:

- Minor Injuries Units
- Walk in Centres
- Telephone triage and advice services
- GP Co-operatives services
- Primary Care Health Centres
- Ambulance Services
- 'see and treat'
- 'treat and refer'

MAIN REVIEW

REVIEW QUESTION 1:

Do after hours primary care services reduce demand for hospital emergency care and ambulance services? If so by how much?

A significant percentage of Emergency Department (ED) attendances are primary health care patients with minor injuries and/or illnesses. It is evident that primary care patient groups are increasingly utilising acute services (Booz Allen Hamilton, 2007; Rubin & Bonnin, 1995; Shesser, Kirsch, Smith, & Hirsch, 1991). Across Australia 10-60% of ED presentations have been estimated as primary health care patients that potentially could be redirected to other health care agencies (Gardner, 2008; Kelaher, Dunt, & Feldman, 2006).

There were many reports of a significant proportion of primary health care patients attending EDs after hours. Many authors suggested that this group could be redirected to other health agencies (Dale, Williams, Crouch, & Patel, 1997; Darnell et al., 1985; Fatovich, Jacobs, McCance, Sidney, & White, 1998).

The review highlighted a significant proportion of evidence that after hours care services (AHC) have a positive impact on other health care agencies (Emergency Departments, ambulance, and General Practitioner). The research coincided largely with primary health care reforms occurring internationally (Hurst, 2006; Roberts & Mays, 1998; Salisbury, 2000). The relevant studies that specifically addressed the extent of impact on EDs and/or ambulance service utilisation originated from the United Kingdom (UK), Ireland, Canada, Netherlands, Denmark, the United States of America (USA), and to a lesser degree Australia. The reforms were in response to a general decline, over the last two decades in after hour GP service provision (Leibowitz, Day, & Dunt, 2003). International Government responses had been to reform primary health care delivery through the implementation of new and innovative models. Consequently, the primary health care focus shifted from a solo GP service model towards collaborative, deputising and nurse-led services. This was in contrast to the Australian AHC model, which has remained largely provided and driven by solo or small GPs clinics. More often these clinics aimed to provide services to their own client base.

The research on AHC models demonstrated reduced demand on hospitals, emergency care and General Practitioner (GP) workload. The evidence was weaker for ambulance services. Quantifying the impact of AHC was difficult as many studies failed to differentiate the hours of operation. Generally hours of operation were between 7.00am to 10.00pm, seven days per week.

Minor Injury Units (MIU)

Key points:

- One UK study reported a 24% reduction in ED demand within 3 months
- One UK study indicated up to 90% of MIU patients managed by Nurse Practitioners without referral
- One UK study indicated patient satisfaction slightly higher for Nurse Practitioners than with medical officers
- No ambulance impact reported

Minor Injury Units, while not specific to after hours care (0700-2200 hours; seven days) had reduced demand for emergency care services. Minor Injury Units (MIU) were implemented in the UK, Canada and USA. MIUs were established in a variety of settings but mainly within or nearby an ED, or co-located within a Primary Care Health Centre (PCHC). In the UK these units were implemented as either nurse-led, GP-led or in collaboration with ED physicians (Paxton & Heaney, 1997; Roberts & Mays, 1998; Shum et al., 2000). Within the ED setting patients choose to or were triaged to the MIU. Unlike the UK model, the USA and Canadian MIU were primarily GP-led (Hutchinson, 2000; Salisbury, Manku-Cott, Moore, Chalder, & Sharp, 2002).

Much of the impact evidence involved research at one site and compared Nurse Practitioners with ED medical staff in the management of patients with minor injuries or illness. In the UK Heaney and Paxton (1997) identified a 24% reduction in ED demand within three months of opening a MIU. The first two years centre saw 20,000 patients attend at an average cost per patient of UK£33. Waiting times were low and 67% of patients were discharged. It was generally accepted in the literature that a percentage of these minor injury patients would previously have sought ED care.

Similarly, further UK evidence was provided by Shum et al (2000). The multicentre randomised controlled trial examined specially educated practice nurses working in a GP clinic and managing minor illnesses. The model reduced the impact on GP activity by managing a select group of patients. Nurse Practitioner consultations on average were two minutes longer than medical consultations. However, patients were slightly more satisfied with nurse consultations than with doctors (mean (SD) score of satisfaction 78.6 (16.0) of 100 points for nurses v 76.4 (17.8); CI 95% for difference between means -4.07 to -0.38). Nurses and doctors wrote prescriptions for a similar proportion of patients (nurses 481/736 (65.4%) v doctors 518/816 (63.5%)). Nurse practitioners managed 73% of patients (577/790) without any input from doctors. The study provided evidence that minor injury and illness patient groups could be redirected and managed by nurses.

In the UK Beales and Baker (1995) and again Beales (1997) conducted studies of a London Hospital and found that the MIU had exceeded expectations with a significant reduction in patient waiting times, more standardised clinical practice, improved patient satisfaction, increased health promotion screening, improved communication and more

appropriate primary care facilities referrals. Another large randomised control trial in the UK assigned 1453 minor injury patients to either a Nurse Practitioner or junior doctor. The study found that Nurse Practitioners were better than junior doctors at recording medical history and fewer Nurse Practitioner patients had unplanned follow-up. There were no significant differences between Nurse Practitioners and junior doctors in the accuracy of examination, adequacy of treatment, requests for radiography, interpretation of radiographs, or planned follow-up. The study demonstrated the safety of Nurse Practitioner MIU managed patients and a reduction in ED workload (Sakr et al., 1999).

There was good evidence of a positive impact of Minor Injury Units on ED activity. In the UK, MIUs, led by Nurse Practitioners, are managing up to 90% of patients without referral to an ED (Heaney & Paxton, 1997; Sakr et al., 2003). If MIUs patients are managed appropriately, with minimal duplication and referral then the impact is likely to be a significant reduction in ED activity (Snooks & Nicholl, 2007).

Walk in Centres (WiC)

Key Points:

- A UK study reported 2 million people utilised the service within two years
- USA WiC studies reported 53 million people utilised the services over 7 years
- One UK study reported a reduction in ED demand and GP consultations but not statistically significant, one UK study reported no impact, one UK study was inconclusive.
- One Canadian study reported 83% of WiC patients would have attended alternative services such as an ED

In the UK, Walk in Centres (WiC) are drop in, nurse-led, primary care service models usually open between 8am and 10pm (seven days). WiC were accessed by patients more often after hours than in business hours (Rizos, Anglin, Grava-Gubins, & Lazar, 1990). WiC were located in shopping centers, nearby EDs or in Primary Care Health Centres. Within two years of implementation two million people had utilised WiC (Salisbury et al., 2002; Salisbury & Munro, 2003). Similarly in the USA 3800 WiC had been established by late 1980s and in seven years 53 million people had been treated and managed (Hellstern, 1987). Within Canada similar findings are evident (Hutchinson, 2000; Szafran & Bell, 2000).

In the UK, Chalder et al. (2003) conducted a two year before and after study, using a large sample (10 WiC; 20 EDs; 40 GP clinics). The findings reported a decrease in emergency departments (-175 (CI 95% -387 to 36) consultations per department per month) and GP (-19.8 (-53.3 to 13.8) consultations per 1000 patients per month). However, the impact was not statistically significant. The reduction in ED demand was greatest in WiC located close to an ED.

In a UK study Salisbury et al. (2002) conducted patient questionnaires comparing 38 WiC and 34 GP clinics. Findings reported visitors to WIC were more likely to be home owners (55% versus 49%; $P < 0.001$), have higher education levels (25% versus 19%; $P = 0.006$), and be white (88% versus 84%; $P < 0.001$) compared to GP visitors. The key reasons given for attendance were speed of access and convenience. Service users were more likely to be on the first day of illness (28% versus 10%; $P < 0.001$), did not expect a prescription (38% versus 70%, $P < 0.001$), and continuity of care was less of a concern (adjusted odds ratio = 0.58; 95% CI = 0.50 to 0.68). There was good evidence that consumers were opting to utilise WiC for primary care needs. It is reasonable to consider that this population group may have previously used acute services for health needs.

A Canadian study, examined WiC patient preference and found 83% of the users would have sought medical attention at an ED, another walk-in clinic, or from their regular physician if opened (Rizos et al., 1990). Of interest was that the majority of visits to the clinic were outside regular weekday business hours. The extended hours, non-appointment system of walk-in clinics, along with family GPs reluctance to work evenings and weekends, made these clinics an attractive option for primary care patients.

The evidence of WiC impact on services was mixed. In the UK Maheswaran (2007) undertook a review of WiC and their impact on GP waiting times. He identified that minimal waiting time improvements had occurred in accessing other health care services such as GPs. He also noted a high patient satisfaction level demand on other health agencies had not shifted. Similarly, in the UK Chalder et al. (2003) found WIC performed adequately and safely compared with GPs and NHS Direct (telephone advice) for a range of conditions, the impact on acute service was inconclusive and required further investigation.

There was minimal evidence that WiC reduced ambulance service activity. In the UK there was evidence to suggest that WiC could reduce ED activity by redirecting primary health care patients with minor injuries and illnesses (Hurst, 2006; Munro, Nicoll, O'Cathain, & Knowles, 2000). WiC satisfy a primary health care need and represented an innovative model to improve healthcare access. The limited research prevented quantifying the impact of the after hours care dimension on acute services.

Telephone Triage and Advice Centres

Key Points:

- Six UK studies reported telephone triage advice centres diverted primary health care presenters away from EDs (ranging from 35% to 49.8% of callers)
- One US study reported telephone advice centres could reduce ED activity by 67%
- One Australian study reported 15.5% reduction in ED activity

- One UK study reported a reduction in GP workload by 50%
- Four UK studies reported telephone triage appeared to reduce the number of GP contacts and out-of-hours visits by general practitioners
- NHS Direct online web based advice services has been utilised by 3.5million users
- Minimal ambulance impact reported

There was good evidence, nationally and internationally, that ED staff were having to provide after hours telephone advice (Buesching et al., 1985; Crouch, 1992; Fatovich et al., 1998; Lee et al., 2003). In Australia, Fatovich (1998) identified 58% of calls occurred between 4pm and midnight, occurring at a rate of 33 calls/100 ED attendances. The mean duration of a call was 3.9 minutes (range, 0.25-25 minutes). A UK study by Dale (1997) identified only 26% of callers were advised to attend ED with 35% managed on the telephone, or advised to contact their GP the next day. Telephone triage advice centres were established nationally and internationally with the aim of diverting after hour primary health care presenters away from EDs and GPs (Bunn, Byrne, & Kendall, 2008). Internationally, telephone advice services usually operated 24 hours and were often integrated with other primary health care models.

There was strong evidence in the UK that telephone triage advice centres reduced after hour primary health care presenters and telephone callers to EDs, GP workload and to a lesser degree ambulance services (Lattimer, Smith, Hungin, Glasper, & George, 1996; Munro, Sampson, & Nicholl, 2005). National telephone triage advice call centres were implemented across the UK (nurse-led), Denmark (GP-led) and the Netherlands (GP-led). The models were established as a first contact primary health care portal. The service aimed to manage patients at the time of the call, refer to an ED and/or ambulance, refer for a 'next day' GP appointment or coordinate a GP home visit. The UK services commonly had a GP on site with experienced nurses triaging and managing the calls.

'NHS Direct' was the UK national telephone advice call centre. An interim report showed minimal impact on ED, GP and ambulance services. However, a subsequent report demonstrated reduced demand in GP cooperative utilisation (Munro et al., 2000; Munro et al., 2005). Analysis of patient management suggested that many had been diverted from attending an ED, after hours or GP services, which they may have otherwise sought. Since implementation in 1999, 'NHS Direct' activity had increased by 4 million callers. There can be no doubt that a proportion of these calls would have utilised other acute services (Bunn et al., 2008; Hurst, 2006).

Lattimer et al. (1998) later conducted a 12 month block randomised controlled trial in the UK. The sample was composed of a 55 member GP Cooperative. The nurse-led telephone consultation service was integrated within the GP Cooperative. The after hours service was 615 pm to 1115 pm from Monday to Friday, 1100 am to 1115 pm on Saturday, and 800 am to 1115 pm on Sunday. The study identified that 14,492 calls

were received (7,308 in the control arm; 7,184 in the intervention arm). Nurses managed 49.8% of callers without referral. The impact was significant with a 69% reduction in GP telephone advice calls. No statistical difference occurred in hospital admission and ED attendance rate. The telephone advice centre reduced overall GP workload by 50% and provided faster access to health information and advice for callers. The impact of the service on GP workload in the UK was consistent throughout the literature.

Lattimer et al. (2005) conducted a more recent UK study to quantify the service integration of after hours care through 'NHS Direct'. A before and after study sampled 34 GP Cooperatives and found a significant but small down turn in overall demand for care seen in two GP cooperatives. Integration of the call management model was achieved. Nine (29%) achieved single call access for all patients.

NHS Direct, while mainly a telephone triage service was extended to include the internet as an alternative service strategy. Pilot work commenced in 2004 but the sample was small (25 patients (mean age 48 years; 57% female). A median time of 30 minutes for web chat sessions was reported. Patient satisfaction was significant after using the service (mean pre-test TMPQ score 44/60, post-test 49/60; $p=0.008$ (2-tailed)) Nurse and GP agreement occurred in 45% (10/22) of cases (Eminovic, Wyatt, Tarpey, Murray, & Ingrams, 2004). While there has been a marked increase in user activity, there is insufficient evidence to determine safety aspects or whether the strategy has led to a reduction in the utilisation of acute services. Nonetheless web user demand has increased from 1.7 million to 3.5 million in March 2008 (NHS Direct, 2008).

In the USA, Darnell et al. (1985) conducted an 18 month study that examined the impact of after hours telephone access to physicians, hospital admissions and ED visits. Patients were randomly assigned to study groups. Only 7.6% of eligible patients choose to call after hours, a rate of 6 calls/1,000 patients/month (200 calls/1,849 patients/18 months). Repeated promotion of the service was subsequently undertaken, and 19.4% of the patients used the service during the final 12 months of study, a rate of 24.1 calls/1,000 patients/month (467 calls/1,616 patients/12 months). However, there were no statistical difference noted in hospitalizations or ED visits among groups. There was further evidence, but again old, that telephone advice centres could reduce ED activity by up to two thirds (Buesching et al., 1985) and GP workload by 50% (Fatovich et al., 1998; Raftery, 2000).

In Denmark Giesen et al. (2007) conducted a cross-sectional, multicentre, observational study and found that telephone triage nurses correctly estimated urgency in 69% of cases and underestimated urgency in 19% of calls. The sensitivity and specificity of urgency by triage nurses was found to be 0.76 and 0.95 respectively. The positive and negative predictive values of the urgency estimates were 0.83 and 0.93, respectively. While there were no adverse patient outcomes there was little evidence to determine best practice sensitivity and specificity urgency level benchmarks.

Countries such as Denmark and Netherlands had developed a coordinated GP telephone advice centre at a national or county/state level. Doctors gave telephone consultations, advised on ED attendance, or arranged for a home visit. Additional

doctors at the center provided a home visit service (Olesen & Jolleys, 1994). A financial after hour call incentive encouraged doctors to provide a telephone consultation in preference to referring patients to an ED or for a home visit. Christiansen and Olesen (1998) conducted a comparative before and after study to determine the impact on the after hours care. The telephone advice model had nearly doubled GP telephone consultations (48%), while home visits reduced by 18%. A decline in ED activity (particularly frequent ED attenders) and reduced costs were also attributed to the implementation of the service (Olesen & Jolleys, 1994; Vedsted & Christensen, 2001). In contrast, Hansen (1998) noted a smaller reduction on GP workload but found no statistical impact on ED or ambulance services. However, the results need to be cautiously interpreted as the one month study period may have influenced findings.

Throughout Australia there had been various telephone advice call centres established. 'Kidsnet' (1997) HealthDirect (1999) and 'HealthConnect' (2000). The demand for Kidsnet in New South Wales increased from 18,327 in 1997/98 to 22,844 in 2001/02, with an average of 1669 callers per month. Most callers were reassured and were referred for a next day GP appointment (Hanson et al., 2004). HealthDirect commenced in Western Australia and had experienced nurses that had undergone additional training to manage telephone calls. HealthDirect provided a range of services, from screening, health information, secondary urgency triage and a residential care on line care service. In July 2007, HealthDirect became part of the National Health Call Centre Network (NHCCN), a nationwide system operating from a single telephone number. A recent review identified the Residential Care Line (part of the service) reduced ED activity by 15.5%. Patients were redirected to their local GP rather than calling an ambulance to attend the ED. The review noted service activity had increased by 113% compared with previous results in 2007 (Department of Health, 2008). Bolton et al. (2002) evaluated 'HealthConnect' over 12 month period. The service received over 12,000 calls, of which about 50% of callers were managed without referral. 'HealthConnect' was discontinued.

Centralised telephone services across large geographical areas may reduce costs as well as acute care demand (Hurst, 2006). Given the evidence of impact by telephone advice models, access to a medical professional whether a nurse or doctor, appeared to satisfy a particular primary care group, which may well have otherwise utilised acute health care services and/or GPs.

GP Co-operatives Services

Key Points:

- Two Australian studies reported reduced ED demand but not statistically significant, one identified minimal impact
- One Sweden GP Co-operative study reported a reduction of 53% in ED service utilisation
- Five studies broadly found GP Co-operative reduced GP workload, led to high GP satisfaction rates and improved after hour service options

- Minimal ambulance impact reported

Nationally and internationally there had been a decline in GP after hours care largely driven by work force, social and life style issues. This decline in services had impacted on acute care services (Booz Allen Hamilton, 2007). Within the UK, Denmark, Ireland and Sweden GP cooperatives had replaced the solo GP clinic in response to declining after hours care. Similarly but to a lesser extent the 'Divisions of General Practice' were implemented in Australia (Douglas, 2008; Gardner, 2008; Sibthorpe, 2008). The international GP cooperatives commonly included a telephone triage advice service, provided home visits and were often located near an ED. These services could have a few or hundreds of GPs within the Co-operative.

Generally GP Co-operatives had improved after hour service delivery and reduced ED referrals and GP work load (Jessopp et al., 1997; van Uden, Giesen, Metsemakers, & Grol, 2006). Both Salisbury (1997) and Scott et al. (2003) identified GP co-operatives services reduced GP home visits; offered fewer prescriptions; had higher telephone advice and referrals to primary health care centres and hospitals compared with deputised locum medical services.

In Denmark the GP Co-operatives provided a home visit service. Giesen (2007) conducted a cross-sectional study of four GP cooperatives. The average home visit waiting time for 5,827 patients was 30.5 min. In relation to home visits, waiting times increased given the additional travel from a GP Co-operative. The evidence suggested traffic intensity, home visit intensity, and urgency influenced home visit waiting times. Of concern was that patients with a life-threatening complaint (and minimal coordinated ambulance services) experienced an increase in waiting times the further the patient's home was from the Co-operative.

In Sweden GP Co-operatives were established with a similar suite of services. The studies demonstrated a significant increase in primary health care usage, telephone consultations rather than home visits and reduction in ED workload of up to 53%. GPs reported high levels of satisfaction with the service (van Uden & Crebolder, 2004; van Uden, Winkens, Wesseling, Crebolder, & van Schayck, 2003; van Uden, Ament, Hobma, Zwietering, & Crebolder, 2005).

In the UK, Scott et al. (2004) examined the costs of different models of service delivery for after hours GP organisations. A cross-sectional survey of eight GP after hour Co-operatives and a sample of patients across Scotland were used. The annual costs incurred by the GP after hours organisation per 1,000 population ranged from UK£2,916 to UK£12,120. There was no relationship between costs and type and size of organisation. Home contacts had the highest average cost per episode (UK£212), followed by telephone contacts (UK£117) and clinic contacts (UK£85). A positive financial impact appeared likely with telephone consultations compared with home and/or GP Co-operatives visits.

A study conducted in Ireland used a questionnaire in mixed urban and rural areas. Of 221 GPs in the Co-operatives, 82% responded and confirmed that the Co-operatives had positive effect on their lives. The majority (63%) would prefer a GP/Health board

partnership for the organisation of after hours care. GPs perceived the service would be enhanced with greater nursing, mental health, dentistry, pharmacy and social work involvement (O'Dowd, McNamara, Kelly, & O'Kelly, 2006).

The Australian evidence of the impact of after hour GP clinics co-located near EDs was mixed. Trials were conducted in New South Wales, Western Australia, Victoria, and Tasmania. The evidence of impact on acute services was not significant, acceptance by local GPs varied, and no financial savings were identified. The exception was a New South Wales after hour GP clinic (Maitland). This model had a more integrative service and combined telephone advice, after hours care, home visits and a transport service. This service demonstrated a reduction in ED Triage Code Category 4 and 5 patients (Douglas, 2008). In another study, Comino et al. (2007) measured, using mixed methods, the impact of a GP clinic (solo GPs) co-located near an ED. The study failed to identify statistical evidence of any impact but the authors noted a trend within ED data. The study lacked rigor, based on only one site and a short evaluation time.

Another Australian study identified minimal impact on acute care agencies by an after hour GP clinic located near an ED. The service was closed before the trial period was completed. Closure related to a poor referral rate and acceptance by emergency doctors (Bolton & Thompson, 2001). The Australian evidence suggested a traditional (solo) after hours GP model while accepted well by GPs, had minimal impact on ED activity or ambulance services (Comino et al., 2007)

The international literature provided strong evidence of reduced demand on acute services by GP Co-operatives. There was minimal evidence of reduced demand on ambulance services. The model demonstrated significant positive impact on the workload of GPs.

Primary Care Health Centres

Key points:

- UK studies suggest geographical location influences utilisation patterns
- Evidence of impact is inconclusive on ambulance and ED services

Primary Care Health Centers (PCHC) are often located near an ED and provide a range of services. They are usually composed of a nurse-led WiC and/or telephone triage advice services and/or deputizing services (locum). A GP-led the service and it was usually more GP Co-operative in nature.

A PCHC in Glasgow demonstrated a significant negative impact . The study found more patients were attending the ED following implementation of telephone advice. However, a large proportion of the patients claimed to be unaware of the service (Stoddart, Ireland, Crawford, & Kelly, 1999). In contrast other researchers noted that PCHC with the high proportion of primary care physicians were associated with significant decreases in acute care utilisation (Kravet et al., 2008).

Two UK studies found that generally if a PCHC was located near an ED or on an arterial transport route it had a higher attendance rate and therefore had a greater potential to impact on ED activity (Brogan, Pickard, Gray, Fairman, & Hill, 1998; Hallam, 1994). Inconclusive evidence of the impact of PCHC on acute care or ambulance services warrants further investigation.

Ambulance Services

Key Points:

- One Swedish study reported a 24% reduction in ambulance transport with establishment of children's primary health care service in ED
- One UK study reported Ambulance 'treat and refer' protocol to MIU resulted in shorter job time
- One UK study reported ambulance 'see and treat' protocol safe and reduced ED transports
- Minimal evidence of ED impact reported

Research on the impact of after hour care models on ambulance services nationally or internationally has been limited. Very few after hour model studies sought to measure the impact on ambulance services.

In NSW ambulance activity had risen by 10% and primary health care patients comprised a portion of this group (Booz Allen Hamilton, 2007). In the USA there was good evidence that ED overcrowding delayed ambulance services (Olshaker & Rathlev, 2006). A Swedish study identified a 24% reduction in ambulance transport with the implementation of a 24 hour primary care service within a city ED (Sjonell, 1986). The service was developed for children as this group was identified as frequent ED attenders. The before and after study, identified a significant reduction in emergency and ambulance services. The study did not differentiate hours of operation. Hence, the impact of the after hours component of the service could not be determined.

Whilst, Lattimer et al. (2005) identified an increase in ambulance utilisation with the implementation of 'NHS Direct' across the UK, this was due to delay in service provision and was not a consequence of the service. From a sample of 34 GP Co-operatives there were only three (one control; two intervention) sites that experienced an increase in ambulance usage (5%, -0.02% to 10%, $P = 0.06$; 6%, 1% to 12%, $P = 0.02$; 7%, 3% to 12%, $P = 0.001$). There was no evidence to determine if the cases transferred were appropriate or inappropriate.

Within Denmark, nearly 50% of emergency departments were closed and replaced by ambulance cars staffed with a doctor. The service delivery model was 'to bring the hospital to the patient'. The evidence was insufficient to determine if care in the

ambulance could replace ED care or whether distance influenced patient outcomes (Nicholl, 2008). This was viewed as a controversial model.

'See and treat' and 'treat and refer' paramedic ambulance extended practice

In Australia ambulance paramedics do not assess and manage patients, they must transport patients to emergency departments. An alternative strategy to reduce ED demand is to extend the role of the paramedic. In the UK Mason (2007) sought to evaluate paramedic 'see and treat' protocols for assessing and treating minor injury or illness in the community. The cluster randomised controlled trial involved 56 UK urban ambulance stations. The sample included 3018 patients (>60 years) who called an ambulance (n=1549 intervention, n=1,469 control). The patients treated by the paramedic were less likely to be transported to an ED (relative risk 0.72, 95% confidence interval 0.68 to 0.75) or need hospital admission within 28 days (0.87, 0.81 to 0.94). The 'see and treat' paramedic model, although not specifically after hours, had a positive impact on health agencies and ambulance officers reported high levels of satisfaction.

Similarly, in the UK Snooks et al. (2004) developed and evaluated a 'treat and refer' ambulance protocol. Crews were then able to leave patients at the scene with either a referral plan or self-care advice. The evaluation identified that there was no difference in the proportion of patients left at the scene in the intervention or control group. However, the job time was longer for the 'treat and refer' group. Three patients in each group were left at home but subsequently admitted to hospital within 14 days. Ambulance 'treat and refer' protocols were used appropriately but some safety issues were identified. Authors suggest that refinement of protocols, decision support systems and further training would achieve a greater impact on other health agencies.

In the UK another strategy implemented to reduce the impact on EDs was an ambulance 'MIU referral' protocol. In a 12 month study ambulance crews could refer to a MIU on randomly selected weeks. The sample identified 41 intervention patients groups attended an MIU, 303 attended an ED and 65 patients were not transported. In the control randomised cluster group 37 attended the MIU, 327 attended ED and 61 were not transported. Ambulance service job times were shorter for MIU patients (-7.8, 95% CI -11.5 to -4.1); compared with ED patients (-222.7, 95%CI -331.9 to -123.5). The MIU patients were 7.2 times as likely to rate care as excellent (95% CI 1.99 to 25.8). The evidence suggested that ambulance officers could make appropriate referrals to alternative health agencies and thereby reduce ED activity (Snooks, Foster, & Nicholl, 2004).

There was limited evidence of after hours care impact on ambulance service utilisation. However, extending the role of the ambulance officer was shown to redirect activity away from acute care services.

Other Strategies implemented to reduce ED activity

While not specific models of after hours care, a 'user pay' and an ED based GP service demonstrated an impact on acute services.

'User pay' strategy for non-urgent ED attender

A user pay strategy to reduce primary care patient presentations to an ED had been implemented in the UK, Netherlands, USA, and more recently in Singapore. A financial disincentive was imposed on non-urgent patients (without GP referral) that attended the ED (Anantharaman, 2008; Hurley, Freund, & Taylor, 1989; Murphy et al., 1997). The gate keeping strategy reduced rates of non-urgent primary health care patients to ED. In Singapore, Anantharaman (2008) demonstrated that financial disincentives were able to change ED primary health care patient presentation rates from 57% to 18%. However, referral of non-emergencies away from EDs resulted in public relations issues. Given the recent implementation of the strategy the impact evidence is limited but merits consideration.

GP service integrated within emergency department team

In the UK, Ireland and USA General Practitioners (GPs) have been employed within EDs treating non-urgent patients. This relieved demand on emergency doctors and community services by providing a primary care service within the ED.

The evidence of impact of GPs providing a primary care service within ED traced back to the late 1970s and varied considerably. The studies by Heaney in the UK (1997) Sjonell in Sweden (1986) and Ullman et al. in USA (1978) demonstrated GPs provided primary care to 24%, 40% and 27% of ED patients respectively. The change in ED demand noted by Ullman et al. (1978) in the USA was attributed to the redirection of pediatric presentations, which were minor trauma related. There was no change in ED medical presentation rates. Similarly, Paneth et al. (1979) in New York conducted a randomised control trial of a primary care service for ED pediatric patients. The doctor led model reduced the paediatric representation rate by 50%. However, the service was 24 hours and so the after hour impact could not be determined. The UK study by Ward (1996) demonstrated GPs based within an ED significantly reduced investigations, referrals, radiology, costs and managed 16.8% of non-urgent ED presentations.

In the UK Dale et al. (1995) conducted a 3 month prospective controlled trial and found primary care patient consultations by ED based GPs resulted in decreased utilisation of investigative, outpatient, and specialist services compared to ED doctors. The odds ratios for patients receiving radiography were 2.78 (95% confidence interval 2.32 to 3.34) for ED doctors compared with GP consultations and 2.37 (1.84 to 3.06) for senior ED doctors compared with GPs. For referral to hospital specialist or outpatient departments compared with discharge to the community the odds ratios were 2.88 (2.39 to 3.47) ED doctors compared with GP consultations and 2.57 (1.98 to 3.35) for senior ED doctors compared with GPs.

In Ireland Murphy et al. (1996) conducted a similar study to determine the impact of GPs working in a Dublin ED. Low urgency patients (including PHC conditions) were randomised to the GP stream or ED doctor. Sixty-six percent of ED patients were eligible (4684). GPs ordered fewer investigations (relative difference 20%; 95% confidence interval 16% to 25%), referred less to hospital services (39%; 28% to 47%), admitted fewer patients (45%; 32% to 56%), but prescribed more often (41%; 30% to 54%). There was no difference in satisfaction for either group of patients. There were significant financial savings for the ED. The findings were supported in the UK by Ward et al. (1996). They conducted a prospective study in which 1,078 patients (16.6%) were triaged as requiring primary care. The ED-employed GPs managed 58.4% of these patients. The majority of patients was young 71.1% and registered with a GP. ED doctors were more likely to over investigate patients and arrange hospital follow-up compared with GPs. Later in the USA Kravet et al. (2008) reported similar results.

A number of ED based after hour GP clinics were opened within New South Wales to provide a primary health care service. The co-location enabled GPs to access hospital services. There was minimal evidence of the impact on acute services. However, in one centre 18,000 patient encounters per year were managed by the service. The evidence of after hour utilisation patterns suggested a proportion of these patients were likely to use other health care agencies if the service was unavailable (Bolton, Mira, & Jones, 1998; Bolton & Thompson, 2001; Comino et al., 2007).

On the evidence presented, GPs employed within EDs had a significant impact on acute services and reduced the emergency doctor workload as well as ED costs.

Summary

Research findings generally demonstrated that after hour care models reduced ED demand. It is difficult to quantify the reduction although a range of between 10-53% was supported. The review found that after hours care services improved health care access, and reduced GP workload. Within the UK and Europe these reforms have been shown to improve population health. After hour model presentation rates (up to 50,000/annually) suggested a substantial patient workload was managed that would otherwise have been managed by an ED or GP service. Ambulance service utilisation was often not examined in relation to many of the after hour primary care models. Research that specifically evaluates the impact of primary health care models on ambulance services is required.

REVIEW QUESTION 2:

What models of after hours primary care have been shown to be most effective in reducing emergency department utilisation and ambulance services? Why?

The after hour care models are discussed below in order of effectiveness in reducing emergency department and ambulance service utilisation:

- Telephone triage and advice services
- Minor Injuries Units
- Walk in Centres
- GP Co-operatives, GP integrated ED Service and Primary Care Health Centres
- Ambulance services
- 'see and treat'
- 'treat and refer' protocols

Telephone Triage and Advice services

Telephone triage and advice services were highly effective in reducing ED utilisation for a number of reasons. Within the context of the health care reform internationally there was already widespread acceptance of nurses providing autonomous, safe, competent, and often more timely care for a range of patient conditions. In the UK a national telephone triage advice call centre was implemented. There was broad engagement with medical staff in the development of agreed protocols and computer software triage programs (Pooley et al., 2003). The telephone advice centre provided a first contact option for callers. Incentives for callers were built into the service with the additional provision of screening, health information, secondary urgency triage and a residential care on line care services. Telephone triage advice centres enabled quicker access to health information and advice reducing the need to attend an ED (Darnell et al., 1985; Giesen, Ferwerda et al., 2007; Lattimer et al., 1998; Raftery, 2000).

The impact on EDs appeared more consistent if centres were nationally coordinated, free and well advertised. Utilisation by patrons was good when a one contact number system was established and service timely. The evidence was mixed as to the benefit of GP-led or nurse-led telephone triage centres.

Minor Injury Units

Within the literature patients presenting with minor injuries or illness comprised a significant proportion of ED attenders (Booz Allen Hamilton, 2007; Lee et al., 2003).

There was strong evidence that Minor Injury Units (MIU), whether Nurse Practitioner or GP-led, redirected patients groups that would have used acute services.

The UK MIUs provided timely, free, non-appointment and after hours option. Presentation rates were between 25,000-50,000 patients annually. Minor musculoskeletal trauma and illnesses, which is a significant ED patient presenter with a clear diagnostic pathway, were the targeted group. Hence, redirection of minor trauma and illness patients to a MIU was considered safe and an appropriate group for redirection. The redirection of these of patients led to significant reductions in ED demand.

While there were stand alone MIUs, those co-located near or within an ED had increased presentation rates. Variations in staffing (Nurse Practitioners and/or GP-led) did not appear to influence the impact of patient utilisation nor ED or ambulance service activity. The presentation rate indicated broad acceptance and satisfaction of these models by medical staff and patients (Roberts & Mays, 1998).

Walk in Centers

Both in Australia and internationally, young adults and children are high ED service users (Booz Allen Hamilton, 2007; Salisbury & Munro, 2003). The patrons of Walk in Centers (WiC) have been found to be parents with their children or young adults. Chalder et al. (2007) identified that 66% of WiC patients would have attended an ED if the centre was not available.

These centres were found to be managing tens of thousands of patients annually. Utilisation by patrons was based on the convenient location, free service, after hours accessibility and timely non-appointment service delivery.

While there has been some suggestion that patrons may use these services (particularly those located in shopping centers) for a second opinion the evidence was inconclusive. In addition, it is unclear whether a second opinion may still have been sought from another health agency such as a GP clinic or ED (Chalder et al., 2003).

GP Co-operatives, GP integrated ED Services and Primary Care Health Centres

The collaborative and integrative character of these primary health care models would appear to contribute to the impact on acute care and model acceptance. There was evidence that PCHC and GP Co-operatives reduced ED demand, hospital admissions, costs and GP workload. The development of collaborative multipurpose models is important. Higher presentation rates were associated with GP Co-operatives and PCHC located beside or nearby an ED (Brogan et al., 1998; Hallam, 1994).

There were similar positive findings with the employment of GPs in EDs. This integrated service provided for greater continuity of care and appealed to primary care physicians. EDs were redesigned to stream GP patients and thus reduce the non-acute workload on ED doctors. The close proximity was found to improve relations between primary health

and acute care providers and provided flexibility within peak activity periods (Jones, Carter, & Everington, 1997; Murphy et al., 1996; van Uden et al., 2005). The collaborative approach created a more integrative environment. Consequently, GPs would assist within the ED if primary care patient activity was low. Working in or nearby the ED meant that after hours care staff felt less isolated (Dale et al., 1995; Pooley et al., 2003; Salisbury, 2000). Within the Australian context the Australasian Triage Scale has no provision for a triage nurse to refer patients to nearby health care agencies (Australasia College of Emergency Medicine, 2006; Ting, 2005).

Ongoing educational campaigns were required to maintain GP Co-operative and PCHC activity and reinforce patron utilisation. The GP Co-operative provided for more flexible working arrangements, shared the after hours workload (often with 100s of GPs) and usually provided a telephone triage advice centre. While the evidence was limited these models had strengthened the relationship between acute services and primary health care agencies. These models enhanced interagency collaboration and cross-referral cooperation to other health and social service personnel. Patients were also receptive to the shorter waiting times experienced within these models.

In contrast, the small number of GP clinics (often with a solo GP) within Australian EDs often closed before trial periods finished. Several authors attributed poor advertisement, a lack of ED engagement and financial difficulties due to bulk billing rate schedules as limiting service impact (Bolton & Thompson, 2001; Kelaher et al., 2006).

The GP Co-operative, GP integrated ED Service and Primary Care Health Centre models demonstrated a reduction on ED services. These models were successful because of the integration of multiple services (telephone advice centres, WiCs, MIUs), collaboration with ED staff, proximity to ED and expanded referral options for ambulance crews and ED triage nursing staff. However, the GP located in the ED would appear to have had a broader impact. Not only were activity and costs reduced but better interagency relationships were established.

Ambulance services 'see and treat' and 'treat and refer'

The ambulance paramedic role change was a recent strategy and findings are inconclusive. However, the 'see and treat' and 'treat and refer' treated patients would have otherwise been transported to an ED. Utilisation of ambulance services by inappropriate callers required further investigation. The impact on expanding the role of the paramedic would appear to warrant further research. A randomised control trial could be implemented to determine impact and application within an Australian context.

Summary

The models shown to be most effective in reducing ED activity were telephone triage and advice call services, Minor Injury Units and Walk in Centres. The GP Co-operative and Primary Care Health Centre tended to have a greater impact on after hour GP

workload. The ambulance services paramedical 'see and treat' and 'see and refer' protocols did not alter ED transport activity.

REVIEW QUESTION 3:

Are there any differences in the impacts of after hours care on acute utilisation and ambulance services whether the services are provided in rural, regional or metropolitan areas?

The research primarily explored metropolitan based after hour care services in relation to acute utilisation and ambulance service impact. Given the lack of formal research into rural and regional after hours care, no comparative differences could be detailed. Some models could be considered for trial within rural and/or regional areas, although others would be difficult and impractical to implement in geographically isolated areas.

Despite national and international concerns about equity and access for non-metropolitan populations, it remained evident that geographically isolated groups had limited primary health care options compared with metropolitan and urban based population groups (Knox, 1979). Within Australia the evidence base was weak regarding rural and/or regional research. In the 'grey' literature there were comparative studies that compared primary health care needs and/or GP services in metropolitan, rural, regional and remote areas (Kelaher et al., 2006; Sibthorpe, 2008). However, the impact of after hours care was not specifically measured.

Due to the lack of research, a further review of grey literature was undertaken. The NSW Rural Doctors Network identifies a looming crisis in rural health care, due to GP workforce shortages. The focus of the policy recommendations of their report was primarily to increase GP numbers. However, they note the opportunity for job redesign and task transfer using non-doctor clinicians to support GPs (NSW Rural Doctors Network, 2007).

Implications of primary health care reform for non-metropolitan areas

Work demands on GP services in rural and regional areas would appear to be different compared to non-metropolitan GPs (Mira, Cooper, & Maandag, 1995; Tolhurst, 1990). A recent Australian study examined GP income, work hours, and dependence on Medicaid reimbursement in rural settings. The cross sectional retrospective analysis of rural and urban physicians demonstrated that GPs in rural and regional areas provided greater after hour patient contact episodes, worked longer and earned less than metropolitan based GPs (Weeks & Wallace, 2008). The trend was also evident within the international literature (Gunn, Little, & Payne, 1986; Scott et al., 2003). A USA study identified that rural GPs earned less income (US\$9585, 5%;CI -7.9%--2.1%;P<.001), had longer work hours, made more home visits and had patients in a lower socio economic group compared with urban GPs (Pooley et al., 2003). In addition, non-metropolitan GPs often lacked separation between work and private life.

Australian after hours care in non-metropolitan areas appeared constrained by work force issues. There was no doubt that GPs were less available in rural areas (75.5 per 100,000) than urban (95.6 per 100,000) (Mira et al., 1995). Booz Allen Hamilton (2007)

linked the high rate of primary care presentations to EDs in rural areas to the lack of GPs in rural areas. Hence, after hour care models could reduce ED presentations significantly. However after hours care models that utilised deputising GP services (locum medical staff) or GP Co-operatives would be limited by the shortage of GPs in non-metropolitan areas.

The Australian-developed GP Co-operative style practice, 'Division of GPs', had provided minimal evidence of impact on acute services. In part the reason could be attributed to the lack of an integrative and collaborative approach between acute services and primary health care (Booz Allen Hamilton, 2007). There was no evidence that the 'Division of GPs' involved acute care or other healthcare agencies in the development of these services. Instead the 'Division of GPs' were usually locally focused and/organised and aimed more at meeting GP workload needs (Comino et al., 2007; Kelaher et al., 2006).

Potential reforms for non-metropolitan areas

A number of after hour care models could potentially be implemented to improve rural and regional health service access and delivery. The 'see and treat' and 'treat and refer' ambulance officer protocols are likely to enhance access and equity for geographically isolated primary care patient population groups.

Within Australia introduction of nurse-led WiC and/or MIU could potentially improve access in geographically isolated regions. Internationally the implementation of these models has been formally structured and largely consistent across geographical areas. There was also literature that early primary health care interventions reduced escalation of chronic condition and diseases (Fireman, Bartlett, & Selby, 2004). These patients, if targeted in non-metropolitan or metropolitan areas, could potentially reduce activity in acute care services (Farmer et al., 2006; Fireman et al., 2004). There was evidence that availability of primary health care services would reduce utilisation of acute services and improve population health (Rizos et al., 1990).

In Canada, Safran and Bell (2000) conducted a comparative study of Walk in Centres in rural areas. The findings, while methodologically weak, identified urban based units had a higher attendance rate. Across the nine sites patients reported that their GP clinic was closed. Walk in Centres provided an alternative after hours care option. The author noted that rural patients tended to contact their GP prior to a WiC presentation. There was further evidence in Canada that rural patients perceived a different relationship with their health service provider than metropolitan based populations (Rizos et al., 1990).

While the evidence on the extent to which telephone triage and advice centres benefited rural and remote areas was unclear, the centralised nature of telephone advice centres would enable access in non-metropolitan areas. Hence, there remains a potential for a reduction in acute services utilisation and costs across geographical areas, which (Rafferty, 2000). However, referral options by the service would be more limited than within metropolitan areas. The evidence demonstrated telephone demand was higher

(30-60% callers) after hours and the majority were telephone managed or referred next day to attend a health agency (Bunn et al., 2008; van Uden & Crebolder, 2004). Given the evidence, a national centralised telephone advice centre provided by a medical professional (nurse or doctor) is likely to enhance health access and equity across geographical distances and isolated areas.

Summary

There was limited research on the differential impact of rural, regional and metropolitan after hours care on acute care and/or ambulance services. The lack of research made it difficult to gauge the impact of primary health care reforms in different geographical locations. Research may be needed to compare the impact of after hours care services in rural, regional or metropolitan areas on acute utilisation and ambulance services before conclusions can be drawn. Nurse - doctor substitution has the potential to improve services, and relieve GP and ED workload, particularly where GP numbers are limited.

REVIEW QUESTION 4:

What factors have been identified as barriers or facilitators of implementing after hours care?

Many barriers or facilitators in the implementation of after hours care were identified within the literature. The barriers and facilitators provide a template for primary health care reforms and policy development. Consideration of these factors could lead to enhanced health outcomes, service sustainability, reduced demand on acute services, greater utility, and population health outcomes. The following barriers and facilitators provide a framework to guide and inform primary health care policy within Australia.

Barrier 1: Service delivery speed

A study in the Netherlands and UK reported that the selection of telephone triage advice software influenced service delivery speed (Ong, Post, van Rooij, & de Haan, 2008; Richards et al., 2004). In the UK comparative studies of triage software programs highlighted the need to examine programs to ensure timely patient responses prior to model implementation (O'Cathain et al., 2004).

UK evidence suggested time delay was associated with patient satisfaction and increased utilisation of acute and ambulance services. Three studies noted that a delay in attending patient calls by NHS Direct (UK telephone advice centre) increased ambulance transports (Lattimer et al., 2005; Pooley et al., 2003; Richards et al., 2004). The instances related to those patients that made at least two calls to contact NHS Direct and then waited 15-30 minutes for a return call. Given the heightened anxiety state of patients and/or relatives, protracted delays may result in patients calling an ambulance. The authors asserted that this outcome could be averted with adequate resources and infrastructure.

Barrier 2: Gate keeping practices of Medical Practitioners

The need for a more integrated patient referral approach between primary health care and acute services was identified. One notable barrier to referral patterns was GP expectations. In the USA and UK GPs viewed alternative health care agencies negatively which influenced referral patterns and largely resulted in increased ED referrals (Anthony, 2003; Calnan, Payne, Kemple, Rossdale, & Ingram, 2007). GPs no longer take an active gatekeeper role to reduce the impact of primary care patients on acute services (Boushy & Dubinsky, 1999; Shipman & Dale, 1999). GPs need to become more proactive in referring patients to alternative primary health care agencies.

Similarly, referral patterns by ED doctors or hospital specialists suggested minimal integration with alternative primary health care providers. Acute care patients on discharge are referred back to a GP. Referrals from acute services to dietitians, dentists, physiotherapists, lifestyle clinics etc remain uncommon. The gate keeping acts

as a barrier for population health, integration of healthcare agencies and improvements in primary health care options.

Australian research is needed into the gate keeping practices of GPs, Emergency Physicians and Hospital Medical Specialists to optimise the potential delivery of primary health care services by non-doctor healthcare workers. Educational programs may be required to alter doctor referral behaviour patterns.

An integrative collaborative approach to model development appeared to facilitate model implementation and sustainability. This was particularly noted in the ED based GP model. The perception that primary health care and acute services were mutually exclusive was replaced by a view of continuity of care for non-urgent patients. ED and GP staff perceived the process as providing better communication and feedback, knowledge transfer and greater continuity of care between the services (Bury, Hungerford, Langton, & Plunkett, 2000; Feachem, Sekhri, & White, 2002; Ham, York, Sutch, & Shaw, 2003; van Uden et al., 2005). The evidence suggested that involvement of emergency care, Area Health Services, consumers and GPs was needed to sustain primary health care reforms.

An alternative model for the delivery of primary care services is needed. This requires a move away from the focus on GP delivered primary health care to a more integrative and collaborative model involving doctors, nurses, Nurse Practitioners and allied health workers.

Barrier 3: Australian Triage Scale fails to accommodate primary health care patients

One significant barrier to primary health care reform is the Australasian Triage Scale tool utilised by EDs to determine patient urgency (Acem, 2002). There is no provision within the scale to accommodate primary health care patients and the potential for referral to other healthcare agencies (Derlet, Kinser, Ray, Hamilton, & McKenzie, 1995; Dos santos, Stewart, & Rosenbery, 1994; Fernandes, Daya, Barry, & Palmer, 1994). Emergency triage nurses are prohibited from referring patients away. A recent example of an after hours GP clinic located adjacent to a Sydney ED proved unsustainable due to low ED referral numbers (Bolton & Thompson, 2001; Comino et al., 2007). The lack of a national definition of primary health care patients and current triage nurse referral practices limit after hour service reforms.

Barrier 4: Medical record system segregation between primary health and acute services

A notable barrier to primary health care reform was the lack of integrated medical health record systems. In the UK the lack of a shared medical record between GP Co-operatives, PCHC, Walk in Centres, Minor Injury Units and/or EDs proved a constraint. Optimising knowledge transfer through shared medical record systems was perceived to

enhance patient management, provide greater continuity of care, improve documentation and reduce duplication within services (Hughes, Neal, & Maskrey, 1997).

A study conducted in Sweden identified health information integration and knowledge transfer would be enhanced by a 'shared' medical record system between primary health care and acute service agencies (Hansagi, Olsson, Hussain, & Ohlen, 2008). Greater quality of data, monitoring and evaluation processes would be achieved if agencies shared one medical record system.

Barrier 5: Patient expectations

Unrealistic patient expectations concerning waiting times posed a barrier to satisfaction. A UK study identified ED patients waited an average of 35min, yet only one third of these patients were satisfied (McKinley, Stevenson, Adams, & Manku-Scott, 2002). Community waiting time expectations appear unreasonable. Further there was evidence from Scotland that patients had stronger expectations around waiting times if they had not used an out of hours service before (Scott et al., 2003). Within the Australian context, patient waiting time expectations may need to be managed.

In the UK patient satisfaction with nurse telephone consultations was reduced when the expectation of seeing a doctor was present (Hallam, 1994; Salisbury, 2000; Shipman, Payne, Hooper, & Dale, 2000). Also in Denmark safety concerns about nurse managed telephone calls led to centres implementing GP supervision (Christensen & Olesen, 1998). UK studies suggest a national resourced approach would enable timely caller responses, consistency, better coordination of services and benchmarking (Hallam, 1994; Pooley et al., 2003).

Barrier 6: Financial barriers

Some countries introduced a 'user pay' system for non-urgent presentations to an ED. Within Australia EDs do not impose a financial disincentive like other medical specialists (Moll van Charante, ter Riet, & Bindels, 2008). Australian Health Care Agreements (AHCA) prohibit charging patients for ED services. The decline in GP bulk billing rates is likely to increase the number of primary care patients attending the ED. A non-urgent user pay fee may reduce this trend. Any user ED pay system would need to ensure marginalised groups are not disadvantaged (Kelaher et al., 2006). The current Australasian Triage Scale tool would require modification to accommodate and track this patient group.

Facilitator 1: Integration, collaboration and identified outcome benefits

When model outcome benefits were articulated early and clearly greater acceptance by stakeholders was achieved. This was particularly so for UK and Irish GPs who were experiencing significantly increased workload (Fletcher et al., 2000; O'Dowd et al., 2006; Thompson, Parahoo, & Farrell, 2004).

Facilitator 2: Geographical location

Minor Injury Units, Walk in Centres and Primary Care Health Centres are best located nearby, co-located with or within an ED (Halvorsen, Meland, & Baerheim, 2007; Jones et al., 1997; Pooley et al., 2003).

Facilitator 3: Non appointment system and waiting times

There was evidence in Canada and the UK that the non-appointment system and shorter waiting times of Walk in Centres, Minor Injury Units and Primary Care Health Centers were attractive to patient groups. Generally patients found non-appointment systems more convenient than the appointment based GP clinics, and shorter waiting times appealed particularly to parents with children and young adults (Paxton & Heaney, 1997; Szafran & Bell, 2000).

Facilitator 4: Incentive for increasing services

Within international literature, geographical constraints had been applied to GP clinic location. In Australia, Federal and State Governments have provided financial incentives to establish after hour clinics or 'Superclinics' (Iemma, 2007; Sammut, 2008). This may facilitate primary health care reform yet the evidence is inconclusive. It remained unclear whether workforce issues and social factors would constrain the capacity of the strategy.

Facilitator 5: Nurse Practitioner role

Compared to the UK and USA, Australia is struggling to expand Nurse Practitioner numbers. There was less regulation of Nurse Practitioners internationally and this may account for the smaller Australian numbers. In the UK, Nurse Practitioner led Walk in Centres and Minor Injury Units are managing safely, quickly and appropriately up to 50,000 patients annually (Sakr et al., 1999; Sakr et al., 2003). Consequently, the impediment to Nurse Practitioner role performance, activity and numbers within Australia needs to be resolved. Primarily, impediments are impacting on medication prescribing rights, expansion of the medical rebate scheme, specialist medical referral and hospital admission rights (Laurant et al., 2008). If these key factors are addressed the potential of this workforce to impact on primary health care and acute services may prove significant (Modell et al., 1998).

Facilitator 6: Medical Benefits Scheme

Within Australia further reform is necessary to ensure after hours care is sustainable for healthcare workers. The after hours care medical rebate items need to be expanded and be more inclusive of other health providers (For example dietitians, dental, physiotherapy practice nurses, mental health services, Nurse Practitioners etc). The recent medical rebate items for practice nurses (which include simple procedures and

assessments) remain under utilised. Within Australia GPs determine the practice nurse role. Traditional models have the practice nurse assisting the GP rather than initiating activities that may potentially generate funding (Burns et al., 1998). A key facilitator would be to develop greater mutual funding arrangements for practice nurses to generate income. The current 'fee for payment' service in Australia and GP direct practice nurse roles are likely to limit practice nurse capacity. However, unlike the Nurse Practitioner role there was minimal evidence on whether the practice nurse role could be extended without significant educational reform.

Facilitator 7: Media campaigns influence patient behaviour

Patients often accessed acute services based on their own perception of urgency, need for radiology and not wanting to wait to see GP (Salisbury & Munro, 2003; Shah, Shah, & Jaafar, 1996). Hence patient's perception of their urgency significantly impacted on their choice of health care provider (Anantharaman, 2008; Grumbach, Selby, Damberg, & Bindman, 1999). Although difficult, there was a need to change patient perceptions and behaviour in relation to utilisation of health services (Davis, 2005; Shipman, Longhurst, Hollenbach, & Dale, 1997; Shipman, Payne, Dale, & Jessopp, 2001). While one study identified that patients preferred their own GP to manage their health, patient outcomes were no different with deputising medical services (McKinley et al., 2002).

In the UK the level of patient advertising in the media, and by GPs and EDs was also a key factor that influenced patient choice. Salisbury and Munro (2003) were critical of the implementation of many WiC and cited lower activity levels was the result of poor advertisement. Similarly in the USA there was evidence that ongoing promotion of telephone advice call services needed to be undertaken (Darnell et al., 1985).

However, in Denmark patient satisfaction was noted to increase as people got used to new services (Vedsted & Christensen, 2001). New services can create confusion and misunderstanding regarding choice for consumers. Public education campaigns are needed and should also involve services such as the ED, GPs and ambulance. In addition, advertising lists of alternative after hour services would improve appropriate service utilisation.

Summary

There were significant barriers and facilitators, which have influenced the implementation of after hours care services nationally and internationally. Given the interrelated and complex nature of barriers and facilitators the reengineering of primary health care services would be improved if these factors informed policy direction. The barriers and facilitators provide a potential framework that could enhance sustainability, acceptance and population outcomes in primary health care.

Government enthusiasm to utilise all healthcare providers in new and innovative ways would optimise delivery of after hour services and increase success, access and sustainability. The collaborative approach should lead to greater engagement between

ambulance, acute services and primary care health agencies than currently exists. Many of the primary health care reforms implemented internationally are likely to have an impact within the Australian context and specifically on acute services.

TABLES

Table 1 Unrestricted relevant search terms

Primary health care	Telephone advice	Walk in Centre	Minor Injuries Units	Emergency department and Primary care attenders	Rural health care	After hours care GP clinic; cooperatives;
After hours and primary care health centres	Telephone triage	Acute care utilisation and emergency	Ambulance	Impact outcomes and emergency; ambulance; GP	Rural health and GP	GP Afterhours;
Primary health care and emergency	Hotlines	Community health	Disease management programs;	Primary health care utilisation patterns	Randomised control trials and Emergency; ambulance; rural	'Division of GP'
Accessing primary health care	Domiciliary care	Walk in Centres and emergency care	Emergency reconfiguring; remodeling;	Ambulatory Care models	Primary health care and randomised control trials	General practice cooperative
Out of hours and after hours care and health centres	Ambulatory care facilities	Non urgent utilisation of hospitals and emergency	Polyclinics	After hours medical service	Rural regional and Ambulance; emergency; ambulance GP	Contrast between rural and metropolitan GPs Macarthur GP
Accessing after hours care	After hours care	Emergency outpatient	Emergency service	Out of hours care	Nurse led models	Rural after hours care

Table 2 Medical subject headings 2008 search strategy MeSH terms

MeSH terms	Tree structure
After hours Care	After hours care Managed care programs Delegation, professional Health care reform Health services accessibility Outpatient clinics Night care Telephone
Ambulatory care	Ambulatory care facilities, non-hospital Health care services Primary health care Remote consultations triage
Emergency services	Emergency outpatients Emergency nursing Telephone hotlines Emergency treatment Nurse practitioners
Primary health care	Continuity of patient care Patient centered care Refusal to treat Progressive patient care
Primary care nursing	Emergency nursing Home nursing Nursing, practical
Community Health services	Community health services community health nursing Community Rural health services Urban health services Emergency medical services
General practitioner	Adult Patient care teams Rural health Urban health House calls

TABULATION OF THE RELEVANT PAPERS

The tabulated references are listed alphabetically.

Author Country	Method sample size, etc	Model of afterhours care	Outcomes (impact on ambulance and ED)	Features of successful models	Variation in rural /regional or metropolit an	Implementation success factors
Chalder et al., 2003 UK	Two year before and after study of impact on ED, GP, and out of hours services 10 WiC and matched control towns without WiC 20 EDs 40 GP Co-operatives Short period of follow-up	Walk in Centre	Reduction in ED and GP consultations was apparent but not statistically significant ED consultations (-175 (95% confidence interval -387 to 36) / per month; GP consultations (-19.8 (-53.3 to 13.8) / per 1000 patients/ month] Shared sites larger impact but not statistical (P=0.18) WiC shared location with an ED, showed overall effect was larger (264 (-651 to 122) fewer consultations per month), but was not significant (P=0.18) because of the small sample size.	Geographical location not specific to after hours	Not addressed	Co-location with ED increased presentation rate Non appointment system Extended hours of operation No out of pocket expenses for patients Convenient location Reduced GP work load GPs were not inclined to be involved in the research
Christensen & Olesen, 1998 Denmark	Longitudinal comparative before and after Evaluation post Primary care reforms Five years study Comparison of data Data collected from published reports, Danish national health statistics, and the Danish trade unions for general practitioners.	GP telephone advice centres After hours First contact	No impact on acute services or ambulance Telephone consultations had almost doubled, to 48%. Consultations in GP clinics unchanged GP home visits reduced to 18%. GP after hours workload -worked 5 hours or more out of hours per week dropped from about 70% to about 50%. Patient satisfaction in 1995 was high (72%).	Trained GPs to undertake a telephone triage function was working satisfactorily GP calls that previously would have required home visits were now dealt with telephone or GP consultations. The out of hours workload for GPs decreased considerably.	Rural and metropolitan	Telephone triage required consistent practices and additional GP education Reduction in GP after hours was associated with greater satisfaction Telephone advice centres have a greater impact on GP work load A group of primary care patients are very satisfied with telephone advice

Author Country	Method sample size, etc	Model of afterhours care	Outcomes (impact on ambulance and ED)	Features of successful models	Variation in rural /regional or metropolit an	Implementation success factors
Comino et al., 2007 Australia	Before and after Three year period Mixed methods Survey Interviews EDIS data 1 GP clinic co-located with hospital Insurance Commission data on after hours GP claims GPs (n=39) surveyed Patient (n=1532) surveyed 56 stakeholder from Area Health Managers interviewed	After Hours GP clinic open every evening and on afternoons on weekends	EDIS data indicated a trend towards patients leaving ED for the GP clinic and a reduction in the number of after hours GP claims	Formal collaborative agreement with Area Health Service Collocated with ED Bulk billing convenience for patients Clinic GP roster voluntary GP received an agreed fee. Not viewed as competitive by local GPs	Metropolitan	Bulk billing was a financial constraint for sustainability Commonwealth Grant subsidies were relied on for sustainability Collaboration between acute services for utilisation of diagnostic Accommodation / consumables supplied by Area Health Service for nominal fee Collocated with diagnostic services Share after hour care provision by local GPs Transport influenced on access No out of pocket expenses for patients

Author Country	Method sample size, etc	Model of afterhours care	Outcomes (impact on ambulance and ED)	Features of successful models	Variation in rural /regional or metropolitan	Implementation success factors
Dale et al., 1995 UK	Prospective controlled trial 12 month study Sample 4641 patients 1702-GP patients 2382 by ED Dr Random allocation of shifts to GPs GP patients 215 ED staff 204	GP integrated ED service Treating non-urgent patients.	Primary care consultations by GPs resulted in less investigations, outpatient and specialist referrals services than by ED staff	High level of PCHC presentations in UK	Inner city metropolitan	Integration and collaboration of service Patients could still attend an ED Improved resource utilisation, Impact on patient outcome and satisfaction unclear Co-located with diagnostic services GP satisfaction high Better continuity of patient care No out of pocket expenses for patients
Fatovich et al., 1998 Australia	Prospective observational August - November 1995 4 month study period 72 hour follow-up Comparison with ED patients	Telephone advice calls received by ED staff 24 hours	1682 calls were received, 58% between 4pm and midnight. There were 33 telephone calls per 100 emergency department attendances. The mean call duration was 3.9 minutes (range, 0.25-25 minutes); 49% of patients were less than 14 years old 72% of callers phoned because of spontaneous illness. Follow-up calls were made to 1132 people (67%), revealing a non-compliance rate of only 6.9% High caller satisfaction, 99% of callers	Highest calls Sunday then Saturday Calls between 4pm 12mn 58% 33/calls / 100 attendances evidence of 28/100 Some patients 1.4% assessed as provided with inappropriate advice associate with less experienced nurses < 2years	Semi rural	Patient who had used service satisfied High after hour utilisation Experienced nursing staff provide better advice Patients need to have realistic expectations of service delivery Telephone advice can meet the needs of a primary care patients

Author Country	Method sample size, etc	Model of afterhours care	Outcomes (impact on ambulance and ED)	Features of successful models	Variation in rural /regional or metropolit an	Implementation success factors
Heaney & Paxton, 1997 UK	Before and after study of ED attendance rates by patient postcode for 3 sample time periods over 26 months	Minor Injuries Unit Nurse led telephone advisory service Co-located with ED Open 9am- 9pm 365 days/ year	ED demand by patients within the postcode of the unit decreased by between 14% and 24%	Low waiting times (average time 37 minutes from arrival to departure) Discharge rate 67% 98% of cases were satisfactorily or very satisfactorily treated Community acceptance and GP support	Metropolitan	Clinical and pharmaceutical protocols designed by nurses with assistance of ED. Communication and co- operation between the unit and existing relevant hospital departments Sustained advertising campaign so the service is well known to the public Nurse practitioner training and experience
Hansen & Munck, 1998 Denmark	Before and after 1 month study Questionnaire Short study between Christmas and New Year	Telephone triage GP-led out of hours GP on Call GP patient home visits	GP workload reduced No impact on acute care services No impact on ambulance services No impact in ambulance transfer resulting in hospital admissions	GP Home visits decreased After hours GP work load decreased from 50% to 10% GP consultation only calls >22% to 54% Patient dissatisfaction in the first year high 13%-28% down to 19%	Metropolitan and rural	Patient expectations need to be managed GP work load reduced High GP satisfaction

Author Country	Method sample size, etc	Model of afterhours care	Outcomes (impact on ambulance and ED)	Features of successful models	Variation in rural /regional or metropolitan	Implementation success factors
Lattimer et al., 2005 UK	Two year before and after study using linear regression models of trends in emergency ambulance transports; attendances at emergency departments, minor injuries units, & NHS Walk in Centres; and emergency admissions to hospital 34 GP co-operatives; four case exemplars; 10 control cooperatives	Single call access to out of hours care. Automatic call diversion from the GP co-operative number to NHS Direct NHS Direct nurses managed calls, gave advice or redirected to other health services	3 to 12% increase in demand for emergency ambulance services in 2 of the 4 cases (P=0.001)	This model was not successful in reducing demand as most patients still needed to make at least two telephone calls and then waited to be called back by a nurse	Metropolitan	Achieving single call access Minimising home visit time waiting Patients need to have realistic expectations of service delivery
(Lattimer et al., 1996) UK	Randomised control trial 116 GP in the Wessex Primary Care Research Network and 83 in the Northern Primary Care Research Network Response rate 74-77%	Telephone advice centre Nurse managed	ED nurse triage had few hospital stay admissions, home visits, ED admissions Surgery attendances 69% fewer referral to GPs ~50% nurse managed 38% fewer patients went to a walk in centre	High after hour utilisation Patient who had used service satisfied	Rural and metropolitan	Saving may not be a significant if GP fee for service Increased flexibility in GP medical rebate schemed High engagement with GPs for change Experienced nursing staff provide better advice Telephone advice can meet the needs of a primary care patients

Author Country	Method sample size, etc	Model of afterhours care	Outcomes (impact on ambulance and ED)	Features of successful models	Variation in rural /regional or metropolit an	Implementation success factors
(Lattimer et al., 1998) UK	Block randomised control trial 12 month study Telephone advice; referral to the GP on duty (for telephone advice, an appointment at a primary care centre, or a home visit); referral to ED	Telephone advice centre Nurse managed Out of hours period was 6:15 pm to 11:15 pm Monday to Friday, 11 am to 11:15 pm on Saturday, and 8 am to 11:15 pm on Sunday	14 492 calls received GP work Load reduced 50% Nurses managed 49.8% of calls without referral 69% reduction in telephone advice from a general practitioner 38% reduction in patient attendance at primary care centres 23% reduction in GP home visits	High after hour utilisation Patient who had used service satisfied Callers perceived faster access to health information and advice	Rural and metropolitan	Patients who had used service satisfied High after hour utilisation Experienced nursing staff provide better advice Patients need to have realistic expectations of service delivery Telephone advice can meet the needs of a primary care patients Increased accessibility to health worker

Author Country	Method sample size, etc	Model of afterhours care	Outcomes (impact on ambulance and ED)	Features of successful models	Variation in rural /regional or metropolitan	Implementation success factors
Mason et al., 2007 UK	Cluster randomised controlled trial 12 month study 3018 patients aged over 60 Involving 56 clusters Patients randomised (n=1549 intervention, n=1469 control) Weeks randomised to the paramedic practitioner service being active (intervention) or inactive (control)	'Treat and refer' Extended skills for paramedics Not specific to after hours	Reduced impact on ED attendance (relative risk 0.72, 95% CI 0.68 to 0.75) Reduced duration of episode of care (235 v 278 minutes, 95% CI for difference -60 minutes to -25 minutes) Hospital admission reduced in 28 days (0.87, 0.81 to 0.94) Mortality no difference in 28 day mortality (0.87, 0.63 to 1.21)	High patient satisfaction High satisfaction by ambulance crew Patients were redirected safely and appropriately	Metropolitan	Timely service was significant to satisfaction levels
Munro et al., 2005 UK	Before and after 24 month observational 3 areas in England and 3 nearby GP cooperatives as controls	NHS Direct telephone after hours service 24 hour service	72% calls out of hours Minimal impact noted on ED and ambulance services GP workload reduced After hour telephone rate 68,500/1.3mill	Minimal impact on ED 8% reduction in calling ED, ambulance Suggestion that it may have restrained ED attendance rate unproven Reduced GP workload		Free national service Extended after hours of operation Trained nurse and utilisation of decision support computer software

Author Country	Method sample size, etc	Model of afterhours care	Outcomes (impact on ambulance and ED)	Features of successful models	Variation in rural /regional or metropolitan	Implementation success factors
Murphy et al., 1996 Ireland	Randomised control trial 12 months study 1 hospital compared care provided by GPs with ED doctors Non urgent patients. Patients randomised to GP or ED staff 4,684 patients 3 GPs employed on a sessional basis	GP integrated ED service Treating non-urgent patients GP referrals to ED excluded	Cost reduction Investigation costs reduced GP (TC3 £Ire 64 and £Ire 58TC4 ED saving of £Ire95125 if GPs replaced staff GP care - Patient satisfaction; lower rate of investigations -25%;Xrays -24%;and, Referral -64%. Higher prescription rate +52%	Collaboration with ED and local GPs Referral collaboration between PCHC and acute services Cost savings may be due to different context junior medical staff GPs had less hospital admissions compared with ED staff	Metropolitan	Geographical location Integrated collaborative health service Co-located with diagnostic services GP satisfaction high Better continuity of patient care No out of pocket expenses for patients
Paxton & Heaney,1997 UK	Before and after study 2 year study Independent clinical audit rated	Walk in Centre Not specific to after hours	Reduced ED activity by 24% in the 3 months of the centre opening Ambulance unknown impact 21% of patients attended a GP within 14 days unclear reason for re-attendance 20,000 patients / 2 years	Potential ED and GP patients choose WiC Patients managed by Nurse Practitioners reported receiving significantly more information about their illnesses Waiting times were low 67% of patients were discharged. 98% cases satisfactorily treated	Urban	Extended opening times appealing Non appointment system convenient Mixed locations improved public access convenience Engagement with local medical community enhanced acceptance

Author Country	Method sample size, etc	Model of afterhours care	Outcomes (impact on ambulance and ED)	Features of successful models	Variation in rural /regional or metropolitan	Implementation success factors
Rizos et al., 1990 Canada	Descriptive study 16 day period in Canada 321 patients surveyed	Walk in Centre	Reasons for attending the clinic were convenient location (in 33% of the cases), inability to see their regular physician soon enough (in 16%) and no appointment needed (in 13%) Most (80%) patients felt that they needed medical attention within 24 hours after the onset of their problem	After hours access 83% of the respondents would have sought medical attention at another walk-in clinic, from their regular physician or ED had the clinic been closed High satisfaction for nurse	Urban	Same day service if needed Extended opening times appealing Non appointment system convenient Mixed locations improved public access convenience A lack of alternatives would have resulted in a ED visit
Sakr et al., 1999 UK	Comparative study A three part prospective study A city ED was closing was replaced by nurse-led MIU Random sample of patients attending the ED and compared a random sample of patients from a nurse-led MIU	Minor Injuries Unit Nurse led	Care was equal to or in some cases better than the ED care Significant process errors were made in 191 of 1447 (13.2%) patients treated by medical staff in the ED and 126 of 1313 (9.6%) of patients treated by Nurse Practitioners in the MIU. 1 significant error occurred Waiting times were much better at the MIU mean MIU 19 minutes, ED department 56.4 minutes Costs were greater in the MIU (MIU GBP41.1, ED department GBP40.01) and there was a great difference in the rates of follow-up and with the nurses referring 47% of patients for follow-up and the ED referring only 27%	MIU accessed more outpatient services MIU cost was higher than the ED sample of patients	Metropolitan	Non appointment system Extended hours of operation No out of pocket expenses for patients Convenient location Reduced GP work load GPs were not inclined to be involved in the research Nurse led service Nurse practitioner minor injury service can provide a safe and effective service for the treatment of minor injury Shorter waiting times improve satisfaction

Author Country	Method sample size, etc	Model of afterhours care	Outcomes (impact on ambulance and ED)	Features of successful models	Variation in rural /regional or metropolitan	Implementation success factors
C. Salisbury, 1997 UK	Mixed methods Questionnaires Data from 5812 patient contacts Co-operative GP services compared to deputized GP services	GP co-operative compared with locum deputized GP services	GP co-operatives did less home visits; offered fewer prescriptions; had higher telephone advice and referrals to primary health care centres and hospitals compared with deputized services Deputized services had shorter waiting times and admitted less patients to hospital	Patient health outcomes no different	Metropolitan	Greater satisfaction by GPs Patient expectations need to be managed Waiting times for GP cooperative were quicker as patient used the telephone advice centre
Salisbury, Chalder et al., 2002 UK	Mixed methods Interview Questionnaires Review and analysis of patient numbers, characteristics, and consultations. WiC n=36 Software data 12 compared Interviewed WIC managers Nurses 6-14 FTE in each centre	Walk in Centre Nurse led workforce Telephone triage option Screening opportunities increased	Increase after hours access choice Clear diagnostic pathway patient group Impact of Walk in Centre on ED and ambulance services not addressed WiC users were Young adults 17-35yrs Children Greatest numbers presented after hours	Potential ED and GP patients choose WiC Maximise nurse role Access easy Convenient location Potential for prevention strategies Good links with GPs Not repeating services Increased population health prevention programs: smoking, palliative care etc.	Not addressed	Waiting times less compared to other services Extended opening times Non appointment system convenient Mixed locations improved public access convenience Clear diagnostic pathway patient The need for shared software in all clinics prior to starting making comparison possible 36 in 20 months opened Inconsistency in implementation of some WiC reduced acceptance

Author Country	Method sample size, etc	Model of afterhours care	Outcomes (impact on ambulance and ED)	Features of successful models	Variation in rural /regional or metropolitan	Implementation success factors
Scott et al., 2003 Scotland	Prospective cross-sectional Descriptive method Questionnaires Survey of 8 GP out of hours organisations and sample of their patients.	After hours home GP visits compared to deputizing services A deputising service of various types of GP clinics	Home contacts had the highest average cost per episode (£ 212), followed by telephone contacts (£117) and centre contacts (£85) Highly educated people perceived ED better than a GP	No relationship between costs and type and size of organization Telephone advice centre was more cost effective than GP home visits	Rural excluded	ED waiting time more important than seeing a doctor Patient expectation of service requirements
Shum et al., 2000 UK	Before and after study Questionnaire 5 GP practices 1815 patients requesting and offered same day appointments by receptionists. Specially educated practice nurses	Minor illness model	High satisfaction with nurses compared to GP Mean (SD) score of satisfaction 78.6 (16. 0) of 100 points for nurses v 76.4 (17.8) for doctors Nurse consultations 2 minutes longer than GP No difference in rate of prescriptions (nurses 481/736 (65.4%) v doctors 518/816 (63.5%)). 577/790 73% of patients were managed by nurses	Equitable service for patients Timely access to a health clinician	Rural and metropolitan	Access to service must be available with perceived need to reduce dissatisfaction Nurses can safely manage specific patient groups. Integration of a suite of services within the PCHC Collaboration between GP and nursing to provide same day service

Author Country	Method sample size, etc	Model of afterhours care	Outcomes (impact on ambulance and ED)	Features of successful models	Variation in rural /regional or metropolitan	Implementation success factors
Sjonell, 1986 Denmark	Longitudinal before and after study 4 year study Expanded model 7.5 district physicians, 15 nurses plus other assistant personnel	Primary care health centre Not specific to after hours	ED attendance reduced by 40% Hospital ambulance car reduced 28% Visits to non-public employed physicians (private, occupational and school health physicians) decreased by 31% 19% increase in PCHC attendance rate Hospital out-patient clinics reduced by 26%	PCHC can redirect patients away from acute services Not specific to after hours care provision Reduced impact on acute services Reduced impact on ambulance services	Metropolitan	Adequate staff numbers to accommodated work activity Integration of a suite of services within the PCHC Collaboration between acute and primary care services
Snooks, Foster et al., 2004 UK	Cluster randomised control trial 12 month 2 ambulance stations Transport to MIU during randomly selected weeks Data from ambulance service, hospitals and/or MIU records Interviews 37 control cluster patients attended MIU, 327 attended ED, 61 stayed at scene	Ambulance 'referral' protocol to MIU Triage and transportation to MIU by paramedic ambulance crews	MIU patients were 7.2 times more likely to rate their care as excellent (95% CI 1.99 to 25.8) Ambulance job time and time in unit were shorter for MIU patients (-7.8, 95% CI -11.5 to -4.1); (-222.7, 95%CI -331.9 to -123.5) 7 patients transferred by ambulance from MIU to ED, medical reviewers judged that three had not met the protocol	Increased referral opportunities for ambulance staff Redirection of patients away from EDs	Metropolitan	Ambulance crew satisfaction Patient expectations need to be managed Refinement of educational policies

Author Country	Method sample size, etc	Model of afterhours care	Outcomes (impact on ambulance and ED)	Features of successful models	Variation in rural /regional or metropolit an	Implementation success factors
Szafran & Bell, 2000 Canada	Comparative study 6 month study Questionnaire 9 community-based family practices Return rate 89.6% (403 of 450)	Walk in Centres Not specific to after hours	7.5% of patients (22.2% of rural, 35.5% of urban patients) attended Walk in Clinics More rural (91.1%) than urban (60.7%) patients felt they could contact their doctors during evenings and weekends (P.004) More urban (67.2%) than rural (33.3%) patients did not call their own physicians before going to walk-in clinics (P.002)	Utilisation was greater for urban based settings Potential ED and GP patients choose WiC	Rural and metropolitan	Patient expectations and perceptions need to be managed WiC attractive options to young adult and parents. Extended opening times appealing Non appointment system convenient Mixed locations improved public access convenience Closed after hour GP services led to redirection by patient to a WiC Engagement with local medical community enhanced acceptance Rural patients perceive a different relationship with their health care provider

Author Country	Method sample size, etc	Model of afterhours care	Outcomes (impact on ambulance and ED)	Features of successful models	Variation in rural /regional or metropolit an	Implementation success factors
van Uden et al., 2005 Sweden	Comparative descriptive Randomized sample of 50 GPs/site Telephone Questionnaire 100 GPs 50 GPs working at the separated GP cooperative and 50 GPs from the integrated GP cooperative. Telephone triage performed by doctors	GP integrated ED service compared to a GP Co-operative locally based Both cooperatives are situated in adjacent geographic regions	GPs in the co-operative were more satisfied with the organisation of out-of-hours care than GPs from the integrated model (70 vs. 60 on a scale score from 0 to 100; P = 0.020) Satisfaction about out-of-hours care organisation was related to opinions on workload, guarantee of gatekeeper function, and attitude towards out-of-hours care as being an essential part of general practice Cooperation with medical specialists was much more appreciated at the integrated model (77 vs. 48; P < 0.001) versus the separated model	In rural greater relationship already present between primary care and acute services	Rural and metropolitan	Integrated services improved communication between PCHC, specialists and acute services The integrated model enabled greater ED and GP consultations with each other and feedback Integrated services improved patient information transfer Integrated patients medical record systems need to be available across primary care and acute services Additional ED streaming of patients can overcrowd existing ED waiting rooms reducing satisfaction Patient privacy not maintained as well in ED compared to GP environment Gatekeeper relationship with ED encouraged GP satisfaction related to work load activity changes

Author Country	Method sample size, etc	Model of afterhours care	Outcomes (impact on ambulance and ED)	Features of successful models	Variation in rural /regional or metropolit an	Implementation success factors
van Uden et al., 2005 Sweden	<p>Before and After To determine the effect of an out-of-hours primary care physician (PCP) cooperative on the caseload at the emergency department (ED) and to study characteristics of patients utilizing out-of-hours care</p> <p>Pre-post intervention a 3-week before and a 3-week after establishing all patient records with out-of-hours primary and emergency care</p>	GP co-operative	<p>ED workload decreased by 53%</p> <p>Patients' primary care utilization increased by 25%</p> <p>The shift was the largest for musculoskeletal disorders or skin problems</p> <p>There were fewer hospital admissions, and fewer subsequent referrals to the patient's own PCP and medical specialists</p> <p>No change in outpatient visits at the hospital or in mortality occurred</p>	Reduced hospital admissions	Rural and metropolitan	<p>National integrated and collaborative model</p> <p>GP acceptance of gate keeping role for acute services</p>

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