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HWA Expanded Scopes of Practice program evaluation: Extending the Role of Paramedics sub-project: final report

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Abstract

The Extending the Role of Paramedics (ERP) sub-project built on a model developed by the South Australian Ambulance Service (SAAS) which aims to provide a service that is complementary to primary health care, thus reducing emergency department presentations. The core of the model is training Extended Care Paramedics (ECPs) to treat patients in their usual place of residence, with referral to other health professionals if appropriate. ECPs manage patients with a diverse, and often ill-defined, range of signs and symptoms. Although these patients are deemed 'low acuity', these cases can be complex and require the ECP to apply advanced clinical reasoning. In many cases, the patient may have multiple chronic conditions and present as generally unwell. The published evidence to date generally supports an expansion of the role of paramedics to include the assessment and management of patients with minor illnesses and injuries to avoid transport to hospital. However, the evidence is primarily from overseas, particularly the United Kingdom, and more research is required to establish the effectiveness and safety of the model.

Keywords

role, extending, evaluation, program, practice, scopes, expanded, paramedics, hwa, report, final, sub, project

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Final Report

July 2014

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List of acronyms

ACT	Australian Capital Territory
CEO	Chief Executive Officer
CHSD	Centre for Health Service Development
ECP	Extended Care Paramedic
ECU	Edith Cowan University
ED	Emergency Department
ERP	Extending the Role of Paramedics
ESOP	Expanded Scope of Practice
GP	General Practitioner
HWA	Health Workforce Australia
ICP	Intensive Care Paramedic
KPI	Key Performance Indicator
NT	Northern Territory
SAAS	South Australia Ambulance Service
SD	Standard Deviation

Key messages

- The results of the evaluation are consistent with evidence from overseas which generally supports an expansion of the paramedic role to include the assessment and management of patients with minor illnesses and injuries to avoid transport to hospital.
- Extended Care Paramedics are typically required to manage patients with diverse, ill-defined, conditions, often against a background of chronic illness. Although considered 'low acuity', this requires expertise and clinical reasoning of a high order.
- Implementation of the Extending the Role of Paramedics model requires an investment in planning, with significant resources devoted to training and establishment of sound clinical governance arrangements. Involvement and support of medical mentors is of critical importance.
- The two training programs supporting this initiative were comprehensive, appropriate and well resourced. The training resulted in safe, competent, practitioners to fill the Extended Care Paramedic role but the qualities paramedics bring to the role are also very important. The cost of training is about \$30,000 per Extended Care Paramedic and this includes the costs of clinical placements and the full training pathway.
- Training programs should lead to a nationally recognised qualification, not only to enhance the career paths of individual paramedics but also to support sustainability of the model.
- The Extending the Role of Paramedics model is low risk, with small likelihood of adverse outcomes. This finding is predicated on having strict clinical governance arrangements.
- The model can be cost-effective, in situations where there is sufficient throughput of suitably identified cases. This depends on the ability of call centre staff to identify cases which can be appropriately managed by Extended Care Paramedics.
- This stand-alone model of care requires sufficient throughput for the model to be viable. In situations (e.g. rural locations) where throughput is insufficient, a hybrid model is preferable. Towards the end of the implementation period, throughput averaged about 1.4 'expanded scope' cases per 12-hour shift, with considerable variability across sites.
- There was a very high level of consumer satisfaction with the model of care. Extended Care Paramedics communicated well with patients, examined them thoroughly, provided effective treatment and seemed comfortable dealing with their problems. Few patients refused treatment by an Extended Care Paramedic.
- A high proportion (72.5%) of patients seen by Extended Care Paramedics did not require transport to hospital.
- Extended Care Paramedics felt their practice was safe and that they provided a high quality of care. They saw the role as an effective retention strategy for experienced paramedics.
- The model has not been sustained at three of the five implementation sites, one ambulance service is still working to secure funding to sustain the model and one service has only committed to funding the model for another 12 months. This suggests that ambulance services will find it difficult to fund the model internally.
- The financial benefits of the model accrue to the broader health system and this creates tensions for ambulance services responsible for funding service delivery.
- Scenario analysis shows that if all implementation sites saw six ECP patients each shift (that is, six daily for each site for 365 days per year) and the same levels of ED avoidance rates seen during implementation were maintained all sites would be highly cost effective with annual cost savings ranging from \$411 per patient at ERP5 to \$998 at ERP2.
- The decision about whether to adopt the model more broadly is one for each ambulance service to make. Any widespread adoption would benefit from various measures to support the model e.g. changes to funding and legislation to support the Extended Care Paramedic role.

Executive summary

The Extending the Role of Paramedics (ERP) sub-project built on a model developed by the South Australian Ambulance Service (SAAS) which aims to provide a service that is complementary to primary health care, thus reducing emergency department presentations. The core of the model is training Extended Care Paramedics (ECPs) to treat patients in their usual place of residence, with referral to other health professionals if appropriate. ECPs manage patients with a diverse, and often ill-defined, range of signs and symptoms. Although these patients are deemed 'low acuity', these cases can be complex and require the ECP to apply advanced clinical reasoning. In many cases, the patient may have multiple chronic conditions and present as generally unwell.

The published evidence to date generally supports an expansion of the role of paramedics to include the assessment and management of patients with minor illnesses and injuries to avoid transport to hospital. However, the evidence is primarily from overseas, particularly the United Kingdom, and more research is required to establish the effectiveness and safety of the model.

Methods

Evaluation of the ERP model was based on a broad evaluation framework developed by the Centre for Health Service Development which has been used for several large-scale program evaluations. The framework recognises that programs aim to make an impact at three levels – consumers, providers and the system (structures and processes, networks, relationships) – and is based on six domains: project delivery, project impact, sustainability, capacity building, generalisability and dissemination. The evaluation employed a range of data sources including interviews, surveys, log books, specific tools, site visits, project documentation and routine administrative data. There were three data collection periods – baseline, implementation and sustainability – and data analysis was facilitated with the use of Excel, SAS 9.2, SPSS and NVivo.

Implementation

The model was implemented in five locations – one regional city, one remote area, one large metropolitan area, and two medium-sized urban centres with large outlying districts – and adapted to meet local needs at each site. Existing call dispatch systems were used to allocate cases to ECPs via the State- or Territory-based Communications Centre or equivalent. Having an ECP in the central call centre greatly assisted case allocation and management. Two sites in South Australia were able to leverage off the experience of the Adelaide metropolitan service, whereas for the other sites the ERP model was a new initiative for their organisation. With one exception, each site procured and equipped a vehicle specifically for ECP use.

Recruitment of paramedics was managed internally at each site, using similar selection criteria to that used by SAAS. Most of those recruited had extensive paramedic experience and 15 of the 17 were trained as Intensive Care Paramedics (ICPs); six were registered nurses, and several had additional tertiary qualifications. There was a high level of retention, with only two ECPs leaving during the project, for reasons which appeared unrelated to the ECP role. Almost 70% of ECPs indicated that they were planning to remain in the role for the foreseeable future.

The capabilities most commonly referred to by ECPs as important to the role included breadth and depth of clinical knowledge; knowledge of the health system and how it works; experience working in the community in an uncontrolled environment; communication and relationship building skills; comprehensive assessment and examination skills; and advanced clinical reasoning and decision-making skills.

The support provided by SAAS to all other project sites was a key enabling factor, with the experience and resources of SAAS greatly assisting the other project teams. All project teams spoke highly of the willingness of SAAS to share their knowledge, experiences and resources. Another enabling factor was the collaborative approach that developed among project teams,

particularly among the ECPs who formed bonds during their face-to-face training. There was a high level of cooperation and sharing between project teams.

The biggest challenge for all projects was the time taken to effectively set up the ERP model of care. Project teams implemented a range of strategies to identify and build relationships with key internal and external stakeholders, with varying degrees of success. Other ambulance service staff and volunteers, medical mentors, clinical coordination committees and Emergency Department (ED) staff were critical internal stakeholders. Consumer engagement was limited. In rural localities, a small number of General Practitioners (GPs) were not overly supportive. It was difficult to engage some hospital and ED personnel who did not see themselves having a role in the project.

Sites took similar approaches to clinical governance by building on existing practices and structures within their organisation. Several project teams had clinical coordinators, clinical support officers and / or experienced operations managers who were available 24 hours/day to provide assistance and advice in the field. Project teams established local coordination / governance committees and developed or adapted existing clinical practice guidelines for the ECPs.

At each site, retrospective clinical audits and regular reviews of ECP activity were conducted, with medical mentors playing a critical role in providing ongoing support, clinical supervision, telephone advice, and back up for the ECPs. ECPs reported that medical mentors were highly effective and particularly useful during the early months of implementation when they were adapting to their new role.

The ECP role was relatively standardised, but with variations on how that role was delivered. If there was sufficient throughput, a sole ECP worked in a specially equipped vehicle with no patient transport capability, quite separate from existing emergency response crews. If throughput was less, two types of hybrid role were implemented: (1) ECP working with another paramedic as part of an existing emergency response service, using a vehicle with patient transport capability; (2) combining the ECP role with another role. In practice, the ECP caseload was too small to warrant a full-time, stand-alone position at most sites. The hybrid role was seen by most ECPs as more satisfying and efficient in rural and regional locations, with the added benefit of ensuring that ECPs maintained their ICP skills.

Training

Each ECP was trained in one of two programs: three sites sent all their ECPs to the training program offered by SAAS; one site, because of a pre-existing contract, used a program from Edith Cowan University (ECU); and one site trained their initial cohort of ECPs using the SAAS program and an abridged version of the ECU program to train two additional ECPs. Several minor modifications to the training programs were made for rural and remote sites, to reduce the amount of time ECPs were away from home and families. All ECPs who undertook the training program successfully completed it. The SAAS and ECU programs had similar costs, estimated at about \$30,000 per ECP (most of these costs came from the salary of the ECP, back-fill of their absence for study blocks and expenses related to travel and accommodation).

The SAAS program consisted of four weeks of theory taught in modules, a two-week clinical placement in Adelaide with two additional weeks in a regional centre or home base for the ECPs, and four weeks of internship or supervised practice. Mixed teaching and learning modalities included face-to-face instruction, simulation and practical experience. The ECU program consisted of distance education; an intensive two-week classroom program; a two-week clinical placement at Fremantle Hospital and clinical placements where possible at facilities in the home State/Territory. Delivery modes included face-to-face teaching, flexible / distance learning, simulation and clinical experience.

The training programs were comprehensive, appropriate and well resourced. Both training programs had clearly articulated assessment schedules with well-documented competency

requirements. The programs proved to be affordable, accessible, and capable of producing competent clinicians that were 'fit for purpose'. They were structured in accordance with adult learning principles and delivered in supportive teaching and learning environments.

For most ECPs the major limitation of the training program was the limited clinical exposure (frequently from relatively small numbers of cases). It was perceived that there was a need for increased supervision to increase confidence in new skills. ECPs felt that the training program needed to emulate the problem solving approach of medicine rather than the more protocol driven approach adopted by paramedicine.

Both training programs demonstrated they could be adapted for use in other jurisdictions and valuable lessons were learned about contextualising the program for local conditions. A significant concern about the SAAS training program was that it did not generate any formal qualification. This is a significant barrier to the transferability of the training program and has implications for national implementation.

Impact

Approximately 60% of ECP cases originated from calls to '000'. Other sources of referral included residential aged care facilities and medical practitioners. Source of referrals was not reported uniformly across sites, so this result must be treated with some caution. In general, presenting problems seen by the ECPs were poorly described with no consistent method of recording across sites. The four main categories of problems seen by ECPs involved general symptoms and signs (26.9%), symptoms and signs related to the digestive system and abdomen (10.8%), injuries (10.3%) and procedures (10.2%).

Between January 2013 and March 2014, ECPs across all sites attended to more than 3,500 cases including more than 2,100 cases in their extended role. On average, across all sites, 1.2 expanded scope cases were seen per 12-hour shift, with considerable variability between sites (range 0.1 to 2.3 cases per shift), which was slightly higher towards the end of implementation (1.4 cases per shift). Median waiting times at each site ranged from 7 to 23 minutes. The average waiting time across all sites – influenced by a few long waiting times – was 30 minutes. Overall, 62% of eligible patients were treated at a private residence (ranging from 50% at one site to 77% at another site). A high proportion of patients (72.5%, range 65% to 78% at different sites) seen by ECPs did not require transport to hospital.

Scenario analysis shows that if all implementation sites saw six ECP patients each shift (that is, six daily for each site for 365 days per year) and the same levels of ED avoidance rates seen during implementation were maintained all sites would be highly cost effective with annual cost savings ranging from \$411 per patient at ERP5 to \$998 at ERP2.

Evidence from the patient survey confirmed that there was a very high level of consumer satisfaction with the ERP model at all sites. In general, patients reported that the ECP listened and communicated well, examined them thoroughly, provided effective treatment and seemed comfortable dealing with their problems. A small group of patients would have preferred more information regarding recovery and self-care, suggesting a target area for future improvements. Satisfaction ratings were very high. Respondents were highly satisfied with waiting times, the care they received, and their overall experience of the ambulance services involved in the trial. Clear communication and information provision were the main factors that predicted overall satisfaction. Overall, 49 consumers refused treatment by an ECP, representing 2.2% of cases.

Respondents to a survey of ambulance staff and stakeholders indicated a reasonably good understanding of the model of care and a high regard for the quality of the service provided. However, a substantial minority reported that they did not fully understand the scope of practice or the education required to become an ECP. Many did not see the model as effective for two of its key aims: reducing pressure on the local ED and improving access to emergency care.

Many respondents – especially community stakeholders – felt the model filled an important niche, addressing the needs of specific, vulnerable groups and complementing other services such as palliative care and community care. Stakeholders (other than the ECPs) believed that having enough trained and experienced ECPs to create a “critical mass” was essential for the model to work efficiently and provide for succession planning. Stakeholders were able to nominate numerous factors they felt contributed to safe practice, including recruitment of suitable paramedics, the extent and quality of training, implementation of comprehensive clinical governance mechanisms, and the engagement of approachable medical mentors with experience in emergency medicine or general practice.

There was strong agreement among ECPs that their practice was safe and that they provided a high quality of care. They perceived that their role had also contributed to the overall quality of care within their ambulance service through the system of review that the ECP could provide. Most ECPs were positive about their experiences working in the role, strongly agreeing that they were comfortable approaching other staff for advice regarding patient management. Some ECPs felt that other staff did not fully understand their role, its functions, the educational preparation required, and differences in extended skills and expertise. They also felt that other staff could more fully acknowledge the ECPs’ additional skills and knowledge. Several ECPs indicated that appropriate personnel for mentoring and supervision were not always available when required. ECPs believed that the individual qualities of the ECP, such as their experience, training and attitude, were key contributors to safety and quality of care.

An unintended outcome of the model was the opportunity for ECPs to ask their colleagues to review a patient during the next shift. Over the course of the program, other ambulance officers occasionally requested ECPs to review a patient that was not transported. This ‘safety net’ aspect was seen as an important contribution of the ERP model to the effective care of patients. On the whole, stakeholders felt that the ERP model of care was as safe as usual care. The results of the evaluation indicate that the model is low risk, with small likelihood of adverse outcomes. This finding is predicated on strict clinical governance arrangements being in place and recruitment of suitable paramedics to the role.

Conclusion

The results of the evaluation demonstrate that the ERP model can be cost-effective in locations with a sufficiently large volume of potential cases. Cost-efficiency is reliant on the availability of enough ECPs to provide adequate roster coverage, and is critically affected by the accuracy of call centre staff in identifying appropriate cases and dispatching ECPs appropriately. The costs of implementing the ERP model are met by ambulance services, but any cost savings accrue to the health system as a whole, a situation complicated by different management arrangements and payment models in each jurisdiction.

Sustainability was seen as reliant on a stable workforce with high levels of staff retention. At all project sites it was reported that staff felt empowered as part of the change process but did not believe the improvement would be sustained. At the time of reporting, three sites have been unable to secure ongoing funding for the ERP initiative, one site has secured funding for a further twelve months and one site is awaiting the outcome of a funding submission. As such, the majority of project teams will not sustain any direct improvements for patients and the ambulance service. However, although the provision of services may cease, the infrastructure, clinical capacity, professional networks and alternative clinical pathways that were developed through the project may be maintained.

There are no major structural impediments to the model being widely adopted. Decisions about whether to implement the model are likely to be taken at a jurisdictional level. Once such decisions are made, a ‘make it happen’ approach is warranted, but with sensitivity to the need for local adaptation. Help is required at a local level to establish and refine the model to meet local needs and at a jurisdictional level to ensure funding and legislation to support ECP practice.

1 Introduction and background

1.1 *Description of HWA's strategic agenda in Expanded Scopes of Practice*

Implementing new models of care is a promising approach to achieving the large-scale workforce reform necessary to meet Australia's future healthcare needs (Australian Health Workforce Advisory Committee, 2005). Health Workforce Australia launched the Expanded Scopes of Practice (HWA-ESOP) program in 2012 with the goal of exploring innovative ways to increase workforce productivity, recruitment and retention. Four sub-projects were funded, each focusing on a different model of expanded roles for health professionals.

One of the four sub-projects, Extending the Role of Paramedics (HWA-ERP), built on a model developed by the South Australian Ambulance Service (SAAS). This model equips ambulance officers with skills and experience to extend their existing roles beyond emergency care to deal with a specific range of urgent but non-life-threatening presentations. They have the potential to improve patient outcomes, reduce waiting times and ease pressure in areas of high demand, such as Emergency Departments (EDs), by reducing the number of patients transported to hospital.

There was a need to implement and evaluate the model systematically and to assess whether it was suitable for wider (national) roll-out and the conditions under which it was most likely to succeed. Four organisations received funding to implement the model at five sites. The Centre for Health Service Development, University of Wollongong, was appointed in June 2012 to undertake the program evaluation.

1.2 *The case for change in paramedic delivery*

Extended Care Paramedics (ECPs) are experienced paramedics with advanced training and skills in patient assessment, delivery of quality care and coordination of appropriate referral pathways. ECPs treat identified patients in collaboration with other health professionals, in their usual place of residence, thus reducing emergency department presentations and inter-facility transfers.

The settings of the five funded sites varied widely. One was situated in a small regional city, one in a remote area, one in a large metropolitan area, and two in medium-sized urban centres with large outlying districts. The model was adapted to meet local needs at each site and was evaluated to assess what worked, for whom, under what conditions, and which aspects could be applied nationally.

1.3 *Objectives of the Extending the Role of Paramedics sub-project*

The objectives of the ERP sub-project were to:

- Reduce costs to the health system associated with ED presentations or early entry into aged care facilities that could be more effectively and appropriately managed in the patients' usual place of residence, and involve the patients' usual general practitioner (GP) whenever possible;
- Increase the capability and capacity of aged care and community health professionals to deliver quality care in the patients' usual place of residence;
- Minimise disruption to patients, their carers and family by providing high level care in their usual residence where appropriate;
- Increase career pathways and retention strategies for paramedic professionals.¹

¹ HWA Request for Proposals: Extending the Role of Paramedics RFP Number: HWA-RFP/2011/015.

1.4 Description of sites

A description of the five HWA-funded ERP sub-project sites is provided in Table 1. The funding allocated by Health Workforce Australia is included in Appendix 1.

Table 1 Description of sites

Project site	Brief description
ERP1	The project was based in a rural city in South Australia, and ECPs were able to be utilised for any cases within the area which met the 60 minute response time criteria for ECP dispatches.
ERP2	The project was based in a remote rural community in South Australia. The local hospital includes a modern 50 bed complex with an ED that operates 24 hours per day. The site serves the local community and surrounding districts.
ERP3	The project was based in an urban environment with the ERP team working within a 25km radius of a metropolitan area. There is a major tertiary referral teaching hospital with approximately 600 beds, and well developed primary care services for ambulatory patients.
ERP4	The project was based in a major metropolitan city, operating across a 50-75km radius from the city extending to smaller outlying areas. There is a regional 300-bed public hospital with a newly redeveloped Emergency Department that provides acute care facilities.
ERP5	The project operated in an urban environment with the ERP team working within a 90km radius of the city. There is only one hospital and ED.

1.5 Structure of report

This final report provides a summative evaluation of the ERP sub-project, building on three formative evaluation progress reports previously submitted. The structure of this report is shown in Figure 1.

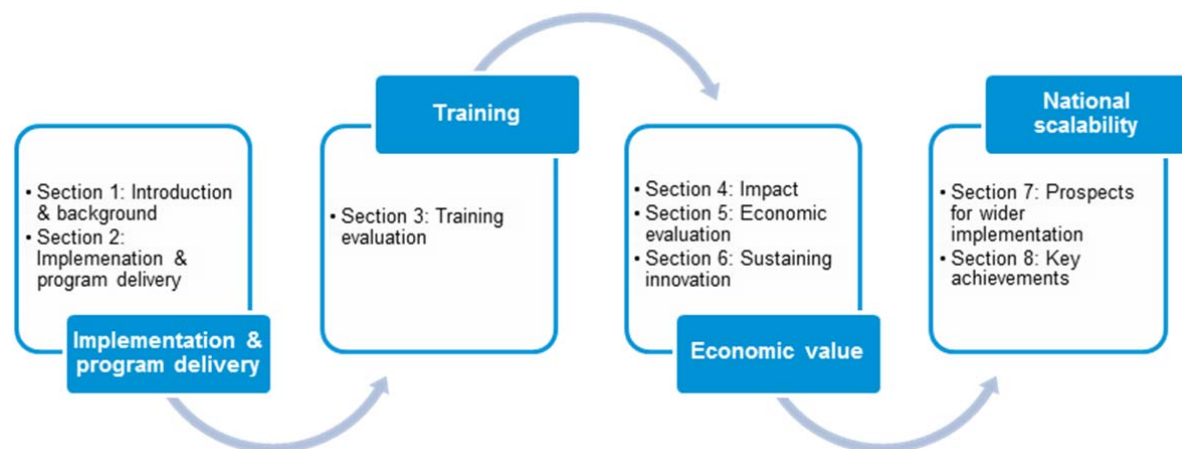


Figure 1 Report structure

A synthesis of the key findings and final results of the overall HWA-ESOP evaluation (including all four sub-projects) is provided in a separate report (Thompson et al., 2014). Methods of the evaluation including data collection and analysis are described in Appendix 2.

2 Implementation and program delivery

2.1 Service delivery models and scopes of practice

This sub-project supported the implementation of an existing Extending the Role of Paramedics (ERP) model that had been developed and implemented within metropolitan Adelaide by the South Australian Ambulance Service (SAAS) and at several sites across Australia. The model focuses on extending the competencies and capabilities of paramedics to provide emergency health care to consumers in their usual residence whenever appropriate, in collaboration with other health professionals, particularly GPs. The aim of the model is to provide a service that is complementary to primary health care, thus reducing emergency department presentations. The model was implemented at five sites:

- ERP1
- ERP2
- ERP3
- ERP4
- ERP5

The target group is lower acuity patients who do not require emergency care and are usually classified as 'non-priority complaints'. Although these cases are not emergencies in the traditional sense of lights and sirens, they may be complex and require the ECP to apply advanced clinical reasoning. In many cases, the person may have multiple chronic conditions and present as generally unwell.

Each project team identified the scope of practice for their ECPs through the development or adoption of clinical practice guidelines which reflected the previous experience of sites that had implemented the ERP model, the implementing organisation's existing guidelines, local population health needs and service development opportunities (e.g. wound care including suturing and managing skin tears, assisting palliative care patients with break through pain, non-routine replacement of urinary catheters). The new scope of practice required the endorsement of a number of health professionals, including clinical and paramedic specialists.

Most project teams analysed the volume and pattern of non-emergency calls over the 24-hour period for each day of the week and used this information to determine the hours of operation. Several sites estimated that approximately 20% of cases attended to by emergency response teams do not require transport. In some locations, overnight calls were less frequent with the afternoon and early evening the peak demand periods for non-emergency response. Roster cycles were arranged to provide a 7-day per week service and cover the periods of peak demand. However, due to competing workforce demands and the lack of trained staff available to cover leave, there were frequent periods in which there was no roster cover and this inevitably affected the number of cases seen.

With the exception of ERP2, each model involved the procurement and equipping of a vehicle specifically for ECP use. ERP1 and ERP2 provided standard guidelines on recommended equipment, and each site revised this based on local supplies and preferences. Engaging the ECPs in the equipping and set-up of the vehicle was important in assisting their transition to working with a non-transport-capable vehicle. At four sites (ERP4 being the exception) the vehicles were equipped with an i-STAT[®] machine for point-of-care pathology testing. Problems were encountered at ERP5 when extreme weather conditions resulted in the machine malfunctioning which could not ultimately be rectified, resulting in use of the machine being discontinued. Temperature extremes also affected the functionality of the i-STAT[®] machine for the ERP3 project team.

Although the ECP role was relatively standardised, there were three variations on how that role was delivered:

1. supernumerary role operating in a solo capacity using a vehicle without the capacity to transport patients (three sites);
2. ECP working with another paramedic as part of an existing emergency response service, using a vehicle with patient transport capability (one site);
3. combining the ECP role with another paramedic role (one site).

One of the sites (ERP4) where ECPs were supernumerary and worked as solo practitioners had to adjust their model. In this location ECPs worked as first responder when service demands necessitated this, which was about 50% of the time. Details of each model are summarised in Table 2.

Table 2 Key elements of ERP models

	Hours of operation	Remoteness of base	Geographic scope	Model
ERP1	7am to 6.30pm	Inner regional	Within 60 minutes driving distance of the city	Specially equipped vehicle with no patient transport capability. Sole ECP working supernumerary to existing emergency response crews.
ERP2	24 hours per day	Remote	Within 90 minutes driving distance of the city	The ECPs worked in tandem with a paramedic as part of the existing emergency response service i.e. in a vehicle with patient transport capability.
ERP3	10am to 10pm	Major city	Within 25km radius of the city	Specially equipped vehicle with no patient transport capability. Sole ECP working supernumerary to existing emergency response crews.
ERP4	10.30am to 10pm	Inner regional	Within 50-75km radius of the city	Specially equipped vehicle with no patient transport capability. Sole ECP working supernumerary to existing emergency response crews. Over time the ECPs were redeployed as first responders to meet organisational needs.
ERP5	11am to 11pm	Outer regional	Within 90km radius of the city	Specially equipped vehicle with no patient transport capability. ECP role combined with another paramedic role. Frequently, the ECPs were unable to function in a supernumerary capacity as an ECP because of their other duties.

2.2 Requirements for Extended Care Paramedics

Recruitment of paramedics into ECP roles was managed internally by sponsoring organisations. Each project team had a copy of the SAAS position description for reference but this was customised by all sites to ensure it aligned with their own human resource practices and industrial classifications. All sites used similar selection criteria to that used by SAAS and followed established organisational processes for recruitment and selection. This varied from an expression of interest process through to internal advertisement of the ECP positions.

Most project teams recruited Intensive Care Paramedics (ICPs) into the ECP roles. The ICP qualification equates to a Graduate Diploma. There was a general view that ICPs, if available, had the best mix of skill and experience for the role. Recruitment and selection at each site is summarised in Table 3.

Table 3 ERP staff summary-cohort one

	# of ESOP clinicians	Years' experience	# trained overseas	# with ICP qualifications	# working in organisation prior to recruitment
ERP1	3	18-30	0	3	3
ERP2	3	6-11	2	3	3
ERP3	4	3-18	0	4	4
ERP4	2	17-35	0	2	2
ERP5	4	4-30	0	2	4
Total	16		2	14	16

Particular features of the recruitment at each site were as follows:

- **ERP1:** recruited from a possible pool of seven ICPs for three positions.
- **ERP2:** recruited from the five eligible ICPs for three positions.
- **ERP3:** secured eight applications for the four positions.
- **ERP4:** an initial proposal to recruit Branch Station Officers was unsuccessful and there was a very short window in which to recruit ECPs due to the decision early in the set-up phase to move the project location to a metropolitan city and to utilise the SAAS training program which was due to start. Two ECPs were recruited, one based locally and the other re-located to the city to take up the role. After one resigned the position was advertised in November 2013 and there were 16 applicants for the role.
- **ERP5:** This project built the ECP role into the staffing structure, converting the existing Station Officer role into a hybrid role including the ECP capability. As there were relatively few ICPs in the locality and wider region, the pool of ICPs that ERP5 had to recruit from was small. They widened the entry criteria to include qualified paramedics with a minimum of two years post-graduate experience. They received seven applications for the four positions.

2.2.1 Characteristics of effective ECPs

Through interviews with ECPs their attitudes, beliefs about capabilities, knowledge and skills were reviewed to determine the characteristics of individuals likely to be successful in the role. ECPs were typically paramedics with a 'can do' attitude, who were committed individuals with a desire to complete the project, provide quality care and improve their practice. Most ECPs saw themselves as an advocate for the patient and demonstrated a compassionate attitude. All demonstrated maturity and most appeared to be at a stage in their career where they recognised that other types of cases could be more interesting and satisfying than the "lights and sirens" cases. The majority demonstrated a reflective learning style. All were measured in their approach. Many discussed the need to be flexible and able to function without direction.

Characteristics of effective ECPs included confidence in their ability as a paramedic and capacity to function as an ECP. There was also a belief that ECPs need to be independent thinkers, capable of lateral thought. It was necessary to possess an enquiring and investigative mind, capable of taking a holistic view of patients and "seeing the bigger picture".

It's not so much of, 'Oh, Mrs James has got a blocked catheter; we'll go round and change it.' It's not that. It's 'Okay, well do that, but in the background let's now try and figure out why the catheter is blocked. How we're going to get around the issues, who do we need to talk to, to make sure that this is not going to be a recurring occasion and how can we make it better?' It makes it better for the client. It makes it better for the system...And we've struck that a few times now where we've had repeat clients with the ambulance service who just keep presenting over and over again. We can do one or two visits with them and we never hear from them again.' (ECP)

There were also strong beliefs that ECPs had to be emotionally capable to do the job and this included the capacity to handle stress and the ability to work alone, the latter particularly important as ECPs worked as single responders when most ambulance crews consisted of two paramedics. Most ECPs felt they were under scrutiny so there was a “*higher onus*” on them to get things right.

“It’s a very different mindset to the traditional ambulance service and to nursing to a certain degree. Ambulance mindset is to fix them up, take them to hospital unless there’s absolutely nothing wrong with them in which case you sort of have a chat and leave them at home. The mindset of the extended care program involves various aspects, not only treatment of conditions that you see in front of you but sort of investigating other referral pathways, alternative care pathways incorporating many of the things I think once was termed nursing care plans when you look into the extended family, this is what networks and what the patient’s needs are in terms of caring for themselves. Taking all those facets into account when tailoring treatment to them, and the other thing that is very different is that you take the full responsibility of the treatment upon yourself and that’s one of the things that is, I’d say, a fairly monumental shift and quite mentally fatiguing being a relatively new thing is taking that level of responsibility upon yourself with all that that entails...”
(ECP)

Consistent themes emerged as to the critical capabilities required for ECPs to function effectively.

“...it does require a different skill set from the ordinary ambulance. It’s very similar and it’s linked, but it is different.” (ECP)

“...you need to know how the lungs work, and what happens after you put that needle in...so you need the knowledge...” (ECP)

In the current cohort most ECPs had extensive paramedic experience (many over 20 years) and 14 of the 16 were trained as ICPs. A surprising number were also qualified Registered Nurses (six of the 16 ECPs). Several had additional tertiary qualifications. Several ECPs also had prior experience working as solo practitioners or in roles that required high levels of independence e.g. providing paramedic type services in isolated communities, mine sites, oil rigs and ships at sea. A couple had previously worked in paramedic related roles in the military and others had worked in aero and helicopter retrieval services.

The capabilities most commonly referred to by ECPs as important to the role included:

- breadth and depth of clinical knowledge (frequently ECPs commented that anyone could learn the procedural skills associated with the role but it was essential to understand why they were doing it)
- knowledge of the health system and how it works particularly hospital Emergency Departments and the primary health care sector
- experience working in the community in an uncontrolled environment
- knowledge of the local community particularly other health and aged care providers, opportunities for collaboration and referral pathways
- communication and relationship building skills
- comprehensive assessment and examination skills, including a capacity to look at the bigger picture, referring to the clinical, social and emotional context of the patient
- advanced clinical reasoning and decision-making skills that are not reliant on protocols but can operate within guidelines.

“To make clinical judgements not based on single individual things but on a total package. We’re not – we’re not driven down certain pathways. How we get to our end point is not driven by a process.” (ECP)

“It’s not as if we’re trying to be doctors or anything like that. It’s not protocol driven because we can obviously think for ourselves but it is guideline driven. If you’re outside the guidelines then we basically refer on.” (ECP)

2.3 Role of the lead sites

This sub-project was not established with a lead site. Although SAAS willingly shared resources, knowledge and experience with the other project teams, perceived jurisdictional differences that may impact upon implementation led to the decision not to appoint a lead site.

2.4 Set-up and establishment phase

The biggest challenge for all projects was the time taken to effectively set up the ERP model of care. A period of six months proved unrealistic for those without prior experience of the model. Most project teams felt that 12 months would have been a more realistic timeframe to identify, develop and comprehensively address the full scope of work associated with the model. The short set-up phase created pressure to complete tasks such as the purchase of equipment, determining accommodation and storage needs, and procurement and set-up of vehicles. The acquisition of equipment was especially problematic and this was further exacerbated around Christmas, resulting in delays. All projects had resource constraints and none had ready access to data and evaluation support staff.

ERP3 and ERP4 had no previous experience with the ERP model and had undertaken very limited planning about its introduction until the HWA funding opportunity arose. As a result, these sites were reliant on the scope of practice and policy framework previously developed by SAAS, even though SAAS was not identified by HWA as a lead site. When this documentation was not readily available in the format needed for review within their organisations this generated substantial additional work that these project teams had not expected. Another issue that was not identified early during the set-up phase was the time taken to get sign off when using existing organisational governance processes. For example, at ERP4 the clinical committees with the power to sign off key documents had wide external representation and only met every few months on a pre-determined schedule. This extended the time taken for the review and endorsement of clinical practice guidelines.

As the intention was to provide integrated care with the patient referred back to their GP or other appropriate primary health care services, sites needed documented and agreed referral pathways. Several project teams did not fully appreciate the work required to establish these referral pathways.

All project teams produced implementation plans which varied in terms of the quality and level of detail provided. Project management in the set-up phase required a high level of investment at each site. This was challenging as initially all project leads were trying to juggle project responsibilities with their normal full-time roles. After a couple of months, project teams recognised this was unsustainable and had to either identify additional resources or move out of their full-time operational role for a period. Any site that tried to combine project management responsibilities with normal duties found this problematic because of the sheer volume of tasks that needed to be done in a very short timeframe.

Two approaches were taken to training the ECPs. SAAS offered to include recruits from other sites in the existing training program for metropolitan ECPs, which commenced in October 2012. Four sites took up this offer: ERP1, ERP2, ERP3 and ERP4. The SAAS program includes a series of clinical placements and period of mentoring with experienced metropolitan ECPs that

extended for four weeks. The trainees from ERP1 and ERP2 received two weeks of clinical placements followed by two weeks of clinical placements in their local regional area. This was followed by a four-week internship period which included a one-week rotation with an experienced ECP in the metropolitan area. ERP3 and ERP4 returned to their local project sites for the clinical placement experience, which meant that they were unable to benefit from mentoring from other ECPs as they were the first in their jurisdiction.

ERP5 had a pre-existing contract with a local University which included provision for ECP training. The training was provided through a combination of distance education, in-class teaching and clinical placements. ERP4, having trained their initial cohort of ECPs using the SAAS program, used an abridged version of the University program to train two additional ECPs following the resignation of an ECP in late 2013. Further details of both training programs are provided in Section 3.

2.5 Implementation of Expanded Scopes of Practice

ERP1 and ERP2 sites were able to leverage off the experience of the metropolitan service, however the rural location of both sites resulted in different project implementation challenges. For all other project sites, the ERP model of care was a new initiative that had not previously been implemented in any of their organisations. Details regarding commencement of implementation and staff turnover during the period of implementation are summarised in Table 4.

Table 4 Implementation of ERP projects

Site	Date ECPs commenced	Staff turnover
ERP1	21 December 2012	Two ECPs provided the service, with a third ECP providing relief for leave and professional development activities. There was no staff turnover.
ERP2	25 December 2012	Two ECPs completed their training in December 2012. The third ECP completed the training in August 2013. There was no staff turnover.
ERP3	14 January 2013	The ECP roster commenced on 14 January 2013 but the ECPs did not function according to their scope of practice until 23 February 2013 when the necessary documentation had been endorsed. Of the four ECPs recruited, one was unavailable for three months and was subsequently deployed elsewhere for the final three months of the project.
ERP4	14 January 2013	The ECPs could not operate according to their full scope of practice until formal guidelines were approved in April 2013. One of the two ECPs resigned in November 2013 and two additional paramedics were trained: one to replace the vacancy and the other to provide additional cover for leave absences.
ERP5	13 March 2013	Four ECPs operated in the hybrid role. ECPs were frequently redeployed to other special duties. Two members of the project team subsequently underwent ECP training to improve familiarity with the model of care. There was no staff turnover.

Sites took similar approaches to clinical governance. In the first instance, they built on existing clinical governance policies, processes and practices within their organisation and where possible integrated the clinical governance requirements of the project into existing organisational processes. Several project teams had clinical coordinators, clinical support officers and / or experienced operations managers who were available 24 hours/day to provide assistance and advice in the field. Project teams established local clinical coordination / governance committees and adapted existing clinical practice guidelines, incorporated with the SAAS clinical practice guidelines, for the ECPs.

In each of the participating organisations, retrospective clinical audits are routinely completed for a proportion of cases. All sites established systems to review ECP activity on a regular basis. The ERP1 and ERP2 projects instituted a process whereby the medical mentors supporting each project reviewed every case managed by an ECP to answer the following questions:

- Was treatment given by the ECP safe?
- Were all possible treatment options for presenting complaint considered and checked for?
- Was treatment given by ECP appropriate?
- Did the ECP contact the medical mentor if you believe it was required?
- Were all appropriate referrals/patient information given to other services?

After ERP5 recruited an experienced project officer, they instituted a policy of following up every patient attended to by an ECP either by phone or in person, to ascertain the outcome of care. More than 100 patients received follow-up visits or telephone calls with high levels of satisfaction with ECP care reported.

Medical mentors played a critical role in providing ongoing support, clinical supervision, telephone advice, and back up for the ECP in the field. The approach adopted depended on local resources, with ERP1 engaging the Director of Emergency Medicine as a clinical mentor to the ECPs with the medical officer on duty in the ED available to provide emergency clinical advice. The ERP2 project used local GPs to provide clinical training, development and clinical liaison. ERP3 took advantage of an existing relationship with their local medical retrieval service for this support. ERP4 had a Medical Director, General Practice and Primary Care, who assisted with medical mentoring and also liaised with local GPs to secure their supervisory support for ECPs. ERP5 employed a medical director 2.5 days per week with diverse clinical responsibilities who also provided this support.

2.5.1 Key lessons

Based on the experiences at each of the five sites, there are two key lessons regarding implementation of the model:

- The pre-implementation phase needs to be relatively long, to allow sufficient time to engage key stakeholders; develop and achieve authorisation of relevant policies, procedures and protocols; establish systems of clinical governance and negotiate clinical placements for the ECPs.
- It is important to allocate adequate resources to project management, including a dedicated project manager.

Although much can be learnt from experiences with the ECP model elsewhere, there is a need for adaptation of the model to meet local needs and existing models of service delivery, all of which takes time and resources.

2.6 Scale of implementation at each site

The five participating ambulance services were quite dissimilar in many respects, including their settings, the populations they served and, importantly, their scale of operations. Although they had similar numbers of ECPs (see Table 3), the volume of eligible patients varied widely. This variation is illustrated in Table 5, which shows the number of presentations to local hospital EDs during the year in which implementation occurred. Presentations classified as semi-urgent or non-urgent (Triage Categories 4 and 5) are most likely to be possible ECP cases. The proportion of these cases that were transported to the ED by ambulance is unknown. Nevertheless, the data indicate that the potential pool of ECP cases was considerably larger for some sites (ERP5, ERP4 and ERP3) than others (ERP1 and ERP2).

Table 5 ED presentations per annum – implementation sites

ERP project site	Local hospital ED activity
ERP1	The total number of patients presenting to the local hospital ED in 2012-13 was 15,704 of which 8,472 (54%) were classified as semi-urgent (Triage 4) and 1,281 (8%) were classified as non-urgent (Triage 5). It is the busiest rural ED in the State. Throughout the ERP project a reported reduction in ED attendance by approximately 4% has

ERP project site	Local hospital ED activity
	assisted in easing the pressure on ED staff and reducing waiting times for other patients. ²
ERP2	The total number of patients presenting to the local hospital ED in 2012-13 was 7,864, of which 4,734 (60%) were classified as semi-urgent (Triage 4) and 1,406 (18%) were classified as non-urgent (Triage 5). A large proportion of these could be treated in their home with alternate pathways.
ERP3	The total number of patients presenting to the local hospital ED in 2012-13 was 65,817, of which 28,461 (43%) were classified as semi-urgent (Triage 4) and 7,000 (11%) were classified as non-urgent (Triage 5). In 2012-13 ERP3 managed 41,346 incidents involving 41,560 responses by operational crews. In approximately 20% of cases patients are not transported.
ERP4	The total number of patients presenting to the hospital ED in 2012-13 was 44,545, of which 22,894 (51%) were classified as semi-urgent (Triage 4) and 2,752 (6%) were classified as non-urgent (Triage 5). Each year ambulances are sent to about 60,000 incidents across the State, with around 48,000 patients transported to hospital by ambulance.
ERP5	The total number of patients presenting to the hospital ED in 2012-13 was 66,278, of which 34,901 (53%) were classified as semi-urgent (Triage 4) and 2,997 (5%) were classified as non-urgent (Triage 5). Prior to the ECP model implementation, patients had no other alternative but to be transported by ambulance to the emergency department after they initiated 000 services. Data suggests that approximately 20% of all 000 cases over the last five years (2008-2012) could have been directed to an alternative ECP pathway. ³

These differences in scale are reflected in the average monthly activity for the entire ambulance service, which ranged from just 250 cases at ERP2 to 2,700 at ERP3. After a new information system came online at ERP5 in August 2013, improving the accuracy of reporting, that service averaged 3,500 cases per month.

2.7 Barriers and enablers in relation to implementation

2.7.1 Communication and stakeholder engagement

The support provided by SAAS to all other project sites was a key enabling factor, with the experience and resources of SAAS greatly assisting the other project teams. All project teams spoke highly of the willingness of SAAS to share their knowledge, experiences and resources.

Most stakeholder engagement occurred during the project set-up phase, although project teams reported an ongoing need for communication about the role of the ECP both within and outside their organisations. This was particularly important in relation to clinical governance processes and gaining support for ECP-specific clinical guidelines and pathways.

Project teams established a variety of mechanisms for engagement, the most popular being steering committees or local clinical coordination committees that provided a practical means of engaging other service providers, stakeholder workshops, distribution of fact sheets and clinical service updates, networking at conferences and the use of clinical placements as part of the training pathway. ERP4 invested three days in a 'travelling road-show' as a way of engaging GPs within the broader region.

² "The total number of patients assessed or treated by SAAS, but not transported, constituted 13.7% of all patient contacts in 2012-13 (where 'all patient contacts' is understood to mean 'total patient contact where patient was assessed, treated and/or transported by SAAS')." Section 6.1.4, page 32 of the SA Ambulance Service Annual Report 2012-13, available from: <http://www.saambulance.com.au/NewsPublications/Annualreports>

³ ED data from <http://www.myhospitals.gov.au/> retrieved 21 July 2014; Ambulance Service data from <http://www.caa.net.au/attachments/article/69/2012-13%20Annual%20Report.pdf> retrieved 21 July 2014; Ambulance data from http://www.dhhs.tas.gov.au/ambulance/emergency_ambulance retrieved 21 July 2014

Another enabling factor was the collaborative approach that developed among project teams, particularly among the ECPs who formed bonds during their face-to-face training. The ECPs established an online 'Dropbox' to allow them to share files and resources. The workshop facilitated by HWA at the beginning of the set-up phase allowed project teams to network. Many of the participants were already known to each other from previous professional experiences and / or conference events. There was a high level of cooperation and sharing between project teams. The contribution by existing committees within the respective ambulance services also enabled a collaborative approach to the clinical oversight of the ERP initiative, together with the contribution of medical directors.

Strong team support from other paramedic staff and members of the ambulance service was identified as an enabler by two projects. The importance of a supportive Chief Executive Officer was identified by all project teams as a key success factor. This leadership from the top sent an important message to the wider workforce about the level of interest in the ERP model of care.

Prior relationships with educational institutions facilitated the development and delivery of the ECP training program. Project teams engaged their local media to promote the community's understanding of the role of the ECP however this was limited in the early phases of the project because of delays in receiving approval to do so from HWA. Project teams also liaised with relevant unions to keep them informed, particularly in relation to recruitment processes.

Consumer engagement was limited and primarily two-fold: (1) inclusion of consumer representatives in consultations and occasional committees; (2) dissemination of project information through local organisations, flyers and the general media.

2.7.2 Role clarification

Three project teams identified barriers that related to the ECP role and the implementation of the model of care. The ERP1 and ERP2 project sites faced an established pre-conception about the role of the ECP based on a metropolitan model that has been operating for some years. The geography of ERP1 and ERP2 are distinctly regional and early in the implementation it could be seen that the country ECPs would have slightly different roles to their metropolitan counterparts. For example, they would cover a broader geographic area with the aim of reducing patient transfers from smaller outlying urgent care centres to the regional hospital. The relationship between the ECPs and GPs, particularly in ERP2, was fundamental to the role and without GP engagement the ECP did not have appropriate clinical supervision or referral pathways. Ongoing education of staff about the difference in these roles was required.

2.7.3 Identification of eligible cases

Existing call dispatch systems were used to allocate cases to ECPs via the State- or Territory-based Communications Centre or equivalent. For SAAS sites, where all calls across the State are managed centrally, there was access to an ECP based in this centre to facilitate appropriate case identification. The ERP5 and ERP3 teams periodically had a clinical resource within the Communications Centre. This was not an ECP.

Having an ECP in the Communications Centre assisted greatly with case allocation and management and was a standard part of the ERP model in metropolitan Adelaide. The SAAS training model incorporated a one-week placement in the Emergency Operations Centre in Adelaide to prepare ECPs for this aspect of their role. However, this placement was not offered to trainees in the ESOP program because they would be working outside the Adelaide metropolitan area. Further, the small scale of implementation in some sites meant it was not feasible to allocate an ECP to dispatch duties.

However, the lack of ECP expertise in the Communications Centres of several implementation sites created some difficulties in identifying and allocating cases appropriately. There needed to be a higher investment in training Communications Centre staff and implementing system changes. Implementation sites reported they were unable to make changes to information

systems that would assist with case identification. This was because they shared the Communications Centre with other emergency services and/or it was not deemed cost-effective to make these changes for a model of care that may not be sustained. This inevitably had impacts on the productivity of the model. Improving this aspect of implementation has the potential to improve efficiency and cost effectiveness by ensuring ECPs are fully utilised for appropriate cases.

2.7.4 Establishment of referral pathways

The ERP model relies on establishing good relationships with GPs and other primary health care providers so that patients who require follow-up after being seen by the ECP can be referred appropriately. During the set-up phase of the project, most teams did not have the necessary relationships and partnerships established with external stakeholders although they did recognise that such relationships were a crucial enabling factor for implementation. Key external stakeholders included pathology providers, pharmaceutical suppliers, medical consumable companies and primary health care providers such as community nurses and GPs.

In rural localities, a small number of GPs were not overly supportive of the project. ERP2 found that the greatest barrier was the lack of support and understanding of the role by a small number of local medical practitioners. ERP3 reported that stakeholder management was one of their biggest challenges, with poor understanding of the role of ambulance in the primary health care setting by a range of external stakeholders. The ERP5 project found that ongoing engagement was needed with the Indigenous community, particularly with other health care providers and agencies to establish effective referral pathways. Several project teams found engagement of hospital and ED personnel difficult as they did not see themselves having a role in a project about not transporting patients to hospital.

2.7.5 Resources

The major resource barriers identified by the project teams focused on isolation from Head Office and corporate resources; pressures to find accommodation for the ECPs and storage for their equipment in ambulance stations where space was already at a premium; and the availability of appropriate information technology to enable access to electronic medical records. Issues relating to the outfitting of specialty vehicles and establishing supply chains for consumables specific to the role have been dealt with previously.

The absence of bulk billing GPs in some locations was also a barrier to patient referral and ongoing care. The current structure of reimbursement for ambulance services was a barrier as in every State and Territory a higher fee is paid to the ambulance service for an emergency transport as opposed to the reimbursement for management of a lower acuity case (approximately 40% less than the emergency transport reimbursement). Several project teams felt that the HWA funding allocation was inadequate. The higher salary of the ECP in some jurisdictions and costs of training, procuring and outfitting a non-transport vehicle and consumables were not always accurately estimated.

2.7.6 Legislative and policy issues

Both ERP3 and ERP4 identified legislative and policy barriers to the implementation of the full scope of practice. ERP4 identified that carriage of blood products by ECPs requires a change of legislation and that an amendment to the Poisons Act was necessary for ECPs to be able to prescribe. An example of a policy issue that created a barrier during the set-up phase was the authority to use and store an extended range of pharmaceuticals (ECPs used a wider range of pharmaceuticals than other paramedics), particularly antibiotics as this limits the management of specific cohorts of patients in their own residence. For ERP3 this requires a recommendation from their Ambulance Clinical Advisory Committee to the Chief Officer. Paramedics are not currently a registered profession. Several project teams raised this in the context of the ECP as a barrier to procurement of a Medicare provider number and the potential capacity to charge for the service provided.

3 Training evaluation

The training evaluation was structured around quality education factors. These factors are broadly reflected in the headings for each sub-section which were designed to capture important aspects of program design that impact on overall quality. This analysis reflects the tertiary education standards endorsed by the Australian Tertiary Education Quality and Standards Agency. It has been generated from triangulating multiple data sources, which are described in the 'Methods' section in Appendix 2. The key objective for the training evaluation was a review of the training programs and their delivery and an analysis of the extent to which they result in 'work ready' participants.

3.1 Structure of training programs

A brief overview of the different approaches to training ECPs across the implementation sites is included to provide context for the training program analysis. The training pathways were described comprehensively in previous evaluation reports (Thompson et al., 2013). The model of care was based on one established by SAAS in 2008. All implementation sites supported the training pathway with local induction and clinical practice guidelines. Most sites without prior experience in the model of care allowed ECPs to work together initially to build confidence.

3.1.1 SAAS program structure

SAAS has been training ECPs for several years using its own educational services personnel. Program development was based on extensive consultation with other health care providers and, where appropriate, professional bodies which have been involved with clinical auditing.

The program structure consisted of four weeks of theory taught in modules, a two-week clinical placement in Adelaide with two additional weeks in a regional centre or home base for the ECPs, and four weeks of internship or supervised practice. The training pathway structure is depicted in Figure 2. ECPs from ERP1, ERP2, ERP3 and ERP4 all attended the four-week training block. This theoretical component was considered essential by the ECPs and the value of interacting with others in the training program was reported to be highly advantageous.

"Some of the conversations we've had during breaks and while we're sitting there after hours having a beer because we couldn't go home because we weren't anywhere near home, were way more impressive." (ECP)

Mixed teaching and learning modalities were used and included face-to-face instruction, simulation and practical experience. The training course incorporated 111 hours of lectures, 23 hours of tutorials and 18 hours of simulation training. Clinical placements provided 232 hours of clinical experience. Simulation training used mannequins and anatomical models to facilitate skill development. Clinical placements provided opportunities to implement theory and practice new skills. The major variation to the SAAS metropolitan training pathway was removal of the week spent in the Emergency Operations Centre (in Adelaide, metropolitan ECPs are routinely rostered to the EOC to assist with case allocation and management).

The program structure did not include online learning. While this would facilitate delivery to rural and remote sites and decrease the risk of trainees becoming isolated, the hands-on nature of the role lent itself to face-to-face teaching with a large practical component. The need for interactive and experiential learning was the major reason why ECPs felt that online learning alone would not provide appropriate learning experiences. They were also concerned that it may be difficult to balance their emergency work demands with online learning.

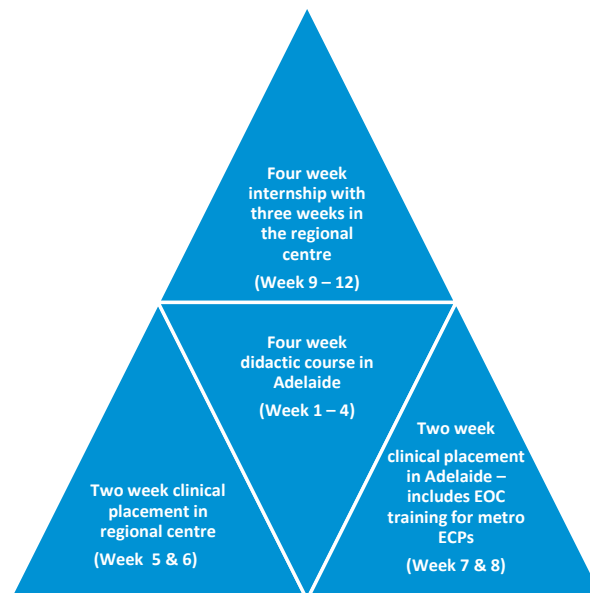


Figure 2 SAAS country ECP training pathway

3.1.2 ERP5 / Edith Cowan University structure

Building on an existing relationship established in 2012, ERP5 and Edith Cowan University collaboratively developed an ECP program. Development occurred in consultation with representatives of Paramedics Australasia and a wide variety of stakeholders.

The ECP program comprised: external education packages (including modules of learning outcomes, assessment and criteria); an intensive two-week classroom program that addressed knowledge, skills, cultural competence and health care law and ethics; a two-week clinical placement at a hospital for the practical skill components and clinical placements where possible at the State/Territory’s facilities (Figure 3).

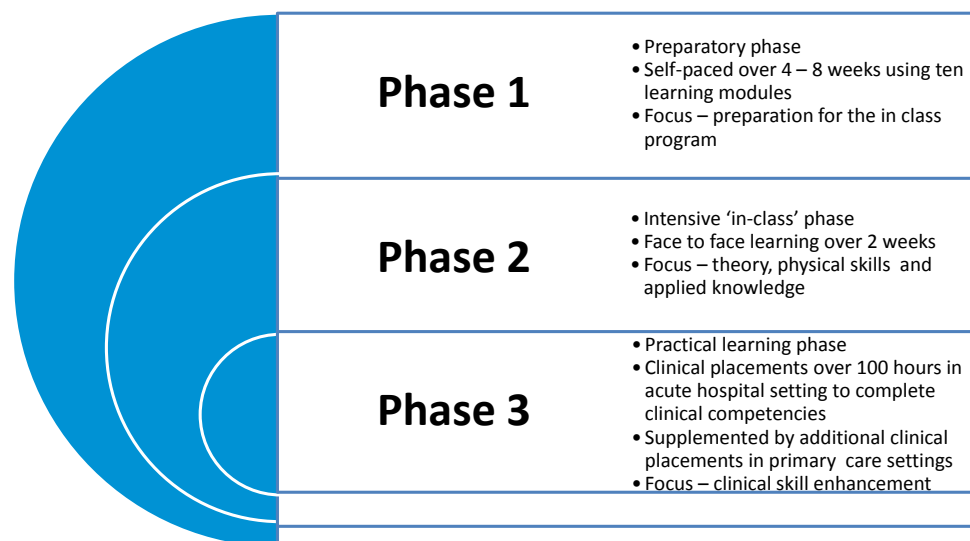


Figure 3 ERP5 / Edith Cowan University ECP training pathway

Delivery modes included face-to-face, flexible / distance learning, simulation and clinical experience. Several reference materials were created specifically for the ECP program

including clinical practice guidelines that linked directly to the extended scope of practice and standards developed by Paramedics Australasia. Learning time included: 80 hours of self-directed learning based on the ECP modules; 80 hours of classroom contact, including simulation activities; and 100 hours of clinical placements in an acute care setting to complete clinical competencies. This was supplemented by further clinical placements in primary care settings and a period of clinical practice during which all cases were clinically reviewed.

The local clinical placement opportunities were limited for the ERP5 student cohort and significant effort has subsequently been invested in establishing these placements for future paramedic and ECP training. Opportunities for placements in GP surgeries and community agencies would be useful and assist with engaging key stakeholders.

3.1.3 Contextualising training pathways

ERP4 was in the unique position of experiencing elements of both training programs which were contextualised for the local environment. Their ECP training was conducted in two phases. The initial two ECPs followed the SAAS ECP training pathway and attended the four-week theory modules in Adelaide, returning home for locally arranged clinical placements. The resignation of one ECP in November 2013 and difficulties covering leave generated a need for further training. As the SAAS course was unavailable at this time, ERP4 negotiated with a training provider to provide a customised version of its training for an additional ECP and the project manager (to support leave cover) on location. Training resources were pooled from the training provider, current ECP equipment and consumables, and a University. The training consisted of one week of intensive didactic and practical sessions, followed by three weeks of clinical placements. The course assessed skills by means of case-based portfolios to be completed within six months of the initial training.

The experience of ERP4 demonstrated that both training programs could be effectively adapted to suit local requirements.

3.2 Experience of Extended Care Paramedics

A survey was conducted to capture the ECPs' overall impressions of the training they completed in 2013. ECPs were asked to rate a range of factors across four domains: course delivery, content, assessment methods, and teaching staff. Ratings were made on a five-point scale from (1) *Strongly agree* to (5) *Strongly disagree*. The 29 items were based on factors identified as important contributors to learning outcomes, and were supplemented by open questions which gave respondents an opportunity to comment on aspects of the training they found useful, and what they would like to see improved.

A 71% response rate was achieved over all sites. There are limitations to these data, as there were small numbers of trainees for each training program.

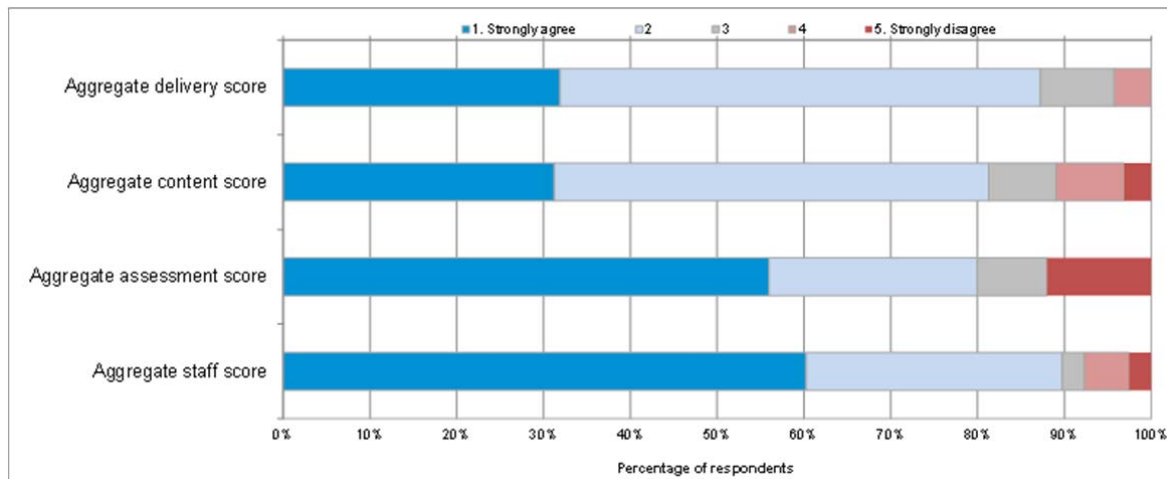


Figure 4 SAAS training program aggregate domain scores

The findings for the SAAS training program are reported in Figure 4 and Table 6. The positive results are demonstrated by a minimum of 80% agreement from respondents with each domain (indicated by a rating of 1 or 2). The results displayed relate to the SAAS training pathway undertaken by ERP1, ERP2, ERP3 and ERP4. Relatively high mean scores for each item were reported (means ranged from 3.25 to 4.75 out of a possible maximum score of 5). Areas for possible improvement include simulation training and explanation of assessment requirements.

Table 6 Descriptive statistics for ERP trainee survey (SAAS training program)

Item	Full sample		
	N	Mean (SD)	Range
1. The training program met my expectations	8	3.75 (0.89)	2-5
2. The training program was well organised	8	4.13 (0.64)	3-5
3. The objectives of the training program were clearly identified	8	3.88 (0.99)	2-5
4. Content was delivered in a logical manner	8	4.13 (0.64)	3-5
5. Training materials (work books, readings, handouts) were appropriate for my needs	8	4.00 (0.93)	2-5
6. There was an appropriate balance between theoretical and practical components	8	3.63 (1.06)	2-5
7. Content was pitched at a level appropriate to the expanded scope of practice role	8	4.63 (0.52)	4-5
8. Necessary equipment and resources were available to complete the training program	8	4.00 (1.07)	2-5
9. Techniques used to present material were appropriate for the training program	8	4.38 (0.52)	4-5
10. The training program provided for debriefing and / or clinical supervision	8	3.88 (1.25)	1-5
11. Learning through simulation assisted me to prepare for the expanded scope of practice role	8	3.25 (1.39)	1-5
12. Assessment tasks were relevant to the training program	5	4.00 (1.73)	1-5
13. The assessment requirements were clearly explained	5	3.60 (1.67)	1-5
14. The assessments were challenging and at an appropriate level	5	4.40 (0.89)	3-5
15. Assessment tasks were graded fairly	5	4.60 (0.55)	4-5
16. Assessment feedback was timely	5	4.00 (1.73)	1-5
17. I was provided with accurate, timely information about the training program	8	4.13 (0.64)	3-5
18. I was informed of any changes within the training program in a timely manner	7	4.43 (0.53)	4-5
19. Training program staff had good knowledge of the subject material	8	4.75 (0.46)	4-5
20. Training program staff facilitated independent practice and decision making with appropriate guidance	8	4.50 (1.07)	2-5
21. Training program staff helped trainees to develop professional confidence and competence	8	4.50 (0.76)	3-5
22. Training program staff provided supportive clinical supervision	7	3.71 (1.60)	1-5
23. Training program staff assisted trainees to relate theory and practice	8	4.13 (0.99)	2-5
24. Training program staff challenged trainees to think critically and problem solve	8	4.63 (0.52)	4-5
25. Training program staff encouraged trainees to ask questions and / or ask for assistance	8	4.75 (0.46)	4-5
26. Training program staff guided students to identify their own learning needs	8	4.38 (1.06)	2-5
27. Training program staff provided individual constructive feedback, identifying both	7	4.00 (1.53)	1-5

Item	Full sample		
	N	Mean (SD)	Range
strengths and weaknesses			
28. Training program staff were accessible when assistance was required	8	4.50 (0.53)	4-5
29. I would recommend this training program to others	8	4.63 (0.52)	4-5

Results are provided for the ERP5 / Edith Cowan University training program in Figure 5 and are also extremely positive.

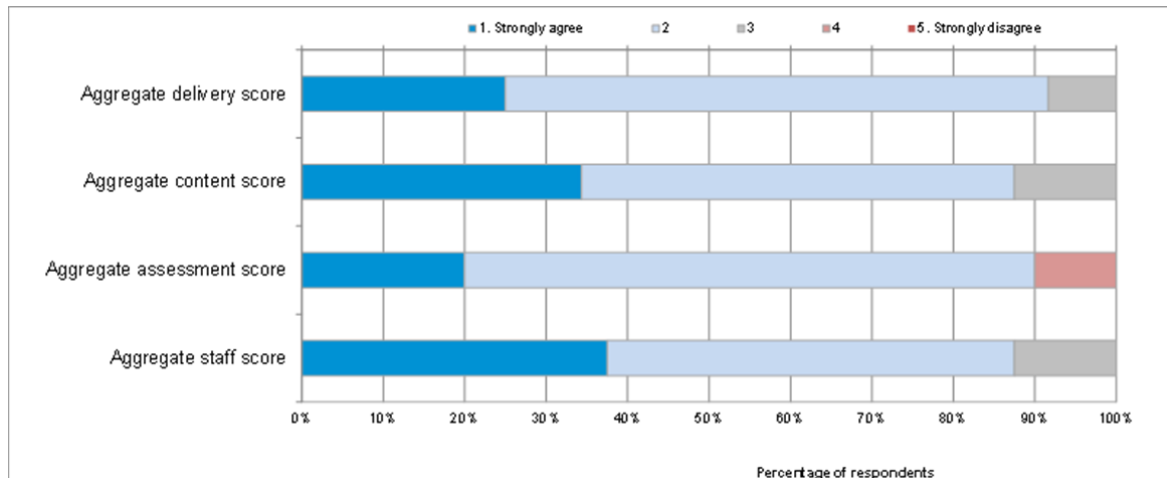


Figure 5 ERP5 / Edith Cowan University training program aggregate domain scores

Results reported in Table 7 demonstrate that all items related to the ERP5 / Edith Cowan University training program were rated very highly. Areas for potential improvement included explanation of assessment requirements and provision of individual constructive feedback by training program staff.

Table 7 Descriptive statistics for ERP trainee survey (ERP5 / Edith Cowan University training program)

Item	Full sample		
	N	Mean (SD)	Range
1. The training program met my expectations	4	4.50 (0.58)	4-5
2. The training program was well organised	4	4.25 (0.50)	4-5
3. The objectives of the training program were clearly identified	4	4.00 (0.82)	3-5
4. Content was delivered in a logical manner	4	4.50 (0.58)	4-5
5. Training materials (work books, readings, handouts) were appropriate for my needs	4	4.50 (0.58)	4-5
6. There was an appropriate balance between theoretical and practical components	4	4.25 (0.50)	4-5
7. Content was pitched at a level appropriate to the expanded scope of practice role	4	4.25 (0.50)	4-5
8. Necessary equipment and resources were available to complete the training program	4	3.75 (0.96)	3-5
9. Techniques used to present material were appropriate for the training program	4	4.50 (0.58)	4-5
10. The training program provided for debriefing and / or clinical supervision	4	4.00 (0.82)	3-5
11. Learning through simulation assisted me to prepare for the expanded scope of practice role	4	4.00 (0.82)	3-5
12. Assessment tasks were relevant to the training program	4	3.75 (1.26)	2-5
13. The assessment requirements were clearly explained	4	3.50 (1.00)	2-4
14. The assessments were challenging and at an appropriate level	4	4.25 (0.50)	4-5
15. Assessment tasks were graded fairly	4	4.25 (0.50)	4-5
16. Assessment feedback was timely	4	4.25 (0.50)	4-5
17. I was provided with accurate, timely information about the training program	4	3.75 (0.50)	3-4
18. I was informed of any changes within the training program in a timely manner	4	4.00 (0.00)	4-4
19. Training program staff had good knowledge of the subject material	4	4.75 (0.50)	4-5
20. Training program staff facilitated independent practice and decision making with	4	4.75 (0.50)	4-5

Item	Full sample		
	N	Mean (SD)	Range
appropriate guidance			
21. Training program staff helped trainees to develop professional confidence and competence	4	4.25 (0.50)	4-5
22. Training program staff provided supportive clinical supervision	4	4.00 (0.00)	4-4
23. Training program staff assisted trainees to relate theory and practice	4	4.00 (0.00)	4-4
24. Training program staff challenged trainees to think critically and problem solve	4	4.25 (0.50)	4-5
25. Training program staff encouraged trainees to ask questions and / or ask for assistance	4	5.00 (0.00)	5-5
26. Training program staff guided students to identify their own learning needs	4	4.00 (1.15)	3-5
27. Training program staff provided individual constructive feedback, identifying both strengths and weaknesses	4	3.50 (0.58)	3-4
28. Training program staff were accessible when assistance was required	4	4.00 (0.82)	3-5
29. I would recommend this training program to others	4	4.50 (0.58)	4-5

Qualitative analysis of the additional comments on both training programs gave greater insight into aspects of the courses that were well received and opportunities for improvement. In addition, interviews with the ECPs at the close of the program provided an opportunity for more detailed feedback on the training.

The didactic component of each training program brought the ECPs together and provided an opportunity for ECPs to learn from the experiences of others:

“I found it very nice to get insights into different services and define the similarities I think more so than anything.” (ECP)

The diversity of experience is demonstrated by some sessions being rated very highly and seen as relevant and applicable and other sessions described as *“a complete waste of time”*.

ECPs across all project teams strongly emphasised the importance of the clinical placement component of the training program. It is recognised that clinical placements can be challenging to organise where there are no pre-existing links with the relevant services. Clinical placements are the component of the training that generated most comments and most suggestions for improvement. The need for clinical placements to be of long enough duration for the ECP to adequately practice new skills, (for example, some placements were one day in duration) was an issue that was raised consistently in interviews with the ECPs.

“So we didn’t get any suturing of a real bleeding person. We just did the non-bleeding textbook!” (ECP)

Implementation sites that had not previously had an ECP in place, found it difficult to identify the most relevant and useful placements in the short set-up period. The types of placement most often mentioned as useful included those with a nurse practitioner in the ED that provided opportunity to see and practice suturing and wound management. The success of placements was influenced in part by the attitude of the ECP participant and the supervising practitioner.

“...I think getting out of our own study area and going into the other facilities and seeing how they work, what they do, and how they interact, builds good bridges between services.” (ECP)

Another issue raised frequently by the ECPs related to mentoring. There are two aspects that were consistently discussed: peer-to-peer mentoring and the critical importance of medical mentoring. ECPs valued the opportunity to spend time with a peer, particularly in the first few weeks on the road. The SAAS project teams were able to negotiate shifts with experienced ECPs based in metropolitan Adelaide. This allowed ECPs to consult with ‘veteran’ ECPs and discuss thoughts and ideas. Although valuable in building skills and confidence, this approach

kept ECPs away from their own stations and families for a longer period, and for some ECPs it was stressful to be mentored in a foreign working environment. Implementation sites like ERP3, ERP4 and ERP5 did not engage in this practice as the ECP initiative was a new model of care for these organisations. Some ECPs from these implementation sites arranged to spend some shifts in Adelaide to accompany established ECPs, but most relied on pairing up with another ECP from their own team for the first weeks on the road. This was an important factor which contributed to the development of confidence and assisted ECPs to consolidate skills and become established in their new role. The role of medical mentors is discussed further in Section 3.5.

3.3 Training timeline and completion of requirements

Across the five implementation sites the training pathway extended from 10 to 12 weeks. Information relating to training commencement is in Table 8. All ECPs who undertook the training program successfully completed it. One paramedic required additional mentoring time although there were no performance issues or clinical concerns with this staff member. Two of the paramedics recruited by ERP5 did not have ICP qualifications but were nevertheless able to complete the training successfully.

Several of the ECPs reported at interview that they were on a “steep learning curve” as the ECP role was very different to their usual practice. Many ECPs reported that they did not feel confident in their first weeks and months on the road. Like any group of adult learners, the ECPs varied in their learning pace, learning styles and preferences. There was a very strong and consistent message that paramedics are practical people and learn best by doing. The confidence of most ECPs developed as they settled into the role; however a few expressed they did not feel confident despite completing their training and working in the role for several months. It appears that ECPs who received longer periods of clinical placements and / or the opportunity to work with another ECP in the three to six weeks after training, adapted to working as a single responder more quickly. The majority of ECPs felt that the training coupled with their prior experience and self-directed learning equipped them for the role.

ECPs who were able to have a gap between the didactic component and their clinical placements reported that this was useful in managing their absence from their usual workplace and home and in absorbing and consolidating the theoretical material before having to put it into practice.

Table 8 ECP cohorts – training commencement and completion

Implementation Site	Training commenced	ECP services commenced	ECPs completing training-cohort 1 and 2	Funded ECP positions
ERP1	October 2012	December 2012	3	3
ERP2	Cohort 1: October 2012 Cohort 2: March 2013	2 ECPs: December 2012 1 ECP: August 2013	3	3
ERP3	October 2012	February 2013	4	4
ERP4	Cohort 1: October 2012 Cohort 2: November 2013	2 ECPs: January 2013 1 ECP: January 2014	3	2
ERP5	December 2012	March 2013	4	4
Total			17	16

3.4 Scope, content and relevance

The training programs were designed to support trainees gain the knowledge and skills needed to work in the community as ECPs. The programs had clearly articulated learning outcomes. The content of the training programs was comprehensive. It included: advanced assessment techniques; wound management; tube and catheter replacement; palliative care; management of a wide range of general conditions; the use of antibiotics and analgesics and supporting and working with other care providers and members of the healthcare community.

ECPs identified several strengths and limitations of the training content. Whilst they recognised the value of having common requirements for the theoretical training, they believed programs should be adapted to meet local needs, taking into account patterns of service provision and clinical guidelines unique to particular jurisdictions. Customising content would ensure that materials were relevant for interstate participants. Based on the implementation experience of several project teams, course content may require review to include end of life issues / management and appropriate mental health content.

Paramedics are adult learners with differing learning styles. They responded well to the mixed learning modalities: didactic lectures, clinical placements and mentoring opportunities where available (Table 9). To address issues raised by ECPs, the feasibility of amending course structure and delivery should be investigated. A considered suggestion from several ECPs was the separation of the face-to-face component into two separate study blocks.

Table 9 Training pathway strengths and limitations

SAAS		ERP5 / Edith Cowan University	
Strengths	Limitations	Strengths	Limitations
Balanced course structure	Time away from home for four week didactic component	Multiple delivery modes	Delivery of entire theoretical component in one study block
Well organised with relevant program content	Limited clinical exposure	Clinical practice guidelines were well developed and provided clear direction for ECPs	Alignment of the proposed scope of practice with identified community needs
Small group size enhanced learning experience	Quality of some resource materials	Small group size enhanced learning experience	Medication guidelines whilst useful could be further developed to include assessment and monitoring requirements, where appropriate and information for patient education e.g. impact of antibiotics on contraception.
Supportive learning environment	Integration of the local context in learning materials	Supportive learning environment	Integration of the local context in learning materials
Quality of expert presenters	Inadequate local clinical placements	Quality of course materials particularly on-line modules	Inadequate local clinical placements
Opportunity to mix with ECPs from different jurisdictions	Insufficient internship period	Quality of instructors, flexible and assistive	

Critical thinking, synthesis of clinical problems and applied clinical reasoning were skills identified as fundamental to the extended role. These attributes could have been more explicitly reflected in the learning outcomes. Given the scope of practice and the opportunity for post-graduate credit to be awarded, (currently only for the ERP5/Edith Cowan University training pathway), synthesis, clinical decision making and advanced clinical reasoning should be reflected in outcomes for this program. Currently a number of these sit at the lower end of Bloom's Taxonomy (Bloom et al., 1971). ECPs felt that the training program needed to emulate the problem solving approach of medicine that is built from a fundamental understanding of anatomy, physiology and pathophysiology as opposed to the more protocol driven approach adopted by paramedicine. This feedback should be considered when course evaluation and redevelopment is undertaken.

Primarily low fidelity simulation was used. This was designed to support trainee's knowledge and skills, enhance the development of practice and assist them to prepare for clinical placement. Simulation provides an essential stepping stone from theory to supervised practice,

and the development of competent autonomous practice. While appropriately included as a delivery method in the program, issues surrounding the use of simulation drew criticism from ECPs. When asked to comment on how simulation assisted trainees to prepare for the ECP role, a number disagreed or strongly disagreed that it had been helpful. The methods and equipment use to support simulation need to be reviewed. Limited access to facilities in one location has now been addressed through a relationship with a University; and access to the simulation laboratory at the local hospital for clinical training. There is scope to extend the use of simulation in this program.

The periods of clinical placement were vitally important. For most ECPs the major limitation of the training program structure was attributed to limited clinical exposure (frequently from relatively small numbers of cases). It was perceived that there was a need for increased supervision to increase confidence in new skills. This would be addressed by a longer internship experience, particularly in localities new to the ERP model of care.

All project teams used the process of case audit or peer review. This was seen as an important mechanism for the ongoing development of the ECPs and a key mechanism for engagement of medical mentors. Several ECPs commented on the variety of cases that they were called to in rural and regional settings and how this made case audit and review even more important. It was acknowledged that it was not possible to cover every eventuality in a training program.

Edith Cowan University assisted ERP4 through providing an abridged training program on site. Whilst this was appropriate given the context and timing, it did not provide the breadth and depth of experience of the longer training programs.

3.5 Staff qualifications

SAAS and Edith Cowan University engaged a diverse range of presenters in the training programs and for the participating ECPs this was identified as a particular strength of program delivery. Many of the clinical educators had previously taught ECP courses and had a good understanding of the nature of the work and environment. Limited details were available regarding the type and level of professional development and other scholarly activity of the key training staff and this precludes further comment or judgement regarding the teaching team's expertise and the appropriateness for this program.

Clinical experts and experienced ECPs provided a useful contribution to several aspects of the training pathway. This provided a targeted teaching approach addressing education needs and ensuring relevance of content. Project teams drew on the expertise of other health professionals (doctors, nurse practitioners, allied health practitioners and other industry specialists) to support the implementation of the program. The utilisation of external professionals acted as an effective mechanism for stakeholder engagement. This was particularly evident in the robust mentoring arrangements that implementation sites established locally. For example the ERP1 project team engaged the Director of the ED and the ERP2 project team identified supportive GPs with prior experience in rural health and education.

3.6 Facilities and resources

Overall both training pathways were well resourced. A variety of teaching and learning resources were used to facilitate learning. It is acknowledged that the ECP role is developing and resources such as text books written specifically for ECPs are limited. Text books from other disciplines addressing physical assessment could be used. Alternative resources such as journal articles and web links were widely deployed. In their interviews, ECPs emphasised the need for better written resources from the SAAS program that the ECPs could take away and use as reference materials.

ERP3 and ERP4 had not had prior experience with the ECP training pathway and found the short period available for project set-up and establishment made it very difficult to develop the

relationships necessary for effective clinical placements. ERP5 was able to leverage off the experience of Edith Cowan University in this area which had established Memoranda of Understanding with two hospitals for clinical placements. Edith Cowan University has subsequently provided assistance in liaising with a range of local health care providers in the region to ensure appropriate local clinical placements are accessible for the next cohort of ECPs.

All implementation sites provided ECPs with clinical guidelines or pathways to support their practice within their local jurisdiction. Ambulance services are traditionally protocol driven, so for many ECPs access to these guidelines was important and provided both direction and reassurance. Project teams new to the ECP model of care valued the capacity to adapt guidelines on the basis of experience in the field.

The ECPs who attended the SAAS training program set up a 'Dropbox' account as a central source of information that all ECPs could access. The ECPs not based in Adelaide particularly appreciated this collegial approach. It was reported that information was added to the Dropbox account regularly. Several ECPs maintained contact with interstate colleagues after returning to their home States and Territories and found this peer contact very helpful.

3.7 Teaching and learning environment

The SAAS training program was conducted at the ambulance station where the metropolitan ECPs were based. The ERP5 ECPs received their training predominantly in their home city with lecturers from Edith Cowan University travelling to them. They undertook clinical placements in a hospital in accordance with the University's established arrangements. In both cases, a supportive teaching and learning environment was provided. Teaching staff were described as being approachable and able to develop a rapport with trainees. The ECPs built close, supportive relationships with each other during training and were subsequently available via telephone when required to provide advice. ECPs valued training program staff who were proactive and provided timely advice and feedback.

Mentoring has emerged as an essential component of providing teaching, supervision and support for trainees in internship. The collaborative way in which senior consultants approached teaching was positive. The importance of a single point of contact with an accessible and supportive medical officer for ongoing advice was identified as a key factor in trainee development and ensuring public safety. Regular meetings provided an opportunity for constructive feedback and discussion of cases and any changes to procedures and protocols. Gathering information to inform a professional judgement about competence is easier and more accurate when there is consistency in supervision, and trainee practice is observed over time.

The newness of the ECP role presents a challenge for clinicians undertaking on-the-job teaching, supervisory and mentoring roles. Clinical facilitators work in teaching hospitals and have undergone some relevant training. Nevertheless, establishing a specific course for preparation of clinical facilitators would ensure a consistent understanding of the scope of practice, supervision and competency requirements. Further, criteria for the selection, appointment and roles of mentors and clarifying their contractual obligations would facilitate consistent student support. Programs could be developed to prepare mentors for their supervision and assessment roles.

3.8 Assessment methods

Both training programs had clearly articulated assessment schedules with well-documented competency requirements. For SAAS, the competencies and final assessment processes, including a written exam, viva and skills tests, were described clearly in the student handbook and documented through the ECP internship portfolio. The viva involved a clinical audit and discussion regarding two ECP cases undertaken during the internship to ensure the ECP's underpinning knowledge and decision making process was at the required level.

It is unclear how the training providers ensured consistency in the assessment process when this occurred outside of Adelaide. Internal moderation occurred at some sites. While this is commended, this practice should be extended across implementation sites with development of quality measures that generate empirical evidence of validity and reliability of assessment outcomes. In most areas well established procedures were employed to prepare students for clinical placement and assessment.

For SAAS ECPs there was some misunderstanding about the requirements and this led to modifications and the establishment of a country specific assessment for the ECPs to be granted 'Authority to Practice'. They were required to complete the equivalent of their metropolitan counterparts but were allocated more time to do this due to reduced job exposure.

ERP3 modified an existing policy 'Authority For and Scope of Clinical Practice' to encompass the ECP role. ERP4 decided not to put its first ECP training cohort through the SAAS assessment process. Although there was some concern around the fact that no official evaluation or learning outcome document was supplied for the SAAS training participants, the further training undertaken with Edith Cowan University (for the new ECP and program manager) included the remaining SAAS-trained ECP. This second ECP training cohort is working through the ERP5 / Edith Cowan University assessment process.

The ERP5 / Edith Cowan University training pathway drew on elements of existing competency assessment frameworks developed by the Nursing and Midwifery Board of Australia and Australian Medical Association, along with recognised national paramedic competencies. It identified four levels of competence and clearly outlined the expectations for students including the stage and level of practice required. While Bondy (1983) is cited as a reference it is not clear how the ECP competency framework / levels relate to Bondy. The framework would be strengthened by developing detailed descriptors / behaviours for each of the four levels of practice to indicate behaviours that describe levels of performance as the Bondy framework does (e.g. Dependent, Marginal, Assisted, Supervised and Independent). Adding this level of detail will provide additional direction for students and mentors and improve inter-rater reliability, enhancing the validity of assessment outcomes.

The ERP5 trainees had the opportunity to engage in simulation and receive formative feedback regarding performance and development needs before starting their placements and undertaking competency assessments. The clinical supervisor who carried out the assessments on-site was supported by a clinical facilitator (supplied by Edith Cowan University). Documentation indicated that there was only one placement site but there are references to two placements sites in other data sources. It is unclear whether all competency assessment was undertaken by the clinical supervisor or if placement supervisors were also involved. If multiple assessors are used then a process for moderation is required. This should be coordinated by the clinical supervisor.

Moderation of course theory materials (including assessment) was undertaken by Edith Cowan University. Some Americanisms in the curriculum were addressed. It is noted that ERP5 believe the curriculum to be 'international' and they 'are bound by agreements to maintain some content in its original form'. Further information regarding this is required. GPs and medical directors were engaged in reviewing the clinical practice guidelines and an external clinical supervisor reviewed the clinical module. The review outcomes included addressing references and contextualising information so that it was appropriate to the placement areas.

Trainee feedback indicates that assessment tasks were clearly explained and from their perspective relevant to the training program. While overall feedback about assessment tasks is positive, areas for potential improvement included provision of individual constructive feedback that identified strengths and weaknesses for individual trainees by program training personnel.

The ERP5 / Edith Cowan University training pathway included the capacity to award 'Recognition of Prior Learning' for the theory modules. The processes for award of credit and determining retention of knowledge and skills were not included in program documents. In order for this to be a transparent process that provides assurances that trainees have the required knowledge base and demonstrate a level of understanding appropriate to the module learning outcomes, some form of evaluation should be completed. This aspect of admission and evaluation of trainees existing knowledge and skills requires further consideration.

Several ECPs found it challenging to juggle the assessment demands with their work schedules. One implementation site decided not to put their ECPs through the assessment process as they were unable to complete the full extent of the SAAS training program (i.e. they only attended the didactic component in Adelaide). There is a need for a consistent approach to assessment across the ECP training pathways.

3.9 *Modifications to the training program*

The training program developed in South Australia has largely met the needs for the rural ECP implementation sites. Some changes were made. ERP2 identified a need for refresher training in wound management and palliative care and two half-day workshops were instituted to fill this gap. Additional content to address conditions such as urinary tract infection, head injuries, vertigo, gastroenteritis, back pain and the management of anticoagulant therapy were added to tutorials. Some evidence of consultation with external specialists/bodies to inform change processes, particularly in regard to medication provision by ECPs, is included in program documents.

All implementation sites established a clinical education committee to coordinate training and regularly review and learn from clinical cases. The review process was most effective when it occurred routinely and all ECPs participated.

Several minor modifications were made for rural and remote sites, to reduce the amount of time ECPs were away from home and families. This reduction in the internship period adversely impacted the confidence of ECPs to practice independently. ERP5 and Edith Cowan University reported that no modifications were made during the implementation of the program.

A consistent theme emerging from the ECP interviews was the importance of ongoing professional development. This was generated from a range of factors including the evolving nature of the ECP role and the varying confidence levels of ECPs in performing specific procedures. Suggestions for ongoing professional development included a "clinician training day" or a regular rotation from a rural or regional area to a busier metropolitan ECP service. SAAS also developed a series of working groups looking at different clinical topics that provided feedback into the broader ECP Clinical Update Group.

The major area for enhancement of the ECP training program relates to clinical placements. These require a lot of groundwork and careful planning to optimise their impact. Clinical placements need to be well organised and structured to align with the primary caseload that the ECP is expected to manage. Clinical placements had a significant role in establishing networks and relationships between the ECPs and other health care providers, improving understanding of the ECP role and establishing the foundation for future interprofessional collaboration. Clinical placements clarified potential referral pathways for ECPs to assist with patient management and coordination of care. There needs to be better communication between organisations in terms of the focus and expected outcomes of the clinical placements. Consumer and service provider demands shifted as the role became better established and relationships with other stakeholders developed, leading to the identification of new service gaps and opportunities for a complementary role.

3.10 Training program sustainability

Both training programs demonstrated they could be adapted for use in other jurisdictions and valuable lessons were learned about contextualising the program for local conditions.

A significant concern about the SAAS training program was that it did not generate any formal qualification. This raises questions about the notion of 'Authority to Practice'. This is a significant barrier to the transferability of the training program and has implications for national implementation. ERP5 / Edith Cowan University training program arranged award of credit toward four units of a Master of Paramedical Science (Community Paramedicine). Opportunities to formalise the qualification in SAAS and facilitate recognition of prior learning to enhance future career development of participants should be explored. Transcripts should be issued to successful graduates and records of achievement established.

This ERP model of care was based on the current SAAS Metropolitan ECP clinical standards and skill-sets as the base level for the introduction of ESOP. Several stakeholders have identified that opportunities exist to review the clinical level required to undertake ESOP care options. An evaluation of those skills utilised most frequently by clinicians or case workload that required preventable transportations to the ED could be the focus of a targeted training package and program implementation to extend the scope of practice of paramedics or ICPs within a specific area for a particular skill. This approach of matching clinical care to identified clinical need or case mix could reduce the training time and costs associated with implementation. This skill-based model would need to have appropriate clinical support and governance to ensure patient safety but these systems currently exist within the organisation. There were divergent views about this approach, with the majority of stakeholders clear that for the ECP role to develop and be understood and accepted it needed to retain appropriate selection criteria, a defined scope of practice and robust training methods.

The majority of ECPs raised concern about skills maintenance and expressed concern that they would deskil in ECP and ICP tasks if they did not use them routinely. Most implementation sites addressed this by integrating ECPs into the usual professional development practices of their organisation. For jurisdictions discontinuing the ECP model of care this will be problematic. All project teams confirmed that continued funding is the most significant issue impacting sustainability.

As SAAS is committed to the metropolitan ECP model, training will be maintained through the existing internal arrangements. ERP5 has entered into a five year Memorandum of Understanding with Edith Cowan University which provides continued access to ECP training for the life of this Memorandum of Understanding. Whilst ERP3 and ERP4 have considered developing training programs in-house for future ECP intakes, this is dependent on the continuation of the ECP program.

There is a need to develop clinical guidelines to help other key stakeholders understand the scope of practice and provide a framework for operation. Further, it is recognised that trainees are working in the community in uncontrolled environments. There is a need to establish protocols for provision of medication. Due to legislative barriers this would require further consideration if the program were offered nationally.

3.11 Training program capacity and impact

The training pathways developed by SAAS and ERP5 / Edith Cowan University produced ECPs that were 'fit for purpose' and capable of safe and effective clinical practice. All implementation sites reported that there had been widespread positive feedback from patients and care providers regarding the program. They claimed that the program had reduced utilisation of emergency ambulance resources, ED attendance and hospital admissions. It is believed that the program has increased treatment options for patients beyond hospital care (e.g. palliative care) by safely managing patients within the home environment and reduced unnecessary out

of hour intervention from GPs. Statistics relevant to the impact of the ECP role are included in Section 4 of this report.

The program appears to have had a positive impact, however primary health care providers raised the need for communication with them regarding interventions for clients. While this issue has been resolved at a local level, considerations should be given to the further development of documentation templates to facilitate interdisciplinary communication and ensure care outcomes are reported appropriately.

The SAAS training pathway does not specify training entry requirements; it is assumed that applicants will have already met the essential minimum criteria for the ECP role, which includes Intensive Care Paramedic (ICP) qualifications and experience. However, in rural and remote locations it may be necessary to recruit ECP trainees who do not have this level of post-graduate training in order to ensure sustainability of the model. One jurisdiction made the decision to change the requirement for ICP qualifications from an essential to a desirable criterion for ECP recruitment in order to broaden the pool of potential applicants. Given the limited number of paramedics with this qualification in rural and remote locations and the impact this has on recruitment, this decision was considered reasonable.

ECP applicant experience, personal abilities and capacity for clinical decision making and advanced clinical reasoning were considered the most important characteristic of ECP selection criteria. Applicants were assessed by interview and response to questions related to a case study and nursing home documentation that detailed complicating factors related to care and ongoing patient management. Information regarding the reliability of this assessment is not available. In order to provide assurances that this is an effective determinant for program entry, it is recommended that the interview questions and evaluation tools are evaluated.

The introduction of the program has provided an additional career pathway for experienced ICPs. It has generated considerable interest in each implementation site with many paramedics expressing interest in future training opportunities.

The focus throughout this project has been on the implementation of capability which has included development. A better approach would be to view the development of the capability separately from the implementation. Feedback has indicated that combining training and implementation has proved difficult. The development of the capability must come before the implementation as a standalone activity.

3.12 *Budget and expenditure*

SAAS developed its ECP training pathway in-house some years prior to the HWA-ESOP program and continues to meet any costs associated with modifications from organisational resources. Throughout the training program the additional costs associated with ECP attendance were met fully from HWA funds. All funds allocated for training were expended.

A modest provision was made in the ERP5 project budget for Edith Cowan University personnel engaged in training and course development. The full development costs are unclear as there was an existing Memorandum of Understanding in place between ERP5 and Edith Cowan University for paramedic training.

Through the economic analysis an estimate was developed of the additional cost of training an ECP. For both training pathways this averaged approximately \$30,000 per ECP (refer to Section 5 for further detail).

3.13 *Summary and conclusions*

The ERP initiative has provided a learning and career pathway for expanding the paramedic role to include the effective delivery and management of patient care in the client's home. The

training pathways have been well constructed and successfully implemented. They provide a consistent and coordinated approach to educating ECPs and have provided highly experienced paramedics with additional skills and training in primary health care allowing them to safely assess, treat and refer this cohort of patients.

Their particular strengths include the clearly articulated learning pathways and structured approaches to education and assessment. Ongoing care is needed to ensure the consistent application of these training pathways in all implementation sites. Partnerships with higher education facilities provide beneficial access to formal moderation and governance systems to oversee content and delivery and monitor quality. The training programs appear to be fit for purpose. With development and continued support - including removal of legislative and other barriers - they have the potential for national implementation.

The content of the programs was appropriate. A mixture of common requirements for the didactic training component and additional content that can be adapted for local needs is highly desirable. For example, courses should cover clinical guidelines unique to the jurisdictions in which the trainees will be working, and develop skills which meet local service requirements. The mentorship and supervision model is a strength of the training programs and provides a valuable mechanism for engaging clinical stakeholders.

The clinical placements need to align with the proposed scope of practice of the ECP and identified community needs as well as providing opportunity to practice skills such as wound assessment, suturing and catheterisation. They need to balance acute hospital experience (ideally in an ED setting, urology ward or plastic surgery outpatients) with exposure to primary health care, particularly community nursing, general practice and palliative care. Opportunities for placements in GP surgeries and community agencies such as Aboriginal Medical Services would also be useful and assist with engaging key stakeholders. These placements provide ECPs with improved understanding of community referral pathways.

A structured period of mentoring with an experienced ECP or through using a two crew arrangement should be considered for the first 4 -8 weeks of implementation. The length of the mentoring period will be dependent on the experience, skills and confidence of the individual ECP. An ongoing mentoring arrangement with an appropriate medical officer (either based in ED or primary health care) is essential and this works best when there is a prior relationship with the selected medical mentor.

The single responder nature of the ECP role means that other paramedics have limited opportunities to see the ECP at work and gain a full understanding of what they do. If this is not addressed, other teams may be less willing to refer patients to the ECP, and opportunities for peer learning may be missed. Ongoing professional development for the ECPs is essential to ensure skills maintenance of both ECP and ICP functions, especially for those in more isolated areas where an annual rotation to a metropolitan service may be warranted. These issues are best managed by using existing organisational processes.

When training did not result in a recognised qualification, several implementation sites provided ECPs with 'Authority to Practice'. These applied only to the host organisation, raising questions about the transferability of the training with consequent implications for national implementation.

In summary the training programs proved to be affordable, accessible, and capable of producing competent clinicians that were 'fit for purpose'. They were structured in accordance with adult learning principles and delivered in supportive teaching and learning environments. They appear to be sustainable, however this would be improved by ensuring training programs generate a qualification that is nationally recognised, and further work is required to achieve this outcome. Several areas for development were identified from the training evaluation and these are summarised in Table 10.

Table 10 Opportunities for training program development

Training component	Opportunities for improvement
Program content and structure	<p>Include content that reflects the unique demographics of Australian populations (e.g. indigenous content and culturally safe practice)</p> <p>Develop a standardised preparation program for clinical supervisors/ mentors that addresses facilitation, supervision and assessment of competence</p> <p>Include content related to mental health</p> <p>Ensure protocols for provision of medication are incorporated into relevant learning modules</p> <p>Develop documentation templates to facilitate interdisciplinary communication and ensure care outcomes are reported appropriately</p> <p>Review processes for competency assessment</p> <p>Develop more take home resources for trainees</p> <p>Review the resources and opportunities to further develop learning through simulation</p>
Program delivery	<p>Review entry criteria</p> <p>Establish robust processes for Recognition of Prior Learning including assessment criteria</p> <p>Explore a training pathway for part time trainees</p> <p>Explore funded study and work release models to facilitate completion</p> <p>Extend moderation procedures for course/module development and assessment and develop robust processes to support marker inter rater reliability</p> <p>Evaluate trainee assessment load and requirements</p> <p>Establish agreements/contracts for clinical placement at all implementation sites</p> <p>Establish agreements/contracts for clinical supervisors and medical mentors</p> <p>Issue transcripts and explore formalisation of qualification</p> <p>Advise about post training endorsement processes including credentialing and re-credentialing process</p>
Program scalability	<p>Explore opportunities for collaborative development between educational organisations to ensure program cohesiveness and a standard approach to training</p> <p>Consult with professional bodies to facilitate national recognition of the program and infrastructure to support this (e.g. national certification)</p> <p>Consult with professional bodies to develop an agreed scope of practice, national standards and competencies e.g. a national framework or approach to training that can be adapted at a jurisdictional level</p> <p>Consult with professional bodies to determine post training endorsement processes including credentialing and re-credentialing process</p> <p>Address legislative barriers that preclude the extension of the role and impact on legal jurisdictions of health providers across states and territories</p> <p>Work with appropriate professional bodies to establish a national record of completions</p> <p>Consider how project sites can be supported when they have no prior experience of implementing a new model of care through the use of a lead site or networked approach to program implementation.</p>

4 Impact

4.1 Introduction

Sections 2 and 3 of this report have addressed the plain-language evaluation question, “What did you do?” Section 4 addresses the question, “How did it go?” It begins with a description of the activities of ECPs both within and outside the ERP model. This addresses key questions around the numbers and types of patients seen, providing an essential context for the evaluation results. Findings on the impacts of the ERP model are then presented, organised around the three levels of the evaluation framework:

- Level 1 – impacts on, and outcomes for, consumers (including carers and communities);
- Level 2 – impacts on, and outcomes for, health care providers (including the ECPs themselves, other ambulance service staff and key stakeholders); and
- Level 3 – impacts on, and outcomes for, the health system (in this case, focusing mainly on effects on the participating ambulance services, local hospital EDs and relationships with primary care organisations and providers).

This summative component of the evaluation seeks to ascertain whether the innovation achieved the desired results and to provide essential information to guide future planning decisions, policy and resource allocation. The desired results are partly defined as a set of Key Performance Indicators (KPIs) which were developed by the national evaluation team in consultation with HWA and sites. The national evaluation team created and/or adapted evaluation tools to address these KPIs and these are described in detail in the *Compendium of Data Requirements and Evaluation Tools* (Thompson et al., 2012b). Performance against each of the relevant KPIs is reported below.

Data collection and analysis activities have gone far beyond the KPIs, with the goal of providing a comprehensive overview of the program’s achievements, limitations, lessons learned and requirements for success. Data collection activities of the national evaluation team, in collaboration with the sites, have generated a vast quantity of data from a variety of sources, including administrative data sets, surveys and semi-structured interviews. This has allowed genuine triangulation of sources and has established a rigorous foundation for the findings reported below. The methods of the national evaluation are described in Appendix 2.

4.2 Activities of the Extended Care Paramedics

4.2.1 How many patients were treated?

While the ERP model did not differ greatly across sites, there was marked variation in activity levels both in terms of the total patients seen, and the proportion of ECP cases seen, across the implementation sites. Activity levels have been shown in Table 11.

The total volume of cases was calculated over the implementation period, this was appropriate given the small relative volume of the ERP model. In addition the baseline data was unreliable for one of the sites. ERP5 moved to a new information system in June 2013, part-way through the implementation period. The new system more accurately reported activity at ERP5, and therefore total activity levels for this project site are likely to be an underestimate.

The total volume of activity at each project site gives an indication of the relative potential of sites to identify appropriate cases for the ERP model of care. Total cases per month is lowest at the regional and rural sites, with ERP2 reporting around 250 cases per month, ERP1 around 925 cases per month, while ERP4 had just over 1,250 cases per month. This compares with much higher numbers at ERP3 which have more than 2,750 cases per month and ERP5 which reported around 2,900 cases per month over the implementation period, but the true caseload is closer to 3,500 cases per month, based on the new information system.

Table 11 Activity levels over implementation period – number of cases by site

Site	Number of ECPs FTE	Number of Months of data	All cases seen by ECPs	ESOP cases seen by ECPs	Average cases at site per month	Average cases seen by ECPs per month	Average ESOP cases per month
ERP1	3.0	15	610	437	928	40.7	29.1
ERP2	2.7	15	^c 56	56	253	^c 3.7	3.7
ERP3	4.0	14.5	1,088	963	2,780	75.0	66.4
ERP4	2.0	^a 12	790	399	^b 1,275	65.8	33.3
ERP5	4.0	12.5	812	263	2,908	65.0	21.0
Total	15.7		3,356	2,118			30.7

a. Activity from 1 Jan 2013 - 31 Mar 2014, except ERP4 which starts from 1 Apr 2013 due to reporting issues in the first three months. During these first three months the ECPs saw a total of 187 cases, of which around 60-70 are estimated to be additional ECP cases, which have not been tabulated.

b. ERP4 refers to only the Northern Region of ERP4.

c. Non-ESOP cases for ERP2 are unknown, so these figures are under-estimates.

Table 11 shows the number of ECPs and their activity levels. The head-count at ERP2 was reported as three ECPs, the Full-Time Equivalency has been adjusted because of the delayed commencement of one staff member. This includes counts of all cases seen by ECPs, and cases seen by ECPs only in their extended role. ERP4's ECP cases were presented for a 12-month period due to issues with separately identifying expanded scope cases at this site prior to April 2013. The only adjustment to activity levels seen here was to standardise the number of cases per month to account for the different lengths of implementation data available. When key performance indicators are addressed, the activity levels were adjusted by the number of ECPs and number of shifts completed to enable comparison of activity by project site (see Table 18).

A range of data quality checks were carried out, including validation against end-of-project reporting for each site (see Appendix 2 for further details). The data tabulated for analysis of KPIs is generally based on supplied databases, rather than site's final reports, because this allows a consistent methodology to be employed, and because various data items are only available in the database. Where a data item was not supplied, final reports were used as a reference, and tables footnoted accordingly. For most sites the number of cases tabulated from the supplied data closely matched the reported activity levels. However at a couple of sites there were small differences between the sites' own reported data and their submitted data. The number of expanded scope cases tabulated from ERP1 data was 18% less than reported, while for ERP2 reported and supplied expanded scope cases indicated the same activity level. At ERP3 and ERP4 all expanded scope cases were identified, but at ERP5 the number summarised from the site's database was less than reported, by around 15%. This could not be accurately assessed as total activity levels for the final report did not align exactly with the supplied data period. ERP2 supplied data on cases seen by all paramedics, but it was not able to be linked with the ECP specific data collection. Therefore no activity was able to be reported for ECPs at this site outside their extended role.

Over the 15 months between 1 January 2013 and 31 March 2014 ECP paramedics across all sites attended to more than 3,500 cases (including cases from the first three months at ERP4). The number of non-ESOP cases at ERP2 cannot be identified from the available data and therefore the total number of cases is unknown. More than 2,100 of the total cases seen by ECPs were in their extended role. On average 30.7 cases per month were seen by ECPs in their extended care paramedic role. Further details on activity by ECPs per shift can be found in Table 18.

At ERP4 ECPs were additional to existing emergency response crews, and worked as single officers, which were contributory factors to this site having the highest volume of activity. They attended an average of 75 cases per month, of which 66 cases were in their extended role. ERP4 and ERP5 each averaged around 65 ERP cases per month. At ERP4, extended role activity accounted for 33 cases per month, around 50% of total (hybrid) ICP/ECP/First

Intervention Vehicle activity. At ERP5, 21 cases per month were extended care, accounting for around one third of cases seen by the ECPs, who had a range of additional administrative, clinical support and back up duties as part of their dual ECP and clinical supervisory role.

ERP1 attended 40.7 cases per month of which 29 were in the extended care role. The ECPs at this site operated initially in a standalone capacity but were subsequently tasked as an emergency response as needed. As indicated above, data supplied by ERP2 was not able to be linked, and therefore there are no reported figures for activity outside the extended role. During the implementation period ECPs at this site attended a total of 56 cases in their extended role, just less than four cases per month. As the ECP role was integrated with the emergency response role, with an ECP working alongside a paramedic in an emergency response ambulance, it can be assumed that ECPs undertook their usual volume of activity in their emergency response roles although the exact volume could not be reported.

4.2.2 What is the potential volume of patients under this model?

Two of the sites conducted a robust process to allow them to estimate the potential volume of cases under the extended role paramedic model. Both ERP1 and ERP2 reviewed cases where an ECP was not available or not on shift and the treatment was provided by a paramedic or ICP but the case would have met the ESOP criteria. ERP2 identified 275 missed ('potential') cases over the 15 months, around 18 cases per month, which were not seen by the ECP⁴. ERP1 identified 848 cases, around 57 per month, which were missed⁵. The most common missed complaints were tabulated, and were similar to the list of complaints for non-missed cases.

ERP4 projected case load, however their estimates were based on extrapolating caseload in shifts covered by ECPs to cover those shifts where no ECP was available due to leave or illness⁶. This methodology resulted in an estimated additional 336 cases of all types, between July 2013 and March 2014, or an additional 37 cases per month. As approximately 50% of their cases were reported as non-ECP case types, this equates to an additional 19 extended scope cases per month.

4.2.3 What type of problems did patients present with?

In general, presenting problems seen by the ECPs were poorly described with no consistent method of recording across sites. Descriptions were based on presenting signs (e.g. bleeding), presenting symptoms (e.g. pain, shortness of breath) or type of problem (e.g. injury, fall). To summarise the data, the presenting problems were categorised using the International Classification of Diseases, which categorises symptoms and signs by body system (e.g. urinary, circulatory), and various categories derived from the data (e.g. palliative care, traffic accident). The four main categories of problems seen by the ECPs involved general symptoms and signs (26.9%), symptoms and signs related to the digestive system and abdomen (10.8%), injuries (10.3%) and procedures (10.2%; Table 12). In 3.2% of presenting problems, the description was inadequately described and could therefore not be categorised.

Table 12 Presenting problems of patients seen by ECPs in their expanded role

Category	Example(s) of descriptions	n	%
General symptoms and signs	Headache, fever, fainting, sick, unwell	590	26.9
Digestive system and abdomen	Abdominal pain, vomiting, constipation	237	10.8
Injuries	Laceration, dislocation, burns	226	10.3
Procedures	Blocked catheter, dressing change	224	10.2
Falls	Collapse, fall	173	7.9
Circulatory and respiratory	Chest pain, shortness of breath	156	7.1
Musculoskeletal	Hip pain, back pain, dislocation	146	6.7
Cognition, perception, emotional state and behaviour	Confusion, dizziness, drowsiness	73	3.3
Skin and subcutaneous tissue	Abscess, lump, swelling, rash	47	2.1

⁴ Final Report ERP1 15/05/2014

⁵ Final Report ERP2 09/05/2014

⁶ Final Report ERP4 16/04/2014

Category	Example(s) of descriptions	n	%
Urinary	Haematuria, urinary retention	45	2.1
Palliative care	Palliative care, end-of-life support	26	1.2
Transfer	Inter-facility transfer, transfer	18	0.8
Psychiatric problem	Depression, threatening suicide	17	0.8
Diabetic problems	Hypoglycaemia, hyperglycaemia	16	0.7
Assessment or review	Assessment, neurological review	12	0.5
Allergic reaction	Allergic reaction, anaphylaxis	11	0.5
Overdose	Overdose	9	0.4
Traffic accident	Motor Vehicle Accident	8	0.4
Problems with mobility	Unable to walk, unsteady gait	7	0.3
Hazardous exposure	Ingestion cleaning fluid	5	0.2
Stroke	Stroke	5	0.2
Assault	Assault, sexual assault	4	0.2
Drowning	Drowning, near drowning	2	0.1
Pregnancy	Obstetric, pregnancy	1	0.1
Other	Assist, deceased, unable to contact	61	2.8
Inadequately specified		71	3.2
Total		2,190	100

(a) Excludes cases where presenting problem was not reported.

4.2.4 Which dispatch priorities were assigned?

Sites were inconsistent in the code-set used for dispatch priority for ESOP cases, making comparison of sites difficult.

ERP1 and ERP2 reported their dispatch priority on a scale from P1 to P8, where P1-P2 represents a case type of Emergency, P4-P5 is urgent, and P6-P8 routine. P3 is a new code. At ERP1 and ERP2 respectively these were reported as follows (excluding cases missing dispatch priority):

- ERP1: Emergency = 8%, Urgent = 51%, Routine = 32%, P3 = 9%.
- ERP2: Emergency = 5%, Urgent = 71%, Routine = 6%

At ERP3, 93% of ESOP cases which were assigned a dispatch priority were coded priority '2', and 7% were coded priority '1'. This was not able to be confirmed in their final report as it was not tabulated.

At ERP4, dispatch priority was recorded poorly in the supplied database. However the final report includes data from the communications dispatch system for all cases seen by ECPs over the 9 months of the implementation period. During this time 34% of cases were Emergency, 60% Urgent, 5% Domestic and 1% Standby.

ERP5 used the MPDS dispatch coding system:

- Alpha Response=Code 1--Low Priority
- Bravo Response=Code 2--Mid Priority (calls that may involve First Responders)
- Charlie Response=Code 3--Possibly Life Threatening
- Delta Response=Code 3--Life Threatening
- Echo Response=Code 3--Full Arrest or Imminent Death
- Omega Response=Code 1--Lowest Priority

At this site 37% of ESOP cases were low or lowest priority (Alpha or Omega), 56% mid-priority (Beta) and 7% were high priority (Charlie or Delta, no level Echo cases were reported).

4.3 Impact on consumers

The evaluation framework included two Key Performance Indicators (KPIs) for consumer impacts. High levels of consumer satisfaction and experiences with ERP services (KPI 1.9) were expected; this was assessed using patient surveys. The national evaluation team developed a survey tool and provided support for implementation, including calculation of target sample sizes to maximise statistical power. The number of patients who refused treatment by the ECP (KPI 2.4) was obtained from administrative data sets and final reports.

4.3.1 Patient survey

Consumer impacts were assessed using a 20-item patient survey tool (Thompson et al., 2012b). The first 11 questions were based on a validated questionnaire used in research for patient experiences of emergency or pre-hospital care (Cherkin, Deyo and Berg, 1991) and were answered on a Likert-type scale from (1) *Strongly agree* to (5) *Strongly disagree*. Scores were reversed before analysis. Questions on satisfaction with time to be seen and care received from the ECP were adapted from a questionnaire designed for ambulance services (Kapulski and Bogomolova, 2011). The key measure of overall patient satisfaction was a single item asking respondents to circle a number reflecting their overall experience on an 11-point visual analogue scale. This item was obtained from the United Kingdom National Health Service Accident and Emergency Questionnaire (NHS, 2012). The remaining questions collected demographic data and asked about previous experiences of ambulance services and the outcome of the current service occasion (i.e. whether the patients was transported to hospital immediately or later, referred to another health care provider or the issue was resolved during the ambulance visit). Further information on the development of the tool is available on request.

Timing of data collection varied among sites. ERP3 began distributing patient questionnaires in June 2013, ERP4 and ERP5 from early November 2013, and ERP1 and ERP2 conducted their surveys from December 2013. ERP1 and ERP2 received ethics approval, the others did not apply. ERP3, ERP1 and ERP2 left questionnaires and reply-paid envelopes with patients seen by the ECP. ERP4 sent out questionnaires by post and had 24 returned from 42 distributed (57%); the other sites did not report response rates.

A total of 152 questionnaires were returned with signed consent forms. Of these, 45 (29.6%) were from a relative or carer of the patient. The average age of patients was 62.8 years (SD 24.4 years, range 1 to 98) and 48.0% were female. Most respondents (84; 55.3%) had not previously called the ambulance with a similar problem; 8 (5.3%) had made a call within the previous week, and 42 (27.7%) had called an ambulance at some earlier time.

As a result of the call, 25 respondents (16.4%) were transported immediately by ambulance to hospital, and nine (5.9%) later went to hospital by other means. Seventy-two respondents (47.3%) were referred to a GP, community nurse or other health care provider (e.g. palliative care service) and 22 (14.5%) did not require any further treatment; the remaining 24 did not answer this question.

Data screening removed six cases where it was apparent that errors had been made in completing the questionnaire, leaving 146 for analysis. The numbers (and valid percentages) of respondents from each site were: ERP1, 28 (18.4%); ERP2, 6 (3.9%); ERP3, 72 (47.7%); ERP4, 24 (15.8%); ERP5, 22 (14.5%).

Results

Figure 6 shows responses to each of the first 11 items on the survey for all sites (n ranged from 121 to 143). The vast majority of respondents were extremely positive about their experiences. More than 90% of respondents strongly agreed that the ECP listened carefully and seemed comfortable dealing with their problems. More than 80% strongly agreed that the ECP performed a thorough examination, provided effective treatment, and made arrangements to ensure follow-up treatment. Around 95% agreed or strongly agreed that the ECP answered their

questions and made them feel less worried about their problems. Respondents were a little less positive about the information provided by the ECP, particularly regarding how long recovery might take (one in eight strongly disagreed, disagreed or were unsure), what caused the problem and what they needed to do to address the problem and prevent recurrences.

Four out of five respondents were very satisfied with the time it took to be seen by the ECP (125; 82.2%) and the experience of being cared for by the ECP (129; 84.9%). Responses to the final question ranged from 6 (1, 0.7%) to 10 (113, 74.3%). Most respondents (129; 84.9%) rated their overall experience as 9 or 10 out of a possible 10.

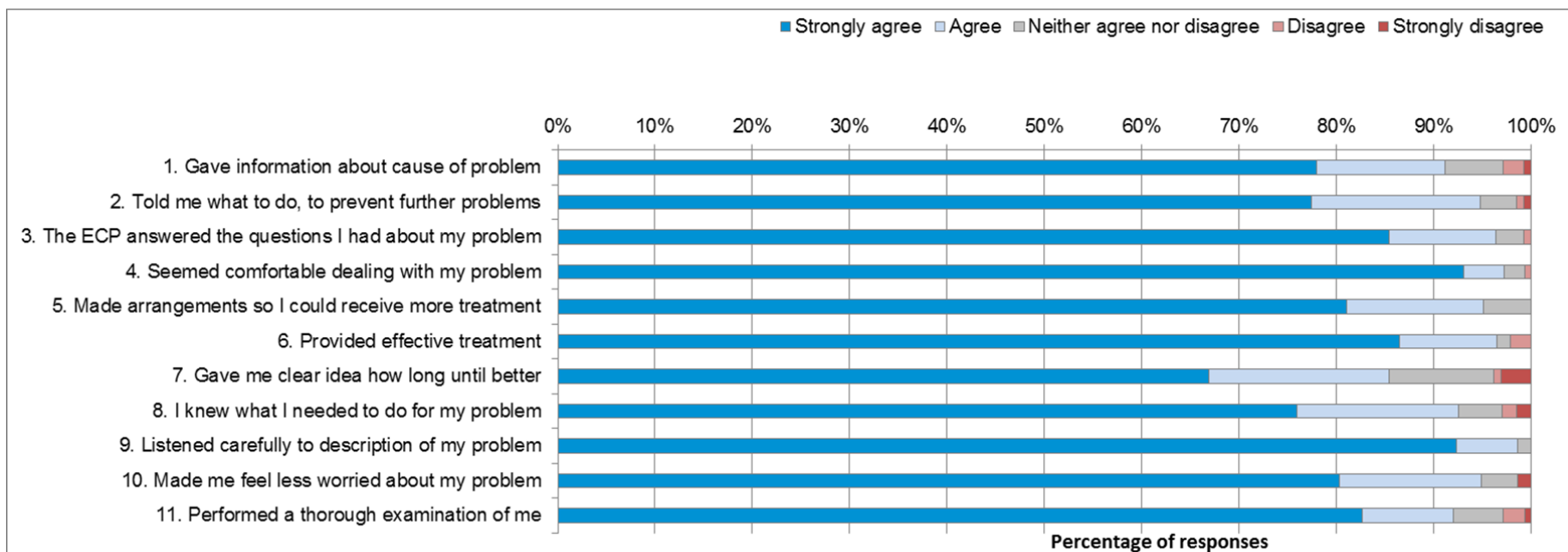


Figure 6 Responses to HWA-ERP patient experiences and satisfaction survey

To identify the key factors that most strongly predicted overall satisfaction with the ED experience, variables were entered into a multiple regression analysis. Satisfaction with the time to see the ECP and with the care received (items 12 and 13) were entered in the first step. Satisfaction with care by the ECP was a significant predictor, $\beta=.50$, $p=.000$. The 11 experience items were entered in the second step. The final equation explained 61% of the variance in overall satisfaction with the ambulance service experience, F change = 4.48 (df = 11, 84), $p<.001$. Satisfaction with care became marginally non-significant once the experience items were entered. Instead, the strongest predictors of overall satisfaction were experiences relating to communication. Patients were more satisfied if they reported that the ECP listened carefully (item 9, $\beta=.36$, $p<.05$), answered their questions (item 3, $\beta=.45$, $p<.01$), told them what to do to address their problem (item 8, $\beta=-.55$, $p<.01$) and gave them a clear idea how long it would take to recover (item 7, $\beta=.27$, $p<.05$).

A Kruskal-Wallis test was used to check for differences according to site. Six of the 11 patient experience items differed between sites. Respondents treated by ERP5 reported the most positive experiences in relation to thoroughness of the examination (item 11) and the information provided by the ECP (items 1, 2 and 7). Respondents treated by ERP5 or ERP3 gave the most positive ratings of the ECP's perceived comfort level in dealing with their problems (item 4) and ability to answer questions (item 3). A difference was also found for satisfaction with care by the ECP. Respondents treated by ERP2 reported lower levels of satisfaction than those at other sites. However, given the small number ($n=6$) of people who returned questionnaires for this site, findings from these cross-site comparisons should be treated with caution. It is notable that ERP2 was ranked third (after ERP5 and ERP3) for the overall satisfaction rating and there were no significant differences among sites for this item.

A second Kruskal-Wallis analysis established that all outcomes – whether the patient was transported to hospital immediately by ambulance, transported later by another means, referred to another health care provider or treated on the spot – had no bearing on patients' reported experiences or satisfaction ratings.

Patient survey conclusions

On the whole, patients were extremely positive about their experiences of care under the ERP sub-project. The vast majority reported that the ECP listened and communicated well, examined them thoroughly, provided effective treatment and seemed comfortable dealing with their problems. A small group of patients would have preferred more information regarding recovery and self-care, suggesting a target area for future improvements. Satisfaction ratings were very high. Respondents were highly satisfied with waiting times, the care they received, and their overall experience of the ambulance services involved in the trial. Clear communication and information provision were the main factors that predicted overall satisfaction. Respondents at ERP5 and ERP3 tended to report the most positive experiences and the highest satisfaction with the care they received from the ECPs, although there were no differences among sites on the overall rating of satisfaction.

4.4 Impact on providers

Three KPIs in the Evaluation Framework addressed the impact on providers. The turnover rate for ECPs (KPI 1.2) was used as an indicator, along with a questionnaire and interviews that explored their experiences and satisfaction with the role in greater depth. Attitudes of other stakeholders, particularly staff working alongside the ECPs, were measured using a staff survey tool developed by the national evaluation team (KPI 2.0). In addition, semi-structured interviews were conducted in the later stages of the program to assess perceptions of the impacts of the ECP role on key stakeholders including ambulance officers, paramedics, medical specialists, managers and representatives of other organisations associated with the sites (KPI 2.1).

4.4.1 ECPs' views of the role

Two data collection methods were used to elicit the experiences and opinions of people working in ESOP roles. These staff members were given the opportunity to complete the 'ESOP personnel survey' and were also interviewed by the national evaluation team at the close of the program (Thompson et al., 2012b). Their responses provided valuable insights into the effectiveness and efficiency of the model of care, including relationships with other staff and consumer acceptability. Their views on sustainability are included in Section 6.

ESOP practitioner questionnaire

The same survey tool was used by all personnel across the four ESOP sub-projects; hence a certain level of generality was necessary, which is why respondents were asked to consider their overall experience. Items are listed in full in Table 13. Relatively high mean scores were reported for most items (means ranged from 2.46 to 4.69 out of a possible maximum score of 5).

Table 13 Descriptive statistics for ESOP personnel survey items

Item	Full sample		
	N	Mean (SD)	Range
1. Staff have a good understanding of my new role & functions	13	3.23 (0.83)	2-4
2. Other key stakeholders have a good understanding of my new role & functions	13	2.46 (0.88)	1-4
3. My professional skills & expertise are acknowledged by other staff	13	3.54 (0.66)	2-4
4. Staff have a good understanding of how my skills & expertise differ from other paramedics	13	3.31 (0.85)	2-4
5. Staff have a good understanding of the educational preparation required	13	2.77 (0.83)	2-4
6. Staff acknowledge that I have the skills & knowledge to provide appropriate care	13	3.69 (0.95)	2-5
7. Staff acknowledge that I have the skills & knowledge to provide education & information	13	3.69 (0.95)	2-5
8. I feel confident that I have the skills & knowledge to provide appropriate care	12	4.25 (0.62)	3-5
9. I feel confident that I have the skills & knowledge to provide education & information	13	4.46 (0.52)	4-5
10. Changes to practices, protocols & policies helped me implement my expanded role	13	4.23 (0.60)	3-5
11. Changes to attitudes & beliefs in my work place helped me implement my expanded role	12	3.00 (1.28)	1-5
12. I feel confident dealing with patients in my expanded role	13	4.31 (0.75)	3-5
13. Patients are comfortable that I have the skills & expertise to provide appropriate care	13	4.31 (0.63)	3-5
14. My expanded role makes the service where I work more effective	13	4.15 (0.69)	3-5
15. My expanded role improves access to emergency care	13	3.85 (1.21)	1-5
16. My expanded role improves quality of care for specific patient groups	13	4.46 (0.52)	4-5
17. I am comfortable approaching other staff for advice regarding patient management	13	4.69 (0.48)	4-5
18. Appropriate personnel are available to supervise / mentor me whenever needed	13	2.85 (1.07)	1-5
19. I am satisfied with my expanded role & feel it has enhanced my career	13	4.23 (0.60)	3-5
20. I am planning to stay on in my expanded role for the foreseeable future	13	4.08 (1.04)	2-5

There was a response rate of 76% (13 out of 17 ECPs across all sites). Figure 7 shows responses to each of the 20 survey items for all sites. There were 12 or 13 responses for each item ('not applicable' responses have been excluded from analyses).



Figure 7 Experience of ECPs

Most ESOP paramedics were positive about their experiences working in the ESOP role, endorsing high levels of agreement with many statements. Respondents most strongly agreed that they were comfortable approaching other staff for advice regarding patient management (item 17, mean = 4.69), and that their ESOP role improved quality of care for specific patient groups (item 16, mean = 4.46). High levels of agreement were also reported for items regarding the ESOP clinician's confidence in dealing with patients and having the skills and knowledge to provide education, information and appropriate care, as well as patients being comfortable in the clinician having these skills (see items 8, 9, 12 and 13). None of these items received any negative ratings from respondents.

There was some disagreement with other items, ranging from 8% for item 3 to 46% for item 2. Most of these items related to the understanding of staff and other key stakeholders of aspects of the ERP role. Specifically, some respondents felt that other staff did not fully understand the role, its functions, the educational preparation required, and differences in skills and expertise compared with other paramedics. They also felt that other staff could more fully acknowledge the ECPs' additional skills and knowledge. Strong disagreement was also expressed by many respondents with the statements "Appropriate personnel are available to supervise / mentor me whenever needed" (item 18, mean = 2.85) and "Changes to attitudes and beliefs in my work place helped me implement my expanded role" (item 11, mean = 3.00). These results suggest that further engagement and education of other staff in the organisation about the ESOP may have been beneficial.

Six respondents made additional comments, most of which were suggestions for how the model of care could be enhanced or better supported. For example, one ECP raised the issue of national standards and accreditation for ECPs, with a specified skill set and range of client presentations. This would improve prospects for wider implementation of the model, providing greater certainty across jurisdictions as to the types of cases suitable for the ECP. In contrast, another respondent suggested that the model of care and skill set may need to vary across jurisdictions according to local needs. In some areas, the ERP model could be combined with other models (e.g. ICP, First Intervention Vehicle) to be more viable and useful. Expansion of protocols and provision of equipment such as i-STAT[®] machines were other suggestions. Three respondents commented on the challenges of engaging and educating other staff members and the wider community, including a need for interagency liaison and training.

ESOP practitioner interviews

Eighteen interviews were conducted with ECPs, including the 16 incumbents, one former ECP who resigned and was replaced during the program, and a SAAS metropolitan ECP who occasionally did shifts at one of the regional SAAS sites to cover leave. ECPs were asked to share their views as to how safety and quality of care was ensured during implementation of the new model of care. Most ECPs discussed organisational factors that supported safety or quality of care. These included:

- Clinical guidelines defining the scope of the model of care
- Adherence to requirements for documentation and record keeping
- Scrutiny of the ECPs' work via peer review and clinical audit processes
- Ready access to medical mentors with experience in general practice or emergency care
- Clear patient referral pathways and cooperative relationships with GP practices

ECPs emphasised that they worked under guidelines and when patient conditions were outside these parameters the ECP would arrange transport to hospital. All implementation sites ensured that ECPs documented details about their patient care and adhered to existing record keeping processes used by their organisation.

ECPs felt there was a high level of scrutiny of their work due to the newness of the model of care for most implementation sites. Most developed formal and informal peer review processes

and mentoring relationships with medical staff or GPs. In addition, some sites instituted clinical audit processes.

For example, the ERP5 ECPs when they commenced shift were expected to review all the cases managed by their colleague in the previous shift and flag any issues that they felt might benefit from clinical review. ERP2 ECPs worked closely with a GP advisor and met frequently to discuss cases.

“...the involvement of the GP and what is normal practice within the community, I think, has been invaluable.” (ECP)

ERP3 developed a system with three levels of clinical audit, the first based on peer-to-peer review by ECPs using a framework with certain trigger points. Cases could be referred to the next level, consisting of all ECPs, a GP and management representative. When required, the third level of audit involved additional primary care practitioners as well as medical specialists with acute hospital and/or medical retrieval experience. Whilst most project teams were disciplined in ensuring clinical audit meetings occurred in the early stages of the project (from one to three weekly), as implementation progressed these became less frequent and documentation more limited.

Several ECPs commented that in their view integration of the clinical audit process into existing organisational clinical governance mechanisms ensured the audit process was more robust. It was also easier to use existing “incident reporting systems” where available (the example given by ERP1 and ERP2 was the State Health “Safety Learning System” that ECPs could access).

ECPs consistently raised the importance of ready access to a supportive medical mentor with appropriate experience. ERP1 and ERP3 used ED specialists and ERP2 used a GP. All were reported by ECPs to be highly effective. The availability of mentors was particularly useful during the early months of implementation when ECPs were adapting to their new roles. They could confer with the mentor when necessary, while treating the patient. Retrospective case reviews with their medical mentor were also effective learning opportunities. Prior relationships between the mentor and ECP facilitated effective mentoring.

“So we have the GP advisor, who sits on our peer review. That’s the person who I think – that I’ve worked most with, because I don’t have to explain to [name deleted], who I am, what I’m doing, what my knowledge base is, he’s well aware of that.” (ECP)

Effective patient referral pathways also supported safety and quality of care. ECPs most commonly referred to GPs and appeared able to establish good relationships with a number of practices, which responded promptly with patient appointments when needed.

ECPs reported that an open and transparent organisational culture supported safety and quality of care. This was seen as essential to ensure that ECPs felt comfortable reporting any safety concerns, as they knew they would be dealt with in a constructive manner with an intention of quality improvement.

All project teams commented on an unintended safety outcome of the introduction of the ERP model of care. They referred to this as a “system of review”, “a safety net” and “filling a gap”. Frequently if ECPs were concerned about a patient they would ensure the ECP on the following shift was aware and if necessary a follow-up call or visit would be made. As the ECPs became more accepted by their paramedic colleagues they would be called by these crews on occasion to follow up a patient that an emergency crew had decided not to transport.

“Probably the best achievement I think we’ve created is putting in a safety net for the clients. Improving the whole ambulance service experience from the point of view of those who get left behind at home, they’re left behind safely.” (ECP)

“...a crew can be concerned about a client and say, ‘Look, can you go back and check on them?’ And to be able to have that facility to go back and check on them, stops the ambulance service from getting itself into trouble from complaints, poor practice, any repercussions, and I think generally speaking I don’t think we’ve had any incidences that we haven’t identified ourselves where we’ve had a problem. That’s been a huge boost.” (ECP)

“And so therefore you’ve just got that extra mechanism to be able to sieve out...those patients that don’t need to present, that the crews aren’t confident enough, either through experience or through their knowledge, to be able to leave them behind.” (ECP)

During the interviews two examples of “system failure” were provided where the ECP detected a problem with patient care provided by other health care providers, which they relayed to demonstrate the importance of the ECP being integrated into the health system to reduce fragmentation of care.

Another point made by the ECPs is that the individual qualities of the ECP, such as their experience, training and attitude, were key contributors to safety and quality of care. ECPs generally demonstrated a compassionate attitude where their primary concern was the best outcome for the patient. This led most ECPs to err on the side of caution when faced with any uncertainty about the patient’s conditions.

In summary, ECPs felt their practice was safe and that they provided a high quality of care. They perceived that their role had also contributed to the overall quality of care within their ambulance service through the system of review that the ECP could provide.

4.4.2 Turnover and retention of ECPs

Throughout the project there was a high level of retention of the ECPs. This was not surprising as all ambulance services reported that they experienced relatively low turnover among the general paramedic population. A summary of the recruitment and retention of ECPs is provided in Table 14.

Table 14 ECP cohort – enrolment, completion and retention

Indicators	ERP1	ERP2	ERP3	ERP4	ERP5	TOTAL
Number of ECPs recruited	3	3	4	3	4	17
Number of ECPs retained at end of implementation period	3	3	4	2	3	15

Two ECPs left during the later stages of the project. The reasons for leaving the position were different for each ECP and did not appear to be directly linked with dissatisfaction in the ECP role but encompassed family responsibilities, financial pressures from decreased income and new career opportunities.

These findings from the ESOP interviews, accord with those from the ‘ESOP personnel survey’ (Thompson et al., 2012b). Almost 70% agreed or strongly agreed with the statement that they were planning to stay on in the role for the foreseeable future, and about 8% disagreed or strongly disagreed. In their additional comments, several respondents commented on retention in the role. Another respondent commented that “longevity within the role is dependent entirely on funding”.

4.4.3 Staff and key stakeholder views

Other ambulance service staff and key stakeholders were given the opportunity to express their views on the effectiveness, efficiency, quality and safety of the ECP model of care via the ‘Staff experience survey’ and key stakeholder interviews (Thompson et al., 2012b).

All ERP sites used a 15-item version of ET8d, adapted by the national evaluation team from a questionnaire used in a published evaluation of the impact of a workforce innovation on other

staff members (Considine and Martin, 2005). The first 14 items were scored on a Likert-type scale from (1) *Strongly agree* to (5) *Strongly disagree*. Scoring was reversed before analysis. Exploratory factor analysis resulted in two, highly reliable sub-scales: Understanding (6 items, $\alpha = 0.94$) and Contribution (9 items, $\alpha = 0.92$). These were very similar to the sub-scales found in the original study, even though that focused on a different workforce innovation (nurse practitioners in an emergency department setting; Considine and Martin, 2005). The final question asked for “any other comments”. Further information on development of the tool is available on request.

Data were collected in late 2013 and early 2014. Sites emailed staff with invitations to take part in the surveys, which were administered using an online tool, Survey Monkey. ERP1 and ERP2 received ethics approval, the others did not apply. Support was provided by the national evaluation team, including a draft participant information sheet, guidelines for administering the questionnaire, an online version and spreadsheets for data entry for those who preferred to use a paper version. Response rates were: ERP1, not reported; ERP2, not reported; ERP3, 21%; ERP4, 19%; ERP5, 97%.

A total of 128 non-ESOP staff and stakeholders responded to the questionnaire. The largest group of respondents were ambulance officers or paramedics (72, 56.3%), followed by other ambulance service personnel, who included management and administration, trainers, volunteers and communications staff (35, 27.3%). Community stakeholders made up the remainder of the sample (21, 16.4%). They included staff from community health and Aboriginal health services, aged care facilities and hospital emergency departments.

Numbers of respondents from each site were as follows: ERP1, 20 (15.6%); ERP2, 10 (7.8%); ERP3, 49 (38.3%); ERP4, 22 (17.2%); ERP5, 27 (21.1%).

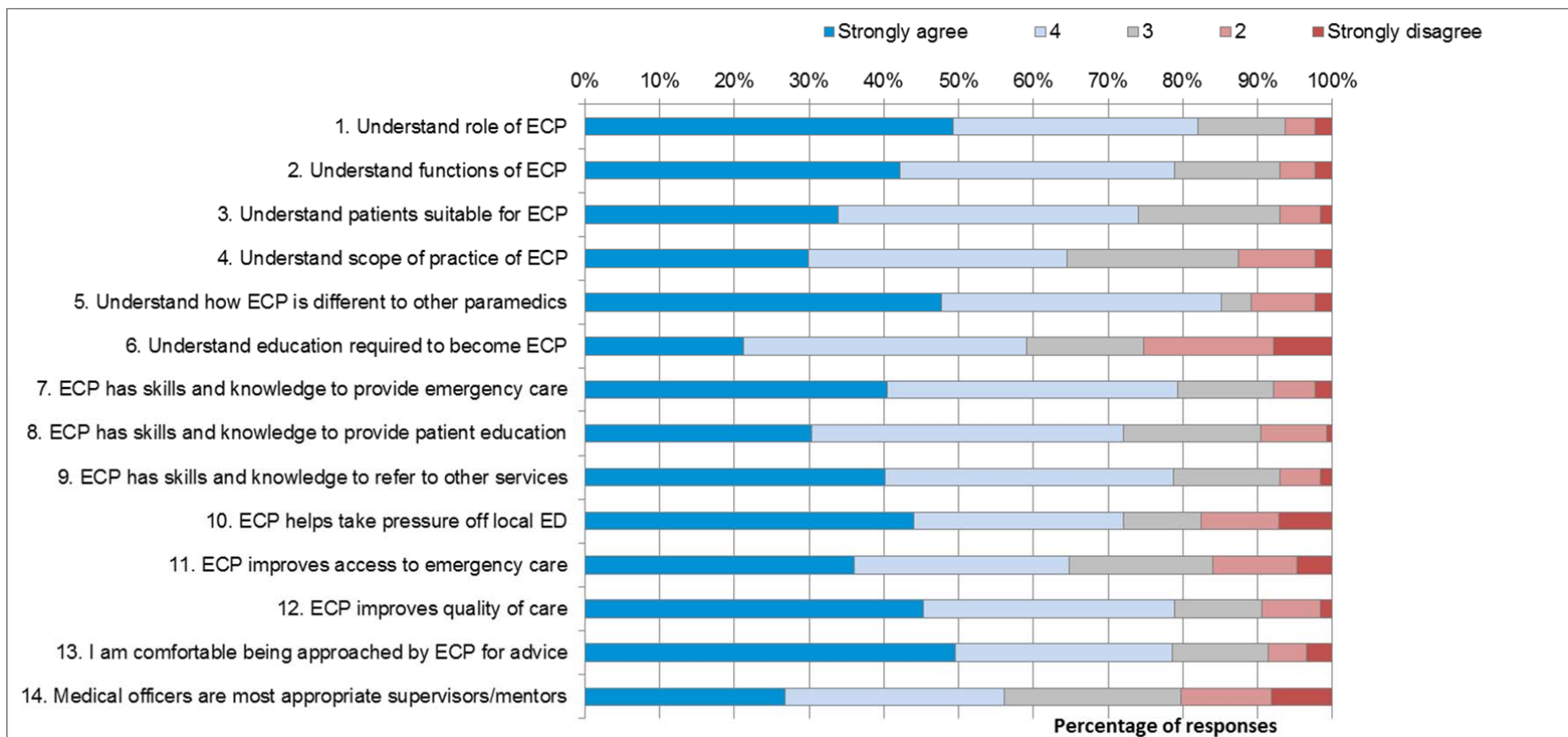


Figure 8 Responses to HWA-ERP non-ESOP staff survey

Results

Figure 8 shows responses to each of the first 14 items on the survey. Overall, understanding and acceptance of the ECP role was reasonably high among other staff and stakeholders. More than 70% of respondents agreed or strongly agreed with the statement for 10 of the 14 items. For eight of the items, less than 10% of the sample disagreed or strongly disagreed with the statement. The items which attracted the largest percentage of unsure, disagree or strongly disagree responses (shown in brackets), are listed below:

- (4) I have a good understanding of the scope of practice of the extended care paramedic (35.4%)
- (6) I have a good understanding of the educational preparation required to become an extended care paramedic (40.9%)
- (10) The extended care paramedic will help take pressure off the local emergency department (28.0%)
- (11) The extended care paramedic will improve access to emergency care (35.2%)
- (14) Medical officers are the most appropriate personnel to supervise and/or mentor the extended role paramedic (43.9%).

Well over a third of the stakeholders who responded to the survey felt they did not fully understand the ECP's scope of practice or the extent of training they had undertaken. A substantial minority were not convinced of the benefits of the ERP model for reducing pressure on the local ED or improving access to emergency care. One in five stakeholders disagreed that emergency physicians were the most appropriate personnel to supervise and mentor ECPs, and almost 25% were unsure.

Independent samples Kruskal-Wallis tests were used to check for differences according to site and stakeholder group. There were no significant differences among the five implementation sites in staff and stakeholders' understanding of the ERP model or their beliefs and attitudes regarding supervision. Opinions of the model's contribution to emergency care varied somewhat among sites, with ERP1 the most positive and ERP3 the least positive. This difference approached statistical significance, $p=.058$.

Participants' understanding of the ERP model and their beliefs and attitudes about its contribution to emergency care differed significantly among the three groups of stakeholders (Table 15). Community stakeholders were more likely than ambulance service staff to report that they understood the role, function, scope and educational requirements, and recognised the benefits of the new model in terms of ECPs' skills and knowledge and their impacts on emergency care quality and access.

Table 15 Responses by stakeholder group, HWA-ERP

Sub-scale or item	Stakeholder group	N	Mean (SD)	Mean rank	Chi-Square
Contribution	All	128	4.01 (0.87)		
	Ambulance officer/paramedic	72		58.76	9.38**
	Other ambulance service personnel	35		63.01	
	Community stakeholders	21		86.64	
Understanding	All	128	3.97 (0.90)		
	Ambulance officer/paramedic	72		56.03	11.46**
	Other ambulance service personnel	35		69.00	
	Community stakeholders	21		86.05	
Supervision	All	123	3.54 (1.24)		

Sub-scale or item	Stakeholder group	N	Mean (SD)	Mean rank	Chi-Square
	Ambulance officer/paramedic	69		58.83	1.99
	Other ambulance service personnel	33		62.98	
	Community stakeholders	21		70.88	

*p<.05, **p<.01, ***p<.001

Qualitative analysis

A total of 39 respondents chose to make additional comments. Of these, 22 were ambulance officers or paramedics, six were communications centre staff and four worked in other roles within ambulance services. The remaining seven were community stakeholders such as aged care facility staff. To avoid identifying staff from a specific service, the generic term “paramedic/ambulance officer” is used throughout this section to refer to non-ECP ambulance personnel.

Opinions of the ERP service were quite mixed. About a third of respondents were unequivocally positive about the model. Community stakeholders were especially appreciative of the service, consistent with the quantitative findings reported above. They saw the service as addressing a need for frail elderly people and palliative patients who required care in their own homes. ECPs were valued for using their skills and knowledge to help avoid preventable or unnecessary after-hours presentations to emergency departments.

“The ECP service has been utilised widely at our facility and has been incredibly valuable. The ECPs are knowledgeable, approachable and efficient.” (Stakeholder – Other Health Care Provider)

“The ECPs have proven to be a wonderful addition to the health care team for the provision of care to people that have life limiting illness and wishing to die at home.” (Stakeholder – Other Health Care Provider)

“I have found them to refer on to relevant services to bolster up home care options and also another resource for early supported discharges when normal resources are not an option.” (Stakeholder – Other Health Care Provider)

“... this is a fantastic initiative and provides for better support for patients who can't get to a medical provider for their treatment. It then frees up the medical practitioners and emergency waiting rooms ...” (Stakeholder - Paramedic Manager)

However, one community stakeholder expressed concern that an older person was “refused medical consultation” by paramedics / ambulance officers who did not transport them to hospital, although this respondent was unsure whether the incident they witnessed involved ECPs. This respondent, and several others including paramedics and ambulance service staff, highlighted a need for more information regarding the role and scope of practice of the ECPs.

“I do not know what an extended care paramedic is, or how the role differs from other paramedics, or what training they have that would enable them to make more advanced clinical judgement/decisions regarding whether a client requires medical attention or not.” (Stakeholder – Other)

“I feel that we need more information disseminated regarding the scope of practice of the ECP. There are many instances where we are unsure of referral.” (Stakeholder – Paramedic)

“Most people don't know what they can do. For a period at the start they didn't have all the right equipment or drugs to do their job. I have no idea what the educational process

is. Some of them seem to lack the primary health care experience and knowledge to deal with some of the patients.” (Stakeholder – Paramedic)

“Some statistics on the work that extended paramedics are doing would be of benefit in educating staff as to what they achieve.” (Stakeholder – Paramedic)

Lack of clarity around the scope of practice and the identification of suitable patients had implications for the productivity of the ECPs and the overall impact of the innovation. Selection of suitable candidates for the role, rostering issues and limitations on the ECPs’ ability to prescribe and / or leave medications for clients were also noted as issues that had to be addressed in order for the model to work effectively.

“Their workload is quite small and most cases that are deemed ECP appropriate are ruled out by the actual ECP later on for one reason or another. I am surprised when the ECP manages even one case a day.” (Stakeholder – Administrative)

“There are some [paramedics] who are not suited to this role. I think the criteria for cases that they can attend needs to be broadened.” (Stakeholder – Administrative)

“Current program is severely limited by [in]ability to leave medications (especially antibiotics) ... I think that the ECPs could be given a wider scope of practice but some consultants do not seem to be comfortable with this – not sure whether this is justifiable.” (Stakeholder – Administrative)

“Scope of practice in [region] is too limited to have significant impact, additional resources and equipment may assist also inconsistent rosters and leave requirements created too many holes in ECP coverage.” (Stakeholder – Paramedic)

“ECPs should be integrated in a 24/7 roster. They should also receive prescription rights.” (Stakeholder – Paramedic)

Despite these criticisms, many respondents felt the ERP model was “a good idea” which nevertheless required further development and more effective execution. Although there were a few who declared it a waste of time and resources, most acknowledged the need for this type of service. Indeed, some saw it as an opportunity for ambulance services to seize a niche in the health care market.

“Embrace the concept; it’s the way of the future for paramedics. If we don’t then nursing will there’s a huge market out there. This is just the tip of the iceberg.” (Stakeholder – Paramedic)

“I believe the services provided by the ECPs definitely decrease the workloads of both our service and the emergency department and therefore if they are to continue then a fee structure should be put in place for their services. Especially if, for example, the nursing homes would like the ECP to return every six weeks to change patients’ catheters, this should be a paid service we provide.” (Stakeholder – Paramedic)

Others proposed alternative models that they felt were better suited to filling this gap and addressing the need for timely care in community settings.

“... the ECP model should not place itself as a substitutive service to other cost effective providers such as community nurses etc. but continue to focus on the group that would otherwise ‘fall through the net’ ” (Stakeholder – Paramedic)

“I feel that the money spent on providing ECPs to [region] is not justified as there is not a great demand for the service ... I would suggest that this extra money is spent in the community providing a continence nurse.” (Stakeholder – Paramedic)

Still others believed that the ambulance services were best placed to provide the service, but with some key changes to the model and scope of practice to increase flexibility, efficiency and productivity.

“[Ambulance service] would benefit more from a hybrid ECP/SRU (Single Response Unit) scenario where there is an advanced ICP operating as an ECP but able to go to low acuity cases (tag-and-release jobs) and first respond to emergency cases. They should be able to fix catheters, do simple suturing/gluing jobs and reduce non-complex dislocations.” (Stakeholder – Paramedic)

“It is more valuable having a single response officer in a SRU with ECP qualifications than the “ECP” itself. Being able to send them to jobs as a SRU with probable TNRs (Transport Not Required) would be more beneficial.” (Stakeholder – Paramedic Manager)

One respondent noted that local health services had a key role in either facilitating or blocking development of alternative pathways to hospital presentations, in which ECPs and /or other community health workers could address the needs of certain client groups and avoid transport to emergency departments. Finally, several respondents commented on the issue of suitable supervision and mentoring for ECPs. One felt that the lines of supervision were unclear. Others agreed that while input and supervision by medical officers was important, other professionals including nurse practitioners and ambulance managers could also play a role, and cultural training may also be appropriate in some contexts.

Staff and key stakeholder survey conclusions

When asked their opinions about the model, other ambulance staff and community stakeholders, around eight in ten said they understood the role and functions of the ECP, agreed or strongly agreed that the ECP had the required skills and knowledge, and believed the ECP would enhance the quality of patient care. The overwhelming majority also said they were comfortable providing clinical advice to the ECPs. Together with the high means for the “contribution” and “understanding” sub-scales, this suggests a reasonable level of support for the model. However, when the qualitative data and responses to certain questions are considered, a more complex picture emerges.

A substantial minority of stakeholders reported that they did not fully understand the scope of practice or the education required to become an ECP. Many did not see the model as effective for two of its key aims: reducing pressure on the local ED and improving access to emergency care. There was also a lack of certainty regarding which personnel should take responsibility for supervising and mentoring the ECPs. This suggests a need for better communication regarding the ERP model to support change management and stakeholder engagement.

There were no significant differences in staff and stakeholder opinions among the five implementation sites. However, it was clear from the quantitative and qualitative responses that although community stakeholders highly valued the ERP model, ambulance service staff members were less convinced of its merits. In particular, ambulance officers / paramedics and other ambulance personnel expressed concerns about the efficiency of the model. Difficulties in understanding the scope of practice and the types of patients suitable for care led to a perception that ECPs were rather narrow in scope and consequently under-utilised. In addition, inadequate roster coverage and limitations on prescribing or leaving medications were seen as problems reducing the effectiveness of the model. Nevertheless, many respondents – especially the community stakeholders – felt the ERP model filled an important niche, addressing the needs of specific, vulnerable groups and complementing other services such as palliative care and community care. Respondents were thoughtful in their analysis of the issues facing the innovation and had suggestions for improvement. A thorough consultation process, particularly within ambulance services, should be incorporated in any planned roll-out of this model.

Key stakeholder views of efficiency and effectiveness

A total of 44 semi-structured interviews were conducted with key stakeholders at the close of the program, covering a wide range of topics. Stakeholders included ambulance service managers and other staff, clinical leaders and representatives of other health care organisations who had contact with the ESOP service. Information about the interviews and the approach to qualitative analysis can be found in Appendix 2.

Having enough trained and experienced ECPs to create a “critical mass” was seen as essential for the model to work efficiently and provide for succession planning.

“If an ECP is suddenly off sick, or leaves, or moves on, the whole service collapses, and there needs to be a fairly rapid process of maintaining the service and then getting someone to replace that position.” (Stakeholder-Medical)

There was also some concern about negative perceptions caused by the ECP refusing jobs that were out of scope. This concern appears justified, given the comments made by some other ambulance service personnel regarding the perceived difficulty of getting ECPs ‘out the door’ and attending cases (see above).

“So a call may come into the 000 centre, the clinician who’s an ICP might make a decision that this might be a patient that the ECP could assist, but then the final decision rests with the ECP. And it has to. I can’t see a way around that. But what perception that creates is, I think, sometimes not optimally managed. If it is poorly understood and the workforce perceives they have the ability to cherry-pick what they do, then you have a potential problem.” (Stakeholder-Paramedic Manager)

The hybrid model, where the ECP vehicle could also be used as a first intervention vehicle, was seen as improving efficiency by ensuring the officer was fully utilised and could provide care even when the case turned out to be beyond the scope of the ERP model.

“That wasn’t something we’d intended to do in the project, but when we first set up it was set up as pure ECP program. And then we were waiting for protocols to come along, we did this first intervention vehicle thing and it just seemed to be appropriate, so we just kept doing it and never stopped doing it. Not only because it boosted our numbers, because we didn’t have the ECP in Communications, we couldn’t filter jobs.” (ECP)

“I think it’s a really viable rural model of care...to use people on site with skills that are underutilised...but the solution is really to break down some of the barriers.” (Stakeholder-Medical)

However, in hybrid roles, effectiveness and efficiency was highly dependent on how the individual decided to expend their effort and time; that is, whether emphasis was placed on the ECP role or on the other aspects of the job. ECP duties could be seen as essentially competing with these other duties: emergency first responder or the station officer role. This meant there needed to be close monitoring and supervision of the job mix.

“Well certainly the nature of the model, using them as first intervention vehicles as well, the side effect of that obviously is that it provides greater coverage and emergency coverage too, to the community...However, having said that, you do need to be very careful because the ECP model that ran in Sydney, where I think it lost a lot of its value, was because there was just so much emergency work done that it actually ended up making it less effective as an ECP vehicle.” (Stakeholder-Paramedic Manager)

“And that’s where you need the management or the supervision at the top going, ‘Okay, you’re going to go to that job.’ Not get the choice, of sitting there and picking and choosing where you go on a day-to-day basis.” (Stakeholder-Paramedic Manager)

“...what you get with a lot of these people, when you give them a defined role and the ability to select themselves what they do, they do less and less than what they’re supposed to do.” (Stakeholder-Paramedic Manager)

The fear of not being able to combine the emergency response role with the ECP role in rural communities proved unfounded.

“...there’s been only one occasion where they actually had to stop a procedure to go and respond to an emergency call in that 12 month period...” (Stakeholder-Paramedic Manager)

Even when an ECP decided a patient was out of scope and needed to be transported to hospital, their contribution (e.g., to comprehensive assessment) often resulted in productivity improvements in the ED setting. These additional efficiencies were not easily quantifiable but were noticed by stakeholders.

“...so when the patient comes in, they’re fast tracked which then is an efficiency in the hospital and health system... So I think they’re probably undefinable efficiencies if you like.” (Stakeholder-Paramedic Manager)

Key stakeholder views of safety and quality

On the whole, stakeholders felt that the ERP model of care was as safe as usual care and that implementation sites had demonstrated effective clinical governance through a structured approach to implementation and established effective checks and balances to ensure patient safety. A large proportion of stakeholders felt that the availability of the ECP provided an additional level of safety for usual operations. This was frequently described as a ‘safety net’, for use in cases where the decision not to transport was made. On occasions an emergency response crew would ask the ECP to follow-up a case several hours later to ensure the patient’s status was unchanged. This provided a level of reassurance for patients and carers as well as the emergency response crew. This practice was closely monitored and ECPs provided feedback about the appropriateness and/or outcome of the referral.

“The other big thing that I think is positive about it, and which they’ve done well, is the review process of going back and following up patients after they’ve seen them. So I think – and which differs quite substantially to standard ambulance practice. I think that would be a real tragedy if they lost that because I think that’s one advantage they provide over other healthcare providers...” (Stakeholder – Paramedic Manager)

Stakeholders were able to nominate numerous factors they felt contributed to safe practice, including the fact that all ECPs were experienced paramedics and many had additional qualifications (e.g. nursing), and characteristics of ECPs such as the capacity to be critical or reflective of their own practice and identify when a patient was out of scope. They also pointed to the extent and quality of training, including ongoing review and accreditation of the scope of practice.

“...when I talk about a paramedic going through to an ICP, the big change in mindset and judgement process for an ICP, and then up to the next level of an ECP, one of the biggest learnings for them is to know what they don’t know, and therefore understand what they don’t know, which makes them a safer beast inherently, than the paramedic who doesn’t quite know what they don’t know, so therefore thinks

they can make a decision, based on a protocol alone. That's another safety net."
(Stakeholder – Paramedic Manager)

"The ECPs are very safe, they don't do anything they are uncomfortable with, if they come across something that is out of scope or on the border of scope they will call ...there is a strong philosophy from management if in doubt take them to hospital."
(Stakeholder – Project Manager)

Many of the structural factors described in Section 2 of this report were also nominated, including the implementation of comprehensive clinical governance mechanisms, multi-level monitoring of safety and quality of care (including benchmarking of performance, assessing consumer experiences, and review of records and individual cases) and the engagement of approachable medical mentors with experience in emergency medicine or general practice.

"...our doctors are available 24 hours a day for them to ring to ask advice..."
(Stakeholder – Medical)

"The case review process, I think, has identified two or three things. One is some variation around the ECP's practice. So, I think, one ECP would do things differently to maybe another ECP, and that may be around quality of record keeping, communication back to the GP, for example, or other stakeholders, or it may be actual variation in the clinical care, so I wouldn't have used that dressing, or whatever, you've done this dressing for that reason. So I think the case review process has ... started to create some degree of standardisation around that variation, which is probably healthy, then the other objective of that process is, of course, to understand what's the variation been, compared to the pathways that have been written." (Stakeholder – Medical)

"...I know that the manner in which we carry out case audits and reviews is not a tick box protocol compliance process, it's an actually pull the case apart and talk about what went well and what didn't, in a non-confrontational, open and honest setting. So that to me achieves a better quality and safety check than a protocol tick box..."
(Stakeholder – Paramedic Manager)

Stakeholder engagement strategies such as feedback to GPs and transparent communication with local health care providers also contributed to perceptions that the care delivered by ECPs was safe and effective.

Challenges to maintaining this standard of care were also identified. The case review and mentoring systems relied on the availability and goodwill of busy medical practitioners. There was a need to ensure that all GPs understood the ERP model and scope of practice, in order to avoid requests for care that fell outside this scope. It was also important to establish and maintain effective referral and follow-up processes (ordering of pathology was highlighted as an area of concern). System improvements, such as refining telephone triage and case allocation practices and collecting additional data on patient outcomes, would enhance effectiveness and safety. Finally, stakeholders saw the need to recognise the training of ECPs with an appropriate qualification.

In conclusion, key stakeholders saw the ERP model as effective and efficient. Combining the ECP role with an ICP role was a promising way to ensure officers were fully utilised but required careful management of how the roles were balanced. Stakeholders were satisfied that the ECPs provided safe and appropriate care.

4.5 Impact on the system

System-level impacts of the ERP sub-project can be demonstrated in terms of the sites' performance on a range of KPIs. Data on these KPIs are presented below. Because at most

sites the ECPs attended cases both within and outside the ERP scope of practice, analyses have been carried out for the subset of patients seen only in the expanded role of practice, labelled “ESOP activity”, and patients seen in any other capacity (such as first-response, or intensive care) labelled “non-ESOP activity”. This terminology was used to differentiate from other acronyms such as for the sub-project Extended Role of Paramedic (ERP), and the paramedic (Extended Care Paramedic, or ECP).

KPI 1.3 *Increased number of extended role paramedic cases undertaken by the ECPs in each of the implementation sites*

The first ESOP case was on 31 December 2012 for ERP1 and ERP2, mid-January 2013 for both ERP3 and ERP4 and in mid-March 2013 at ERP5.

A time series of expanded role activity is shown for each site in Figure 9. The figure shows cases by month seen by ECPs in their extended role only. At most sites a ramping up effect can be seen where activity levels have increased over the first three to six months.

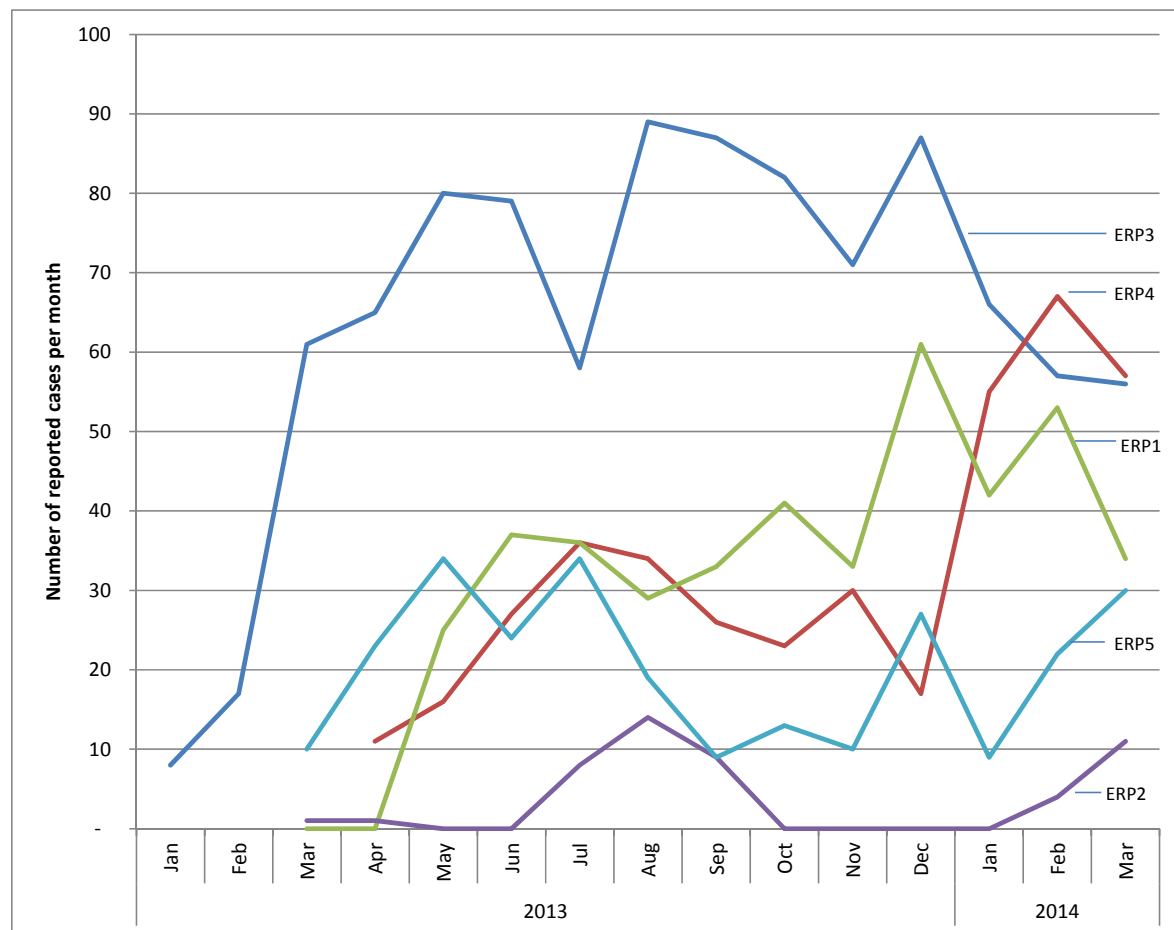


Figure 9 Number of ESOP cases by month by site

(a) Revisions which were received after data was processed may not have been incorporated in final figures and tables.

The figure shows an overall trend of increased activity as the implementation period progressed. ESOP activity levels have particularly increased for ERP3, ERP4, and ERP1 which have shown a steady rise over the period. ERP3 reached 100 ESOP presentations in a month, in March 2014. The spike in activity in ERP4 in January 2014 is associated with the addition of a new ECP after a period of operating with only one ECP. Activity levels at ERP5 and in particular

ERP2 have fluctuated over time which appears to be a reflection of the hybrid role at these sites.

Data for each quarter have been tabulated, and also demonstrate a general increasing trend (Table 16).

Table 16 Expanded scope of practice activity by quarter by site

Site	Jan-Mar 2013	Apr-Jun 2013	Jul-Sep 2013	Oct-Dec 2013	Jan-Mar 2014
ERP1	0	62	102	139	134
ERP2	1	2	38	0	15
ERP3	86	224	234	240	179
ERP4	unknown	54	96	70	179
ERP5	10	80	62	48	63
Overall	>97	422	532	497	570

The last quarter of the data submission saw caseloads averaging around 60 per month at ERP3 and ERP4, 45 cases per month at ERP1, and 20 per month at ERP5. ERP2 had an average of 5 cases per month in the last quarter of data collection.

KPI 1.4 Decreased number of consumers transported to ED subsequent to ECP attendance

A key measure of the successful implementation of the ECP model is a decrease in the rate of transports to hospitals or other health facilities. Table 17 below shows the non-transport rate for ESOP cases relative to non-ESOP cases during the implementation period.

Table 17 Hospital avoidance rates by site for ESOP cases

Site	Number of patients transport to ED avoided	Number of patients with transport status reported	Non-transport rate %
ERP1	337	430	78.4
ERP2	41	56	73.2
ERP3	657	939	70.0
ERP4	250	331	75.5
ERP5	172	263	65.4
Overall			72.5

a. Patient activity shown for the dates between 1 Jan 2013 and 31 Mar 2014, except for ERP4 (1 Apr 2013 - 31 Mar 2014)
b. Activity excludes refusals and cases where no information has been provided on whether a transport was avoided.

The overall percentage of patients seen by the ECP not requiring transport to hospital was 72.5%. Across implementation sites this varied only slightly from the average – from 65.4% at ERP5, up to 78.4% at ERP1. ERP2 was the only site where the ECPs used a vehicle equipped for patient transport and their non-transport rate was comparable to the other sites.

The non-transport rate for ERP4 was also able to be calculated for the non-ESOP cases seen by the ECPs. The rate at ERP4 of 18.8% is comparable to national non-transport rates for emergency crews. The non-transport rates achieved are much higher than usual care and are an indication of the ability of the dispatch/referral process to identify cases appropriate for the ERP model.

KPI 1.5 Decreased number of inter-facility transfers (as applicable)

The avoidance of transfers to other, non-hospital health facilities was also considered. This performance measure was originally designed to address the transfer of patients between small hospitals linked to a base hospital, and is only applicable for some sites. Consequently, this KPI has only been discussed for sites where a transfer to another health facility was a possible outcome after ECP treatment.

ERP1 noted in the final report that there were “a couple of cases” where the ECP provided treatment and avoided a transfer from a hospital or aged care facility. ERP2 treated 11 patients in a residential aged care setting that would have usually been transported, and of these eight avoided transport to hospital.

Transfers were not applicable for ERP3 and not reported by ERP4 or ERP5.

KPI 1.6 Average number of consumers seen per shift by the ECP

The activity levels reported above described activity at each project site without adjusting for the number of ECPs at each site or the number of shifts completed. Table 18 provides adjusted activity counts by accounting for the number of ECPs at each site, the number of shifts they completed and the length of these shifts.

ERP2 had one of their ECPs commence at the end of April 2013 so their FTE level was adjusted accordingly. If sites did not report all shifts in their activity logs the total number of shifts worked may be an underestimate. All sites' hours of operation was standardised to a 12-hour shift. ERP5 ECPs expended at least 50% of each shift with non-ECP duties as part of the Station Officer role, so the adjustment per 12 hour shift occurred by doubling the standard shift of six hours. No adjustment has been made for clinical time, but the reported percentage of clinical time across sites was tabulated for information.

Table 18 ECP patients seen per standardised shift

Site	Number of FTE ECPs	Number of months activity	Total shifts	Number of shifts per month per ECP	% clinical time	Number of ESOP patients ^a	Number of ESOP Patients/shift	Number of ESOP patients/ 12 hr shift ^{c,d}
ERP1	3.0	15.0	517	11.5	100%	437	0.8	0.9
ERP2	2.7	15.0	448	10.9	94%	56	0.1	0.1
ERP3	4.0	14.5	426	7.3	92%	963	2.3	2.3
ERP4	2.0	12.0	301	12.5	98%	399	1.3	1.4
ERP5	4.0	12.5	443	8.9	5%	263	0.6	1.2
Average	3.1	13.8	427	10.2	78%	423.6	1.0	1.2

a. Patient activity shown for the dates between 1 Jan 2013 and 31 Mar 2014, except for ERP4 (1 Apr 2013 - 31 Mar 2014).

Across sites, there was an average of 1.2 expanded scope cases seen per shift, ranging from 0.1 at ERP2 to 2.3 at ERP3. As some sites had an increasing volume of expanded scope activity over the implementation period (as shown in Table 18) the activity per shift has also been analysed for the first 3 months of 2014, shown in Table 19.

Sites completed an evaluation tool keeping track of their clinical and non-clinical hours each week, hours worked, leave and training commitments. Due to some missing data in the last few weeks of the data collection, some sites' average number of shifts per week across the implementation period were used to estimate the number of shifts in this three month period.

Table 19 Patients per shift at end of implementation period

Site	Number of FTE ECPs	Number of months of data	Total shifts	% clinical time	Number of patients		Number of patients per shift		Number of patients per 12 hour shift	
					ESOP	All	ESOP	All	ESOP	All
ERP1	3.0	3.0	112	100%	134	144	1.2	1.3	1.2	1.3
ERP2	2.7	3.0	77	100%	15	-	0.2	-	0.2	-
ERP3	4.0	3.0	76	98%	179	200	2.4	2.6	2.4	2.6
ERP4	2.0	3.0	69	100%	179	316	2.6	4.8	2.7	5.0
ERP5	4.0	3.0	105	7%	63	71	0.6	0.7	0.6	0.7
Average	3.1	3.0	88	81%	114	731	1.4	2.2	1.4	2.4

There were 1.4 expanded scope cases per shift in the first quarter of 2014, a slightly higher level than the implementation period reported in Table 18. Some sites had a particularly large increase over the project, with ERP4 reporting 2.7 expanded scope cases per shift and 5.0 total cases per shift over the first quarter of 2014. Several factors contributed to this higher level of activity, including a new ECP commencing and the training of their project manager in order to provide leave cover.

Total case time has been reported by some of the project sites. ERP1 reported an average of 1 hour 30 minutes including documentation and referral, or 1 hour 8 minutes excluding typing up and sending letters. ERP2 were unable to report due to small sample size and information not collected. ERP5 reported a total case time of 1 hour 15 minutes of which 40 minutes was spent on scene. Based on an average of 1 hour 30 minutes per case, in a 12-hour shift the maximum number of patients seen would be around six, given case availability and end of shift constraints. ERP4 saw approximately five patients per shift for the last quarter of implementation.

KPI 1.7 *Average waiting time from 000 call to the time the ECP arrived at the scene*

The length of time from the call to arrival on scene has been presented in Table 20. A few cases were outliers, with extreme scores that strongly influenced the mean. These cases (n<5) were excluded from the analysis. Further, for reasons not well understood, call and scene times were reported for only 39.2% of cases and so waiting times could not be calculated for the remainder (over 60%) of cases. Therefore this analysis should be considered indicative only as the missing data could have a large impact on the true waiting times.

Table 20 **Waiting time from call to arrival at scene – by site**

Site	Number of ESOP cases ^a	Average waiting time (minutes)	Median waiting time (minutes)
ERP1	361	0:33	0:15
ERP2	29	0:13	0:07
ERP3	827	0:36	0:24
ERP4	399	0:27	0:13
ERP5	148	0:28	0:23
Total	1,314	0:27	

a. Patient activity shown for the dates between 1 Jan 2013 and 31 Mar 2014

b. Cases where call time or scene time are missing are excluded

Elapsed time has been calculated for all cases (regardless of source of referral) from the call received time to the time the paramedic arrived at the scene. The average waiting time across sites was 30 minutes. Sites average waiting times ranged from 13 to 36 minutes. The median waiting time, which represents the time at which 50% of cases waited less than this amount of time, were much lower as these are not influenced by any longer waiting times. These ranged from seven minutes at ERP2 to 23 minutes at ERP5.

In 2012–13 SAAS and the State Health department set the following response-time targets for urban areas (including ERP1 and ERP2)⁷:

- Priority 1 Ambulance intervention within eight minutes in 60% of emergency (life-threatening) cases
- Priority 2 Ambulance intervention within 16 minutes in 95% of potentially life-threatening cases
- Priority 4 Ambulance on scene within 60 minutes in 92% of urgent cases

KPI 1.8 *Number of ECP consumers treated in their 'usual residence'*

The ERP model aims to treat patients in their home / or private residence when appropriate, although some patients were also treated in the wider community. ERP4 provided destination

⁷ State Ambulance Service Annual Report 2012–13 p33

post-treatment rather than location of treatment. The figures in this table are therefore sourced from the ERP4 final report.

Table 21 Consumers treated in a private residence by site

Site	Number of ECP patients	% of ECP patients
ERP1	437	50%
ERP2	56	77%
ERP3	891	67%
ERP4	399	69%
ERP5	263	54%
Overall	2,046	62%

a. Patient activity shown for the dates between 1 Jan 2013 and 31 Mar 2014, patient activity shown for the dates between 1 Jan 2013 and 31 Mar 2014.

b. Cases where treatment location is missing are excluded

Overall 62% of patients receiving expanded scope care from an ECP were treated at a private residence. This varied across sites from 50% at ERP1 to 77% at ERP2.

ERP4 had 63% of patients with a post-treatment destination recorded as usual residence in baseline data from 1 October 2011 – 30 September 2013.

KPI 2.2 *Consistent or improved unit safety outcomes pre and post introduction of the ERP initiative e.g. number of re-contacts with the 000 service by consumers treated by the ECP for the same health care problem ; number of adverse events; number of complaints*

The number of adverse events, a count of re-contacts with the '000' service, and complaints were identified as indicators of safety. These are presented in Table 22. It is unclear for some sites whether re-contacts with '000' were for the same clinical need.

The information on safety measures was compiled from data submissions, and verified against sites reports and qualitative data such as interviews with senior managers and the project team during final site visits. In some cases safety metrics were not collected in the quantitative unit record data, and data was sourced from final reports (identified by footnotes to Table 22).

Table 22 Patient safety metrics by site

Site	Number of ESOP cases	Number of adverse events	Number of re-contacts with '000'	Number of complaints
ERP1	437	1	14	0
ERP2	56	0	4	0
ERP3	963	not reported	not reported	not reported
ERP4	399	0	5	0
ERP5	263	Not reported	3	not reported
Overall	2,118	1	26	0

a. Patient activity shown for the dates between 1 Jan 2013 and 31 Mar 2014, patient activity shown for the dates between 1 Jan 2013 and 31 Mar 2014.

b. Information on adverse events and complaints was sourced from final reports as it was not available in the submitted data.

c. Re-contacts were only provided for the period

ERP1 reported one adverse event, which was investigated and found that all correct procedures were followed and no changes were required. The site's data submission included 14 flagged cases which were re-contacts with '000'. This rate of 3.2% is slightly inconsistent with the final report which noted that 1.3% of patients seen by ECPs re-contacted '000' for the same presenting complaint, or approximately six cases out of 437. There were no reported complaints. During the implementation time period there were seven complaints for the entire ERP1 catchment area⁸, but none of these were for ECP cases.

⁸ ERP1 Final Report 15/05/2014, p22.

ERP2 reported no adverse events or complaints, which was confirmed in the qualitative data analysis and final reports. There were four re-contacts with '000' tabulated from the data submitted. This was slightly inconsistent with the final report which stated 4% of patients treated by the ECP recontacted '000' within 24 hours for the same presenting complaint⁹, equating to two out of 56 patients.

A low-risk incident was noted in the ERP3 final report and confirmed through qualitative data analysis. The case was a patient who had a hypotensive episode after drug administration and was transported to hospital. The incident was classified as low risk and not specific to the ECP program. It was considered to be unavoidable and would have been expected to have occurred had treatment been provided by an ICP. No data was provided on re-contacts with '000' or complaints, however no complaints were noted in the qualitative data analysis.

ERP4's unit record data did not include a data item for either adverse events or complaints. According to the site's final report there were no adverse events or complaints, and this was confirmed in qualitative data analysis such as interviews with senior managers and the project team. There were five re-contacts with '000' during the implementation period. The final report for this project site described the reasons for all re-presentations including ECP follow ups, these included patient anxiety relating to medications and condition, dressing checks and nausea and vomiting condition checks¹⁰. The final report for this site also noted that across the 15 months period ERP4 also had three patients re-present to the ED within 24 hours after being seen by the ECP. These were for a blood chemistry diagnosis after blood collection at home, palliative care with worsening symptoms, and a patient with multiple chronic complaints. Two of these patients were seen again by the ECPs.

ERP5 unit record data also did not include a data item for either adverse events or complaints, however their final report noted that there were no adverse events or complaints, and this was confirmed in qualitative data analysis such as interviews with senior managers and the project team. ERP5 reported three re-contacts with '000' in their first six months of implementation, with indwelling catheter blockage the most common complaint. No data on re-contacts was provided in the later data submission. Through follow-up, two patients reported having complications as a result of or after the ECP treatment. The presenting problem for each of these cases was a laceration and the complaints were related to the presenting problem or injury and need for ongoing treatment.

KPI 2.3 *Number of ECP cases deemed 'out of scope' by the ECP*

The ECP model is initiated when the dispatch co-ordinator / communications centre flags a case as appropriate for ECP care. The ECP then also makes a determination on whether the case is in scope either by telephoning the patient before leaving the station or after arriving at the scene. The number of cases deemed to be in scope by dispatch but out of scope by the ECP is provided in Table 23. This data was not able to be reported for ERP3 or ERP1.

Table 23 **Cases deemed out of scope by ECP vs dispatch**

Site	Number of ECP cases	Number of cases deemed out of scope
ERP1	437	Not reported
ERP2	56	3
ERP3	963	Not reported
ERP4	399	0
ERP5	263	25
Overall	2,118	28

a. Patient activity shown for the dates between 1 Jan 2013 and 31 Mar 2014, patient activity shown for the dates between 1 Jan 2013 and 31 Mar 2014.

⁹ ERP2 Final Report 09/05/2014, p19.

¹⁰ ERP4 Final Report 16/04/2014, p.24

No cases were out of scope at ERP4, as the hybrid model allowed staff to respond as either an ECP, First Intervention Vehicle or ICP care type. ERP1 ECP staff were also trained as ICPs so could respond to an emergency case when required.

ERP5 did not provide this data item; therefore the number of ECP cases out of scope was sourced from their final report for the period from 12 Aug 2013 - 28 Apr 2014.

KPI 2.4 *Number of consumers refusing treatment by the ECP*

Potential ECP patients at ERP3 were asked by staff at the communications centre whether they would consent to treatment by an ECP. Therefore data on refusals was not able to be reported by ERP3.

Table 24 **Consumers refusing treatment by ECP in their expanded role**

Site	Number of cases	Number of patient refusals	% refusals
ERP1	437	5	1.1%
ERP2	56	0	0.0%
ERP3	1046	3	0.3%
ERP4	399	15	3.8%
ERP5ERP5	263	26	14.0%
Average	2,201	49	2.2%

a. Patient activity shown for the dates between 1 Jan 2013 and 31 Mar 2014, patient activity shown for the dates between 1 Jan 2013 and 31 Mar 2014.

b. There may be a data issue with ERP4 refusals counts – these may have been mistakenly coded as refusals rather than non-transports.

Overall there were 49 refusals, accounting for approximately 2.2% of cases over the implementation period and across sites. ERP4 noted that refusals cases are likely to be a data entry issue, and therefore the refusal rate is likely much lower. Excluding these cases there is a 1.0% refusals rate.

This compares to 0.8% refusal rate at ERP4 for non-ESOP patients treated by the ECP.

KPI 2.6 *Number of consumers referred to the ECP model by other health care providers (source of referral)*

The majority of cases seen by the ECP were expected to be sourced from calls to '000'. Staff from implementation sites also promoted the ECP model to local services such as GPs and aged care services, and as the implementation period progressed they also received referrals from other paramedic crews. Table 25 shows the source of referral across sites for cases seen by ECPs in their expanded role.

ERP5 did not provide information on the source of referral however the final report notes that most ECP cases were a direct referral from the '000' call centre¹¹.ERP3 received cases from the communications centre, therefore requests for the ECP from sources other than '000', such as GPs and medical centres are made through the communications centre. Therefore they were unable to report on this data item.

¹¹ ERP5 May 2014 Final Report, p29.

Table 25 Source of referral for ECP cases

Site	ECP cases	'000'		Residential aged care		Medical practitioner		Other	
		Number of cases	% of cases	Number of cases	% of cases	Number of cases	% of cases	Number of cases	% of cases
ERP1	437	205	46.9	157	35.9	21	4.8	54	12.4
ERP2	56	37	66.1	10	17.9	5	8.9	4	7.1
ERP3	963	-	-	-	-	-	-	-	-
ERP4	399	270	67.7	28	7.0	1	0.3	100	25.1
ERP5	263	-	-	-	-	-	-	-	-
Average			60.2		20.3		4.7		14.9

a. Activity from 1 Jan 2013 - 31 Mar 2014, except ERP4 which is from 1 Apr 2013-31 Mar 2014.

Across all reporting sites approximately 60% of referrals for ECP cases were sourced from calls to '000'. ERP1 received the lowest proportion of cases from '000', with less than half of its ECP cases from this source and approximately one third from residential aged care facilities. Residential aged care accounted for one in five referrals across the program (reported sites only), but this varied across sites, with ERP4 only receiving 7% of their ECP cases through this source. Medical practitioners only accounted for 5% of ECP cases on average across the three sites that reported these data. As the figures are unknown for ERP5 and ERP3 the actual average across all sites is unknown.

Two sites reported the sources of referral for cases seen by ECPs outside their ESOP roles. At ERP1 76.9% of non-ECP cases were from '000', much higher than the 46.9% of ECP cases. At ERP4 87.3% of non-ECP cases were from '000' compared to 67.7% for non-ECP cases. Residential aged care accounted for 8.3% of cases outside the ECP role at ERP1, and 4.9% for ERP4, while medical practitioners referred 1.8% of cases at ERP1 and 3.5% at ERP4.

4.6 Unintended consequences

Key stakeholders who were interviewed at the close of the program identified a number of unexpected consequences of the ERP model.

HWA funding enabled ambulance services to be proactive in providing care for specific groups of patients. Although an unconventional role for what is traditionally an emergency service, the ERP program allowed these organisations to develop and pilot test a new business model.

"The other thing is – we, as an ambulance service have a phone number where people call us, which is 000, and then we tend to go – it's always one way. So it gives us the ability for the ECPs to book appointments. We can actually anticipate jobs and make contact with them. So the ECP program's given us the opportunity for our staff to ring up patients, which is unheard of in the ambulance industry; we don't call patients, they call us." (Stakeholder-Paramedic Manager)

"The ECP program's given us the opportunities to have something that's committed to that function rather than integrating it just into our normal operations. It's given us an opportunity to test it out..." (Stakeholder-Paramedic Manager)

Several stakeholders highlighted the capacity for the ECP role to support other health care providers and contribute to coordination of care in the community, especially for older people and palliative care patients.

"...I've got to say as somebody that hasn't always worked in community palliative care, it is this very interesting and daunting experience of walking into someone's home in the middle of the night, not quite knowing what you're going to get...I think knowing that you've got somebody that you can call after-hours, I mean in-hours we

would normally call the doctors...it's around ensuring that people feel more supported." (Stakeholder-Other Health Care Provider)

"For example, we had a guy come through here a couple of weeks ago who needed his suprapubic catheter changed, and my junior medical staff all went "Oh, I don't know how to do that" and I had to be somewhere else, so I rang the ECP and asked him to come up and assist...and that's the other role we can use them in, the teaching role. So that's just an example of how we can provide multi-disciplinary care and share our experiences and knowledge." (Stakeholder-Medical)

A noted side benefit of the program was the improvements in communication and relationships with other health care providers observed by ECPs and key stakeholders. For example, partnerships were established to provide training of other students and paramedics. This benefited not only the ECPs but other ambulance officers and led to opportunities for inter-professional collaboration with other primary health care providers. This breaking down of barriers was seen as a real bonus of the model.

"...communication has improved. The work with the nursing homes has improved dramatically...ambulances are silos, hospitals are silos, primary care is a silo, it's just improving that whole communication which is critical to integration." (Stakeholder-Medical)

"Memorandums of Understanding set up as part of the ECP initiative with other organisations and formal clinical placements organised for both paramedic students and new ECPs...that would not have happened without the ECP project." (Stakeholder-Administrative)

"It's had a flow on as far as education goes...in the downtime we'll say 'Pick a case; pick a job you've done...with this patient who had an infection...What would we expect to find or which antibiotic do we think we would have used? Let's go and get the antibiotic guidelines.' It makes the job more interesting when you can follow up on it and say, I wonder what the GPs going to do? It helps with your interaction with the GP if they are viewing you as someone who is part of health that has an input as opposed to, I drove them; they had a respiratory rate of 18 and their pulse was 80." (ECP)

"It's had a real knock on effect, as far as education goes; it's had a knock on effect as far as job satisfaction goes, not just for those who are doing it; I think for everybody, in my opinion, or certainly people I've worked with; and it's had a knock on effect for the patient and GP because they're having some sort of interaction that they wouldn't have had before, even if they're not ECPs. Now the barriers are starting to come down..." (ECP)

"...anecdotally I'm also hearing that other staff members on the station are contacting the doctors now and looking for alternative care pathways rather than just taking the patient to hospital." (ECP)

This opportunity also carried potential costs such as the difficulty of balancing different service demands and ensuring that ambulance services continued to meet their primary responsibility of providing an emergency response to urgent health care needs in the community. There was also a risk that care could become fragmented by the creation of too many distinct roles for health care professionals.

"Our primary responsibility is to provide pre-hospital emergency services to the community and there is the potential for the extended role paramedic which looks at primary care patients to actually be resourced at the expense of our core function." (Stakeholder-Paramedic Manager)

“I think the disadvantage is it creates another layer of fragmentation in what is already a fragmented healthcare system. So it potentially becomes confusing and potentially causes blurring of roles. The risk is there’s no one person accountable for someone’s care... You can mitigate against that risk by good communication... with whoever the accountable healthcare professional is.” (Stakeholder-Medical)

In addition, stakeholders pointed to the perils of implementing a new service and then having to withdraw it when funding ceased. Concerns about these reputational and relationship risks led some to decide they would not pick up certain types of cases. For example, one site declined palliative care cases for this reason.

“...we have done some palliative care work; they would like us to do all their rural work. Our management has decided to defer that at the moment because the program is not going to continue; therefore we’re not going to create something we can’t sustain. Which again, is shooting ourselves in the foot.” (ECP)

Finally, the ECP experience had motivated several ECPs to pursue higher education and improved their capacity in their usual roles.

“Most of us are going to go on and continue on doing our Master’s.” (ECP)

“There are certainly advantages for them...from the new knowledge they’ve acquired and the new skills they’ve acquired. There’s been a cascade, like an overflow, from that into their existing role.” (Stakeholder-Paramedic)

5 Economic evaluation

5.1 Introduction

One important goal of the ERP model is to avoid unnecessary transports to hospital by treating suitable patients in their usual residences. If achieved this has the potential to reduce the costs of transport and potential inpatient admissions. These potential benefits are the focus of the economic evaluation. It is acknowledged that there are other likely benefits, such as reduced pressure on local hospital EDs and enhanced continuity and quality of care, which are not easily quantified but have been thoroughly explored and documented by the qualitative elements of the evaluation.

The participating ambulance services have indicated that a proportion of patients who have traditionally been transported to hospital could be better served by the ERP model of care (labelled as suitable ECP patients in Figure 10). A key factor in the efficient working of the ERP model is accurate and timely identification of these cases at the communications centre so that the ECP can be dispatched appropriately. The decision to send out an ECP rather than usual ambulance transport will require an assessment of the patient's needs from limited information in an often stressful and time critical environment. The potential benefits of quicker treatment without transport, and the consequent cost savings, need to be weighed up against the possibility that treatment may be delayed and costs increased if the patient subsequently does require ambulance transport to hospital. At four of the five sites, this eventuality would require the dispatch of an additional vehicle equipped for patient transport and staffed by emergency response paramedics.

Another important factor affecting cost-efficiency is the size of the patient population suitable for the ERP model. As shown in Section 4, only a small proportion of cases for each ambulance service were seen by ECPs during the implementation period (labelled as pilot program in Figure 10). Nevertheless, sites have indicated that many more cases would have been suitable but no ECP was available at that time to attend those patients (labelled as suitable ECP patients in Figure 10).

For the economic evaluation the costs and effects of providing care under the ERP model, incremental to usual care, are compared to the costs and effects of providing usual care by itself. A characteristic of the ERP model is that the ambulance service bears the cost of setting up and running it while other stakeholders of the health care system realise some of the benefits. In particular, a number of ED presentations and potential inpatient admissions may be avoided. However, ECPs might also divert some of these avoided ED presentations by referring the patient to a GP. The evaluation should take all of these downstream impacts into account and should therefore analyse the impacts on costs and effects of the ERP model on the health care system as a whole.

While a number of studies have previously explored patient safety, quality of care and skills of ECPs, few include economic evaluations. In the United Kingdom, the Emergency Care Practitioner Report found potential cost savings for the ambulance service of £26,600 per ECP per year plus £31,700 in avoided ED attendances (NHS Modernisation Agency, Department of Health, 2004). In another project in the United Kingdom it was estimated that ECP contact cost would be between £24 and £89 per case. Total cost savings of £291 per case were reported using an incremental approach (Mason et al., 2004; Mason et al., 2005).

In New South Wales, the Extended Care Paramedic Program estimated from different scenarios using an incremental approach suggesting potential for cost savings of \$23 to \$89 per case (Access Economics, 2010). A 'virtual experiment' is currently being carried out in Western Australia and the study methodology has been published (Finn et al., 2013). In the Western Australian experiment ECPs will identify potential ECP patients but treat the patient using

standard protocols and this set of potential ECP patients will then be tracked and associated ED and inpatient data interrogated to estimate downstream costs and outcomes.

All the previous studies and the analysis reported below evaluate local initiatives or pilot programs. It is assumed that cost savings from avoided transportation of ECP cases can be directly translated into equivalent cost savings for ambulance services. However, a further level of analysis is required, taking into account the effects of this model on the efficiency of the ambulance services more broadly. Broader effects will depend on whether the ERP model is incremental to, or substitutes for, usual care. Both costs and benefits may increase if the ECP personnel and vehicles are implemented in addition to the existing capacity of the service, assuming there is sufficient demand to ensure that emergency response personnel and vehicles remain fully utilised. However, if the ERP model results in a decrease in usual care, there may be a need to adjust existing services accordingly. Current funding models which reward ambulance services for transporting patients, and not for avoiding transport, also have implications for the ERP model and its effects on the broader cost-efficiency of the ambulance services. Although these issues are beyond the scope of the current economic evaluation, they need to be factored in when considering any proposed scaling up of the model in the future.

5.2 The economic model

Under the usual care model ambulance services are faced with two types of patients. While the vast majority are transported to ED, a much smaller proportion of patients will not require transportation. This is illustrated on the left side of Figure 10. If an ambulance service has an ERP model in place, then this will be in addition to the usual care provided. For patients deemed suitable for ECP care the process of assessment and treatment will potentially differ as illustrated on the right side of Figure 10. Therefore, for the economic evaluation an incremental approach is taken, in that only patients who are, or would be seen by an ECP in treatment and control arms are considered and the results will provide information about the established ERP models at the sites (Section 2.1).

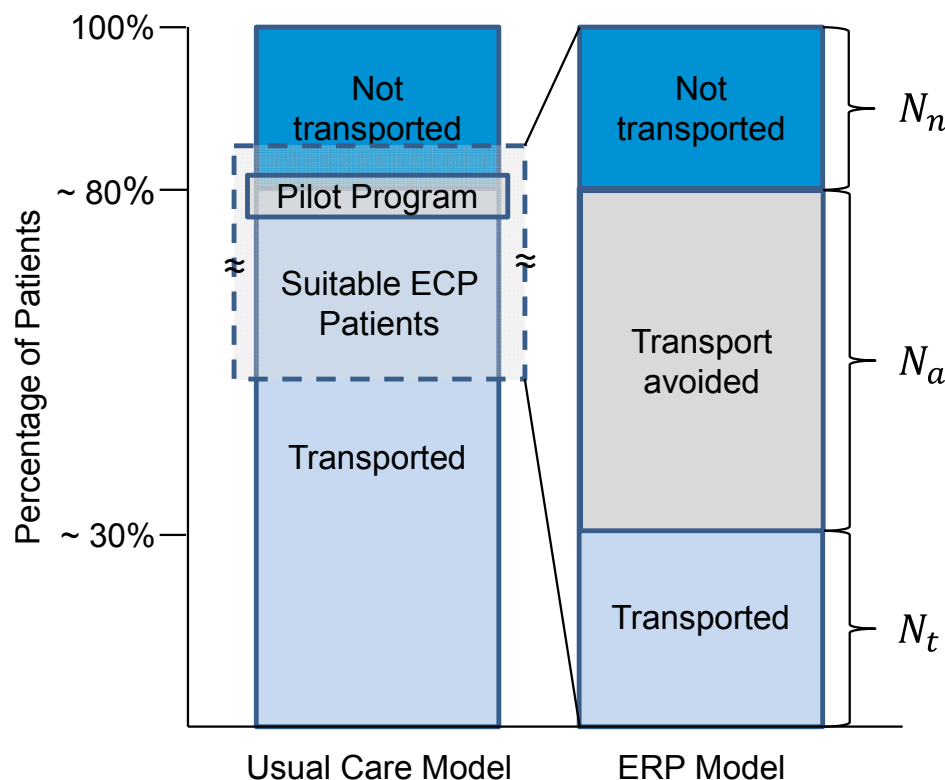


Figure 10 Illustration of ERP model

Let $N = N_a + N_n + N_t$ be the total number of patients seen by an ECP, where:
 N_a is the number of avoided transports of patients to the ED, i.e. patients that are not transported to the ED under the ERP model who would be transported otherwise;
 N_n is the number of other patients that are not transported and;
 N_t is the number of transported patients.

Let ECP_a , ECP_n and ECP_t denote the associated ECP cost in these respective patient populations. Then the total cost of providing care under the ERP model to these N patients is the sum of cost related these three types of patients. That is:

ECP_a cost per patient of the avoided transport cases N_a , a proportion of which will be seen by a GP

ECP_n cost per patient related to the N_n patients not transported to ED under the ERP model or usual care; and

ECP_t cost per patient of an ECP seeing a patient but deciding that transportation to ED is required.

Let α denote the proportion of patients that are referred to a GP and GP denotes the associated cost. Also, Amb_t denotes the cost of transporting a patient to ED using the ambulance service and $Hosp_t$ refers to the cost of treatment in ED including a potential inpatient stay. Then the total cost of treatment with the ERP model can be expressed in the following way:

$$N_n \times ECP_n + N_a \times (ECP_a + \alpha \times GP) + N_t \times (ECP_t + Amb_t + Hosp_t)$$

If these N patients were to be treated under the usual care model then – by definition – the N_n patients would not be transported to ED. All other $N_a + N_t$ patients would be transported and would also receive treatment in hospital. The total cost is the sum of the following components: (i) The cost of an ambulance responding to a patient that does not require transportation and (ii) the cost of transportation and treatment in hospital. Let Amb_n denote the cost of an ambulance patient that does not require transport and let Amb_a and $Hosp_a$ denote the transportation and treatment cost of a patient whose transport would have been avoided in the ERP model. The total cost can then be expressed in the following way:

$$N_n \times Amb_n + N_a \times (Amb_a + Hosp_a) + N_t \times (Amb_t + Hosp_t)$$

Cost savings in treatment of ECP patients to the health system can arise if direct cost of ECP and higher rates of GP use among additional patients not transported are more than offset by reduced transport and hospital costs. That is, treating ECP allocated patients with the ERP model is cost-saving relative to usual care in this population if the following inequality holds.

$$N_n \times ECP_n + N_a \times (ECP_a + \alpha \times GP) + N_t \times (ECP_t + Amb_t + Hosp_t) < N_n \times Amb_n + N_a \times (Amb_a + Hosp_a) + N_t \times (Amb_t + Hosp_t)$$

However, in assessing this, as discussed below, cost and activity information available for this evaluation is limited. Cost information about usual care patient transport is only available from external sources as total expenditure per financial year. Also, activity information available does not make it possible to distinguish differences in resource utilisation between not transported, transported patients, and patients where a transport was avoided, e.g. time spent with patient, km driven, time waited, time spent for patient follow-up. Therefore, no distinction can be made between ECP_a , ECP_n and ECP_t , Amb_a , Amb_n and Amb_t , nor between $Hosp_a$, $Hosp_n$ and $Hosp_t$. The equation has to be rewritten with ECP , Amb and $Hosp$ denoting the respective average cost per patient.

$$N \times ECP + N_a \times \alpha \times GP < N_n \times Amb + N_a \times (Amb + Hosp)$$

This equation can primarily be used to quantify the cost difference between care provided under the usual care model and the alternative ERP model at each site in ECP patients. This cost difference can be expressed per year or per ECP patient.

However, it can also be rearranged to consider, all other factors being equal (*ceteris paribus*), the maximum cost of ECP per patient and minimum proportion of patients avoiding transport or hospitalisation for ECP to be cost neutral. That is, the threshold for cost of ECP per patient to be cost saving (with inequality) or cost neutral (with equality)

$$ECP \leq \frac{N_n}{N} \times Amb + \frac{N_a}{N} \times (Amb + Hosp - \alpha \times GP)$$

or the threshold for the minimum proportion of transports avoided by the ERP model for ECP to be cost saving (with inequality) or cost neutral (with equality)

$$\frac{N_a}{N} \geq \frac{ECP - \frac{N_n}{N} \times Amb}{Amb + Hosp - \alpha \times GP}$$

It should be noted that there could also be a situation where an ambulance arrives at the scene and decides that no transport is required and calls an ECP instead. Since no data was collected to capture this it is disregarded in the equation.

The ECP model at ERP2 is slightly different in that the ECP vehicle there has patient transport capability. Hence, if transport is required, no additional ambulance is necessary. The corresponding (simplified) equation is the following:

$$N \times ECP + N_a \times \alpha \times GP \leq N \times Amb + N_a \times Hosp$$

When evaluating the ERP2 site this equation is used. Table 26 shows the necessary inputs into the economic evaluation. The details of each of the components are discussed in the sections outlined. The initial training costs are not incorporated in the evaluation and will be discussed separately.

Table 26 Overview of model inputs

	Ongoing ECP	GP Visits	Patient Transport	Hospital Care	Initial Training
Model inputs	<i>ECP</i>	α, GP	<i>Amb</i>	<i>Hosp</i>	–
Data and assumptions	Section 5.3.1	Section 5.3.2	Section 5.3.3	Section 5.3.4	Section 5.3.5

5.3 Data sources and assumptions

5.3.1 Ongoing ECP

Only limited cost information could be provided by the implementation sites. Therefore assumptions had to be made based on End of Financial Year Reports, initial budget plans submitted to HWA and a spreadsheet filled in by the sites. Staff classifications were taken from the staff establishment profile (ET1). Salary levels (base rate and allowances) were taken from the respective enterprise agreements; 9% superannuation, state specific payroll tax and 17.5% annual leave loading was added.¹² Table 27 shows the estimated annual cost for each of the sites. Equipment and consumables included all costs associated with the vehicle and all medical consumables. It was assumed that the vehicle and all equipment built into it would be used for five years and that IT equipment would be replaced every three years.

¹² SA Ambulance Service Enterprise Agreement 2011; ACT Public Service Justice and Community Safety Directorate; ACT Ambulance Service Enterprise Agreement 2011 – 2013; Ambulance Tasmania Agreement 2013; St John Ambulance Australia (NT) Inc. Ambulance Enterprise Agreement 2010-2013; <http://www.payrolltax.gov.au/harmonisation/payroll-tax-rates-and-thresholds> (last accessed on 06/07/2014)

It should be noted that the differences in salary cost are due to different FTE numbers of personnel involved in the ERP model at the sites. Also, the number of ECP persons was estimated to be 2.7 because one person started later.

Table 27 Estimated annual cost by site

Site	ECP Persons	Salary (\$, per Year)	Equipment and Consumables (\$, per Year)	Total (\$, per Year)
ERP1	3	458,166	29,871	488,037
ERP2	2.7	417,440	31,439	448,879
ERP3	4	571,990	37,796	609,785
ERP4	2	248,468	33,777	282,244
ERP5	4	492,543	52,851	545,394

5.3.2 GP visits

Information about subsequent GP visits was limited. While some sites reported GP referral rates, others surveyed some of their ECP patients and reported actual GP visit rates and one site did not report on GP utilisation at all. Therefore, a common GP visit rate was calculated at the average of the reporting sites weighted by their number of ECP cases. This was 47.3%. GP visits were considered to be standard consultations at consulting rooms lasting less than 20 minutes. According to the MBS schedule these visits cost \$36.30.¹³

5.3.3 Patient transport

The cost per patient for transport by the ambulance service was not captured as part of this program. As done in previous evaluations, external sources had to be used to estimate these costs (Access Economics, 2010). The annual Report on Government Services (ROGS) provided information about activity and expenditure for ambulance services around Australia (SCRGSP, 2014). Table 28 contains an excerpt of that report showing the total number of patients and total expenditure in the jurisdictions. It also shows the percentage of patients that did not need transportation in 2011-12, the baseline period. For the analysis it had to be assumed that the costs associated with an ambulance transport to ED was the ratio between total expenditures and total number of patients, as shown in Table 28.

Table 28 Ambulance service activity and expenditure in 2012-13

Ambulance Service	Total Patients	Not transported (%)	Total Expenditure (\$)	Average Cost per Patient (\$)
JurisdictionERP1	233,724	19.1	209,746,680	897.41
JurisdictionERP3	36,865	18.6	45,053,800	1,222.13
JurisdictionERP4	70,734	17.7	60,898,381	860.95
JurisdictionERP5	47,451	19.2	25,930,800	546.48

These represent the potential cost saving to ambulance services from avoiding a transport with the ECP. However, whether cost savings to the ambulance service from reduced transport of ECP patients are actually realised by the ambulance service in practice depends on whether usual care services are commensurately reduced or are absorbed in treating usual care patients. Given the marginal nature of the ERP model it is likely that in practice additional resources freed by the ECPs are likely to be absorbed in other activity.

5.3.4 Hospital care

No data about subsequent treatment in hospital were available from the evaluation. This was compounded by the different data sets used by ambulance and hospital services and because not all ambulance services are managed under their respective State or Territory Department of Health. The costs associated with ED presentations and possible subsequent admissions had

¹³ For details see www.mbsonline.gov.au/ (last accessed on 01/07/2014)

to be estimated based on external data sources. The Independent Hospital Pricing Authority (IHPA) produces an annual National Efficient Price (NEP) which is used in combination with price weights (PW) and other adjustments to determine the price of an activity under Activity Based Funding (ABF). Price weights are produced for acute, subacute, non-admitted, and ED activity using the corresponding national classifications (IHPA, 2012).

While newer price weights would have been available, the latest available hospital activity data dated from 2012-13 as well as the majority of all cost and activity information from within the ERP sub-project. It was therefore decided to use the 2012-13 NEP to be consistent.

Urgency Related Group (URG) v1.2 was used by the IHPA to classify ED activity for Level 3B to Level 6 EDs in the 2012-13 national price weights. This classification is based on the patient's admission status, diagnosis grouping and discharge destination. The IHPA also produced a set of 2012-13 price weights using Urgency Disposition Group (UDG) v1.2, which are used for Level 1 to Level 3A EDs¹⁴, and are calculated at a higher aggregate level than URGs. These price weights exclude diagnosis as a classification variable. The price weights for UDG v1.2 are shown in Table 29 below.

Table 29 IHPA 2012-13 price weights for ED attendances

UDG v1.2	Description	Price Weights
1	Admitted Triage 1	0.2996
2	Admitted Triage 2	0.2061
3	Admitted Triage 3	0.1801
4	Admitted Triage 4	0.1531
5	Admitted Triage 5	0.1165
6	Non-Admitted Triage 1	0.2203
7	Non-Admitted Triage 2	0.1475
8	Non-Admitted Triage 3	0.1136
9	Non-Admitted Triage 4	0.0768
10	Non-Admitted Triage 5	0.0477
11	Did Not Wait	0.0353
12	Dead on Arrival w any Triage w any MDB	0.0440

It has to be assumed that the price weights in Table 29 appropriately reflect costs. Since triage category, admission status and discharge destination were unknown for patients who were treated under the ECP program. Further assumptions were required about the distribution of patients to combine the various price weights and deduce a single average price weight which could be applied to all ECP patients.

The Australian Institute of Health and Welfare (AIHW) publishes annual reports on hospital utilisation in general and ED presentation in particular (Australian Institute of Health and Welfare, 2013; 2014). ED activity data is shown by triage category and discharge status separately for each jurisdiction is shown in Table 30.

Table 30 AIHW activity data – ED presentations and proportions of subsequent hospital admissions 2012-13

	Triage 1		Triage 2		Triage 3		Triage 4		Triage 5	
	#	Admit (%)	#	Admit (%)	#	Admit (%)	#	Admit (%)	#	Admit (%)
SA	5,797	79	56,537	59	164,357	41	190,840	15	33,285	6
ACT	469	81	12,909	56	40,298	36	53,505	16	11,416	4
TAS	818	80	11,470	52	49,108	33	67,362	11	12,615	4

¹⁴ EDs are classified into six levels based on size and service capability, with level 3 EDs further split into two categories (A and B) for funding purposes. Level 3A has medical staff available for recall to hospital within 20 minutes, 24 hours a day and Level 3B has medical staff available in hospital 24 hours a day.

[http://www.ihsa.gov.au/internet/ihsa/publishing.nsf/Content/E425944BFC5B86C7CA257B3A00037C3A/\\$File/NEPDetermination-OnlineGlossary.pdf](http://www.ihsa.gov.au/internet/ihsa/publishing.nsf/Content/E425944BFC5B86C7CA257B3A00037C3A/$File/NEPDetermination-OnlineGlossary.pdf)

	Triage 1		Triage 2		Triage 3		Triage 4		Triage 5	
	#	Admit (%)	#	Admit (%)	#	Admit (%)	#	Admit (%)	#	Admit (%)
NT	772	72	12,230	57	39,485	44	75,397	16	13,297	5

For the purpose of this economic evaluation, it was assumed that ECP patients would be triaged as Triage Category 4 or 5 and would have been triaged and admitted with the same relativities as non-ECP patients who did present to the ED.

The proportion of activity which was classified Triage Category 4 or 5 in Table 30 could be applied to the price weights in Table 29 to create an estimated price weight for ECP patients, which has been based on the observed ED activity profiles. This was calculated by multiplying the proportion of activity in each category by the UDG price weight and summing the weights. This had to be done separately for admitted and non-admitted patients.

For example, for non-admitted ED presentations in South Australia the calculation was the following:

$$\frac{(190,840 \times 0.85) \times 0.0768 + (33,285 \times 0.94) \times 0.0477}{(190,840 \times 0.85) + (33,285 \times 0.94)} = 0.0721$$

The result of this calculation for all four States and Territories is shown in Table 31. For the admitted patients further costs had to be added for the admitted part of the hospital care. It was assumed that ECP patients would stay one day for observation. The price weight of this stay was assumed to be the average of all Medical DRGs weighted by the number of separations, divided by the average length of stay of all Medical DRGs. The 2012-13 price weights for Medical DRGs were provided by IHPA and the corresponding number of separations and average length of stay (latest available for 2011-12) had been taken from the annual Australian Public Hospitals Cost Report (IHPA, 2012; 2014). The calculated price weight was 0.2766.

For example, for admitted episodes in South Australia the calculation was the following:

$$\frac{(190,840 \times 0.15) \times (0.1531 + 0.2766) + (33,285 \times 0.06) \times (0.1165 + 0.2766)}{(190,840 \times 0.15) + (33,285 \times 0.06)} = 0.4273$$

The average across non-admitted and admitted episodes was calculated weighted by the corresponding number of presentations, shown in Table 30. The result of this calculation is displayed in Table 31.

Table 31 Average unadjusted price weights for hospital episodes

	Non-Admitted Episodes		Admitted Episodes			All Episodes
	Total	ED Price Weight	Admitted Price Weight	Total	Total	
SA	0.0721	0.1507	0.2766	0.4273	0.1206	
ACT	0.0711	0.1512	0.2766	0.4279	0.1207	
TAS	0.0719	0.1508	0.2766	0.4274	0.1071	
NT	0.0720	0.1512	0.2766	0.4278	0.1230	

In addition, adjustments to the price weights were added based on the indigenous status of the patient and the remoteness area of the usual place of residence (IHPA, 2012). The adjusted price weights were calculated as follows:

$$\text{Adjusted PW} = \text{unadjusted PW} \times (1 + \text{Indigenous} + \text{Remoteness area})$$

Table 32 shows the amount of the adjustments.

Table 32 Price weight adjustments in 2012-13

Adjustment Factor	Amount (%)
Indigenous	5.0
Outer Regional Area	8.7
Remote Area	15.3
Very Remote Area	19.4

The AIHW report 'Australian hospital statistics 2012–13: emergency department care' contains information about potentially avoidable GP-type presentations to public hospital EDs by remoteness area and Indigenous status, see Table 33. These are defined as presentations to peer group A or B hospitals with triage category of 4 or 5 where the patient did not arrive by ambulance or by police or correctional vehicle and at the end of the episode, was not admitted any hospital and did not die (Australian Institute of Health and Welfare, 2013).

Table 33 GP-style presentations by indigenous status and nationality of the usual place of residence

	Indigenous (%)	Outer regional (%)	Remote (%)	Very remote (%)
SA	3.3	1.6	0.4	0.5
ACT	2.4	0.0	0.0	0.0
TAS	4.8	36.2	0.6	0.1
NT	30.2	58.2	30.2	11.6

For this analysis it had to be assumed that the same relativities hold for ECP patients. Again, the weighted average using the figures in Table 33 had to be calculated. Finally, the corresponding price had to be calculated by multiplying the 2012-13 National Efficient Price (NEP) of \$4,808. The results are shown in Table 34.

Table 34 Average adjusted price weights and costs for hospital visit

	Average unadjusted Price Weight	Average adjusted Price Weight	Average Price (\$)
SA	0.1206	0.1212	582.72
ACT	0.1207	0.1208	580.78
TAS	0.1071	0.1108	532.96
NT	0.1230	0.1398	672.10

5.3.5 Initial training

Actual training costs were not captured as part of this program, but all sites provided detailed training plans for their ECP staff at the beginning of the program. For all sites except ERP5 initial training was provided by SAAS. This training program comprised of four weeks teaching in South Australia and an additional four to eight weeks of placements and internships in the respective home region (it should be noted this varied considerably from site to site). ERP5 had an existing collaboration with a training partner and arranged training through that agreement. Their training schedule was designed to have four to eight weeks of online learning, four weeks of teaching and placement and another four weeks placement locally.

However, the training actually carried out varied widely depending on the local circumstances at the time. Therefore, only a minimum common training was assumed, comprising four weeks of teaching away from the local region and four weeks of placements in the local region. The costs of attendance at the training for ECPs included salary, accommodation, meals, travel and allowances. The cost for the local placement comprised salary costs. No backfill or supervision costs were assumed. Assumptions about per diems were based on the Australian Taxation Office reasonable allowances for 2012-13: accommodation \$157 (Adelaide), meals \$98.40,

allowance \$17.85.¹⁵ The costs of return flights were assumed to be \$700. The results are shown in Table 35.

Table 35 Training costs

Site	Salary (\$, 8 weeks)	Per diems and Travel (\$, 4 weeks, per person)	Total (\$, per Person)	No. of Persons	Total (\$)
ERP1	23,496	8,351	31,847	3	95,540
ERP2	23,496	8,351	31,847	3	95,540
ERP3	22,000	8,351	30,351	4	121,402
ERP4	19,113	8,351	27,464	2	54,928
ERP5	18,944	8,351	27,295	4	109,180

5.4 Results

The implementation sites reported ECP activity for a varying number of months. Therefore activity was calculated on an annual basis. Also, some of the sites reported that ECPs undertook a high proportion of activity outside their ESOP roles, such as first responder and intensive care duties, (Section 4). To account for these variations in the way ECPs were utilised by the participating services, two different models of activity were considered and their cost effectiveness evaluated. The first model included ECP patient activity only and the second model included all cases seen by ECPs including those outside the ESOP role.

5.4.1 ECP-only model

For the ECP-only model, only the cases seen by ECPs in their ESOP roles were included. Because activity was reported for varying number of months, ranging from 12 to 15 months, annual ECP activity was calculated, see Table 36. Annual ECP patient figures ranged from 45 at ERP2 to 797 at ERP3. The ED avoidance rates ranged from 46.2% at ERP5 to 59.3% at ERP1. The total rate of ECP patients not transported, including those who could be expected to be not transported either in usual or ECP care, ranges from 65.4% at ERP5 to 78.4% at ERP1.

Table 36 ECP-only model – activity

Site	Length of Activity (Month)	Total Patients	Patients (per Year)	Not transported (%)	Transport avoided (%)
ERP1	15	437	350	78.4	59.3
ERP2	15	56	45	73.2	54.1
ERP3	14.5	963	797	70.0	51.4
ERP4	12	399	399	75.5	57.8
ERP5	12.5	263	252	65.4	46.2

Table 37 shows the calculated cost per ECP patient using the estimated annual ECP cost as shown in Table 27. Due to the large differences in activity ECP cost varied from \$707 for ERP4 to \$10,020 for ERP2.

Table 37 Cost per ECP patient

Site	ECP Cost (\$, per Patient)
ERP1	1,396
ERP2	10,020
ERP3	765
ERP4	707
ERP5	2,160

¹⁵ <http://law.ato.gov.au/atolaw/view.htm?DocID=TXD/TD201217/NAT/ATO/00001>
ATO references: NO: 1-40JVPHYD; ISSN: 1038-8982

Using the annual ECP patient activity presented in Table 36 together with the assumed costs reported in Section 5.3 the cost difference between the usual care model and the ERP model was calculated. Table 38 shows the results. The ERP models at ERP3 and ERP4 bear annual cost savings of \$302,889 and \$96,065 (\$380 and \$241 per ECP patient). The ERP model at the other three sites is not cost-effective and the annual costs are higher than under the usual care model.

Table 38 Incremental cost of ECP relative to usual care (total and per patient)

Site	Cost Difference (\$, per Year)	Cost Difference (\$, per Patient)
ERP1	124,823	357
ERP2	394,968	8,816
ERP3	-302,889	-380
ERP4	-96,065	-241
ERP5	378,763	1,500

Table 39 shows the calculated thresholds for the ERP models to be cost neutral. All other factors being equal, the cost per patient at ERP1, ERP2 and ERP5 would need to reduce to \$1,039, \$1,203 and \$660 respectively to be at least cost neutral. On the other hand, (keeping all other factors constant) these three sites would not be able to increase their ED avoidance rate to the extent necessary to achieve cost effectiveness, indicated by ‘-’ in Table 39.

Table 39 Thresholds for ECP only model

Site	Threshold Cost (\$, per Patient)	Threshold Transports avoided (%)
ERP1	1,039	-
ERP2	1,203	-
ERP3	1,145	30.1
ERP4	948	40.3
ERP5	660	-

5.4.2 Hybrid activity

At most sites the activity of the ECP personnel comprised not only ECP patients. Often ECPs carried out other duties too, in particular as first responder (Section 4). While this additional activity contributes to higher outcome results of the ambulance service, it impacts on the availability of ECPs for the target group of patients while they are engaged with other duties. Therefore it influences the effectiveness of the local ERP model. For those sites that reported ECP activity and non-ECP activity along with ED avoidance rates an (adjusted) evaluation was calculated. Data were only available from three sites. Table 40 shows the total annual activity of ECPs and the corresponding avoidance rates. ED avoidance rates are lower for all of the sites, while the reported activity of ECPs is higher.

Table 40 Hybrid model – annual activity

Site	Patients (per Year)	Not transported (%)	Transport avoided (%)
ERP1	488	72.2	53.1
ERP3	900	63.9	45.3
ERP4	790	47.5	29.8

Table 41 shows the results using these changed inputs instead. The ERP models at ERP3 and ERP4 bear annual cost savings of \$323,274 and \$162,255 (\$359 and \$205 per patient seen). The ERP model at ERP1 is not cost saving with the hybrid ECP costs being higher than under the usual care model.

Table 41 Incremental cost of hybrid ECP relative to usual care (total and per patient)

Site	Cost Difference (\$, per Year)	Cost Difference (\$, per Patient)
ERP1	25,297	52
ERP3	-323,274	-359
ERP4	-162,255	-205

However, keeping all other factors equal the ERP model at ERP1 would be cost effective if costs per case were lower than \$948 or the ED avoidance rate were higher than 56.6%, see Table 42.

Table 42 Thresholds for hybrid activity model

Site	Threshold Cost (\$, per Patient)	Threshold Transports avoided (%)
ERP1	\$948	56.6
ERP3	\$1,036	25.2
ERP4	\$563	14.9

5.5 What-if scenario

In addition to the first two calculations where cost savings based on actual reported patient activity were calculated, a third what-if scenario with higher patient activity and constantly high ED avoidance rates was calculated. In this scenario it was assumed that six ECP patients could be seen in each shift (that is six daily for each site for 365 days per year) and the same level of ED avoidance rates as reported in this program could be maintained. The assumed annual activity is shown in Table 43.

Table 43 ECP only (higher activity scenario) model – assumed annual activity

Site	ECP Patients (per day)	Not transported (%)	Transport avoided (%)
ERP1	6	78.4	59.3
ERP2	6	73.2	54.1
ERP3	6	70.0	51.4
ERP4	6	75.5	57.8
ERP5	6	65.4	46.2

Table 44 shows the results using these changed inputs. All implementation sites would be highly cost effective. Annual cost savings range from \$899,953 at ERP5 (\$411 per patient) to \$2,186,507 at ERP2 (\$998 per patient).

Table 44 Potential incremental cost of an ECP relative to usual care (total and per patient) if seeing six patients per day without reduced diagnostic accuracy

Site	Cost Difference (\$, per Year)	Cost Difference (\$, per Patient)
ERP1	-1,787,243	-816
ERP2	-2,186,507	-998
ERP3	-1,898,173	-867
ERP4	-1,794,191	-819
ERP5	-899,953	-411

5.6 Policy implications

Different scenarios assuming three different levels of activity were calculated. The first model included ECP activity only, the second included all reported activity (ECP and non-ECP) and the

third was based on the assumption that each ECP sees six target patients in each and every shift.

ERP3 and ERP4 were cost saving with current ERP models, realising savings of \$302,889 and \$323,274 for ERP3; and \$96,065 and \$192,255 in ERP4 respectively, in the first two scenarios. The primary reason for this was their relatively high level of activity for given ECP resources in comparison to the other three sites.

In ERP1, the site with the next highest patient activity, the ERP models did not create a cost saving. However, their hybrid model would have been cost neutral if it was 5% less costly or alternatively their ED avoidance rate was 56.6% instead of 53.1%.

The ERP models of the other two sites ERP2 and ERP5 were not able to create a cost saving. This was primarily due to low levels of activity. ERP2 reported only 56 ECP cases in 15 months. At ERP5 the ERP model was comparatively expensive and only a relatively low ED avoidance rate could be achieved. At both sites increased ED avoidance rates would not have been sufficient to create a cost saving. Unfortunately, no data were available from ERP2 and ERP5 to calculate the second scenario taking into consideration all the activity those ECPs carried out in addition to their ESOP roles.

Sites were able to achieve non-transport rates between 65.4% and 78.4% in the pilot populations selected for the ERP sub-project and the corresponding ED avoidance rates were 46.2% and 59.3%. These rates can be seen as indicating the degree of accuracy in identifying patients for ECP services, as they represent the proportion of patients seen where ECP services were appropriate in terms of transportation needs. Trying to maximise this rate is critically important in assessing whether the ECP is likely to be net resource or cost saving or cost effective. Ambulance service and health system resources and costs are generally saved when ECPs are dispatched to suitable patients and transport to hospital is avoided, but costs increase if ambulance transport is required for these patients as some double handling is involved. Hence, for example one can contrast impacts of accuracy in identifying suitable ECP patients at:

- (i) ERP5 where use of ECP would have saved cost and resources in the 46.2% of ECP patients with transport avoided, while incurring additional costs in the 34.6% who ended up being transported and;
- (ii) ERP1 where use of ECP would have saved cost and resources in the 59.3% of ECP patients with transport avoided, while incurring additional costs in the 21.6% who ended up being transported.

ECPs in this pilot program saw a very small proportion of the total ambulance population, suggesting highly selective identification of target patients. The rate of inaccurate dispatch may well increase if the model is scaled up beyond these pilot sites leading to higher rates of transportation with flow-on effects on cost-efficiency. For successful implementation of the ERP model on a larger scale it is therefore of high importance that dispatch systems are in place that accurately identify patients suitable for ECP care.

If ECP services were able to see six patients per day and maintain the avoided transportation rates, all sites would create cost savings for the health care system. However, while the assumed activity levels are rather conservative at six ECP patients per day, the reported activity levels during implementation were much lower. They would have to be increased by a factor of 2.7 at one site to almost a factor of 50 at another. While all sites seem to have the capacity to increase their current activity levels it is questionable if the catchment area of all five sites would allow for such an increase in ECP patients. Again, the key to cost savings from transport avoidance under this scenario is diagnostic accuracy in allocating ECP to ambulance populations.

While the initial training costs were kept separate from the model, it should be noted that at ERP3 and ERP4, the sites with sufficient activity levels, the initial training investment was offset already in the first year of implementation.

However, it should also be noted that this economic evaluation is based on a short implementation period and a number of simplifying assumptions had to be made. Before ERP models are rolled out on a larger scale, further research into their impacts on identification of ECP patients and provision of usual care across the ambulance service should be carried out as well as possible shifts between health care providers. The models presented here, as in previous analysis, assume that ambulance services save on the transport avoided by ECP; savings of between \$546 and \$1,222 in the sites in this study (Table 28). However, where the ECP service is incremental at the margin to usual care – that is, when it is provided in addition to the normal service - the freed resources are expected to be absorbed in servicing calls that require an emergency response. Hence, although more cases might be attended overall, and all types of patients might receive more appropriate and timely care, the total number of transports provided by the service may not be reduced.

These practical issues are critical in creating appropriate incentives for ambulance services to adopt ERP models. It appears likely that any cost savings will arise for hospitals rather than ambulance services, particularly if funding for ECP care is lower than for usual care ambulance transport services.

This analysis overall shows potential cost savings for the health care system through the use of ECPs but only where volume and diagnostic accuracy is high enough. The crucial factors for successful implementation are sufficient levels of ECP activity and high ED avoidance rates through correct identification at the time of call. Further, mechanisms need to be considered to create appropriate incentives and capture cost savings arising in ECP patients across the ambulance populations and services where these could be expected to arise.

6 Sustaining innovation

Innovative models expanding the scope of practice of paramedics have been implemented in five diverse locations. The strategies deployed by State and Territory ambulance services to manage and embed these changes have been closely examined as part of the national evaluation. This section of the report explores the major influences on sustainability and addresses the question from the ESOP evaluation framework: 'Can you keep it going?' An innovation ideally leads to a lasting improvement in level or service or quantity or quality of output by an organisation (Bartos, 2003). Organisations have successfully sustained the innovation "when new ways of working and improved outcomes become the norm" (Maher et al., 2006).

Some models of sustainability focus on identifying factors or conditions that increase the likelihood of a specific intervention being continued. Other models examine sustainability from a systems perspective, focusing on the interplay of environmental forces, contextual influences and the intervention (Stirman et al., 2012). In reality, it is a combination of both perspectives that produces the greatest insights about sustaining innovation.

Influences on the sustained use of new practices, programs or interventions can be broadly classified into four categories:

- characteristics of the innovation (its fit, adaptability and effectiveness)
- organisational context (including external factors like the climate of the health system and legislation and internal factors such as organisational culture and leadership)
- the capacity to sustain the innovation (including external factors like funding and internal factors such as access to champions, workforce availability etc.)
- processes that facilitate sustainability (such as stakeholder engagement, collaboration and partnership development and integration of policies and procedure (Stirman et al., 2012).

These categories were identified from a review of the literature relating to the sustainability of new programs and innovations in healthcare settings (Stirman et al., 2012). The ESOP program evaluation captured data on factors influencing sustainability from a range of sources including semi-structured interviews and the use of the NHS Sustainability Model (Maher, Gustafson & Evans, 2006). This categorisation provides a way of organising the major evaluative findings for the ERP sub-project. It is illustrated in Figure 11. Only factors that were relevant to the ERP sub-project were addressed in the following analysis.

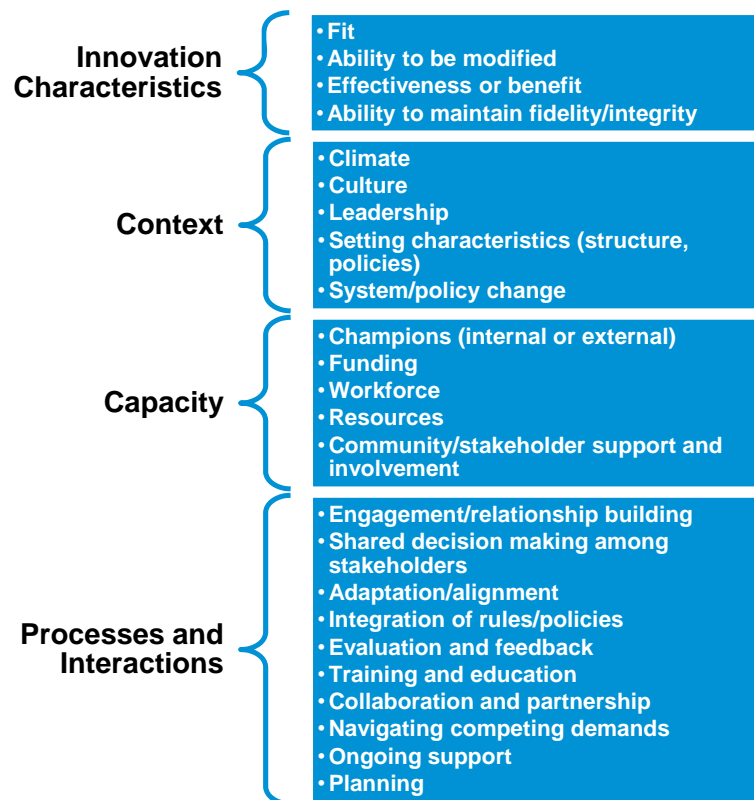


Figure 11 Influences on sustainability (adapted from Stirman et al., 2012)

6.1 Innovation characteristics

Innovation characteristics relevant to the sustainability of the ECP role are the ability of the model of care to be modified as needed to suit local requirements, the ability to maintain fidelity of the model during implementation and the perceived effectiveness or benefit generated from the model of care.

6.1.1 Ability for modifications

In their interviews, many ECPs stated that the model of care had needed review and adaptation to account for local conditions. In reality, data collected during the formative part of the evaluation showed that most projects did not need to make significant changes to the model of care. Adaptations were principally related to internal organisational processes for authorisation and acceptance of clinical practice guidelines. The ability to adapt and modify aspects of the ECP model facilitated acceptance by different jurisdictions. The experience of implementation showed that localities had varying demand and supply issues for health services. There was a need to modify the focus of the ECPs to ensure alignment between the model of care and the local setting. This allowed ECPs to fill gaps or 'niches' in primary care services; for example, the resignation of the community based continence nurse in one locality led to a demand for ECPs to assist with catheter replacement.

6.1.2 Implementation fidelity

ERP1 did not achieve the throughput anticipated from a stand-alone ECP resource. The experience at ERP2 was that a hybrid role where the ECP could also function as a first responder was more sustainable. ERP3 was able to implement the most consistent service with four dedicated ECPs. These positions were supernumerary to the existing emergency crews. ERP4 appointed two ECPs and whilst these were intended to be supernumerary to the emergency response crews, over time the ECPs were redeployed as first responders to meet organisational needs. The hybrid model of ECP response has demonstrated the capability for

safe treatment of patients in their home environment, often negating the use of additional paramedic crews for transport to hospital. ERP5 implemented a combined Station Officer Role. However, this dual function combined with the limited number of ICPs at that site meant that frequently the ECPs were called on to fulfil other duties and were unable to function in the ECP role. Where hybrid models were adopted throughput was affected. It proved challenging for most services to balance the first response to emergency cases with extended care responses.

Nevertheless, the majority of ECPs felt that some form of hybrid role was more satisfying and efficient in rural and regional locations. It had the added benefit of ensuring that ECPs maintained their ICP skills. Several ECPs explained how the hybrid model also reduced the mental fatigue associated with the ECP role that came from the added complexity of patient management and individual responsibility for treatment decisions.

“...and like I said to you, the fatiguing part is the decision-making side of things...”
(ECP)

6.1.3 Effectiveness or benefit

As noted in Section 5, one of the fundamental barriers to sustainability of the ERP model is that the cost benefits of the ECP role accrue to the health system rather than the ambulance service which meet the costs of implementation. This is complicated in States and Territories where ambulance services are not managed as part of the health portfolio. It is also complicated by current payment models, in some States and Territories, where the service secures a higher payment from government for transporting a patient then treating a patient and avoiding transport.

It was also challenging to engage busy primary care providers, external government departments and entities like Medicare Locals to argue for sustaining the initiative.

“By being determined and constantly motivating and engaging these entities you can consistently demonstrate that the ECP path is an exceptional patient journey avenue that fills the gap in the healthcare system, while at the same time is effective, safe and provides cost savings.” (ECP)

Project teams that consistently communicated achievements were better able to sustain interest in their initiative. Presenting early wins and communicating widely to many different organisational stakeholders helped silence critics and swayed some of the sceptics. This was most effective when the data presented was aligned to organisational key performance indicators. The teams who used this strategy most effectively listened to the criticisms of their project and communicated information that addressed this.

Some ERP project teams used information related to the cost of avoiding a hospital presentation to place a monetary value on the number of cases where transport to hospital was avoided. Involvement of administrators and media public relations departments throughout the project was valuable. ERP4 used newsletters to distribute this information both within and outside their organisation.

“Well you need government support and the Health Department support, but I think before that you have to prove that there’s a need and that you can feel the need and provide a cost-effective solution to it, otherwise they’re not even going to look at it.”
(Stakeholder – Paramedic Manager)

The ERP projects had relatively short implementation periods of 18 months; a range of factors such as the short set-up phase, lack of leave cover and limited referral pathways meant that most projects did not achieve full productivity and this influenced views about the viability of the model.

6.2 Context

The key contextual factors that have impacted sustainability of the ERP projects have included: the organisational climate, culture, leadership and the characteristics of the localities in which the projects were based.

6.2.1 Organisational climate

The ERP1, ERP2 and ERP4 project teams faced an uncertain organisational climate with tightly contested State government elections held in March 2014 resulting in a change in government in one State and a minority government another. This resulted in a turbulent environment with significant fiscal constraints from the respective Departments of Health impacting on ambulance services. In this environment the attraction of new funding for ERP projects was highly challenging, this was particularly so when ambulance services were not part of the State/Territory Health Department.

This climate of limited resources also led to managers having to balance the implementation of the ERP project with multiple organisational demands. Three of the five project teams experienced changes in the project manager role during the implementation period. Project teams that maintained a high level of investment in project management best positioned their projects for sustainability.

“There's that middle period where we thought everyone just lost interest and now the project is winding up everyone is focused on it again.” (ECP)

6.2.2 Organisational culture

Most projects highlighted the potential impact of the industrial culture of ambulance services to derail organisational change. This meant that project teams and particularly the ECPs had to work at engaging their peers; communicating their role; and ensuring that the ECP Clinical Guidelines and protocols were disseminated. Continuous internal stakeholder engagement was just as essential as external stakeholder engagement.

Several ECPs worked to address any negativity by providing prompt feedback on cases to referring crews recognising that increasing the acceptance of the model of care and demonstrating how it could operate effectively alongside ‘usual care’ may support sustainability.

Most ECPs found their immediate project team and fellow ECPs their greatest support and identified that a supportive organisational culture was a key factor in encouraging ECPs to remain in the role and to generate interest in the extended care role among other paramedics. As the ECP role was new to ERP3, ERP4 and ERP5 the performance of the ECPs was under significant scrutiny and these pressures, if not well managed, may have impacted upon the retention of the ECPs and project sustainability.

“It's a really nurturing environment to work in and it feels very non-critical but you're also expected to be responsible for what you do.” (ECP)

“We really enjoy great collegiality as a team, and no one is afraid and everyone is open enough to say, “If there's something I'm not doing or something I'm not saying or questions I'm not asking, I want you to say something.” (ECP)

6.2.3 Leadership

The expertise held within organisations was leveraged by project teams, for instance the inclusion of experienced ambulance executives at the HWA Workshop 2, occurred to provide input into the development of business cases.

“No, look, we’ve had excellent support, and the CEO supported it from day one, which has been fantastic.” (ECP)

All ECPs identified the need for leadership for the ECP model of care from the CEO through to operational management levels.

Several project teams found that it was challenging for operational managers to reconcile the ECP initiative with the organisation’s emergency response focus and this may have influenced their views about sustainability. Engagement of local operational managers, so they had ownership of the project, was identified as a key influence on the perception of the ECP role within the organisation.

“It’s not their core business. Core business is going out, responding, meeting KPIs of priority one response times and if it’s not within that window then it’s all too hard.” (ECP)

6.2.4 Characteristics of the localities

The sustainability of the ERP sub-project was dependent on selecting the right implementation locations. Whilst project teams understood the demographics of their local area and current demand for ambulance services, this did not necessarily translate into demand for ECP appropriate cases. In addition to having a receptive environment for the new model of care, project teams needed an adequate caseload to ensure full utilisation of the ECP capability. In most localities the volume of cases was lower than anticipated and this influenced sustainability.

The projects at ERP1 and ERP2 were based in smaller rural communities where the ambulance service was part of a relatively small network of health and community care providers. Frequently the ECPs were known within their communities and had established relationships with primary care and hospital based services. This had implications for project teams who made decisions not to sustain the project as they needed to sensitively deal with agencies and organisations that had supported project implementation.

The ERP5 project team was based in a unique remote environment also provided challenges for sustainability. ECPs had to observe strict protocols relating to the management of intoxicated patients which frequently meant that transportation to hospital was the safest option. This reduced the potential caseload.

6.3 Capacity

Other key influences on sustainability included the existence of ‘change champions’ (both internally and externally), funding and the characteristics of the workforce or ECPs themselves.

6.3.1 Change champions

Most project teams had a change champion; this person could be external or internal to the organisation. Medical champions were a critical strategy and increased acceptance of the ECP model of care among ED clinicians and GPs. In all implementation sites, several ECPs themselves acted as change champions. Their enthusiasm for the project and willingness to engage with their paramedic colleagues and other hospital and primary care practitioners contributed to positive perceptions of the role.

6.3.2 Workforce characteristics

The limited transferability of the ECPs between other localities within their own State or Territory and other jurisdictions was seen to impact the sustainability of the initiative. Implementation of the ECP model in more than one locality within a State or Territory would contribute to sustainability by building a critical mass of expertise, extending the identity of the role and improving a service’s capacity to cover periods of leave. There is little evidence to suggest that

an 'Authority to Practice' issued by one jurisdiction would be recognised by another. The training provided to ECPs in ERP5 by their training partner was formally recognised as equating to several units of study in a Master's program should an ECP complete the Master's program this would be a qualification recognised in other States and Territories.

Sustainability was seen as reliant on a stable workforce with high levels of staff retention. The major barriers to continuing in the role identified by ECPs were:

- Access to ongoing funding
- Support from management
- Impact of the current hours and rosters on family life
- Limitations of the service model (standalone ECP vs. hybrid role)
- Transferability of ECP training and experience to another locality
- Being seen as an ambulance resource and not a health resource

The majority of project teams instituted a roster of 12-hour shifts with the ECP rostered on for four shifts and then off for four shifts. When the shift ran from for example, 10am to 10pm, ECPs found that this impacted upon their quality of life and family time. Although ECPs had committed to this roster for the life of the project, they did not see it as sustainable in the longer term. Split shifts were an option suggested to ensure that ECPs were available during peak periods of demand; however this was not endorsed by any ECP as a viable option.

Despite these barriers, the intention of most ECPs was to continue in the role where possible. For example, results from analysis of the 'ESOP practitioner survey' (Thompson et al., 2012b) showed that no respondents were unsatisfied with their expanded role and only one of 13 respondents indicated that they did not plan to stay on in their expanded role for the foreseeable future. These results point towards the sustainability of the ECP role. Furthermore, analysis of the 'Staff establishment profile' (Thompson et al., 2012b) provided another positive indication of sustainability of the role, demonstrating limited turnover of ECPs during the program, with only one ECP resigning because of family issues and another pursuing a new career opportunity after completing a University qualification.

The ERP project teams pursued a strategy of recruiting the ECP candidates from their existing cohort of ICPs (the exception was ERP5 who decided to include non ICP paramedics with appropriate experience because of the small numbers of ICP qualified paramedics based within the region). Paramedics applied for the ECP role for a specific period and were guaranteed an ongoing position at their original or substantive salary at the end of the project. This strategy rewarded highly experienced personnel and improved the credibility of the role in most participating organisations as it was associated with some of the most competent staff.

An additional ECP was trained for the ERP2 project team. One ECP working with ERP4 resigned and an additional paramedic underwent a training program provided on site in collaboration with ERP5's training partner (the project manager also went through the training program to improve his capacity to support the ECPs).

ERP2 identified that refresher training was needed for ECPs in wound management and palliative care with two half day workshops instituted. ERP4 also identified the value of additional clinical placements to support the ECPs resources for referral and ongoing care e.g. falls management. All project teams used existing professional development processes within their organisations to maintain the capacity of the ECPs.

Project teams who engaged other personnel who were not working in the ESOP role ensured an ongoing 'pipeline' of future ESOP candidates and also reduced any friction from other staff not working in the ESOP role. The ERP2 team achieved this by including all paramedics in a couple of training opportunities. This had a dual purpose, to upskill the ECPs and to help other station staff understand how the ECPs worked with patients.

The availability of two different training models has provided important infrastructure that could be adapted and meet future training needs.

In summary, prior to the development of the ECP role most paramedics saw only one career path, to progress from a paramedic to an ICP. The ECP role was perceived as a parallel pathway to the ICP role and offered another opportunity for career progression. The majority of ECPs reported that it was a very rewarding role and all implementation sites reported interest from other paramedics in future ECP training opportunities.

The intentions of ECPs to continue in the role should it be maintained was a significant factor in the sustainability of the projects. The vast majority of ECPs hoped to be able to continue to practice as an ECP.

6.3.3 Funding

Business cases needed to align with the strategic agenda of the CEO. Most project teams worked to link the contribution of the ESOP role to key organisational performance metrics. For the ERP sub-project the ability to reduce transfers to hospital was an important project impact.

ERP1 and ERP2 project teams planned for ongoing sustainability and transitioning of the project into normal business after the cessation of HWA funding; however, funding was unable to be secured. A communications plan and project closure strategy was developed to communicate this outcome to all stakeholders and users of the ECP service. Despite the development of a business case, ERP4 was unable to secure ongoing funding. Ongoing maintenance of the ERP3 ECP service was reliant on appropriate resourcing. A determination was needed as to whether funding should be provided from the National or State/Territory Level. ERP3 flagged the potential for a shared funding model and discussion around relaxing access to the Medicare Benefits Scheme (MBS) and Pharmaceutical Benefits Scheme (PBS). It appeared most realistic that funding would need to be redirected from the State/Territory Health portfolio to ERP3's organisation.

For all project teams, the availability of additional funding was the single most important determinant of sustainability.

“If I was given an increased budget I absolutely would support the continuation of the program... Without a doubt, to the point where I would actually expand it to different sites across the state. I believe it is certainly worth it, and I actually have very strong views that it shows that in the future, the next five to ten years, it will be absolutely the way ambulance goes. There is absolutely no doubt about that in my mind.” (Stakeholder – Paramedic Manager)

ERP5 determined that the most effective sustainability strategy was for their ECP leadership to join forces with the national evaluation team providing the State/Territory Department of Health a budget proposal from a united front. The combined knowledge from a national level, along with the definitive experiences at the local level, developed a more compelling proposal.

“Since the financial benefits of the ECP workload accrue elsewhere in the acute care system and there is no cost benefit to my organisation, sustainability and further integration of the ECP model into this locality will be reliant on sourcing funds from the Department of Health.” (ERP Budget Proposal)

6.4 Processes and interactions

Several processes and interactions have influenced sustainability, most significantly: stakeholder engagement, collaboration and partnership development and integration of the operations of the ECP with existing organisational policies and procedures.

6.4.1 Stakeholder engagement

Processes to facilitate stakeholder engagement began at the initial workshop where HWA brought together all ERP project teams and used the concept of the Johari Window as a lens to identify key stakeholders of high influence (Galpin, 1995). Project teams identified internal and external stakeholders, planned engagement, and then built, managed and sustained relationships, with varying degrees of success.

Stakeholders identified as having high influence and high involvement were mostly effectively engaged, including EDs, local GPs and other health professionals. Those groups with low influence and high involvement, including patients and the community more broadly, were engaged at a lower level, for instance through the distribution of information via leaflets and brochures. Ongoing engagement of stakeholders over the life of the project supported implementation. However, maintaining key stakeholders' involvement so they advocated for project sustainability was a challenge, with engagement appearing to diminish during the course of the project. Project teams who maintained their steering committees / clinical coordination committees had a forum where they were able to present information on their project over time.

Several sites mentioned the importance of wider publicity in building support for the innovation. For example, the 'road show' instigated by ERP4 consisted of a tour by the ECP steering committee to visit GPs, aged care facilities and allied health providers in the region. The ECPs also addressed paramedical sciences students at a university. Two sites mentioned adverse publicity such as rumours of adverse outcomes and misunderstandings of the ECP role among health workers. These were overcome through education and communication, but delayed productive engagement in some cases.

The Paramedic Reference Group was the mechanism used to engage professional organisations and bodies. This group, which can be seen to have high influence and low involvement, was effectively utilised.

6.4.2 Collaboration and partnership development

Connecting with and managing stakeholders to establish referral pathways was time consuming for the sites within the ERP sub-project, as most project teams did not have the necessary partnerships in place prior to project commencement. Relationships took time to develop, project teams developed a range of new networks within their communities through various means, such as consulting with Medicare Locals about GP access, working with Aboriginal health organisations to establish referral pathways and arranging clinical placements with specialty services including palliative care and diabetes management. The partnerships developed to support ECP training and education proved particularly important.

A large number of stakeholders believed the ECP role offered an opportunity for ambulance services to collaborate with other health service providers in the delivery of primary health care that has not previously been realised. Ambulance services were perceived to have limited opportunity to engage with other parts of the primary care workforce and had an opportunity in the ECP role to contribute (in tandem with the patient's GP) to the continuity of care. ERP5 is investigating whether there is scope to match an ECP with a patient transport officer. This would free the ECP from driving and allow them to utilise travel time between cases for patient record management and administrative tasks. Establishing this collaborative role would support ERP5's Aboriginal Employment Strategy as the patient transport role for ECPs would be classified as indigenous specific. This might also assist with cultural acceptance of the ECP role in certain communities.

6.4.3 Integration of policies and procedures

Whilst ECP-specific protocols or clinical practice guidelines have been developed, all sites were able to integrate their operations within their organisation's existing clinical governance framework allowing for ongoing quality assurance and patient safety. As safety was identified as a primary concern, this was an important sustainability strategy. Project teams identified

medical mentors and ensured that clinical audit and review processes fed into existing clinical governance structures. Operational policy, procedures and guidelines that underpinned the ECP model of care were developed in consultation with medical mentors and ratified by clinical governance committees.

Some formal processes were developed in conjunction with stakeholders, for the ongoing management of patients. For example, ERP1 developed strong referral pathways in conjunction with personnel from their local hospital and community health services, building on existing partnerships. ERP4 identified that the Hospital Aged Liaison Team (HALT) referral process and similar referral processes could be developed with stakeholders such as a Medicare Local or palliative care service.

Additionally, modifications to patient data systems were necessary to comply with national evaluation requirements, and these enabled ECP activity to be measured in a more reliable way into the future. Purchase of equipment to improve clinical capacity was also undertaken, including the purchase of vehicle leases and vehicle maintenance as well as installations and / or configurations to vehicles.

Perhaps the most critical organisational procedure for the ERP sub-project was the process of case allocation. The inability to resolve ongoing difficulties with this process influenced project sustainability. There was no consistent process that identified missed or potential ECP cases to generate a more accurate understanding of the potential volume of ECP cases.

6.5 Sustainability outcomes

The extent to which new programs are sustained is influenced by many different factors as well as their combination and interaction (Stirman et al., 2012). Sustainability is a dynamic phenomenon and in the case of the ERP sub-project, organisational views on the initiative shifted over the implementation period.

The various definitions of sustainability coalesce around two main ideas: sustainability of the direct improvements made as part of a program, and sustainability of the techniques and approaches learnt as part of the program. Evaluation of sustainability is closely aligned with the issue of capacity building (e.g. increased capability and skills, increased resources) and any changes in structures and systems that 'anchor' or embed changes and facilitate sustainability (Thompson et al., 2012a). Realistically, sustainability needs to be assessed after implementation is completed and usually this would occur two or more years after implementation and over several years (Stirman et al., 2012). Consequently the current assessment of sustainability focuses on influences rather than outcomes.

6.5.1 Sustainability of direct improvements

Sites were asked to complete a sustainability tool (Thompson et al., 2012b) measuring 10 factors that have been shown to influence sustainability (Maher et al., 2006). The tool was completed twice, once at the beginning of implementation activities and again at the end of the program. Results indicated an increased likelihood of project activities being maintained over the course of the program. For nine of the factors the average Time 2 score was higher than the average Time 1 score and closer to the possible maximum, indicating a move towards greater sustainability by the end of the project. The factors with the greatest improvement between pre- and post-implementation were 'Clinical leadership engagement' and 'Infrastructure for sustainability', both of which appeared to be significant risks at project commencement but were somewhat mitigated during the course of the project.

The factors with the greatest potential for improvement by project end were 'Staff behaviours toward sustaining the change' and 'Senior leadership engagement'. This analysis highlights the factors that ERP project sites had most difficulty improving, which can be viewed as the greatest risks to sustainability. The most significant problem was the behaviours and attitudes of staff

towards sustaining the model. At all project sites it was reported that staff felt empowered as part of the change process but did not believe the improvement would be sustained. It seems this risk was not effectively addressed, as the mean score for the factor decreased by the conclusion of the project. Senior leadership engagement was the other factor seen to jeopardise sustainability towards the conclusion of the project. However, this view was only held by two sites, with all other sites reporting increased engagement with senior leadership to the maximum level possible. Two sites also reported that while organisational leaders took responsibility for efforts to sustain the change process, there needed to be better two-way communication between staff and leaders.

The data from use of the sustainability tool indicated some optimism about continuation for the majority of sites, although experience with previous evaluations suggests that sustainability is challenging for a project-driven model of change. Many projects relied on dedicated funding for training and implementation which begged the question as to how this would be maintained beyond the life of each project.

Data from evaluation risk monitoring was less positive. The only scores not improving over time (from progress report 1 to final report submission) were for items highly related to sustainability, namely:

- The project is supported by management
- Changes to systems created by the project will remain after the project ends
- Changes to practices undertaken by the project will remain after the project ends.

The apparent lack of sustainability, as indicated by responses to items relating to changes to systems and practices, was mainly associated with two project sites (ERP1 and ERP2), which reported a much less positive outlook at the end of the project compared to their initial rating. In contrast, other projects were relatively consistent with their ratings for this item. Support from management through the identification of funding marginally decreased over time for all projects.

All project teams, with the encouragement of HWA, worked to sustain the ERP model. HWA provided high quality input about business case development. Lobbying and negotiation was undertaken by all project sites, and local evaluation data was used to present a case for sustainability following the conclusion of the implementation period. At the time of this report three project sites (ERP1, ERP2 and ERP4) advised that they had been unable to secure further funding for the ERP initiative. ERP3 secured funding for a further twelve months and intended to train additional ECPs. ERP5 was awaiting the outcome of their funding submission to the State/Territory Department of Health. Consequently the majority of project teams will not sustain any direct improvements for patients and the ambulance service (refer to Table 45).

Table 45 Sustainability prospects – ERP sub-project

ERP project site	Current status	Innovation sustained
ERP1	<p>The HWA funded ECP project concluded on 30 June 2014, with ECPs returning to their substantive positions on 1 July.</p> <p>Significant budgets savings were imposed in this State/Territory. For the trial to become 'business as usual' following HWA funding, it needed to be funded from the SAAS budget. Unfortunately, the funds were unable to be sourced (neither internally nor externally) to ensure the ongoing service delivery by ERP1.</p> <p>However, a number of benefits to patient care will continue; alternative referral pathways for ambulance clinicians to improve treatment choices, improved interaction and communication between health services, and the ongoing professional development opportunities forged through the project will continue to impact and improve health outcomes for the local community. The infrastructure and capacity for this service delivery model will continue to exist and could be recommenced if the opportunity arose in the future</p>	No
ERP2	<p>The HWA funded ECP project concluded on 30 June 2014, with ECPs returning to their substantive positions on 1 July.</p> <p>Significant budgets savings were imposed in this State/Territory. For the trial to become 'business as usual' following HWA funding, it needed to be funded from the SAAS budget. Unfortunately, the funds were unable to be sourced (neither internally nor externally) to ensure the ongoing service delivery by ERP2.</p>	No
ERP3	<p>The ECP service was transitioned into the existing structure of the ERP3's organisation. The service became an extension of operations, supported by existing structures. This will assist in ongoing management and support of the service consistent with existing arrangements. Sustainability of the service was reliant on transitioning into existing management arrangements</p>	Yes
ERP4	<p>HWA funding for the ERP4 ECP trial concluded on 30 June 2014. At this stage the initiative will not be continued past the end of June 2014.</p> <p>The ECPs and program manager involved with the ERP4 ECP trial are assigned to regular paramedic duties following the completion of the trial.</p>	No
ERP5	<p>There are positive indications that the ERP5 project will continue indefinitely. The ERP5 has strong leadership support for the continuation of the service. ERP5 plans to maintain the three existing ECPs in their capacity and ensure ECP consumables are provided and maintained.</p> <p>The current cohort of ECPs is appropriately positioned to provide mentoring for future courses. Lobbying within ERP5's organisation for funding to train another ECP cohort in late 2014 is being undertaken, with reasons for optimism for a successful outcome. Strategic discussions with the State/Territory Department of Health on ECP services in the State/Territory continue.</p>	Pending

6.5.2 Sustainability of techniques and approaches learnt as part of the Program

While the provision of services to ERP1 and ERP2's communities ceased, the infrastructure, clinical capacity and professional networks that were developed through the project were maintained and continue to be strengthened. The ability and establishment of systems to re-introduce services quickly when the environment and financial situation allows was part of the closure of the current project.

SAAS has identified the need for ECPs to maintain their skills and Authority to Practice (ATP) at the ECP level and aimed to put strategies in place to assist staff with the reaccreditation of these skills on an annual basis. Possible strategies considered were supporting the staff to complete the required time in Adelaide working as an ECP in order to reaccredit, or facilitating reviews, education and training at their home station with external ECP staff. Local options for

training would be investigated through the members of the clinical coordination committee and the possibility of the ECPs completing placements at identified venues that will allow them to utilise their skills.

The developed networks and alternative clinical care pathways that were established would continue to be developed and further opportunities explored. The improved interaction between SAAS clinicians and the various health professionals within the two project localities was seen as a benefit to patient care and the treatment pathways available to them. SAAS planned to work with those health providers to provide for referral options and appropriate alternative clinical care pathways for all ambulance staff to continue the collaborative care model established in the project. A communications plan and project closure strategy was developed to communicate the decision about not sustaining the project to all stakeholders and users of the ECP service.

ERP4 has gained valuable experience in trialling the ERP model of care in the region and established training and clinical placement networks that may assist in the development of this capability in the future.

Building capacity, improving retention and improving productivity are means to achieving the longer-term sustainability of the workforce.¹⁶

6.6 Dissemination

The evaluation framework for the HWA-ESOP program also sought to understand how project teams disseminated information relating to the ERP project, in order to answer the plain-English evaluation question, “Who did you tell?” Disseminating information about the ERP initiative was an essential component of managing the change both within and outside organisations and for raising awareness of the initiative and building support for sustainability of both the projects and the model of care within communities and across the broader paramedic profession.

The following results, from analysis of dissemination logs¹⁷ submitted by all projects, provide an indication of the dissemination strategies employed, the activities undertaken, and the breadth of these activities.

Most dissemination occurred during the set-up and establishments phases of ERP projects, which indicated a concerted effort from sites to disseminate information early on. Whilst dissemination activities continued to be undertaken throughout the implementation and evaluation phases, this was at a much lower level. Sustaining the change effort required ongoing communication and the fewer dissemination activities in the implementation phase of the project suggested that project teams needed to invest more energy in regular dissemination activities throughout the life of the project. Dissemination towards the conclusion of the project was particularly important, and provided an opportunity to disseminate project achievements. For the ERP sub-project, limited activity occurred at this project stage which may reflect competing time pressures relating to data collection and final report development.

A presentation to staff at one service or agency in the local area (e.g. discussion at a staff meeting) was the most common method of dissemination employed. Project managers and project team members most frequently conducted dissemination activities, although other groups and individuals did disseminate information, such as members of local project steering committees and HWA.

The purpose of approximately two thirds of total dissemination activities was capacity building and sustainability (which included information shared with project stakeholders, such as

¹⁶ <http://www.hwa.gov.au/our-work/boost-productivity/nursing-retention-and-productivity-program>, accessed 5 June 2014

¹⁷ Evaluation Tool 20: Dissemination Log.

steering committee members, management and staff of participating services, and groups or individuals in the local community to support the capacity building and sustainability aspects of the project). The purpose of the remaining third was classified as generalisability (e.g. information shared with the wider health care community, including clinicians, academics, managers, planners and policy makers to support the generalisability of the project).

A range of audiences were reached by the dissemination activities. The primary audience for most activities were the staff of the host organisations in an effort to improve organisational engagement and assist change management. Nonetheless, some activities did have a broader audience including the local community and state and national audiences. For instance, several ECPs contributed to a presentation about the role at a HWA national conference in November 2013, titled 'Extending the scope of paramedics in providing care'. Other high profile coverage included a project team being finalist at the ACTML Primary Healthcare Awards 2013, receiving an award for customer service at the 2014 Director General's awards for the Justice and Community Safety Directorate and being nominated for an ACT Public Service Award for Excellence. An example of dissemination to an international audience included a poster showcasing one site's ECP project at the International Forum for Quality and Safety in Healthcare in Paris. Dissemination to nursing home staff, GP practices and local clinical coordination committees also took place.

The vast majority of activities resulted in someone who heard about the project following up to seek more information, suggesting that interest was generated among some audience members, and providing some indication of successful dissemination.

Project officers rated the overall effectiveness of each dissemination activity very positively, with no activities being rated as ineffective. The most effective activities were perceived to be presentations to staff at one service or agency in the local area. While suggesting that dissemination strategies were highly successful, the potential of self-report bias should be recognised. Furthermore, accuracy of some of the other data from the tool is unclear as the classification of activities may have varied between project teams due to differing interpretations.

HWA also undertook some dissemination activities, promoting awareness of the ERP sub-project and its achievements. For instance, short videos were filmed and produced about the ERP initiative and made available online. Also, the sub-project was featured in a progress report on the ESOP program and HWA's Aged Care Workforce Reform program, accessed via the HWA website (HWA, 2014).

Active information dissemination about the ECP role by means of newsletters, education sessions and word of mouth resulted in increased referrals to the ERP program. The numbers of referrals from other crews grew as the program continued.

6.7 Summary

Based on the findings from the ERP sub-project a number of predictors or pre-conditions of sustainability of the innovation emerged:

- The ability to adapt and modify the ERP model of care is necessary to ensure alignment between the model and the local setting, facilitate acceptance by different jurisdictions and create a receptive context for change.
- An ECP hybrid role (e.g. with the ECP also functioning as a first responder or an ICP) as opposed to a standalone ECP role may have benefits but this service model may affect throughput and present challenges for balancing the first response to emergency cases and an extended care response.
- A fundamental barrier to sustainability is that the cost benefits of the ECP role accrue to the health system rather than the ambulance service, who meet the costs of implementation.

- Project teams that consistently communicate achievements are better able to sustain interest in the initiative. Presenting data aligned to organisational key performance indicators is effective. Business cases need to align with the strategic agenda of the CEO and the contribution of the ECP role should be linked to key organisational performance metrics.
- Maintaining a high level of investment in project management position projects well in terms of sustainability.
- Internal and external stakeholders should be identified, engagement planned, and then relationships built, managed and maintained. Continuous internal stakeholder engagement is just as essential as external stakeholder engagement, especially when the industrial culture of ambulance services can potentially derail organisational change. Relationships take time to develop.
- Engagement of medical staff is critical however the impost on medical mentors may present a risk to sustainability, for example if required for after-hours mentoring via telephone.
- Leadership for the ERP model of care is essential from the CEO through to operational management levels. Expertise held within organisations should also be leveraged.
- The characteristics of the localities in which the initiative is to be implemented should be considered, including not only receptiveness to the new model and other unique features such as remoteness, but also availability of cases, as an adequate caseload volume is needed to ensure full utilisation of the ECP capacity and retention of skills.
- Change champions, whether internal or external to the organisation, are critical and increase acceptance of the ERP model of care among ED clinicians and GPs.
- A receptive environment is crucial for sustainability; this includes the requirement of a strong case for change, context for change and adequate resources.
- An appropriate mechanism for recognition of ECP training, would improve the transferability of the role.
- Ongoing certification is essential to ensure that ECPs retain their ECP and ICP skills.
- Implementation of the ERP model in more than one locality within a State or Territory would contribute to sustainability by building a critical mass of expertise, extending the identity of the role and improving a service's capacity to cover periods of leave. Transferability of ECP training and experience to another locality is also important.
- Staff retention is highly associated with sustainability, and is influenced by factors such as job satisfaction, career pathways, support from management and impact of the current hours and rosters on family life.
- Integrating operations within an organisation's existing clinical governance framework allows for ongoing quality assurance and patient safety.
- Effective processes are required for case allocation which identify missed or potential ECP cases and generate an accurate understanding of the potential volume of ECP cases.
- Disseminating information about the ERP initiative was an essential component of managing the change both within and outside organisations and for raising awareness of the initiative and building support for sustainability of both the projects and the model of care within communities and across the broader paramedic profession.
- Additional funding is the single most important determinant of sustainability.

In conclusion, despite efforts to sustain the ECP role, at the time of this report three project sites (ERP1, ERP2 and ERP4) were unable to secure further funding for the initiative. ERP3 has secured funding for a further 12 months and ERP5 were awaiting the outcome of their funding submission. As such, the majority of project teams will not sustain any direct improvements for patients and the ambulance service. However, although the provision of services may cease, the infrastructure, clinical capacity, professional networks and alternative clinical pathways that were developed through the project may be maintained.

7 Prospects for wider implementation

7.1 Evidence of effectiveness of the ERP model

The starting point for decision-making around wider implementation of any innovation is the extent and quality of the available evidence of effectiveness. The evidence to date on the ERP model is well summarised in four recent reviews of the literature. Pre-hospital practitioners, including paramedics with roles similar to those of ECPs, have been shown to reduce the number of patients conveyed by ambulance to emergency departments (Tohira et al., 2013). A review of 20 papers from 13 studies from the United Kingdom (9 studies), New Zealand (3 studies) Canada (1 study) concluded that:

“The implementation of NPP schemes reduced patient conveyance to the ED and may reduce unnecessary transportation of patients by providing care at the place where a patient resides. However, rigorous evidence about the appropriateness of decisions made by NPPs and the safety of patients is lacking.” (Tohira et al., 2013, p.7).

A second review focused on practitioners described as community paramedics and their impacts on the management of urgent, low-acuity illnesses and injuries (Bigham et al., 2013). The review found that the expanded scope model had benefits for patients and the health system (with the evidence described as ‘promising’) but highlighted the ‘paucity’ of evidence regarding the effectiveness of the role and pointed out that

“...what is lacking is consensus on what [community paramedics] should do, and the science supporting the safety and effectiveness of the practice...” (Bigham et al., 2013, p.371).

Evans et al. (2014) conducted a systematic review of literature describing and evaluating programs in which paramedics received additional training and skills to perform tasks beyond their baseline competencies. Nineteen articles covering 15 different studies were included and skills classified into nine types according to the British Paramedic Association’s core competencies. This review found that paramedics could be successfully trained to assess and manage patients with minor acute illness; particularly older people (age 60+). This was acceptable and beneficial to patients and carers. It probably reduced resource-use but there was a lack of cost-benefit analysis. Protocols for paramedics to ‘treat and refer’ did not appear to alter transportation rates, and advanced training, particularly in decision making, may be required to influence transfers to hospital. The review was not able to make recommendations on preferred training methods for extended paramedic skills.

A fourth systematic review focused on non-transportation of older patients to hospital after falls, specifically: (1) rates of non-transportation after ambulance attendance; (2) patient outcomes following non-transport, including subsequent ambulance call-outs and admissions to hospital; and (3) effectiveness of interventions – including expanded scope paramedics – designed to improve outcomes for older patients who have fallen but refused or not required transport to ED by ambulance (Mikolaizak et al., 2013). Twelve articles were included, up to December 2011. Non-transportation rates varied widely and depended in part on the training level of paramedics. Non-transported older people had higher rates of ambulance service recall or presentation to other medical services in the weeks following the original fall. Interventions such as specialised training for paramedics and linking patients with alternative care pathways can improve patient outcomes.

In summary, the published evidence to date generally supports an expansion of the role of paramedics to include the assessment and management of patients with minor illnesses and injuries to avoid transport to hospital. However, the evidence is primarily from overseas,

particularly the United Kingdom, and more research is required to establish the effectiveness and safety of the model.

7.2 Suitability of the model

Evidence from the literature indicates that certain attributes of an innovation can influence the adoption of that innovation:

- Relative advantage – the degree to which the innovation is better than what is in place already i.e. the innovation is clearly effective or cost-effective.
- Compatibility – the innovation is compatible with the values and perceived needs of the adopting organisation.
- Complexity – the innovation is relatively simple. If the innovation is relatively complex, it helps if it can be broken down and implemented in stages.
- Trialability – the innovation can be ‘tried out’ before full adoption.
- Observability – the benefits of the innovation (to either consumers or staff) are visible.
- Adaptability – the innovation can be adapted for local use.
- Risk – the innovation is perceived as low risk (Greenhalgh et al., 2004; Rogers, 2003).

The extent to which the PCP model has these advantageous characteristics is summarised in Table 46.

Table 46 Attributes of the ECP model

Relative advantage	The results of the evaluation demonstrate that the ECP model can be cost-effective in locations with a sufficiently large volume of potential cases. Cost-efficiency is reliant on the availability of enough ECPs to provide adequate roster coverage, and is critically affected by the accuracy of communications centre staff in identifying appropriate cases and dispatching ECPs appropriately. The costs of implementing the ECP model are met by ambulance services, but any cost savings accrue to the health system as a whole, a situation complicated by different management arrangements and payment models in each jurisdiction.
Compatibility	The practice of ECPs is compatible with current practice of ambulance paramedics. From an organisational perspective, the major issue of ‘compatibility’ relates to throughput. If there is sufficient throughput, a sole ECP can work in a specially equipped vehicle with no patient transport capability, quite separate from existing emergency response crews. If throughput is less, two options for a hybrid role are possible: (1) ECP working with another paramedic as part of an existing emergency response service, using a vehicle with patient transport capability; (2) combining the ECP role with another role.
Complexity	ECPs are required to manage patients with a diverse, and often ill-defined, range of signs and symptoms (e.g. pain, fever, fainting, nausea, vomiting, confusion, dizziness, drowsiness, shortness of breath, bleeding, skin rashes). Although these patients are deemed ‘low acuity’, these cases can be complex and require the ECP to apply advanced clinical reasoning. In many cases, the person may have multiple chronic conditions and present as generally unwell. This requires relatively in-depth training, with mentoring and supervision of experienced ECPs an important feature. Lack of experienced ECPs reduces mentoring and support for new ECPs. Medical mentors played a critical role in providing ongoing support, clinical supervision, telephone advice, and back up for the ECP in the field. The ECP role requires highly qualified and experienced ambulance officers.
Trialability	The training requirements and the need for specially-equipped vehicles and well-defined clinical governance arrangements (e.g. clinical guidelines, protocols, mentoring) mean that the model is difficult to ‘try out’ without a significant investment of time, money and stakeholder engagement. The results of the evaluation indicate that a pre-implementation period of 12-18 months is required.
Observability	The benefits of the model are ‘visible’ to ECPs and those they treat. There was strong agreement among ECPs that their role improved quality of care for specific patient groups and all sites achieved very high levels of consumer satisfaction with the ECP model.
Adaptability	The ECP model can be varied according to local context and needs. At most sites, the ECP caseload was too small to warrant a full-time, stand-alone position. A hybrid role was seen by most ECPs as more satisfying and efficient in rural and regional locations, with the added advantage of allowing ECPs to maintain their ICP skills. The stand-alone ECP model may be more viable in large metropolitan locations. This issue is controversial and the advantages of a

	standardised role and training model also need to be taken into account.
Risk	The results of the evaluation indicate that the model is low risk, with small likelihood of adverse outcomes. This finding is predicated on strict clinical governance arrangements being in place (e.g. clinical audits, medical mentoring and peer review). ECPs and stakeholders identified a set of organisational factors that ensured safety and quality. ECP recruits were highly experienced, carefully selected and comprehensively trained. In addition, they had a distinctive set of personal characteristics and attributes that were seen to promote safe practice. Key stakeholders were satisfied that the ERP model operated safely and offered a very high level of quality in patient care. This was reinforced by the available information from administrative data sets.

7.3 Requirements for success

Based on the final reports from each project and the results of the national evaluation, the main requirements for success in implementing the ECP model are:

- a receptive context for change;
- attributes of the ERP model, as described in the previous section;
- selecting staff for the role who have the necessary skills, experience and personal characteristics for the role, and supporting them with appropriate recognition of their qualifications and ongoing professional development;
- overcoming structural barriers such as funding models and role classification.

A receptive context for change has been described in various ways in the literature, but typically includes factors such as a need for change, a supportive culture which is conducive to innovation, managerial support, leadership, appropriate infrastructure and resources, and engagement of key stakeholders (Dopson et al., 2002; Greenhalgh et al., 2004; Pettigrew et al.; 1992). A receptive context was variously expressed by project staff:

*“The ECP program has operated in an interprofessional and collaborative environment.”
(ERP4 final report)*

“The acceptance of the organisation’s staff to be involved in new initiatives was another key for success.” (ERP1 final report)

[one of the requirements for success is] “...having assured and absolute operational and management support...” (ERP 5 final report)

For the ECP model, appropriate infrastructure and resources included the funding from HWA; allocation of sufficient resources to project management; appropriate equipment to support the role and the training resources available from the two training pathways.

The necessary qualifications, experience and personal characteristics of ECP recruits have been described above (Section 2), as has the extent and quality of the training required to prepare them for this new role (Section 3). One issue that requires consideration is the extent to which the role should be standardised as opposed to tailored for different contexts. This issue generated considerable comment from stakeholders and arose from a perception that ECPs had identified a ‘niche’ role at each site. There were strongly divergent views about this issue with the majority of ECPs and stakeholders stating that the title of ECP needed to be linked to a defined scope of practice so that the role developed a ‘professional identity’ amongst consumers and other health care providers.

“I don’t have a problem with focusing on individual areas with individual needs, but ultimately you should have a standard that you need to reach, and then you can

always scale it back rather than go, oh you can do bits and pieces of it. So to me you should have areas of expertise, and an ECP should be a certain level. And then after that you can then scale back. Otherwise, just call it ICPs with advanced skills which are what we've had in the past.” (ECP)

“But a paramedic is not a paramedic from jurisdiction to jurisdiction... So therefore I think that there needs to be a stronger level of control and uniformity with the extended role paramedic, with a tertiary level qualification, if this is going to be sustainable.” (Stakeholder-Paramedic Manager)

The opposing view was that small communities may not generate the caseload necessary for an ECP and by training paramedics in specific skills; crews with lower utilisation could potentially offer both emergency response and a specialty primary care response. Whilst this approach could assist with concerns about skills maintenance, it was not widely supported during this still-early evolution of the ECP role.

“If you have a community that has a particular need, I would think that training a service to provide that particular need would make much more sense; a) they'd then become very skilled in that particular need and would fill the gap. Having them trained in all sorts of other things that they rarely use I think is clinically problematic because they don't get experience in it.” (Stakeholder-Medical)

“And that's going to be the difficulty, in that the dynamic resource workload tension is going to be different in each community, and each station. And so therefore the push and pull of a combined model is going to be complex and not straightforward, and you really will have to assess each individual site based on the infrastructure and the resourcing, and the workload, and the perceived need; and research those needs.” (Stakeholder- Paramedic Manager)

What was clear from interviews however, was what several stakeholders saw as the untapped potential of the paramedic, particularly in rural and remote locations and the opportunity that the ERP model of care might present both now and in the future.

“There is clear research around the urbanisation of the medical and nursing workforce without any doubt, and what that means is very commonly, the paramedic is the last health care professional standing in some of these rural and remote communities.” (Stakeholder- Paramedic Manager)

An important aspect of the model is whether there is a 'critical mass' of ECPs, without which providing mentoring, supervision and cover for leave can be problematic. Services require enough ECPs to allow some to be deployed in the call centre while others work in the field, thus improving the accuracy of case identification and dispatch and maximising cost efficiency. Inadequate roster coverage has detrimental effects on the efficiency of the model. Succession planning was another issue identified by stakeholders as critical to ensuring that service delivery is not adversely affected by personnel absences.

Once there are sufficient ECPs trained and operating in their roles, it is more likely the model will achieve the scale and momentum required for a definitive assessment of the model's true impacts. Any such assessment should encompass the model's effects on the overall efficiency of ambulance services, its downstream impacts on ED attendance and hospital admissions, the primary care resources required to support the model, and the benefits in terms of quality and continuity of patient care.

If an organisation commits to this model of care then an investment in ongoing training and skills maintenance is required. Through the HWA initiative training has been delivered using 'in-house' training services and through partnering with a university. Whilst 'in-house' training is likely to be more flexible and affordable in terms of broader workforce development it usually

does not result in a transferable qualification that can be recognised in other organisations and jurisdictions. The creation of a new role, such as the ECP, also generates a demand for ongoing assessment and re-accreditation of skills, all ambulance services that were part of the ESOP program demonstrated that they had these systems in place and they were readily adaptable for the ECP role. These re-accreditation processes should follow a similar format to those applied for specific ICP related skills where it is expected that the paramedic undertakes a certain number of procedures annually. The majority of ECPs identified the importance of regular rotations as an ICP to ensure their intensive care skills remained current; a similar process would be needed to maintain ECP skills.

As previously indicated in Section 5 and Section 6, one of the major barriers to the sustainability and therefore the wider implementation of the ERP model is the fact that costs are borne by the ambulance services while benefits are dispersed across the health system. Moreover, current funding models provide a disincentive for avoiding patient transportation to hospital.

Currently there is no national process for paramedic registration. The position of the industry and profession in relation to national registration remains under review by the Health Workforce Principal Committee of the Australian Health Minister's Advisory Council. The Council of Ambulance Authorities (CAA) comprises the ten public ambulance services of Australia and New Zealand; these services employ almost all of the paramedics working in Australasia. The CAA supports measures to enhance the professional standing of paramedics but has cautioned against overly rigid prescription of the scope of practice of paramedics, because of the different configurations of health systems and ambulance services in each jurisdiction. The CAA recommends a combination of State and Territory regulation of private services that include paramedicine and national registration of paramedics.¹⁸ One implementation site argued that registration was an essential pre-requisite for ECPs to eventually be able to access items, as nurse practitioners do, through the Medicare Benefits Schedule and Pharmaceutical Benefits Scheme which would contribute to the sustainability of the role, particularly in rural and remote localities. SAAS provided a different perspective on this issue by advising that in South Australia many smaller EDs are supported by fee for service GPs and that in their experience, regional centres with salaried staff specialists had been more receptive to the ERP model of care.

7.4 National scalability

There are various ways of conceptualising the wider implementation of innovations. One way of framing a strategic approach to wider implementation involves three main mechanisms of adoption:

- 'Let it happen': allow innovations to be adopted in a 'natural' way, with individual organisations making their own decisions about whether to adopt or not adopt an innovation. This approach is unpredictable and self-organising, as individuals and organisations learn from each other and adapt what has been shown to work elsewhere to their own environment.
- 'Help it happen': the process of innovation adoption is facilitated, influenced and enabled e.g. with additional resources, changes in legislation, changes to funding.
- 'Make it happen': the adoption of innovations is managed in a formal way, typically by some central agency (Greenhalgh et al., 2004).

The ECP model has been implemented in metropolitan, regional and remote settings. There are no major structural impediments to the model being widely adopted. Alone among the four HWA-ESOP sub-projects, ambulance services are organised on a jurisdiction-wide basis. Hence, decisions about whether to implement, or not implement, the model are likely to be taken at a jurisdictional level. Once such decisions are made, a 'make it happen' approach is warranted, but with sensitivity to the need for local adaptation. Help is required at a local level to

¹⁸ Regulation of Paramedics, Submission from The Council of Ambulance Authorities Inc. September 2012
http://www.caa.net.au/attachments/article/127/2012_Regulation_of_Paramedics_CAA_Submission_Final.pdf

establish and refine the model to meet local needs and at a jurisdictional level to ensure funding and legislation to support ECP practice.

There may be specific legislative barriers to realising the full potential of the role. For example, in some States and Territories, the carriage of blood products by ECPs requires a change of legislation and an amendment to the Poisons Act is required for ECPs to be able to prescribe. Legislation may inhibit the ability of ECPs to use and store an extended range of pharmaceuticals such as antibiotics which may limit the management of specific cohorts of patients in their own residence. In one jurisdiction, the inability of paramedics to supply medicines means that some patients have to be transported to the emergency department for this purpose.

There may be some economies of scale in taking a national approach to the training of ECPs, including the two training models used in this program. National recognition of ECP training would support paramedics working across jurisdictions. The significant training resources resulting from the two training pathways should be made widely available. Consideration should be given to the most cost effective way of providing training. For example, there are merits in having a university qualification for ECPs, particularly the portability of the qualification, but there may be scope to include a greater proportion of the education in online or distance learning modalities. The most appropriate method for providing clinical placements also needs to be considered.

As detailed in Table 46, ECPs are required to manage patients with a diverse, and often ill-defined, range of signs and symptoms, often with a history of chronic illness. Although considered to be 'low acuity', this requires expertise and clinical reasoning of a high order. From the perspective of managing local paramedic resources, and indeed from the perspective of the paramedics themselves, there may well also be a need to maintain the critical care skills of the paramedics. There is a certain tension between these two competing demands, which requires careful management.

Table 47 includes a series of questions at the level of patients, providers and the system which can be considered at each site where implementation of the ECP is being considered.

Table 47 Factors influencing national scalability for the ECP model

Level	Questions to be answered
Patient	<p>Is there sufficient demand for ECPs (in terms of sufficient numbers of low-acuity patients who might benefit from the model)?</p> <p>Is there sufficient demand to justify a stand-alone ECP model, or would a hybrid model be more suitable?</p>
Providers	<p>Is there a critical mass of appropriately trained personnel who can fill, or be trained to fill, the ECP role?</p> <p>Can the skills and expertise of the ECPs be maintained?</p> <p>Can the critical care skills of the ECPs be maintained while spending the majority of their time caring for low-acuity patients?</p> <p>Will other paramedics accept and support the ECP role?</p> <p>Will other providers (e.g. GPs, medical specialists) accept and support the ECP role?</p> <p>Does the ECP model fill a gap among existing providers?</p> <p>Will the ECP model help to attract and retain experienced paramedics?</p>
System	<p>Does the organisation have the necessary infrastructure and systems in place to support the ECP role?</p> <p>Are appropriate medical mentoring, supervision and supports available when needed?</p> <p>Will the ECP model contribute to increased efficiency for the ambulance service?</p>
Broader system of legislation and funding	<p>Are any legislative changes required to facilitate the ECP role?</p>

One of the project final reports suggested integration of the ECP model with 'standard' paramedic practice:

The qualification of ECP could be offered as an adjunct to general paramedic or intensive care practice in much the same way as the intensive care specialty currently exists. ECPs could work solo or on general crews. As crews this may extend patient care time at the scene, however rather than transport to hospital and then facilitate transfer of care in a potential climate of 'bed block' or 'ramping' for non-acute patients; the crew would be available for immediate response once care is complete. The ECPs from the trial program could be utilised as a starting point in this model. In the potential withdrawal of the ECP model some skills would be transferrable to general crews even without an ECP 'specialty'. These would be based on most common treatments carried out by ECPs during the trial and could include (but not restricted to) enhanced gastrointestinal management, urinary catheter replacement and specialised acute wound care such as suturing. (ERP4 Final Report, p. 46)

Another of the projects suggested a more targeted training program to meet specific local needs:

'... opportunities exist to review the clinical level required to undertake ESOP care options. An evaluation of those skills utilised most frequently by clinicians or case workload that required preventable transportations to ED could be the focus of a targeted training package and program implementation to extend the scope of practice of paramedics or ICPs within a specific area for a particular skill. This approach of matching clinical care to identified clinical need or case mix could reduce the training time and costs associated with implementation. This skill based model would need to have appropriate clinical support and governance to ensure patient safety but these systems currently exist within the organisation. (ERP1 Final Report p. 37)

The relative advantages of standardisation versus local adaptation generated widely divergent views among key stakeholders and this issue requires careful consideration as its ultimate resolution has implications for the sustainability and acceptability of the model.

8 Key achievements

The HWA-ESOP program was part of a work plan implementing the National Health Workforce Innovation and Reform Strategic Framework for Action 2011-2015 (HWA, 2011). The framework was designed to guide future health workforce policy and planning in Australia by establishing priorities for innovation and reform. Five key domains of action were identified, each with a set of objectives:

1. Health workforce reform for more effective, efficient and accessible service delivery:
Reform health workforce roles to improve productivity and support more effective, efficient and accessible service delivery models that better address population health needs
2. Health workforce capacity and skills development:
Develop an adaptable health workforce equipped with the requisite competencies and support that provides team-based and collaborative models of care
3. Leadership for the sustainability of the health system:
Develop leadership capacity to support and lead health workforce innovation and reform.
4. Health workforce planning:
Enhance workforce planning capacity, both nationally and jurisdictionally, taking account of emerging health workforce configuration, technology and competencies.
5. Health workforce policy, funding and regulation:
Develop policy, regulation, funding and employment arrangements that are supportive of health workforce reform.

In this section, these five domains are used as a structure to present a summary of information from the training, implementation and economic evaluations, integrated with core data on program impacts and sustainability. Discussion focuses on a number of key evaluation questions listed in the *Evaluation Framework* (Thompson et al., 2012a).

Project teams in the ERP sub-project had the opportunity, when writing their final reports, to highlight what they felt were their key achievements. These were used as a starting point, and were supplemented and reinforced with information from the wide variety of data sources and analyses undertaken as part of the national evaluation. Where relevant, limitations are also noted.

8.1 Effectiveness, efficiency and access (HWA Domain 1)

Objective:

Reform health workforce roles to improve productivity and support more effective, efficient and accessible service delivery models that better address population health needs.

Key points:

- Over the 15 months between 1 January 2013 and 31 March 2014 ECPs attended to more than 3,500 cases, including more than 2,100 in their expanded role. In total across all sites, 153.6 patients eligible for ESOP care were seen, on average, every month.
- Although the ambulance services had similar numbers of ECPs, they varied enormously in the scale of their operations. Average monthly activity for the entire ambulance service ranged from just 250 cases at ERP2 to 2,700 at ERP3. After a new information system came online at ERP5 in August 2013, improving the accuracy of reporting, that service averaged 3,500 cases per month.
- These differences in scale are reflected in the volume of ESOP cases seen by sites, which ranged from 66 per month at ERP3 to less than 4 per month at ERP2.
- The extent to which ECPs performed additional duties also varied among the sites. At ERP1, ECPs had a dedicated vehicle and operated in addition to the emergency response

crew. This site averaged 29 ESOP cases per month. In contrast, ERP2 did not have a dedicated vehicle and ECPs worked alongside emergency paramedics and performed ICP duties as required. However, this site was not able to report on the number of cases attended in addition to the ERP role.

- 'Hybrid' roles, in which ECPs performed additional duties, were also implemented at ERP4 and ERP5. At ERP4, ECPs saw an average of 33 ESOP cases each month and attended around the same number of cases as either first responders or back-up ICPs. At ERP5, ECPs saw an average of 21 cases per month and also acted as Station Duty Officer and as back-up to emergency crews. At ERP3, ECPs attended emergency cases only when they were the closest available resource.
- Over the course of the program, the average monthly volume of ESOP cases increased steadily at three sites and fluctuated at the others. On average 1.2 ESOP cases were attended per 12-hour shift (range 0.1 at ERP2 to 2.3 at ERP3) increasing slightly to 1.4 in the last three months.
- Median waiting times ranged from seven minutes at ERP2 to 23 minutes at ERP5. By definition, half of all patients waited less than the median. The average waiting time across all sites – which is influenced by a few large waiting times – was 30 minutes.
- A key goal of the ERP model is to treat particular patient groups in their own residence or the community and thus avoid transport to hospital. This has largely been achieved. Overall, 62% of eligible patients were treated at a private residence. This varied from 50% at ERP1 to 77% at ERP2.
- A high proportion of patients (average 72.5%, range 65.4% at ERP5 to 78.4% at ERP1) seen by ECPs did not require transport to hospital. Avoidance of hospital was seen as especially beneficial for patients living in residential aged care facilities and for Aboriginal clients.
- Safety and quality was supported at all sites through the use of clinical guidelines or pathways appropriate to the local jurisdiction. This approach was appropriate and provided both direction and reassurance for the ERPs, who are accustomed to working in a protocol-driven environment. Project teams new to the ERP model of care valued the capacity to adapt guidelines on the basis of experience in the field.
- The ERP model operated safely on the whole. Of more than 2,000 ECP cases, there were 31 subsequent calls to 000 and 13 presentations to ED within 24 hours of ECP attendance (some sites did not report these outcomes). Four adverse events were reported.
- There was strong agreement among ECPs that their ESOP roles had improved quality of care for specific patient groups. In their survey responses, ECPs reported that patients seemed comfortable being cared for under the ESOP model. Administrative data show that only 49 patients (2.2% of cases) refused ERP treatment across all sites over the 15-month implementation period, and there were no reported complaints.
- Evidence from the patient survey confirmed that there was a very high level of consumer satisfaction with the ERP model at all sites. Of the 152 patients who returned questionnaires, 129 (84.9%) rated their experience as 9 or 10 out of a possible 10. Most were highly satisfied with waiting times and the care they received. Clear communication and information provision were the main factors that predicted overall satisfaction.
- ECPs identified a number of organisational factors that promoted quality and safety, namely: clinical guidelines defining the scope of the model of care; adherence to requirements for documentation and record keeping; scrutiny of the ECPs' work via peer review and clinical audit processes; ready access to medical mentors with experience in general practice or emergency care; and clear patient referral pathways and cooperative relationships with GP practices. In addition, personal qualities such as compassion and a cautious attitude also contributed to ensuring high quality and safe care for patients.
- An unexpected but welcome outcome of the model was the opportunity for ECPs to ask their colleagues to review patients during the next shift. Increasingly, over the course of the program, other ambulance officers also requested that ECPs review their patients, and they also received referrals from residential aged care facilities and GPs. This 'safety net' aspect

was seen as an important contribution of the ERP model to effective care of patients in the community.

- The costs of training, equipment and personnel are borne by the ambulance services, whereas the benefits of the ERP model are likely to be seen in reduced transport to hospital and fewer ED attendances. Any calculation of impacts on the health system needs to account for an increase in referrals to GPs and other health providers for ECP patients who do not require hospital treatment.
- Costs of training pathways were analysed as part of the economic evaluation. The two training pathways had similar costs, estimated at around \$30,000 per ERP. Trainees already had considerable previous experience and most were trained to ICP standard before being selected for ESOP roles.
- Economic modelling, taking into account the costs of ECP salaries, vehicles and equipment and the benefits accruing from fewer hospital transports, projected annual cost savings of approximately \$300,000 for ERP3 and \$95,000 for ERP4 for a model including only activity specific to the ECP role. At the other three sites, costs were higher for the ERP model than for usual care.
- To be cost-neutral, ECP activity at the ERP1, ERP2 and ERP5 sites would need to increase considerably without an increase in the level of resources. ERP1 ECPs would need to attend 470 patients annually, an increase of 35% over the current annual total of 350. ERP5 would need to triple the number of ECP-eligible patients seen, from 252 to 856. ERP2 would require a 700% increase in output, from 45 ECP patients to 373 annually.
- At most sites, ECPs also undertook first-responder duties. When modelled at the three sites for which data were available, this 'hybrid' approach improved cost-efficiency. However, it should be noted that attending emergency cases reduces the availability of ECPs for patients under the ERP model.
- Scenario analysis shows that if all implementation sites saw six ECP patients each shift (that is, six daily for each site for 365 days per year) and the same levels of ED avoidance rates seen during implementation were maintained all sites would be highly cost effective with annual cost savings ranging from \$411 per patient at ERP5 to \$998 at ERP2.
- Successful engagement of medical mentors has occurred, ensuring that ECPs can consult with GPs and / or emergency physicians as required while attending clients. The approach adopted depended on local resources. One site (ERP1) liaised closely with the ED at the local hospital; another (ERP2) used local GPs to provide training, development and clinical liaison. ERP3 built on an existing relationship with the retrieval service. Two sites (ERP4, ERP5) had senior medical staff employed to provide mentoring and support.
- Community stakeholders viewed the ESOP model as complementary to other services such as palliative care and community care, and a few (non-ECP) ambulance officers suggested it could usefully occupy a niche in the health care market. For example, ERP3 engaged with the Medicare Local to ensure the ECP service was available as part of the multi-disciplinary care team for certain patients.

8.2 Workforce capacity and skills development (HWA Domain 2)

Objective:

Develop an adaptable health workforce equipped with the requisite competencies and support that provides team-based and collaborative models of care.

Key points:

- Highly qualified and experienced ambulance officers were recruited into the 16 ECP positions across the five sites. With the exception of ERP5, all candidates were ICPs and were recruited from within the organisation.
- In their interviews, ECPs identified a number of characteristics they believed were essential requirements for the role. Successful ESOP practitioners needed to have sufficient breadth

and depth of clinical knowledge to understand why, as well as how, certain procedures were performed. They needed a solid understanding of the health system (particularly EDs and primary health), knowledge of the local community and the personal skills and attitudes required to build collaborative relationships with other health care providers. Experience as a solo practitioner in uncontrolled environments was useful. In addition to comprehensive assessment and examination skills, they needed to be able to consider the social and emotional context of the patient. Finally, the role was guided by, but not reliant on, guidelines and protocols and therefore required advanced clinical reasoning and decision-making skills.

- Vehicles were procured and equipped specifically for ECP use at four sites. The ECPs took part in this process, which was an important step in the transition to working with vehicles without patient transport capacity. At ERP2 the ECPs worked in tandem with emergency response paramedics and did not have a dedicated vehicle.
- Two approaches to training were taken by sites. ERP5 had an existing contract with a training provider, which provided distance education, in-class teaching, and clinical placements. SAAS provided the training for the remaining four sites. This included clinical placements and mentoring with experienced metropolitan ECPs over a four-week period. However, the lack of experienced ECPs in the ACT, Tasmania and NT reduced access to mentoring and support for trainees.
- All ECPs completed their training and met requirements for authority to practice.
- Twelve ECPs completed a questionnaire asking about their experiences of training. For the SAAS training, at least 80% of respondents were highly positive about the course delivery, materials, assessment methods and staff. All agreed or strongly agreed that they would recommend the training to others. Asked which aspects they particularly enjoyed, SAAS trainees nominated the highly knowledgeable lecturers and guest speakers, the opportunity to meet and network with trainees from other services, and the delivery which supported adult learning styles. They appreciated having the whole package of training delivered at one time, rather than distance education over an extended period.
- Areas for possible improvement, suggested by the SAAS trainees, included: scheduling placements immediately after classroom sessions to consolidate learning; more case-based lessons; a longer internship period; providing written resources; and incorporating local guidelines into the course.
- For the ERP5 training, opinions of the course delivery, materials and staff were positive. Aspects of the course that were particularly appreciated were the quality of the ERP5's training partner's lecturers, the classroom sessions supplemented by in-house training to utilise newly learned skills, and the opportunity to work with student doctors, consultants and nurse practitioners.
- Areas for possible improvement, suggested by the ERP5 trainees, included having more relevant placements and local training within local health care facilities.
- Several ECPs reported in their interviews that they had been on a "steep learning curve" as the role was very different to their usual practice. Many did not feel confident at first, but this increased over time for most. Those who had longer clinical placements and / or the opportunity to work with another ECP for three to six weeks after training adapted more quickly to work as a single responder. Although they varied in their pace and styles of learning, there was a strong and consistent message that these paramedics were practical people and learned best by doing.
- A formal evaluation of the training programs concluded that they were well structured and successfully implemented, producing ECPs who were "fit for purpose" with relevant skills in primary health care, enabling them to treat suitable patients safely and effectively.
- Course content was appropriate and comprehensive, covering a wide range of topics including: advanced assessment techniques; wound management including closure using sutures/staples and glue; tube replacement for indwelling catheters, supra-pubic catheters and percutaneous endoscopic gastrostomy tubes; palliative care; diagnosis and treatment (for example: infection gastroenteritis, vertigo, muscular skeletal pain, minor ear, nose and

throat and allergies); general medicine (rehydration, intravenous placement); the use of antibiotics and analgesics and supporting and working with other care providers and members of the healthcare community.

- Additional elements of content that should be investigated for future training courses include mental health and end-of-life care.
- A review of the equipment and methods used for simulation training is warranted, as some ECPs felt this aspect of the course was not useful. There is also a need for improved written resources for the ECPs to take away from training to use as reference materials.
- Clinical placements are a crucial part of preparing ECPs for the new role and require careful planning and groundwork to optimise their impact. They need to be aligned with the main caseload the ERP will manage in the field. If well organised and structured, clinical placements can have additional benefits, such as establishing networks of relationships between ERPs and other health care providers, creating a foundation for future collaboration, and improving understanding of the ECP role.
- The new roles have enhanced confidence and job satisfaction for ECPs. When surveyed towards the end of the program, they reported high levels of confidence in dealing with patients and believed they had the skills and knowledge to provide education, information and appropriate care. This finding was echoed in the interviews, when most ECPs reported that the training programs, combined with self-directed learning and their previous experience, had equipped them well for the new role.
- There was a low rate of staff turnover. Almost 70% of respondents to the ECP survey agreed or strongly agreed that they planned to stay on in the role. This stability of employment is reflected in other data collected during the program evaluation. Of the 17 ECPs originally recruited (into 16 positions), 15 remained at the end of the program. Barriers to retention included reduced remuneration (compared with previous positions and despite increased education and responsibility) and lack of flexibility in working hours.
- One barrier to retention in the role was the impact on family life. Most project teams ran a roster of 12-hour shifts (four shifts on, four off). Shifts from 10am to 10pm reduced family time and quality of life and many ECPs saw this as unsustainable in the long term. Split shifts to cover periods of peak demand were not seen as a viable alternative.
- Nevertheless, the role provides a pathway for career progression, alongside the established ICP pathway. ECPs reported that the role was rewarding, and all sites reported interest from other paramedics in future ERP training opportunities.

8.3 Leadership and sustainability (HWA Domain 3)

Objective:

Develop leadership capacity to support and lead health workforce innovation and reform.

Key points:

- Project teams implemented a range of strategies to identify and build relationships with key internal and external stakeholders, with varying degrees of success. Other ambulance service staff and volunteers, medical mentors, clinical coordination committees and ED staff were critical internal stakeholders. The lack of local champions and limited project management resources made engaging with these stakeholders more challenging. The Paramedic Reference Group was utilised effectively to support sites. Highly influential and involved external stakeholders such as GPs and other health professionals were successfully engaged by the sites.
- As implementation of the ERP model relies on the support of key stakeholders, and establishing that support takes considerable time and effort, a pre-implementation period of 12-18 months is advisable for future projects.
- Influential external stakeholders were included on clinical coordination committees and took part in developing clinical pathways and governance arrangements. Their involvement

ensured ECP treatment was consistent with current practice and facilitated monitoring of safety and quality outcomes.

- Support from the highest levels of the organisation was seen as a crucial factor in the success and sustainability of the ESOP model. Such leadership sent a signal to ambulance service staff about the level of interest and investment in the model.
- Other ambulance service staff and key stakeholders had a reasonably good understanding of the ERP model of care and a high regard for the quality of the service provided. Of the 128 survey respondents, around eight in ten said they understood the role and functions of the ERP, agreed or strongly agreed that the ECP had the skills and knowledge required for the role, and believed the ECP would enhance the quality of patient care. Most said they were comfortable providing clinical advice to the ECPs.
- In their open comments on the survey, ambulance service staff identified a number of potential barriers to the efficiency and sustainability of the model, especially: lack of clarity regarding the model of care; restrictions in the range of patients seen; limits on the ERPs' authority to prescribe and leave medications with clients; and inadequate roster coverage.
- ERPs echoed some of these concerns in their survey responses, acknowledging that other ambulance service staff sometimes had limited understanding of the role, its functions, the educational preparation required, and differences in skills and expertise compared with other paramedics. There was some dissatisfaction with the availability of mentoring and supervision, and with the attitudes and beliefs of others in the workplace.
- All sites increased their rating for core sustainability factors over the course of implementation, except for one factor, relating to staff attitudes and behaviours towards sustaining change. This was seen as the most difficult challenge and the greatest risk for sustainability.
- The largest improvements in sustainability factors were seen for clinical leadership engagement and infrastructure provision. These were initially identified as risk factors but were largely mitigated during the course of the project.
- All sites in the ERP sub-project developed business cases to secure ongoing funding; however, at the time of this report, three had been unsuccessful. The possibility of a 12-month extension to the ERP1 and ERP2 was put forward and high-level discussions took place, but no ongoing funding sources were identified. A statement in the organisation's newsletter at the close of the trial acknowledged its successes and indicated that the organisation would examine the future viability of the model in rural and regional areas. Strategies are being considered to allow ECPs to maintain their skills and 'Authority to Practice' and renew their accreditation annually.
- Despite the good fit between the model and its organisational values and aims, ERP4 saw little prospect of continuation due to financial constraints. The ECPs were reassigned to regular paramedic duties.
- ERP3 has continued the ECP role, which has been integrated into, and supported by, existing operations and structures.
- A decision on the future of the ERP5 ECP service is pending. ERP5 argued that the model supported several key State/Territory Department of Health policy objectives for ED performance and workforce development. The ERP5's Board strongly supported continuation of the service. Training of another ECP cohort has been proposed for late 2014, and the three remaining ECPs are well-placed to provide mentoring for trainees.
- The majority of stakeholders saw great potential in the ERP model of care for localities that could generate an adequate caseload and/or smaller localities where the hybrid role could work effectively. However the low throughput within the implementation period reduced the capacity of senior managers to argue the case for ongoing funding.

8.4 Workforce planning (HWA Domain 4)

Objective:

Enhance workforce planning capacity, both nationally and jurisdictionally, taking account of emerging health workforce configuration, technology and competencies.

Key points:

- In rural areas and smaller ambulance services, it may be unrealistic to require ECPs to have ICP qualifications. One jurisdiction amended the selection criteria to make ICP qualifications a desirable, rather than an essential, criterion in order to broaden the field of applicants. Experience, personal abilities, capacity for clinical decision making and advanced clinical reasoning were considered the most important characteristics for ERP candidates.
- Models of care may need to vary according to local context and needs. The ECP caseload was too small to warrant a full-time, stand-alone position in this role at most of the sites, with the exception of ERP3. At ERP2 and ERP4, the combination of the ECP role with first-responder responsibilities worked well. At ERP5, the role was combined with an administrative position. A hybrid role was seen by most ECPs as more satisfying and efficient in rural and regional locations, with the added advantage of allowing ECPs to maintain their ICP skills. In large metropolitan locations, a stand-alone ECP role may be more viable, as shown by the experience of ERP3. However, interviews with the ECPs and key stakeholders showed that this was a contentious issue and there are a number of advantages of a standardised role definition, not least the fact that this would facilitate formal recognition of qualifications.
- Consideration should be given to the transferability of training and qualifications between states and territories. Currently, there is little evidence that an 'Authority to Practice' issued in one jurisdiction will be recognised by another. Transferability across jurisdictions would help build a critical mass of ECP expertise, make the role more widely recognised and understood, and assist in covering periods of leave, thus enhancing the effectiveness and sustainability of the model. One option is to develop a formal qualification. Training programs developed for the HWA-ESOP project combined classroom-based lessons (e.g. the units of study which count towards a Master's degree) with elements of practical work, clinical placements and mentoring, and this style of learning was well-received by trainees.
- Due to the relative newness of the ECP role, workforce planning has not occurred in any systematic way at a state, territory or national level. If the ECP role is to be sustained then jurisdictions will need to plan for this workforce development. HWA in collaboration with the Council of Australian Ambulance Authorities has embarked on 'The Ambulance officer and Paramedic Workforce Study' to build a comprehensive understanding of Australia's ambulance officer and paramedic workforce and add to the nationally consistent evidence base it is developing for Australia's health workforce. This remains a work in progress¹⁹. Various jurisdictions are also engaged in workforce planning, for example the New South Wales Ministry of Health released in 2012 a Reform Plan for New South Wales Ambulance that addresses the development of new models of care.²⁰

8.5 Workforce policy, funding and regulation (HWA Domain 5)

Objective:

Develop policy, regulation, funding and employment arrangements that are supportive of health workforce reform.

Key points:

¹⁹ <http://www.hwa.gov.au/our-work/health-workforce-planning/ambulance-officers-and-paramedic-workforce-study>

²⁰ http://www.ambulance.nsw.gov.au/Media/docs/reform_plan_dec12-7562b6e6-5387-46fd-b840-aecc18f7c895-0.pdf

- The costs of implementing the model are met by ambulance services, whereas the benefits are likely to accrue to the health system as a whole. This discrepancy represents a challenge to the viability of the model of care. The situation is complicated by different management arrangements and payment models in different jurisdictions. For example, ERP3 is not part of the health portfolio in its State/Territory. In one jurisdiction, ambulance services receive approximately 40% less reimbursement for management of a lower acuity case than they do for an emergency transport case. In another jurisdiction ambulance services are supplied on a contract basis to the State/Territory government. These issues of funding and management require consideration because they are likely to affect sustainability.
- Full implementation of the model of care depends on local authorities and may require the development of additional local processes and procedures. Likewise, any proposed extensions of the model of care should be considered in the light of potential legislative and policy barriers.
- The changes needed are likely to vary between jurisdictions. For example, in some jurisdictions patients who require antibiotics cannot be managed by ECPs as they do not have authority to use and store these pharmaceuticals. In other jurisdictions ECPs cannot prescribe medication or carry blood products. These barriers have to be addressed by policy and legislative changes.
- The key stakeholder interviews highlighted a need for better communication between ambulance services and primary health care providers regarding interventions for eligible clients. Although this issue was resolved at a local level for each of the sites, it would be worth considering the development of standard templates to document the care provided, facilitate communication and ensure care outcomes are reported appropriately.
- National registration of paramedics, similar to that in place for nurse practitioners, could facilitate access to items through the Medicare Benefits Schedule and Pharmaceutical Benefits Scheme. This would assist the sustainability of the model, particularly in rural and remote locations where access to health care is limited and the ability for ECPs to prescribe and provide certain medications could be a valuable contribution.

8.6 Conclusion

The results of the evaluation demonstrate that the ERP model can be cost-effective in locations with a sufficiently large volume of potential cases. Cost-efficiency is reliant on the availability of enough ECPs to provide adequate roster coverage, and is critically affected by the accuracy of call centre staff in identifying appropriate cases and dispatching ECPs appropriately. The costs of implementing the ERP model are met by ambulance services, but any cost savings accrue to the health system as a whole, a situation complicated by different management arrangements and payment models in each jurisdiction.

Sustainability was seen as reliant on a stable workforce with high levels of staff retention. At all project sites it was reported that staff felt empowered as part of the change process but did not believe the improvement would be sustained. At the time of reporting, three sites have been unable to secure ongoing funding for the ERP initiative, one site has secured funding for a further twelve months and one site is awaiting the outcome of a funding submission. As such, the majority of project teams will not sustain any direct improvements for patients and the ambulance service. However, although the provision of services may cease, the infrastructure, clinical capacity, professional networks and alternative clinical pathways that were developed through the project may be maintained.

There are no major structural impediments to the model being widely adopted. Decisions about whether to implement the model are likely to be taken at a jurisdictional level. Once such decisions are made, a 'make it happen' approach is warranted, but with sensitivity to the need for local adaptation. Help is required at a local level to establish and refine the model to meet local needs and at a jurisdictional level to ensure funding and legislation to support ECP practice.

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Appendix 1 Funding allocation by project

Recipient	Execution date	Completion date	Total HWA funding (GST incl.)
ERP1	26/06/2012	30/06/2014	\$680,446
ERP2	26/06/2012	30/06/2014	\$690,727
ERP3	29/06/2012	30/06/2014	\$962,000
ERP4	12/06/2012	30/06/2014	\$879,600
ERP5	21/06/2012	30/06/2014	\$712,903
Total			\$3,925,676

Appendix 2 Methods of the national evaluation, HWA-ERP

This appendix provides essential background information on the methods of the National Evaluation for the ERP sub-project. It begins by describing the generic Evaluation Framework on which the national evaluation methods were based, and then links the levels of this framework to the HWA Domains of Inquiry and to specific KPIs and Evaluation Tools. Finally, details of national evaluation team activities such as site visits, data submissions and stakeholder interviews are provided as a guide to the timing and extent of data collection for the ERP sub-project.

Evaluation framework

The ESOP program evaluation was based on a broad evaluation framework developed by Centre for Health Service Development and used in several previous national program evaluations (Thompson et al., 2012a). This framework recognises that programs such as the ESOP program aim to make an impact at multiple levels, each of which needs to be considered in the evaluation:

- Level 1: Impact on, and outcomes for, consumers (consumers, families, carers, friends, communities)
- Level 2: Impact on, and outcomes for, providers (professionals, volunteers, organisations)
- Level 3: Impact on, and outcomes for, the system (structures and processes, networks, relationships)

Six 'plain language' evaluation questions are posed to assist in considering all the relevant evaluation issues (Figure 1). These questions provide a starting point to define the scope of the evaluation and assist with data collection. This framework aligns well with the HWA Impact Assessment Framework and can be integrated with the key domains of inquiry relevant to HWA. It is also compatible with the Victorian Innovation and Reform Impact Assessment Framework.

The six key elements in the evaluation framework are described below.

EVALUATION HIERARCHY	What did you do?	How did it go?	Can you keep going?	What has been learnt?	Are your lessons useful for someone else?	Who did you tell?
	PROGRAM / PROJECT DELIVERY	PROGRAM / PROJECT IMPACT	PROGRAM / PROJECT SUSTAINABILITY	PROGRAM / PROJECT CAPACITY BUILDING	PROGRAM / PROJECT GENERALISABILITY	DISSEMINATION
Level 1	Impact on, and outcomes for, patients (consumers, families, carers, friends, communities)					
Outcomes, indicators and measures to be developed for each cell as relevant	Describe what was implemented and, if necessary, contrast to what was planned	Impact on consumers and carers	Sustainability assessment	Capacity building assessment	Generalisability assessment	Dissemination log
Level 2	Impact on, and outcomes for, providers (professionals, volunteers, organisations)					
Outcomes, indicators and measures to be developed for each cell as relevant	Describe what was implemented and, if necessary, contrast to what was planned	Impact on professionals, volunteers, organisations	Sustainability assessment	Capacity building assessment	Generalisability assessment	Dissemination log
Level 3	Impact on, and outcomes for, the system (structures, processes, networks, relationships)					
Outcomes, indicators and measures to be developed for each cell as relevant	Describe what was implemented and, if necessary, contrast to what was planned	System level impacts, including external relationships	Sustainability assessment	Capacity building assessment	Generalisability assessment	Dissemination log

Figure 1 Evaluation framework

Program / Project delivery

Program/project delivery (implementation) explores ‘what did you do?’ It includes what was done and how it was done. This includes comparison of what was planned with what was actually delivered. This is a fundamental step in the evaluation process and contributes to evaluability assessment (Hawe et al., 1990).

Program / Project impact

Here we are asking the question ‘how did it go?’ Projects are usually able to describe what they did, but often have a much less clear understanding of whether their activities were successful. This usually includes exploring several dimensions of both project and Program effectiveness with a focus on the project’s objectives. In the context of the ESOP initiative this included effectiveness, efficiency and workforce productivity impacts.

Sustainability

This element of the framework asks ‘can you keep going?’ The various definitions of sustainability coalesce around two main ideas – sustainability of the direct improvements made as part of a Program, and the sustainability of the techniques and approaches learnt as part of the Program. Evaluation of sustainability is closely aligned with the issue of capacity building (e.g. increased capability and skills, increased resources) and any changes in structures and systems that ‘anchor’ or embed changes and facilitate sustainability.

Capacity building

Capacity building is a key component of the evaluation framework and answers the question, 'what has been learnt?' Capacity building is concerned with changes to workforce capacity; for example, improving the knowledge and skills of professionals and the system.

Generalisability

The concept of generalisability refers to whether lessons learnt from a project or the Program may be useful to others. In the context of the evaluation of the ESOP Program it also includes the issue of scalability. Can the workforce models be replicated more broadly and / or on a national level?

When considering generalisability it will also be critical to clarify what was unique to each project implementation site and what factors or characteristics were both beneficial and applicable to other sites. This will assist in identifying the key elements that drive the expanded scope of practice models.

Dissemination

This final element focuses on disseminating lessons learnt from both within and beyond the Program. It challenges the projects and the Program to share the knowledge gained throughout the life of the ESOP program by answering the question 'who did you tell?' Dissemination activities can often be distinguished by two purposes, as follows:

- Information shared with project stakeholders, such as Project Advisory / Reference Group members, management and staff of participating services, and groups or individuals in the local community. This type of dissemination supports the capacity building and sustainability aspects of the project.
- Information shared with the wider community, including clinicians, academics, managers, planners and policy makers. This type of dissemination supports the generalisability of the project.

The evaluation framework is structured to generate both formative and summative findings. In formative evaluation, the results of the evaluation inform the ongoing development and improvement of the program. This 'action research' approach fits well with the aim of the HWA-ESOP to build capacity within the health system for longer term sustainable change. We call this evaluation for learning: 'How can we learn and get better as we go?'

Summative evaluation seeks to ascertain the extent to which the Program was implemented as intended and the desired / anticipated results achieved. The purpose is to ensure accountability and value for money. Results of the evaluation are used to inform planning decisions, policy and resource allocation. We call this evaluation for judgment: 'How did we do?'

Both components of the evaluation seek to achieve the same goal: to assist clinicians, managers and policy makers to make better informed decisions about how to improve the implementation of expanded scope of practice interventions.

Evaluation tools and KPIs

HWA's Strategic Plan and Work Plan focuses on the delivery of three key objectives:

1. Build capacity
2. Boost productivity
3. Improve distribution

Boosting productivity is one of three HWA strategic objectives to address the increasing demand for health services. To contribute to this objective HWA funded the ESOP program. This involves undertaking a number of targeted innovative health workforce reform initiatives

with a specific focus on role redesign and expanding the scope of existing health workers in acute and primary care settings. The program aims to improve productivity, retention, accessibility, efficiency and effectiveness of healthcare services²¹. The work of HWA is guided by five domains of action which are described in the *National Health Workforce Innovation and Reform Strategic Framework for Action 2011-2015*. The domains are:

1. Health workforce reform for more effective, efficient and accessible service delivery
2. Health workforce capacity and skills development
3. Leadership for the sustainability of the health system
4. Health workforce planning
5. Health workforce policy, funding and regulation²²

The domains or key priority areas were aligned with the evaluation framework.

A set of KPIs was developed by the national evaluation team. Each site's response to the Request for Proposal and / or Project Plan was reviewed and the proposed KPIs noted, providing a starting point. These were refined through consultation at the initial sub-project workshop, during site visits and through discussions with the Project Advisory Group. The aim was to develop a suite of KPIs broadly applicable across all four sub-projects.

The national evaluation team designed methods for collecting each of the KPIs, developing or adapting standardised tools where necessary and establishing a schedule of data collection. The tools can be found in the *Compendium of Data Requirements and Evaluation Tools* (Thompson et al., 2012b), along with the proposed timing and frequency of data collection²³.

Table 1 shows the KPIs, mapped to HWA Domains of Inquiry and the Evaluation Framework Levels. Methods and, where appropriate, specific evaluation tools are listed for each KPI.

Table 48 HWA Domains and corresponding KPIs, methods and tools used in the ERP sub-project evaluation

CHSD Evaluation Framework Level	HWA Domain of Inquiry	KPI	Method	Evaluation Tool
Level 1	Domain 1: Effectiveness and efficiency	1.9 High level of consumer satisfaction/experience with the ECP role	Consumer survey Patient journey analysis pre and post implementation	ET9d ET13
Level 1, 2 & 3	Domain 1: Effectiveness and efficiency	2.2 Consistent or improved unit safety outcomes pre and post introduction of the ERP initiative e.g. number of re-contacts with the OOO service by consumers treated by the ECP for the same health care problem ; number of adverse events; number of complaints 2.3 Number of ECP cases deemed 'out of scope' by the ECP	Administrative &/or unit routine data sets Clinical case audit	ET5

²¹ Available at: <https://www.hwa.gov.au/our-work/hwa-strategic-plan-and-work-plan> accessed 11 June 2014.

²² Available at: <https://www.hwa.gov.au/sites/default/files/hwa-wir-strategic-framework-for-action-201110.pdf> accessed 11 June 2014.

²³ Available at: https://www.hwa.gov.au/sites/uploads/HWA%20Extended%20Scopes%20of%20Practice%20Project_Evaluation%20Tools%20Compendium_Oct%202013.pdf accessed 11 June 2014.

CHSD Evaluation Framework Level	HWA Domain of Inquiry	KPI	Method	Evaluation Tool
		2.4 Number of consumers refusing treatment by the ECP		
Levels 2 & 3	Domain 1: Effectiveness and efficiency	2.5 Increased capacity of medical staff to manage more complex ED or primary care consumers in a more timely fashion	Semi-structured interviews with other members of the health care team to ascertain their perceptions of any changes in workflow	ET12
Levels 2 & 3	Domain 1: Effectiveness and efficiency	1.3 Increased number of extended role paramedic cases undertaken by the ECPs in each of the implementation sites	Administrative &/or department routine data sets ECP Case codes Clinical audit to identify practice changes	ET5
Level 3	Domain 1: Effectiveness and efficiency	1.4 Decreased number of consumers transported to ED subsequent to ECP attendance	Administrative data sets ECP Case codes	ET5
Level 3	Domain 1: Effectiveness and efficiency	1.5 Decreased number of inter-facility transfers (as applicable)	Administrative data sets	ET5
Level 3	Domain 1: Effectiveness and efficiency	1.6 Average number of consumers seen per shift by the ECP (including triage category, time spent on call, call out ratios, break number metrics etc.) 1.7 Average waiting time from 000 call to the time the ECP arrived at the scene of the consumer 1.8 Number of ECP consumers treated in their 'usual residence'	Administrative data sets ECP Case codes	ET5
Level 2	Domain 2: Workforce capacity and skills development	1.1 Increased number of ECPs who have completed the agreed training pathway through the ERP projects 1.2 Turnover rate of recruited ECPs during the funded period of the expanded scope of practice project	Record of completion (including evidence of attainment of competency) by the ERP against the agreed training pathway Record of staff employment for the duration of the project	ET1 ET1
Level 2	Domain 3: Leadership and sustainability	2.0 High level of staff satisfaction and acceptance of the ECP	Staff survey (other members of the health care team)	ET8d

CHSD Evaluation Framework Level	HWA Domain of Inquiry	KPI	Method	Evaluation Tool
		role; staff experience of the impact of the expanded scope of practice role	ESOP personnel survey	ET10
			ESOP personnel interviews	ET11
		2.1 Perceptions of the impact of the expanded scope of practice role on key stakeholders	Key stakeholder interviews	ET12
Level 2 & 3	Domain 3: Leadership and sustainability	2.6 Number of consumers referred to the ECP model by other health care providers (source of referral)	Semi-structured interviews with key stakeholders	ET12
		2.7. Strengthened partnerships developed between other aged care and primary care service providers and the ECP service		
Levels 2 & 3	Domain 3: Leadership and sustainability	2.8 Conditions for sustained implementation in place	Semi-structured interviews with senior managers to ascertain their perceptions of project sustainability	ET12

Note. *Using this tool was optional.

Monitoring these KPIs was intended to help sites gather information to evaluate their achievements at the end of the implementation period (summative evaluation), as well as providing early indication of risks, allowing corrective action to be taken (formative evaluation). All project teams secured ethics approval for their project evaluation.

It should be noted that data collection by the national evaluation team went well beyond the KPIs. Other methods of data collection were used to support the interpretation of the information arising from the KPIs. These included tools assessing the quality and impact of training, a tool to assess the relationship between lead and implementation sites, a measure of partnership building, logs to document issues, lessons learned and dissemination activities, and a sustainability questionnaire.

The design of the HWA-ESOP program emphasised three of the five HWA Domains of Inquiry. Consequently, the remaining two domains are not covered by specific KPIs or evaluation tools: Domain 4 (Workforce planning) and Domain 5 (Workforce policy, funding and regulation). Nevertheless, the additional data collections captured relevant information to enable the national evaluation team to address these domains in the final sub-project reports.

Data submissions

Tables 2 and 3 show the data submitted by each HWA-ERP site. Brief information about each tool, including dates of submission, changes and omissions is outlined below.

Table 49 National evaluation tools completed by ERP sub-project²⁴

Site	ET1	ET5	ET6	ET8d	ET9d	ET18	ET19	ET20
	Staff profile	Data spec	Log book	Staff survey	Patient survey	Sustainability tool	Issues/ Lessons Log	Dissemination Log
ERP1	✓	✓	✗	✓	✓	✓	✓	✓
ERP2	✓	✓	✗	✓	✓	✓	✓	✓
ERP3	✓	✓	✗	✓	✓	✓	✓	✓
ERP4	✓	✓	✗	✓	✓	✓	✓	✓
ERP5ERP5	✓	✓	✗	✓	✓	✓	✓	✓

Note. ET refers to the Evaluation Tool in the Compendium of Data Requirements and Evaluation Tools (Thompson et al., 2012).

ET1 was used to record information about the staff in ESOP roles, including dates commenced, qualifications and experience, salary and hours worked in the role. This provided essential background information for the evaluation and was collected throughout the program.

During the initial site visit the proposed data specification (ET2) was reviewed with project teams to ensure it that the data items were appropriate and available from existing information systems. There were three data extracts for ET2. Data submission 1 was due 31 March 2013 and provided baseline data for the 12 months prior to implementation of the ESOP initiative (1 October 2011 to 30 September 2012). This data submission provided an opportunity to sort out any problems with data extracts and interpretation of data items prior to the more critical data submissions. Data submission 2 was due 31 October 2013 and encompassed what was originally envisaged to be the peak period of project implementation (1 October 2012 to 30 September 2013).

HWA had envisaged that all projects would commence by 1 October 2012 and a full 12 months of implementation data was a contract requirement. Data submission 3 extended from 1 October 2013 to 31 March 2014 and was due for submission by 30 April 2014. This data submission provided information on sustainability of the model of care.

The national evaluation team statistician worked closely with project teams to assist with data extraction queries and data transfer. The disparate nature of emergency information systems has presented major challenges for the national evaluation and for the sites. In order to meet the requirements of ET5, all sites needed to extract information from both their Advanced Medical Priority Dispatch System and their patient information system. Every project team had difficulty linking data from their Medical Priority Dispatch System and patient information systems. Several data items included in ET5 are not routinely reported (e.g. patients who recontact triple 0 within 24 hours, adverse events and patient complaints), which has made it extremely difficult to monitor metrics relating to patient safety and quality. Data extraction was further complicated by the lack of expertise and resources at HWA-ERP sites. As a result, data submissions were often late, incomplete and arrived in instalments which had to be matched and compiled. The national evaluation team provided considerable support to assist sites with this process to maximise data quality and completeness. Nevertheless, no site has been able to provide the complete dataset as specified in ET5.

Unfortunately not all sites had access to electronic data with the SAAS project teams having to retrospectively enter data from paper 'case cards' into an Excel spreadsheet in order to supply the data items necessary for ET5.

²⁴ Optional evaluation tools included ET7 Patient Interview and ET13 Patient Journey Mapping (ET2, 3, 4 and 16 were not relevant to the ERP sub-project).

In order to collect the data required for the national evaluation team KPIs, ERP3 tried to modify existing databases. This enabled identification of ECP cases and potential ECP cases that were not allocated to ECPs.

Administrative databases used by ERP5 were not able to register ECP cases, making it necessary to log manually all available statistical data at the commencement of ECPs attending calls (from 20 March 2013). This was essential in order to produce data for the evaluation. Subsequently ERP5 implemented a new patient information system. This generated an enormous additional workload for the project manager as the system was not configured to generate standard reports for the ERP project.

ET6, a logbook to record training and clinical activities of ESOP practitioners, was not applicable for the HWA-ERP sites.

ERP1 and ERP2 obtained ethics approval for its evaluation activities involving staff and patients; the other sites did not apply. Support for the surveys was provided by the national evaluation team, including calculation of target sample sizes to maximise statistical power, draft participant information sheets, guidelines for administering the questionnaires, the online version of the surveys, and spreadsheets for data entry by those who preferred to use a paper version. Details of tool development are available on request.

Most sites used the online survey platform Survey Monkey for ET8d. ET8d was a 15-item questionnaire designed to assess understanding, opinions and attitudes regarding the model of care and its impacts from other staff members and stakeholders working with ESOP practitioners. It was adapted from a questionnaire published by Considine and Martin (2005). Data collection for ET8d took place from late 2013 into early 2014.

ET9d assessed patient experiences and satisfaction with ECP ambulance care. The 20-item questionnaire was designed to measure patient experiences and satisfaction with their treatment by the ESOP practitioner. It was adapted from the Patient Satisfaction Sub-scales developed by Cherkin et al. (1991) with additional questions from other sources (Kapulski and Bogomolova, 2011; National Health Service, 2012). The timing of data collection varied among sites. ERP3 began distributing patient questionnaires in June 2013, ERP4 and ERP5 from early November 2013, ERP1 and ERP2 conducted their surveys from December 2013. ERP1, ERP2 and ERP3 distributed the questionnaires by leaving them with patients seen by the ECP, with reply-paid envelopes provided. ERP4 sent out questionnaires by post and had 24 returned from 42 distributed (57%); the other sites did not report response rates.

Three sites collected additional data by interviewing patients. Interviews for ERP1 and ERP2 were conducted by staff members external to the ECP service, to avoid bias. A total of 123 patients were interviewed at ERP1, and nine at ERP2. The ERP5 patient interviews were conducted from April to December 2013. All patients seen by the ECPs during that time were approached for an interview, and 111 agreed to be interviewed. The telephone interviews collected similar information, namely whether the patient presented to the ED subsequent to ECP contact, whether the patient saw their GP after being treated by the ECP and if so for what reason, whether there were any complications as a result of or after ECP treatment and any further information the patient wished to provide about their experience with the ECP.

The sustainability questionnaire (ET18) was completed twice: projects were asked to submit this tool in early 2013; however submission dates ranged from April to September. Most sites submitted their second sustainability tool in February 2014. The issues log (ET19) and dissemination log (ET20) were compiled throughout the project period by project staff. Both were submitted to the national evaluation team by most sites in February 2014, except for ERP3 which submitted the data in December 2013.

Table 50 Additional evaluation tools (ERP sub-project)²⁵

Site	ET10 ESOP Practitioner survey	ET11 ESOP Practitioner Interviews	ET12 Key Stakeholder Interviews	ET14 Lead/ Implementation Site Survey	ET15 Training program review	ET17 Trainee experience survey
ERP1	✓	✓	✓	✗	✓	✓
ERP2	✓	✓	✓	✗	✓	✓
ERP3	✓	✓	✓	✗	✗	✓
ERP4	✓	✓	✓	✗	✗	✓
ERP5	✓	✓	✓	✗	✗	✓

Note. ET refers to the Evaluation Tool in the Compendium of Data Requirements and Evaluation Tools (Thompson et al., 2012).

ET10 was a 20-item questionnaire used to elicit the experiences of personnel working in ESOP roles, including role satisfaction, relationships with other staff, consumer acceptability and their opinions on whether the new ways of working are sustainable. This tool complemented the collection of qualitative data via semi-structured interviews (ET11). The same tools were used across all sub-projects to facilitate comparison and ensure key issues were covered. Surveys were distributed to ECPs from late November 2013 and collection was closed for the final site on 18 February 2014. There was a response rate of 76% (13 out of 17 ECPs across all ERP sites). ET12 was an interview schedule for use by the national evaluation team in conducting the final key stakeholder interviews. The numbers and dates of the ESOP practitioner and key stakeholder interviews are provided below.

ERP1 and ERP2 used the optional Patient Journey Analysis Tool (ET13) and submitted this to the national evaluation team in October 2013. ET14 was not relevant to HWA-ERP as there were no lead sites.

ET15 and ET17 were used to inform the training evaluation – see details below.

Local evaluation activities were conducted at each HWA-ERP site. ERP1 and ERP2 provided monthly data for cases attended by the ECP and cases missed to the local Clinical Coordination Committees. ERP3 collected internal activity data for the ECP operations fortnightly on the number of incidents overall, the number attended by the ECP, the number of incidents where the ECP is first car on the scene, and the total hours consumed. This enabled reporting of activity and utilisation rates and average job hours. ERP4 provided comprehensive monthly reports for internal stakeholders, tracking the activity of the ECPs in detail and comparing their performance to non ECP services in their local region.

ERP1 and ERP2 also instituted a process of ECP case reviews by medical mentors. This process addresses a series of questions:

- Was treatment given by the ECP safe?
- Were all possible treatment options for presenting complaint considered and checked for?
- Was treatment given by ECP appropriate?
- Did the ECP contact the medical mentor if you believe it was required?
- Were all appropriate referrals/patient information given to other services?

Data analysis

Before data from ET5 could be analysed, a considerable amount of work was required in compiling and checking the information received from sites. As indicated above, there were three data collection periods: baseline, implementation and sustainability. At each submission,

²⁵ ET11 and 12 were completed at the final site visits which were scheduled in February/March 2014.

sites typically provided at least two data sets, one containing the ESOP cases alone and another with usual activity data, which sometimes included the ESOP cases. Often, sites provided many more than two data sets in various formats including Excel, Access and Adobe (.pdf) files or records of individual case cards. These needed to be linked into one data file, using all available information to ensure that each ESOP case appeared in the data set only once. The linking process could not be automated because of the variations across data sets, and was therefore extremely time-consuming and labour-intensive.

Once data had been compiled into one database containing both ESOP and usual cases, the codes used for items had to be standardised across sites and jurisdictions where possible. For example, dispatch codes for similar types of cases varied across different ambulance organisations. Data items which were not supplied according to the data specification in ET5 were recoded to ensure consistency across the data set and enable reliable analysis and accurate interpretation of the information. This required extensive liaison with sites to check the meaning of codes and ensure they were mapped correctly to the data dictionary. Activity levels for each site could then be calculated, checked against final reports from the sites, and integrated across the sub-project.

Data analysis was carried out using Excel and SAS 9.2. First, descriptive data tables were produced to provide a context for the KPIs. For example, patients seen at different sites within a sub-project may vary according to diagnosis, severity, demographic factors and so on, and these contextual factors may affect performance at the site. Site-specific factors such as the size of the service and the typical numbers of consumers seen are also important contextual factors. After adjusting for context, data for each KPI were analysed and presented, and relevant comparisons (e.g. across time, site, sub-group) were made.

Recordings of the ESOP practitioner (ET11) and key stakeholder (ET12) interviews were professionally transcribed and confidentiality was assured. A random sample of the transcripts was checked for quality against the detailed notes taken by the interviewers.

Qualitative data from the interviews were coded using NVivo through an inductive process, starting with a sample of the interviews and comparing emerging categories with the overall evaluation framework. Through this process, a coding framework was created. Due to the large number of interviews, there was a considerable quantity of qualitative data. Consequently, the data were interrogated for specific data issues pertaining to relevant evaluation questions.

Framework Analysis was the method chosen for data analysis because it is rigorous, systematic and appropriate for large and complex data sets (Ward et al., 2013). The analysis process involves five steps. After familiarising themselves with the data, researchers identify a thematic framework and begin indexing the data according to that framework. The final steps are charting and interpreting the data (Srivastava et al., 2009). Framework Analysis is particularly suitable for organising qualitative data around key themes of interest to policy makers and relevant to the people affected by policies (Srivastava et al., 2009).

A number of the evaluation tools were questionnaires (ET8d, ET9d, ET10, ET14, ET17, and ET18). Responses were generally sent to the national evaluation team from individual sites as Excel files. All data for each survey were compiled into one worksheet and checked by members of the national evaluation team before analysis in Excel and/or SPSS 19.0. Where open questions were included in the questionnaire, thematic analysis was conducted on the qualitative data.

ET1, ET6, ET19 and ET20 were essentially running records kept throughout the project period and required a mix of quantitative and qualitative methods to extract the relevant information.

Site progress and final reports

The national evaluation team and HWA collaboratively developed a template for progress and final reports from sites, in an effort to standardise the information provided by project teams and reduce repetition and simplify the process. All reports were reviewed both by the national evaluation team and HWA. The ERP sites submitted two progress reports: December 2012 and December 2013. An interim report was submitted by all sites except ERP5 in May / June 2013 (ERP5 submitted its interim report in September 2013). Final reports were due by the end of May 2014. These have provided a useful source of qualitative and quantitative data for the national evaluation.

Each progress report included a questionnaire comprising a series of statements relating to different aspects of the project. Project teams were asked to rate these statements using a seven-point Likert scale to reflect the situation with their project during the current reporting period. These responses were used as part of the formative evaluation, providing an early warning system for each sub-project and flagging areas where project teams may be encountering obstacles to progress.

Site visits

Site visits by the national evaluation team provided a valuable source of qualitative data for the national evaluation. National evaluation team members conducted initial visits in late 2012 and early 2013. A second and final round of visits took place in March 2014. Each visit extended over one to two days, with more time needed for remote sites. Discussions were guided by a standard agenda.

Site visits provided a vital opportunity to meet ESOP staff face-to-face in their usual working environments, and to learn about the contexts in which the HWA-ESOP workforce innovations were being implemented. National evaluation team members gained a valuable appreciation of the real-world barriers and enablers that influence program outcomes. These meetings also helped to build positive, supportive relationships with program participants.

National evaluation team members were able to obtain detailed information on how the models of care were being implemented, and to gain a greater understanding of the impact of context and the local setting. Evaluation issues were also discussed, including: local evaluation plans and tools; the use of the Compendium; routine data collection systems and the potential for extracting a standard set of items to use as quality and safety indicators. ESOP staff members were encouraged to consider several issues including: change management approaches, consumer engagement and to plan for sustainability. Potential risks were highlighted and risk management strategies reviewed.

National evaluation team members took detailed notes during the site visits, which were later written up under the key themes of the visit and kept as a record and resource for follow-up and reporting.

In between site visits, the national evaluation team maintained contact with sites through the regular workshops organised by HWA, email and telephone contact. Teleconferences occurred regularly, particularly to provide support during the evaluation phase of the projects and to support interim and final report development. Records were kept of key interactions to track progress and facilitate early identification of risks.

ESOP practitioner and key stakeholder interviews

Stakeholder interviews were a critical source of qualitative data for both the formative and summative components of the evaluation. Interview schedules (ET11 and ET12) were designed for one-off data collection for a snapshot period with a purposive sample of key stakeholders.

Stakeholder interviews were predominantly conducted during the final site visits to all project teams. Two experienced evaluators from the national evaluation team conducted the interviews at each site. All participants signed consent forms and gave permission for the interviews to be recorded.

Semi-structured interviews were conducted with 44 key stakeholders. Eighteen interviews were conducted with ESOP practitioners; this included interviews with the 16 incumbents and additional interviews with one former ECP and one ECP from another service who provided relief during periods of leave. Dates and numbers of interviews by site are shown in Table 4.

Table 4 Interviews with ESOP practitioners and key stakeholders

Site	ESOP practitioner	Key stakeholder	Total	Dates
ERP1 and ERP2	7	20	27	17, 18 & 19/02/2014
ERP3	4	7	11	04 & 05/03/2014
ERP4	3	10	13	13 & 14/03/2014
ERP5	4	7	11	10, 11 & 12/02/2014
Totals	18	44	62	

Key stakeholders included ambulance officers, paramedics, medical specialists, managers and representatives of other organisations associated with the sites. Table 5 provides a breakdown of key stakeholder professional roles by site. Project sites were asked to nominate appropriate individuals for interview on the basis of guidelines provided by the national evaluation team. The guidelines specified inclusion of medical mentors, members of the project advisory or management committee, management representatives and other medical and health care providers affected by the ESOP role.

We used non-probability sampling to select a small sample of key individuals to participate in stakeholder interviews recognising that the results may not represent other characteristics of the population.

Table 5 Professional roles of key stakeholders by site

Site	Manager	Doctor	Nurse	Other	Total key stakeholders
ERP1 and ERP2	4	3	6	7	20
ERP3	4	3	0	0	7
ERP4	3	3	2	2	10
ERP5	4	1	0	2	7
Totals	15	10	8	11	44

Training evaluation

Three evaluation tools were developed specifically for the Training Evaluation. ET15, ET16 and ET17 were structured around quality education factors. These factors are broadly reflected in the headings for each section which were designed to capture important aspects of programme design that impact on overall quality. The structure of these evaluation tools reflects the educational standards endorsed by the Australian Tertiary Education Quality and Standards Agency.

ERP1 and ERP2 completed ET15 and this was sent to ERP3 and ERP4 for comment. ET17 was intended to capture the ESOP practitioners' overall impressions of the training program that they completed in 2013. Distribution of ET17 commenced in late November 2013 and collection was closed for the final site on 3/2/14. The questionnaire was sent to all 16 incumbents and one former ECP who had been involved in the earlier stages of the project. There was a response rate of 71% (12 out of 17 ECPs over all sites). ET16 was not used for this sub-project.

Additional qualitative data for the training evaluation came from the semi-structured interviews with ESOP practitioners (ET11) and key stakeholders (ET12) and quantitative data were available from the ESOP questionnaire (ET10). Insights were also drawn from:

- Information provided by project teams in their progress and final reports and;
- Data and observations collected during the conduct of two sites visits to each project team (the first during the set-up and establishment phase of the project and the second during the final stages of implementation and evaluation).

The data from all sources was synthesised and written up using a training evaluation data analysis template. This process generated the summative conclusions that have been used in the training section of the sub-project reports.

Economic evaluation

There were several sources of data for the economic evaluation. First, information on estimated project expenditure was available from the original bids submitted by sites to HWA. This was supplemented by the regular financial statements included in the sites' progress, interim and final reports. For some sites, these statements provided valuable information on the costs associated with salaries, consumables and other project expenses. In addition, a financial reporting template was created and sites were asked to provide further details on costs, to help link expenditure to different periods of the program. Three types of cost data were collected: setup costs, initial training costs and costs associated with the period after the initial training.

Approximately half the sites across the HWA-ESOP program used the financial reporting template, and data were of variable quality and completeness due to local constraints such as the nature of sites' financial systems, the training and experience of the project staff, and available time.

External data sources were used primarily to estimate the cost of usual care and, where necessary, supplemented the information received from sites. These data sources included government reports, enterprise agreements, academic journal articles and consultancy reports. These alternative data sources were used as a best estimate of certain parameters required for the economic modelling.

Cost information from these sources was combined with activity data used for the analysis of the KPIs to build economic models, tailored specifically for each sub-project, predicting likely cost implications given various levels of the key parameters. These sub-project specific models were used to model number of different scenarios exploring the conditions under which the models of care were likely to be most cost effective, reflecting the variety of sites and organisations involved in the HWA-ESOP program and their particular constraints.