

HWA Expanded Scopes of Practice Program Evaluation: Advanced Practice in Endoscopy Nursing Sub-Project

Final Report

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Table of contents

List of acronyms	iv
Key messages	v
Executive summary	vi
1 Introduction and background	1
1.1 Description of HWA's strategic agenda in Expanded Scopes of Practice	1
1.2 The case for change in endoscopy delivery	1
1.3 Objectives of the Advanced Practice in Endoscopy Nursing sub-project	1
1.4 Description of sites	2
1.5 Structure of report	2
2 Implementation and program delivery	3
2.1 Service delivery models and scopes of practice	3
2.2 Requirements for nurse endoscopist trainees	3
2.3 Role of the lead sites	4
2.4 Set-up and establishment phase	5
2.5 Implementation of Expanded Scopes of Practice	7
2.6 Barriers and enablers in relation to implementation	9
3 Training evaluation	12
3.1 Structure of training programs	12
3.2 Experience of nurse endoscopist trainees	13
3.3 Training timeline and time to completion of requirements	16
3.4 Scope, content and relevance	16
3.5 Staff qualifications	17
3.6 Facilities and resources	17
3.7 Teaching and learning environment	17
3.8 Assessment methods	18
3.9 Modifications to the training program	19
3.10 Training program sustainability	19
3.11 Training program capacity and impact	20
3.12 Budget and expenditure	20
3.13 Summary and conclusions	20
4 Impact	22
4.1 Introduction	22
4.2 Activities of nurse endoscopist trainees	22
4.3 Impact on consumers	23
4.4 Impact on providers	26
4.5 Impact on the system	37
4.6 Unintended consequences	45
5 Economic evaluation	48

5.1	Introduction	48
5.2	Length of training	48
5.3	Cost of training	50
5.4	Scenario modelling	50
5.5	Conclusions	52
6	Sustaining innovation	54
6.1	Innovation characteristics	55
6.2	Context.....	57
6.3	Capacity	59
6.4	Processes and interactions.....	60
6.5	Sustainability outcomes	63
6.6	Dissemination	65
6.7	Summary.....	66
7	Prospects for wider implementation	68
7.1	Evidence of effectiveness of the APEN model.....	68
7.2	Suitability of the model.....	68
7.3	Requirements for success	69
7.4	National scalability	70
8	Key achievements	74
8.1	Effectiveness, efficiency and access (HWA Domain 1)	74
8.2	Workforce capacity and skills development (HWA Domain 2).....	76
8.3	Leadership and sustainability (HWA Domain 3)	78
8.4	Workforce planning (HWA Domain 4).....	80
8.5	Workforce policy, funding and regulation (HWA Domain 5).....	81
8.6	Conclusion	81
	References	82
Appendix 1	Funding allocation and dates by project.....	85
Appendix 2	Methods of the national evaluation, HWA-APEN	86

List of figures

Figure 1	Report structure.....	2
Figure 2	Overview of Nurse Endoscopist Training Pathway	6
Figure 3	Components of the Nurse Endoscopist Training Pathway	12
Figure 4	Aggregate domain scores (all APEN sites)	13
Figure 5	Age distribution of patients treated by nurse endoscopists by site.....	23
Figure 6	Responses to HWA-APEN patient survey, items 1-5	24
Figure 7	Experience of nurse endoscopist trainees	28
Figure 8	Responses to APEN non-ESOP staff survey	32
Figure 9	Successful unassisted snare polypectomies – cumulative counts and projections by site by week.....	39
Figure 10	Mean total time and insertion time (mins) across all sites	41
Figure 11	Average number of patients per list – by nurse by site.....	43
Figure 12	Distribution of time spent other than colonoscopies	44
Figure 13	Training trajectories and linear prediction.....	49
Figure 14	Influences on sustainability (adapted from Stirman et al., 2012).	55
Figure 15	Evaluation framework	87

List of tables

Table 1	Description of sites	2
Table 2	APEN staff summary	4
Table 3	Descriptive statistics for APEN trainee survey (Module 2: Theoretical)	14
Table 4	Nurse endoscopist trainee cohort – training enrolment and completions.....	16
Table 5	Opportunities for training program development	21
Table 6	Age and sex distribution of patients treated by nurse endoscopist trainees	23
Table 7	Refusal rates – by site	26
Table 8	Descriptive statistics for ESOP personnel survey	26
Table 9	Responses by professional group, HWA-APEN.....	33
Table 10	Progress of nurse endoscopist trainees through training pathway.....	37
Table 11	Performance metrics (Standard reporting for Conjoint committee) – by site.....	38
Table 12	Caecal intubation rates by site	40
Table 13	Mean insertion and total time by site for nurse endoscopist trainees.....	40
Table 14	Mean total colonoscopy time by quarter.....	41
Table 15	Safety outcomes – by site	42
Table 16	Activity level per list – by site.....	42
Table 17	Total time spent on other professional activities – by site	44
Table 18	Sustainability prospects – APEN sub-project	64
Table 19	Number of studies included in the systematic review by Day et al. (2014)	68
Table 20	Attributes of the APEN model.....	69
Table 21	Factors influencing national scalability for the APEN model	73
Table 22	HWA Domains and corresponding KPIs, evaluation methods and tools used in the APEN sub-project evaluation	89
Table 23	National evaluation tools completed by APEN sub-project	91
Table 24	Additional evaluation tools (APEN sub-project).....	93
Table 25	Interviews with ESOP practitioners and key stakeholders, HWA-APEN.....	95
Table 26	Professional roles of key stakeholders by site, HWA-APEN	96

List of acronyms

APEN	Advanced Practice in Endoscopy Nursing
ASA	American Society of Anaesthesiology
CCRTGE	Conjoint Committee for Recognition of Training in Gastrointestinal Endoscopy
CHSD	Centre for Health Service Development
ESOP	Expanded Scopes of Practice
GENCA	Gastroenterological Nurses College of Australia
GESA	Gastroenterological Society of Australia
DOPS	Direct Observation of Procedural Skills
RPL	Recognition of Prior Learning
FTE	Full Time Equivalent
HWA	Health Workforce Australia
KPI	Key Performance Indicator
NBCSP	National Bowel Cancer Screening Program
SD	Standard Deviation
SETC	State Endoscopy Training Centre (Victoria)

Key messages

- Using nurses to perform endoscopies is new to Australia but is well established overseas, particularly in the United Kingdom. The evidence to date indicates that nurses performing endoscopies is safe and efficacious.
- One of the main drivers of the of the Advanced Practice in Endoscopy Nursing sub-project was the need to respond to growing demand for lower gastrointestinal endoscopies arising from bowel cancer screening. However, only about a quarter of same-day colonoscopies are performed in public hospitals, thus severely limiting the ability of nurse endoscopists to meet this demand without operating in the private sector, which would be strongly opposed by the medical profession.
- The Advanced Practice in Endoscopy Nursing model was not fully implemented, with trainees only nearing completion of their training towards the end of the project. The effectiveness and cost effectiveness of the model could therefore not be determined and warrants further investigation.
- Patients were satisfied with the care they received from the nurse endoscopist trainees, with the personal manner and technical skills of the nurse endoscopist trainees highly regarded. Very few patients refused to have their endoscopy performed by a nurse.
- Six highly experienced nurses were recruited across the lead and implementation sites. Five of the nurses had at least 10 years post-graduate experience.
- The Advanced Practice in Endoscopy Nursing project incorporated two models of nursing practice – nurse practitioners and advance practice nurses. Both are perfectly acceptable models. Which model is preferable in which circumstances will depend on local factors, particularly the need for nurses to work (or not work) in an expanded role (e.g. prescribing, ordering pathology).
- The training program provided a structured approach to assessment, mentorship and medical supervision. The study requirements are quite onerous. There are opportunities to improve program content and structure, program delivery and program scalability. The estimated net cost of the training, based on the observed experience of the nurse endoscopist trainees, is approximately \$90,000.
- Training of nurse endoscopists is critically dependent on the support and active encouragement of medical leaders in the fields of gastroenterology and colorectal surgery.
- The best place to train nurses to perform endoscopies may not be the best places for them to function once fully trained. Training is resource-intensive and requires sufficient critical mass of medical proceduralists to support the process. The presence of a critical mass reduces the need for nurse endoscopists once trained. Locations lacking medical endoscopists (which cannot support training nurses) may have greater need for nurse endoscopists.
- Over the 15-month period from January 2013 to March 2014, the nurse trainees performed 1,458 procedures on patients with intact colons, of which 1,034 (70.9%) were completed unassisted. All nurses exceeded the benchmark of 90% for caecal intubation rate. The average time to complete the procedure reduced over time.
- Various strategies could be employed to assist wider implementation of the model, including seed funding to support implementation, funding for lead organisations, a nationally accredited course for nurses wanting to train as endoscopists and changes to funding and legislation to support the model.
- National recognition and professional issues including credentialing and re credentialing processes may influence sustainability.

Executive summary

The Advanced Practice in Endoscopy Nursing (APEN) sub-project was undertaken in response to a national trend of increasing demand for endoscopy services, in part due to the implementation of the National Bowel Cancer Screening Program. The aim was to train nurses to perform endoscopic procedures previously only undertaken in Australia by doctors. Although new to Australia, nurse endoscopists are well established in the United Kingdom. Recently published evidence based on a systematic review of the literature indicates that nurses can achieve similar results for efficacy and safety to those achieved by doctors.

Methods

Evaluation of the APEN 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 at five sites, one in Queensland and four in Victoria, with two of the sites (APEN1 in Queensland and APEN2 in Victoria) serving as lead organisations. The same training program was undertaken at all sites. The focus during training was almost entirely on colonoscopies, although the two nurses at the Queensland site did commence performing upper gastrointestinal endoscopy towards the end of the program.

The two lead organisations adopted different approaches with regards to the concept of advanced nursing practice. APEN1 implemented a nurse practitioner model of care, with the nurse practitioner (candidates) working within the endoscopy service in a fully integrated role, performing endoscopy and related health care functions within a broad scope of practice including: advanced patient assessment; interpretation of diagnostic interventions and pathology, differentiating diagnoses; establishing management plans, including selection and prescription of appropriate medication and direct referrals to other health care professionals.

The model of care implemented in the Victorian sites was based on an advanced practice nurse model with the nurse endoscopist trainees undertaking protocol-driven activities within a defined practice scope under the direct supervision and delegated authority of a senior medical officer. The trainees participated in gastroenterology clinics, but even by project end there was still work to be done to clearly define the clinic role of the trainees given their inability to practice as a nurse practitioner e.g. prescribe, order pathology.

Six highly experienced nurses were recruited, two at APEN1 and one at each of the four Victorian sites, with one nurse having previous experience in a similar role in the United Kingdom. Selection criteria included at least five years post-graduate nursing experience, with a minimum of two years in endoscopy. Five of the nurses had at least 10 years post-graduate experience. One of the nurses resigned shortly after being employed and was quickly replaced.

The two lead sites had quite different roles, with APEN1 having primary responsibility for developing the training program (with no additional implementation sites to support) and APEN2 having three implementation sites to support. This resulted in some confusion about their respective roles but, in general, having lead organisations worked well and helped to streamline implementation, reduce duplication and provide an ongoing source of support and expertise for the implementation sites.

Project teams used existing clinical governance structures within their organisations to ensure safety and quality, with most projects also establishing working groups and a steering committee to oversee the project. Both lead sites appointed full-time project managers and would not have been able to manage the project without this resource. Implementation required significant organisational resources and financial investment, with sufficient time for extensive planning, consultation and recruitment of key personnel.

Most sites established two dedicated training lists per week for each trainee, with variations due to leave requirements and the availability of procedure rooms. On average, 3.2 patients were allocated to each list. Supervision arrangements and criteria for allocating patients to training lists varied by site to meet local circumstances. Most of the trainees spent some time (typically about five minutes) with each patient prior to the procedure, with some trainees also seeing patients following their procedure. The most significant barrier relating to resources was the impact of the training requirements on usual throughput. Throughput was least affected when the training lists were in addition to existing endoscopy lists.

Training

The training program used a combination of methods, including self-directed learning packages, face-to-face instruction, skill development through simulation and medical supervision. The program commenced in November 2012 and consisted of four modules: (1) orientation to the workplace; (2) a theory module developed by the University of Hull in the United Kingdom; (3) a skills training program; (4) supervised clinical practice in their place of work. The training program was structured so that the two main components (modules 2 and 3) took place concurrently over a 12-18 month period. Completion of the training program results in the awarding of a Graduate Certificate from the University of Hull. Progression of the nurse endoscopists through the training program was monitored using metrics based on the requirements of the Conjoint Committee for the Recognition of Training in Gastrointestinal Endoscopy.

Trainees were dissatisfied with the theory module, with only one agreeing that the module was well organised. Despite this, there was support for recommending the training materials from the University of Hull to others. There was broad consensus that it would be preferable for future training programs to be offered by an Australian university. Some nurse endoscopists found it challenging to balance work and study commitments, with a large amount of study required out of hours.

The training program effectively integrated the different learning methodologies and provided a structured approach to assessment, mentorship and medical supervision. The program appears to be fit for purpose and with development and continued support, including removal of legislative and other barriers, appears to have the potential for national implementation. Evaluation of the training program identified opportunities to improve program content and structure, program delivery and program scalability. The level of clinical supervision required during the training period may lead to most training occurring in major teaching hospitals unless systems and support structures can be established at participating smaller hospitals. The cost of training is dependent on many factors, particularly the time it takes a nurse to reach proficiency and be deemed competent to practice independently. For an 18-month training period, the estimated net cost (after allowing for revenue raised from the procedures) is approximately \$90,000.

Impact

Over the 15-month period from January 2013 to March 2014, the nurse trainees performed 1,458 procedures on patients with intact colons, of which 1,034 (70.9%) were completed unassisted. During this time, two of the nurse trainees performed over 200 unassisted colonoscopies. All but one nurse reached the target of 30 successful unassisted snare polypectomies. All nurses exceeded the benchmark of 90% for caecal intubation rate. Average insertion time varied from 13.5 minutes to 20.5 minutes across sites; total time varied between 25.2 minutes and 44.0 minutes. The average time to complete the procedure reduced over time.

There was wide variation in how nurses spent their time other than performing procedures for the four sites that reported this data, with the main category being research-based activities.

Five patients re-presented to hospital within 96 hours but this result is considered unreliable due to issues with the reporting of this data item. There was only one readmission to hospital. Two adverse events were reported at one of the implementation sites.

The vast majority of patients responding to a survey reported excellent or very good experiences of care under the APEN model. In particular, the personal manner and technical skills of the nurse endoscopist trainees were very highly regarded. Although a large number of patients reported feeling mildly anxious during the procedure, experiences of pain, discomfort or severe anxiety were rare. Around nine out of ten patients were satisfied or very satisfied with the care they received and the time it took to be seen by the nurse endoscopist trainee, and seven out of ten rated their overall experience as very good. Seventeen patients (at two sites) refused to be scoped by a nurse endoscopist.

The nurse endoscopist trainees were ambivalent about the impact of their role. Half strongly agreed that the role had made their service more effective, but half were unsure. Similarly, only half agreed or strongly agreed that their role had improved the quality of care for patients. This data was collected some months prior to the nurses achieving competency. Five out of six believed that patients were comfortable being treated by nurse endoscopists.

Staff working with the nurse endoscopist trainees agreed that medical specialists were the best people to supervise and mentor the endoscopy nurses during and after their training, and said they were happy to be approached for advice regarding patient management. Nurses were generally supportive of the model but some doctors expressed serious concerns. The model was seen by a number of doctors as inefficient because of the length of time taken for training, the perceived slowness of the nurse endoscopists undertaking the procedures and the high level of medical supervision required. Senior doctors did not regard these procedures as purely technical in nature and felt that nurses lacked the necessary expertise due to their more limited knowledge base. There were concerns about patient selection: on one hand, respondents identified cases of inappropriate patients being placed on nurse endoscopy lists; on the other, they argued that reserving relatively simple cases for the nursing lists would reduce training opportunities for junior doctors. Staff at lead sites, where the models were developed and had been established for a longer period of time, were more positive about the model's contribution than those at implementation sites.

Conclusions

Full implementation was not achieved, with some trainees yet to complete the required number of procedures and be assessed as competent at the time of reporting. Therefore, the relative advantage (effectiveness and cost effectiveness) of the model could not be evaluated. Relative advantage can only be fully assessed when trainees are qualified and working at full capacity.

The APEN model can be varied to meet local circumstances but there are core elements which cannot be varied, particularly: the training requirements; need for medical mentoring and supervision; and dedicated resources for performing endoscopies.

The scope of practice within the APEN model was largely restricted to colonoscopies. Although the training requirements are considerable, once competency is achieved the 'model' is relatively straightforward. There is the potential to introduce greater complexity by expanding practice to include upper gastrointestinal procedures and utilise the nurses in a broader role e.g. in outpatient clinics. Wider implementation of the model would benefit from a 'help it happen' approach, with the 'help' coming in various forms: seed funding to support implementation, funding to support lead organisations in the provision of support and guidance to implementation sites, a nationally accredited course for nurse endoscopist training and changes to funding and legislation to support the APEN model.

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 (HWA) launched the Expanded Scopes of Practice (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.

The Advanced Practice in Endoscopy Nursing (APEN) sub-project commenced in 2012/13. Funds were provided to APEN project sites to introduce advanced endoscopy by nurses to support them to work to the top of their licence and extend their skills.

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 they were most likely to succeed. Five organisations received funding to implement the model. 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 endoscopy delivery*

Bowel cancer is a major public health problem in Australia, representing the second most common cause of cancer-related death (after lung cancer). Almost 4,000 Australians died from bowel cancer in Australia in 2010. Around 14,000 Australians were diagnosed with bowel cancer in 2009 and this is projected to rise to 20,000 in 2020. The National Bowel Cancer Screening Program (NBCSP) was introduced in 2006 to reduce the incidence, illness and mortality related to bowel cancer in Australia through screening to detect cancers and pre-cancerous lesions in their early stages, when treatment will be most successful (AIHW, 2013; AIHW, 2012).

The APEN sub-project responds to the national trend of increasing demand for endoscopy due to the implementation of the NBCSP. There is a resulting need to enhance the capacity and capability of the workforce to cope with this demand (The Cancer Council Australia and Australian Government Department of Health and Ageing 2006; Quality Working Group for the National Bowel Cancer Screening Program 2008). The sub-project aims to implement an innovative model of expanded scope of practice for nurse endoscopists. While there is not a mature model of advanced practice in nurse-delivered endoscopy developed within Australia, progress is occurring, hence the establishment of two lead sites.

1.3 *Objectives of the Advanced Practice in Endoscopy Nursing sub-project*

As reported in the Request for Proposals documentation, the objectives of the APEN sub-project were to:

- Identify an innovative model of extended scope of practice for nurse endoscopists that demonstrates improved productivity in terms of waiting times for an endoscopic procedure;
- Implement a new workforce role on a national basis with consideration of national training and scope of practice guidelines;
- Establish a national training program for nurse endoscopists;
- Facilitate the redesign of the workforce to match the changing needs and demands of the service and not the determination of professional boundaries;

- Develop toolkits and implementation guidelines including requirements to support national implementation.¹

1.4 Description of sites

A description of the five organisations HWA funded to implement the APEN initiative is provided in Table 1. The funding allocated by Health Workforce Australia is included in Appendix 1.

Table 1 Description of sites

Organisation	Brief description
APEN1	APEN1 (a lead and implementation site) is located in a fast growing and large outer suburban area. It is based within a busy metropolitan teaching hospital with over 360 beds and a well-established Endoscopy Unit with two endoscopy suites.
APEN2	APEN2 (a lead and implementation site) operates endoscopy units across two campuses. It is based within a large tertiary referral hospital with approximately 400 acute beds. The Surgery and Endoscopy Centre at APEN2 contains two endoscopy rooms and there are also two endoscopy rooms in the Surgery Centre at the adjacent hospital campus.
APEN3	APEN3 is a major tertiary referral hospital located in close proximity to a metropolitan CBD, with 688 beds. It has established gastroenterology and endoscopy services with two rooms used for endoscopic service within the day procedure unit.
APEN4	APEN4 provides a direct access endoscopy service from two facilities: APEN4 is based at a busy metropolitan teaching hospital and has approximately 360 beds but does not have a dedicated endoscopy unit with the two rooms used for endoscopy located within the same day surgical unit.
APEN5	APEN5 is a major teaching and research hospital with 640-beds and a new endoscopy suite with three functioning endoscopy rooms.

1.5 Structure of report

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

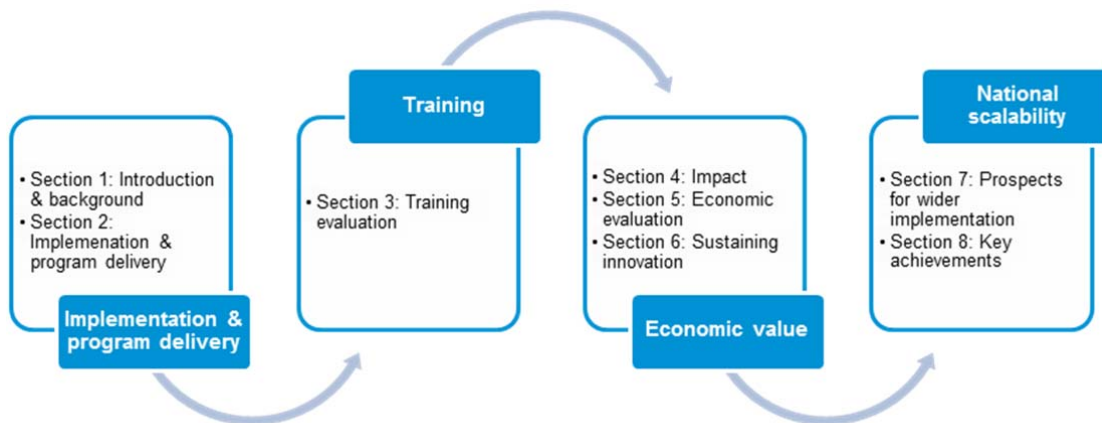


Figure 1 Report structure

A synthesis of the key findings and final results of the overall HWA-ESOP evaluation (including all 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.

¹ HWA Request for Proposals Extended Scope of Practice for Nurse Endoscopists (Lead Organisations) HWA-RFP/2011/011 and HWA Request for Proposals Extended Scope of Practice for Nurse Endoscopists (Implementation Sites) HWA-RFP/2011/012.

2 Implementation and program delivery

2.1 *Service delivery models and scopes of practice*

The APEN sub-project was undertaken in response to a national trend of increasing demand for endoscopy services, in part due to the implementation of the national bowel cancer-screening program. Traditionally medical officers have performed endoscopies. The APEN sub-project aimed to implement an innovative model of expanded scope of practice for nurse endoscopists. There are well-established models and training programs in the United Kingdom (Williams et al, 2009).

Five services were funded to implement APEN projects, with two services (APEN1 and APEN2) also serving as lead organisations. APEN2 supported three implementation sites in Victoria (APEN3, APEN4, APEN5). The APEN2 service operates endoscopy units at two locations.

Both lead sites had considerable experience with the nurse endoscopist role, with APEN1 recruiting one nurse who had previously worked in this role in the United Kingdom. APEN2 had recently trained a nurse endoscopist, and this staff member commenced his own endoscopy lists in late January 2013. APEN2 had also successfully implemented a similar advanced practice role – nurse cystoscopists. The role of the nurse endoscopist was new to all other implementation sites.

Each lead site implemented the same training pathway and developed a model of care suited to their organisational context. It was anticipated that at the completion of their training, nurse endoscopists would be competent to perform diagnostic colonoscopy (working towards proficiency) on patients that meet ASA I and ASA II criteria (American Society of Anaesthesiology Classification, I and II either mild or no disease), within a defined practice scope, in a delegated role. The focus during training was almost entirely on colonoscopies. Towards the end of the training period, one of the nurse endoscopists at APEN1 commenced supervised training of upper gastrointestinal endoscopy (completing four assisted gastroscopies), with the second endoscopist due to do likewise in the second half of 2014.

The two lead organisations had different views on the level of nursing practice required. APEN1 implemented a nurse practitioner model of care, with the broad scope of practice inherent in the nurse practitioner role. The nurse practitioner (candidates) worked collaboratively within the gastroenterology-endoscopy service in a fully integrated role, performing endoscopy and related health care functions within a broad scope of practice including: advanced patient assessment; interpretation of diagnostic interventions and pathology, differentiating diagnoses; establishing management plans, including selection and prescription of appropriate medication and direct referrals to other health care professionals.

APEN2 advocated an advanced practice nursing model and this was the model adopted by all the Victorian sites. Nurse endoscopist trainees undertook protocol-driven activities within a defined practice scope in a delegated role (i.e. under the direct supervision and delegated authority of a senior medical officer). The trainees participated in gastroenterology clinics, but even by project end there was still work to be done to clearly define the role of the trainees in the clinics. This role was necessarily limited because these nurses did not have the nurse practitioners' ability to prescribe or order pathology and could not practice autonomously.

2.2 *Requirements for nurse endoscopist trainees*

The lead sites collaborated to develop the position descriptions, selection criteria and key attributes of nurse endoscopists. APEN2 coordinated the recruitment process for all Victorian sites, employing a wide range of recruitment strategies. After two rounds of advertising, all nurse endoscopist positions in Victoria were filled and remunerated as clinical nurse consultants. In total, six nurse endoscopist trainees were recruited, one at each site except for

APEN1 which recruited two nurses, one already an endorsed nurse practitioner and the other a nurse practitioner (candidate). All those recruited had post-graduate qualifications (Table 2).

Selection criteria included a Bachelor of Nursing Science (or equivalent) with at least five years of experience post their graduate nurse year. This included a minimum of two years in endoscopy (ideally candidates had at least three years full time experience in the gastroenterology specialty with at least two of these in endoscopy). The desirable criteria included a post-graduate course in gastroenterology. The lead sites agreed to be flexible about this requirement to broaden the pool of applicants. If a candidate did not have this post-graduate qualification they could supplement their experience by completing a foundation module in gastroenterology (under-graduate level) prior to commencing the training pathway.

Table 2 APEN staff summary

Organisation	# of ESOP clinicians	Full-time equivalent positions	Years of experience	# trained overseas	# with post-graduate qualifications	# working in organisation prior to recruitment
APEN1	2	1.4	17 & 30	1	2	2
APEN2	1	0.8	30	0	1	0
APEN3	1	0.8	10	0	1	1
APEN4	1	0.8	19	0	1	1
APEN5	1	0.6	7	0	1	0
Total	6	4.4		1	6	4

During implementation, it was suggested that future applicants should be required to have endoscopy experience rather than only gastroenterology experience and that consideration may need to be given to ensuring that the next cohort of applicants have appropriate post-graduate qualifications. There is a need to balance this perspective with the risks of narrowing the potential pool of eligible applicants.

In addition to their clinical competencies, trainees required additional attributes. The lead sites believed that candidates needed particular qualities to manage the challenging conversations that may arise with their peers, have the confidence and ability to promote the role and the experience and knowledge to ensure the role is embedded in safe practice.

Highly experienced nurses were recruited at all sites, with one nurse having previous experience in a similar role in the United Kingdom. The decision to offer permanent appointments for all the Victorian positions supported sustainability of the role.

2.3 Role of the lead sites

The two lead sites performed quite different roles. One (APEN1) had no implementation sites to support, whereas the other (APEN2) had three implementation sites to support. Both lead sites were of course, implementing the initiative in their own organisations. APEN1 had a far greater role in the establishment and maintenance of the training program for nurse endoscopists. The four Victorian sites formed the Victorian Nurse Endoscopy Consortium.

The lack of clarity about the lead site role was an obstacle to establishing a consistent approach to the APEN sub-project. Descriptors should be developed for the role of lead and implementation sites, so that in the future lead sites have a checklist that identifies the features necessary in an implementation site for higher likelihood of success. In situations where there is more than one lead site there needs to be clarity and an agreed understanding about the respective roles, together with a mechanism for resolving any differing views.

The strength of the dual lead site approach was that it provided an opportunity for discussion and critical evaluation of the model of care and training pathway. The presence of lead sites streamlined the process of implementation, reduced duplication and provided an ongoing source of support and expertise for the implementation sites. The lead project teams supported each other through recruitment, training, equipment procurement and ethics application

processes and worked collaboratively to address professional and legislative barriers as they emerged, including the issues of credentialing and professional recognition of the ESOP role. Survey data demonstrates that the lead-implementation model appears to have added value to the sub-project. The highest need for support was in the initial phases of recruitment and project establishment and subsequently for training and competency assessment (either in the form of consultation or practical assistance).

Each lead site identified challenges caused by their having distinct roles, with one site responsible for developing the training program and the other responsible for communicating the program with the implementation sites. Difficulties caused by this arrangement led to a lack of understanding among trainees regarding their training requirements, so that they tended to under-estimate the workload, the level of education required to perform the role and the nuances of distance learning. Nonetheless, they felt that communication improved over time.

2.4 Set-up and establishment phase

The two lead organisations worked together to develop a training program designed to meet the needs of the trainees, but with elements applicable to medical staff training. APEN1 prepared a wide range of high-quality documentation about the training pathway, educational modules and related assessment methods. The training used a combination of methods, including self-directed learning packages, face-to-face instruction, skill development through simulation and medical supervision. The pressure to commence training prior to the end of December 2012 made it impossible to think through all aspects of the training prior to recruitment of the nurse endoscopists and commencement of the training program. The training program was common to both models of care (nurse practitioner, advanced practice), taking place from November 2012 to December 2013, and consisted of four modules:

- Module 1: Orientation to the workplace, which was the responsibility of each site.
- Module 2: A theoretical learning module in which trainees complete a self-directed learning package from the University of Hull, United Kingdom. Successful completion of the module resulted in a Graduate Certificate qualification from the University of Hull, which was seen as an important incentive for trainees and a way to enhance their career opportunities. The theoretical component commenced in late January 2013. The course included theoretical material for both upper and lower gastro-intestinal procedures, with the former being redundant given the sole focus on lower gastro-intestinal practice in the APEN sub-project.
- Module 3: A skills training program in which trainees undertook extensive supervised clinical practice that included formative and summative clinical assessments. The skills training was based on research conducted by an interdisciplinary group of scientists from the University of Queensland and the Queensland Health Clinical Skills Development Service. The first phase of face-to-face training occurred in Brisbane in December 2012 and was attended by five trainees (two from APEN1, three from the Victorian sites). The second three-day workshop 'Basic Skills in Colonoscopy' occurred in January 2013. Feedback from all sites indicates that the training was of a very high standard and was an ideal way for trainees to commence their training program.
- Module 4: Supervised clinical practice, in their place of work. Each site implemented a model of skills development and supervised clinical practice that aligned with the agreed training model, including the allocation of dedicated training lists, with local variations in how this was done (see Section 2.5). Supervision included formative and summative assessment using the Direct Observation of Procedural Skills (DOPS) assessment form.

APEN1 invested a significant level of resources in developing and coordinating the training program. The training program was structured so that the two main components (Module 2 and Module 3) were implemented concurrently over a 12-18 month period with the objective of graduate trainees being able to perform competent diagnostic colonoscopy within a defined practice scope. A schema of the training program (produced by APEN1) is provided in Figure 2 (taken from HWA, 2014a). An orientation workshop for nurse endoscopist trainers / medical leads was conducted in January 2013 at APEN1.

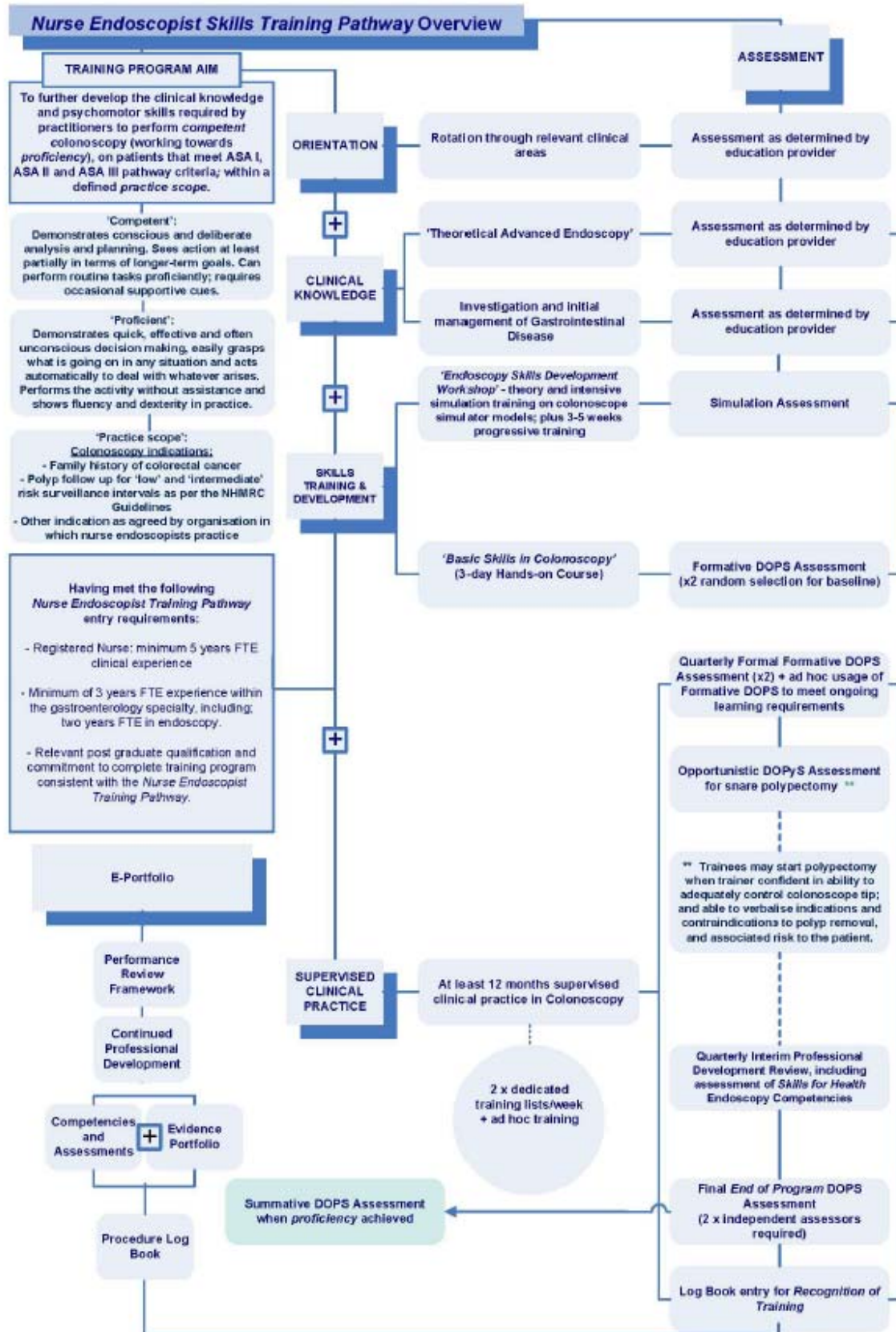


Figure 2 Overview of Nurse Endoscopist Training Pathway

At the commencement of the project, it was hoped that successful completion of the training program would lead to the trainee nurses being credentialed as nurse endoscopists by the Conjoint Committee for Recognition of Training in Gastrointestinal Endoscopy (CCRTGE). Although this did not eventuate, the training program was designed to ensure that trainees would meet all of the requirements of the CCRTGE, including the completion of 200 unassisted colonoscopies.

Victorian trainees accessed the tip control model once only due to the expense of having the equipment come to Victoria (deemed as \$3,000 rental plus payment of flights and accommodation from Brisbane on four occasions within the 12-month period). Consequently the Victorian trainees did not participate in the quarterly assessments of colonoscope tip control (for further details see Section 3).

Despite some concerns (e.g. the relevance of some of the training materials to the Australian clinical setting, delays waiting for feedback from the course coordinator in Hull), there was widespread agreement that using training materials from the University of Hull was a good approach. However, there was broad consensus that it would be preferable for future training programs to be offered by an Australian university.

Given the self-directed nature of the learning program, the amount of time spent on completing the program was very much dependent on individual trainees. Some Victorian trainees indicated that the volume of work for the theoretical component was greater than had been anticipated.

The logbook system available from the CCRTGE for medical trainees was not available for the nurse endoscopists. This necessitated the establishment of an iTeMS for Health log book system (e-portfolio) for each nurse endoscopist which captured the information required for certification of the training for each nurse endoscopist. Each supervising doctor was required to complete a 'Direct Observation of Procedural Skills', an assessment tool designed to evaluate the performance of a trainee undertaking a practical procedure, against a structured checklist. The trainees received immediate feedback to identify strengths and areas for development.

The development of the training framework and sourcing of the necessary educational resources and equipment was time consuming and a significant focus of the set-up phase, requiring the collaboration of many individuals and organisations. There were high costs in sourcing several resources and equipment e.g. training materials from the University of Hull.

2.5 Implementation of Expanded Scopes of Practice

All project teams produced a project plan which informed ongoing implementation. The decision-making structures set up by project teams within their organisations appeared to work well, with all sites progressing satisfactorily. All project teams, particularly those from lead sites, demonstrated a strong commitment and vision for the initiative. The best evidence of commitment was the quantum of 'in-kind' resources invested by every project team.

Project teams used existing clinical governance structures within their organisations to ensure safety and quality, with most projects also establishing working groups and a steering committee to oversee the project. Only one implementation site did not have a functioning steering committee. Each lead and implementation site established a project team, which worked most effectively when they established strong two-way communication with their executive sponsor. Both lead sites appointed full-time project managers and would not have been able to manage the project, (particularly the set-up phase), without this resource. Policies and documentation (particularly consent forms) require modification and approval by Directors of Medical Services or Health Information Services prior to project commencement.

At each site, implementation was consistent with the training program guidelines, with some variations in the number of patients allocated to each list, supervision arrangements and the protocol for allocating patients to the training lists:

- Most sites established two dedicated training lists per week for each trainee, with variations due to leave requirements and the availability of procedure rooms.
- The number of patients allocated to each training list varied between three and five.
- The supervision arrangements during the trainee lists were variable. For example, at one site, all trainee lists were supervised by the same clinical mentor. At another site, supervision was shared between two gastroenterologists and two colorectal surgeons. In both cases, the respective trainee indicated their satisfaction with these arrangements.
- Three of the five sites allocated patients to the training lists using essentially the same approach as allocating patients to a physician endoscopy list. The rationale for this approach was to expose trainees to a wide range of clinical presentations. One site (APEN1) excluded patients that had previously undergone partial colectomy surgery and patients referred through the NBCSP.
- One site developed trainee lists specifically to ensure a range of clinical presentations and included one weekly list supervised by the head of surgery. This site excluded private patients from the trainee's list.
- One site took a different approach by only allocating Category 3 patients to its training lists. The rationale for this approach was to use the training program to address very long Category 3 waiting lists by providing services to patients that would not otherwise receive services for at least two years.
- Most of the trainees spent some time (typically about five minutes) with each patient prior to the procedure, with some trainees also seeing patients following their procedure.

The logistics of ensuring medical staff availability for training activities was challenging, particularly over holiday periods (such as Christmas and New Year).

Several project teams significantly reduced their investment in project management during the implementation period. Those projects that sustained their commitment to project management coped far better with the demands of data collection, evaluation, business case development and final report preparation. When these resources were reduced, inevitably the nurse endoscopist or service manager was left to pick up the slack and try to fit project management tasks into an already full schedule. This created unnecessary stress and impacted on the ability for these projects to deliver outputs on time and to an acceptable standard.

All projects engaged key stakeholders from project commencement but it was challenging to maintain their involvement and have them advocate for project sustainability. Project teams who maintained their steering committees had an ongoing forum for presenting information about their project over time. Project teams most successful in working with key stakeholders had a strong medical champion who was prepared to actively lobby for ongoing funding.

Strategies for sustaining practice change included consistently communicating achievements to sustain interest in the initiative. Presenting early wins and communicating widely to many different organisational stakeholders helped silence critics and sway 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.

Several nurse endoscopists found it challenging to balance their work and study commitments, with a large amount of study required out of hours. Strategies to sustain ESOP personnel in their new role were critical. Significant investment in clinical supervision was required; whilst all sites had a primary coordinator of clinical training or medical mentor they all used multiple clinical supervisors. Sites with high engagement and involvement of the Nurse Unit Manager

Endoscopy and Director of Gastroenterology and / or Endoscopy benefited significantly from this input.

One of the risks to sustainability is the potential for individual practitioners working at geographically dispersed sites to feel isolated and lacking support. This was addressed by establishing a network of nurse endoscopists across the projects starting with an introductory day at APEN2 in late 2012. Having the trainees come together for study days proved beneficial in enabling the nurse endoscopists to build ties with others who shared and understood their challenges and experiences. The nurse endoscopists formed a strong 'informal' network and regularly shared information as a group.

2.5.1 Lessons learned

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

- Before implementation can commence, sufficient time and resources need to be devoted to project planning, engaging key stakeholders, developing systems and processes to support the work of the trainee (e.g. protocol for allocating patients to training lists), and establishing appropriate clinical governance arrangements. This is best done with dedicated project management resources and expertise.
- The training program is lengthy and requires management, in particular to ensure that the needs of the trainee(s), the needs of their medical supervisors and mentors; and the needs of the organisation are met. For example, there is a need to ensure that trainees perform sufficient procedures to obtain proficiency, while maintaining throughput. Throughput is least affected when the training lists are supernumerary or additional to existing endoscopy lists. Separate nurse endoscopist lists also ensure there is no impact upon registrar trainees achieving their advanced training in gastroenterology.

Although much can be learnt from experiences with the APEN 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 Barriers and enablers in relation to implementation

2.6.1 Communication and stakeholder engagement

All project teams identified the importance of a supportive chief executive officer and senior executive as a key success factor, particularly the message that such support conveyed to the wider workforce and professional groups about the level of interest in the nurse endoscopy role. One site experienced a lack of stakeholder engagement due to the resignation of key executive stakeholders. Important internal stakeholders included clinical and administration staff within endoscopy units, nursing leadership including directors of nursing and regional executive bodies; medical specialists and registrar trainees; and hospital management including the CEO and divisional director(s). On-site clinical champions assisted with managing the complex and influential stakeholders involved in endoscopy.

As training and implementation proceeded, all sites consistently reported a high level of acceptance from medical officers exposed to the project, although this mainly involved medical officers working within the endoscopy units. Some registrars expressed concerns that the introduction of nurse endoscopists could reduce their access to training opportunities. This was not considered to be a significant risk, but it did require ongoing communication with registrars. Only one instance was reported of an individual physician refusing to work with a trainee. More generally, there was antipathy towards the project from specialists who saw no value in training nurse endoscopists (this included anaesthetists, surgeons and gastroenterologists). There would have been greater concern if there had been any suggestion that a trained nurse endoscopist was intending to practice in a private capacity outside the public hospital system.

Physical proximity could facilitate engagement of internal stakeholders. For example, at the APEN3 the relocation of the endoscopy suite enabled the nurse endoscopist to be accommodated in an open-plan office with the registrar trainees, in the same building as the offices of the Endoscopy Department and the Endoscopy Suites, facilitating ongoing supervision and access to clinical supervisors when required. Co-location of the nurse endoscopists and registrar trainee at APEN1 also improved collaboration and shared understanding of the ESOP role.

External stakeholders included representatives from professional organisations, local universities, Medicare Locals, State Health Departments, medical experts and trainers, and web technology providers. The development of training resources facilitated engagement with universities, the Gastroenterological Society of Australia (GESA) and Gastroenterological Nurses College of Australia (GENCA). Project teams used meetings, workshops, conferences and technologies such as email and teleconferences to engage stakeholders. Workshop and steering committee meetings were considered by the project teams to be very valuable in setting the foundations for their project and establishing working relationships with all key partners. Consumer engagement was not a priority, with only one instance of consumer engagement noted by any of the projects (at APEN1 where they had a consumer representative on their project advisory group).

2.6.2 Resources

Implementation required significant organisational resources and financial investment, with sufficient time for extensive planning, consultation and recruitment of key personnel (project officer, medical lead, trainee endoscopist). Appropriate investment in project management resources during the set-up phase helped to facilitate project implementation. Both of the lead sites commented on the level of resources required for a lead site

Several sites identified resource constraints. For example, APEN3 needed an additional list to support the project as budget provision was only made for one trainee list per week. The Victorian Department of Health allocated additional funding to all Victorian project teams (approximately \$65,000 per implementation site), primarily to assist with project management and travel costs.

APEN1 was in the difficult position of having unfunded training lists. Queensland Health cut funding that had previously been provided for training lists at APEN1. One or two project teams did not have ready access to data and evaluation support staff and expressed concern about the additional administrative work generated by the project. Further details of the resource implications can be found in Section 5.

The most significant barrier relating to resources was the impact of the training requirements on usual throughput. Throughput was least affected when the nurse endoscopists training lists were supernumerary or additional to the existing endoscopy lists provided by the implementation site. Separate nurse endoscopist trainee lists also ensured there was no impact upon medical registrar trainees achieving their advanced training in gastroenterology requirements. One service (APEN4) advised that a medical specialist normally does 6-8 endoscopies during a session, which decreased to approximately four per session during the first year of training. One site (APEN3) tried to mitigate this impact by running one new list for the nurse endoscopist in addition to her providing support for one of the medical specialist's lists. At APEN5, the two existing endoscopy suites were operating at full capacity, with no time for training lists. Funding from HWA was used to outfit a third suite to overcome this problem. The nurse endoscopist at APEN4 worked across three campuses to ensure availability of training lists.

Other resource issues identified included delays to training sessions and assessments. This was mainly due to a lack of availability of medical personnel and anaesthetic staff to supervise the training sessions, limited access to simulation equipment and delays in the fit-out of an endoscopy suite in one facility.

2.6.3 Role clarification

Two quite different issues emerged in relation to role clarification. The first related to the patient's understanding that the nurse endoscopist was in a training role. There was concern that patients may refuse treatment if they were informed that the practitioner performing the procedure was in a training role. This required clear communication with patients that the nurse endoscopist was a qualified and experienced registered nurse with specific training in endoscopy. All project teams had to review their patient consent and information processes.

The second issue related to role confusion about the nurse endoscopy role at a broader level, an issue which took some time to work through. Sites agreed that all nurses would complete the same training pathway, with differences in role reflected in the development of local models of care designed to suit individual organisational needs. Some project teams felt that contract negotiations were prolonged with HWA because of confusion about intellectual property and other contractual obligations. These issues did not impact adversely upon the timeframes for project implementation and development of the training program.

2.6.4 Policy issues

The principal policy barriers that arose during implementation phase related to the development of the role, the workforce and funding implications of a nurse practitioner model and the need for a nationally agreed terminology in relation to advanced practice nursing roles. Lead sites agreed that there needs to be a nationally accredited course for nurse endoscopist training. Later on during implementation, the main policy barrier involved the uncertainty around the conjoint committee endorsement of the APEN nurses, when it became clear this would not occur the need emerged to develop an alternative certification process that would support national recognition of the training pathway.

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

The APEN sub-project developed an integrated training pathway for nurse endoscopist trainees which addressed the variations in the models of care implemented by the two lead sites. It was utilised effectively in all implementation sites with the six nurse endoscopist trainees forming the first student cohort. One lead site took major responsibility for the development of the training program and the other focused on supporting the delivery of the training program in the Victorian implementation sites.

The project aimed to expand the scope of practice of registered nurses in all project teams for Advanced Practice in Endoscopy Nursing, and was developed with consideration for national implementation. It has four components which are outlined in Figure 3. A more detailed graphic of the training pathway is included in Section 2. The program is entitled the Nurse Endoscopist Training Pathway (HWA, 2014a).



Figure 3 Components of the Nurse Endoscopist Training Pathway

The Nurse Endoscopist Training Pathway is a competency based program that aims to provide the clinical knowledge and psychomotor skills required by practitioners to perform colonoscopy procedures competently on patients that met ASA I and ASA II criteria. The overall structure of the program comprised three types of learning activity: clinical knowledge modules (three theory modules), skills training and development (workshop, e-learning, hand skills and assessment) and supervised clinical practice (dedicated training lists). Modules included weekly self-directed learning tasks, case studies and e-learning packages.

Program documentation outlines a clear training pathway with clearly articulated learning outcomes and specified competencies. Simulation is incorporated within the program to enhance skill development. Theoretical program components supporting clinical knowledge development were implemented using self-directed learning modules provided by the University of Hull, United Kingdom. Embedded concepts are integrated in a skills and training development program that provides trainees with extensive supervised clinical practice which includes formative and summative clinical assessments. The training program was structured so that these components were implemented concurrently over a 12 – 18 month period. The nurse endoscopist trainees have not been completely satisfied with the structure of the program and question the relevance of aspects of learning modules where content is incongruent with the Australian context.

The Graduate Certificate qualification from the University of Hull is awarded on successful completion of the training program. As a credentialed nurse endoscopist graduates are prepared to perform endoscopy independently within a defined scope of practice.

3.2 Experience of nurse endoscopist trainees

A survey was conducted to capture the nurse endoscopist trainees' overall impressions of the training program. Trainees were asked to rate a range of factors specifically in relation to the course component delivered by the University of Hull, United Kingdom. These factors were across four domains: program delivery, content, assessment and teaching staff. These results focus on Module 2: Clinical knowledge which was the formal theoretical study undertaken by the trainees to build on previously acquired gastroenterology knowledge.

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 100% response rate was achieved over all sites. All six trainees completed the survey.

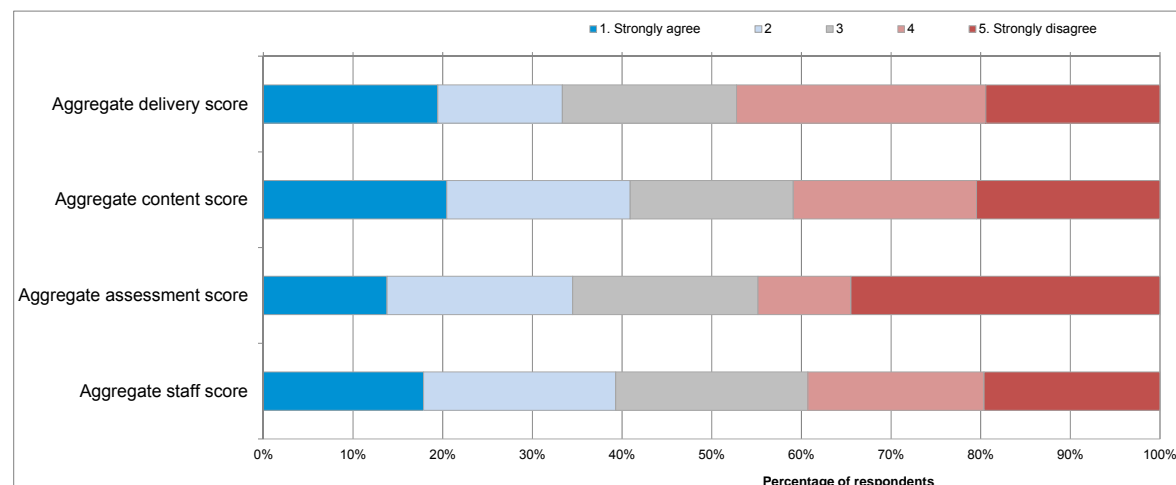


Figure 4 Aggregate domain scores (all APEN sites)

Figure 4 displays the total aggregate scores for the four domains. Results demonstrate a minimum of 40% agreement from respondents with each domain (indicated by a rating of 1 or 2). The descriptive statistics displayed relate to the theoretical module undertaken by all trainees.

A high degree of variability is observed in the data presented in Table 3. This is indicated by high standard deviations and maximum ranges for most items. This is partially due to one

respondent being an outlier (responding positively to each item), shifting the mean and substantially increasing the standard deviation. Despite these concerns item 29 generated the highest mean score: "I would recommend this training program to others."

Table 3 Descriptive statistics for APEN trainee survey (Module 2: Theoretical)

Item	Full sample		
	N	Mean (SD)	Range
1. The training program met my expectations	6	2.83 (1.47)	1-5
2. The training program was well organised	6	2.33 (1.51)	1-5
3. The objectives of the training program were clearly identified	6	2.67 (1.21)	1-4
4. Content was delivered in a logical manner	6	2.83 (1.47)	1-5
5. Training materials (work books, readings, handouts) were appropriate for my needs	4	2.50 (1.73)	1-5
6. There was an appropriate balance between theoretical and practical components	6	2.83 (1.60)	1-5
7. Content was pitched at a level appropriate to the expanded scope of practice role	6	3.00 (1.67)	1-5
8. Necessary equipment and resources were available to complete the training program	6	3.17 (1.47)	1-5
9. Techniques used to present material were appropriate for the training program	5	3.40 (1.34)	2-5
10. The training program provided for debriefing and / or clinical supervision	6	2.83 (1.47)	1-5
11. Learning through simulation assisted me to prepare for the expanded scope of practice role	5	3.40 (1.67)	1-5
12. Assessment tasks were relevant to the training program	6	3.17 (1.33)	1-5
13. The assessment requirements were clearly explained	6	2.33 (1.51)	1-4
14. The assessments were challenging and at an appropriate level	6	2.67 (1.63)	1-5
15. Assessment tasks were graded fairly	6	2.83 (1.47)	1-5
16. Assessment feedback was timely	5	2.40 (1.95)	1-5
17. I was provided with accurate, timely information about the training program	6	2.00 (1.55)	1-4
18. I was informed of any changes within the training program in a timely manner	6	2.00 (1.55)	1-4
19. Training program staff had good knowledge of the subject material	6	3.67 (1.03)	2-5
20. Training program staff facilitated independent practice and decision making with appropriate guidance	6	3.17 (1.47)	1-5
21. Training program staff helped trainees to develop professional confidence and competence	6	2.50 (1.52)	1-5
22. Training program staff provided supportive clinical supervision	6	2.50 (1.52)	1-5
23. Training program staff assisted trainees to relate theory and practice	6	2.83 (1.33)	1-5
24. Training program staff challenged trainees to think critically and problem solve	6	2.50 (1.38)	1-5
25. Training program staff encouraged trainees to ask questions and / or ask for assistance	6	3.00 (1.41)	1-5
26. Training program staff guided students to identify their own learning needs	6	2.83 (1.72)	1-5
27. Training program staff provided individual constructive feedback, identifying both strengths and weaknesses	6	2.00 (1.67)	1-5
28. Training program staff were accessible when assistance was required	6	2.67 (1.97)	1-5
29. I would recommend this training program to others	6	4.17 (0.98)	3-5

Qualitative analysis of additional comments on both Module 2 (Theoretical) and Module 3 (Skills and Training Development) of the training program provide greater insight into aspects of the course that were well received. In addition, interviews with the Nurse Endoscopist Trainees at the completion of the program provided an opportunity for more detailed feedback on the training. This information is summarised in Section 3.2.1 and Section 3.2.2.

3.2.1 Module 2 (Theory) – University of Hull

In their survey comments and again in interviews at the close of the program, each nurse endoscopist trainee identified aspects of the University of Hull course content / material that required improvement. Modules were not well organised and there was limited time to absorb content and put learning into practice. Issues with the course being run by an institution in another country were evident; as the nurse endoscopist role has been established for approximately 20 years in the United Kingdom, and the level of practice is significantly more advanced. Some felt that this disparity in experience made it difficult to participate in group

discussions and created a feeling of intimidation. On the other hand, others felt this was a positive, for instance:

“... very experienced [clinicians] had been practising for many years with a wealth of knowledge to share... These nurses gave an insight into where the role could develop for Australian nurse endoscopists.” (Nurse Endoscopist Trainee)

Students felt that course work was intense and time consuming, with each module requiring significant hours of study per week. The University of Hull website / e-portal network was difficult to navigate. The study load (which was in addition to clinical hours) was seen as more time consuming than an Australian Graduate Certificate, and potentially more than a Masters equivalent. Some trainees reported that the workload gave rise to a very stressful year, and drastically reduced or eliminated any time for independent study. It was also identified that ‘weekly tasks’ were demanding, and not reflected in overall module marks. The diminishing quality and value of course materials were questioned by trainees as the course progressed. A large proportion of the course work was seen as not relevant to the project or nurse endoscopist trainee position in Australia, particularly the course work focused on upper gastrointestinal endoscopy. This was because gastroscopies are not part of the current scope of practice of the role in Australia.

Trainees described communication as poor, with lecturers either not responding to questions or not responding in a timely manner. Lengthy delays in feedback and distribution of results were also reported. The following quote demonstrates the prevalent views of trainees:

“Feedback from the lecturers at [University of] Hull was disappointing, there was minimal to no constructive feedback, time delays in returning emails and also the long delay in returning our results ... it was approximately two months after our final submission that we received results. For our last component of study, they have not communicated a due date.” (Nurse Endoscopist Trainee)

Several nurse endoscopist trainees found it challenging to maintain their work hours and study load with a large amount of study required out of hours. Strategies to sustain ESOP personnel in their new role were identified as critical.

3.2.2 Module 3 (Skills and Training Development) – APEN1

Training consisted of two workshops the ‘Endoscopy Skills Development Workshop’ that combined theory and intensive simulation training on colonoscope simulator models plus three to five weeks progressive training. The ‘Basic Skills I Colonoscopy’ workshop was a three-day ‘hands-on’ course. These workshops occurred in December 2012 and January 2013.

Trainees reported that these workshops were highly relevant with the theoretical and practical component pitched at the right level. The simulation and hands-on clinical workshop was very positive and assisted in learning how to perform colonoscopies and trainees benefited from access to tip control and insertion models. The application of information technology supported learning, particularly by enabling trainees to observe others’ completing procedures. Orientation to the log book record for DOPS assessment was reported to be very helpful.

One trainee suggested extending the training program over two years as progress was affected when the supervisor or trainee took annual leave. One trainee stated that the interstate travel required to attend the training was challenging and significantly increased project costs (i.e. travel and accommodation). They felt this was particularly pertinent as four trainees were based in Victoria whereas only two trainees were Queensland-based.

3.3 Training timeline and time to completion of requirements

The program entry and enrolment pre-requisites included a Bachelor of Nursing Science (or equivalent) with at least five years postgraduate clinical experience, including a minimum of two years in endoscopy. It was desirable that candidates had three years full time experience in the gastroenterology specialty with two of these in endoscopy. Additional desirable criteria included a post-graduate course in gastroenterology and a range of attributes, including the confidence needed to manage the challenging situations encountered in a new role.

Entry criteria appear adequate for a postgraduate certificate level speciality program. Recognition of Prior Learning (RPL) was awarded to two trainees; however details regarding the criteria and assessment processes for this are unclear.

The training program commenced with orientation to the nurse endoscopist trainees' own institutions. This was followed by a face-to-face 'Endoscopy Skills Development Workshop' in December 2012. The 'Basic Skills in Colonoscopy' three day hands-on course occurred in late January 2013. For the next 12 months the nurse endoscopist trainees completed their 'Supervised Clinical Practice'. During this period most trainees were able to complete one to two dedicated training lists per week.

Additional training support was provided through access to simulation equipment and two study days were held in May and September 2013. These study days focused on managing conflict and the professional expectations of the role, history taking and presentation skills as well as context about radiological investigations. It was anticipated that the training pathway would be completed by the time the project concluded in March 2014.

Table 4 Nurse endoscopist trainee cohort – training enrolment and completions

Implementation Site	Training commences	Enrolments	Trainee completion- summative assessment	Funded FTE positions
APEN1	December 2012	2	1	1.4
APEN2	January 2013	1	0	0.8
APEN3	December 2012	1	0	0.8
APEN4	December 2012	1	0	0.8
APEN5	December 2012	1	1	0.6
Total		6	2	4.4

Table 4 includes information on training commencement dates and the number of trainees who completed their summative DOPS assessment and were deemed to be proficient and capable of independent practice. At the time of this report one nurse endoscopist trainee was scheduled to complete all training requirements by June 2014 and the remaining three were anticipated to be practising independently by August / September 2014.

3.4 Scope, content and relevance

The training program is outlined in Section 2.4 of this report. Additional information is included in an earlier progress report produced by the national evaluation team (Thompson et al., 2013).

As an integrated member of the gastroenterology service, it is anticipated that nurse endoscopists would work collaboratively with medical colleagues to provide: advanced patient assessment; interpretation of diagnostic interventions and pathology, differentiating diagnoses; establishing management plans, including selection and prescription of appropriate medication and direct referrals to other health care professionals.

While there were limitations with the University of Hull component, there was widespread agreement by implementation sites that given the lack of an Australian training program, this provided the best training option at the time. APEN project staff and trainees have indicated a

preference for future training programs to be offered by an Australian university. There is a need for further consultation with professional bodies to facilitate national recognition of the program. This will require an agreed scope of practice, national standards and competencies, credentialing and re-credentialing process. Legislative barriers that preclude the extension of the role and impact on legal jurisdictions of education providers across states and territories pose implicit barriers to implementation of the program nationally and have the potential to impact sustainability.

If an international education provider continues to be used then differences in endoscopy practice should be reflected in course materials with references to equipment and procedures relevant and appropriate for Australia. The program level is commensurate with the Australian Qualifications Framework level 9. Implementation sites identified leadership as an area of program content that should be introduced to enhance the skills of the nurse endoscopist.

3.5 Staff qualifications

In conjunction with clinical experts at implementation sites who provide local training, supervision and assessment, this program was offered by the University of Hull, United Kingdom. Staff experience and qualifications were commensurate with higher education at this level.

The personnel delivering the December and January training workshops arranged by a lead site; were reported to be a very professional and well-organised team; the clinical supervision was perceived to be of a very high standard and staff made students feel valued and appreciated.

3.6 Facilities and resources

The training program used a variety of teaching and learning resources including face-to-face skills training and supervised practice and flexible / distance theoretical subjects. Video conferencing with a live video link was used in colonoscopy workshops and complemented simulation and clinical practice including direct supervised patient contact.

A range of high-quality materials were made available to facilitate learning with trainees having access to models and clinical training equipment. The development of the training framework and sourcing of the necessary educational resources and equipment to support this program has required significant set-up costs. Trainees and medical assessors from Victoria had to travel to Brisbane to access equipment and complete course requirements. While lead sites are commended on the collaborative approach adopted to ensure that the necessary resources were available, nurse endoscopist trainees found arranging release from work at the same time as their clinical supervisor was problematic.

3.7 Teaching and learning environment

Trainees reported a poor rapport between students and the University of Hull training program staff, inadequate communication and feedback were problematic. The difference in time zones complicated communication in real time. When working with the United Kingdom students in online discussions this necessitated either early morning or evening discussions to be scheduled outside normal 'business hours'. This was difficult if the trainee had a morning list or had other family commitments in the evening.

The University was also slow to establish e-Bridge access (the University of Hull supported web-based learning environment) and provide information regarding content for the clinical practice module. The absence of a contract for provision of education with the University of Hull may have some bearing on the education service provided. Lead sites extended ongoing support to implementation sites and facilitated a supportive teaching and learning environment

through working with the University of Hull to address concerns and standardise aspects of program implementation.

There were effective supervised clinical practice arrangements with trainees consistently allocated one to two dedicated training lists per week. The number of patients allocated to each training list and protocol for patient selection varied across sites. Project teams reported variations in approaches to supervision of clinical practice. For example, at one site, all trainee lists were supervised by one clinical mentor. At another site, the supervision was shared between two gastroenterologists and two colorectal surgeons. While both models provide support, consideration should be given to the impact of having multiple mentors on assessment expectations and outcomes. The availability of mentors has a significant impact on the ability of sites to implement and sustain the training model.

The lead site based in Victoria conducted observation visits with each implementation site in the state. These visits identified any training issues and reinforced the expected training outcomes. Clinical supervisors were expected to complete a 'train the trainer' course in colonoscopy instruction, to support consistency in training methods across sites. Work release issues prevented some trainers from attendance. A training program is essential for clinical supervisors to ensure a standardised approach with consistent role expectations and training.

Stakeholders reported that casual and part-time staff did not have a good understanding of the nurse endoscopist role and how these nurses fit into the team. Attitudes of medical staff to nurse endoscopist trainees have been varied with some unsupportive of the role. This situation has improved over the course of program implementation. Initiatives to educate staff across the health service about the nurse endoscopist role may assist in improving acceptance of the role.

The nurse endoscopist trainees formed a support network. This was facilitated by commencing the program with an introductory day. They reported that study days were beneficial in enabling the trainees to network and build ties with others who shared and understood their challenges and experiences. There may be difficulties in supporting individual practitioners working at geographically dispersed sites and strategies to mitigate this risk, should be considered if national adoption of the program were considered.

3.8 Assessment methods

The training program had a clearly articulated assessment schedule with documented competency requirements. Competency was assessed at a number of critical points in the program and supporting data was managed through the iTeMS for Health Professional Management System. The 'Nurse Endoscopist Training Pathway' produced as part of the ESOP initiative outlines the assessment requirements in detail (refer to Figure 2 in Section 2.4 and HWA, 2014a).

In addition to competency assessments, e-portfolios and log books were used to record achievement. Trainees used their e-Portfolio to reflect their learning, knowledge and practical experience and expertise surrounding the competencies and core skills relevant to their role. Examples of items included were their DOPS forms, procedure logbook, certified workshops or employer led training, e-learning, reflective accounts and witness statements etc. A further issue requiring consideration relates to the selection of patients for the trainee's summative DOPS assessment that occurs at the end of the training program. The patient selection criteria and processes for this assessment should be standardised. The DOPS form includes a rating of 'case difficulty' that is completed by the trainer.

The volume of work from the University of Hull was far greater than had been anticipated. One trainee indicated that between 15 and 20 hours per week was required to complete her study commitments including having to complete a 3,000-word essay on a weekly basis. Coupled with practical requirements, observations and competency assessment, this aspect of the program was very demanding. Limited feedback on written assessment tasks resulted in trainee

dissatisfaction. The assessment load for the training program should be reviewed and formally evaluated.

All Victorian implementation sites had concerns about completing quarterly tip control assessments. The training program required each APEN trainee to complete progressive quarterly assessments of colonoscope tip control and insertion competence. The simulation equipment to complete this assessment was in Queensland. Victorian trainees completed one assessment only. Project teams felt the cost of supporting trainees to complete this assessment on a quarterly basis was unsustainable by clinical providers. Several clinicians considered the assessment to be more a measure of time rather than technique and questioned its validity. Questions were raised about whether this assessment was necessary and should be excluded from the assessment schedule.

While the program provides an overarching training pathway, individual organisations determined and approved the nurse endoscopist trainee's scope of practice in accordance with the industrial classification and clinical focus of the role. These variations would be managed by an agreed scope of practice detailing role expectations and capability. Two independent assessors were involved in the 'end of program' assessment. This demonstrated that quality practices including assessment moderation were incorporated as part of the program administration. This moderation process should be extended to all modules of the program particularly the theoretical training modules.

Further development is needed of criteria and processes surrounding the award of recognition of prior learning (RPL). On successful completion of the program the Graduate Certificate is awarded by the University of Hull. RPL opportunities for graduates of the program wishing to enrol in Masters degrees or a Nurse Practitioner program should also be explored.

3.9 Modifications to the training program

The skills training component of the program was based on recent research conducted by an interdisciplinary group of scientists from the University of Queensland and the Queensland Health Clinical Skills Development Service.

Mucosal inspection and specific polyp detection skills assessments were unavailable and removed from the assessment schedule. Two study days were implemented to support the nurse endoscopist trainees with some of the change management issues they confronted and to provide further opportunities for the trainees to meet face-to-face.

3.10 Training program sustainability

Issues identified from the training evaluation that may impact both negatively and positively on sustainability of the training program include the:

- high costs associated with training and acquiring equipment
- funding climate and cuts to health budgets, may limit nurse endoscopy trainees' access to dedicated training lists in order to practise their skills, and reduce the possibility of gaining a permanent appointment at the end of the project. It may also impact on health service ability to provide additional clinical staff to support trainee / trainer ratios and associated consumables/ training costs
- continued funding to establish and maintain nurse endoscopy training programs and services within a hospital setting is critical for the success of this project
- commitment by organisations to formalise the role of nurse endoscopists and operationalise the role by establishing lists for nurse endoscopists once qualified
- differences in training requirements and model of care. The APEN1 lead site supports a nurse practitioner model for nurse endoscopy, whereas the Victorian sites have pursued an advanced practice nurse model of care. Project participants have expressed concern that

this inconsistency across sites and states may affect stakeholder trust in the model, especially among medical practitioners, and this may have negative impacts on sustainability

- exploration of part-time study options may positively facilitate program accessibility and promote completion
- perceived opposition from medical endoscopists may influence acceptability of the role
- there are barriers to the extension of the role including issues of national recognition and impact on legal jurisdictions of education providers across states and territories, which need to be addressed if the models are to be more widely implemented and sustained
- availability of a national education provider may enhance sustainability
- national recognition and professional issues including credentialing and re credentialing processes may influence sustainability.

3.11 Training program capacity and impact

The majority of nurse endoscopist trainees from this initiative are not yet practising independently. There is no empirical evidence that evaluates the impact of the role. It is however expected that with continued implementation nurse endoscopist programs will provide recognisable outcomes that parallel those of the medical workforce in this area.

The ESOP-APEN initiative enables implementation sites to expand endoscopy services. By being responsive to health service needs, the nurse endoscopist role has the capacity to make a significant contribution to decreasing wait time for assessment and diagnostic procedures, and positively influence productivity and cost effectiveness.

Data generated from patient surveys confirmed that patients found the model of care acceptable. Managerial and nursing personnel were highly supportive of the role. Qualitative data confirmed that in the Victorian implementation sites there was limited support for the nurse practitioner model amongst a significant proportion of medical practitioners.

3.12 Budget and expenditure

APEN1 Hospital had invested considerable energy in investigating nurse endoscopy training options prior to their receipt of HWA funds. The cost of developing the training pathway was largely met from HWA funds.

All funds allocated for training were expended. Further information on the estimated costs of training is included in Section 5.

3.13 Summary and conclusions

This initiative has provided a learning and career pathway for nurse endoscopy trainees and addresses the increased need for colonoscopy in the community. The training pathway has been well constructed and successfully implemented across all implementation sites. It provides a consistent and coordinated approach facilitating education of nurse endoscopists. The training program effectively integrates mixed learning methodologies, a structured approach to assessment, mentorship and medical supervision. The training program appears to be fit for purpose and with development and continued support, including removal of legislative and other barriers, appears to have the potential for national implementation.

The strengths of the program include the:

- investment of resources in development and coordination of the training program
- articulation of a well-structured, competency based learning pathway
- provision of a structured and standardised approach for education and assessment

- utilisation of mixed learning methodologies including simulation
- incorporation of the principles of adult learning and teaching
- provision of local supportive teaching and learning environments
- integration of medical mentoring and supervision and supported workplace learning and assessment
- utilisation of performance measures that address procedural competence and quality indicators
- successful delivery of the training program across five implementation sites
- award of a formal qualification at the Graduate Certificate level.

Areas for development were identified from the training evaluation and these are summarised in Table 5.

Table 5 Opportunities for training program development

Training component	Opportunities for improvement
Program content and structure	<p>Address theoretical and practice differences between the United Kingdom and Australia in theoretical modules</p> <p>Include content that reflects the unique demographics of Australian populations (e.g. indigenous content and culturally safe practice)</p>
Program delivery	<p>Establish agreements/contracts for clinical supervision all implementation sites</p> <p>Establish assessment criteria and robust processes for recognition of prior learning</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 ensure consistent assessment criteria across different assessors</p> <p>Evaluate trainee assessment load and requirements</p> <p>Explore options for an Australian tertiary qualification</p> <p>Clarify post training endorsement processes including credentialing and re-credentialing process</p>
Program scalability	<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>Support an Australian program delivered by an Australian educational provider</p> <p>Work with appropriate professional bodies to establish a national record of completions</p> <p>Support project sites with no prior experience of implementing a new model of care through project management resources and 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 nurse endoscopist trainees both within and outside the APEN 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 APEN model are then presented and 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 trainee nurse endoscopists themselves, other endoscopy 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 health services and hospitals and the prospects for wider implementation).

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 nurse endoscopist trainees

Over the 15 month period from 1 January 2013 – 3 March 2014 the six nurse trainees performed a combined 1,458 procedures on patients with intact colons. Of these 1,458 procedures, 1,034 (70.9%) were completed unassisted.

Patient characteristics

The nurse endoscopist trainees overall treated similar numbers of males and females (Table 6), however at APEN1 the percentage of male patients was much higher than the other sites (59% compared to 49% overall). Patients aged 36-75 accounted for four out of every five patients across the sites (Table 6, Figure 5). APEN3 had the largest proportion of patients in the oldest age category, 76 years and older, which accounted for 16% of their patients, compared to only 7% of patients in this age group at APEN2.

Table 6 Age and sex distribution of patients treated by nurse endoscopist trainees

Site	Gender Distribution (%)		Age distribution (%)						
	Female	Male	18-25	26-35	36-45	46-55	56-65	66-75	76+
APEN1	41	59	2	4	10	23	30	21	9
APEN2	53	47	2	5	14	25	32	16	7
APEN3	47	53	2	8	11	19	23	20	16
APEN4	55	45	2	7	17	20	27	20	8
APEN5	56	44	3	11	12	20	26	18	11
Total	51	49	2	7	13	21	27	19	10

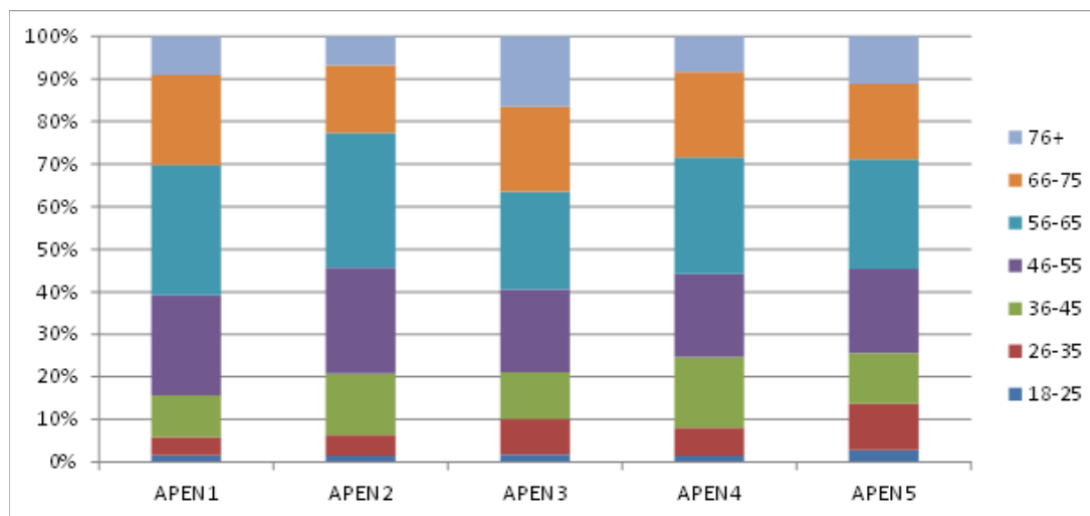


Figure 5 Age distribution of patients treated by nurse endoscopists by site

For 99% of patients sedation was carried out by an anaesthetist. Across sites 95% of patients had an intact colon (no previous colonic resection), which varied between 92% at APEN2 up to 98% at APEN5.

4.3 Impact on consumers

The evaluation framework included two KPIs relating to consumer impacts. High levels of consumer satisfaction and experiences with nurse endoscopy services (KPI 1.4) 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 to be scoped by the nurse endoscopist (KPI 1.5) was obtained from administrative data sets.

4.3.1 Patient survey

Consumer impacts were assessed using a patient survey tool based on a validated questionnaire used in research with endoscopy patients (Johanson et al., 2009). All sites used the same 15-item tool, with no modifications. It measured patients' experiences of care (five items), levels of anxiety and pain/discomfort (two items), satisfaction with time to be seen and care by the nurse endoscopist (two items) and overall satisfaction with the experience (one item). The remaining questions collected basic demographic data. At most sites, patients were given a printed copy of the questionnaire and asked to return it by mail or to place it into a sealed box in the recovery area. Surveys took place in late 2013 and early 2014.

One hundred surveys were returned with signed consent forms. Most were from patients; only one carer returned a survey and two declined to answer the question. The average age was

56.3 years (SD 12.8 years) and 52% of respondents were female. Three out of five respondents had had a previous endoscopy.

Half the respondents were treated at lead sites. APEN1 had 31 respondents; the remainder received the APEN2 lead site's model of care at the following sites: APEN5 (24), APEN2 (19), APEN3 (17) and APEN4 (9).

Figure 6 shows responses to each of the first five items on the survey (n ranged from 96 to 99). Overall, patients reported very positive experiences of care. They were particularly impressed by the personal manner (courtesy, respect, sensitivity and friendliness) of the nurse endoscopists; 75% of patients gave this aspect of their experience a rating of excellent and a further 21% rated it as very good. The technical skills of the nurse endoscopists, and the explanations and information provided before and after the procedure, were also highly rated. More than 60% of respondents said these aspects of care were excellent and around a quarter said they were very good. Eight patients felt the nurse endoscopists' knowledge of their problem and medical history was only fair or poor, suggesting this is an area for future improvement.

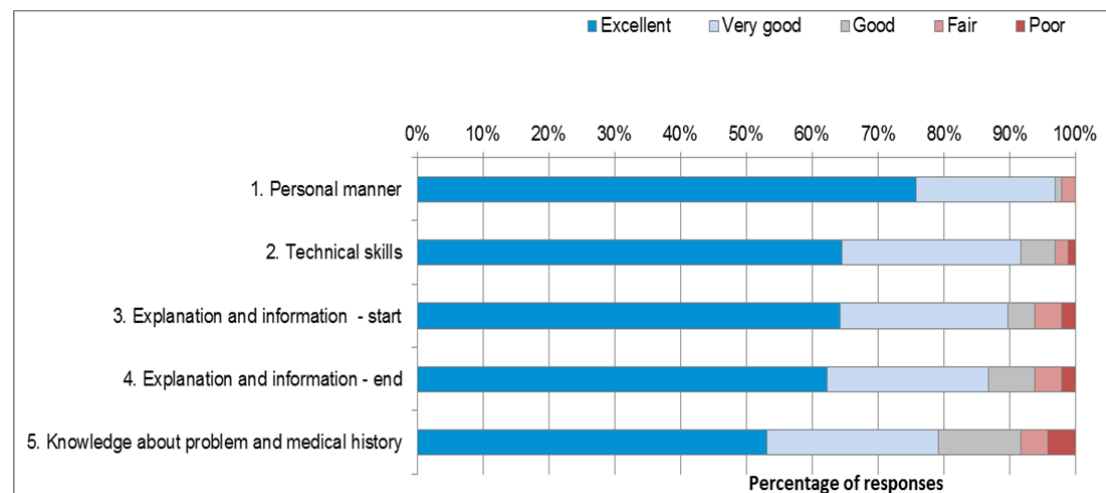


Figure 6 Responses to HWA-APEN patient survey, items 1-5

More than half the patients (55%) reported some level of anxiety during the procedure. For most people, this was mild (33%) or moderate (15%) but some reported that their anxiety was severe (3%) or very severe (4%). In contrast, the vast majority (81%) of patients did not experience any pain or discomfort during the procedure. Among those who did report pain, most said this was mild (12%) or moderate (5%). One patient reported severe pain, and another reported very severe pain. Female patients reported higher levels of anxiety and pain on average than males.

High levels of satisfaction were reported. Of the 99 patients who answered the satisfaction questions, 73% were very satisfied and a further 17% were satisfied with the care they received from the nurse endoscopist. Only one patient was highly dissatisfied. Similarly, 69% were very satisfied and 20% were satisfied with the time it took to be seen by the nurse endoscopist, and only 2% were dissatisfied or highly dissatisfied. Across all sites, 50% of patients rated their overall satisfaction with care as 10/10 and a further 21% gave it a rating of 9/10. There were two patients who were highly dissatisfied with their experiences overall, rating these as 0/10, and six others who expressed relatively low levels of satisfaction (scores of 5/10 or 6/10).

In addition to the patient survey, APEN5 conducted telephone interviews with patients during the early part of the project as a quality assurance and risk management exercise. The same tool, 'Patient experience survey', was used for the telephone interviews and later for the survey. Between January and May 2013, patients who had had a colonoscopy performed by the nurse endoscopy trainee (approximately 150 people) were contacted by the project officer and invited

to take part in an interview. The first 40 people who consented to take part were interviewed. Findings from the telephone interviews were very similar to those from the later survey. The overwhelming majority (95%) reported that the personal manner of the nurse endoscopy trainee was very good or excellent. Eight in ten were highly satisfied with their overall experience (8, 9 or 10 out of 10). Eighty percent reported no pain or discomfort, and 70% reported no anxiety during the procedure.

On average, patients treated under the APEN1 model reported more positive experiences in relation to the explanations given by the nurse endoscopists following the procedure, and the nurse endoscopists' knowledge of their problem and medical history. They were also more satisfied than patients treated under the APEN2 model with the time to be seen, the care they received and their endoscopy experience overall. Comparisons by site revealed considerable variation in patient experience and satisfaction scores among the implementation sites. Mean ranks showed that the APEN5 and APEN4 sites had, on average, lower scores than the other sites for the nurse endoscopists' personal manner, technical skills and knowledge of the patients' problems and medical histories. Patients at APEN4 also reported lower satisfaction with the time to be seen by the nurse endoscopists. This finding suggests that the higher ratings for the APEN1 model can be partly explained by variations among sites within the APEN2 model.

To identify the key factors that most strongly predicted overall satisfaction with the endoscopy experience, variables were entered into a multiple regression analysis. Satisfaction with the time to see the nurse endoscopist and with the care received (items 8 and 9) were entered in the first step, followed by the 5 experience items, anxiety and pain ratings in the second step. The final equation explained 76% of the variance in overall satisfaction, F change = 7.56 ($df = 7, 83$), $p < .001$. The single strongest predictor of overall satisfaction was satisfaction with care by the nurse endoscopist ($\beta = .45$, $p < .001$), followed by (low levels of) pain and discomfort (item 7, $\beta = -.23$, $p < .001$) and receiving adequate explanation and information following the procedure (item 4, $\beta = .32$, $p < .05$). Satisfaction with the time to be seen by the nurse endoscopist did not predict overall satisfaction when other factors were controlled ($\beta = -.02$, $p = .788$).

In conclusion, the vast majority of respondents to the patient survey reported excellent or very good experiences of care under the APEN model. In particular, the personal manner and technical skills of the nurse endoscopists were very highly regarded by patients. Although a large number of patients reported feeling mildly anxious during the procedure, experiences of pain, discomfort or severe anxiety were rare. Around nine out of ten patients were satisfied or very satisfied with the care they received and the time it took to be seen by the nurse endoscopist, and seven out of ten rated their overall experience as very good (9/10 or 10/10). Satisfaction with the overall experience was predicted by satisfaction with the care received from the nurse endoscopist, low levels of pain and discomfort, and being given sufficient information and explanation following the procedure.

4.3.2 Patient refusals

Another indicator of acceptability to consumers is the number of patients who refused to be scoped by nurse endoscopist trainees. This data item was requested in the APEN data specification and information was also obtained from sites' final reports. Results are reported below.

KPI 1.5 Number of patients who refuse to be scoped by the nurse endoscopist

There were 17 refusals across the APEN2 sites (p. 226 APEN2 final report) over 18 months. These were noted to be in the majority from members of staff. No refusals were reported at APEN1.

Table 7 Refusal rates – by site

Site	Number of refusals	Number of attempted scopes	Refusal rate %
APEN1	0	400	0.00
APEN2	5	278	1.80
APEN3	0	337	0.00
APEN4	0	258	0.00
APEN5	12	265	4.53
Total	17	1,538	0.01

a. No data on refusals were provided for this site, figure sourced from final report to HWA.

4.4 Impact on providers

Three KPIs in the Evaluation Framework addressed the impact on providers. The turnover rate for nurse endoscopists (KPI 1.2) was used as an indicator, along with a survey and interviews that explored their experiences and satisfaction with the role in greater depth. Attitudes of other stakeholders, particularly staff working alongside the nurse endoscopists, were measured using a staff survey tool developed by the national evaluation team (KPI 1.6). In addition, semi-structured interviews were conducted in the later stages of the program to assess perceptions of the impacts of the nurse endoscopist role on key stakeholders including medical specialists, junior doctors, nurses assisting with endoscopy, and managers (KPI 1.6, 1.7).

4.4.1 Turnover and retention of nurse endoscopists

In their responses to the ESOP personnel survey (ET10), four of the six nurse endoscopist trainees indicated that they were planning to stay on in the role for the foreseeable future. The other two were unsure about their career plans. Apart from one trainee who resigned soon after they were appointed and was quickly replaced, there was no turnover during the course of the program. Further information on this indicator is provided in Section 4.5.

4.4.2 Nurse endoscopists' 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 role satisfaction and sustainability are included in Section 6.

The same survey tool was used by all personnel across the four HWA-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 8.

Table 8 Descriptive statistics for ESOP personnel survey

Item	Full sample		
	N	Mean (SD)	Range
1. Staff have a good understanding of my new role & functions	6	3.83 (1.17)	2-5
2. Other key stakeholders have a good understanding of my new role & functions	6	3.83 (0.75)	3-5
3. My professional skills & expertise are acknowledged by other staff	6	4.00 (0.89)	3-5
4. Staff have a good understanding of how my skills & expertise differ from other nurses	6	3.83 (0.98)	3-5
5. Staff have a good understanding of the educational preparation required	6	2.83 (1.33)	1-4
6. Staff acknowledge that I have the skills & knowledge to provide appropriate care	6	4.17 (0.75)	3-5
7. Staff acknowledge that I have the skills & knowledge to provide education & information	6	4.33 (0.82)	3-5
8. I feel confident that I have the skills & knowledge to provide appropriate care	6	4.33 (0.82)	3-5

Item	Full sample		
	N	Mean (SD)	Range
9. I feel confident that I have the skills & knowledge to provide education & information	6	4.33 (0.82)	3-5
10. Changes to practices, protocols & policies helped me implement my expanded role	6	3.67 (1.03)	3-5
11. Changes to attitudes & beliefs in my work place helped me implement my expanded role	6	3.50 (1.38)	2-5
12. I feel confident dealing with patients in my expanded role	6	4.50 (0.84)	3-5
13. Patients are comfortable that I have the skills & expertise to provide appropriate care	6	4.33 (0.82)	3-5
14. My expanded role makes the service where I work more effective	6	4.00 (1.10)	3-5
15. My expanded role improves access to endoscopy	6	3.83 (1.33)	2-5
16. My expanded role improves quality of care for specific patient groups	6	3.83 (0.98)	3-5
17. I am comfortable approaching other staff for advice regarding patient management	6	4.67 (0.52)	4-5
18. Appropriate personnel are available to supervise / mentor me whenever needed	6	4.17 (0.98)	3-5
19. I am satisfied with my expanded role & feel it has enhanced my career	6	3.67 (1.51)	1-5
20. I am planning to stay on in my expanded role for the foreseeable future	6	4.17 (0.98)	3-5

There was a response rate of 100% (all six nurse endoscopist trainees from the five APEN sites). Figure 7 shows responses to the 20 items. 'Not applicable' responses have been excluded from analyses.



Figure 7 Experience of nurse endoscopist trainees

Nurse endoscopist trainees were generally very positive about their experiences working in the ESOP role. The high level of agreement with the majority of statements from respondents indicates positive experiences and perceptions related to the role. For most items, at least three of the six respondents agreed or strongly agreed with the statements.

All respondents agreed or strongly agreed that they were comfortable approaching other staff for advice regarding patient management (item 17, mean = 4.67). This reflects close working relationships between nurse endoscopist trainees and their medical mentors.

There was some disagreement and uncertainty among the trainees, particularly with statements concerning the attitudes of other staff members and their understanding of the ESOP role. Four of the six respondents gave a neutral response to the statement, "Changes to practices, protocols and policies have helped me to implement my expanded role" (item 10, mean = 3.67).

The two statements given the lowest rating were:

- Other staff at the service where I work have a good understanding of the educational preparation required to take on my expanded role (item 5, mean = 2.83)
- Changes to attitudes and beliefs in my work place have helped me to implement my expanded role (item 11, mean = 3.50).

Four respondents provided additional comments. Of these, three noted that they were still in training and therefore potential improvements in access to endoscopy and in their own confidence in the role could not yet be assessed. These aspects would be more appropriately evaluated after they had worked as an independent practitioner for a period of time. Two commented on the lack of understanding by other staff of their role; one of these respondents felt that attitudes towards the role by medical staff were not always positive. In contrast, another respondent commended the high level of support provided by the organisation for the new model of care and the ESOP role.

Interviews with nurse endoscopist trainees

The nurse endoscopist trainees recruited demonstrated professionalism, maturity and tenacity in their challenging role. In the early weeks and months of implementation they frequently faced opposition from several medical stakeholders opposed to the nurse endoscopist trainee role. This appeared to lessen over time as the trainees slowly became more accepted.

"I think amongst the medical profession the role is not accepted. They think that I'm taking their jobs... the nurses see me as a pioneer." (Stakeholder-Nurse Endoscopist Trainee)

"...I made a conscious effort when I started here that I would be obviously professional and that I'd – I would always try to gain respect from all the staff and nurses and I felt – I did feel like I needed to prove myself with this position." (Stakeholder-Nurse Endoscopist Trainee)

Their organisations provided supportive training environments as did their immediate colleagues within the endoscopy service, however it took time to fit into the team and to establish relationships amongst stakeholders.

"Trying to fit into the team where there is - I guess you would call it an element of fear, because people don't know how this role is going to affect their own job. And so there is a range of people that are somewhat hesitant to accept you doing that role. And for me that was really difficult, because coming to a new organisation, I didn't know who was who, and who was in favour, and who wasn't in favour, and I found that really difficult, treading on eggshells, if you like, because I didn't want to put the project in jeopardy, and I didn't want to put the possibility of nurses doing

endoscopy anywhere in Australia in doubt, because of stepping on the wrong toes, maybe.” (Stakeholder-Nurse Endoscopist Trainee)

“I do feel really supported, both by the clinicians and by the nursing staff in the room.” (Stakeholder-Nurse Endoscopist Trainee)

The trainees frequently spoke of the need to build trust with their colleagues. They quickly formed a supportive network amongst themselves after the second training workshop held early in 2013. There was pressure from championing of an innovative workforce role, developing the technical skills required for safe practice and managing the heavy study load.

“We just, kind of, all decided we need to stick together, and because we’re the ones going through the same thing, we all just recognised that it would be a good thing. I think the clinical challenges have all been very similar, and there are many times when we thought, oh we’re never going to get this.” (Stakeholder-Nurse Endoscopist Trainee)

“...we do communicate well with each other; we do have a very good relationship with each other. And it’s been throughout. And I think probably we are each other’s biggest support. And I do think that we all independently would have struggled without each other.” (Stakeholder-Nurse Endoscopist Trainee)

“Just finding my own ways of doing things as well, like managing my time, how do I get best value of my time because I’m studying, working, and family. So it’s just trying to get that good balance between all three is a bit challenging.” (Stakeholder-Nurse Endoscopist Trainee).

Several trainees felt frustrated as a trainee as they were highly experienced and competent nurses with previous experience at senior levels. They also spoke about the added responsibility they felt and their professional and personal responsibility to succeed in the role.

“I still have my good days and bad days. I mean, I’ve learnt a lot and the majority of what I know through my trainers, and just keep doing them and doing them, I think you do learn. But it didn’t come easy.” (Stakeholder-Nurse Endoscopist Trainee).

“I really, really do enjoy this nurse endoscopist position, and I’ve gotten used to the speed of it, and the accountability and all that, the responsibility of it all. And I think that – that was really good because – not that I was unsure, but it really cemented it in my mind that this is what I want to do”. (Stakeholder-Nurse Endoscopist Trainee).

The confidence of the nurses improved over time and toward the end of the implementation period they reported that their confidence had improved.

“I’m very proud of what I’m doing. Just when I’m speaking to patients, I’m very confident and – I don’t feel like I’m someone, sort of, tiptoeing around, just learning the ropes now. I do feel like that I am a professional, and I’m in this role in my own right, and I’ve earned it.” (Stakeholder-Nurse Endoscopist Trainee).

4.4.3 Staff and key stakeholder views

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

All APEN sites used a 15-item version of the survey, 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 three, highly reliable sub-scales: Understanding (5 items, $\alpha = 0.87$), Contribution (4 items, $\alpha = 0.89$) and Acceptability (5 items, $\alpha = 0.84$). 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”.

Data were collected in late 2013. Support was provided by the national evaluation team, including a draft participant information sheet, guidelines for administering the survey, an online version and spreadsheets for data entry for those who preferred to use a paper version. Response rates were: APEN1, 34%; APEN2, not reported; APEN3, 80%; APEN5, 12%, APEN4, 91%. These varied widely as some sites took a more targeted approach to distribution than others.

A total of 119 non-ESOP staff responded to the survey. The largest group of respondents were nursing staff (73, 61.3%), followed by medical officers, specialists and registrars (34, 28.6%) and non-clinical, administrative or “other” staff (12, 10.1%). Numbers of respondents from each site were as follows: APEN1, 23 (19.3%); APEN2, 25 (21.0%); APEN3, 20 (16.8%); APEN4, 32 (26.9%); APEN5, 19 (16.0%).

Figure 8 shows responses to each of the first 14 items on the survey. On average, more than half of the respondents agreed or strongly agreed with each of the items. The strongest agreement was for the item on supervision: 91% of respondents agreed or strongly agreed that medical specialists were the most appropriate supervisors and mentors for nurse endoscopists. Almost nine out of ten respondents understood how the nurse endoscopist was different from nurses assisting with endoscopy, and almost eight in ten understood the nurse endoscopist role. However, a substantial minority indicated a lack of understanding of the education required (48% were unsure, disagreed or strongly disagreed), the scope of practice (48%), and which patients were suitable (37%).

Most staff had high regard for the nurse endoscopists’ skills in performing specific procedures and providing patient information, with 82% agreement for these items, and 80% said they were comfortable being approached for advice on patient management. There was less confidence in other aspects of the model. Almost half strongly disagreed, disagreed or were unsure that the nurse endoscopist would improve quality of care, and improvements in access and team effectiveness were also a source of doubt or disagreement for around 30% of the sample.

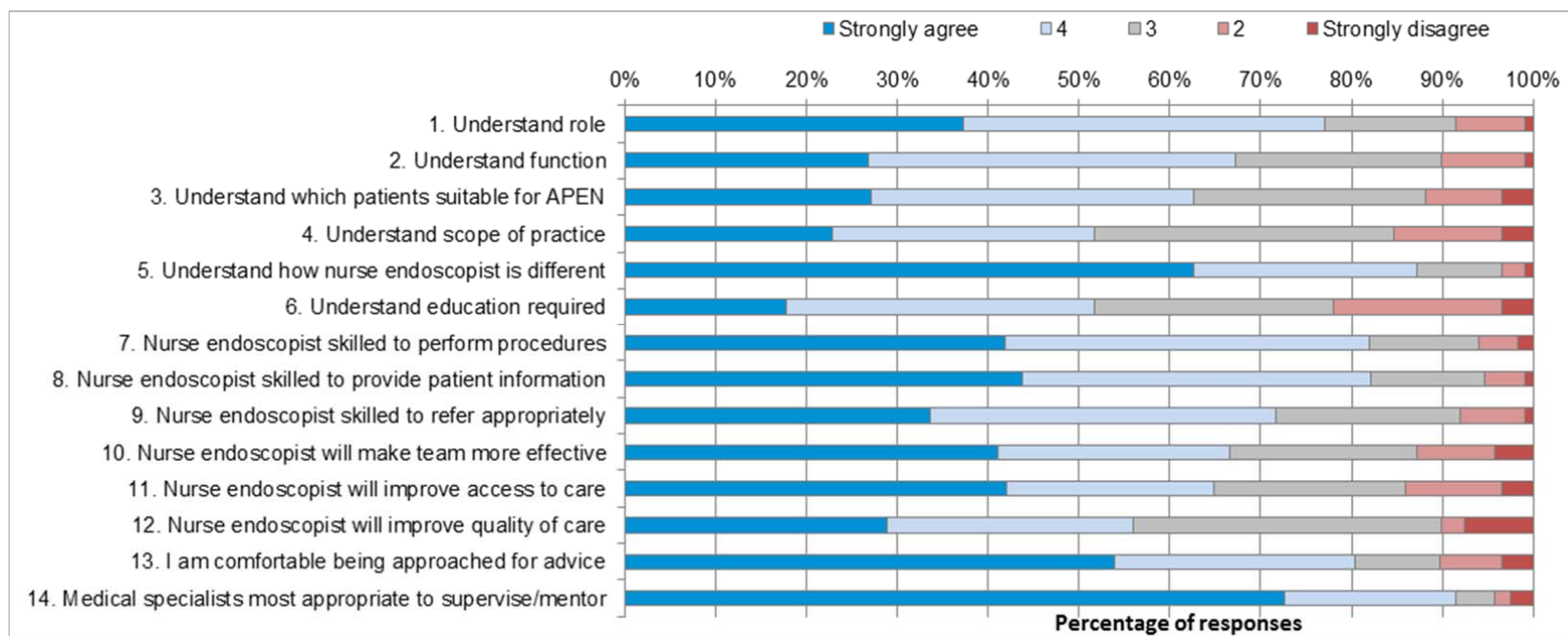


Figure 8 Responses to APEN non-ESOP staff survey

An independent samples Mann-Whitney U-test was used to check for differences in responses according to which model was used at the site. There was a systematic difference between the two models in the extent to which non-ESOP staff believed the nurse endoscopists contributed to the effectiveness of the team, improved access to care and enhanced quality of care. Mean ranks showed that staff members at APEN1 were more positive about the contribution of the nurse endoscopists than staff at the APEN2-led sites.

Staff members at lead sites were more positive than those at implementation sites regarding the model's contribution (Mann-Whitney U = 1136.00, p = .003). This finding was echoed in the analysis of differences among all sites, with APEN1 and APEN2 obtaining higher mean ranks than the other sites for the contribution sub-scale (Chi-square = 9.53, df = 4, p < .05).

Independent samples Kruskal-Wallis tests were used to check for differences according to the respondents' professional affiliations. To assist interpretation, specific job roles were allocated to three categories: nursing, medical and other (non-clinical / administrative). Respondents from these three professional affiliations differed in their opinions about the contribution of the nurse endoscopist model, but not in their understanding of the model or their opinions about its acceptability (Table 9). Specifically, medical staff members were the least positive about the model's contribution to team effectiveness, access and quality.

Table 9 Responses by professional group, HWA-APEN

Sub-scale or item	Profession	N	Mean (SD)	Mean rank	Chi-Square
Contribution	All	118	3.84 (0.98)		18.99***
	Nursing			67.19	
	Medical			38.26	
	Other			73.54	
Understanding	All	119	3.72 (0.87)		0.37
	Nursing			59.64	
	Medical			58.78	
	Other			65.63	
Acceptability	All	119	4.32 (0.71)		0.79
	Nursing			60.14	
	Medical			57.13	
	Other			67.25	

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

Qualitative analysis

A total of 27 respondents chose to make additional comments. Several noted that the nurse endoscopist had significantly improved in skills and competency from the start of the project. Some, mainly nursing staff, described the role as "valuable" or as an "asset".

"I support the idea that they can implement their expanding skills to provide [the] public with treatment in a timely manner." (Stakeholder-Nurse)

"The nurse endoscopist trainee is a valuable asset to our endoscopy unit and on completion of her training should become a permanent member of the staff." (Stakeholder-Nurse)

The need for clear role definitions and close supervision was mentioned by several respondents. Training requirements were seen as rigorous but time-consuming and potentially affecting both efficiency and sustainability of the model.

“Role in QA yet to be established, need to work in a fully staffed GE environment with physician support.” (Stakeholder-Surgical specialist)

“I do believe that their roles will need to be predefined very clearly; if so they will provide a valuable service.” (Stakeholder-Medical specialist)

“The training requirements appear to be cost prohibitive for ongoing sustainability.” (Stakeholder-Administrative)

“I think that the nurse endoscopist must be someone who has been in endoscopy as a senior nurse for a period.” (Stakeholder-Nurse)

Most of the positive comments came from nursing staff. One nurse said they had previous knowledge and work experience of the nurse endoscopy model from overseas, and another expressed strong interest in undertaking the training and expanded scope of practice. Some implied that the nurse endoscopy role was not as well supported as (they believed) it should have been.

“Nursing and medical staff need to be more supportive and understanding of the nurse endoscopist and be patient with her as she is still learning and procedures will take longer.” (Stakeholder-Nurse)

“I strongly believe the unit should support the nurse endoscopist now and in the future.” (Stakeholder-Nurse)

“There remains a disconnect with the understanding of the purpose of the role with the general surgeons.” (Stakeholder-Other)

Medical and surgical specialists, anaesthetists and other doctors were somewhat over-represented (41% of comments) and tended to be critical of the nurse endoscopy model. In particular, they raised concerns about its safety and efficiency.

“The current working of the list is time and resource inefficient at multiple levels from patient selection, list start times, nurse endoscopist supervision and time to complete procedures.” (Stakeholder-Anaesthetist Registrar)

“Some patients on the nurse endoscopy list were not medically suitable ... [which] may have meant that her scope times were slower than they should have been ...” (Stakeholder-Anaesthetist)

Several indicated that they did not fully understand the role, the scope of practice or the training required. There were also concerns about the impact of nurse endoscopy lists on availability of suitable patients for trainee doctors. A few respondents asserted that the nurse endoscopy model was simply a way to cut costs by paying nurses to perform work previously done by doctors. Often this assertion was made in conjunction with the statement that there was no lack of medical staff either qualified or training in endoscopy to cover the existing workload.

Staff survey conclusions

Endoscopy unit nurses, medical and surgical specialists, anaesthetists and junior doctors were asked to respond to a series of statements on the nurse endoscopy model of care. The vast majority understood how the nurse endoscopist was different to nurses assisting with endoscopy, agreed that medical specialists were the best people to supervise and mentor the endoscopy nurses during and after their training, and said they were happy to be approached for advice regarding patient management. Nevertheless, their answers revealed gaps in understanding of the model and ambivalence regarding its merits. Compared with nurses and managers, doctors were less convinced that the model contributed positively to the effectiveness of the endoscopy team, patient access and quality of patient care. Clearer

communication is needed around the nurse endoscopists' scope of practice, the education they undertake in preparation for the role, and identification of suitable patients.

Comments made by respondents provided a valuable source of qualitative data which both illuminated and reinforced the quantitative findings. Although nurses were generally supportive of the model, doctors expressed serious concerns. The model was seen by many doctors as inefficient because of the length of time taken for training, the perceived slowness of the nurse endoscopists undertaking the procedures and the high level of medical supervision required. Senior doctors did not regard these procedures as purely technical in nature and felt that nurses lacked the necessary expertise, in contrast to doctors who had broader knowledge of diagnosis and referral. There were concerns about patient selection: on one hand, respondents identified cases of inappropriate patients being placed on nurse endoscopy lists; on the other, they argued that reserving relatively simple cases for the nursing lists would reduce training opportunities for junior doctors.

These findings should be interpreted in light of the fact that the nurse endoscopists had undertaken an extensive and lengthy training process and had not yet attained full competency at the time of the survey, which is likely to affect perceptions of productivity. Several respondents commented on how much the trainee had improved over time, and others stated that there was a role for a nurse endoscopist provided the role was clearly defined and well supported. It is notable that staff at lead sites, where the models were developed and had been established for a longer period of time, were more positive about the model's contribution than those at implementation sites. Staff attitudes to the nurse endoscopy model should be evaluated again at a later date, when the trainees are qualified and working at full capacity and their impacts on access, quality and efficiency can be more fairly judged.

Stakeholder interviews also captured data from medical specialists, surgical specialists, anaesthetists and advanced medical trainees on their opinions of the model's safety, efficiency and effectiveness. The nurse endoscopist model was seen as valuable under the right set of circumstances, but stakeholders were sceptical about the extent to which these conditions could be met in the Australian health care system. First, they questioned whether a real need for this model had been established.

"... we're not short of colonoscopists ... And that's the whole thing. That in the UK, yes, they were short of endoscopists, and nurses in colonoscopy, nurse endoscopy programs were very important. And I think that nurses do colonoscopy, endoscopy as well, in some situations better than the gastroenterologists, in certain situations. But it's not an issue about who's doing it. It's just an issue that a whole [lot] of government money is being put into a program to solve a problem where the problem is ... you can't actually identify the problem." (Stakeholder – Medical)

"I think the concept of nurse colonoscopy is there's no problem. It's just whether – usually if you do something like this you've got to fill a gap." (Stakeholder – Medical)

"So for us, the nurse that we are training will be a very valuable part of our team, in the public setting ... this process that we've undertaken was considered, it was well supported and the training, in theory, and I think in practice, seems to be adequate, and will produce what we want, for the process, but whether we needed the process, I don't know." (Stakeholder – Medical)

The greatest need for these procedures was in rural and outer urban areas, but these were also the locations least suitable for a nurse endoscopist to practice due to the lack of infrastructure and supervision. The model was seen as best suited to a team environment, as an element of a large metropolitan service, where mentoring and medical back-up was constantly available. The suggestion that nurse endoscopists might extend beyond these parameters made stakeholders uneasy and was seen as a step too far, introducing a level of risk that was unacceptable.

“... they shouldn’t be scoping somewhere else as an alternative to having a procedure by a medical professional. And I have a feeling that people don’t fully understand how nurse endoscopy should be working and it should be just an aspect or a part of endoscopy delivery in a major centre, not a substitute because we think we can supply this in a rural centre – that’s not what it’s for.” (Stakeholder – Medical)

“I also work at [name removed] hospital and we’ve got huge waiting lists there, and the nurse endoscopist would be fantastic to have someone full-time and doing all the scopes all the time, but ... it’s the infrastructure, we’ve only got one endoscopy room, so we can’t actually physically do them, so it’s not the answer to everywhere.” (Stakeholder – Medical)

“...we’ve all had complications of procedures and as soon as a nurse has her first complication, if that’s not happened in a supportive environment, I think that could be very damaging.” (Stakeholder – Medical)

Related to this theme was the conception of nurse endoscopy as an activity that could occupy only a quite small niche in the overall system. Their lack of medical training meant there had to be very tight boundaries around the role. Again, the issue of need was raised. This had flow-on implications for sustainability of the tertiary education courses required for only a small number of trainees.

“I mean it just seems to be a problem waiting to happen, that you’ll have a lot of people who are qualified and have no work or minimal work.” (Stakeholder – Medical)

“Because if you’re looking at getting patients taken care of and out again, you have to rely, for the most part, on people who can cover all those bases, and so those still remain doctors. So if we’re talking about the practice of medicine, it’s still the practice of medicine, if you want to do that you should go to medical school. But there’s a role, there’s a technical role for a nurse endoscopist to do this, but I don’t see that – as I said, I don’t see this being a huge workforce.” (Stakeholder – Medical)

“There’s only ever going to be one University in Australia to support the numbers of people that are going to be doing this. And it really probably has to be supplemented by other gastroenterology subjects because, again, if you train five new people a year, that’s probably, what you’re going to be doing ... So you’re not going to run a course for five people a year.” (Stakeholder – Nurse Manager)

There were others, however, who did not view the role as purely technical in nature and expected expanded scope nurses to “know a bit more about the patient”.

Stakeholders were able to identify characteristics of a nurse endoscopist trainee who could survive and thrive in this role. The model required nursing professionals with maturity, eloquence and tenacity, who were ‘thick-skinned’ and adaptable, and most importantly able to forge productive relationships with gastroenterologists, colorectal surgeons, anaesthetists and their nursing colleagues. The development of the ESOP role was seen by senior nurses as an important step forward for the profession and a natural step: ‘more of an evolution rather than a revolution’, as one put it. These nurses were confident that other clinicians would come to support the model once they had seen it in practice.

“Personally for me, I think it’s opened my eyes to possibilities for growing the nursing profession. I think it’s really positive and ... I think the patients can benefit greatly for a nurse to do the primary screening, I can see benefits in that, the cost savings and the waiting lists and that sort of thing.” (Stakeholder – Nurse Manager)

"I don't have an issue with it at all. I mean, when I very first started nursing, nurses couldn't even give antibiotics. We didn't put IV lines in. Now, look at what's happened now. I mean it's a norm now for all those sorts of things to be done. It's a norm for a whole host of stuff that 30 years ago you would never have even considered that a nurse would do." (Stakeholder – Nurse Manager)

4.5 Impact on the system

A series of key performance indicators were developed to measure the impact and quality of the advanced practice in endoscopy nursing model of care (Thompson et al., 2012a). These include clinical measures such as caecal intubation rate, procedure time and complication rates, and measures of activity such as the time to reach target volumes of colonoscopies relevant to the training pathway. This section reports on the trainee nurses progress against these indicators 15 months into the training period, as well as presenting the metrics reported on as part of the training requirements for the Nurse Endoscopist Training Pathway (HWA, 2014a).

KPI 1.1 *Increased number of nurse endoscopists who have completed the agreed nurse endoscopist training pathway through the ESOP-APEN projects*

Procedures on patients with obstructing cancer and/or severe colitis must be recorded but are excluded from the calculation of overall intubation rate.²

Nurse endoscopist trainees are considered to have *completed* their training when they have performed 200 colonoscopies unassisted, on patients with intact colons. They are then able to be assessed for *proficiency* through an independent, supervised clinical assessment in which they must meet specific rating levels. Clinical judgement via regular supervision forms an additional level of performance management, and assists in determining whether the nurse endoscopist trainee is proficient but also ready to practice independently.

How far the nurses have progressed on the training pathway was tabulated below based only on data supplied to the end of the data submission period, i.e. 31 March 2014.

Table 10 Progress of nurse endoscopist trainees through training pathway

Site	Number of nurse endoscopist trainees			
	Enrolled	Completed	Employed in expanded scope role	Reached proficiency
APEN1	2	1	2	1
APEN2	1	0	1	0
APEN3	1	0	1	0
APEN4	1	0	1	0
APEN5	1	1	1	1
Total	6	2	6	2

There were six nurse endoscopist trainees who enrolled in the training program, and at 31 March 2014 two of the nurses had completed the training and also reached proficiency. The remaining four nurses had not completed the training pathway. All six nurses who enrolled in the training were still employed in the role at the end of the final data submission period.

KPI 1.2 *Turnover rate of recruited nurse endoscopists during the funded period of the expanded scope of practice project*

As part of the HWA program, six nurse endoscopist trainees were initially recruited, two at one site, and one each at the remaining sites. One of these trainee nurses resigned shortly after being employed, and did not commence the training program. The trainee nurse was replaced,

² <http://www.conjoint.org.au/information.html>, accessed 27 July 2014.

within a short time. Therefore a total of seven nurse endoscopist trainees were recruited. Accounting for this false-start, the overall turnover rate would be one in seven, or 14.3%. As this is a small sample, estimating a low prevalence event, this should be considered indicative at best, and disregarding this nurse who did not even commence the training program, the turnover rate could be argued to be 0% over the 15 months from January 2013 to March 2014.

None of the sites reported on a comparator within their facility. National estimates are also contentious, with Holland et al. (2012) estimating 15% of nursing staff intend to leave the profession in the next 12 months, based on a small sample of 640 respondents, and other estimates in the range of 2-6% (Cresswell, 2011; Department of Health, 2013, Chapter 7). A more reliable estimate of turnover rates would be possible with a larger pool of trainee nurses and a longer time period.

KPI 1.3 Progressive increase in skills of nurse endoscopists in endoscopy procedures

As the nurse endoscopist trainees progress through the training period their performance on a set of key metrics are monitored. These metrics are based on the requirements of the CCRTGE. Each nurse reports monthly on the total number of attempted intact colons, total completed unassisted, percentage success rate, mean total and withdrawal time, number of complications and number of procedures including snare polypectomy. Across sites between 92% and 98% of attempted procedures by the trainees were for intact colons, i.e. with no prior colonic resection.

These same monthly report metrics are reproduced for each nurse endoscopist trainee below. One of the sites had two trainees, but their previous experience and hence training trajectory were quite different. For this reason trainees were not averaged to site-level. The performance metrics have been tabulated for the full implementation period, however some measures such as success rate and procedure time would be expected to change over time. Therefore selected measures are investigated later in this section on a quarterly or monthly basis in order to assess skills progression over the training window.

Table 11 Performance metrics (Standard reporting for Conjoint committee) – by site

Site	Number attempted intact colons	Number completed unassisted	Success rate (%)	Mean total time (mins)	Mean withdrawal time (mins)	Complications	No with snare polypectomy
APEN1 – nurse 1	268	174	64.9	44.0	23.5	0	36
APEN2 – nurse 2	112	108	96.4	31.8	17.5	0	30
APEN2	257	179	69.6	33.5	16.7	0	50
APPEN3	314	222	70.7	25.2	11.3	0	41
APEN4	252	138	54.8	36.4	19.3	2	27
APEN5	255	213	83.5	26.5	13.0	0	100
Overall	1,458	1,034	70.9	32.3	16.4	2	284

a. Data tabulated for period 1 Jan 2013 – 3 Mar 2014, except for APEN4 which is tabulated for 1 Jan 13 – May 14.

b. Number of procedures completed unassisted on intact colons only.

c. Success rate = number of intact colons completed unassisted / number attempted intact colons x 100.

d. Caecal intubation rate = number reached caecum or ileum (unassisted) / intact colons completed (unassisted) x 100.

e. Count of snare polypectomies includes independent snare polypectomy only, and includes where the colonoscopy was either assisted or unassisted.

Over the 15 month period from 1 January 2013 – 3 March 2014 the nurse trainees performed a combined 1,458 procedures on patients with intact colons. Two of the nurse endoscopist trainees reached over 200 unassisted colonoscopies in the first 15 months. Of these 1,458 procedures, 1,034 (70.9%) were completed unassisted. The success rate varied from 54.8% to 96.4%, although the latter was atypical and achieved by a nurse endoscopist trainee with previous experience in the role.

Over the 15 months the average total time spent performing a scope was 32.3 minutes, of which 16.4 minutes was withdrawal time.

For details on the two complications reported at APEN4 see KPI 1.8 below.

Trainee nurses needed to complete 30 successful unassisted snare polypectomies. All nurses but one reached this target within the first 15 months.

A linear model was fit to the data to form a prediction model for estimating the rate of unassisted colonoscopies, as well as the number of weeks to complete a target volume of unassisted colonoscopies. This model was based on the experiences of the nurse endoscopist trainees. The model used the full data submission window from January 2013 to March 2014.

One of the endoscopy trainee nurses was excluded from the modelling due to having an atypical trajectory, a result of taking extended leave. The modelling process and result are detailed in Section 5.2.

Similarly, a linear model was fit to the trainee nurse's rate of successful unassisted snare polypectomies. Again, the goal was to predict the number of weeks into the training program that the trainee nurses were likely to reach a target level of independent snare polypectomies.

The trajectories for completing unassisted snare polypectomies are shown for each of the five nurse endoscopist trainees in Figure 9.

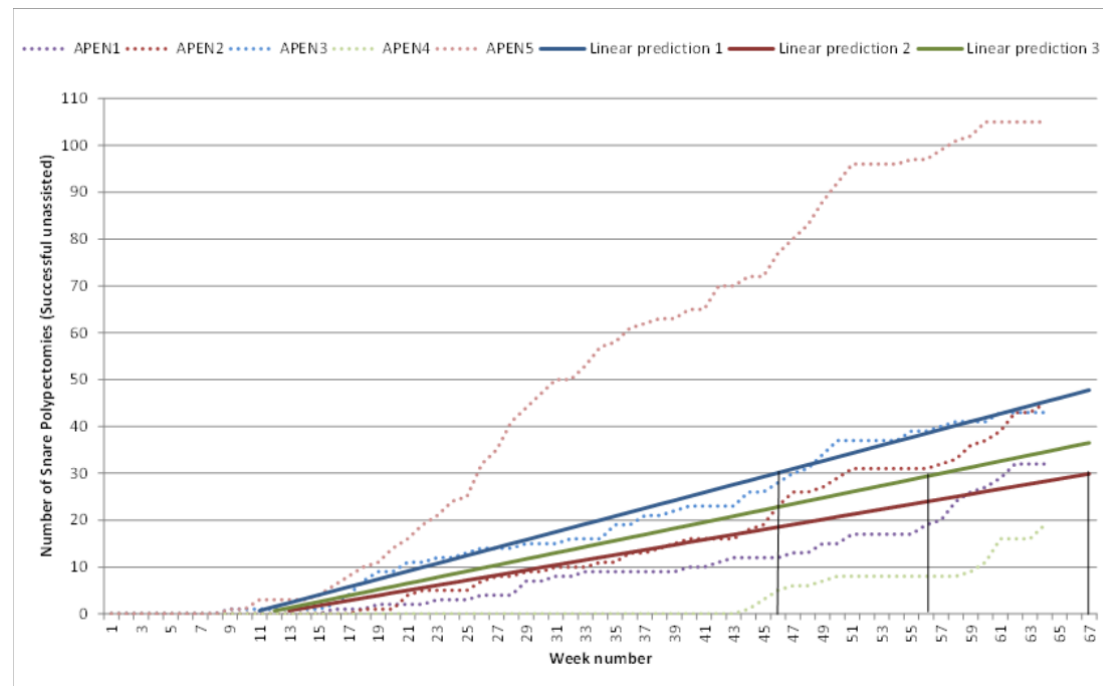


Figure 9 Successful unassisted snare polypectomies – cumulative counts and projections by site by week

The empirical trajectories are shown using dashed lines, and it can be seen that the trainee nurse from APEN5 had a particularly fast rate of performing snare polypectomies unassisted. The trainee nurse at APEN4 was further through the training period before performing the first unassisted polypectomies, and also progressed through these at a slower pace.

A linear model was fit using data from all five trainee nurses resulting in the model labelled 'linear prediction 1'. This model results from an averaging of all five trajectories, and results in

an estimated 46 weeks till completion of 30 successful unassisted polypectomies. A second linear model was fit excluding the trainee nurse from APEN5 which resulted in linear prediction 2 – an estimated 67 weeks till completion of 30 unassisted polypectomies. Finally a linear model excluding both the slowest and fastest trajectories was fit, resulting in the model identified as 'linear prediction 3' which averages the central three trajectories, and results in an estimated 56 weeks to completion of the required 30 successful unassisted polypectomies.

The three models were fit to show the uncertainty around the estimated number of weeks to complete the required number of unassisted polypectomies, which is reflecting both the small number of nurses, and the variation in their rate of development.

Another Conjoint Committee requirement is that trainee endoscopists achieve at least a 90% caecal intubation rate by the completion of training.

Table 12 Caecal intubation rates by site

Site	Number of procedures	Number attempted intact colons	Number reached ileum (unassisted)	Number reached caecum (unassisted)	Caecal intubation rate (%)
APEN1 – nurse 1	283	268	45	125	97.7
APEN2 – nurse 2	117	112	72	36	100.0
APEN2	278	257	61	114	97.8
APEN3	337	314	84	136	99.1
APEN4	258	252	80	57	99.3
APEN5	265	255	89	123	99.5
Overall	1,538	1,458	431	591	98.8

a. Data for the period 1 January 2013 – 3 March 2014.

b. Number of procedures completed unassisted on intact colons only.

c. Caecal intubation rate = number reached caecum or ileum (unassisted) / intact colons completed (unassisted) x 100.

Each of the trainees has surpassed and exceeded the benchmark of 90% for caecal intubation rate.

Table 13 Mean insertion and total time by site for nurse endoscopist trainees

Site	Number of procedures	Mean Insertion time	Mean total time
APEN1 – nurse 1	283	20.5	44.0
APEN2 – nurse 2	117	14.3	31.8
APEN2	278	16.8	33.5
APEN3	337	13.9	25.2
APEN4	258	17.1	36.4
APEN5	265	13.5	26.5
Overall	1,538	15.9	32.3

a. All procedures – unassisted only, intact colon only.

Average insertion time varied from 13.5 minutes to 20.5 minutes across sites, with total time between 25.2 minutes and 44.0 minutes. Average time taken to complete the procedure (Figure 10) has reduced over time.

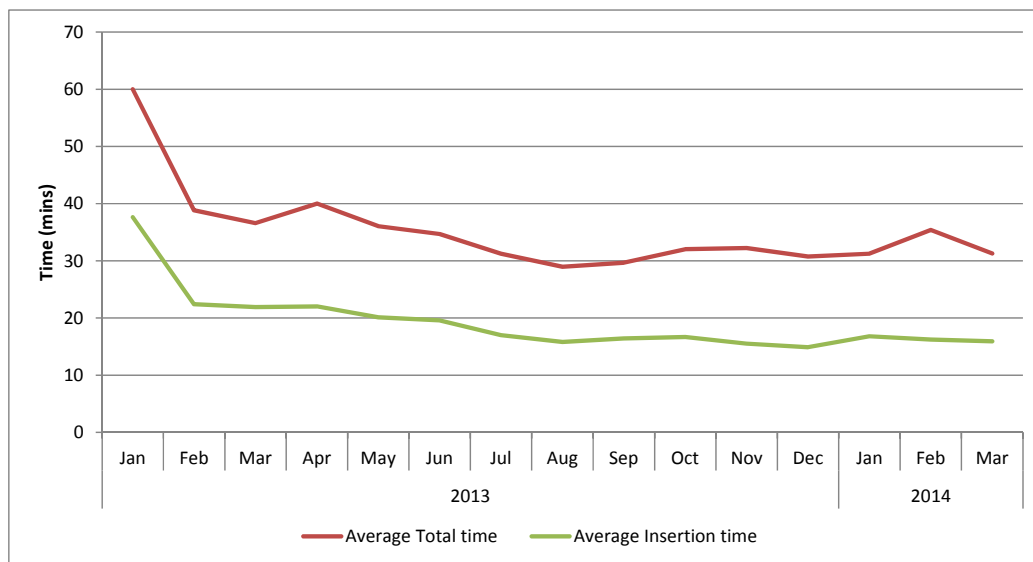


Figure 10 Mean total time and insertion time (mins) across all sites

- a. Excludes one nurse from APEN1 who had a different trajectory and periods of leave.
- b. Includes all procedures – assisted and unassisted.

Both total and insertion time decreased across the implementation period, with a quick drop in total time scope and insertion time over the first two months, with a further decrease in procedure and insertion time till around six months into the training period. After this point the time taken is relatively stable, although the nurse endoscopist trainees are likely to be increasing both the volume of activity per list and potentially the complexity of casemix over the remainder of the training program.

Table 14 Mean total colonoscopy time by quarter

Site	Mean total time (mins)				
	Jan – Mar 2013	Apr – Jun 2013	Jul – Sep 2013	Oct – Dec 2013	Jan – Mar 2014
APEN1 – nurse 1	52.5	47.7	41.7	38.9	45.1
APEN2 – nurse 2	35.0	n/a	32.3	28.3	36.6
APEN2	37.0	33.8	28.9	30.9	37.6
APEN3	35.3	29.3	23.1	24.0	22.2
APEN4	38.8	36.4	33.4	37.2	35.4
APEN5	35.2	31.8	23.9	23.0	23.3
Total	37.8	35.7	28.2	29.9	33.7

By the final quarter of data submission the average total time for a colonoscopy varied widely across sites, between 22.2 minutes for the nurse endoscopist trainee at APEN3 to 45.1 minutes for a trainee nurse at APEN1. Without a measure of complexity of procedures undertaken at each site these figures should be considered indicative of the range of times likely after 15 months of training.

KPI 1.8 Consistent or improved unit safety outcomes post introduction of the ESOP-APEN initiative e.g. number of adverse events; number of consumer complaints

Table 15 Safety outcomes – by site

Site	Number of re-presentations within 96 hours	Readmissions within 28 days	Adverse events	Complaints
APEN1	0	0	0	0
APEN2	1	0	0	0
APEN3	0	0	0	0
APEN4	3	1	2	0
APEN5	1	0	0	1
Overall	5	1	2	1

a. Data for period from 1 January 2013 to 31 March 2014 except APEN4 which includes 2 additional months of data for the adverse events.

Although the sites monitored safety and quality closely with regards to complications and complaints some of the other safety performance metrics were more difficult to collect. One of the sites specifically noted that representations and re-admissions cannot be directly related to the colonoscopy. This means that representations and re-admissions may be an over-estimate of the true count. Some sites did not specify whether the re-presentation was planned or unplanned. If these rates include planned activity, this may instead be good clinical practice.

Across all sites there were five reported re-presentations in 96 hours, out of a total of 1,458 procedures. This is not considered to be a reliable estimate due to issues with reporting of this data item. Sites were able to confirm readmissions counts, of which there was only one across all sites. Two adverse events were reported at one of the five implementation sites.

KPI 1.9 Increased number of 'routine / surveillance' endoscopic procedures completed within the Endoscopy Unit

Advice provided by sites was that until the trainee nurses have been practising independently, with routine data submission, any potential increase of routine / surveillance colonoscopies cannot be effectively measured.

KPI 2.0 Number of endoscopic procedures completed by the nurse endoscopist throughout the project (per list and total)

Table 16 Activity level per list – by site

Site	Total number of procedures	Number of lists involving nurse endoscopist	Average number of procedures per list
APEN1 (nurse 1)	287	96	3.0
APEN1 (nurse 2)	118	34	3.5
APEN2	276	96	2.9
APEN3	274	91	3.0
APEN4	256	73	3.5
APEN5	278	77	3.6
Total	1,489	467	3.2

a. Activity between 1 January 2013 and 31 March 2014.

The number of lists attended by the nurse endoscopist trainees was calculated using daily activity and assuming that a nurse endoscopist is not assigned to more than one list per day. Across the 15 months the nurse endoscopist trainees worked across a total of 467 lists, averaging 3.2 procedures per list. This was fairly consistent across the trainee nurses, with a range of 2.9 to 3.6 procedures per list.

The number of procedures per list and complexity of these procedures would be expected to increase over time as the trainees gain in experience.

Figure 11 shows that this increase in volume per list happened quite quickly, with the nurse endoscopist trainees seeing close to three patients per list from around three months of commencing their training.

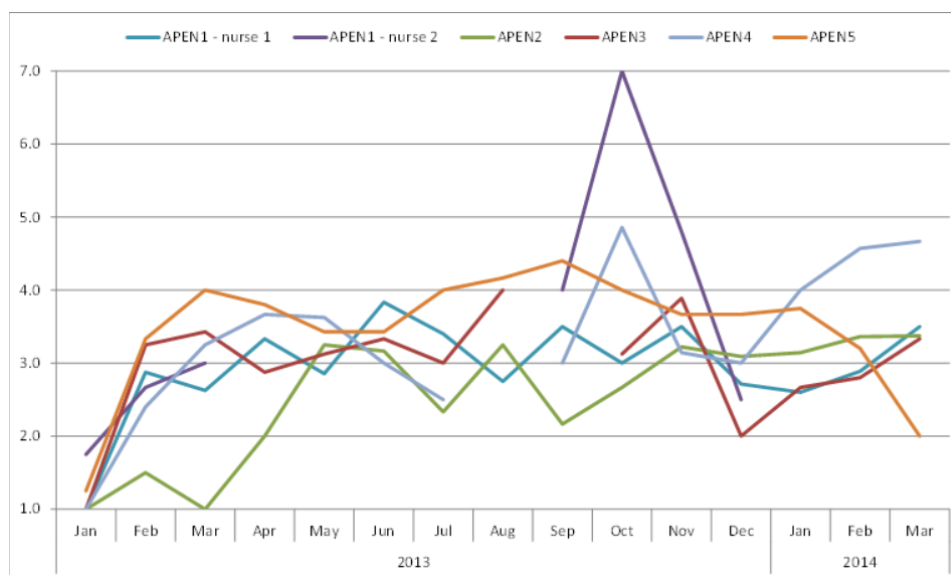


Figure 11 Average number of patients per list – by nurse by site

KPI 2.1 Quantum of other types of activity that the nurse endoscopist is involved in besides endoscopic procedures, e.g. this may include outpatient consultations, multidisciplinary clinical meetings, etc.

As nurse endoscopist trainees are employed on a salary basis (rather than being paid per session), they have additional time available above allocated lists. Time spent on activities other than undertaking endoscopic procedures has been reported as part of the requirements of Evaluation Tool 2.

Table 17 Total time spent on other professional activities – by site

Site	Clinic time outside endoscopy unit (hours)	% of other time	Multi-disciplinary team meetings (hours)	% of other time	Research (hours)	% of other time	Total
APEN1– nurse 1	200.0	50.4	37.0	9.3	160.0	40.3	397.0
APEN1 – nurse 2	0.0	0.0	0.0	0.0	120.0	100.0	120.0
APEN2	74.5	66.8	23.0	20.6	14.0	12.6	111.5
APEN3	108.0	31.3	40.5	11.8	196.0	56.9	344.5
APEN4	-	-	-	-	-	-	Not reported
APEN5	0.0	0.0	0.0	0.0	248.0	100.0	248.0
Average	70.9	32.7	17.3	8.0	128.4	59.3	216.6

a. Time spent on activities other than endoscopic procedures during the full data submission period Dec 2012 – Mar 2014, except at one site.

b. Average times includes 0 reported hours but excludes not reported.

c. Where data was not supplied, or was incomplete, figures have been sourced from sites final reports to HWA.

d. Time reported for 1 Dec 2012 to 30 Apr 2014.

One of the sites did not report this data item, and across the remaining sites there was wide variation in how the nurses spent their other time. The majority of 'other' time is reported against research based activities, accounting for 59% of other time. This varied from 13 hours in total at APEN2 (less than half an hour per week), to 248 hours at APEN5 (around 4 hours per week). This is likely to include course work for the University of Hull module.

Some of the nurse endoscopist trainees were able to participate in clinical work outside the endoscopy unit, such as outpatient consultations. Clinical time also accounted for a large proportion of non-endoscopic time, varying between 38.7% and 66.8% across the reporting sites.

Not all nurse endoscopist trainees were involved in multi-disciplinary team meetings, but when they were this roughly accounted for roughly 10-20% of their non-endoscopic time.

The overall distribution of time across sites is shown in Figure 12.

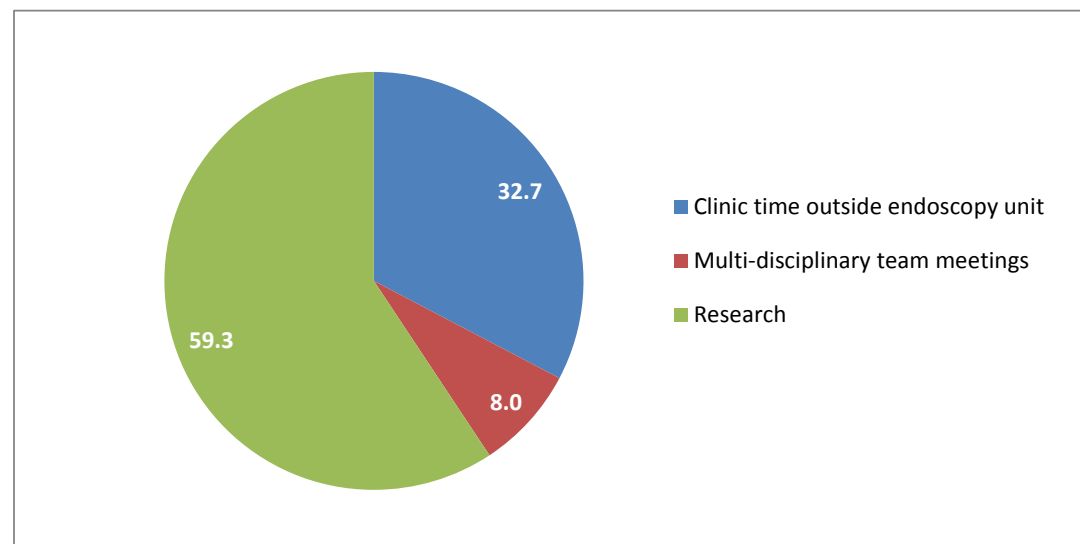


Figure 12 Distribution of time spent other than colonoscopies

KPI 2.2 Decreased waiting time for 'routine / surveillance' endoscopic procedures

The quality of waiting time data varied considerably across sites. Two were able to supply waiting times for most of the procedures undertaken in their endoscopy unit – with around 10% of planned procedures missing the date the patient was put on the waiting list. However the other three sites had between 45% and 100% of procedures missing waiting time. One of these sites provided aggregate counts of patients removed off the waiting list but without reporting the length of time these patients were on the list. The reported data therefore cannot be used to give a realistic representation of the distribution of waiting times across the implementation sites.

Waiting list category was also reported with low consistency, with between 45% and 100% of data missing across sites, making this key performance indicator unable to be reported on reliably.

4.6 Unintended consequences

The process of implementing any workforce change produces unexpected consequences both positive and negative. These can be clustered into operational or strategic issues.

The major operational issues that arose that were unexpected and negative in impact, related principally to the nurse endoscopist trainee and the medical supervisor. For all but one organisation the trainee was the first person to occupy the role of nurse endoscopist. This brought with it some professional isolation and challenges in managing the attitudes of those who opposed this new role. These experiences were overcome by the trainees forming a tight-knit group and integrating into the nursing governance and professional development structures of their specialty and hospital. This suggests that training nurse endoscopists in a coordinated way and in a small student cohort is important. Several sites appointed a nursing mentor in addition to a medical mentor / clinical supervisor and this was a useful source of professional support, particularly if the trainee was new to the organisation.

"I think the disadvantage ... at the start, was maybe isolation and being ostracised and really, [name removed] had to develop a really thick skin. And not everyone's cut out to be like that." (Stakeholder-Nurse Manager)

"I think it has been a negative from others in my professions – others with influence, but it's hard for me to measure how negative that's been, but there were certainly some extremely inappropriate things said by fairly senior gastroenterologists... to my prospective trainee." (Stakeholder-Medical specialist)

The medical supervisor was not immune from the conflict and as a change champion for the role, frequently encountered opposition from various members of the health care team about the nurse endoscopist role. While the majority of supervisors reported that they enjoyed their training role and the professional rapport they developed with the nurse endoscopist trainee, it was time consuming and hard work.

"I think there's been a huge strain on my time, and so I've neglected other things." (Stakeholder-Medical specialist)

"Yeah, it's been hard work. Would I do it again? I honestly can't answer that. I don't know...it has diverted a lot of my attention and resources away from other things in the unit. And you know, I guess that for me has been – that's the downside. I mean I've only got so much attention...And so at times it's sort of felt like I've needed to supervise everybody and kind of keep tabs on everybody, where I actually haven't got the clinical load to do that, and keep all these other things going." (Stakeholder-Medical specialist)

Another operational issue that emerged was the inability to manage extended periods of leave with the nurse endoscopist trainees. There were no resources to back-fill extended leave absences (e.g. maternity, sick or annual leave) as would be expected due to the newness of the role. This affected the momentum of the project as there was no training progress during these periods of absence. Several medical stakeholders spoke from their own personal experience advising that after an extended absence from scoping it took a little time to get back into the 'flow.'

Several project teams reported encountering some minor jealousy from advanced trainees / registrars who felt that they had less access to training lists than the nurse endoscopist trainee. All project teams worked hard to balance the demands of both medical and nurse trainees to ensure that everyone met their training requirements.

"Essentially every one is a teaching list. And also there are less available for the registrars, for the medical registrars. So that's been a negative." (Stakeholder-Medical specialist)

The key strategic issue that emerged that was unanticipated was the decision by two jurisdictions to expand nurse endoscopy training. In 2013-14, the Victorian Department of Health established the 'State Endoscopy Training Centre' with a plan to incrementally increase the number of nurse endoscopists. The SETC is structured in a way that allows nurse endoscopy training to be delivered through a multi-site, partnership arrangement with health services seeking to establish and provide a multidisciplinary team based nurse endoscopy service. At the time of this report the SETC was considering expressions of interest for additional implementation sites; the intention is to build this capacity incrementally and an additional two nurses are likely to commence training this year.

The Nursing and Midwifery Office of Queensland Health announced the funding of a long-term plan for nurse endoscopy training to increase the capacity (timeliness and accessibility) of service provision to address the rapidly growing demand for endoscopy services. The project proposes to prepare up to 15 nurse endoscopists at specialist nurse level across hospital and health services. It has been reported by the Queensland Health Director-General that:

"This plan builds on national work initiated by Health Workforce Australia (HWA) which involved APEN1 in collaboration with the APEN2 in Melbourne which piloted a training program for nurse endoscopists".

Positive unintended consequences include work practice improvements, the training improvements seen generally within the sites participating in the initiative, infrastructure improvements and the 'kudos' from being part of a workforce innovation.

One site in particular undertook a review of waiting list processes and how patients were booked and the waiting list was managed. This resulted in significant process improvements and a much clearer understanding of priority patient groups. This allowed the project team to use the additional resources of the nurse endoscopist trainee to attend to a specific cohort of patients.

"A lot of tidying up. And interestingly and fair enough they were a lot of failings in our system so – because people were just busy. They didn't re-evaluate, so it – we put more structures in place." (Stakeholder-Nurse Manager)

"It's interesting because as this project's gone on I – my views have changed quite a lot on it and I think for how we have managed the model within our implementation site... it has impacted significantly on the community that have been waiting for a procedure. So the wait time for some of the people that... trainee nurse endoscopists have managed to treat, has from their perspective, it has cut that waiting time. So I think there has been great benefit on that but also the challenge

behind that is the nurse endoscopist could only do certain things, so those people on the waiting list just waiting for certain things, they were targeted to that rather than to have something that might be more complex that a medical clinician would do.” (Stakeholder-Nurse Manager)

The attention and focus on nurse training inevitably led to improvements in training more generally and this had an unexpected benefit for the advanced medicine trainees. There was extensive feedback from medical and surgical specialists provided about the benefit of their participation in ‘train the trainer’ courses held at the beginning of the project.

“So, we’ve changed our practice to training endoscopy in this hospital as a result of this. The first year medical trainees get a lot more exposure, a lot more scoping, a lot more hands on, early on in the piece. Previously, the training, I guess, was a bit more, sort of apprenticeship training, you know, you don’t get to do a colonoscopy until you’ve done plenty of gastroscopies. Even though they’re quite different procedures.” (Stakeholder-Medical specialist)

“Well, I did a train the trainer course at the beginning before I started getting involved, and that had certainly made me much better, without any doubt.” (Stakeholder-Surgical specialist)

The funding made available by HWA allowed several project teams to improve the infrastructure for endoscopy within their hospital, usually through the acquisition of additional equipment.

“I’d say, because if you’re talking about health workforce and efficiencies and what’s the reason we’re doing this – because there is massive scope, wait list, etc – then that would be maximised by having multiple rooms going. But this comes back to my irritation with it. We’ve got another whole room because of this program... But people don’t appreciate that we’ve got that third room just solely because of this program. And if we didn’t do this program it would still be a store-room.” (Stakeholder-Medical specialist)

“Oh, it hasn’t affected my personal practice, but it’s given us the opportunity to purchase equipment which has been utilised by all the staff. And it’s also given us more of an opportunity to think about training as a priority.” (Stakeholder-Medical specialist)

Finally, several project teams reported the positive experience of being part of a national initiative and that this was a ‘career-developing’ experience they also felt it generated reputational gain for their organisation.

“I think just the positivity of being like a national leader in something. It’s just been so exciting.” (Stakeholder-Nurse Manager)

“The other positive for the hospital – just on your question about why has it been a good thing, I think the message that it’s sent around workforce change and...being a leader, that reputational effect has been really good. It’s not really about the role but it’s about the fact that we’ve taken a risk. We’ve gone very carefully and we’ve managed the politics well and that’s taken a lot of people doing their bit.” (Stakeholder-Nurse Manager)

5 Economic evaluation

5.1 Introduction

Training of nurse endoscopist trainees has the potential to cost effectively increase health system capacity and ability to undertake endoscopy. Whether such training and the use of nurse endoscopists is cost effective in practice depends on factors including:

- (i) How long it takes to train a nurse endoscopist trainee until deemed to be proficient to practice independently;
- (ii) How much it costs to train a nurse endoscopist trainee to reach proficiency and practice independently; and
- (iii) The cost and effectiveness of using nurse endoscopists to perform endoscopy independently in the health system practice, relative to current practice.

In the APEN sub-project, endoscopy care provided by the nurse endoscopist trainees to patients was purely incremental, that is, it was provided in addition to the care already provided by medical practitioners. All the colonoscopies performed by nurse endoscopist trainees were explicitly funded by HWA for training purposes. Funding was required because hospitals could not provide these procedures without a corresponding reduction in the number of procedures performed by medical practitioners. The total number of endoscopic procedures at each hospital is limited by the funding model which has an annual cap. Once this cap is reached no more funding is received for additional endoscopies.

Economic analysis of the APEN sub-project presented here focuses on (i) and (ii) and in particular the training time and costs until deemed to be proficient to practice independently.

The third of these questions cannot be robustly addressed until the nurse endoscopist trainees complete their training pathway, reach a level of proficiency and are working to their full scope of practice. Once this occurs, the services provided by the nurse endoscopists will substitute for, rather than being incremental to, the current service to some extent (taking into account the need for supervision, consulting and referral for more complex cases) Until nurse endoscopist trainees are used to manage endoscopy lists independently they do not see the volume of patients they would expect to see in practice, so data currently available are likely to underestimate their potential contribution to the effectiveness and efficiency of the system. Hence, this third type of economic analysis is not possible at this stage. Economic analysis in the future would be required to address (iii) where nurse endoscopist trainees are used to manage endoscopy lists independently in practice and compared incrementally to current practice.

5.2 Length of training

The first question that needs to be addressed in assessing the potential cost effectiveness of nurse endoscopist trainee is:

- (i) How long it takes to train a nurse endoscopist trainee, until deemed to be proficient to practice independently.

The training of the nurse endoscopist trainees contains four modules described in Section 3. The 'Nurse Endoscopist Training Pathway' produced as part of the ESOP initiative outlines the assessment requirements in detail (refer to Figure 2 in Section 2.4). During this project all four training modules started almost simultaneously and Module 4 (Supervised Clinical Practice) lasted the longest. According to the Nurse Endoscopist Training Pathway the minimum requirements before the summative DOPS assessment can be undertaken are:

Trainees are required to:

- Perform a minimum of 100 unassisted, supervised, complete colonoscopies to the caecum and preferably to the ileum in patients with intact colons (i.e. with no prior colonic resection). Trainees and training organisations should aim to complete 200 colonoscopy procedures in total during the supervised clinical practice module to achieve this.
 - Perform successful snare polypectomies on a minimum of 30 patients.
 - Achieve at least 90% caecal intubation rate by the completion of training.
- (HWA, 2014a, p. 23)

After passing the summative DOPS assessment it is a formal requirement that the clinical supervisor also deems the nurse endoscopist trainee to be proficient to practice independently. One minimum requirement is that nurse endoscopist trainees are required to have performed 100 unassisted colonoscopies. Figure 13 below shows the observed training trajectory of nurse endoscopist trainees across five sites reporting the weekly rate of unassisted colonoscopies performed per nurse endoscopist trainee.³ Training commenced in January 2013. In four of the sites unassisted colonoscopies were not performed at any scale until week four, while beyond that linear regression indicates the number of colonoscopies averaged at 4.5 per week across the five sites. However, it is clear there is large variation across the five sites, with for example APEN2 not achieving a rate of unassisted colonoscopies approaching this until week 15, while APEN1 achieved a higher rate from week three. The different rates of ability in achieving unassisted colonoscopies across the five sites are generally reflected by the difference in total number of unassisted colonoscopies performed at 26 weeks, when the mean number of unassisted colonoscopies per nurse endoscopist trainee across the 5 sites reached 100.

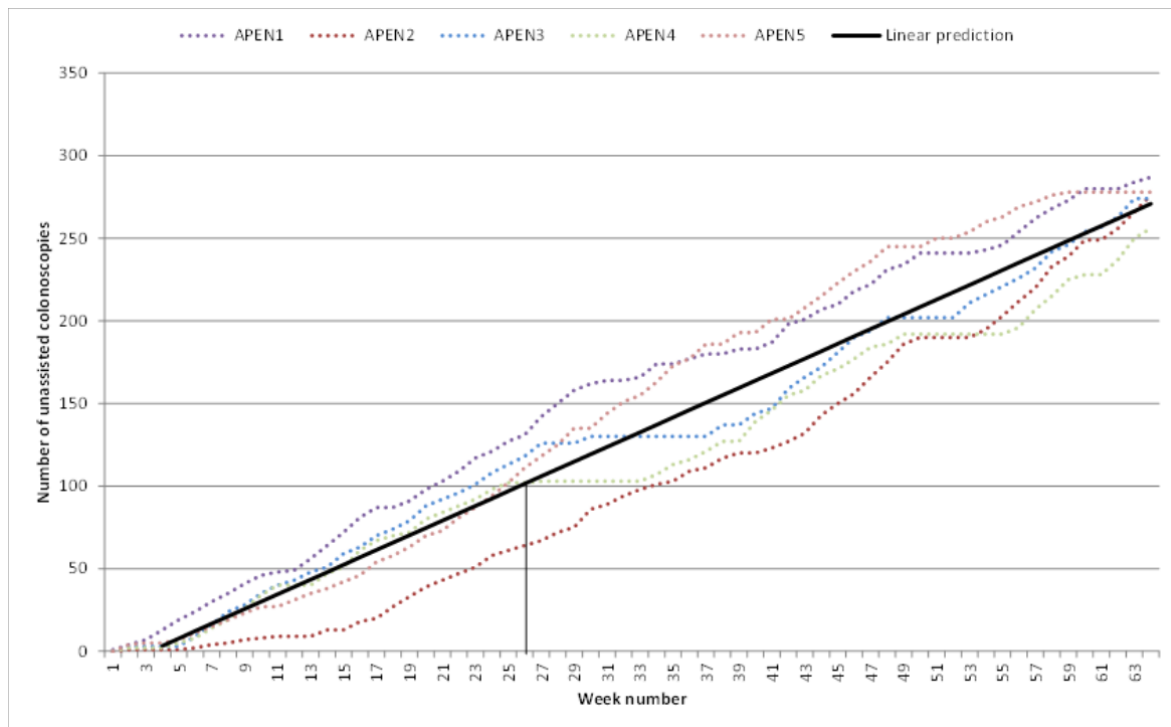


Figure 13 Training trajectories and linear prediction

Training continued until 2014 and in most cases beyond the end of this project. The training data available to this evaluation covered training up till week 64 (end of March 2014). By then,

³ Even though six nurse endoscopist trainees took part in the project, only five are included in this analysis because one had taken extended leave during the training, which would have biased the result.

nurse endoscopist trainees at all sites had performed more than 250 unassisted colonoscopies. While not a formal minimum requirement, the Nurse Endoscopist Training Pathway suggested to aim to complete 200 or more total colonoscopies (assisted and unassisted). This took on average 31 weeks to achieve across the five sites, with the rate of unassisted colonoscopies 69%, while 31% were assisted.

However, the second binding minimum requirement, performing 30 successful snare polypectomies, on average took longer to achieve. The requirement took on average 46 weeks to achieve. Nurse endoscopist trainees typically started performing these procedures successfully between weeks eight and nine, and carried out an average of 0.84 successful snare polypectomies each week thereafter.

The required 90% caecal intubation rate was maintained by all nurse endoscopist trainees.

5.3 Cost of training

Only limited cost information on resource use and costs was provided by the sites. Therefore costs had to be inferred with triangulating across evidence from end of Financial Year Reports, initial budget plans submitted to HWA and a spreadsheet filled in by the sites and with scenario and sensitivity analysis undertaken based on various assumptions made as part of this inference.

Annual salary costs (including oncost) for each nurse endoscopist trainee were \$120,000 per FTE and for a nurse unit manager (0.1 FTE) per annum were \$11,975. Course fees (including the University of Hull course, skills training, hands-on course and train the trainer fees) were \$18,727 per participant. Additionally, an annual licence fee for the nurse endoscopist trainee log book (iTeMS) of \$1,250 was required.

Training of colonoscopies was performed in an endoscopy suite under supervision of a medical supervisor. It was estimated under a plausible set of base case assumptions that the total cost of one hour of an endoscopy suite was \$1,036, including:

- A supervisor at \$172 / hr,
- Anaesthetist \$156 / hr,
- Three nurses' time totalling \$125 / hr and
- Consumables including administration totalling \$583 / hr.

Training lists were assumed to be undertaken in four hour sessions and hence the costs of these four hour lists were estimated to be \$4,144 (four hours multiplied by \$1,036 per hour).

As part of this project APEN1 developed the Nurse Endoscopist Training Pathway that was followed by all nurse endoscopist trainees. The associated costs were \$136,818 plus additional \$37,660 for the development of the log book (iTeMS), totalling \$174,478.

5.4 Scenario modelling

Three training scenarios were calculated. The first was based on the observed training trajectories of the nurse endoscopist trainees in this project, the second was based on the suggested Nurse Endoscopist Training Pathway, and the third was based around qualitative feedback from site visits and project final reports.

5.4.1 Scenario one – observed training pathways

Scenario one is based on the average training pathway observed during this project as described in Section 5.2 and in Section 4.5. The times to reach the minimum requirements were:

- Average time to complete 100 unassisted colonoscopies: 26 weeks

- Average time to complete 200 colonoscopies (assisted and unassisted): 31 weeks
- Average time to successfully complete 30 snare polypectomies: 46 weeks
- Average lists per week: two, each of four hours' duration

On average a minimum of 46 weeks was necessary to fulfil all requirements. The cost for lists over this period were $2 * 46 * \$4,144 = \$381,248$, corresponding to 279 total colonoscopies.

Added to this were course costs of \$18,727; iTeMS licence fee for one year \$1,250 and salary cost over 46 weeks for nurse endoscopist trainee and nurse unit manager of \$116,747, resulting in a total cost of \$517,972 per nurse endoscopist trainee.

From a site perspective these costs could be reduced by revenue from an expected 279 colonoscopies performed in these lists assuming the same rates as observed across the five sites. Assuming these colonoscopies represent same day admission AR-DRG G48C which had a NWAU of 0.3185, then applied to the 2013-14 National Efficient Price of \$4,993 the hospital revenue at sites would be \$1,590 per colonoscopy (IHPA, 2013). Hence the hospital would receive funding of \$443,610 for these 279 colonoscopies, assuming such funding is uncapped. Hence the net average cost per site of training offsetting these revenues would be \$73,362 over 46 weeks under these assumptions.

5.4.2 Scenario two – Nurse Endoscopist Training Pathway

The Nurse Endoscopist Training Pathway requires participating organisations to have service capacity for a minimum of two dedicated training lists per week. This suggests that each nurse endoscopist trainee should have two training lists per week with four patients in each list. It was assumed that 200 total colonoscopies were sufficient to achieve 100 unassisted endoscopies (at least 50% unassisted rate required) and that 30 snare polypectomies were successfully completed during these 200 colonoscopies.

Average time to complete 200 colonoscopies and the other requirements was 25 weeks with two lists, each of four colonoscopies.

Cost for lists were $2 * 25 * \$4,144 = \$207,200$; Course costs \$18,727; iTeMS licence fee for one year \$1,250. Salary cost for nurse endoscopist trainee and nurse unit manager over 25 weeks were \$63,450; and hence total cost \$290,627.

If 200 colonoscopies were performed, and each colonoscopy resulted in revenue of \$1,590 (as in scenario one), the hospital would receive funding of \$318,000. This scenario assumes such funding is uncapped.

Under these, more favourable, assumptions the net cost of training could be more than met by revenue raised by the procedures performed by nurse endoscopists during their training period. However, whether the minimum requirements can be fulfilled within 25 weeks is questionable, particularly in relation to successfully completing 30 snare polypectomies, which took on average 46 weeks during this project. Further, whether meeting the minimum requirements and undertaking the summative DOPS assessment is sufficient to enable nurse endoscopist trainees to practice independently has been raised by the medical supervisors. Scenario three incorporates this feedback.

5.4.3 Scenario three – Extended Supervised Clinical Practice Training

While all nurse endoscopist trainees achieved the minimum requirements set out in the Nurse Endoscopist Training Pathway most of them had not been deemed to be proficient enough to practice independently by their supervisor. The supervisors suggested that more training under supervision was necessary. Based on the final report of the sites it was assumed that this level of proficiency would be reached on average after 18 months (78 weeks).

Scenario three models costs allowing for 78 weeks of supervised training until nurse endoscopist trainees are deemed to practice independently. Assuming two average lists per week of four hours each, and costs of \$4,144 per list as per scenario one and two, the total cost at 78 weeks is $2 * 78 * \$4,144 = \$646,464$.

To these direct costs of carrying out the procedures need to added the course costs of \$18,727, iTeMS licence fee for two years of \$2,500 and salary cost for nurse endoscopist trainee and nurse unit manager of \$197,963, resulting in a total cost of \$865,654 over 78 weeks.

During the training period of 78 weeks it is estimated (based on the observed average throughput for the 64 weeks of the APEN implementation period) that nurse endoscopist trainees will have carried out 488 colonoscopies of which 337 would be unassisted. They would also have successfully completed 57 snare polypectomies thus meeting all training requirements. Assuming revenue of \$1,590 per colonoscopy as in scenario one the hospital would receive funding of \$775,920. Again, this scenario assumes that such funding is uncapped.

Under this set of assumptions, the net average cost per nurse endoscopist trainee offsetting these revenues would be \$89,734 over 18 months (78 weeks).

5.5 Conclusions

Because most nurse endoscopist trainees in the APEN sub-project have not yet attained independent practice and consequently are not operating at full productivity, economic analysis has focused on the costs of training offset against revenue from the procedures undertaken by trainees. Three scenarios were modelled, based on data from sites and other relevant sources.

On average it took nurse endoscopist trainees 46 weeks to reach all three minimum requirements to undertake the summative DOPS assessment: undertaking 100 unassisted colonoscopies (26 weeks); undertaking 200 colonoscopies in total (31 weeks) and successfully completing 30 snare polypectomies (46 weeks). This training on average could be expected in net terms to cost each site (per nurse endoscopist trainee) \$73,362 over 46 weeks with \$517,972 cost of lists and training offset by \$443,610 of revenue raised from performing these procedures.

Potentially, in the most ambitious training pathway (which is based on the timeline proposed in the Nurse Endoscopist Training Pathway), these minimum requirements could be reached at 25 weeks with two lists of four patients each week. The cost to each site (per nurse endoscopist trainee) would be \$290,627 for undertaking lists and training, which would be offset by \$318,000 revenue raised from performing these procedures.

However, more realistically even after minimum requirements were achieved supervisors suggested that on average nurse endoscopist trainees would require 18 months (78 weeks) of training to be able to practice independently. This training on average could be expected in net terms to cost each site (per nurse endoscopist trainee) \$89,634 over 78 weeks with \$865,654 cost of undertaking list and training offset by \$775,920 of revenue raised from performing these procedures.

While these analyses inform factors (i) and (ii) above, the potential for cost savings from nurse endoscopists working independently in practice for (iii) needs further research after the nurse endoscopists have started practicing independently which could then be combined with the analysis here to assess the overall incremental costs and potential incremental effectiveness of nurse endoscopists. Further economic evaluation would need to take into account the continuing proficiency requirements for nurse endoscopists as well as potentially ongoing training requirements. The Nurse Endoscopist Training Pathway sets certain minimum requirements for nurse endoscopists after being deemed to be proficient to practice independently by their supervisor.

The nurse endoscopist should meet the following quality indicators of performance annually:

Colonoscopy Key Performance Indicators:

- *Perform a minimum of 200 procedures per year to maintain competence*
- *Achieve a caecal intubation rate of > 90%*
- *Achieve an ADR (Adenoma Detection Rate) > 10% in over 50 year olds and excluding Inflammatory Bowel Disease*
- *Achieve a polyp retrieval rate of > 90% (HWA, 2014a, p. 30).*

It should be noted that all scenarios modelled here assumed that funding was uncapped. However, in practice the minimum number of colonoscopies to achieve proficiency and realise the training investment would need to be accommodated within the existing, capped funding environment.

6 Sustaining innovation

The APEN sub-project has been successfully implemented in five hospitals. A range of lessons has been learned from the strategies deployed by lead and implementation sites and State health authorities to manage and embed these changes. This section of the report explores the major influences on sustainability and addresses the question from the HWA-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).

There are various conceptualisations of sustainability, in some models the focus is on the factors or conditions that increase the likelihood of sustainability of a specific intervention. Models that examine sustainability from a systems perspective focus on the interplay of environmental forces, contextual influences and the intervention (Stirman et al., 2012). In reality, it is a combination of both that produces the greatest insights about sustaining innovation.

The potential influences on the sustained use of new practices, programs or interventions can be broadly classified into four categories. These categories were identified by Stirman et al. (2012) from a review of the empirical literature relating to the sustainability of new programs and innovations in healthcare settings. The ESOP program evaluation captured several sources of data on factors influencing sustainability. This categorisation provides a way of organising the major evaluative findings for the APEN sub-project.

The major influences on sustainability include:

- 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).

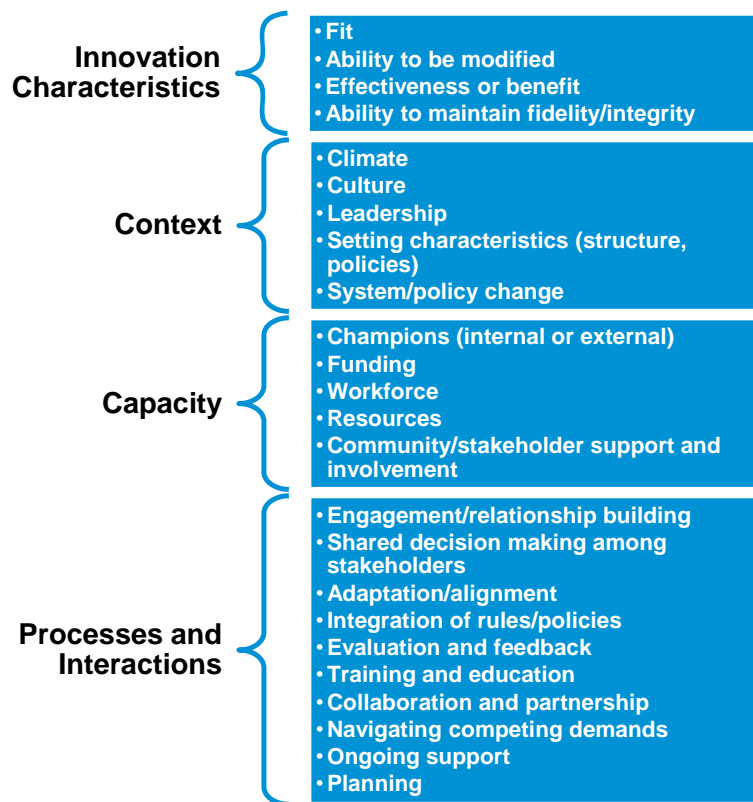


Figure 14 Influences on sustainability (adapted from Stirman et al., 2012).

6.1 Innovation characteristics

The characteristics of the innovation itself influenced sustainability of the nurse endoscopy role. These included the ability of the model of care to be modified, the ability to maintain fidelity of the model during implementation and the perceived effectiveness or benefit generated from the model of care. This was assisted by the development of the 'Nurse Endoscopy Training Pathway' which outlines training requirements to assist a nationally consistent training pathway. The recommended training requirements within the Nurse Endoscopy Training Pathway are based on the experience and evidence developed during the HWA Advanced Practice Endoscopy Nursing project drawing on overseas experience. While some of the education modules used in the project includes material on upper gastrointestinal endoscopy the focus of the HWA project has been on training for colonoscopy (HWA, 2014a).

6.1.1 Ability for modifications

Project teams were able to modify policies and procedures to fit their organisational context and support implementation. For example, APEN5 reviewed their waiting list processes for endoscopy and made significant improvements that improved the accuracy of these lists. Most project teams utilised existing processes for booking the lists for the nurse endoscopist trainee and while this had the advantage of ensuring the trainee saw a broad spectrum of cases, at times it created inefficiencies when the list included patients requiring procedures outside the scope of practice.

"There's no set criteria as far as I'm aware, and it has been challenging at times because I do get very high acuity patients...and inpatients, things like that. And I have mentioned it before but the rationale is, "Well, you should learn on difficult cases," which I understand but sometimes it seems to be one difficult case after another, and sometimes that I'd just like a break. But I understand that the doctors don't get a break either, they just do what they have to do. So, I mean, I am training

and I think that I shouldn't get special consideration. The registrars will do whatever is on their list so should I..." (Stakeholder-Nurse endoscopist trainee)

"The endoscopy booking girl does it... So she's a nurse and she'll just put the cases onto the list in no particular order or – as far as I'm aware." (Stakeholder-Nurse endoscopist trainee)

"But on those four patients, at least two of them are doubles. Like, upper gastrointestinal as well as lower. And I don't do the uppers. So that means that you've got to have extra instruments, and then you've got to reposition the patient. It does add to the procedure time." (Stakeholder-Nurse endoscopist trainee)

"I needed to get the Bookings Department on side otherwise that wasn't going to work, 'cause of course we had quite strict criteria as to what was put on the schedule..." (Stakeholder-Nurse Manager)

Most sites were required to review their patient consent process and this took time to negotiate through the approval process as this involved various groups within the hospital and health district, for example, directors of medical services and health information service managers. The trainees and stakeholders identified this as an issue that should have been resolved prior to project commencement.

"I am still waiting for the hospital to develop a consent form for my patients... this is still not done, I would have like to have seen this established across all sites before we commenced the role." (Stakeholder-Nurse endoscopist trainee)

6.1.2 Implementation fidelity

The APEN1 lead site supported a nurse practitioner model for nurse endoscopy, whereas the Victorian sites pursued an advanced practice nurse model of care. This generated different views about the training and personal qualities required to carry out this work safely and effectively. Project participants from APEN1 expressed concern that this inconsistency across sites and States may affect stakeholder trust in the model, especially among medical practitioners, and this may have negative impacts on sustainability.

The trainees from APEN1 and APEN4 reported that they spent time in gastroenterology outpatient clinics working collaboratively with the medical specialist. All trainees participated in educational meetings within their respective departments.

"So I think that's where our role fits in, a lot of that patient coordination, a lot of that follow-up of our own patients." (Stakeholder-Nurse Endoscopy Trainee)

Only one of the four trainees in Victoria had been signed off by their Head of Gastroenterology and the hospital by the conclusion of the project. The remaining three trainees were estimated to be three to six months from final sign off according to their respective medical supervisors. This seems to indicate that 12 to 18 months may be insufficient time to develop the skills required to perform independent colonoscopy at a level required by the Health Services. Following discussion with all of the medical consultants, the general consensus was that 200 colonoscopies were insufficient in number to attain a level of proficiency required for independent practice. The measure of 200 colonoscopies, the minimum required to complete the training, should be reviewed in light of the results.

It will be important to consider the usefulness of a standardised training program, a consistent description of the nurse endoscopist workforce role and a national governance framework. This would potentially reduce variation in this workforce into the future, as occurred in the United Kingdom.

6.1.3 Effectiveness or benefit

Project teams that consistently communicated with the various stakeholders within their organisation and were transparent about presenting early data relating to the nurse endoscopist trainees' achievements were better able to sustain interest in the initiative. Presenting early wins and communicating widely to many different organisational stakeholders helped silence some critics, however, a range of medical personnel remained unconvinced of the benefit and therefore sustainability of the role by project end. The teams who used this strategy most effectively listened to the criticisms of their project and communicated information that addressed this. Some APEN project teams used information related to reduced waiting list times for an endoscopic procedure to demonstrate the value of the initiative, others presented comparable data on key performance metrics used to evaluate competency and clinical effectiveness.

6.2 Context

The key 'contextual' factors that have impacted sustainability of the APEN sub-project included: the organisational climate and culture, leadership, characteristics of the localities in which the projects were based and system / policy change.

6.2.1 Organisational climate

In the funding climate, cuts to health budgets were a risk and limited nurse endoscopy trainees' access to dedicated training lists in order to practise their skills, and reduced the possibility of gaining a permanent appointment at the end of the project. This was frequently a source of conflict as advanced medical trainees and even consultants at times complained that their access to lists had been reduced because of the nurse endoscopy training program.

"Certainly some scepticism and some resistance, but only in the sense of why do we need this, and also we have some access difficulties in providing training for our own surgical trainees or gastroenterology trainees, so this is another party. So, getting in the way of this, but I think that's a problem to be addressed, not a reason to stop or not to have the program". (Stakeholder-Surgical specialist)

6.2.2 Organisational culture

As the APEN model of care involves nurses performing colonoscopies which have traditionally been performed by medical personnel, the role was threatening for some members of medical staff. Senior support proved vital for the APEN role as the trainee moved into an area previously only occupied by medical personnel. Senior support will aid acceptance at the registrar level.

"So as you'll see when you talk to the trainers, they were very supportive and very - they thought it was a good idea. But they are probably in the minority." (Stakeholder-Medical specialist)

"They see it as a threat. And even though they see it as a threat to private, and so it's been emphasised and reemphasised that this is only in public hospitals, and not in private, because they see the nurses going out and setting up their own private scope, and so that's a problem for them. The current model, and again, just talking about the current model - if it's public, then that's really not a threat. But others have the same concerns that I've just expressed about the degree of training, and how much you know as a doctor versus how much you know as a nurse. And that's probably where a lot of this opposition comes in. So I think if it's managed well, you can overcome that opposition." (Stakeholder-Medical specialist)

"We haven't got to the real crunch phase which is where the gastroenterologist is not in the room, that's the next phase and some of our anaesthetists - even when

you have the gastroenterologist in the room and no nurse endoscopist in the room you can't settle them down." (Stakeholder-Medical specialist)

6.2.3 System / policy change

APEN lead sites worked collaboratively to address professional and legislative barriers as they emerged. The APEN sub-project was challenged by the issues of credentialing and professional recognition of the ESOP role. Most project teams recognised that change had to be incremental – within their organisations, their professions and their State.

Consideration should be given to the establishment of a national body to provide direction and oversight of the implementation of nurse endoscopy in Australia beyond this project. The establishment of the Victorian State Endoscopy Training Centre (SETC) may go some way in providing this direction and oversight, and is certainly an important condition for sustainability in Victoria.

The Victorian Department of Health announced the establishment of a SETC at APEN2 in January 2014. Its role is to work in partnership with Health Services across the state to provide training and support for new nurse endoscopy positions in Victoria. The Department of Health Victoria has provided funding for an initial four year period to assist with the educational training, the practical training and support, as required, to Health Services who meet the Organisational Readiness required to obtain funding for a nurse endoscopist.⁴

APEN2 stated:

"The Victorian State Government, represented by the Department of Health, values the outcomes of this project that it has funded the State Endoscopy Training Centre at APEN2. The SETC's role is to co-ordinate, train and support Victorian hospitals to introduce Nurse Endoscopists into their workforce.

The SETC and the Department of Health Victoria have developed an Organisational Readiness Chart for institutions considering the introduction of a Nurse Endoscopist to their Gastroenterology team. This provides practical guidelines which have been learned through this program. Some fundamentals are necessary to successfully implement this new role into a hospital. Apart from a support network, hospitals must have the physical capacity to introduce more procedures. If the existing endoscopy suites are at capacity at a hospital then there will issues with providing sufficient training lists for the Nurse Endoscopist. Other fundamentals include enough equipment, an appropriate patient mix and the correct governance to establish this new role into the hospital.

The SETC will work in partnership with all stakeholders to continue the provision of this pathway for advance practice nurses in Victoria for the benefit of patients."

In Queensland, prospects for sustainability have been bolstered, with the Nursing and Midwifery Office, Queensland Health, indicating that the Queensland Government was committed to the establishment of a nurse endoscopy workforce.⁵

The issue of nurse endoscopist positions being filled by 'advanced practice nurse endoscopists' or nurse practitioners was also associated with sustainability. Several stakeholder groups felt that the advanced scope of practice nature of the role restricted the ability of the nurse endoscopist to work autonomously and independently. Some trainees expressed interest in becoming nurse practitioners to achieve this autonomy. There were contrasting views with other stakeholders convinced of the effectiveness of the advanced practice role. The appropriate

⁴ <http://www.health.vic.gov.au/workforce/reform/nurse-endoscopist.htm>, accessed 20 July 2014.

⁵ <http://www.health.qld.gov.au/nmqq/optimisingnursing/endoscopy.asp>, accessed 20 July 2014.

model of care is clearly a decision that has to be made within the context of each organisation. The sustainability of either model of care has not yet been tested in the Australian context.

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 nurse endoscopist trainees themselves.

6.3.1 Change champions

Clinical leads were the most critical change champions, and contributed to acceptance of change and the achievement of projects' vision. Champions came from various clinical backgrounds and roles within the organisation and included medical and surgical specialists and a range of nursing personnel.

"I think the amount of, sort of behind the scenes politics, I think can't be underestimated. So the amount of, sort of, quiet chats on the side, and just – again I think the key to this is just quietly plodding along. Because it is such a significant kind of change for people, I think the worst thing you can do is go out there beating your chest and just saying this is fantastic, this is the way to do it. The only way people are going to be accepted, is that oh, actually, sort of, seven out of eight tertiary hospitals have one of these positions. Maybe we should get one as well." (Stakeholder-Medical specialist)

Nurse endoscopist trainees themselves acted as change champions, as did project managers. Their enthusiasm for the project and willingness to engage with their colleagues in the endoscopy unit and other areas of the hospital contributed to positive perceptions of the role.

"I think that this has to be a collegiate development. The sites have to have a person who is a champion to establish this position. It will take 10 years or 15 years before these positions are well enough established that they will just – you can go and work in this hospital, because the role has been there long enough that it functions, and then you can tweak the role to your interest. That's what happened in the United Kingdom, and I think that's what will happen here. But in the initial phases you cannot force it, because unless you have somebody who is prepared to – there is still a lot of negativity by the medicos, and unless you have a doctor who is prepared to wear that from their colleagues, it's not going to happen." (Stakeholder-Nurse Manager)

6.3.2 Workforce characteristics

The attributes of the nurse endoscopist trainees themselves supported sustainability of the role. Highly experienced trainee nurse endoscopists were recruited with one nurse with previous experience in a similar role in the United Kingdom. Several trainee nurse endoscopists accepted a lower level of remuneration in order to participate in the training program (i.e. in moving from their pre-existing position some dropped pay). One nurse noted that she had moved interstate to take up the role and one reported returning early from maternity leave demonstrating a high level of commitment to embarking upon this new workforce role.

However, back-up staff resources were not identified early during the set-up phase to support project implementation in the event of planned leave and unplanned absences. As projects generally had less than 1.0 FTE nurse endoscopist, any prolonged absence from this position impacted on patient throughput and project impact. Having only one trainee position at each site posed a risk to sustainability, in the event that the trainee left the organisation. The establishment of the SETC however has somewhat mitigated this risk, as it provides a 'pipeline' of new recruits, not only building critical mass but also addressing the issue of replacement.

A risk to sustainability of the APEN sub-project was the potential for individual practitioners working at geographically dispersed sites to feel isolated. This was addressed by establishing a network of trainee nurse endoscopists across the projects, effectively developing a partnership between the trainees themselves. Having the trainees come together for study days proved beneficial in enabling the nurse endoscopists to build ties with others who shared and understood their challenges and experiences. The trainee nurse endoscopists formed a strong 'informal' network and regularly shared information as a group.

The intention of all trainee nurse endoscopists was to continue in the role where possible. For example, results from analysis of the 'ESOP personnel survey' (Thompson et al., 2012b) showed that no respondents indicated that they did not plan to stay on in their expanded role for the foreseeable future (two of the six respondents provided a neutral rating). These results point towards the sustainability of the nurse endoscopist role. There was limited turnover during the implementation of the program with one trainee from APEN2 resigning two weeks after commencement in the early stages of the project.

The nurse endoscopist trainees worked hard to 'fit in' and adapt to the workplace, this certainly helped their acceptance at a personal level.

"...because [name removed] is very good, and is very personable... like everyone likes the nurse endoscopist. So that made it easy. Did it change people's perception of the role as it stood? No, I don't think it did." (Stakeholder-Medical specialist)

Several project teams identified the 'flexibility' the nurse endoscopist contributed to the workforce mix as a key advantage of the role. The flexibility of the role increased when the nurse endoscopist worked in a full-time capacity. What was meant by this was that the organisation had the capacity to back-fill lists that would otherwise be cancelled by the absence of a medical officer.

"And so the flexibility of the workforce of a staff nurse working as a nurse endoscopist is what's going to provide the bang for buck for public hospitals." (Stakeholder-Nurse Manager)

6.3.3 Funding

The decision to offer permanent appointments to the organisation for all Victorian trainee nurse endoscopists supported sustainability of the role. At the time of this report all nurses had a continuing appointment in their respective organisation.

6.3.4 Resources

Most project teams required additional resources for training lists; funding for two training lists per week was needed to ensure the trainee progressed appropriately along the training pathway. Once the nurse endoscopist is capable of practising independently these lists should generate revenue to cover their costs, however several facilities reported that the additional lists had to fit within their existing activity based funding cap.

During the training stage significant investment in clinical supervision was required; whilst all sites had a primary coordinator of clinical training or medical mentor they all used multiple clinical supervisors. This investment may not be sustainable and, indeed, may not be available at other sites.

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 nurse endoscopist trainee 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 APEN project teams and used the concept of the Johari Window as a lens to identify key stakeholders of high influence (Galpin et al., 1995). Project teams identified internal and external stakeholders, planned engagement, and then built, managed and sustained relationships, with varying degrees of success.

One of the key aspects of sustainability was engaging stakeholders at the start and throughout the project. There was a high level of stakeholder engagement amongst internal stakeholders but there remains resistance from small pockets of medical personnel. Important internal stakeholders for the APEN project sites included clinical and administration staff within the Endoscopy Unit, endoscopy nurses, nursing leadership including Directors of Nursing and regional executive bodies, medical specialists and registrar trainees, and hospital management including the CEO and Divisional Director(s).

Stakeholders identified as having high influence and high involvement were mostly effectively engaged, particularly through inclusion on project steering committees. The steering committees had representation from the Executive, Gastroenterology and Nursing teams, as well as other consultants and educational representatives. Several medical stakeholders reported that they chose to be involved in the training program so they could see at 'first hand' what pathway the trainees followed.

"Personally I think that there is a role for nurse endoscopists because we have a duty to service the community. If we can train them in the appropriate way. So that's obviously why I've wanted to become involved, to make sure that we are training people appropriately for our patients." (Stakeholder-Surgical specialist)

The engagement and support of hospitals' Executive Teams was essential to ensure an outcome when opposition to the role from consultants was experienced. The Executive's decisions were communicated through the Heads of Department to all consultants, allowing issues to be addressed through discussion and compromise or through education.

Sites with high engagement and involvement of the Nurse Unit Manager Endoscopy and Director of Gastroenterology and/or Endoscopy benefited significantly from this input.

Those groups with low influence and high involvement, including patients and the community more broadly were also engaged. A member of the Consumer Health Forum was appointed as a representative on the APEN Project Advisory Group. Patient engagement was critical and from the initial face to face contact patients were informed about the role of the nurse endoscopist trainee. Patients were central to the development of consent forms. In addition, pamphlets were developed by APEN5 to give to patients about Nurse Endoscopists. APEN4 recognised meaningfully engaging with non-English speaking consumers as a challenge and an area that would need to be improved in undertaking a similar project, and worked with their consumer engagement manager to determine a successful method to achieve representation.

6.4.2 Collaboration and partnership development

Many instances of collaboration and partnerships were evident within the APEN sub-project. Key partnerships included the Victorian Department of Health, with all Victorian project leads and HWA attending Department of Health Executive Committee meetings.

The APEN lead sites provided good examples of what can be achieved by engaging State Health Departments. It was through their ongoing collaboration with HWA and jurisdictional

representatives that they secured significant wins in ongoing government commitments to train nurse endoscopists in the future.

A key stakeholder for the Victorian project sites was the Victorian Government. The engagement of the Victorian Department of Health was evident through the contribution of additional funding, representation on the steering groups and membership of the PAG. As a direct result of this high-level engagement, the Department has funded the State Endoscopy Training Centre.

The APEN lead sites consistently worked with professional bodies to keep them informed and discuss issues relating to training and credentialing. They also engaged with academic institutions and / or professional bodies to try and establish academic credit or recognition of the training implemented throughout the ESOP program.

6.4.3 Integration of policies and procedures

Safety was a primary concern related to the new nurse endoscopy role and as such ensuring patient safety was an important sustainability strategy. Supervision was consistently provided by medical and surgical specialists. In addition, risks were minimised with trainees completing simulation training before commencing 'hands on' practice, medical trainers supervising all procedures on a 1:1 basis, limiting the number of cases per training list and appropriate triaging of patients.

6.4.4 Training and education

The development of the National Nurse Endoscopist Training Pathway by APEN1 in consultation with APEN2 in Victoria, and the Model of Care for Nurse Practitioners in Gastroenterology, are important achievements of the APEN sub-project (HWA, 2014a). The recognition of the training was a major issue to be addressed in terms of sustainability. There is currently no protocol for the recognition of training associated with this role and no recognised body that will recognise the current training pathway. A professional body is needed to recognise and endorse the training to mitigate the risk of an institution commencing a training pathway without following the criteria required. Standardisation of training is needed as is a process for post training credentialing and professional accreditation of nurse endoscopists. Attempts to establish a group of professionals who will recognise the training may address this and would result in a measure of satisfactory training across different public hospitals.

The study and training requirements associated with the trainee nurse endoscopist role were demanding and could present a barrier to the sustainability of the project for future trainees.

6.4.5 Adaptation / alignment

Although the defined practice scope of the delegated role focused on lower gastrointestinal endoscopy, there is an argument that expanding the scope of practice to allow nurses to perform upper gastrointestinal gastroscopies would increase the versatility of the role. Anecdotally, a number of interviewees noted that gastroscopies are actually easier to perform than endoscopies, and should be included within the role's scope.

"Nurse endoscopy may very well be cost effective if you think about gastroscopy or flexible sigmoidoscopy." (Stakeholder-Medical)

Research has shown that experienced nurses can perform upper gastrointestinal endoscopy "safely in everyday clinical practice and with as little discomfort and as much patient satisfaction as medical staff" (Smale et al., 2003) and that "nurses can provide an accurate general diagnostic upper gastrointestinal endoscopy service as competently as doctors" (Meaden et al., 2006).

"I mean, if I can do a colonoscopy I think I'm pretty safe with doing a gastroscopy. I think there's more pathology in terms of things that can go wrong with an upper GI."

So you have to really get your head around that kind of stuff, which I think will come with time.” (Stakeholder-Nurse endoscopist trainee)

6.4.6 Integration of rules / policies

Processes for identifying uncomplicated surveillance colonoscopy patients need to be improved to allow the nurse endoscopist to perform the procedure in a shorter waiting period. This would allow patients with more complicated issues to be dealt with by gastroenterologists and in turn the aim is to lessen the waiting time for these patients as well. It appears that which patients were suitable for management by the APEN trainee was not well understood. This may not have been sufficiently well developed during implementation of the project. For example, clinical examiners who attended APEN4 for the final assessment of the nurse endoscopist trainee found that selection of patients for the trainee did not demonstrate sufficient consideration for her skill level and scope of practice.

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 APEN 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 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 (Thomspon 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 this 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 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. The mean score for eight of the 10 factors remained constant at Time 1 and Time 2. The only changes in scores were for the factors ‘Effectiveness of the system to monitor progress’ and ‘Staff behaviours toward sustaining the change’, both of which improved marginally in relation to the maximum possible score. Despite the lack of change in scores each factor was rated relatively highly at both time points, indicating that prospects for sustainability were viewed positively throughout the project.

The factors with the greatest potential for improvement by project end were ‘Benefits beyond helping patients’, ‘Infrastructure for sustainability’ and ‘Staff behaviours toward sustaining the change’, in that order. This shows the factors that APEN project sites had most difficulty improving; which can be viewed as the greatest risks to sustainability. The most significant problem was that while benefits of the model for patients may have been clear, sites struggled to demonstrate that the model also improved efficiency in the endoscopy unit and made jobs easier. In addition, it was felt that not all infrastructure was in place to sustain the change, which may include appropriate staff, facilities and equipment, as well as policies, procedures and communication systems. The behaviours and attitudes of staff towards sustaining the model, in particular a lack of belief that the improvement would be sustained, presented another risk, and only a small improvement in this area was realised throughout the course of the project.

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 begs the question as to how this would be maintained beyond the life of each project.

Data from evaluation risk monitoring (from the early to later stages of the sub-project) was also positive, further supporting the potential for sites to sustain the initiative. The score for each item improved over the two time periods. Although the most significant risk at Time 1 was for the item 'The project's impact is generating support for this change to be sustained', the view of project officers markedly improved on this matter by the conclusion of the project. In addition, the overall increase in the aggregate mean was relatively large for other items related to sustainability ('Changes to systems created by the project will remain after the project ends' and 'Changes to practices undertaken by the project will remain after the project ends'). It was also felt that more did not need to be done to engage stakeholders and build support for change. These results all bode well for the sustainability prospects of most projects.

All project teams, with the encouragement of HWA, worked to sustain the nurse endoscopy role. 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, all organisations maintained their commitment to employ the nurse endoscopists on an ongoing basis. Not all had become independent. Funding had not necessarily been determined. The establishment of the SETC and the support of Queensland Health for nurse endoscopy were important developments in terms of sustainability.

Table 18 outlines the status of the project at each site at the time of writing this report.

Table 18 Sustainability prospects – APEN sub-project

APEN project site	Current status	Innovation sustained
APEN1	The project team have sought the creation and permanent appointment of two full-time nurse practitioners in gastroenterology positions to sustain the project outcomes. One of the FTE positions will be filled on a part-time basis in 2014 due to maternity leave. APEN1 is committed to continuing the role but is still pursuing additional recurrent funding to support the service.	Yes
APEN2	The intention is to retain the one nurse endoscopy position trained through the HWA initiative, employed at 0.8 FTE. The project team was hopeful that this nurse endoscopist trainee would be signed off to practice independently by mid-2014.	Yes
APEN3	The intention is to retain the one nurse endoscopy position trained through the HWA initiative, employed at 0.8 FTE. The project team was hopeful that this nurse endoscopist trainee would be signed off to practice independently by mid-2014.	Yes
APEN4	The intention is to retain the one nurse endoscopy position that is employed at 0.8 FTE on a two-year contract until November 2014. The project team was hopeful that this nurse endoscopist trainee would be signed off to practice independently by mid-2014. Consultant mentors will support the APEN trainee in continuing in her role once she is practicing independently.	Yes
APEN5	The foundations have been laid for the ongoing role of the nurse endoscopist. The third endoscopy suite is fully functioning and criteria have been established to identify patients suitable for the NE list. In March 2014 the nurse endoscopist trainee completed all training requirements and was deemed proficient, and was therefore able to independently perform endoscopy within an expanded scope of practice. In addition, all documentation to support the ongoing sustainability of the NE role has been developed, including the expanded scope of practice application, policies and	Yes

APEN project site	Current status	Innovation sustained
	procedures, and a business case for ongoing funding. It is anticipated that all documentation will be approved before the current NE returns from leave and resumes independent practice. The sustainability of the project will be reinforced by the dissemination of findings to other organisations, consumers, and other stakeholders.	

6.6 Dissemination

The evaluation framework for the ESOP program also seeks to understand how project teams disseminated information relating to the APEN sub-project – to answer the question, ‘Who did you tell?’ Disseminating information about the APEN 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 nursing and endoscopy-specific professions.

The following results, from analysis of dissemination logs (Thompson et al., 2012b) submitted by four of the five project sites, provide an indication of the dissemination strategies employed, the activities undertaken, and the breadth of these activities.

Dissemination was conducted relatively consistently throughout the project, suggesting that some effort was made to disseminate information at each stage of the project (i.e. set-up, establishment, implementation and evaluation). However, overall a lower number of activities were reported in comparison to other sub-projects, which may be due to the predominantly internal focus of the project – the Endoscopy Unit. Sustaining the change effort requires ongoing communication and project teams may have needed to invest more energy in regular dissemination activities throughout the life of the project. Dissemination towards the conclusion of the project is particularly important, and can provide an opportunity to disseminate project achievements. For the APEN 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 within the organisation was the most common method of dissemination employed. Project team members, project managers and other representatives of the organisation were largely responsible for dissemination.

There was a relatively equal balance between disseminating information for the purpose of capacity building and sustainability (which included information shared with project stakeholders, such as 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) and disseminating for the purpose of 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 audience for different activities included staff of the local organisation (the respective hospital or health service), as well as a state and national audiences. Only very few activities targeted the local community as an audience. Examples of dissemination activities aimed at a national audience included publication in the Journal of the Gastroenterological Nurses College of Australia, launch of the APEN2's SETC webpage and a presentation to the Australian and New Zealand Council of Chief Nurses and Midwives. Other activities involved dissemination to other HWA-APEN sites and a Nurse Endoscopist presentation at the Gastroenterology Journal Club. An example of high profile coverage was APEN2 receiving an award at the Victorian Public Healthcare Awards

(the Victorian Minister for Health's Award for achieving a highly capable and engaged workforce).⁶

The ensuing dissemination effort by APEN2 resulting from winning this award, including discussions with representatives of other hospital services in attendance at the presentation and other related correspondence and enquiries, was significant. However, overall relatively few activities resulted in someone who heard about the project following up to seek more information, suggesting that the level interest generated among some audience members was not high, and providing an indication that some dissemination was not particularly successful.

HWA also undertook some dissemination activities, promoting awareness of the HWA-APEN sub-project and its achievements. For instance, the sub-project was featured in a progress report on HWA's ESOP and Aged Care Workforce Reform programs, accessed via the HWA website (HWA, 2014b).

Project officers rated the overall effectiveness of each dissemination activity fairly positively. The most effective activities were perceived to be presentations to staff within the organisation. Of the few activities which were given a negative rating, some related to the launch of the SETC web page. Nonetheless, other activities relating to the SETC were perceived more positively, for example g. an Expression of Interest sent by SETC to all Victorian public hospitals to participate in the Victorian Nurse Endoscopy Program.

As a result of the project more health professionals are now aware of the role and the SETC is being approached to present at various conferences. This will continue the education regarding the role of the nurse endoscopist within the health professions. The SETC webpage contains information about the program in Victoria and continues to be developed.

While suggesting that dissemination strategies were reasonably 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.

6.7 Summary

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

- The advanced practice in endoscopy nursing model of care is capable of adaptation within a large teaching hospital. Both the nurse practitioner model and advanced nursing practice model have been effectively implemented. Project teams were able to modify patient consent processes and refine existing waiting list processes to accommodate the nurse endoscopist role.
- Sustainability will founder without the strong support of key senior medical stakeholders. The clinical lead is a pivotal appointment in the implementation site.
- Change champions, whether internal or external to the organisation, are critical and increase acceptance of the APEN model of care among clinicians.
- Pockets of resistance remain among medical, surgical and anaesthetic specialists.
- The development of the 'Nurse Endoscopy Training Pathway' has provided a comprehensive, safe and effective way to train nurse endoscopists.
- Collaboration with an Australian University to develop a recognised post-graduate qualification would improve transferability of the nurse endoscopist role.
- Establishing a small trainee cohort to ensure the trainees are not professionally isolated is likely to improve retention and training completion.

⁶ <http://www.health.vic.gov.au/healthcareawards/winners/2013.htm>

- Communicating openly about performance metrics and the training progress of the nurse within the endoscopy unit and broader organisation helps embed the role and may silence some critics.
- In a fiscally restrained environment, protecting training lists allocated to the nurse endoscopists may be challenging.
- Establishing a lead site with experience implementing nurse endoscopy training to assist with new service development and support ongoing services is an effective sustainability strategy.
- The APEN lead sites consistently worked with professional bodies to keep them informed and discuss issues relating to training and credentialing.
- Jurisdictional engagement early in the development of the role and training program will support sustainability of the role in the medium to longer term.
- The attributes of the nurse endoscopist trainees themselves supported sustainability of the role as they worked hard to 'fit in' to the workplace and develop professional relationships.
- Maintaining a high level of investment in project management, positions projects well in terms of sustainability.
- Dissemination towards the conclusion of the project is particularly important, and can provide an opportunity to disseminate project achievements.

In conclusion, all project teams are committed to sustaining the nurse endoscopy role. APEN1 is pursuing recurrent funding for two full-time positions. Through collective effort led by HWA its jurisdiction is being supported in the implementation of a State-wide nurse endoscopy training strategy. APEN2 has permanently appointed their nurse endoscopist trainee and is continuing to provide leadership in expanding nurse endoscopy training in conjunction with the State Department of Health. Through the establishment of the SETC two additional nurse endoscopist trainee positions have been funded in Victoria. APEN3, APEN4 and APEN5 are committed to employing their nurse endoscopist on an ongoing basis. None of these five implementation sites have decided to recruit another nurse endoscopist trainee at this stage, their focus is sustaining their current personnel and supporting their continued growth and development.

7 Prospects for wider implementation

7.1 Evidence of effectiveness of the APEN model

The starting point for decision-making around wider implementation of any innovation is the extent and quality of the available evidence of effectiveness. There is, however, a lack of evidence to date on the APEN model.

One recent systematic review and meta-analysis examined safety and quality outcomes for endoscopic procedures performed by any health professionals other than doctors (Day et al., 2014). Practitioners included nurses, nurse practitioners and physician assistants. Twenty-four studies met inclusion criteria, reporting outcomes such as polyp detection rate, colorectal cancer detection rate and adverse events.

As can be seen from Table 19, most of the included studies were observational (primarily cohort studies) rather than randomised controlled trials (RCTs), with most investigating lower gastrointestinal endoscopy rather than upper endoscopy. Most practitioners were nurses rather than what the reviewers referred to as 'mid-level practitioners' which they defined as either nurse practitioners or physician assistants. Half the studies involved screening for colorectal cancer. Six studies compared the performance of doctors and nurses; three studies compared doctors and mid-level practitioners. Only one study was undertaken in Australia (Morcom et al., 2004). The authors concluded that:

"The largest body of literature on this topic focused on nurses and mid-level providers performing flexible sigmoidoscopies, with non-physicians achieving endoscopic quality results similar to those of physicians. While fewer data were available for colonoscopies and upper endoscopies, similar efficacy and safety between non-physicians and physicians was evident." (Day et al., 2014, p. 407)

Within the context of the APEN sub-project, it is worth noting the lack of studies investigating colonoscopies (the focus of the APEN model) and that the authors of the review made no attempt to draw any conclusions about the outcomes achieved by nurses versus nurse practitioners (because that was not the focus of the review).

Table 19 Number of studies included in the systematic review by Day et al. (2014)

	Mid-level practitioners		Nurses		Total
	Observational	RCTs	Observational	RCTs	
Flexible sigmoidoscopy	7	0	10	2	19
Colonoscopy	0	1	2	0	3
Upper endoscopy	0	0	1	2	3
Total	7	1	13	4	25

Note: one of the RCTs involved nurses performing flexible sigmoidoscopy and upper endoscopy, hence the total in the table is 25, rather than the 24 studies included in the systematic review.

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 APEN model has these advantageous characteristics is summarised in Table 20.

Table 20 Attributes of the APEN model

Relative advantage	Relative advantage cannot be fully assessed until trainees are qualified and working at full capacity when their impact on access, quality and efficiency can be more fairly judged. Modelling of training costs offset against revenues from the procedures performed by nurse endoscopist trainees indicates a net cost to the organisation of almost \$90,000 per trainee under the most realistic of three scenarios.
Compatibility	The practice of nurse endoscopists is compatible with a long-standing trend to advance the practice of nurses and expand their scope of practice by performing procedures previously the preserve of medical practitioners. Medical stakeholders see the model as filling a useful niche in existing large, metropolitan endoscopy services where appropriate supervision and infrastructure support is available, although most unmet demand for endoscopy exists in rural and outer urban locations.
Complexity	The scope of practice within the APEN model was largely restricted to colonoscopies. Although the training requirements are considerable, once competency is achieved the ‘model’ is relatively straightforward. There is the potential to introduce greater complexity by expanding practice to include upper gastrointestinal procedures and utilise the nurses in a broader role e.g. in outpatient clinics.
Trialability	The extensive training requirements of the APEN model mean that the model should not be ‘tried out’. A considerable financial and ‘in-kind’ contribution and stakeholder engagement is needed to establish the model and this level of investment requires a commitment to ensuring demonstrable and sustainable outcomes in the medium- to long-term.
Observability	It is expected that the nurse endoscopy service will substitute for usual practice to some extent, thus reducing costs of care for less complex cases, but this has yet to be demonstrated in practice. The benefits of the model will not be apparent until the nurse endoscopist trainees are proficient. Because most trainees have not yet achieved independent practice, available data will under-estimate the potential benefits of wider implementation.
Adaptability	The model can be varied to meet local circumstances but there are core elements which cannot be varied, particularly the training requirements; need for medical mentoring and supervision; and dedicated resources for performing endoscopies.
Risk	The results of the evaluation indicate that the model is relatively low risk, as long as appropriate clinical governance arrangements are in place, particularly mentoring and supervision by medical staff. There is no evidence of increased risk and adverse outcomes with nurse endoscopist trainees.

7.3 Requirements for success

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

- a receptive context for change.
- selecting staff with the necessary attributes for the role.
- a well-structured, well-resourced training program with strong medical supervision and mentorship supported by an ongoing credentialing process.

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). For the APEN sub-project, particularly important characteristics of a receptive context are management support at all levels of the organisation; engagement and support of key

medical leaders (e.g. gastroenterologists, colorectal surgeons, anaesthetists); and adequate resources (e.g. dedicated lists for the nurse endoscopists; upgrading of existing facilities and equipment). For example, one of the project final reports concluded:

'Support is required for success at all levels starting with the Executive team, the consultants (Gastroenterologists, Colorectal Surgeons and Anaesthetists) and the endoscopy nursing staff.' (APEN2 final report)

The support of key medical leaders is imperative to overcome any resistance which may arise from medical staff.

Staff recruited to train as nurse endoscopists require a mix of personal qualities (assertiveness, self-motivation, commitment to the role), knowledge and skills (good hand-eye coordination, good fine motor skills), which were well summarised in one of the project final reports:

'Selection of the best candidate for the role of APEN is also vital for success. The ideal candidate needs to be resilient, courageous, a quick learner, be assertive, have good hand-eye coordination and motor skills, be autonomous and independent in their learning, have excellent communication skills and emotional intelligence, a mind for detail and data analysis, excellent presentation skills and a patient focus.' (APEN4 final report)

This sub-project has resulted in a training pathway that provides a consistent and coordinated approach facilitating education of nurse endoscopists. The training program has a structured approach to assessment, mentorship and medical supervision. It requires organisational commitment and a considerable investment in resources, with strong medical supervision and mentorship. National recognition and professional issues including credentialing and re credentialing processes may influence sustainability and wider implementation.

7.4 National scalability

One important point to note with regard to wider implementation is that full implementation was not achieved, with some trainees yet to complete the required number of procedures and be assessed as proficient at time of reporting. It is therefore difficult to make judgements about the full impact of the nurse endoscopists on, for example, patient throughput. Another point influencing wider implementation is that the APEN sub-project involved large metropolitan hospitals, ranging in size from 360 to 688 beds. It is therefore not possible to make firm judgements about the ability of smaller hospitals to take on the responsibility for training nurse endoscopists. However, the considerable investment of time required by medical specialists to mentor and supervise trainees is far less likely to be available in smaller hospitals. This leads to two separate questions for consideration by anyone interested in utilising the skills of nurse endoscopists:

- What is the optimal environment for training nurse endoscopists?
- What is the optimal environment for employing nurse endoscopists once they are trained?

Much of the rationale for the APEN sub-project is based on meeting the increasing demand for endoscopy arising from implementation of the NBCSP introduced in 2006. This is tempered by the knowledge that only 24% of same-day colonoscopies are performed in public hospitals, with the remainder performed either in public hospitals or private free-standing day-only facilities (AIHW, 2013). Comments by doctors interviewed for the evaluation indicate that there would be fierce opposition from the medical profession to nurse endoscopists performing colonoscopies (or any type of endoscopy) in the private sector and there is no suggestion that this is being contemplated at this time. This limits wider implementation of the model.

"And the minute anybody thinks that nurse endoscopists are going to start in private practice there'll be a large push-back because then you're looking at people's

incomes and living, and then you'll have no one wanting to train them, because they'll feel like they are training up their competitor. And so I think part of the concern from the medical side is that they feel like eventually they are going to train up their competitors. Stupidly, because every medical registrar we train is also going to be competing against them in the private workplace. (Stakeholder-Medical)

In some jurisdictions, current funding models for endoscopy also limit the number of procedures hospitals can schedule in a given period, as they will not be funded for additional procedures. Stakeholders pointed to this problem in their discussions of the sustainability and wider applicability of the APEN model. One noted that in that year the endoscopy unit had been allocated a bigger share of the hospital's WIES cap (i.e. activity-based funding), possibly because the unit's profile had been raised as a result of the APEN innovation. However, in general the lack of reporting requirements for colonoscopy waiting lists meant this area was a lower priority for funding and the chance of gaining extra money to run additional lists was low.

"Because of the blend of public and private in this country, we train a lot of doctors, and they are available and working, and willing to do the work, the fundamental problem is that, hospitals, because of budget constraints, aren't prepared to fund the lists that they need, to do the work. I think the problem would be solved, if the state health departments or the federal government made colonoscopy waiting lists reportable, which they are not, at the moment, unlike surgical waiting lists for instance, so there's no real incentive for hospitals, there's no physical incentive for hospitals to worry about their colonoscopy waiting list, and therefore, it makes it very hard for us, as people who run endoscopy services, to get funding to expand the service, to fit the need." (Stakeholder-Medical)

There is also a basic contradiction which may well apply in some sites with the greatest potential to benefit from nurse endoscopists: the reason why some hospitals have long waiting lists for endoscopic procedures is that they have few medical specialists to perform the procedures. The lack of medical specialists limits the ability of such sites to provide support to nurse endoscopists, even when fully trained.

As indicated above, some stakeholders alluded to perceived pressure at State level to develop the nurse endoscopist model as a way to address shortages of specialist doctors in rural and outer urban hospitals. Most expressed concern about this idea, seeing it as potentially risky given the lack of supervision and mentoring available at these sites. Another drawback of implementing training in smaller hospitals was the impact on productivity during the training phase.

"We've only got two rooms and it has a significant impact on us and that's why if you go up to the [name removed] they've got five endoscopy, that sort of setting is just perfect, because you do your basic service delivery, you might do some high end stuff in one or two of the rooms and you've got some training going on in one or two of the other rooms, and there'd be a colonoscopist around to perhaps to provide support for the training rooms. And I can imagine you could run two training rooms with two – a senior medical trainee and a senior nursing trainee and you sort of just supervise." (Stakeholder-Medical)

"I think that until we get it right in the big hospitals, you shouldn't move it to a small hospital. Because it is a lot of responsibility. And I think at the moment with the research and education and those sorts of things that go on here we're better set up for it. I think if you had them training in regional centres it would be difficult." (Stakeholder – Medical)

Some, however, suggested that systems could be introduced to allow the model to operate in this way and thus address issues of access to preventative health measures for populations

outside the metropolitan area. This might include placements and training at major teaching hospitals with additional support structures in place at participating smaller hospitals.

Another key question concerns the difference between the two models implemented as part of this sub-project, and more specifically concerns the level of autonomy required of a nurse endoscopist. Several stakeholders identified additional benefits from having a nurse practitioner in the role, such as wider recognition and transferability. The added value could depend on other activities undertaken in addition to their endoscopy lists.

"I have a very clear view and understanding of the nurse practitioner role and I don't believe that you need to have an advanced scope role as a nurse practitioner role. I believe their scope is very narrow and, in my view, the nurse practitioner role scope is broader and I wouldn't like to see it as a nurse practitioner role because I think that the role that the individual and the endoscopy role isn't getting to act – wouldn't be able to act fully as a nurse practitioner. However, if you were to set up a role where you had a nurse practitioner who had a domain of care around gastroenterology or something like that, the skill of scoping would be part of the care that they would provide. It wouldn't be the sole – the total sum of the care that they would provide. So I think the skill of scoping could be part of their skill set, but I don't think you would just have a nurse practitioner endoscopy role." (Stakeholder – Nurse Manager)

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).

Given the importance of local requirements for success (e.g. receptive context for change, particularly the support of local managers and medical staff) a 'make it happen' approach would be inappropriate and self-defeating. A 'let it happen' approach could be taken and may well achieve some success, given the momentum that has been building in recent years, particularly in Victoria and Queensland with their involvement in the APEN sub-project. However, a 'help it happen' approach is the preferred course of action, with the 'help' coming in various forms: seed funding to support implementation, funding to support 'lead' sites in the provision of support and guidance to implementation sites (for any implementation sites which would like such support), a nationally accredited course for nurse endoscopist training and changes to funding and legislation to support the APEN model. The results of the evaluation demonstrate the value of the lead/implementation site model, with lead sites facilitating implementation, minimising duplication and serving as a source of ongoing support.

Much of the 'help it happen' should occur at a State / Territory level, rather than a federal level, with the main exception being the establishment of a nationally accredited course linked with an agreed national framework for trainee nurses to be credentialed as nurse endoscopists.

The Victorian Department of Health recently announced the establishment of a SETC at APEN2 with the intention of funding four additional trainee nurse endoscopy positions in 2014. The

Nursing and Midwifery Office, Queensland Health, has also indicated that the Queensland Government is committed to the establishment of a nurse endoscopy workforce.

Table 21 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 APEN model is being considered.

Table 21 Factors influencing national scalability for the APEN model

Level	Questions to be answered
Patient	Is there sufficient demand for nurse endoscopists (in terms of sufficient numbers of patients who might benefit from the model)?
Providers	Is there a critical mass of appropriately trained personnel who can fill, or be trained to fill, the nurse endoscopist role? Can the skills and expertise of the nurse endoscopist(s) be maintained? Will other providers (e.g. GPs, medical specialists) accept and support the nurse endoscopist role? Does the APEN model fill a gap amongst existing providers?
System	Does the organisation have the necessary systems in place to support the APEN role? Does the organisation have the necessary infrastructure in place to support the APEN role e.g. dedicated lists? Is there management support, particularly at the most senior level, for the APEN model? Is appropriate medical supervision and support available when needed? Will the APEN model contribute to increased efficiency?
Broader system of legislation and funding	Are any regulatory changes required to facilitate the APEN role?

The questions in Table 21 and the finding regarding the importance of a receptive context for change (Section 7.3) are consistent with an organisational readiness chart developed in Victoria to assist with determining the capacity and organisational readiness of health services to implement a nurse endoscopy service.⁷

⁷ The organisational readiness chart is available from the State Endoscopy Training Centre in Victoria.

8 Key achievements

Health Workforce Australia's Expanded Scopes of Practice (HWA-ESOP) program is part of a work plan implementing the National Health Workforce Innovation and Reform Strategic Framework for Action 2011-2015 (HWA, 2011). The framework provides an overarching, national platform to guide future health workforce policy and planning in Australia. It sets out key priority areas and five essential domains for innovation and reform to create an integrated, high-performing health workforce:

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, information from the training, implementation and economic evaluations is summarised and integrated with core data on program impacts and sustainability. Discussion is structured around the five HWA Domains for action and innovation in health workforce reform, and focuses on a number of key evaluation questions listed in the *Evaluation Framework* (Thompson et al., 2012a).

Project teams in the APEN 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:

- Most sites established two dedicated training lists per week for each trainee, with three to five patients per list. Sites took various approaches to allocating patients to lists. Three sites used the same approach as for physicians' lists, in order to expose trainees to a wide range of presentations. One included only Category 3 patients, in order to address long waiting lists. Another excluded patients who had undergone partial colectomy surgery and those referred through the NBCSP.
- Most of the trainees spent some time, typically about five minutes, with each patient prior to the procedure, with some trainees also seeing patients following their procedure.
- Between them, the six nurse trainees at five sites performed 1,458 procedures on patients eligible for care under the model during the implementation period. Of these, 70.9% were

completed unassisted. Two of the nurse endoscopist trainees reached over 200 unassisted colonoscopies in the first 15 months.

- The success rate varied from 54.8% to 96.4%, although the latter was atypical and achieved by a nurse endoscopist trainee with previous experience in the role.
- The average total time spent performing a scope was 32.3 minutes, of which 16.4 minutes was withdrawal time. Trainee nurses needed to complete 30 successful unassisted snare polypectomies. All nurses but one reached this target within the first 15 months. Each of the trainees has surpassed and exceeded the benchmark of 90% for caecal intubation rate.
- By the final quarter (March 2013) the average total time for a colonoscopy varied widely across sites, between 22.2 minutes for the nurse endoscopist trainee at APEN3 to 45.1 minutes for a trainee nurse at APEN1 Hospital. Without a measure of complexity of procedures undertaken at each site these figures should be considered indicative of the range of times likely after 15 months of training.
- Final reports from the sites describe the high standard of work produced by the nurse endoscopists, with increasing capacity and case complexity and decreasing need for supervision over time. The two nurse endoscopists at the APEN1 site saw a total of 405 patients with no recorded complications and no refusals. The APEN2 lead site and its three implementation sites recorded two complications out of more than 1,200 procedures. There were 17 patient refusals at these sites, most of whom were members of staff.
- Project teams used existing clinical governance structures within their organisations to ensure safety and quality, and most established working groups to oversee the project. All but one implementation site also had a steering committee.
- Usual throughput of patients tended to fall during training, due to the need for supervised practice. This impact can be mitigated somewhat if nurse endoscopists are supernumerary or additional to the existing lists, which has the added advantage that there is no reduction in the availability of lists to registrars completing their advanced training requirements.
- Unlike medical officers, who are reimbursed on a sessional basis, nurse endoscopists are salaried staff members. This means that once they are able to practice independently, they could take on additional lists without increasing costs. It also provides an opportunity to cover lists that become available at short notice (e.g. due to leave) as long as the patient type is suitable, thus avoiding cancellations and rescheduling of patients.
- Because most nurse endoscopist trainees in the APEN sub-project have not yet attained independent practice and consequently are not operating at full productivity, economic analysis focused on the costs of training offset against revenue from the procedures undertaken by trainees. Three scenarios were modelled, based on data from sites and other relevant sources.
- Under the most realistic scenario, nurse endoscopist trainees would require 18 months (78 weeks) of training to be able to practice independently. The net cost per trainee would be just under \$90,000 taking into account the estimated \$865,654 cost of undertaking two lists per week (each of four patients) and the \$775,920 of revenue raised from performing these procedures. This does not include the up-front cost of developing the training program.
- As a group, nurse endoscopists were ambivalent about the impact of their role, as shown by their responses to the ESOP personnel survey. Half strongly agreed that the role had made their service more effective, but half were unsure. Similarly, only half agreed or strongly agreed that their role had improved the quality of care for patients. This data was collected some months prior to the nurses achieving competency. Nevertheless, five out of six believed that patients were comfortable being treated by nurse endoscopists (the remaining respondent was uncertain).
- This perception was confirmed by evidence from the patient survey. Of the 100 consumers who returned surveys, the vast majority reported very positive experiences of care under the APEN model. In particular, the personal manner and technical skills of the nurse endoscopists were very highly regarded by patients.
- Although many patients reported feeling mildly anxious during the procedure, experiences of pain, discomfort or severe anxiety were rare. Around nine out of ten patients were satisfied or

very satisfied with the care they received and the time it took to be seen by the nurse endoscopist, and seven out of ten rated their satisfaction with the overall experience as 9 or 10 out of a possible 10. The strongest predictors of overall satisfaction were satisfaction with the care received from the nurse endoscopist, low levels of pain and discomfort, and being given sufficient information and explanation following the procedure.

- Key stakeholders were satisfied that the model could operate safely and effectively as a component of a larger endoscopy service with a supportive environment, sufficient infrastructure and ready access to medical supervision and referral.

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:

- Six highly experienced nurses were recruited into the positions of nurse endoscopist trainees. Requirements included a Bachelor of Nursing Science (or equivalent) and at least five years' full-time experience, including at least two years in endoscopy. In addition, candidates were expected to have post-graduate qualifications in gastroenterology or to complete a foundation module in this speciality at undergraduate level before commencing the training pathway. Those employed in the roles had 7 to 30 years' experience and all had post-graduate qualifications.
- The Victorian sites offered permanent positions at the level of clinical nurse consultant, either 0.8 FTE (three sites) or 0.6 FTE (one site). At APEN1, two trainees shared 1.4 FTE positions, one already an endorsed nurse practitioner and the other a nurse practitioner (candidate). The level of prior qualifications was an important difference between the APEN1 and APEN2 models of care.
- Certain personal qualities were also considered important in the trainees, including excellent communication skills for handling challenging conversations that might arise with their peers, confidence and the ability to promote the role, and the experience and knowledge to ensure the role was embedded in safe practice.
- The two lead sites worked together to develop a common training program serving both the advanced practice (Victorian) and nurse practitioner (Queensland) models of care. The APEN1 site invested considerable time and effort in the development of a Nurse Endoscopist Training Pathway. This document provides a pathway for senior gastroenterology nurses to progress to advanced practice or nurse practitioner levels. One goal of the training pathway is to create career options for experienced nurses who would prefer to build high standard clinical skills rather than moving into management. APEN1 also documented its Nurse Practitioner in Gastroenterology Model of Care.
- The training took place over a 13-month period and involved various methods including self-directed learning packages, face-to-face instruction, skill development through simulation and medical supervision. As part of the Training Pathway, APEN1 successfully developed and ran the skills development and hands-on training courses for all the trainees, which included engaging and utilising an international expert in endoscopy training to run the hands-on training. The self-directed learning module was delivered by the University of Hull, United Kingdom, and led to the award of a Graduate Certificate qualification.
- Both APEN1 trainees completed the requisite number of unassisted procedures and were assessed at expert level by the two independent DOPS assessors in December 2013. The Victorian trainees all completed the theoretical component of the pathway and showed consistent improvement in procedural aspects of colonoscopy as evidenced by their logbook entries. At the time of writing this report, only one of the Victorian trainees (APEN5) had

been signed off by the Health Service for independent practice. The others were expected to achieve independent practice within the next three to six months.

- Evaluation of the course components delivered by APEN1 showed they were well received. Staff were seen as professional, expert and helpful and the course work was practical, relevant and pitched at the right level. Trainees appreciated the workshops and study days. The hands-on training met their learning needs. They also found it useful to observe each other's procedures and gain peer feedback as well as the formal demonstrations.
- Trainees valued the simulation, tip control and insertion models. However, Victorian trainees had limited access to the tip control model and consequently did not take part in quarterly assessments. The model was brought to Victoria only once due to the costs of transport.
- Trainees were not satisfied with the theoretical component delivered by the University of Hull. All six trainees completed a questionnaire assessing their experiences of training. Only one agreed that the theoretical component was well-organised and they were informed in a timely manner of any changes. Three of the six disagreed or strongly disagreed that they were given accurate information about the training, that objectives were clearly defined, and the training met their expectations. Nevertheless, four out of six said they would recommend the training program to others.
- In their comments on the questionnaire, trainees highlighted problems with communication, including slow, incomplete responses to emails, changes to course content, timing and expectations that were not well-defined, and the time difference which made participating in online sessions very challenging.
- Nurse endoscopy is well-established in the United Kingdom and the trainees there were operating at a more advanced level, which the Australian trainees felt was an unfair disadvantage in assessments and also meant some content was irrelevant to the local model of care. The course work was seen as intense, time-consuming and not always useful.
- Differences in legislation, health policies and role descriptions between the two countries exacerbated the communication difficulties between the Australian trainees, United Kingdom trainees and lecturers. There were also problems with the University of Hull student web portal and with administrative procedures such as enrolment, which delayed access to online coursework.
- The training pathway has been well constructed and successfully implemented across all implementation sites. It effectively integrates mixed learning methodologies, a structured approach to assessment, mentorship and medical supervision. The training program appears to be fit for purpose and with development and continued support, including removal of legislative and other barriers, appears to have the potential for national implementation.
- A significant investment in clinical mentoring was required for the model to succeed. Supervision and mentoring arrangements varied among sites. For example, at one site, all trainee lists were supervised by the same clinical mentor, whereas at another, supervision was shared between two gastroenterologists and two colorectal surgeons. In both cases, the respective trainee indicated their satisfaction with these arrangements.
- Policies and documentation required modification and approval by Directors of Medical Services or Health Information Services prior to project commencement. For example, consent forms had to be adapted for non-medical personnel to accommodate the nurse endoscopy model.
- One unexpected benefit of the model's introduction, noted at the APEN2 site, was the implementation of rosters for training lists. This was required in order to identify specific lists for the nurse endoscopy trainees. Previously, registrars would attend endoscopy lists on an ad-hoc basis but they are now included on the roster. If they are unable to attend, they notify the trainee where possible so that the list can proceed. This ensures the maximum number of lists are utilised for training purposes across all trainees in the department.
- The nurse endoscopy trainees were generally positive about their roles. In their responses to an ESOP practitioner survey, all agreed or strongly agreed that they felt comfortable

approaching other staff members for advice on patient management, and four agreed that other staff were available when needed to provide mentoring and supervision. All but one expressed confidence in their skills and knowledge to provide care, education and information and were generally confident dealing with patients in their expanded role.

- One nurse endoscopist strongly disagreed with the statement, “I am satisfied with my expanded role and feel it has enhanced my career”, and one was unsure. Four agreed or strongly agreed that they were planning to stay on in the role for the foreseeable future.
- The intention of all trainee nurse endoscopists was to continue in the role where possible. For example, results from analysis of the ‘ESOP personnel survey’ showed that no respondents indicated that they did not plan to stay on in their expanded role for the foreseeable future (two of the six respondents provided a neutral rating). These results point towards the sustainability of the nurse endoscopist role. One recruit resigned before commencing training and was quickly replaced. There was no staff turnover during the remainder of the program.
- With only one or two nurse endoscopists working at each site, there was a risk of isolation. One strategy to overcome this potential threat to the sustainability of the model was to establish a network of trainees across the sites, starting with an introductory day at APEN2 in late 2012. Having the trainees come together for study days proved beneficial in enabling them to build ties with others who shared and understood their experiences and challenges.

8.3 Leadership and sustainability (HWA Domain 3)

Objective:

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

Key points:

- The presence of lead sites streamlined the process of implementation, reduced duplication and provided an ongoing source of support and expertise for the implementation sites. Despite some initial tension between the lead sites, mainly due to differences in the models of care and the fact that one lead site had implementation sites and the other did not, this did not prevent a collaborative approach to the many tasks that needed to be completed. APEN1 and APEN2 supported each other through recruitment, training, equipment procurement and ethics application processes and worked collaboratively to address professional and legislative barriers as they emerged, including the issues of credentialing and professional recognition of the ESOP role.
- There is, however, a need for a clearer definition of the role of lead sites and their relationships with each other and with their implementation sites. More structured communication processes between lead and implementation sites would also be beneficial.
- Each lead and implementation site established a project team, which worked most effectively when they established strong two-way communication with their executive sponsor. Both lead sites appointed full-time project managers and would not have been able to manage the project, particularly the set-up phase, without this resource. The three implementation sites had part-time project officers.
- Steering committee meetings were considered valuable in setting the foundations for the sites and establishing working relationships with all key partners. Project teams that maintained their steering committees had an ongoing forum for presenting information about their achievements and challenges over time.
- Consistent and widespread communication was the key to establishing and sustaining practice changes. Effective strategies included presenting early wins, aligning data to organisational key performance indicators and listening carefully to criticisms so that these could be addressed with relevant information.

- External stakeholders included representatives from professional organisations, local Universities, Medicare Locals, State Health Departments, medical experts and trainers, and web technology providers. The development of training resources facilitated engagement with Universities, the Gastroenterological Society of Australia (GESA) and Gastroenterological Nurses College of Australia (GENCA).
- High-level support was crucial to the success of each project team. The involvement of a supportive chief executive officer and senior executive sent a message to the wider workforce and professional groups about the level of interest in the nurse endoscopy role. Other important internal stakeholders were clinical and administrative staff in endoscopy units, nursing leadership, medical specialists and registrars. On-site clinical champions assisted with managing the complex and influential stakeholders involved in endoscopy and with lobbying for ongoing funding.
- Medical officers working within endoscopy units tended to be most accepting of the model. However, some specialists saw no value in training nurse endoscopists. Only one physician refused to work with nurse endoscopists.
- Registrars expressed concern that the model could reduce their access to training opportunities. This perception needed to be managed by project teams. Co-location of the nurse endoscopists and registrar trainee at APEN1 improved collaboration and shared understanding of the ESOP role. At APEN2, the nurse endoscopy trainee attended shared simulation training sessions with first year registrars. The relocation of the endoscopy suite at the APEN3 enabled the nurse endoscopist to be accommodated in an open-plan office with the registrar trainees, near the offices of the Endoscopy Department and the Endoscopy Suites. Not only could such proximity help overcome the reservations of junior medical staff, it also facilitated ongoing supervision and access to clinical supervisors when required.
- Findings from a survey of medical, nursing and administrative staff working with the nurse endoscopists indicated a high level of understanding of the role and how it differed from that of nurses assisting with endoscopy. Of the 119 other staff who returned surveys, 82% expressed very high regard for the nurse endoscopists' skills and 80% said they were comfortable being approached for advice on patient management. However, almost half did not fully understand the education required, and a similar proportion doubted that the model would improve the quality of patient care.
- Compared with nurses and managers, doctors were less convinced that the model contributed positively to the effectiveness of the endoscopy team, patient access and quality of patient care. This finding from the quantitative analysis was echoed in their additional, qualitative comments. Many doctors saw the model as inefficient, due to the level of training and supervision required. Some believed that medical expertise was essential, and raised particular instances of inappropriate patient selection. To address these concerns, clearer communication may be required around the nurse endoscopists' scope of practice, the education they undertake in preparation for the role, and identification of suitable patients.
- These findings should be interpreted in light of the fact that the nurse endoscopists had undertaken an extensive and lengthy training process and had not yet attained proficiency at the time of the survey, which is likely to affect perceptions of productivity. Several respondents commented on how much the trainee had improved over time, and others stated that there was a role for a nurse endoscopist provided the role was clearly defined and well supported. It is notable that staff at lead sites, where the models were developed and had been established for a longer period of time, were more positive about the model's contribution than those at implementation sites. Staff attitudes to the nurse endoscopy model should be evaluated again at a later date, when the trainees are qualified and working at full capacity and their impacts on access, quality and efficiency can be more fairly judged.
- Findings from the ESOP personnel survey reinforced the need for improved strategies to enhance the understanding of and support for the nurse endoscopist model. Most nurse endoscopists agreed or strongly agreed that other staff acknowledged their expertise, skills and knowledge. However, half disagreed or strongly disagreed that other staff understood

the educational preparation required for the role. There was also disagreement and uncertainty around whether policies and protocols were in place to help with implementation of the new role, and whether staff attitudes and beliefs were supportive.

- Both initial and final scores on the National Health Service Sustainability Model were very high: 81 and 83 respectively, of a possible maximum of 101. According to the tool's developers, an initial score over 55 indicates reason for optimism regarding the sustainability of the initiative. For eight of the ten items there was no change over time.
- According to the findings from the National Health Service Sustainability Model, the greatest potential for improving prospects of sustainability lies in demonstrating benefits beyond helping patients, improving infrastructure and addressing staff attitudes to the innovation. There is a need to demonstrate positive impacts on endoscopy unit efficiency and making jobs easier, and to ensure that appropriate facilities, policies and communication systems are in place. The behaviours and attitudes of staff towards sustaining the model, in particular a lack of belief that the improvement *would be* sustained, presents another risk, and only a small improvement in this area was realised throughout the course of the project.
- The APEN2 lead site reported that, as a result of this project, the Victorian government had recognised the value of the nurse endoscopy model by funding the SETC located at APEN2. The role of the SETC is to work with Victorian public hospitals to train nurse endoscopists and facilitate their introduction into gastroenterology departments, where they will be able to perform colonoscopy independently once reaching a consistently high level of practice.
- The decision to offer permanent appointments to the organisation for all Victorian trainee nurse endoscopists supported sustainability of the role. At the time of this report all nurses had a continuing appointment in their respective organisation.

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:

- Most unmet demand for endoscopy exists in rural and outer urban locations due to a lack of medical specialists at smaller hospitals. However, without medical specialists to support nurse endoscopists – even when they are fully trained and proficient – transferring the model to those hospitals may not be viable. Medical stakeholders are likely to resist strongly any efforts to implement a stand-alone nurse endoscopy model. They see the model as making a valuable contribution as one component of a larger service, where sufficient infrastructure, supervision and medical support are readily available.
- One lead site has advocated strongly for a nurse practitioner model, whereas the other has promoted an advanced practice role for highly experienced registered nurses. There is no consensus among stakeholders as to whether the model is or should be purely technical in nature or whether true expanded scopes of practice are required.
- The added value of having a nurse practitioner in the role is likely to depend on the range of other activities undertaken by individuals in addition to their endoscopy lists. This approach has the advantage of providing a standardised level of credentialing and greater transferability between jurisdictions.
- It will be important to consider the usefulness of a standardised training program, a consistent description of the nurse endoscopist workforce role and a national governance framework. This would potentially reduce variation in this workforce into the future and build stakeholder trust in the model.

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:

- The principal legislative and policy barriers that arose during the set-up phase related to the development of the role, the workforce and funding implications of a nurse practitioner model and the need for a nationally agreed terminology in relation to advanced practice nursing roles. Lead sites agreed that there needs to be a nationally accredited course for nurse endoscopist training. Later on during implementation, the main legislative and policy barrier involved the uncertainty around the conjoint committee endorsement of the APEN nurses, when it became clear this would not occur the need emerged to develop an alternative certification process that would support national recognition of the training pathway.
- In some jurisdictions, current funding models for endoscopy also limit the number of procedures hospitals can schedule in a given period, as they will not be funded for additional procedures. Activity-based funding 'caps' mean that nurse endoscopy is effectively in competition with medical endoscopy unless a greater share of the funds are allocated internally. However, hospitals are not currently required to report on colonoscopy waiting lists so there is little incentive to provide extra money to this part of the hospital budget.

8.6 Conclusion

Full implementation was not achieved, with some trainees yet to complete the required number of procedures and be assessed as proficient at time of reporting. Therefore, the relative advantage (effectiveness and cost effectiveness) of the model could not be evaluated. Relative advantage can only be fully assessed when trainees are qualified and working at full capacity.

The APEN model can be varied to meet local circumstances but there are core elements which cannot be varied, particularly: the training requirements; need for medical mentoring and supervision; and dedicated resources for performing endoscopies.

The scope of practice within the APEN model was largely restricted to colonoscopies. Although the training requirements are considerable, once competency is achieved the 'model' is relatively straightforward. There is the potential to introduce greater complexity by expanding practice to include upper gastrointestinal procedures and utilise the nurses in a broader role e.g. in outpatient clinics. Wider implementation of the model would benefit from a 'help it happen' approach, with the 'help' coming in various forms: seed funding to support implementation, funding to support lead organisations in the provision of support and guidance to implementation sites (for any implementation sites which would like such support), a nationally accredited course for nurse endoscopist training and changes to funding and legislation to support the APEN model.

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Appendix 1 Funding allocation by project

Recipient	Victorian Department of Health funding allocation	Execution date	Completion date	Total HWA funding (GST incl.)
APEN1 (Lead)	N/A	22/06/2012	30/06/2014	\$350,000
APEN1 (Implementation)	N/A	22/06/2012	30/06/2014	\$400,000
APEN2(Lead)	\$155,000	26/06/2012	30/06/2014	\$385,000
APEN2 (Implementation)	\$65,000	26/06/2012	30/06/2014	\$440,000
APEN3	\$65,000	26/06/2012	30/06/2014	\$440,000
APEN4	\$65,000	26/06/2012	30/06/2014	\$437,140
APEN5	\$65,000	26/06/2012	30/06/2014	\$439,670
Site withdrew from ESOP program	N/A	25/03/2012	30/06/2014	\$390,000
Total	\$415,000	-	-	\$3,281,810

Appendix 2 Methods of the national evaluation, HWA-APEN

This appendix provides essential background information on the methods of the national evaluation for the APEN 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 APEN sub-project.

Evaluation framework

The ESOP Program evaluation was based on a broad evaluation framework developed by CHSD 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 15). 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 15 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 program 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 ESOP Program. This involved 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 services⁸. 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 regulation⁹

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 over a twelve-month period. The tools can be found in the *Compendium of Data Requirements and Evaluation Tools*, along with the proposed timing and frequency of data collection (Thompson et al., 2012b).

Table 22 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 22 HWA Domains and corresponding KPIs, evaluation methods and tools used in the APEN sub-project evaluation

CHSD Evaluation Framework Level	HWA Domain of Inquiry	KPI	Method	Evaluation Tool
Level 1	Domain 1: Effectiveness and efficiency	1.4 High level of consumer satisfaction/experience with ESOP-APEN endoscopy services	Consumer survey	ET9a
			Consumer follow-up telephone survey 30 days post endoscopic procedure for a 'snapshot' period	ET7*
			Patient journey analysis pre and post implementation	ET13*
		1.5 Number of patients who refuse to be scoped by the nurse endoscopist	Log book data and administrative records	ET6
Level 1, 2 & 3	Domain 1: Effectiveness and efficiency	1.8 Consistent or improved unit safety outcomes post introduction of the ESOP-APEN initiative e.g. number of adverse events; number of consumer complaints	Administrative &/or unit routine data sets	ET2
Level 2	Domain 1: Effectiveness and efficiency	1.3 Progressive increase in skills of nurse endoscopists in endoscopy procedures	Log book data collected for each nurse endoscopist	ET2, ET6

⁸ Available at: <https://www.hwa.gov.au/our-work/hwa-strategic-plan-and-work-plan> accessed 11 June 2014.

⁹ Available at: <https://www.hwa.gov.au/sites/default/files/hwa-wir-strategic-framework-for-action-201110.pdf> accessed 11 June 2014.

CHSD Evaluation Framework Level	HWA Domain of Inquiry	KPI	Method	Evaluation Tool
			to comply with the requirements of the Conjoint Committee for the Recognition of Training in Gastrointestinal Endoscopy	
Levels 2 & 3	Domain 1: Effectiveness and efficiency	1.9 Increased number of 'routine / surveillance' endoscopic procedures completed within the Endoscopy Unit	Administrative &/or unit routine data sets	ET2
		2.0 Number of endoscopic procedures completed by the nurse endoscopist throughout the project (per list and total)	Log book data	ET6
		2.1 Quantum of other types of activity that the nurse endoscopist is involved in besides endoscopic procedures, e.g. outpatient consultations, multi-disciplinary clinical meetings	Log book data	ET6
Level 3	Domain 1: Effectiveness and efficiency	2.1 Decreased waiting time for 'routine / surveillance' endoscopic procedures	Administrative &/or unit routine data sets	ET2
Level 2	Domain 2: Workforce capacity and skills development	1.1 Increased number of nurse endoscopists who have completed the agreed nurse endoscopist training pathway through the ESOP-APEN projects	Record of completion (including evidence of competency assessment) of the agreed nurse endoscopist training pathway.	ET1
		1.2 Turnover rate of recruited nurse endoscopists during the funded period of the expanded scope of practice project	Record of staff employment for the duration of the project.	ET1
Level 2	Domain 3: Leadership and sustainability	1.6 High level of staff satisfaction and acceptance of the nurse endoscopy role; staff experience of the impact of the expanded scope of practice role	Staff survey (other members of the health care team)	ET8a
			ESOP personnel survey	ET10
		1.7 Perceptions of the impact of the expanded scope of practice role on key stakeholders	ESOP personnel interviews	ET11
			Key stakeholder interviews	ET12
Level 2 & 3	Domain 3: Leadership and sustainability	2.3 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

Table 23 and Table 24 show the data submitted by each HWA-APEN site. Brief information about each tool, including dates of submission, changes and omissions is outlined below.

Table 23 National evaluation tools completed by APEN sub-project¹⁰

Site	ET1	ET2	ET6	ET8a	ET9a	ET18	ET19	ET20
	Staff profile	Data spec	Log book (ITeMS)	Staff survey	Patient survey	Sustainability tool	Issues/ Lessons Log	Dissemination Log
APEN1	✓	✓	✓	✓	✓	✓	✓	✗
APEN2	✓	✓	✓	✓	✓	✓	✓	✓
APEN3	✓	✓	✓	✓	✓	✓	✓	✓
APEN4	✓	✓	✓	✓	✓	✓	✓	✓
APEN5	✓	✓	✓	✓	✓	✓	✓	✓

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 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). APEN3's first data submission (ET2) was delayed by local ethics application processes.

¹⁰ Optional evaluation tools included ET7 Patient Interview and ET13 Patient Journey Mapping (ET3, 4, 5 and 16 were not relevant to the APEN sub-project).

HWA had envisaged that all projects would commence by 1 October 2012 and a full 12 months of implementation data was a contract requirement. None of the APEN projects were ready to commence implementation at this time due to delays in recruitment and equipment procurement. In addition initial orientation and training for the nurse endoscopist trainees was not completed until late January 2013. Data submission 3 extended from 1 October 2013 to 31 March 2014 and was due for submission by 30 April 2014.

The national evaluation team statistician worked closely with project teams to assist with data extraction queries and data transfer. A large number of different databases and information systems were used across the sites. In order to ensure that all essential items could be collected consistently across sites, additional databases were designed to supplement the existing information systems. Data extraction was a complex process, further complicated by the lack of expertise and resources at many 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.

ET6 was designed for use throughout the program to record clinical training and activities of the nurse endoscopists. There were delays in securing log book data from several Victorian project sites due to new project staff being unfamiliar with the report generation function in iTeMS.

All sites received ethics approval for their evaluation activities involving staff and patients. 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 survey, 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 **ET8a**. ET8a was a 15-item survey 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 published questionnaire by Considine and Martin (2005). Data collection for ET8a took place from October to December 2013.

ET9a assessed patient experiences and satisfaction with nurse endoscopy care. The 15-item survey included content from a questionnaire widely used in research and quality management to assess patient satisfaction with endoscopy (Johanson et al., 2000). Data collection for ET9a began in late 2013 and was extended to March or April 2014 in order to obtain sufficient responses. Most sites used printed surveys distributed to patients in recovery, with return via a sealed box or self-addressed envelopes. Some sites made follow-up phone calls to try to increase the number of responses. APEN1 also surveyed patients who were seen by medical endoscopists, to allow comparisons.

Several sites conducted patient interviews in addition to the patient surveys. APEN1 routinely telephones all colonoscopy patients as part of an existing quality management exercise to ascertain if they have had any problems post procedure, and these data were included in the ET2 data submission in November 2013. The team from APEN5 conducted telephone interviews with 40 patients (26% response rate) who were contacted two to four weeks after the procedure and incorporated findings into their final report.

The sustainability survey (**ET18**) was completed twice: projects were asked to submit this tool in early 2013, however most surveys were not returned until mid-2013. The second data submission occurred in early 2014. The issues log (**ET19**) and dissemination log (**ET20**) were compiled throughout the project period by project staff. The final submissions for ET19 were received by the national evaluation team between December 2013 and April 2014 and for ET20 from February to April 2014. APEN1 did not collect ET20 routinely from the start of the project but used the routine progress reports to outline key dissemination activities.

Table 24 Additional evaluation tools (APEN sub-project)¹¹

Site	ET10 ESOP personnel survey	ET11 ESOP practitioner interviews	ET12 Key stakeholder interviews	ET14 Lead / implementation site survey	ET15 Training program review	ET17 Trainee experience survey
APEN1	✓	✓	✓	✓	✓	✓
APEN2	✓	✓	✓	✓	✓	✓
APEN3	✓	✓	✓	✓	✗	✓
APEN4	✓	✓	✓	✓	✗	✓
APEN5	✓	✓	✓	✓	✗	✓

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 survey 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 nurse endoscopists from December 2013 and collection was closed for the final site in mid April 2014. There was a response rate of 100% (6 out of 6) nurse endoscopists across all APEN 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.

No sites elected to use the optional Patient Journey Analysis Tool (**ET13**). This is understandable as the focus of this tool was to map the patient journey using a time and motion approach. All project teams reported that no change was occurring in the patient journey.

Initially the Lead/Implementation site relationship was to be assessed through qualitative methods during the final site visit. This was supplemented through the use of **ET14** to gather more specific survey data. Two versions of the tool were developed; one for lead sites and one for implementation sites. Only one response was required per site. Distribution of surveys commenced in January 2014 and collection was closed at the end of the month.

ET15 and **ET17** were used to inform the training evaluation – see details below.

Data analysis

Before data from ET2 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, 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. 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. Data items which were not supplied according to the data specification in ET2 were recoded to

¹¹ ET11 and 12 were completed at the final site visits which were scheduled in March/April 2014.

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. The accuracy of a random sample of transcripts was also checked against the recording.

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 and Thomson, 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 and Thomson, 2009).

A number of the evaluation tools were surveys (ET8a, ET9a, 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 APEN sites submitted four progress reports: September 2012, December 2012, March 2013 and June 2013. An interim report was submitted by APEN3 in September 2013, by APEN5 in December 2013 and by APEN1 and APEN2 in January 2014. APEN4 did not submit an interim report. 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 late 2013 and early 2014. Each visit required approximately a day. 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 each of the six APEN nurse endoscopist trainees and with 35 key stakeholders. Dates and numbers of interviews by site are shown in Table 25.

Table 25 Interviews with ESOP practitioners and key stakeholders, HWA-APEN

Site	ESOP practitioner	Key stakeholder	Total	Dates(s)
APEN1	2	6	8	25 & 26/02/2014
APEN2	1	9	10	11/11/2013; 08 & 09/04/2014
APEN3	1	8	9	25/03/2014; 28/03/2014
APEN4	1	6	7	27/03/2014

Site	ESOP practitioner	Key stakeholder	Total	Dates(s)
APEN5	1	6	7	18/03/2014; 26/03/2014
Total	6	35	41	

Key stakeholders included endoscopy nurses, medical specialists, managers and researchers associated with the sites. Table 26 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 26 Professional roles of key stakeholders by site, HWA-APEN

Site	Manager	Doctor	Nurse	Other	Total key stakeholders
APEN1	1	3	2	0	6
APEN2	1	5	3	0	9
APEN3	1	5	2	0	8
APEN4	1	5	0	0	6
APEN5	2	2	2	0	6
Total	6	20	9	0	35

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 program design that impact on overall quality. The structure of these evaluation tools reflects the tertiary education standards endorsed by the Australian Tertiary Education Quality and Standards Agency.

ET15 was only required from the lead sites who collaboratively completed this document early in 2014. APEN2 worked with Victorian implementation sites to review the draft of ET15 initially prepared by APEN1. ET17 was collected from the six nurse endoscopist trainees with data collection opening in early December 2013 and closing in mid-January 2014. The administration of ET17 (and ET10) was delayed until advice was received from the University of Hull regarding the last module of training. 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 survey (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 assess several 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.