

Overview of the planned introduction of nurse endoscopy in Queensland

Nursing and Midwifery Office, Queensland

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Contents

1 Executive summary	1
1.1 Introduction and background.....	1
1.2 The need for increased capacity of endoscopy services	1
1.3 Strategies to address the mismatch between demand and supply of endoscopies	2
1.4 Proposed implementation of nurse endoscopy.....	3
1.5 Expected outcomes	5
2 Introduction.....	6
2.1 Scope	6
2.2 Constraints and limitations.....	6
2.3 Policy context.....	6
3 Background	9
3.1 What is endoscopy?.....	9
3.2 Who provides endoscopy?.....	9
3.3 Why is endoscopy important?	10
3.2.1 Gastroscopy (Upper endoscopy).....	10
3.2.2 Colonoscopy/lower endoscopy	10
4 Endoscopic activity and demand in Queensland	12
4.1 Queensland endoscopic activity.....	12
4.2 Queensland Health endoscopic activity.....	13
4.2 Public waiting lists.....	15
4.3 Private sector endoscopic activity	19
4.4 International activity comparison	20
4.5 Estimating demand for endoscopy	21
4.5.1 Population growth coupled with an ageing population.....	22
4.5.2 National Bowel Cancer Screening.....	26
4.5.3 Change in practice	28
4.5.3 Latent demand.....	29
4.5.4 Underlying demand estimate	29
5 Statewide access to endoscopy services	31
6 Workforce	33
6.1 Workforce overview	33
6.2 Gastroenterologist workforce	35
6.2.1 Estimating growth in the gastroenterologist workforce	35
6.3 Workforce distribution	36
6.4 Estimating workforce demand.....	36
6.4.1 Model 1: Queensland Health proceduralist average.....	37
6.4.2 Model 2: McKinsey report of time taken per procedure	37
6.5 Summary	37
7 Other factors impacting on endoscopy	39
7.1 Funding models	39
7.1.1 Practitioner incentives.....	39
7.1.2 Previous funding models.....	40

7.2 Funding a sustainable service.....	41
7.3 Leadership and the cultural change required	41
8 Strategic response	43
8.1 Demand management	44
8.2 Supply management.....	45
8.2.1 Productivity management	45
8.2.2 Capacity management.....	46
8.3 Key interventions	46
9 International evidence for nurse endoscopy: literature review.....	48
9.1 Scope of current roles and practice in nurse endoscopy	48
9.2 Quality and safety	48
9.2.1 Systematic reviews	48
9.2.2 The MINuET trial [36].....	49
9.2.3 Multicentre prospective cohort studies	49
9.3 Education and training	50
9.4 Cost effectiveness	50
9.5 Patient satisfaction.....	50
9.6 Implications.....	51
10 Introducing nurse endoscopists in Queensland.....	52
10.1 Nurse endoscopy workforce projections.....	52
10.2 Nurse endoscopy and Hospital and Health Service readiness	52
10.3 Credentialing.....	52
10.4 The level of the nurse endoscopist.....	53
10.5 Nurse endoscopist education and training	53
10.6 Cultural change.....	54
10.7 What is proposed.....	54
11 Benefits	56
11.1 Reduction in the number of people developing and dying from cancer	56
11.2 Better health outcomes for all Queenslanders with gastroenterology conditions	56
11.3 Reduced burden of care for gastroenterology patients.....	57
Abbreviations.....	58
References	59
Appendix 1: Investment management logic map.....	63
Appendix 2: Bowel cancer quick statistics	64
Appendix 3: Demand drivers for endoscopy.....	67
Appendix 4: Literature review	69

Figures

Figure 1	Proposed nursing pathway to advanced practice in gastroenterology.....	4
Figure 2	Endoscopy.....	9
Figure 3	Queensland endoscopies between 2008–09 and 2012–13.....	12
Figure 4	Queensland public and private endoscopies 2012-13.....	12

Figure 5	Queensland Health endoscopies between 2008–09 and 2012–13.....	13
Figure 6	Queensland Health endoscopic activity by Hospital and Health Service 2012–13.....	14
Figure 7	Types of endoscopies performed in Queensland Health 2010–11	14
Figure 8	Growth in endoscopic procedures Queensland Health – financial year 2010–11 to 2011–12.....	15
Figure 9	Queensland Health hospital waiting lists for endoscopy by category - financial year 2010–11.....	17
Figure 10	Total endoscopy waiting list for Queensland Health 2009–10 and 2010–11	18
Figure 11	Estimated waiting list	19
Figure 12	Private sector endoscopy activity between 2008–09 and 2012–13	20
Figure 13	Comparison of colonoscopy procedures per 100,000 population with European practice [15].....	21
Figure 14	Factors driving the demand for endoscopy	22
Figure 15	Population profile by age [16]	23
Figure 16	Colorectal cancer age specific incidence rate per 100,000, by age and at diagnosis, Queensland, 2009 [17].....	23
Figure 17	Gastric and oesophageal cancer incidence per 100,000, by age at diagnosis, Queensland, 2009 [17].....	24
Figure 18	Projected growth in cancer incidence for bowel (colorectal), stomach and oesophagus (upper GI) cancers by age of diagnosis, Queensland, 2001 to 2021 [17].....	24
Figure 19	Actual and projected new cancer incidence for bowel, stomach and oesophagus cancers, Queensland, 2000–2021[17]	25
Figure 20	Growth in colorectal new cases, Queensland, 1982–2009 [17].....	26
Figure 21	Estimated number of positive NBS FOBT test results in Queensland as the program is expanded to include people of 60 years and biennial screening of people 50–74 years.....	28
Figure 22	Upper bound expected Queensland Health endoscopy demand 2018.....	30
Figure 23	Distribution of positive Faecal Occult Blood Test (FOBT) results 2011–12	31
Figure 24	National Bowel Cancer Screening positive Faecal Occult Blood Test practitioner follow-up rates.....	32
Figure 25	National Bowel Cancer Screening positive Faecal Occult Blood Test colonoscopy rates.....	32
Figure 26	Specialists credentialed to perform endoscopy in Queensland 2013	33
Figure 27	Gastroenterologists by State and Territory in 2011 [23]	35
Figure 28	Cause and effect diagram showing the influences on incentivisation	40
Figure 29	Cause and effect system diagram showing the factors that are impacting innovative practice.....	42
Figure 30	Cancer development at the time when it is first diagnosed, new incidents and percentage 2013 [31]	43
Figure 31	Proposed nursing pathway to advanced practice in gastroenterology.....	54
Figure 32	Estimated international colorectal incidence and mortality by world ASR, selected countries, 2008 [50].....	66
Figure 33	National Bowel Cancer Screening program long-term endoscopy demand from positive Faecal Occult Blood Test and surveillance.....	68

Tables

Table 1	Queensland Health hospital waiting lists for endoscopy – financial year 2009–10 to 2010–11	16
Table 2	National bowel cancer screening results for Queensland—overall diagnostic outcomes (including histopathology) 2011–12	27
Table 3	Upper and lower bound estimates for endoscopy demand drivers	29
Table 4	Queensland endoscopy/gastroenterology/hepatology/transplant hepatology workforce by location 2012	34
Table 5	Current estimates of treatment and five year survival rates [30]	43
Table 6	Proposed key performance measures for endoscopic services	57

1 Executive summary

This report presents an overview of the planned introduction of nurse endoscopy as a key strategy for addressing capacity problems associated with the delivery of gastro-intestinal (GI) endoscopies (particularly colonoscopies and, to a lesser extent, gastroscopies) in public hospitals in Queensland. The case for change is presented, including the background, analysis of the demand and supply issues, a range of some suggested strategies for addressing the issues, and international literature supporting the introduction of nurse endoscopy.

1.1 Introduction and background

Endoscopy is used for diagnosis and treatment of disorders in the GI tract. In Australia it is usually provided by medical practitioners, particularly gastroenterologists, general physicians and surgeons, with a small number of registered nurses. Internationally, particularly United Kingdom, New Zealand, Canada, Netherlands and United States, nurse endoscopists have an increasing role in delivering gastroenterology procedures.

There has been a significant focus on identified problems with public sector access to GI endoscopic services in Queensland Health for a number of years. The issue is serious as lack of such access could result in a large number of people dying from potentially preventable conditions. The Queensland Government has identified the establishment of nurse endoscopy as an effective strategy to increase capacity and has tasked the Nursing and Midwifery Office, Queensland (NMOQ) with the implementation. This project builds on national initiatives, such as the Health Workforce Australia (HWA) pilot to expand the scope of practice of nurses, including advanced practice in endoscopy nursing, where Logan Hospital, Metro South Hospital and Health Service (HHS) is one of the pilot sites.

1.2 The need for increased capacity of endoscopy services

The total number of endoscopies performed in Queensland in 2012–13 was 158,065. Of these, the majority were in the private sector with only 51,344 being in the public sector, largely in South East Queensland.

The demand for public sector endoscopies significantly outstrips the capacity. It is estimated that 23,000 people were waiting in 2012–13 with anecdotal evidence of some people waiting up to eight years. The demand for endoscopies has increased significantly over the past 5 years, with 27% more endoscopies performed while the waiting lists also increased.

The demand for endoscopic and related specialist services continues to increase rapidly. Factors, such as the ageing of the population, population growth, increased use of endoscopic procedures, the downstream effect of the National Bowel Cancer Screening Program (NBCS), and need for on-going monitoring of patients with diagnosed treatable conditions, all contribute to a projected growth in demand for endoscopic and gastroenterological services. Our analysis has estimated that by 2018 demand for public endoscopies will be between 92,200 and 111,365 procedures per annum.

In addition, there is an increased indication for the use of diagnostic and therapeutic treatments. Increased endoscopic activities, such as colon cancer screening, has been

shown to reduce service demand for more resource intensive health treatments, such as cancer surgery, radiation and chemotherapy. Currently around 50% of new cases of colorectal cancer are diagnosed at Stages 3 or 4 when survival is poorest and spending per case is significantly higher. It is estimated that 76% of the current deaths could have been prevented if diagnosed at Stage 1 or 34% if diagnosed at Stage 2. Thus, not only would patient outcomes improve would more emphasis on endoscopy, but also there would be considerable cost saving to the health system. While over time, an increase in diagnosis and early intervention should release health resources from more intensive care, until this state is reached significant extra investment, particularly in workforce supply, will be required to reap the future rewards and meet the demand for early intervention while service provision for late stage diagnosis remains resource intensive.

The projected increase in demand is not matched by growth of the relevant workforce. Workforce analysis shows that in 2012, there were 171 specialists credentialed for endoscopy in the public sector, equating to only 50 full-time equivalents (FTE), with the vast majority being gastroenterologists. It is concerning that estimations of future workforce supply indicate an annual growth of gastroenterologists of only 2 to 4% at the same time as modelling of workforce requirements indicate between 97 and 106 FTEs will be required to meet the projected service demand for endoscopies in 2018, a doubling of the current specialist workforce.

1.3 Strategies to address the mismatch between demand and supply of endoscopies

In order to address the increasing mismatch between demand and supply for endoscopies, a range of strategies are required. These include reducing demand at the same time as increasing supply of services through increasing, both capacity and productivity. While increased funding will be needed to establish an effective response, merely increasing funding in itself will not address the problem until workforce supply is addressed. What is needed is a new way of delivering services that substantially improves productivity.

While the funding models are important to drive change, perhaps the more significant barrier for innovative change is the culture of the service and difficulties in prioritising and championing shifts in endoscopic policy and practice. The problems identified in this report are not unique to Queensland with many of the issues reflecting similar trends elsewhere [1]. These findings have led countries, such as the United Kingdom to introduce innovative changes to their healthcare practice, enabling every person who needs endoscopy to book into and receive a procedure within two to six weeks with no waiting list. Such a transformation in the United Kingdom was not achieved by simply tweaking the system. It required a wholesale shift in the way service models were conceptualised and delivered.

Demand strategies include use of a standardised and consistent approach to referrals, triage and surveillance through the improved use of standardised guidelines, and avoiding the use of endoscopy for universal screening prior to filtering through more efficient tests, such faecal occult blood testing.

Supply strategies, include:

- sourcing additional services through procurement from the private sector
- increasing productivity through more efficient and effective use of staff and facilities,

- redesigning of service models
- funding and optimising the use of endoscopy
- increasing workforce capacity through expanding the number of skilled and credentialed providers.

The analysis undertaken as part of developing this report has highlighted the deficiencies of relevant information which limits the ability for accurate service planning and evaluation of impact. Establishing a system for regularly collecting robust information on endoscopies, the workforce delivering the services and the waiting lists would enable more effective monitoring of the service and is a key strategy.

The introduction of nurse endoscopists is a potential game-changer. International evidence has demonstrated the impact of such a strategy. An examination of the literature demonstrates that appropriately prepared and skilled nurses can deliver quality endoscopy services safely, cost effectively and achieve high patient satisfaction. The United Kingdom, for example—has achieved improvements of patient waiting lists to two weeks for critical cases and six weeks for all other appropriate referrals [22].

Evidence from the United Kingdom and the Netherlands shows that introduction of nurse endoscopists has the potential to lower the labour costs without any reduction in the quality of care. Using nurses as part of multidisciplinary teams to undertake more straightforward procedures, does not only augment the workforce, but also enables limited specialist medical skills to be re-deployed into areas where they can make a greater contribution to the service.

It is fairly usual for the introduction of role substitution to be actively resisted by those affected by such a change. It has been established that nurse endoscopists are as good as medical professionals in performing endoscopies and this practice is becoming widely accepted in many parts of the world. There is a question about the extent to which such a change in practice will be accepted in Queensland. It is likely that Queensland will experience resistance to change. It will be important for Queensland to address these concerns if nurse endoscopy is to be implemented successfully.

1.4 Proposed implementation of nurse endoscopy

In response to the Queensland Government's request, NMOQ has developed a report which has been informed by international literature (refer to Appendix 3), the work of HWA, and consultation both within Queensland and wider Australia. NMOQ has been given responsibility for leading the project, including working with participating HHSs, education provider(s) contracted to develop the training program and materials, and professional associations to establish credentialing standards and processes.

The objectives of the proposed project are to:

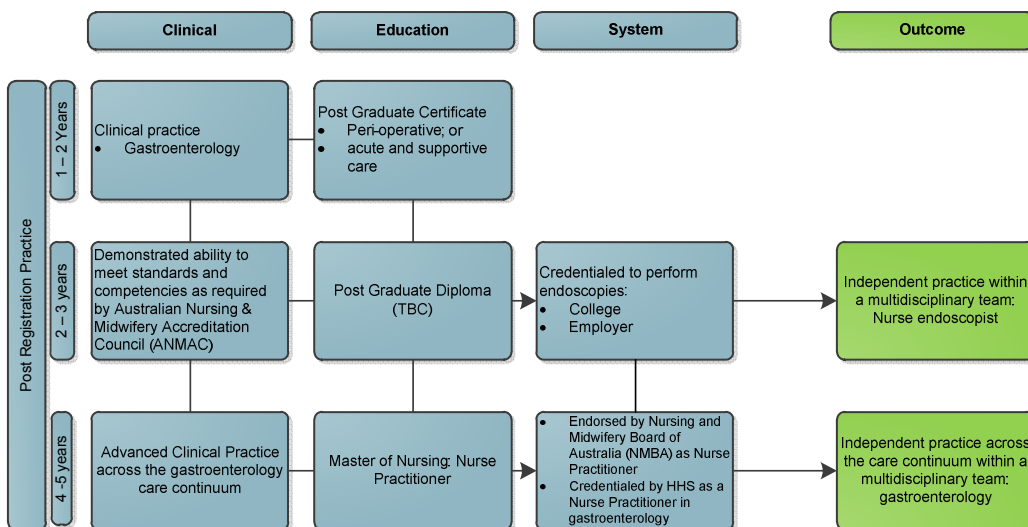
1. Prepare up to 15 nurse endoscopists at specialist nurse level trained and deployed in HHSs.
2. Develop course materials and training programs for future training, which will meet the requirements for accreditation at a minimum of Australian Qualifications Framework (AQF) level 9 (Masters equivalent) leading to the ability to perform a nurse endoscopists role at Graduate Diploma level, with the ability to articulate into, or form part of, a qualification leading to nurse practitioner registration.

3. Work with HHSs to transform services and introduce nurse endoscopy service models with HHS workplaces ready for trained nurse endoscopists to become effective immediately to undertake procedures as members of multi-disciplinary teams with consistency of quality outcomes delivered by a variety of service delivery and business models across the participating HHSs.
4. Develop a credentialing system through a relevant professional nursing college or association.
5. Evaluate the implementation one year post-implementation.

NMOQ has developed an educational pathway for nurse endoscopists, including an academic qualification which will be able to be articulated into a Master's degree to enable the nurse endoscopist to exit at advanced level and also if they choose continue to be considered for endorsement for nurse practitioner registration in wider gastroenterology nursing.

Entry level for nurses into the pathway is aligned with the Nursing and Midwifery Board of Australia (NMBA) *Fact sheet for advanced practice nursing [2]*. The registered nurse pathway to advanced practice is outlined in the figure below.

Figure 1 Proposed nursing pathway to advanced practice in gastroenterology



Nursing and Midwifery Office, Queensland

1.5 Expected outcomes

Implementation of nurse endoscopy has been found to be successful at addressing the increasing demand for endoscopy services. This report, while focusing on nurse endoscopy, also recommends that it is introduced as part of a package of strategies which, if implemented as intended, can be expected over time to produce the following outcomes:

1. Reduction in the number of people developing and dying from cancer.
2. Better health outcomes for all Queenslanders with gastroenterology conditions.
3. Reduced burden of care for gastroenterology patients.

Ongoing monitoring and evaluation will be important to assess the success of the service changes, including the implementation of nurse endoscopy, as they are rolled out. Draft key performance indicators have been developed and are presented in the report.

2 Introduction

There has been a significant focus on identified problems with public sector access to GI endoscopic services in Queensland Health for a number of years. The issue is serious as lack of such access could result in a large number of people dying from potentially preventable conditions. A number of reports have been written and committees have been formed. While there have been a number of gains, a major problem still exists, with increasing waiting lists and time delays for treatment.

This report presents a case for introducing nurse endoscopy as a key strategy for addressing these issues. The case for change includes the background and issues facing the delivery of GI endoscopic services, a range of some suggested strategies for addressing the issues, and international literature supporting the introduction of nurse endoscopy.

2.1 Scope

The scope of this report includes:

- gastrointestinal endoscopy
- examination of public health sector and
- examination of nurse endoscopy.

The following are excluded:

- endoscopy procedures coded as part of surgical intervention occurring in the operating theatre
- any endoscopies occurring within the primary care or private healthcare setting
- detailed workforce and service planning and
- physical facility design, which is beyond the remit of service planning guidelines, although recognised as an important element for maximising efficiency and capacity.

2.2 Constraints and limitations

There was significant difficulty in obtaining accurate and reliable data and information regarding endoscopy services in Queensland. Information regarding waiting lists is based on audits conducted and anecdotal evidence. At this time it appears there is no single source of cleansed data. This is a major problem that impacts on key decision making at HHS and department level.

The *Health Service Planning Guidelines* were not approved at the time of writing this document. It is anticipated that this information will forecast the proposed activity over the next few years.

2.3 Policy context

NMOQ has been tasked by the Minister for Health to lead the implementation of nurse endoscopy in Queensland. In June 2013, the Chief Nursing and Midwifery Officer collaborated with the Health Renewal Portfolio Office and the Contestability Branch,

Department of Health, to undertake a series of Investment Management workshops which were conducted in August 2013. Investment management aims to assist organisations direct resources to deliver best outcomes. It helps organisations to improve the way they operate and manage new investments (refer to Appendix 1).

The Investment Management workshops identified a range of potentially effective strategies, including nurse endoscopy which has informed the development of this report.

The following documents outline the policy intent of the Queensland Government in relation to nurse endoscopy:

1. *Queensland Commission of Audit, Final Report*

This report [3] highlights the need for increased workforce flexibility and productivity to meet the health needs of Queenslanders. It states that this can be achieved through:

- workforce redesign to make more cost-effective use of medical, nursing and allied health professionals in providing safe, quality healthcare
- rationalising and simplifying industrial relations arrangements, and ensuring management flexibility is not compromised by restrictive work practices
- accountable and transparent performance incentive arrangements for senior clinical staff.

A key example highlighted in this report in regards to workforce redesign is nurse endoscopy.

2. *Blueprint for better healthcare in Queensland*

In February 2013, the Queensland Government published the blueprint [4]. The blueprint outlines the Queensland Government's policy for healthcare in Queensland. It highlights the need for clinicians to work to their full scopes of practice and challenge the 'myths' of what is possible, and be open to new ways of working and models of care. It outlines the need to break down traditional barriers between professions, build clinician leadership and promote a culture of respect for each other's knowledge and skills. Nurse endoscopy is highlighted as a key example of this policy in action. Following the release of the blueprint, the Minister for Health tasked the Chief Nursing and Midwifery Officer with implementing the nurse endoscopy initiative.

3. *Strengthening health services through optimising nursing strategy and action plan 2013–2016*

The purpose of strategy [5] is to facilitate action on the Queensland Government's priorities and lead to better healthcare for all Queenslanders. The strategy, which has been approved by the Minister of Health, includes, as a key action, the development of nurse endoscopy service models to improve access to safe and reliable gastroenterology services. The implementation of the strategy is overseen by a program board which was established in October 2013.

4. *National Health Workforce Innovation and Reform Strategy: Framework for Action 2011–2015*

In 2012, HWA initiated the Expanded Scopes of Practice Program, including investment in Advanced Practice in Endoscopy Nursing pilots, aimed at broadening the roles of a range of health professionals in order to increase workforce productivity, recruitment and retention.

The HWA Advanced Practice in Endoscopy Nursing Project is driven by two lead sites and delivered in five implementation sites in Queensland and Victoria. The Logan Hospital in Metro South HHS is both a lead and implementation site, and has a role in developing and

delivering training and mentoring future implementation sites/staff. Early project findings indicate the role is contributing to positive patient outcomes, and has the potential to reduce waiting lists in the longer term.

3 Background

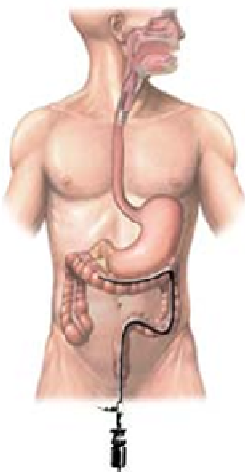
3.1 What is endoscopy?

Endoscopy is primarily a diagnostic procedure that is used to examine inside the body using an endoscope. Since its development in the 1960s, endoscopes have assumed a dominant role in the diagnosis and treatment of disorders of the oesophagus, stomach, duodenum, terminal ileum and colon (see Figure 2).

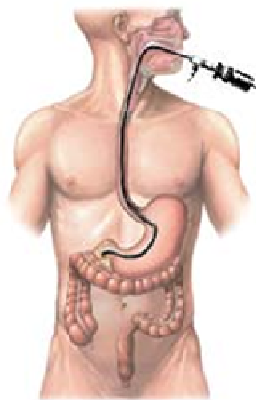
The endoscope is a long thin tube, usually flexible, that has a light and video camera on the end. The endoscope enables the practitioner to view the interior surfaces of an organ or tissue, usually on a video screen. Other purposes of the endoscopy are to take a biopsy, for example—taking samples of tissue and/or to remove a foreign object, such as the removal of a polyp in the colon or a tumour that is affecting the oesophagus. The advantage is that endoscopy is generally considered a non-invasive procedure that avoids surgery [6].

Figure 2 Endoscopy

**Lower Endoscopy
Colonoscopy**



**Upper Endoscopy
Gastroscopy**



Endoscopy services provide a range of diagnostic and therapeutic procedures under varying anaesthetic/sedative combinations on an admitted or non-admitted basis, as elective or emergency procedures, in both public and private healthcare settings. Such procedures require specialist equipment, environment and staffing, either within a dedicated endoscopy suite or, more commonly in Queensland, as a co-located service with day surgery [7].

3.2 Who provides endoscopy?

In Australia, endoscopy is provided by a range of medical practitioners (including physicians and surgeons) and a very small number of registered nurses. All clinicians performing endoscopy in the public health sector must be properly endorsed by the Health Service Chief Executive (HSCE) in which they operate.

For doctors, the Conjoint Committee for the Recognition of Training in GI endoscopy provides registration and recognition of the qualification and training. This is a national body comprising representatives from:

- Gastroenterological Society of Australia (GESA)
- Royal Australasian College of Physicians (RACP)
- Royal Australasian College of Surgeons (RACS).

The committee recognises endoscopic training of specialist physicians and surgeons, who have completed their training in Australia or who are now practising in Australia [8].

For nurses performing endoscopic services there is currently no national body that recognises nursing endoscopic qualifications and training which meets the necessary credentialing standards required by the HHSs. While this gap does not prevent a HHS from endorsing a registered nurse who meets the necessary criteria, it presents barriers in transferability of skills and experience.

3.3 Why is endoscopy important?

Endoscopy is an important diagnostic test for a range of internal organs. The report focuses on gastroscopy and, more importantly, colonoscopy (including sigmoidoscopy) as these are the procedures proposed for nurses to carry out.

3.2.1 Gastroscopy (Upper endoscopy)

Upper endoscopy is used to determine the cause of:

- abdominal pain
- nausea/vomiting
- swallowing difficulties
- gastric reflux
- unexplained weight loss
- anaemia
- bleeding in the upper digestive tract.

Upper endoscopy is also used to remove trapped objects (including food), treat conditions, such as bleeding ulcers and biopsy tissue. Biopsies can be taken to determine sites of infection, to test the functioning of the small bowel and to diagnose abnormal tissue, including conditions, such as coeliac disease and cancerous lesions [9].

3.2.2 Colonoscopy/lower endoscopy

Colonoscopy can detect inflamed tissue, ulcers and abnormal growths. The procedure is used to look for early signs of colorectal cancer and can help diagnose unexplained changes in bowel habits, abdominal pain, bleeding from the bowel and weight loss. In some individuals with a family history, this may also be an appropriate test to check for bowel cancer¹ [10].

¹ Sometimes referred as colorectal cancer, colon cancer.

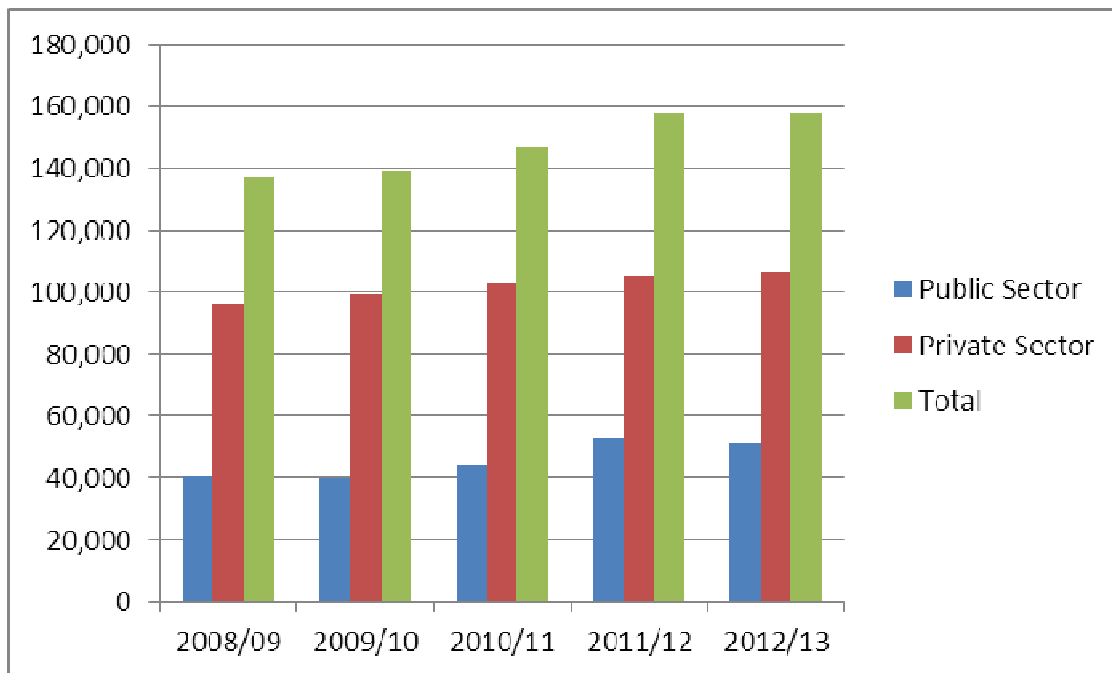
Colonoscopy is the primary procedure for diagnosing bowel cancer occurring in the lower colon. The **prevalence of bowel cancer** and the **high burden** it places on both the patients and healthcare system means it is often singled out when discussing endoscopy. Bowel cancer is the second most commonly diagnosed cancer in Australia after prostate cancer and accounts for the largest proportion of hospital inpatient costs of any cancer diagnosed in Australia (refer to Appendix 2) [11]. As a result, much of the focus of this report will be the ramifications of problems associated with accessing colonoscopy and the resulting impact of bowel cancer on Queenslanders.

4 Endoscopic activity and demand in Queensland

4.1 Queensland endoscopic activity

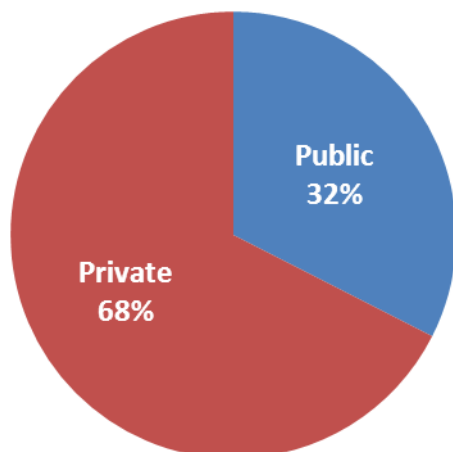
The total number of endoscopies performed in Queensland in 2012–13 was 158,065 [Queensland Hospital Admitted Patient Data Collection (QHAPDC) and Decision Support System (DSS) Panorama Data, extracted November 2013] (see Figure 3). Of these, the majority were performed in the private sector (see Figure 4). While this report is for the public sector only, a complete picture of the services provides the context.

Figure 3 Queensland endoscopies between 2008–09 and 2012–13



Source: QHAPDC and DSS Panorama Data extracted November 2013

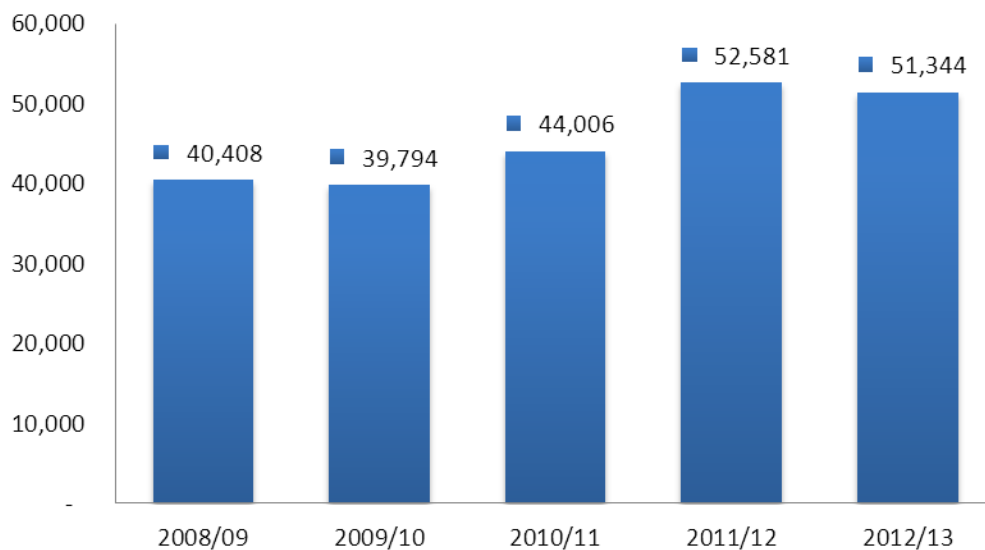
Figure 4 Queensland public and private endoscopies 2012-13



4.2 Queensland Health endoscopic activity

There has been difficulty in obtaining activity data for endoscopy services in Queensland Health facilities. Data extrapolated in previous reports could not be replicated, but there has been some level of agreement between them. According to data obtained from the QHAPDC (admitted) and Panorama DSS (non-admitted), in 2012–13, Queensland Health performed 51,344 procedures. This is a 27% increase in activity over a 5 year period following a reduction from the previous year. Figure 3 highlights the activity performed in the public sector between 2008–09 and 2012–13.

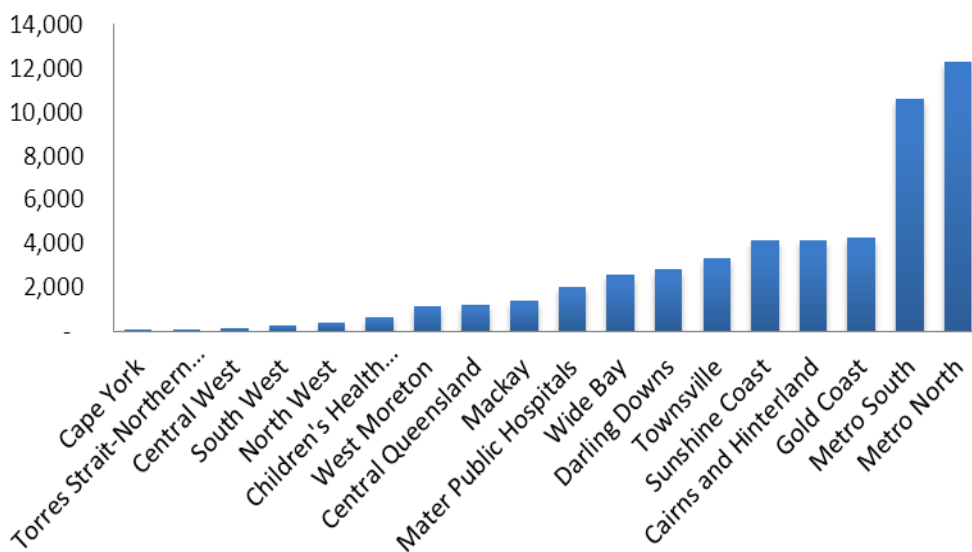
Figure 5 Queensland Health endoscopies between 2008–09 and 2012–13



Source: QHAPDC, DSS Data extracted November 2013

Figure 6 shows in 2012–13, the metropolitan HHSs performed 44.5% of the endoscopies in Queensland. South East Queensland HHSs perform approximately 70% of endoscopies in Queensland.

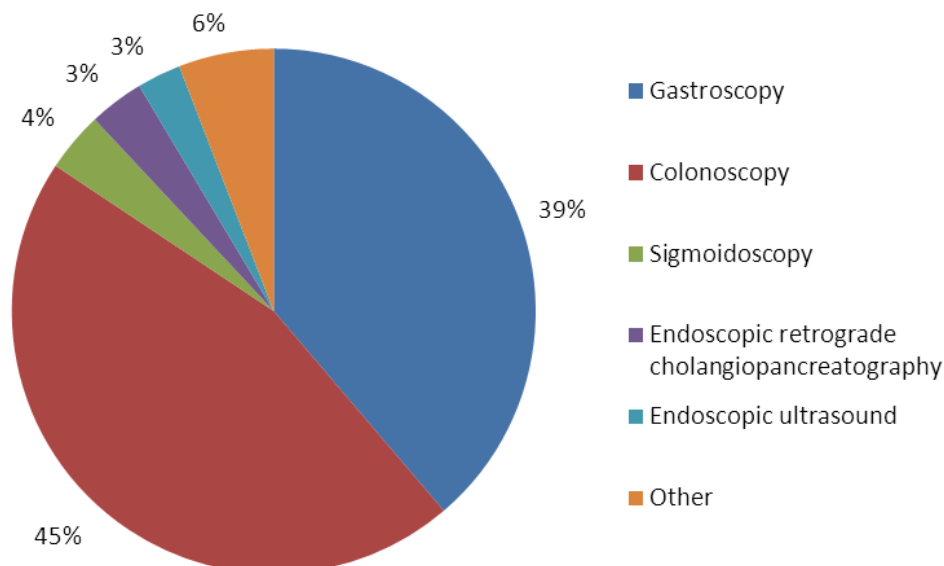
Figure 6 Queensland Health endoscopic activity by Hospital and Health Service 2012–13



Source: QHAPDC, DSS Data extracted November 2013

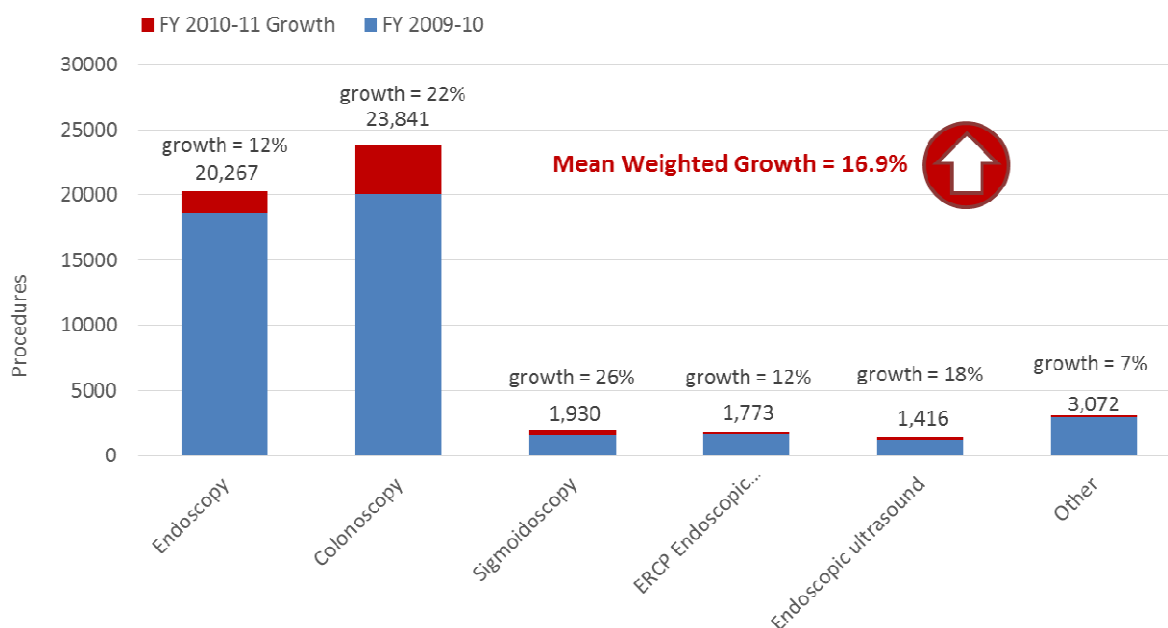
The majority of Queensland Health endoscopies are colonoscopies. In 2010–11 [12], the most recent data available, colonoscopies represented 45% of total endoscopic procedures performed (see Figure 7).

Figure 7 Types of endoscopies performed in Queensland Health 2010–11



Between 2010–11 and 2011–12, colonoscopy activity increased by 22% (from 18,096 to 23,842 procedures) (see Figure 7). This was significantly higher than other endoscopic procedures. Factors influencing this growth include, but are not restricted to funding increases for the services and uptake of the NBCS program.

Figure 8 Growth in endoscopic procedures Queensland Health – financial year 2010–11 to 2011–12



Source: Clinical Workforce Planning and Development Branch, Queensland Health

4.2 Public waiting lists

In addition to rising numbers, endoscopy is becoming increasingly complex, extending procedure length and limiting daily room throughput. Despite increases in the number of procedures increasing, anecdotal reports suggest unmet need has also increased. Endoscopy is not reportable as a surgical procedure; therefore waiting list data is incomplete and challenging to access. Furthermore, there appears to be little standardisation in waiting list addition practices and limited evidence of active waiting list management – which is known to reduce the numbers waiting markedly [13]. Ongoing challenges with data collection and management have impacted on projections of demand into the future and the ability to accurately plan for corresponding service requirements [7].

The best available data for current waiting lists for all endoscopic procedures by HHSs is based on a survey conducted for the Queensland Health Endoscopy Workforce Advisory Group (QHEWAG) in 2012 [18]. The results of this survey are shown in Table 1. The categories listed in Table 1 refer to the urgency of the procedure:

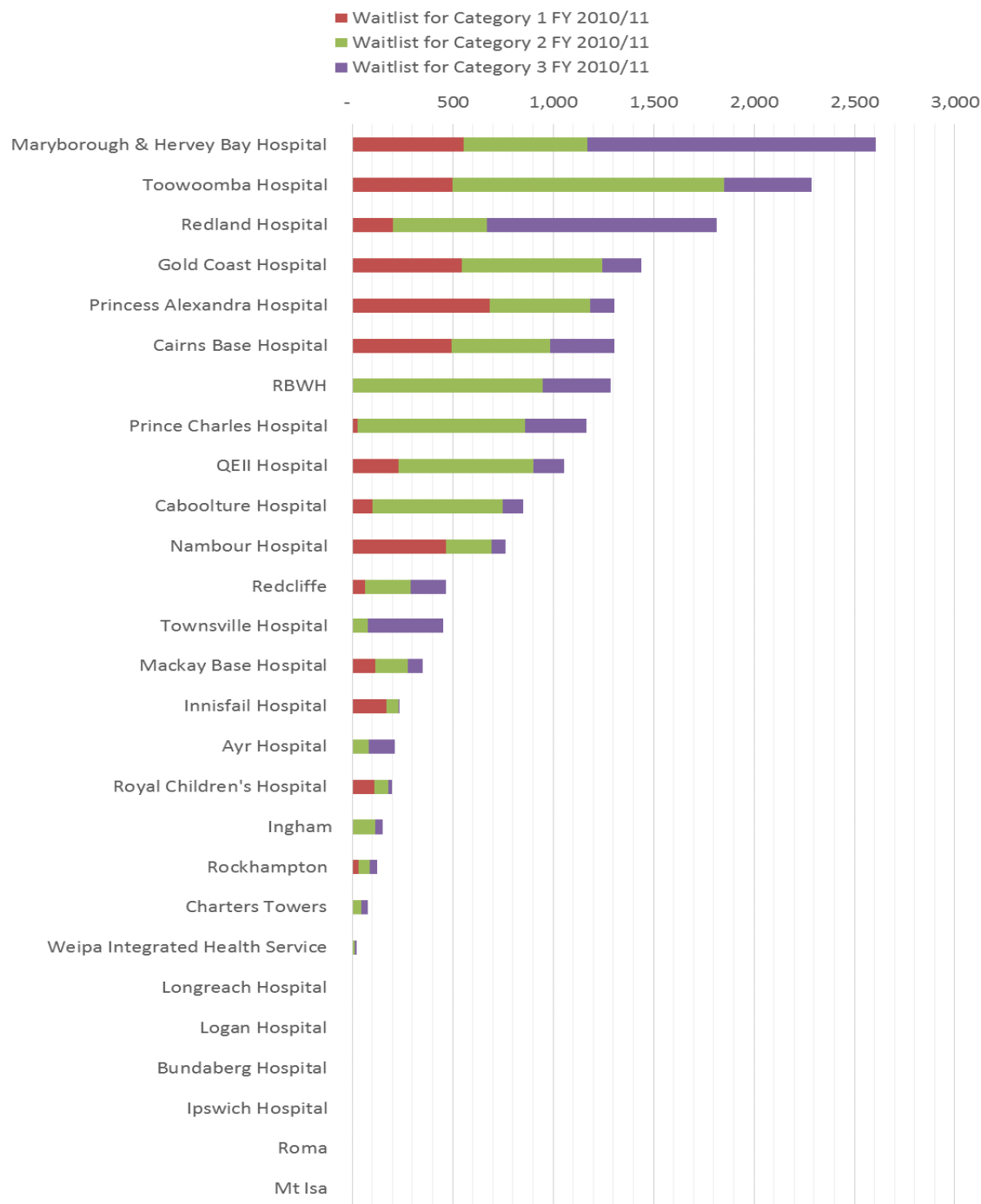
- Category 1: Procedure required within 30 days.
- Category 2: Procedure required within 90 days.
- Category 3: Procedure required within 365 days.

Table 1 Queensland Health hospital waiting lists for endoscopy – financial year 2009–10 to 2010–11

	Category 1 2009–10	Category 1 2010–11	Category 2 2009–10	Category 2 2010–11	Category 3 2009–10	Category 3 2010–11
Princess Alexandra Hospital	308	687	621	497	132	119
Royal Brisbane and Women's Hospital	-	-		948		338
Prince Charles Hospital	17	27	658	836	276	305
Gold Coast Hospital		548		698		192
Logan Hospital						
Townsville Hospital	-	-	1	79	207	372
Bundaberg Hospital						
Cairns Base Hospital	364	493	713	491	439	319
Redcliffe	32	63	137	227	159	178
Toowoomba Hospital	327	498	1,544	1,353	328	436
Mackay Base Hospital	65	117	281	161	100	72
Ipswich Hospital						
Maryborough and Hervey Bay	268	556	665	617	1,386	1,435
Nambour Hospital	336	469	244	223	57	70
QEII Hospital	139	231	523	671	107	153
Caboolture Hospital	71	102	620	648	119	100
Redland Hospital	220	205	575	464	1,158	1,147
Royal Children's Hospital	n/a	109	n/a	69	n/a	19
Rockhampton	17	30	60	56	34	39
Innisfail Hospital	70	170	130	62	50	3
Ayr Hospital		1		83		128
Roma		-	-	-	-	-
Mount Isa						
Ingham		-		116		38
Weipa		5		9		8
Charters Towers		-	-	44		35
TOTAL	2,234	4,311	6,772	8,352	4,552	5,510

Figure 9 shows the endoscopy demand by category for facilities in Queensland Health. Of particular concern are the Wide Bay and Darling Downs HHSs.

Figure 9 Queensland Health hospital waiting lists for endoscopy by category - financial year 2010–11

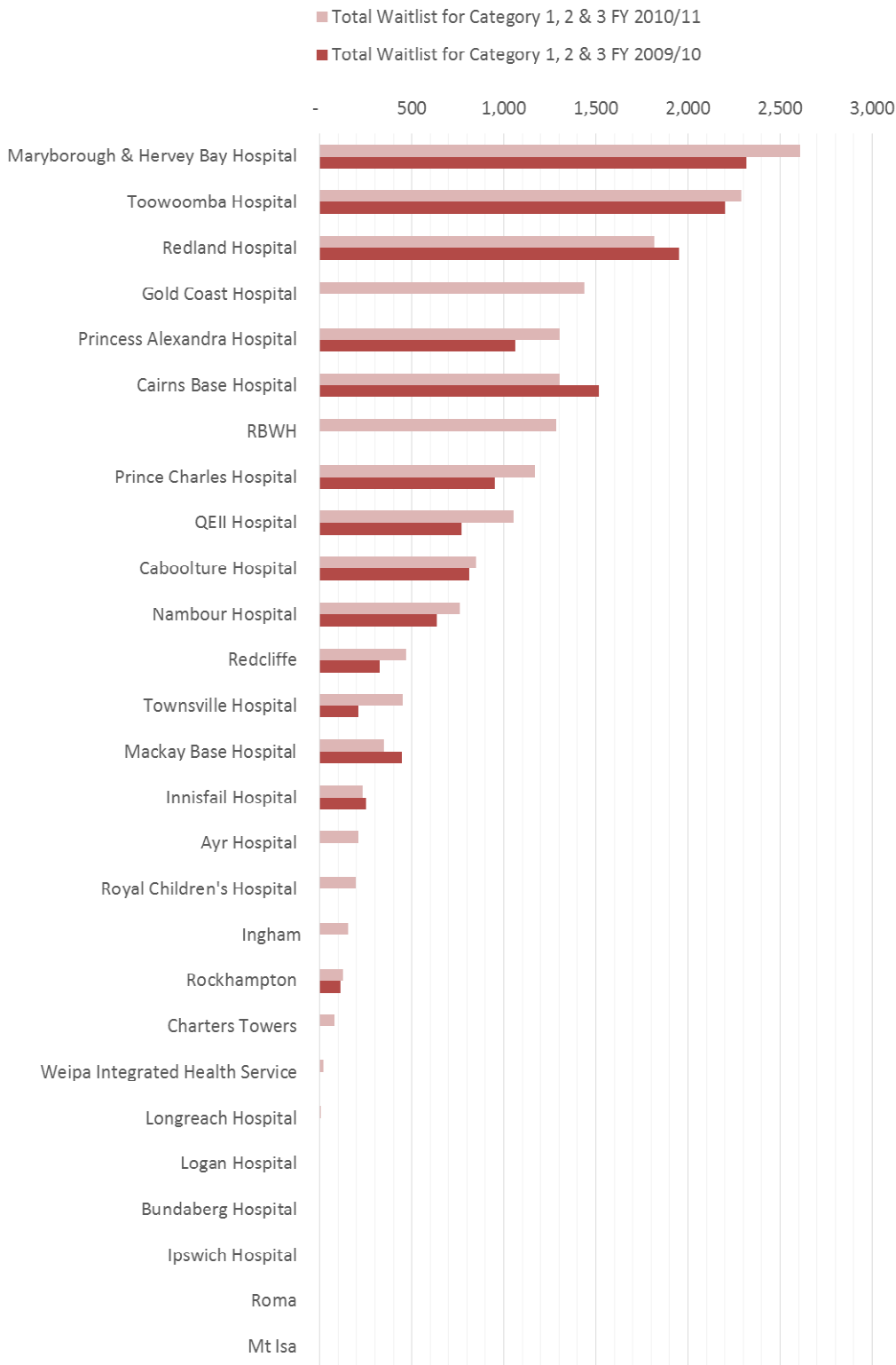


Source: Clinical Workforce Planning and Development Branch, Queensland Health

Figure 10 highlights the change in waiting lists between 2009–10 and 2010–11. Anecdotal evidence provided to the *Mckinsey report* [12] states that there had been a 24% growth in

waiting list. In the absence of data from the Gold Coast HHS and the Royal Brisbane and Women's Hospital, the estimate could not be validated.

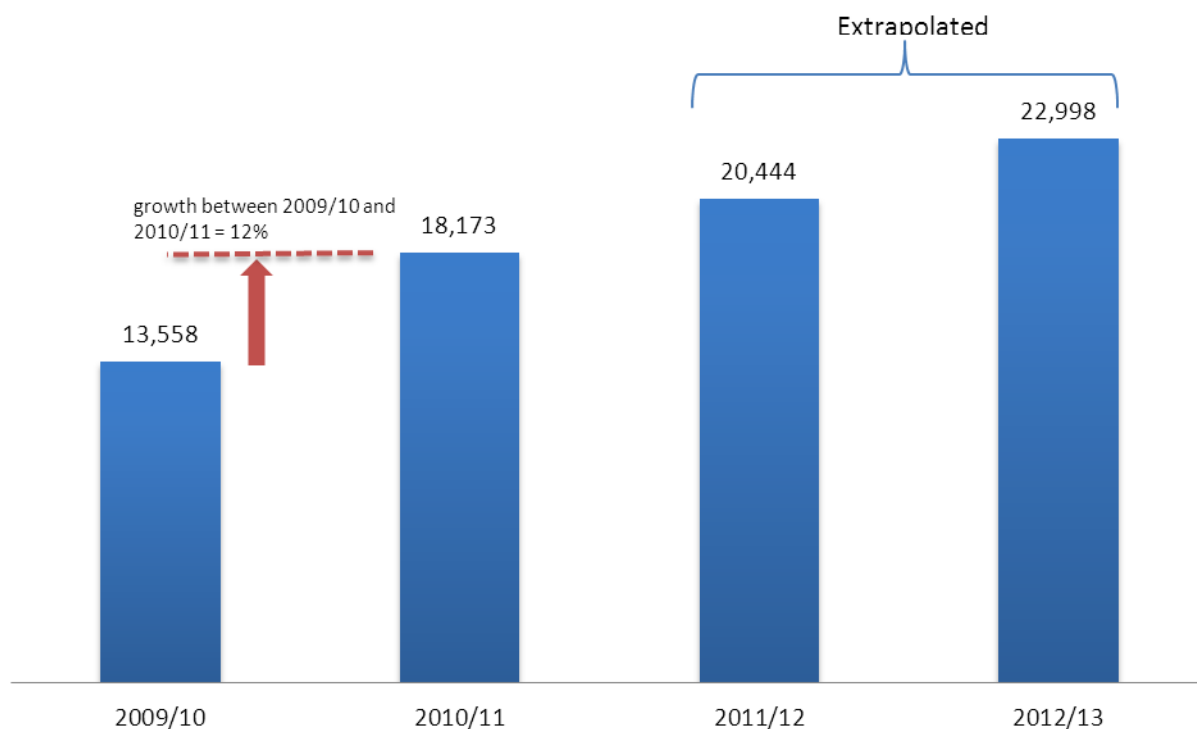
Figure 10 Total endoscopy waiting list for Queensland Health 2009–10 and 2010–11



Source: Clinical Workforce Planning and Development Branch, Queensland Health

Based on data from 2010-11, the projected growth for services in 2012-13 is 23,000 in 2012–13. This estimate is likely to be conservative as previous projections have been in the vicinity of 30,000 people [1]. The conservative estimates are used in this analysis. Figure 11 shows projected waiting lists.

Figure 11 Estimated waiting list

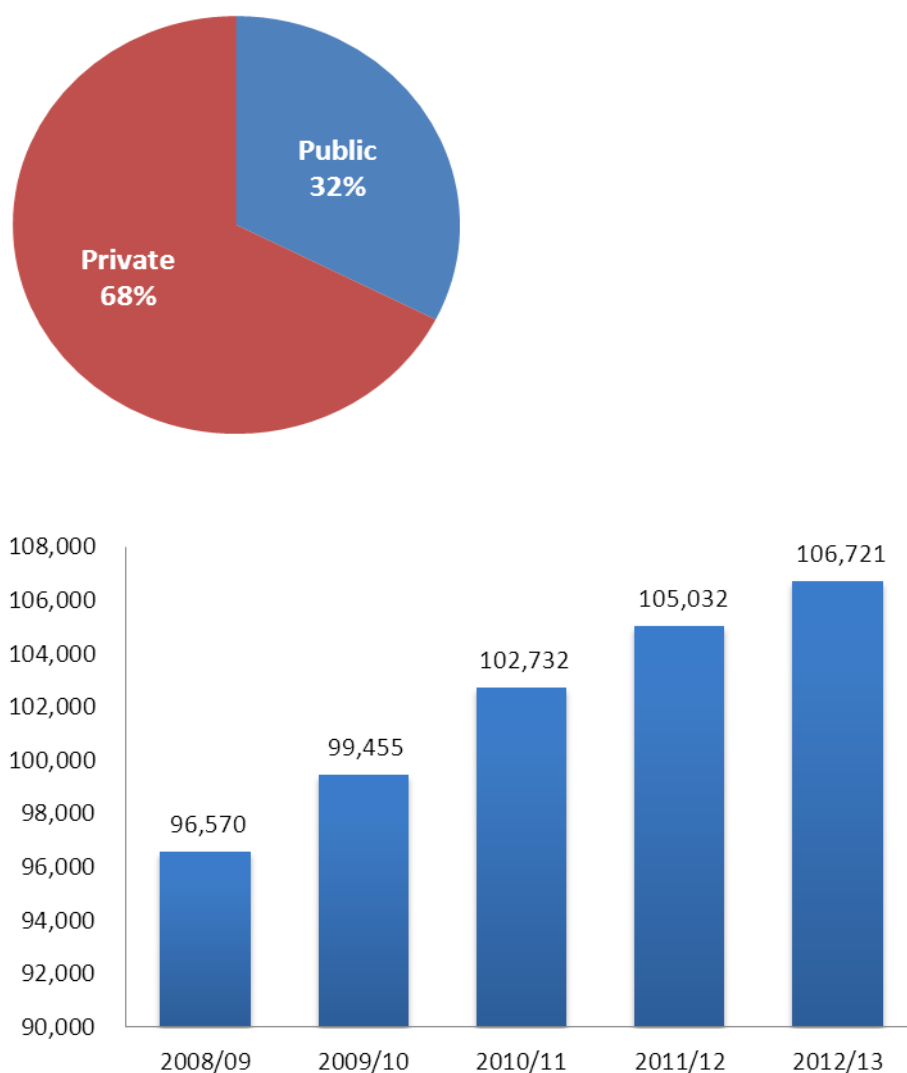


Of major concern around waiting list data, is the length of time for patients' access to services. Stakeholder comments made in the Investment Management workshops suggest that some patients may be waiting up to eight years for a procedure. These statements have been supported by media reports stating that patients in the Caboolture region are waiting seven years for a gastroenterology clinic [14].

4.3 Private sector endoscopic activity

In 2012–13, the private sector performed 106,721 endoscopic procedures (see Figure 12). Over the last five years, the activity has grown by 10%. While the majority of services are still performed in the private sector, the growth in services is less than that being established in the public sector.

Figure 12 Private sector endoscopy activity between 2008–09 and 2012–13



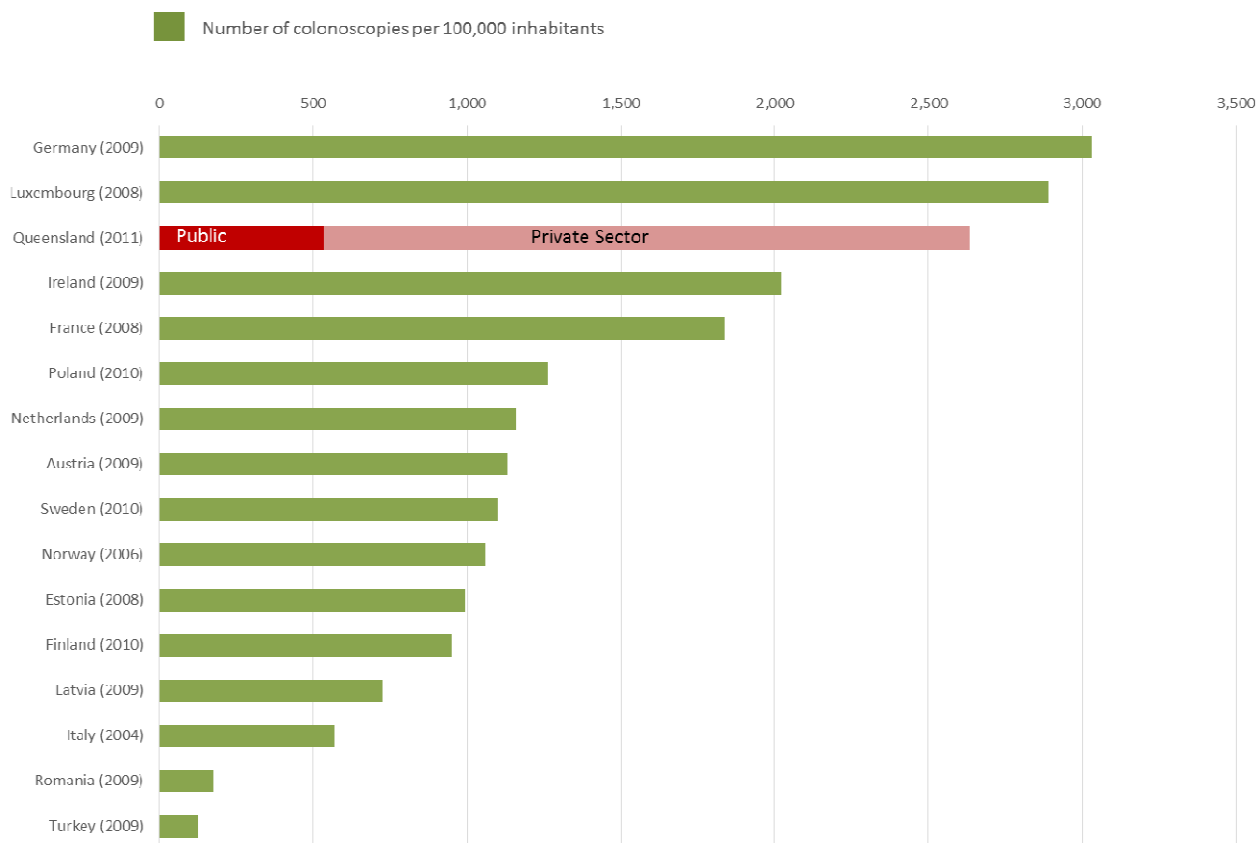
Source: QHAPDC, data extracted November 2013

The vast majority of private activity is colonoscopy, representing 70% of total endoscopic procedures performed.

4.4 International activity comparison

International comparisons for endoscopic procedures were unable to be obtained. However data for number of colonoscopies, a subset of endoscopy, is compared across a number of European countries. The evidence suggests that Queensland rates of colonoscopy procedures are comparable with selected European countries (see Figure 13).

Figure 13 Comparison of colonoscopy procedures per 100,000 population with European practice [15]



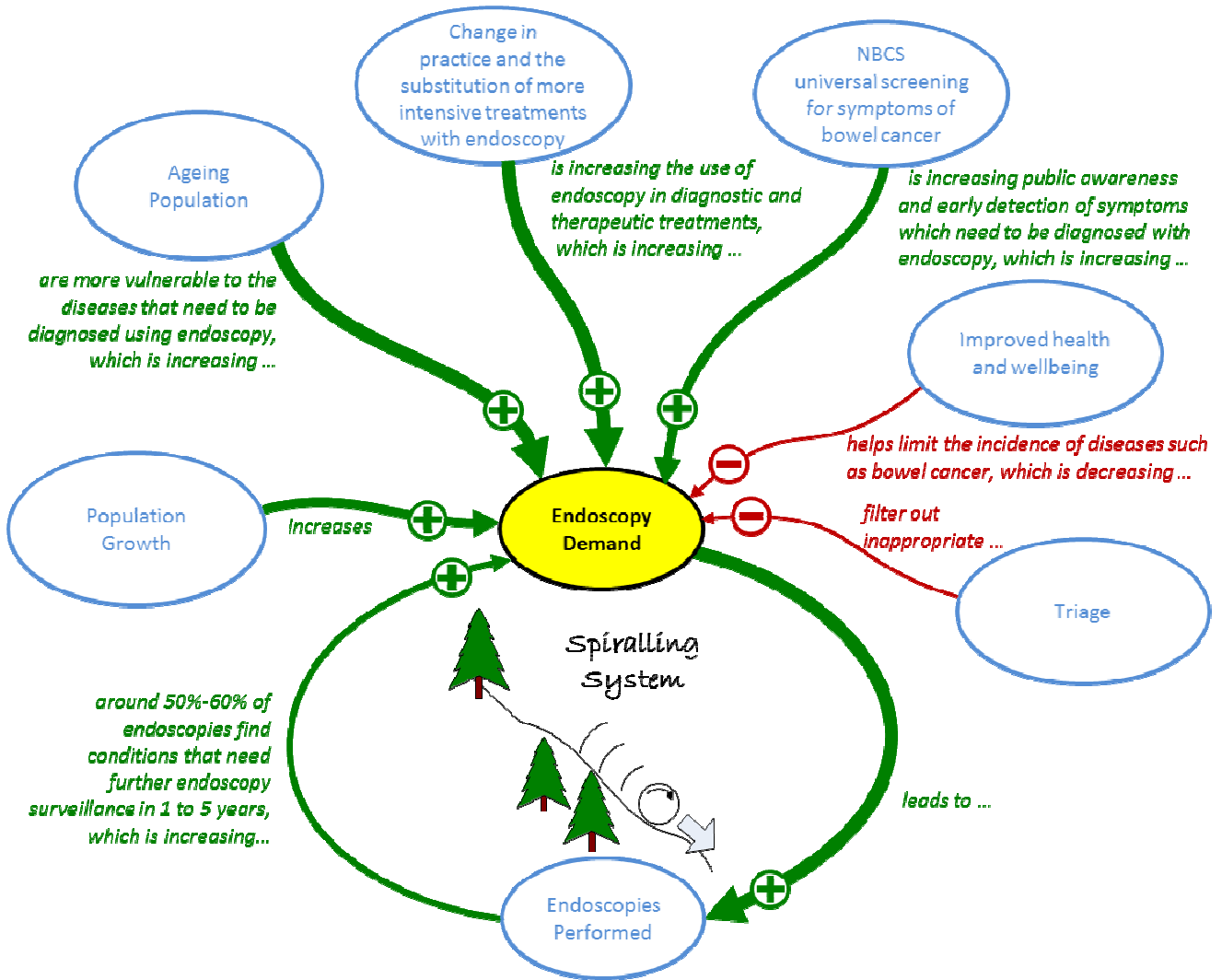
4.5 Estimating demand for endoscopy

The key factors (refer Figure 14) driving the growth in demand for endoscopic services are:

- the ageing population and growth in population
- the use of endoscopic procedures more broadly
- the downstream effect of the NBCS program and
- the need to monitor patients who have had a treatable condition diagnosed (Figure 10).

It is expected a small offset in growth is attributable to improved health and wellbeing of the population, and the triaging of demand to filter out inappropriate referrals.

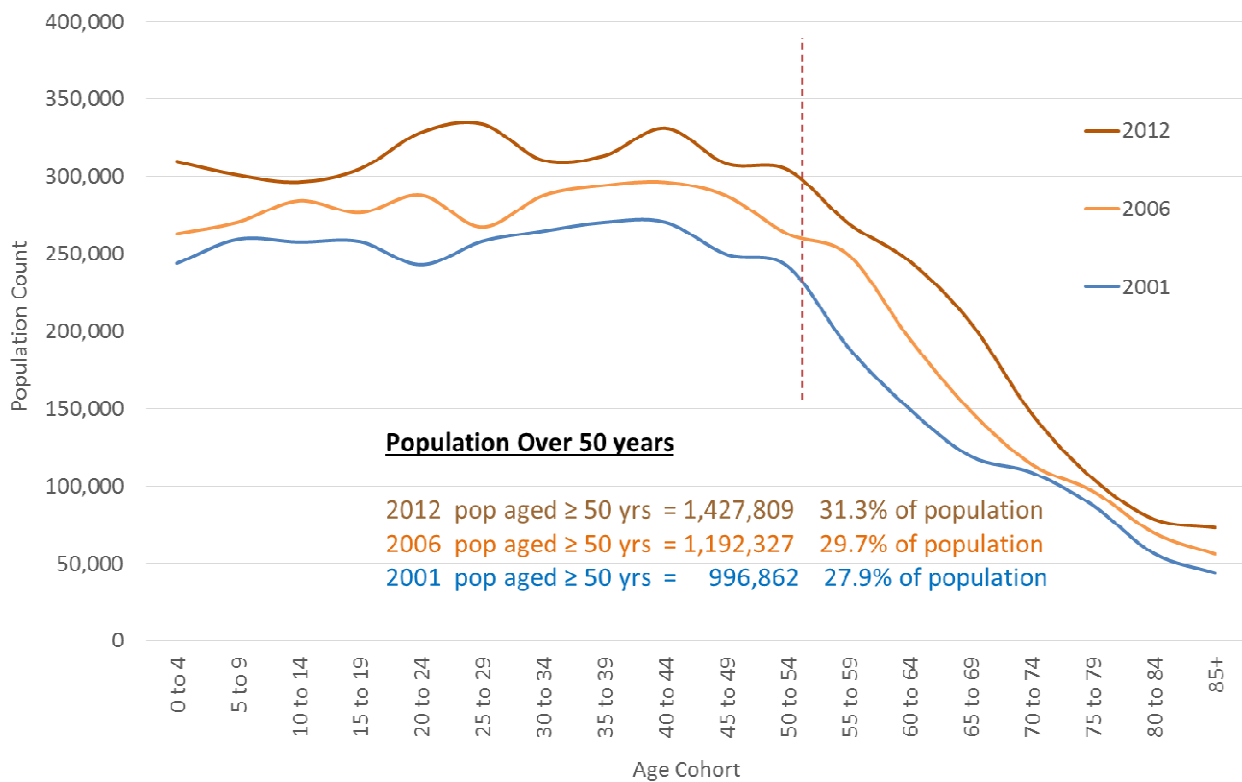
Figure 14 Factors driving the demand for endoscopy



4.5.1 Population growth coupled with an ageing population

Two major drivers of endoscopy demand are the growth in the population – in particular persons aged 50 years and over (refer to Figure 15). This age group are particularly vulnerable to bowel, stomach and oesophagus cancers which require diagnosis using endoscopy (see Figures 16 and 17).

Figure 15 Population profile by age [16]



Since 2001, Queensland’s population over the age of 50 has been growing at 3.32% per annum; whilst the total population average annual growth is 2.26%. As a result a 3.14% forecast growth in the incidence of bowel and upper GI cancer is predicted (see Figures 16 and 17).

Figure 16 Colorectal cancer age specific incidence rate per 100,000, by age and at diagnosis, Queensland, 2009 [17]

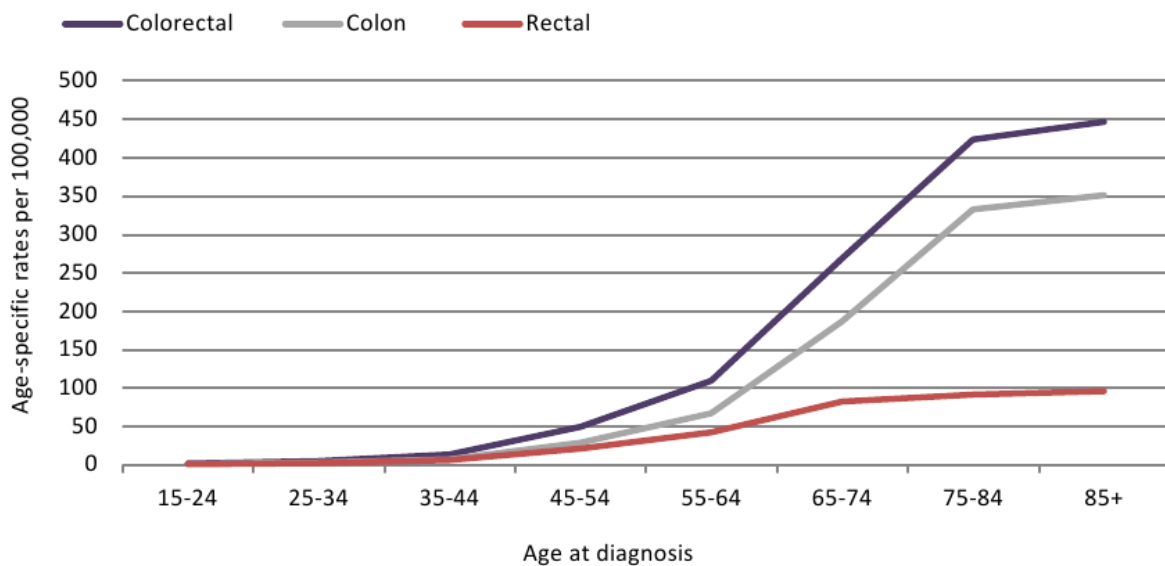


Figure 17 Gastric and oesophageal cancer incidence per 100,000, by age at diagnosis, Queensland, 2009 [17]

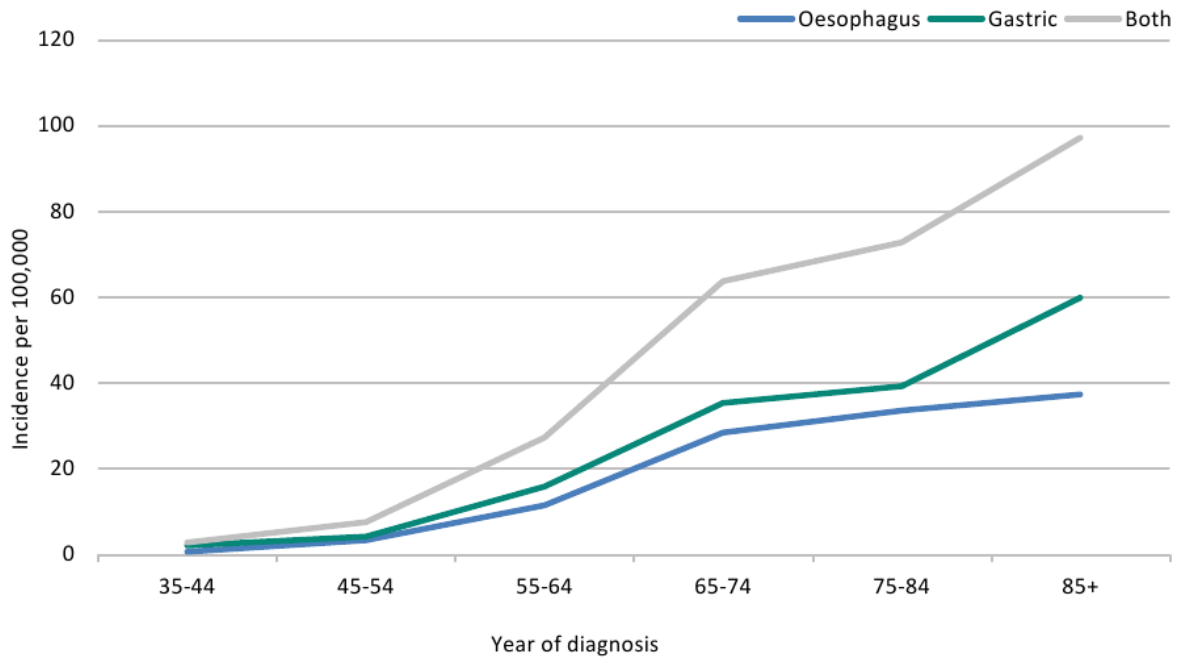
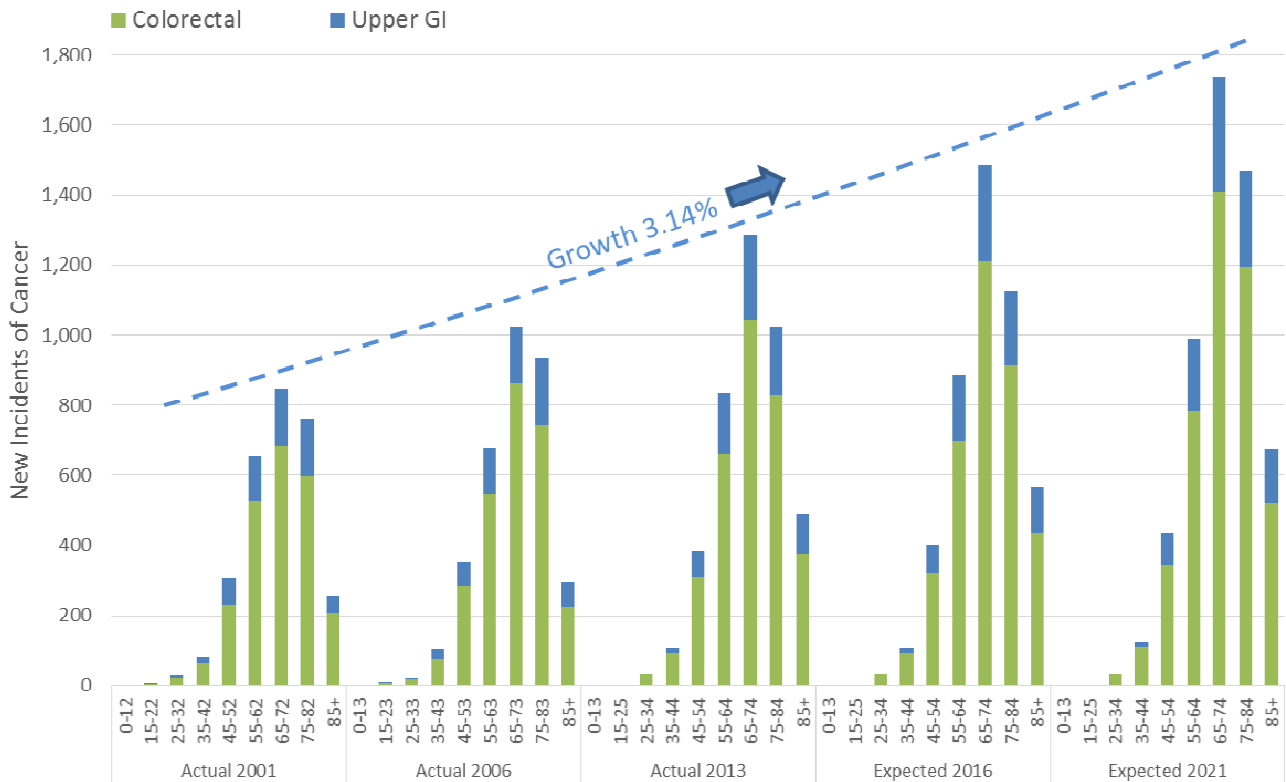
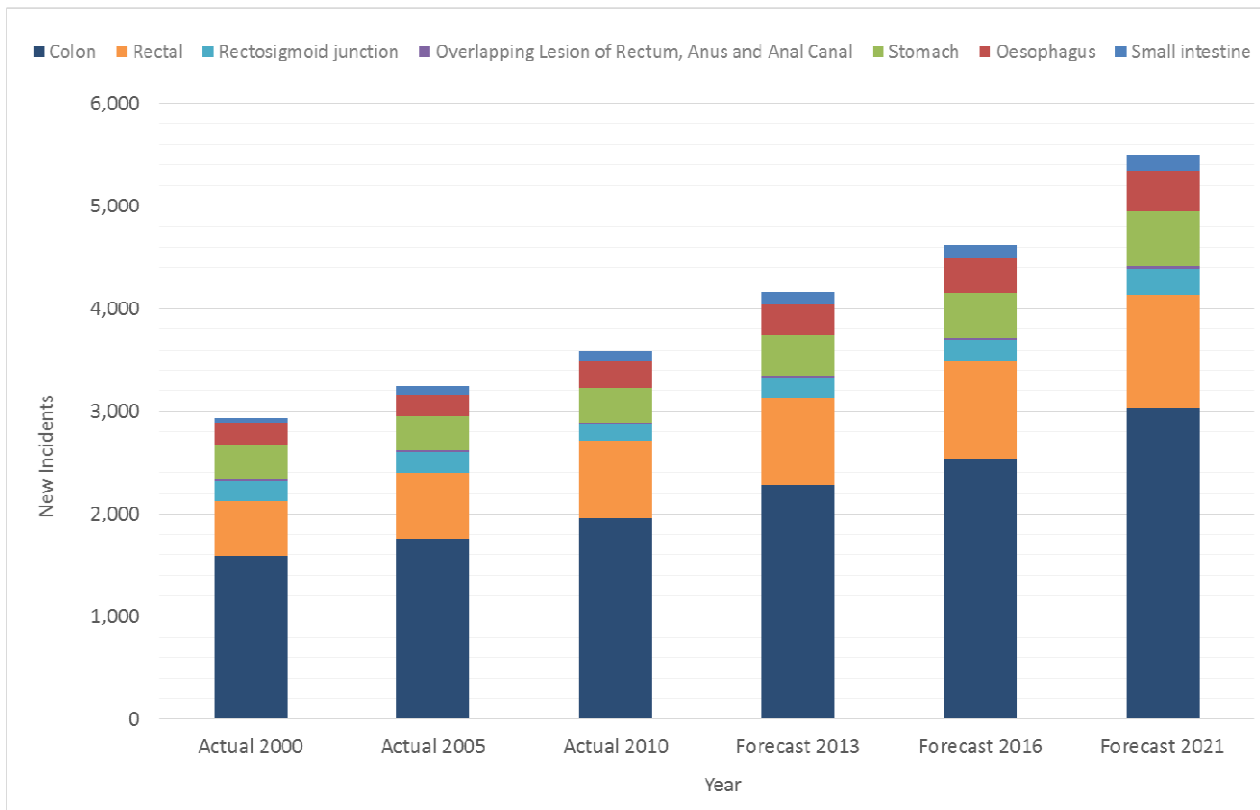


Figure 18 Projected growth in cancer incidence for bowel (colorectal), stomach and oesophagus (upper GI) cancers by age of diagnosis, Queensland, 2001 to 2021 [17]



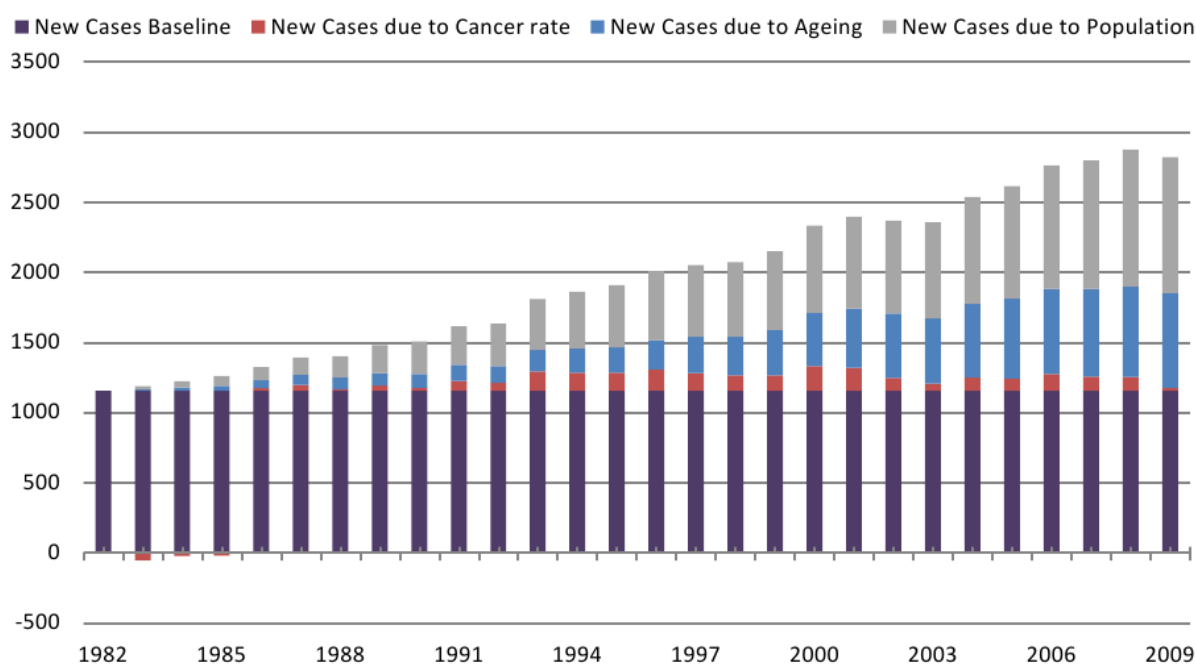
As a result of actual and projected growth in the ageing population, it is estimated 4975 new incidents of GI tract cancer, predominately bowel cancer, will need diagnosis using endoscopy (refer to Figure19).

Figure 19 Actual and projected new cancer incidence for bowel, stomach and oesophagus cancers, Queensland, 2000–2021[17]



In summary, the growth in incidence of cancer, which accounts for over 50% of the demand for endoscopy, is a combination of population growth; an ageing population and the natural disease growth (refer to Figure 20). Figure 20 shows the relative composition of each key factor in trends for colorectal (bowel) cancer between 1982 and 2009.

Figure 20 Growth in colorectal new cases, Queensland, 1982–2009 [17]



4.5.2 National Bowel Cancer Screening

The Australian Government’s NBCS program for citizens at the age of 50, 55, 60 and 65 has driven up demand for endoscopies. The scheme will introduce screening for citizens at age 70² years in 2015 and biennial screening for 50–74 years in 2017. Evidence suggests that screening for bowel cancer enables the cancer to be detected 2–3 years earlier than waiting for the symptoms to become evident, thus increasing the chance of better health prognosis and reducing the overall burden of care [18].

As a result of the Faecal Occult Blood Test (FOBT) screening program it is estimated that around 74 lives will be saved in Queensland in 2013—growing to over 400 by 2018. However, this outcome is only possible with a timely endoscopic investigation and diagnosis following a positive FOBT test. In 2011–12, 182,918 Queenslanders were invited to participate in the NBCS, of which 61,971 (33.9%) responded. Of those who responded, 4310 (7.0%) tested positive to the FOBT and 3568 (82.8%) of those followed up the positive FOBT with colonoscopy. Of these 1859 (59.9%) were diagnosed with polyps, adenoma or cancer.

Phase	Start date	End date	Target ages
1	7 August 2006	30 June 2008	55 and 65
2	1 July 2008	30 June 2011 ^(a)	50, 55 and 65
2 ^(b)	1 July 2011	30 June 2013	50, 55 and 65
3	1 July 2013	ongoing	50, 55, 60 and 65
3	1 July 2015		50, 55, 60, 65 and 70
3	1 July 2017		Phasing in of biennial screening (50–74) commences

² National Bowel Cancer Screening Program phases and target populations

As part of the 2012–13 Federal Budget, the Australian Government announced that the NBCS program will be expanded to include Australians turning 60 years of age from 2013 and those turning 70 years of age from 2015.

The program will be further expanded in 2017–18, when a phased implementation of biennial screening will commence. www.cancerscreening.gov.au/internet/screening/publishing.nsf/Content/bowel-about accessed 03/09/13.

As a result of these diagnoses, it is assumed that most of these individuals will follow up with surveillance through future periodic colonoscopy (1 year, 2 year 3 year or 5 year). The 2011 analysis included the 50, 55 and 65 cohorts. Data from July 2013 will include the 60 years cohort, which will increase the number of invited participants from Queensland by 20% to around 219,700 persons. Numbers of Queenslanders expected to participate in the NBCS is expected to continue to increase as the program aims to increase the response rate from 33.9% to 65% [19].

The subsequent demand for 4310 colonoscopies in Queensland from the 2011 NBSC was based on an uptake rate of 33.9% (refer Table 2). However, this demand is expected to grow to over 35,000 colonoscopies per annum as the program pushes towards its target take-up of 65% and when biennial screening is introduced in 2017. Furthermore, by 2020 it is estimated that surveillance endoscopies will compound to around 20,000 as patients return for their second and third procedure.

Table 2 National bowel cancer screening results for Queensland—overall diagnostic outcomes (including histopathology) 2011–12

Invitations issued	Number screened	Total positive FOBT	Colonoscopy recorded	FOBT Positive						
				No cancer or adenoma	Polyps awaiting histopathology	Confirmed diminutive adenoma	Confirmed small adenoma	Confirmed advanced adenoma	Suspected cancer	Confirmed cancer
182,918	61,971	4,310	3,101	1,242	1,121	140	91	418	64	25
				40.1%	36.1%	4.5%	2.9%	13.5%	2.1%	0.8%

Source: National Bowel Cancer Screening Program monitoring report: July 2011–June 2012.

The implications of an expanding NBCS program are significant for Queensland Health. Taking into account the current proportion of uninsured Queenslanders (54%), Queensland Health could see an additional demand for FOBT generated diagnostic colonoscopy of 14,000 per annum by 2018. In addition, it is estimated 60% of these new patients will require surveillance – effectively increasing the annual demand for colonoscopies to 17,500 by 2018 (14,000 initial diagnosis + 3500 surveillance)—adding a further 74% to the current demand of 23,841. This growth will occur very quickly once biennial surveillance is introduced in 2017–18 (refer Figure 21).

Figure 21 Estimated number of positive NBCS FOBT test results in Queensland as the program is expanded to include people of 60 years and biennial screening of people 50–74 years

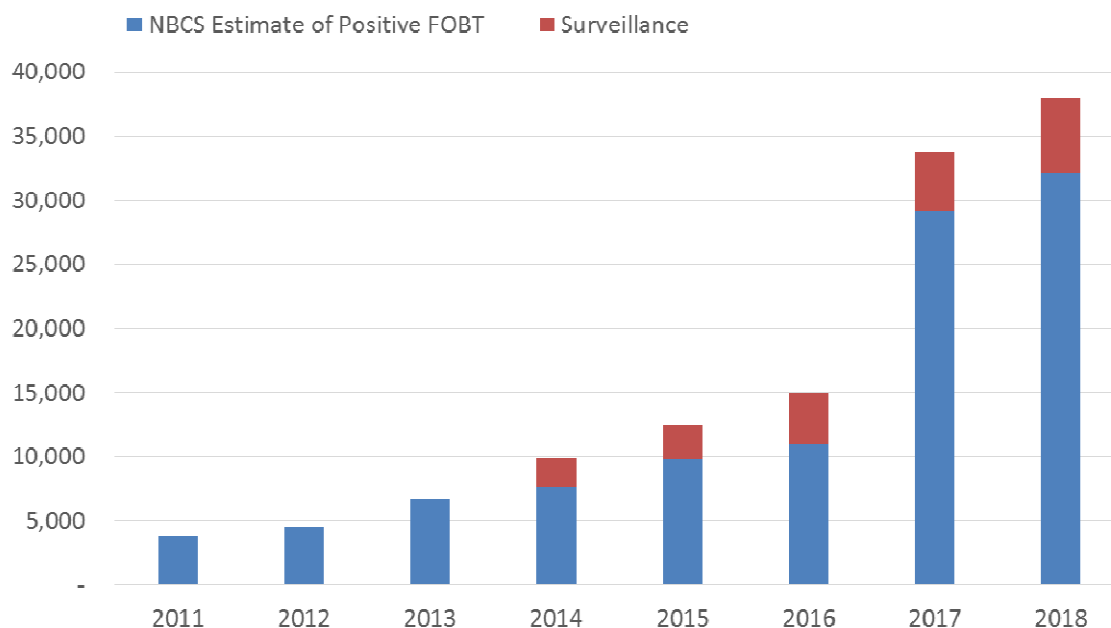


Figure notes:

1. Projection based on data published in *NBCS monitoring report: July 2011–June 2012*.
2. Assumes linear improvement of uptake from 33.9% in 2011 to target 65% in 2018.
3. Assumes 7.0% of FOBT return a positive result [19].

4.5.3 Change in practice

The last 10 years has seen significant changes in practice towards endoscopy practices informed by evidence-based guidelines. These changes have enabled increased use of endoscopic procedures as a substitution for intensive surgical treatments. Less invasive endoscopy diagnosis and therapy is being enabled and accelerated through the continued technical advances in endoscopy, such as:

- video capsule endoscopy
- endoscopic ultrasound
- double balloon endoscopy and
- magnifying techniques.

The ease of use of modern endoscopy technology makes the performance of procedures less complex and can deliver more reliable outcomes. Examples of where endoscopic procedures are preferred over surgical include:

- early oesophageal and colorectal malignancy
- the palliation of hepato-biliary and GI malignancy and
- combining endoscopic ultrasound with video to provide better information for staging cancers to explore the penetration of cancers into the surrounding structures.

Increasing levels of awareness of the availability of endoscopic procedures contributes to the significant uptake of demand for endoscopy. The increased use of endoscopy as the primary

diagnostic tool has evidential support for its benefits, however is not without controversy [20, 21].

4.5.3 Latent demand

Presently 54% of the Queensland population are uninsured and 53% of persons aged 50 years and over. Therefore, if the public health sector was performing procedures in line with the uninsured ratio of 2500 colonoscopies per 100,000 population – 65,000 colonoscopies would need to be performed per year; this number is almost three times the 23,842 colonoscopies delivered by Queensland Health in 2011. The data suggests a potentially considerable latent demand for public colonoscopy – which is currently being met by the private sector.

4.5.4 Underlying demand estimate

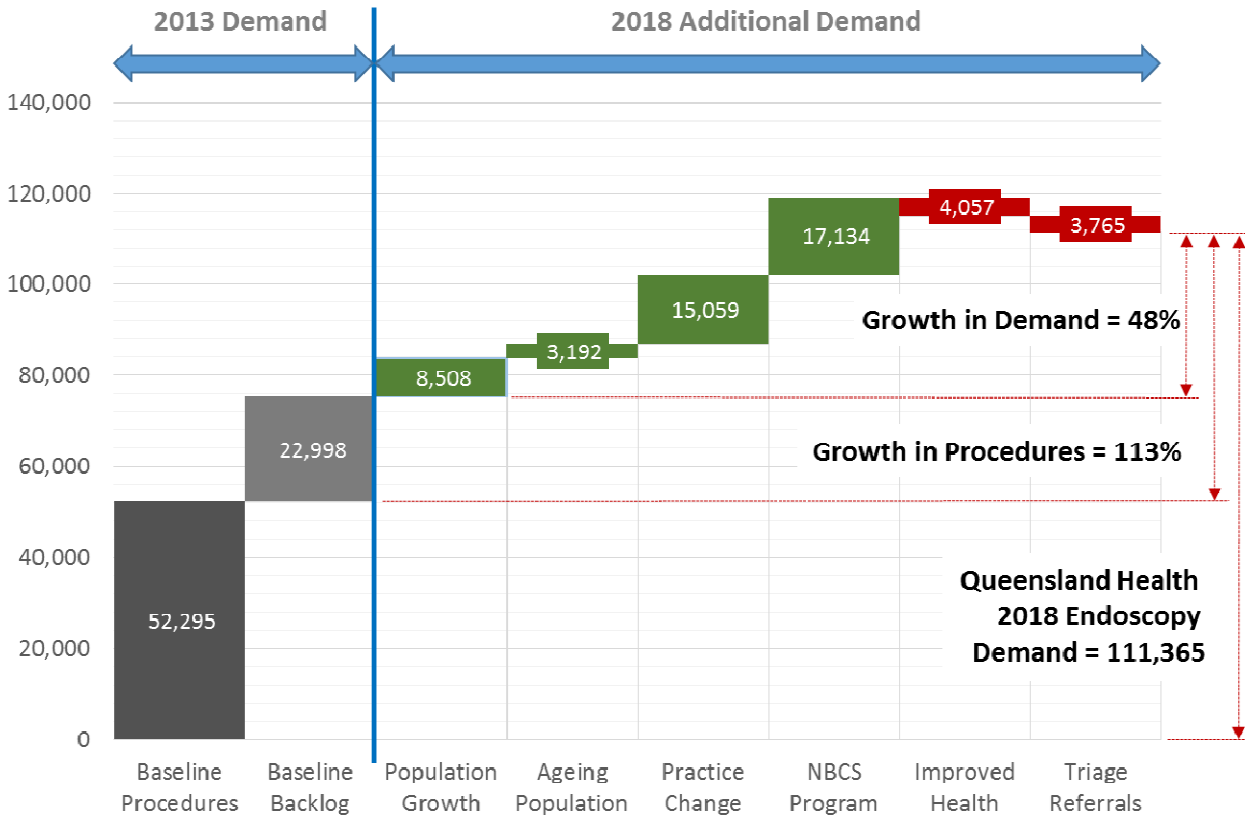
The paucity of reliable data constrains prediction for overall endoscopy demand, however using the cause and effect demand model, the expected upper bound demand for 2018 is 111,365 with a lower bound demand of 92,200 (based on the figures shown in Table 3 and illustrated in Figure 21). Further information on demand drivers can be found in Appendix 2.

Table 3 Upper and lower bound estimates for endoscopy demand drivers

Driver	Description	Forecast growth by 2018 Upper estimate	Forecast growth by 2018 Lower estimate	Confidence high, medium, low
2013 Baseline	Current endoscopy demand	Procedures = 52,295 Backlog = 22,998	Procedures = 52,272 Backlog = 18,173	Medium Low
Population	Population growth will increase all aspects of endoscopy	11.3% (2.3% per annum)	10% (2.0% per annum)	High
Ageing	The contribution that an ageing cohort adds to the population growth	4.2% (0.85% per annum)	3.2% (0.64% per annum)	High
Practice change	The growth in endoscopy created by improved technology, better medical treatment and patient awareness	20.0% (4% per annum)	10% (2% per annum)	Low
NBCS program	Growth from increased participation through program expansion and uptake Plus growth from consequential surveillance	Positive FOBT = 25,381 Surveillance = 5887 Uninsured = 54.8% Total = 17,134	Positive FOBT = 18,276 Surveillance = 5,109 Uninsured = 54.8% Total = 12,815	Medium
Improved Health	Decline caused by better health	-5.4% (-1.08% per annum)	-2.5% (-0.5% per annum)	Medium
Triage Referrals	Reduction caused by better triaging of referrals	-5.0% (-1.0% per annum)	-3.8% (-0.75% per annum)	Low

Figure 22 shows the proportion of growth for each driver. The major increase driver will be the expansion of the NBCS program.

Figure 22 Upper bound expected Queensland Health endoscopy demand 2018

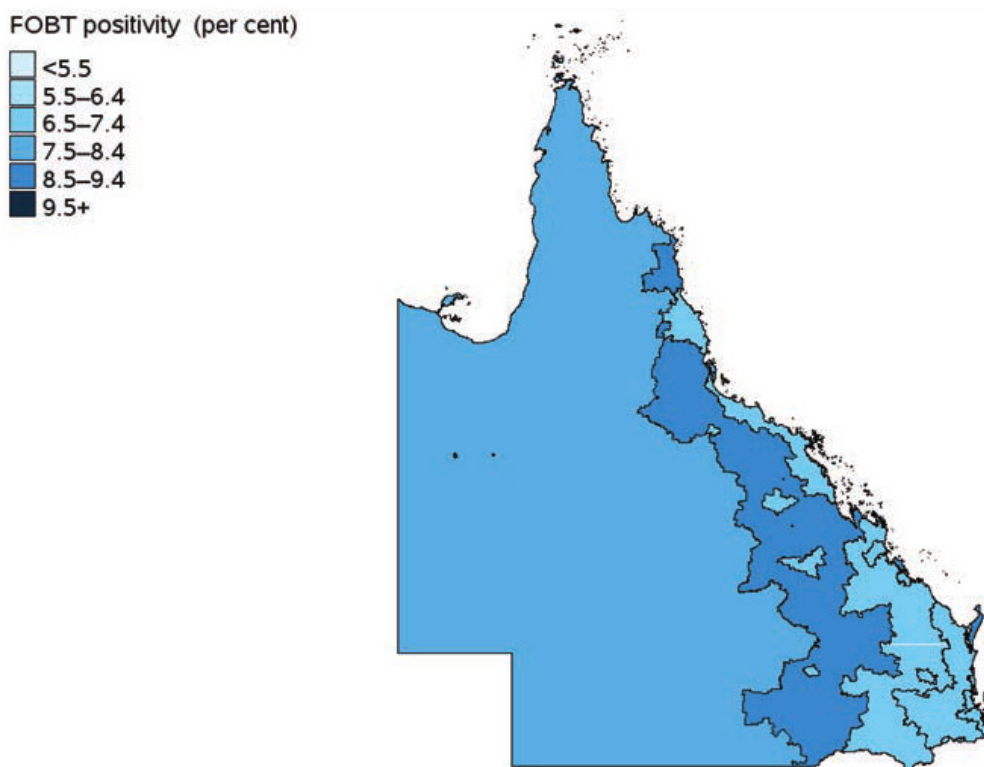


5 Statewide access to endoscopy services

A review of the outcomes of the NBCS program [22] demonstrates access issues for endoscopic services in Queensland. While this program focuses particularly on colonoscopy, it may be representative of all endoscopic procedures.

While an average of 7% of Queenslanders had positive FOBT test results (between 2011–12), Figure 23 shows patients in regional areas had higher positive test outcomes than those residing in metropolitan areas. Correspondingly, many of these regional areas do not have medical specialists in HHSs who perform endoscopy procedures (refer to Table 4). Figure 22 highlights current inequities in supply of services in regional areas; where demand clearly exists. With the increased uptake of the NBCS, the impact of this inequity will worsen over time.

Figure 23 Distribution of positive Faecal Occult Blood Test (FOBT) results 2011–12



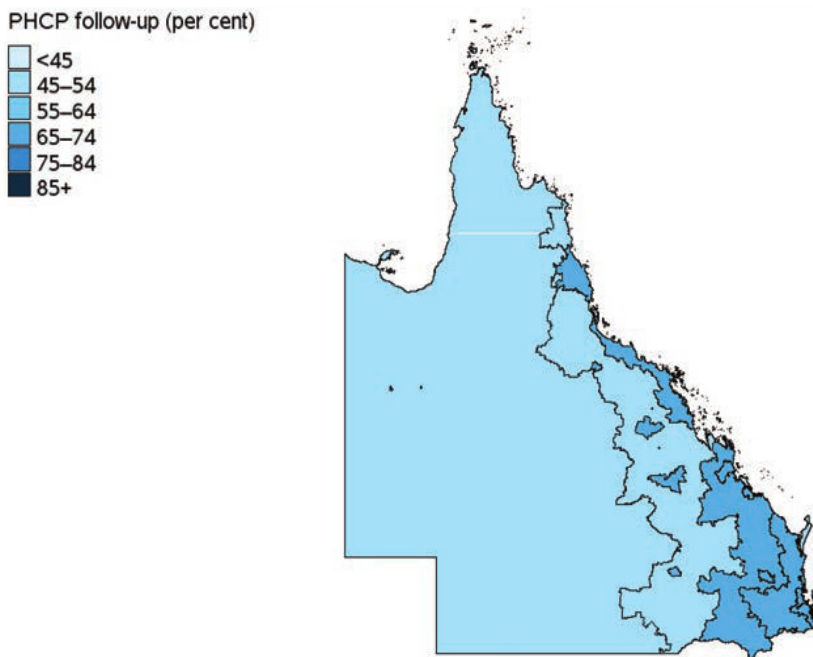
Notes

1. Rate per remoteness area is an average of positivity across that remoteness area.
2. Positivity rates rounded to one decimal place.

Source: National Bowel Cancer Screening Program Register as at 31 December 2012.

The impact of disproportionate access to endoscopic services for patients in regional areas is further exacerbated when examining data on practitioner follow-up rates (see Figure 24). Figure 25 shows the regions with the highest positive FOBT are also the lowest to follow-up their results with their medical practitioner. This trend was consistent for regional patients with only 45% actually having a colonoscopy screening following a positive FOBT test (Refer Figure 25).

Figure 24 National Bowel Cancer Screening positive Faecal Occult Blood Test practitioner follow-up rates

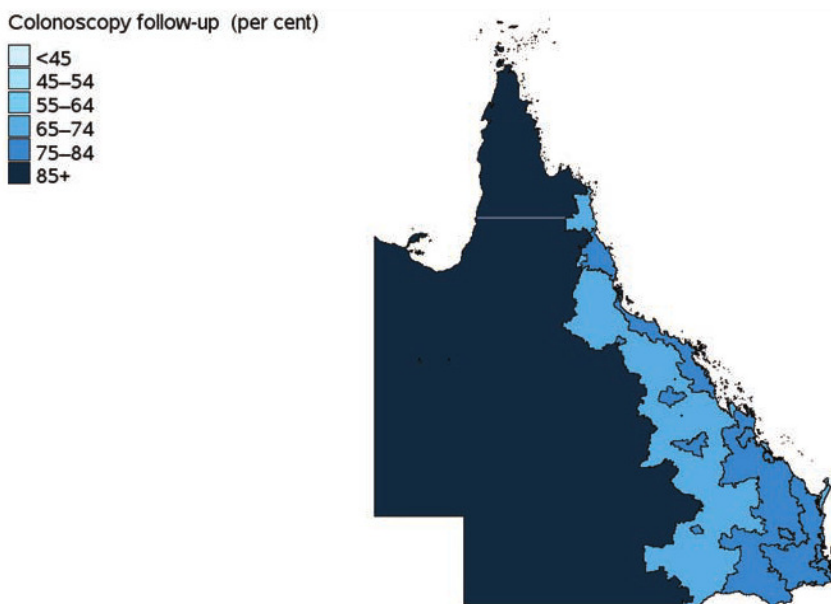


Notes

1. Rate per remoteness area is an average of PHCP follow-up reported across that remoteness area.
2. PHCP follow-up rates rounded to integers.
3. Differences in PHCP follow-up rates across remoteness areas may involve differences in assessment form return only.

Source: National Bowel Cancer Screening Program Register as at 31 December 2012.

Figure 25 National Bowel Cancer Screening positive Faecal Occult Blood Test colonoscopy rates



Notes

1. Rate per remoteness area is an average of colonoscopy follow-up reported across that remoteness area.
2. Colonoscopy follow-up rates rounded to integers.
3. Differences in colonoscopy follow-up rates across remoteness areas may involve differences in form return only.

Source: National Bowel Cancer Screening Program Register as at 31 December 2012.

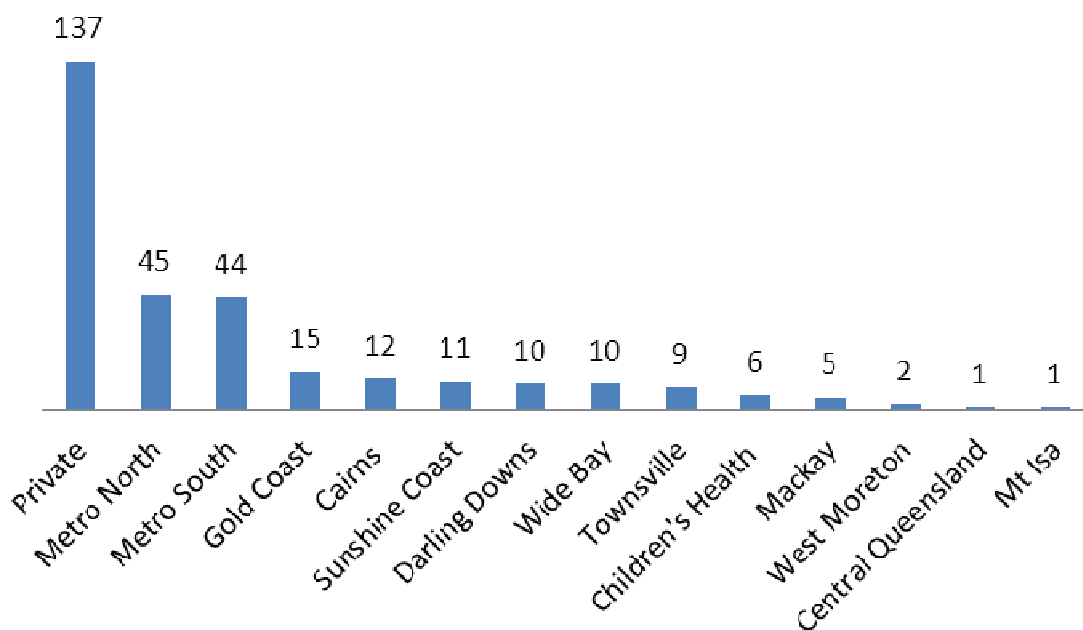
6 Workforce

6.1 Workforce overview

Stakeholder comments made at the Investment Management workshop in August 2013 attributed growing waiting lists for endoscopy in Queensland Health; with inadequate numbers of credentialed endoscopy practitioners.

The Conjoint Committee for Recognition of Training in Gastrointestinal Endoscopy has a list of credentialed endoscopy medical practitioners in Queensland. As of November 2013, there were 308 specialists who were credentialed to undertake endoscopic procedures. Of these, 171 specialists work in Queensland Health for a portion of their time. Further information is required to understand the level of endoscopy activity that each specialist performs; as endoscopy may only be a small component of the specialist workload – particularly for general surgeons and general physicians. Figure 26 highlights the number and location of specialists who are credentialed to perform endoscopy in Queensland.

Figure 26 Specialists credentialed to perform endoscopy in Queensland 2013



In 2012, a survey was conducted by the Clinician Planning and Leadership Unit. They had difficulty in obtaining consistent information regarding endoscopy services. However, the information provides insight into the number of practitioners actually performing endoscopy services in Queensland. While there are 171 specialists credentialed to perform endoscopy in Queensland who are working in the public sector, this number equates to no more than 50 FTEs (40 FTEs physicians, largely gastroenterologists with a small number of general physicians and 10 FTEs surgeons). While the number of FTEs of credentialed specialists is known, the actual proportion of time these specialists are available to provide endoscopies is unknown.

Table 4 outlines the locations of specialist FTE gastroenterologists and surgeons in facilities across Queensland Health.

Table 4 Queensland endoscopy/gastroenterology/hepatology/transplant hepatology workforce by location 2012

Site	Gastroenterologist/ general medicine FTEs	Surgeon FTEs	Total FTEs
Redland	0.3	0.5	0.8
QEII	0.75	0.1	0.85
Princess Alexander Hospital	6.9	0.5	7.4
Logan	1.95	0.25	2.2
Weipa	0	0	0
Longreach	0	1 session	1 session
Toowoomba	1.5	0.7	2.2
Mackay	0.2	1	1.2
Ipswich	0.1	0.9	1.9
Rockhampton	0	2	2
Roma	0	1	1
Gold Coast	4.7	0.3	5
Nambour	0	0	0
Cairns	1.6	0.3	1.9
Bundaberg	4	0	4
Maryborough/ Hervey Bay	0	0	0
The Prince Charles Hospital	1.9	0.4	2.3
Royal Brisbane and Women's Hospital	6.89	0.1	6.99
The Royal Children's Hospital	4	0	4
Caboolture	0.9	0.7	1.6
Redcliffe	0.8	0.5	1.3
Innisfail	0.05	0.05	0.1
Mount Isa	0	0	0
Townsville	3.05	0.25	3.3
Ayr	0	0	0
Charters Towers	0	0	0
Ingham	0	0	0
Total	39.59 FTEs	9.55 FTEs	49.14 FTEs

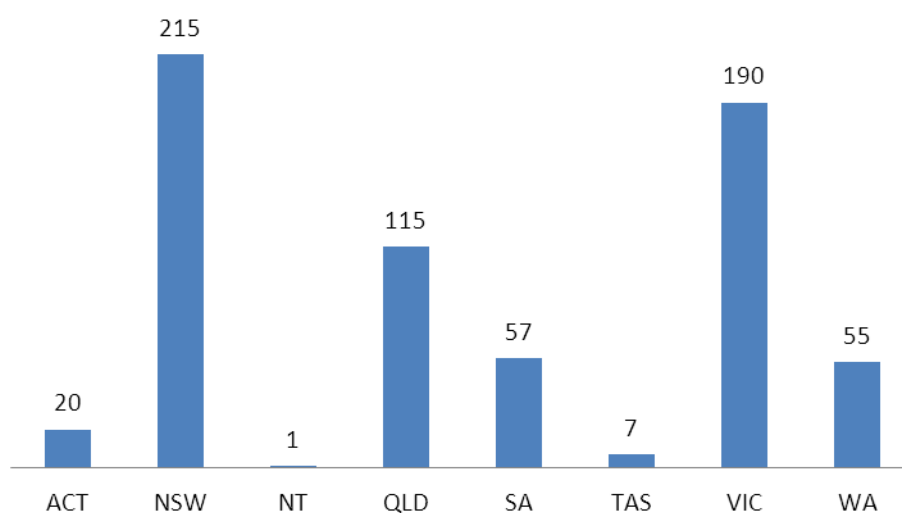
These figures indicate the majority of endoscopists' practice in South East Queensland.

6.2 Gastroenterologist workforce

A complete picture of the gastroenterologist workforce is not available as most data relates specifically to gastroenterologists – instead of all specialists – performing endoscopic procedures. This limits our ability to provide an analysis of total workforce capacity and resultant workforce requirements in Queensland.

According to the Australian Health Practitioner Regulation Agency [23], in 2011 there were 115 gastroenterologists working in Queensland. This represents 17% of the total gastroenterologist workforce in Australia (Refer Figure 27).

Figure 27 Gastroenterologists by State and Territory in 2011 [23]



Less than half (50) of the 115 gastroenterologists working in Queensland work for Queensland Health. The 50 gastroenterologists working in Queensland Health equate to approximately 40 FTEs.

6.2.1 Estimating growth in the gastroenterologist workforce

Gastroenterology, with endoscopy as a sub-set, falls under the auspices of the Royal Australasian College of Physicians (RACP). Gastroenterology is, along with cardiology, the predominant clinical specialty within this college. The length of training and availability of training places within the 'pipeline' for any workforce stream will influence the supply of home-grown professional health workforce, and is one indicator of the robustness of workforce sustainability [12].

The inability of public hospitals to provide a sustainable workforce replenishing model impacts significantly on the supply of gastroenterology specialists. The main barrier relates to the limited employment opportunities for newly graduated specialist medical staff in the public sector as well as for trained gastroenterologists barrier. These limitations have a direct impact on the public system being able to sufficiently meet future increases in demand. Capacity to train medical staff at the advanced trainee level within the public hospital system is an ongoing issue, as workload increases have in many instances negatively impacted on

clinical supervision capability and limit the number of trainees that can be supervised [12]. The cause of this shortage has been attributed to lack of funding for established positions.

The limited number of training positions is the other key barrier in providing a sufficient and sustainable workforce going forward [12].

The limited use of multi-modality training methods, coupled with constraints on capacity to supervise clinical training placements, are limiting factors which impact on the health systems ability to train gastroenterology specialists and to replenish the stocks and flows of the workforce. It should also be noted that not all staff who complete advanced specialist gastroenterology training will be retained to provide endoscopic services. A significant proportion will move to private practice which also contributes to the limited number of staff practicing in this field [12].

Based on current teaching capacity, it is estimated that six new gastroenterologists will complete their training each year for the next 3 years. It may be expected that a significant proportion of the graduates will transition to the private sector – resulting in a growth of eight gastroenterologists by 2018.

In a labour workforce survey conducted in 2011 [24], 17 out of 115 gastroenterologists indicated that they will be leaving the profession by 2018. Assuming that 43% of these worked in the public sector, the net gain in gastroenterologist staffing may only be one or two (2–4%). This is particularly concerning as the growth in the gastroenterology workforce is increasing by 2–4% while at the same time activity may be increasing by 48%.

6.3 Workforce distribution

Anecdotal evidence suggests that endoscopy procedures undertaken outside the major metropolitan centres are usually performed by surgeons in the absence of specialist gastroenterology staff at these sites. Geographic mal-distribution of gastroenterology services and staff in Queensland remains severely problematic. In some instances to maintain patient safety and quality of overall service provision, local services have been closed and patients transferred to major metropolitan hospitals rather than maintain a regional service with quality assurance issues largely related to inadequate or sub-optimal supply of specialist workforce, which translates to increased risk in regional and remote locations. Geographic mal-distribution (and differences in under servicing as reflected by growing waiting lists) seems to be at least partly driven by allocation of funding and not only by preferences of the workforce [12].

6.4 Estimating workforce demand

A review of literature was unable to identify the average number of endoscopies performed by each proceduralist per year. Therefore two models have been used to provide an estimated figure of the future demand. The estimation of workforce requirements by 2018 does not show significant variation between application of both models.

6.4.1 Model 1: Queensland Health proceduralist average

This model makes the following assumptions:

- Productivity per FTE remains the same in 2011 as in 2018.
- The average number of procedures performed per FTE (1,051) = endoscopies performed in 2011 (52,581)/FTE identified staff (50 FTE).

Detail	Number
Estimated demand	111,365
Estimated Av no. of procedures performed per FTE	1,051
Estimated FTEs Required	106

Based on these calculations, the required FTE by 2018 is 106. This means the workforce will need to double by 2018.

6.4.2 Model 2: McKinsey report of time taken per procedure

This model is based on the following assumptions:

Detail	Number
Procedural days per year*	240
Sessions per day	2
Sessions length of time (hours)	4
Number of sessions per operator	60%
Operator procedural hours per year	1152
Av. Procedural time (hours)**	1
Estimate operator procedures per year	1152
Estimated demand 2018	111,365
Estimate FTEs required	97

* Assumes four week closure period

** Assumption based on *McKinsey (2013)*³. Excludes gastroscopy.

*** Draft benchmark paper being developed by Policy and Planning Branch estimates that 10 procedures can be performed per room per day. This is slightly higher output than suggested above.

Based on these calculations, the required FTEs by 2018 is 97. As above, this is a doubling of the current workforce FTEs.

6.5 Summary

To achieve the anticipated activity by 2018 it is estimated that approximately 100 FTE will be required in the public sector. There are currently (2013) 40 FTE gastroenterologists and 10 FTE surgeons performing endoscopy in Queensland Health. Therefore within the next five years there needs to be a growth of over 50 FTEs. With current forecasts of growth of locally

McKinsey, *Colorectal cancer in Queensland: Identifying opportunities to reduce mortality and improve value*. 2013.³

trained staff and estimated attrition rate, it is anticipated that the growth in gastroenterologists will only be two. This means that there will be a significant gap between supply and demand.

Strategies proposed in previous reports[12] to address this issue include:

- increased recruitment of medical staff
- increased training of medical staff to perform endoscopies
- development of nurse endoscopy
- reduce demand through strategies, such as outsourcing activity to the private sector.

7 Other factors impacting on endoscopy

The following points reflect the opinions of stakeholders in a series of investment management workshops that were held in August 2013. In some instances they may be deemed controversial and are supported only by anecdotal evidence.

Stakeholders in the investment management workshop suggested that there were three key effects that the system failures were causing:

- the inability of the public health system to incentivise its practitioners to achieve levels of efficiency and productivity comparable to those of the private sector
- the difficulty for HHSs to implement strategic plans that required upfront investment to deliver potential health benefits (mostly through deferred cost of care) that would not be realised within the current budget
- the seemingly enormous inertia that sits behind the current business as usual system that resists and/or retards innovative change as well as the absence of leadership to drive change.

While there are multiple causes that contribute to these consequences two stood out as being the most significant—funding models and leadership.

7.1 Funding models

Funding models play a vital role in driving the outcomes. There are several parts to this, as shown in the cause and effect model in Figure 28.

7.1.1 Practitioner incentives

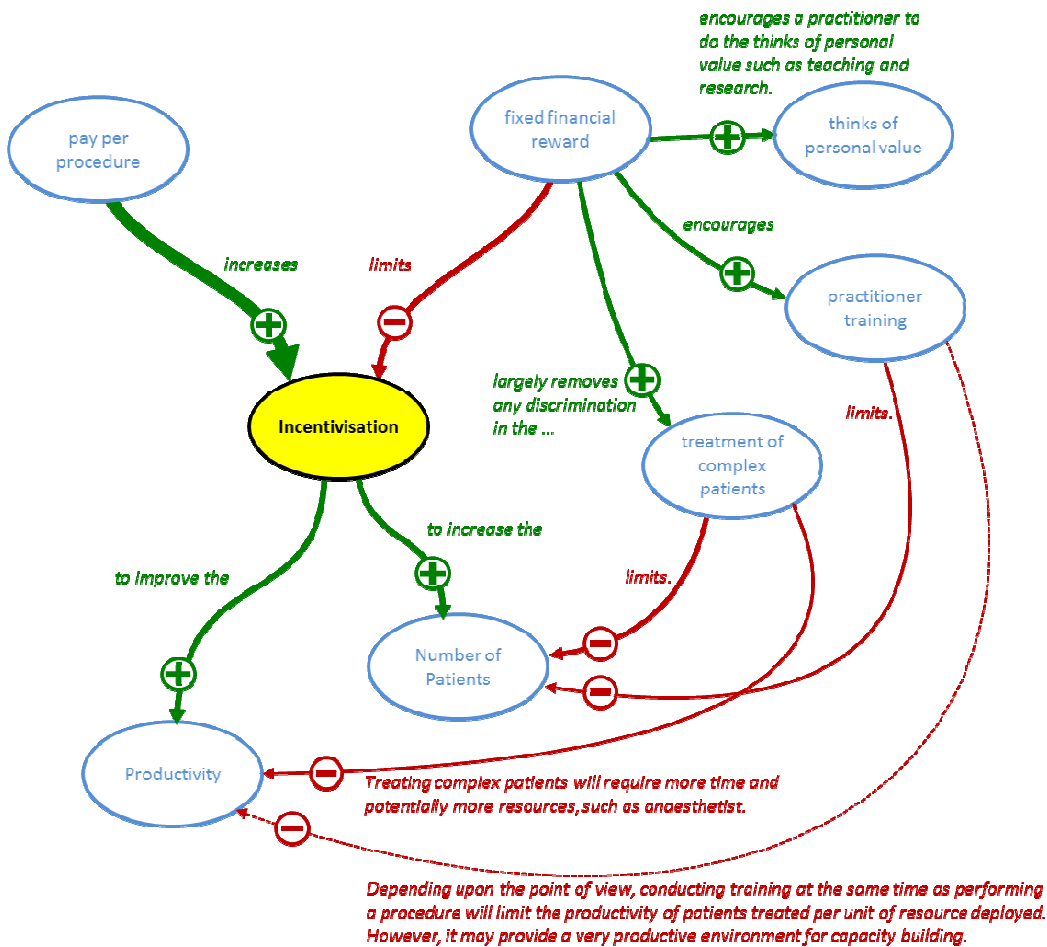
In the public system, practitioners are paid a fixed salary independent of how many or how few endoscopy procedures they perform. As such, a public sector practitioner gains no personal financial benefit from either improved efficiency or increased throughput. In contrast, private system providers are paid per procedure. This provides the private sector with incentives to:

- improve their financial margin through increased efficiency of their practice by better utilisation of staff and facilities and ensuring they are using the most efficient procedures and
- increase revenue by treating more patients (assuming unmet demand for the service).

A frequent observation by workshop participants was that the public health system dealt with most of the complex patients which were not easily managed by the routine procedures of the private sector.⁴ Another factor affecting the ability to compare productively between the public and private sectors is that procedures performed in the public sector often occur in the context of training.

⁴ No evidence has been provided to substantiate the suggested scale and impact that this has on the overall productivity of endoscopy in the public health setting.

Figure 28 Cause and effect diagram showing the influences on incentivisation



7.1.2 Previous funding models

In the past, HHS funding models did not allow the organisation to either run at a loss or transfer surplus or loss into future years. The net result was that HHSs focused predominantly on managing and treating immediate demand. Strategic planning for long-term future benefits (e.g. reduced cost of care in five years' time) was difficult to justify and execute. As a result, the practice within many HHSs failed to:

- prioritise diagnostic and preventative procedures in the face of increasing pressures from acute and complex chronic conditions
- adequately plan for gastroenterology recruitment, retention and succession planning and
- provide reasonable security of tenure for the specialist endoscopy practitioners.

Business environments for HHSs have been reformed enabling them to forward plan and manage multi-year budgets. However, other aspects influencing improvements in increased efficiency such as culture and experience may be impacting on capability to embrace a wholesale strategic shift in this area.

7.2 Funding a sustainable service

The sustainability of endoscopy as a standard diagnostic and therapeutic tool for pre-cancerous and early stage malignancies is dependent upon funding levels that will meet the price of the procedure.

The ability to price services effectively is important for service planning and policy-making. There is significant variance of costs between the public and private sector with a range of factors contributing to this, including:

- differences in acuity, complexity and co-morbidities of patients
- different fee structures of proceduralists and
- direct and indirect costs of training in the public sector.

Current estimates on the unit cost in the public sector, however, range considerably with more than a tenfold difference in the reported public health cost of endoscopy. The cause of these variations is unclear.

7.3 Leadership and the cultural change required

While the funding models are important to drive change, perhaps the more significant barrier for innovative change is culture of the service and the difficulties in prioritising and championing shifts in endoscopic policy and practice. The problems identified in this report are not unique to Queensland with many of the issues reflecting similar trends elsewhere [1]. For example, the benefits of early detection of bowel cancer through FOBT and colonoscopy are widely reported [20, 25, 26]. These findings have led countries, such as the United Kingdom to introduce innovative changes to their healthcare practice, enabling every person who needs endoscopy to book into and receive a procedure within two to six weeks with no waiting list. Such a transformation in the United Kingdom was not achieved by simply tweaking the system. It required a wholesale shift in the way service models were conceptualised and delivered.

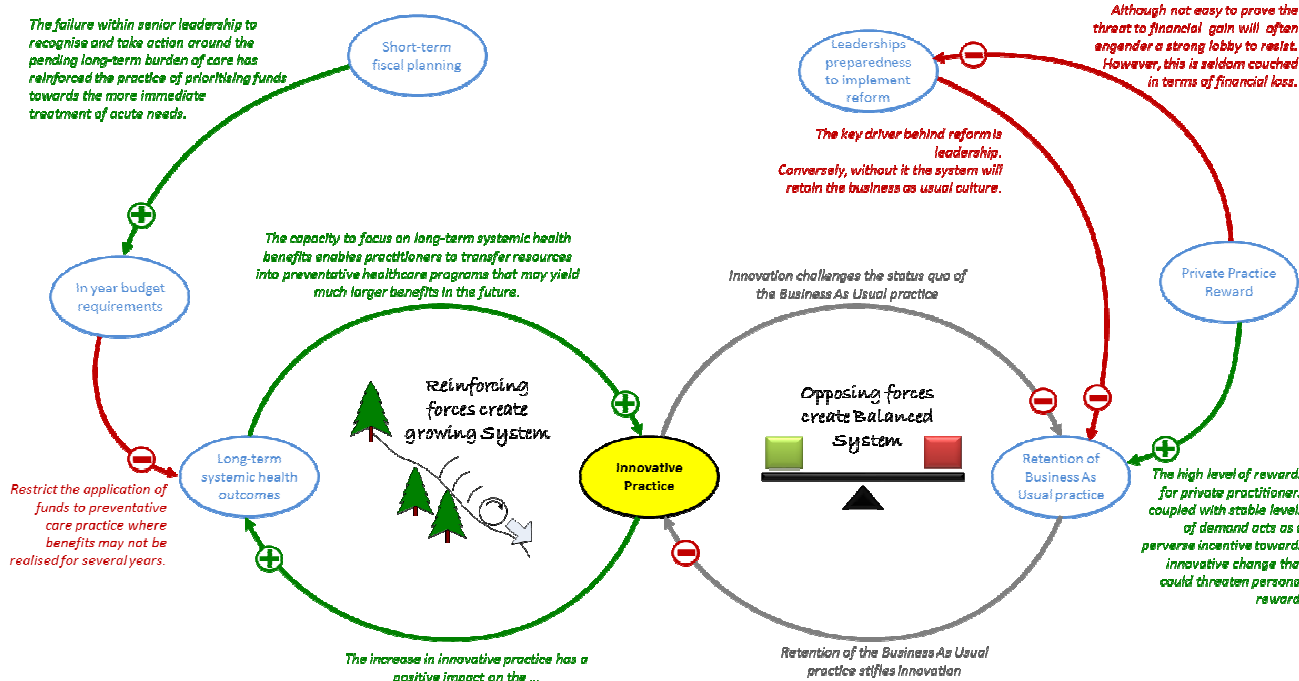
The United Kingdom National Health System (NHS) introduced teams of specialists working with registered nurses, who were trained and qualified to practise endoscopy. The United Kingdom model did not replace gastroenterologists with registered nurses, rather it augmented the service. This increased the overall capacity of the system, while maintaining the high standards of quality control and the capability to deal with more complex situations should they arise. The United Kingdom model is a team based approach; not around individuals or a single specialisation. The use of registered nurses is what helps improve the efficiency and productivity. Evidence from the United Kingdom concerning the change in practice [27, 28] suggests that there has been:

- increased productivity
- increased numbers of patients seen
- no loss of quality and
- reduction in the total cost of care.

The United Kingdom experience with endoscopy service provision demonstrates how innovative change has enabled significant benefits for health consumers and for the health system. The key difference between the United Kingdom and Queensland is that most gastroenterologists in the United Kingdom work for the NHS compared to 62% of Australian

gastroenterologists who work in the private health sector. Figure 29 shows a cause and effect representation of a number of factors impacting on endoscopy service provision.

Figure 29 Cause and effect system diagram showing the factors that are impacting innovative practice



8 Strategic response

This report has demonstrated that there is a significant demand for endoscopy services in Queensland. It has also demonstrated (i.e. waiting list statistics) that the current capacity of the HHSs is inadequate to cope with this demand. It is anticipated that this problem will be exacerbated into the future with a rapidly increasing demand for endoscopy services coupled with an insufficient growth in a trained workforce.

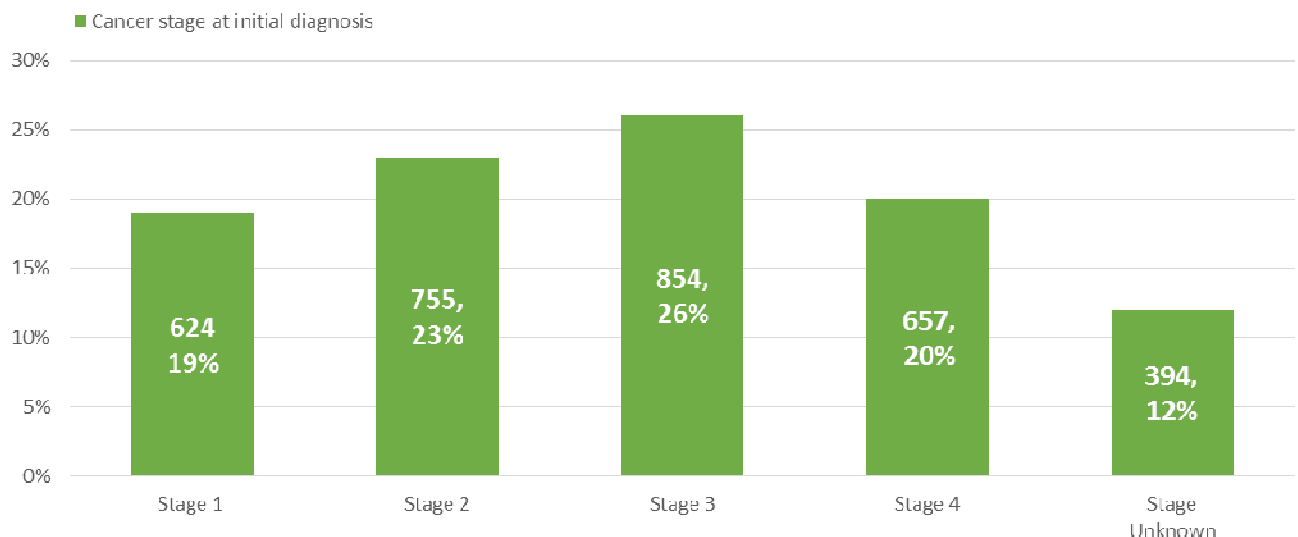
The impact on Queenslanders is substantial. The most dramatic is colorectal cancer (CRC). In Queensland in 2013, there will be approximately 3325 new cases diagnosed and 1170 deaths from CRC. Around 50% of these cases will be diagnosed at Stage 3 or 4 when survival is poorest and per-case spending is highest—showing the current pathway does not support early detection as effectively as it should. The main root cause of this is low deployment and uptake by eligible patients of primary screening (via FOBT, where uptake in Queensland is only 36% versus 65 % recommended level), and long waiting times in the public sector for CRC-related diagnostic investigation [29].

It is projected that of the 1905 Queenslanders who will receive a late diagnosis comprising either Stage 3, 4 or unknown cancer in 2013, 1037 will have a life expectancy of less than five years. Around 789 of these deaths could be prevented if they were diagnosed in Stage 1 – or 362 preventable deaths if diagnosed at Stage 2.

Table 5 Current estimates of treatment and five year survival rates [30]

CRC Stage	Current estimates of treatment costs	Current estimates of 5 year survival rates
Stage 1	\$30,890	87%
Stage 2	\$47,534	81%
Stage 3	\$74,225	64%
Stage 4	\$61,423	16%

Figure 30 Cancer development at the time when it is first diagnosed, new incidents and percentage 2013 [31]



Not only is the impact on health outcomes substantial, but late stage diagnosis incurs considerable health costs. Total spending on CRC screening, diagnosis and treatment, reaches approximately \$300 million across Queensland—equivalent to approximately \$100,000 per case. This is driven primarily by:

- intensive use of colonoscopy for screening activity (rather than use of FOBT)
- treatment for more expensive late-stage cases (Stage 3 and 4 treatment is over double the cost of Stage 1 treatment) and
- emergency presentation of CRC cases [29].

A number of strategies have been identified, which – if implemented – may improve health outcomes; improve patient experience and create a better value-for-money system. While our workforce analysis has demonstrated that re-designing and augmenting the workforce will be necessary to make real positive impact on the mismatch between demand and supply; these are longer-term strategies. It will take time to build the workforce to the extent needed to realise the full gains from such an investment. The immediate problem is a large waiting list being added to with increasing referrals. The problem needs to be dealt with in the immediate future with the deployment of a combination of strategies. The strategies identified are outlined below.

8.1 Demand management

One strategy is to reduce the demand for endoscopy procedures through a standardised and consistent approach to referrals, triage and surveillance through the improved use of standardised guidelines and avoiding the use of endoscopy for universal screening prior to filtering through more efficient tests, such as FOBT or the Faecal Immunochemical Test (FIT) for bowel cancer.

Key assumptions

Anecdotal evidence implies that excess demand in the system may be compounded by inappropriate referrals. Endoscopy should not be used as the default screening for patients to determine if they have the symptoms of bowel cancer. Only patients with an appropriate clinical need, based on standardised guidelines (e.g. positive FOBT, family history etc.) should be candidates for endoscopy. Reducing inappropriate servicing and reducing the frequency of surveillance may enable the current capacity to maintain service outcomes. A revised model encompassing tightened criteria for endoscopy referral will be better able to maintain steady service delivery equilibrium, once the backlog is addressed.

Alternative demand management

It is well known that lifestyle factors play a significant role in promoting and alternatively preventing gastrointestinal tract cancers. The risk factors for both upper and lower GI cancers include high intake of fat, alcohol or red meat, obesity, smoking and a lack of physical exercise with around 10% linked to insufficient activity. The risk for alcohol appears to increase at greater than one drink per day [19]. Therefore, preventative health education strategies should be considered along with other demand management strategies.

8.2 Supply management

The two key approaches to managing supply are increasing productivity and increasing capacity. Increasing the funding allocation available for endoscopy enabling HHSs to source additional services, including procurement from the private sector is one approach to increasing supply. This would facilitate the creation of a larger and more stable market for providers and patients to participate in, and could introduce a degree of contestability into the provision of endoscopy services as a HHS could potentially tender its service, including its waiting list backlog to the market.

Key assumptions

The option assumes that if HHSs are given certainty around appropriate levels of additional resource to purchase endoscopy at an 'efficient market price' they would be able to plan for, and deliver, sufficient endoscopy services, regardless of the demand. The same approach applies to the removal of the backlog, although this may be better managed at a state level. It also assumes that the available capacity is present, or could be obtained, in the private sector to service the extra demand. While in some areas this may mitigate the problem, there are limitations to the sustainability of this approach.

- Potential distortions in the market may provide perverse outcomes, such as:
 - reducing the supply of clinicians in the public sector by increasing the incentives to practise privately
 - increasing the price and
 - leading to increased over-servicing.
- Ongoing surveillance and treatment of conditions, such as cancer still require referral back to the public sector, thus increasing the pressure on gastroenterology services and increasing fragmentation of the patient care pathway with potentially poorer outcomes.
- More complex patients cannot always be treated in the private sector.
- The proportion of endoscopies in the public sector that are actually performed by registrars or trainees is unknown. It is important that access to training (for medical practitioners and nurses) is not impeded to ensure the future supply of a skilled and competent workforce for both public and private sectors.

8.2.1 Productivity management

Productivity of the system could be increased by:

- more efficient and effective use of staff
- more efficient and effective use of facilities
- redesigning the model of care around referrals, patient presentation, triage, treatment and surveillance and increasing the use of multidisciplinary teams to improve patient outcomes as well as productivity
- introducing funding models that encourage multi-year perspective on health benefits and costs and
- optimising the use of endoscopy (in particular, colonoscopy) to deliver the best quality adjusted life year (QALY) for given price constraints.

Key assumptions

The problem is neither supply nor demand but predominantly the failure to use the available resources efficiently and effectively. Furthermore, the processes that support them are out-dated, convoluted and fail to leverage the productivity that can be achieved from modern technology and multidisciplinary teams.

8.2.2 Capacity management

The previous discussion has identified that the production and deployment of relevant medical specialists will be insufficient to meet the projected demand. In light of this it is assessed that the most effective way to increase capacity is to expand the number of alternative skilled and credentialed health practitioners, such as general practitioners (GPs) or nurses to perform endoscopies. Previous consideration of the use of GPs has indicated a range of potential difficulties and leads us to the conclusion that focusing on augmenting multidisciplinary teams with nurse endoscopists as the most likely way of increasing capacity successfully.

Key assumptions

Even with the productivity improvements expected with the previous strategies, the growth in demand is likely to create a considerable financial burden in meeting the demand for increased endoscopy services. The most significant cost component of endoscopy is the labour costs of the medical specialists performing endoscopic procedures. The introduction of nurse endoscopy has the potential to lower the labour cost without any reduction in the quality of care. We consider that Queensland cannot ignore the paradigm shift that has occurred in the United Kingdom and Netherlands, where endoscopy services are delivered using registered nurses.

The other major driver is the shortage of specialist medical labour in the public health system. Using medical specialists for procedures that are increasingly performed by nurses as part of multidisciplinary teams in other countries is inefficient and a poor use of limited medical skills, which should be deployed in areas where they can make a much greater contribution relative to the rest of the labour pool.

8.3 Key interventions

Key interventions discussed in the Investment Management workshops (August 2013) include:

- implementing transparent, reliable and accurate data and reporting systems for waiting lists and endoscopy activity to support decision making
- increasing the uptake of non-invasive and more cost effective screening approaches, such as FOBT to reduce the reliance on endoscopy for screening
- improving the endoscopy referral process to optimise demand for services, including: screening, referrals, triage and surveillance
- notifying current patients on waiting lists that they will receive an endoscopic procedure within 12 months through the one-off procurement of additional services
- securing additional on-going funds to manage the year on year growth in endoscopy that is largely outside Queensland Health control

- enabling, empowering and encouraging HHSs to take a long-term systems approach to planning for and resourcing endoscopy
- changing the model by which public hospitals can incentivise an increase in the throughput of endoscopy patients
- increasing the level of utilisation of public health system endoscopy facilities
- improving productivity through service redesign and optimal use of resources, such as specialist clinicians, nurse endoscopy and Telehealth services
- transforming the cost and capacity to service demand through the use of nurse endoscopists operating within a multidisciplinary team
- improving patient outcomes and productivity through the increased use of multidisciplinary teams
- replacing waiting lists with a process of booking patients to receive an endoscopy at the time of referral and
- ensuring all patients have timely access to treatment following endoscopy diagnosis.

9 International evidence for nurse endoscopy: literature review

In 2009, the NBCS program quality working group published a report [32] outlining strategies to improve colonoscopy services in Australia. The issue confronted by the group was the expansion of demand with current and future workforce capacity. It was predicted that medical graduates would be insufficient to meet future colonoscopy demand. A key consideration in this report was the introduction of specialist nurses trained to perform colonoscopies and sigmoidoscopies.

Internationally there has also been growing interest in the development of nurse endoscopy to address similar concerns over demand, capacity and efficiency. As such, there is a growing body of literature about this model of service delivery. This evidence will be presented as a means to mitigate a number of concerns raised over the introduction of nurse endoscopy in Queensland. A full bibliography is appended as Appendix 4 and a sample of some of the representative documents demonstrating that the utilisation of nurses for endoscopy services is a safe and effective strategy is summarised below.

9.1 Scope of current roles and practice in nurse endoscopy

Endoscopy performed by nurses or technicians occurs in various parts of the world. In the United Kingdom, registered nurses have been performing endoscopy since the mid-1990s [32]. Nurse endoscopists undertake diagnostic and therapeutic flexible sigmoidoscopy, diagnostic and therapeutic colonoscopy and upper GI endoscopy [33].

In a report by Douglas [34], the workload of nurse endoscopists was between 11–13 flexible sigmoidoscopies and between four and eight colonoscopies per week. The MINuET [27] researchers considered the workforce implications of nurse endoscopy and suggested that two FTE nurse endoscopists could undertake approximately 2500 upper GI endoscopies and 500 flexible sigmoidoscopies per annum.

9.2 Quality and safety

A significant number of studies were identified relating the roles and competencies of nurses undertaking endoscopy. The available evidence suggests that appropriately trained nurses can perform diagnostic endoscopy safely and with similar outcomes to doctors.

9.2.1 Systematic reviews

A systematic review in 2007 by Vershuur et. Al. [35] of three randomised trials comparing nurses with doctors or medical trainees for flexible sigmoidoscopy and upper endoscopy found that there was no difference in performance and accuracy of the procedure between doctors and nurses.

A further 14 non-randomised studies evaluated nurses' performance in:

- upper endoscopy (two studies)
- endoscopic ultrasound (one study)
- flexible sigmoidoscopy (seven studies)

- capsule endoscopy (two studies) and
- percutaneous endoscopic gastrostomy placement (two studies).

Overall, the authors concluded that nurses were able to perform all these procedures safely and accurately.

9.2.2 The MINuET trial [36]

The objective was to compare endoscopy (diagnostic upper GI endoscopy or flexible sigmoidoscopy) carried out by nurses and the resulting sequence of events with endoscopy carried out by doctors and its sequelae. The trial was performed in 23 hospitals in the United Kingdom and was a pragmatic trial with endoscopy being performed according to the standard protocols of the participating hospitals. Outcomes were evaluated one day, one month and one year after the procedure. The primary outcome was the score on a gastrointestinal symptom rating questionnaire one year after endoscopy.

Of 4964 potentially eligible patients, 4128 were randomised and 1888 were recruited into the trial. They were treated by 67 doctors and 30 nurses. There were no statistically significant differences between groups in outcomes except that patients were more satisfied with nurses at one day after endoscopy. Nurses were significantly more thorough than doctors in examining the stomach and oesophagus. Quality of life scores were slightly higher in the doctor group but the difference was not statistically significant. The authors' main conclusion was that diagnostic endoscopy can be undertaken safely and effectively by nurses.

9.2.3 Multicentre prospective cohort studies

Two studies have been undertaken in the Netherlands to evaluate the quality and safety of colonoscopies performed by nurse endoscopists.

In the first study, colonoscopies were performed for screening or surveillance in 42% of cases and for symptomatic indications in 58% of cases. The unassisted cecal intubation rate was 94%—the mean withdrawal time was 10±5 minutes. The adenoma detection rate was 26.7%. In 229 of the colonoscopies (23%), the nurse endoscopists required assistance from the supervising gastroenterologist. The complication rate was 0.2%—one perforation and one cardiopulmonary complication. The study concluded that nurse endoscopists performed colonoscopies according to the internationally recognised quality standards [37].

In the second study the endoscopic quality and safety were comparable between nurse and physician trainees. Overall, rates of cecal intubation were 95% for nurses and 93% for physicians, including procedures that required assistance from a supervisor—mean withdrawal times were 10.4 and 9.8 minutes, respectively. Each group detected 27% of adenomas and had a 0.5% rate of complication. In both groups, the rates of unassisted cecal intubation gradually increased with the number of colonoscopies performed, from 70% for nurses and 74% for physicians at the beginning to 89% and 86%, respectively, at the end of the assessment period. The study concluded that in a supervised setting, nurse endoscopists perform colonoscopies according to quality and safety standards that are comparable with those of physician endoscopists [38].

9.3 Education and training

Literature [33, 37, 38] suggests nurses performing endoscopy should have completed their training to a standard set of appropriate and approved guidelines. Woods et al [33] recommend that education qualifications from a university support clinical work and patient management.

While early training in the United Kingdom recommended that nurses first undertake training in flexible sigmoidoscopy prior to colonoscopy, more recent literature states that no prior experience is required to undertake colonoscopy training [38].

Massl et al [38] states that the quality and safety of training of nurse endoscopists is comparable to physician trainees.

9.4 Cost effectiveness

There are three potentially relevant economic evaluations that have been able to be found. These include:

1. The *MINuET Economic Evaluation* [27] was based over a one-year horizon conducted from the perspective of the NHS. This evaluation was based on quality-adjusted life years (QALYs) from a baseline to one year after endoscopy. Patients who had the procedure performed by doctors had slightly higher QALYs than nurses. This result was attributed to a higher number of additional tests and investigations in the nurses' group. The authors concluded that endoscopies carried out by doctors were slightly more expensive, but were more cost effective than those carried out by nurses. There is considerable uncertainty surrounding the economic findings. In addition, any loss of cost-effectiveness resulting from a transfer of elective endoscopy from doctors to nurses needs to be balanced against possible gains from using the doctors more effectively elsewhere. The influence of any of these factors on any decisions relating to service provision was outside the scope of the MINuET study.
2. A study by Verschuur et al [35] regarding screening for CRC with flexible sigmoidoscopy by non-physicians concluded that endoscopies performed by nurses tend to be less expensive than those performed by doctors.
3. A study conducted by Massl et al [38] concluded around 15% reduction in personnel costs associated with nurse endoscopists performing colonoscopy.

9.5 Patient satisfaction

Studies identified [27, 39, 40] a high patient satisfaction rate with nurses performing endoscopy. In van Putten et al [37], a questionnaire was completed by 734/1000 patients (73%). Patients (95%) were satisfied with the endoscopic procedure, 72% had no preference for a physician or nurse endoscopist, 15% preferred a physician and 12% preferred a nurse. In conclusion, there was a high-level of satisfaction with nurse endoscopists.

9.6 Implications

The overwhelming evidence reviewed to date indicates that nurse endoscopy is safe and can be used to augment gastroenterology services. The level and mix of staff employed in a hospital will be core determinant of the cost and quality of care delivered. The literature review has revealed considerable scope for skill mix change, including role design, such as substitution of doctors by nurses. As the MINuET (pg. 55) [27] study states, research evidence *'can and should be influencing workforce policy'*.

There are a number of reasons for health managers and policy-makers to consider appropriate skill mix in hospitals and a number of factors that drive change in the skill mix of healthcare delivery. The drivers for nurse endoscopy include:

- staff shortages in the medical workforce
- increasing demand for diagnostic and therapeutic services
- inappropriate use of skills, particularly underutilisation of specialist gastroenterology nurses, and
- cost, particularly in services where staffing costs are responsible for the most of the overall expenditure.

10 Introducing nurse endoscopists in Queensland

10.1 Nurse endoscopy workforce projections

Use of nurse endoscopy is a newly emerging trend across numerous countries. As such, there was no evidence to assist in workforce planning. At this stage it is difficult to assess the numbers that are required in Queensland Health and this will be determined largely on the models of care proposed by the HHSs and the private sector.

10.2 Nurse endoscopy and Hospital and Health Service readiness

It should be recognised that nurse endoscopists are not sole practitioners working in isolation. They work within multidisciplinary teams with the support of gastroenterologists. It is also recommended that appropriate level surgical support remains available in the unlikely event of complications.

In regards to organisational readiness for the training of nurse endoscopists, there are a number of prerequisites that should be considered. NMOQ intends to develop a tool to support the initiative and its effective implementation.

10.3 Credentialing

All clinicians performing endoscopy in the public health sector should be properly credentialed by the HHS in which they operate. For medical practitioners, the Conjoint Committee for the Recognition of Training in Gastrointestinal Endoscopy provides registration and recognition of the qualification and training. This is a national body comprising representatives from the GESA, RACP and the Royal Australasian College of Surgeons (RACS). The committee recognises endoscopic training of specialist physicians and surgeons, who have completed their training in Australia or who are now practising in Australia.

There is currently no national body that recognises nurse endoscopy qualifications and training that meets the standards necessary for credentialing by the HHS. While this gap does not prevent a HHS from credentialing a registered nurse who meets the necessary criteria it does create barriers in transferability and the ability of other health providers to recognise the experience.

While the NMBA has responsibility for the initial and on-going registration of registered nurses, there is currently no statutory or formal set of standards in Australia to establish or identify an individual registered nurse as capable of undertaking endoscopy. There is a potential role for a professional nursing college or association in establishing a national set of standards to identify nurses who are able to undertake endoscopy with an associated process to recognise individuals meeting those standards. While the national health practitioner regulation system provides for public safety through the registration and accreditation processes there is clearly a need to have a credentialing process in place for nurses undertaking endoscopy to support movement of staff across employers, and provide assurance to employers and the public that nurses undertaking endoscopy meet national standards and any associated professional development requirements.

Credentialing nurse endoscopy through a professional college will validate the qualification, competencies and education of the clinician through an external body and allow transferability of practice. This would further progress the development of nurse endoscopy and enhance the visibility and contribution of registered nurses in the specialisation of gastroenterology. NMOQ will identify a relevant professional college and work with them to develop a robust credentialing process.

10.4 The level of the nurse endoscopist

The nurse endoscopist is a registered nurse educated and trained to undertake endoscopy procedures. The role requires post-graduate education to be competent and authorised to perform specific or defined tasks in a specialist area/context of practice [41].

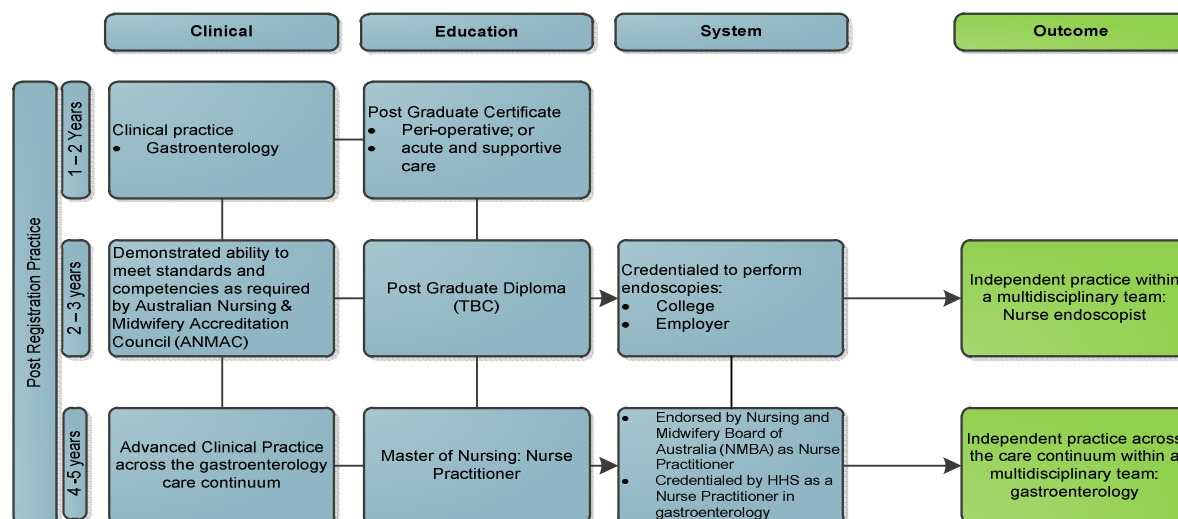
The nurse practitioner role is distinct from other nursing roles due to the legislative and regulatory framework applied in Australia. The scope of practice of the nurse practitioner encompasses much broader service provision across the specialty of gastroenterology, rather than being limited to a defined clinical activity or task [41].

10.5 Nurse endoscopist education and training

NMOQ has developed an educational pathway for nurse endoscopists, including an academic qualification which will be able to be articulated into a Master's degree to enable the nurse endoscopist to exit at advanced level and also if they choose continue to be considered for endorsement for nurse practitioner registration in wider gastroenterology nursing.

Entry level for nurses into the pathway is aligned with the NMBA *Fact sheet for advanced practice nursing* [2]. The registered nurse pathway to advanced practice is outlined in Figure 31.

Figure 31 Proposed nursing pathway to advanced practice in gastroenterology



Nursing and Midwifery Office, Queensland

10.6 Cultural change

It is fairly usual for the introduction of role substitution to be actively resisted by those affected by such a change.

It has been established that nurse endoscopists are as good as medical professionals in performing endoscopies and this practice is becoming widely accepted in many parts of the world. There is a question about the extent to which such a change in practice will be accepted in Queensland. A survey in New Zealand [42] of medical staff performing endoscopy concluded that only a minority of medical practitioners had a positive attitude towards the role of nurse endoscopists. This is in contradiction to a study undertaken in the Netherlands [43] where the majority of gastroenterologists have a positive attitude towards nurse endoscopists.

It is likely that, like New Zealand, Queensland will experience resistance to change. In the United Kingdom when nurses took on roles previously undertaken by medical practitioners, the objections for implementation included lack of professional regulation, low pay and cultural objections by doctors [44]. It will be important for Queensland to address similar concerns if nurse endoscopy is to be implemented successfully.

10.7 What is proposed

Examination of the issues and the literature has informed the development of a project to introduce nurse endoscopists in Queensland. The proposed establishment investment will provide:

1. Up to 15 nurse endoscopists at specialist nurse level trained and deployed in HHSs
2. Course materials and training programs will be developed for future training, which will meet the requirements for accreditation at a minimum of AQF level 9 (Masters equivalent) leading to the ability to perform a nurse endoscopists role at Post Graduate

Diploma level, with the ability to articulate into, or form part of, a qualification leading to nurse practitioner registration

3. Service transformation and introduction of nurse endoscopy service models with HHS workplaces ready for trained nurse endoscopists to become effective immediately to undertake procedures as members of multidisciplinary teams with consistency of quality outcomes delivered by a variety of service delivery and business models across the participating HHSs
4. Development of a credentialing system through a relevant professional nursing college or association
5. Evaluation one year post-implementation.

NMOQ will be the central coordination body for the project and will undertake a leadership role to guide and support the HHSs who will be responsible for many of the activities supporting the project objectives. The key roles and responsibilities will be developed and negotiated with participating HHSs prior to commencement of the education and training phase of the project. NMOQ will also work with the selected university developing program design and course materials and delivering training.

11 Benefits

Introducing nurse endoscopists is one of a range of potential strategies to improve access and provision to endoscopy services. Others are outlined previously in this report. While nurse endoscopy cannot be seen as the single solution to endoscopy access problems in Queensland, an in-depth analysis of the information available suggests that it would be an effective and useful strategy. It may be difficult to quantify exactly the potential benefits expected through this changed model of service delivery.

The Investment Management workshop stakeholders (August 2013) recommended the following benefits and measures that will be achieved through the implementation of the strategic interventions.

11.1 Reduction in the number of people developing and dying from cancer

Approximately 1646 Queenslanders died from bowel, stomach and oesophageal cancer in 2013 [31]. A large proportion of these deaths could have been prevented through the early detection of cancerous and precancerous tissue. Approximately 80–95% of bowel cancers originate from polyps. Forming polyps are not malignant tumours, that is, they are not considered to be cancer. Over time there is a risk that a benign polyp will transform into a malignant polyp. The removal of polyps before they become malignant tumours (polypectomy), and regular surveillance thereafter, has been found to reduce bowel cancer risk by about 76–90% [45].

The progression of cancer is usually described by stages where Stage 0 is in-situ and Stage 4 represents a cancer that has become metastatic (i.e. it has spread to distant parts of the body). The survival rate at five years for Stage 3 and 4 cancers is significantly lower than that at the early stages (refer to Table 5). Diagnosis of cases of CRC through screening tends to occur two to three years before diagnosis of cases with symptoms, which can make a considerable difference to a person with Stage 1 or 2. Primarily the goal is to transform the present situation where just over 40% of all bowel cancers are initially diagnosed as Stage 1 or 2 to a situation where 66% of patients are initially diagnosed with Stage 1 or 2 cancers [46].

11.2 Better health outcomes for all Queenslanders with gastroenterology conditions

Ensuring people have access to the diagnostic, clinical and other health services when needed leads to better outcomes. It is important there is timely response and a quality service regardless of where the person lives in Queensland. In the context of endoscopy, the two key indicators are the time from referral to diagnosis and the time from diagnosis to the first treatment. Improvement in both of these factors will make a measurable impact in health outcomes.

In the United Kingdom, the NHS achieved endoscopy bookings within two weeks for critical cases and six weeks for all other appropriate referrals [28].

It is also important to ensure patients have timely access to treatment following diagnosis. Caution must be exercised against developing strategies and solutions that commit all available skilled resources at the diagnostic endoscopies to the potential detriment of maintaining timeliness of progressing treatment lists. This benefit highlights the importance of maintaining balance in providing timely diagnosis, treatment and monitoring endoscopy services.

11.3 Reduced burden of care for gastroenterology patients

The third benefit focuses on reducing the burden of care to the individual, their immediate carers and to the State of Queensland. Whilst the first two benefits provide very positive outcomes for patients, they must be delivered within the context of a sustainable model of care. It is crucial that the financial costs of delivering services are affordable and sustainable as services grow. The earlier a patient can be diagnosed the greater the potential for cost efficiency.

Endoscopy is an essential tool in the diagnosis and intervention of multiple medical conditions. Other alternatives to endoscopy such as CT colonography and barium enema are not as effective or as readily available as endoscopy.

The *Blueprint for better healthcare in Queensland* has set Queensland Health the target of achieving a lower price than the national efficient rate. This measure aims to base Queensland's performance against the national efficient price.

Key performance measures are suggested to enable ongoing measurement of the impact of the introduction of nurse endoscopy and other service improvements (Refer Table 6).

Table 6 Proposed key performance measures for endoscopic services

Benefit	Key performance indicator	Measure
Reduction in the number of people that develop and die from cancer	Cancer prevented by polypectomy	Adenoma polyps detected and removed
		Adenoma polyp detection rate per endoscopy
	Cancers detected early	Cancer stage on first endoscopy for bowel cancer
		Cancer stage on first endoscopy for stomach cancer
		Cancer stage on first endoscopy for oesophagus cancer
Proportion of mis-staged cancers based on the difference between pre and post-surgery for bowel cancers		
Better health outcomes for all Queenslanders with gastroenterology conditions	Reduced time from referral to diagnosis	Time from referral to actual public health endoscopy procedure
	Reduced time from diagnosis to first treatment	Time from endoscopy diagnosis to first clinical treatment
Reduced burden of care for gastroenterology patients	Reduced clinical pathway costs	Cost of care based on cancer stage and the published cost of bowel cancer treatment
	Reduced cost of endoscopy	Endoscopy efficient price versus national efficient price

Abbreviations

AQF	Australian Qualifications Framework
CRC	Colorectal cancer
DALYs	Disability adjusted life years
FIT	Faecal Immunochemical Test
FOBT	Faecal Occult Blood Test
GESA	Gastroenterological Society of Australia
GI	Gastro-intestinal
GPs	General practitioners
HHS	Hospital and Health Service
HWA	Health Workforce Australia
MINuET	A Multi-Institution Nurse Endoscopy Trial
NBCS	National Bowel Cancer Screening
NEs	Nurse Endoscopists
NHS	National Health System
NMBA	Nursing and Midwifery Board of Australia
NMOQ	Nursing and Midwifery Office, Queensland
OASys	Oncology Analysis System
QALY	Quality adjusted life year
QALYS	Quality-adjusted life years
QHAPDC	Queensland Health Admitted Patient Data Collection
QHEWAG	Queensland Health Endoscopy Workforce Advisory Group
RACP	Royal Australasian College of Physicians
RACS	Royal Australasian College of Surgeons

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Appendix 1: Investment management logic map

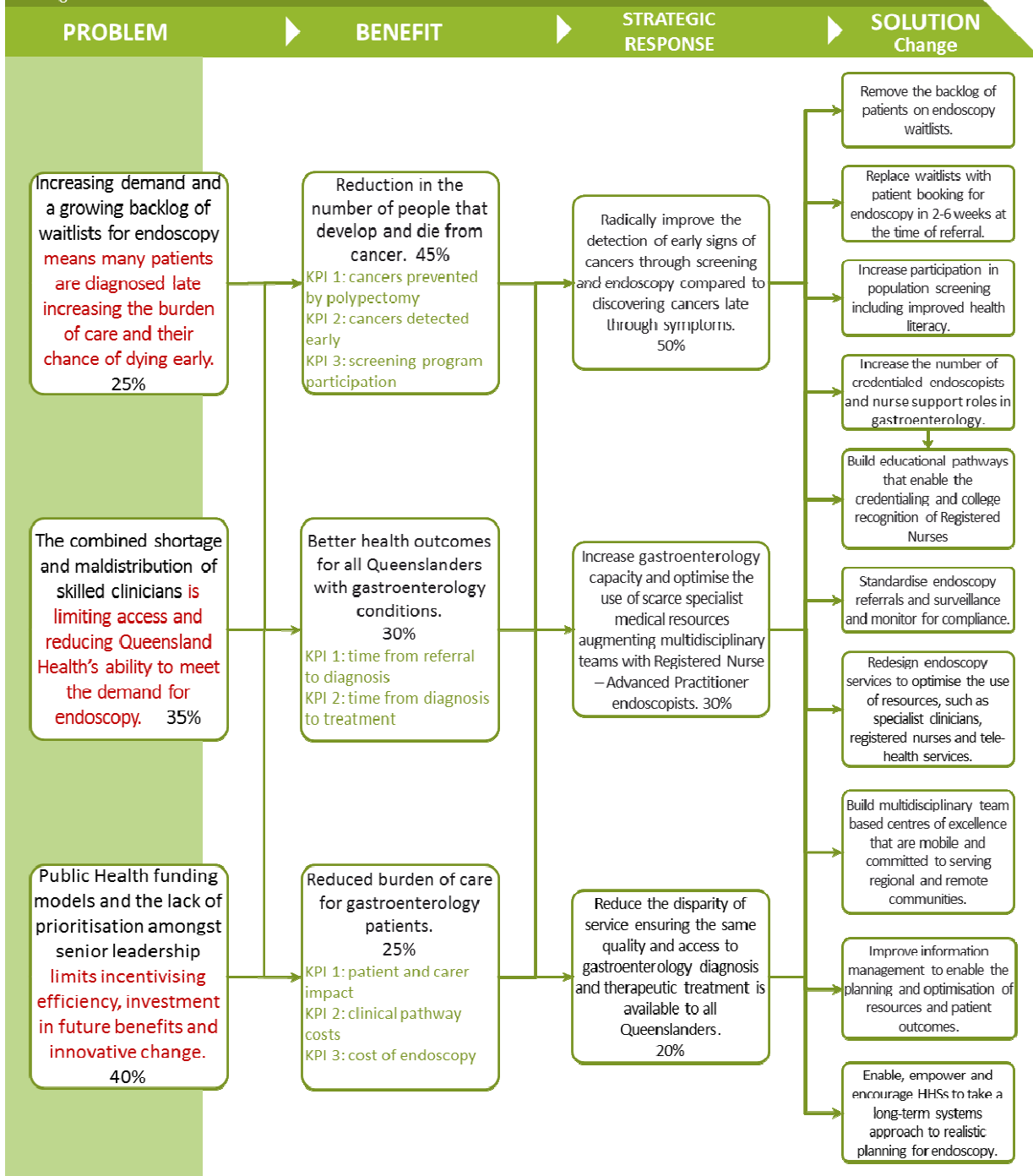
Queensland Health

Endoscopy Services

Addressing the issues surrounding public health system endoscopy services

INVESTMENT LOGIC MAP

Program



Investor: Michael Cleary
Facilitator: David Platt
Accredited Facilitator: Yes

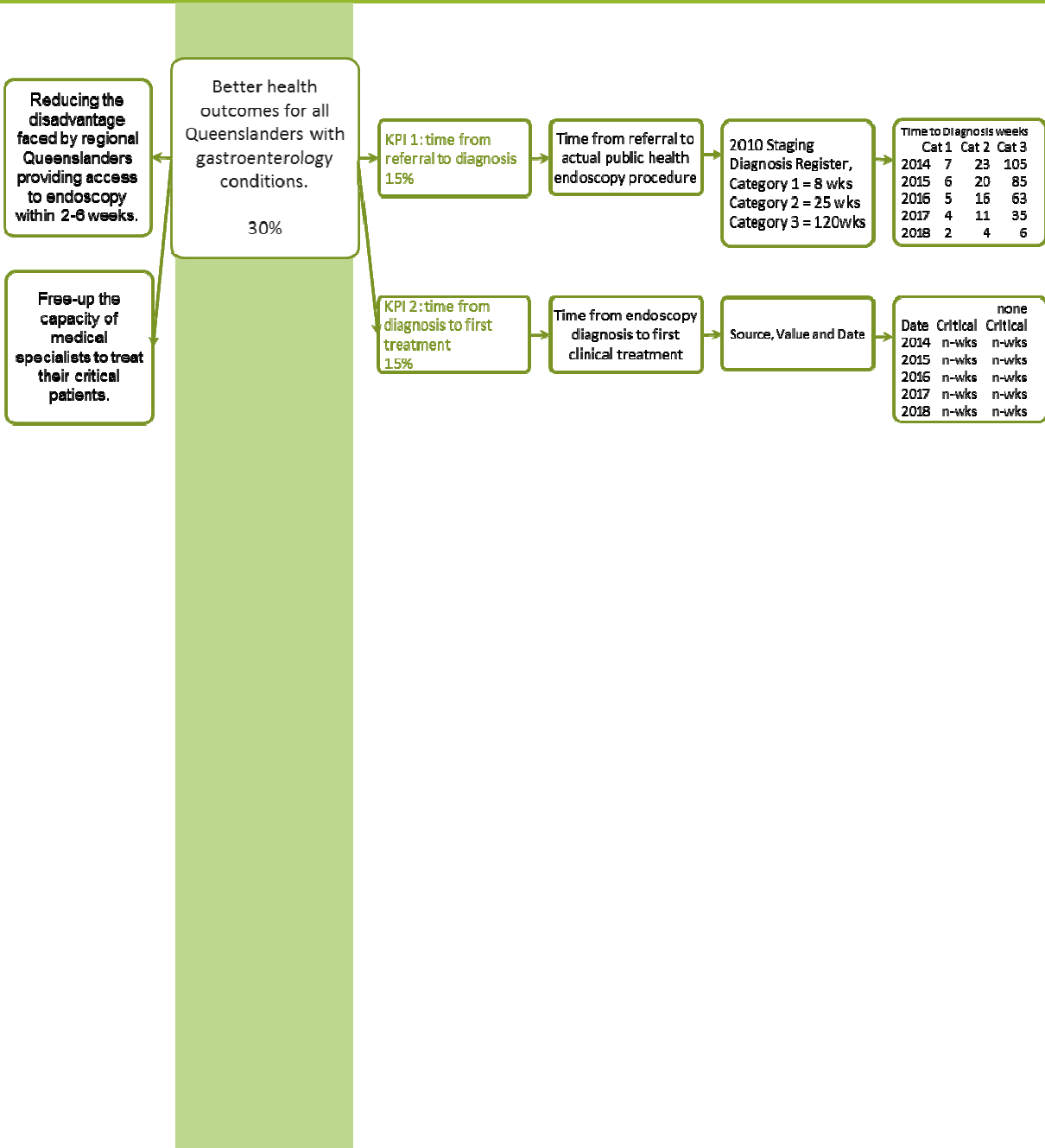
Version no: 13
Initial Problem Definition Workshop: 15/07/2013
Last modified by: David Platt 29/10/2013
Template version: 5.0

Endoscopy Services

Addressing the issues surrounding public health system endoscopy services.

Benefit Map

PUBLIC VALUE MESSAGE ◀ BENEFIT ▶ KPI ▶ MEASURE ▶ BASELINE ▶ TARGET



Investor: Michael Cleary
 Facilitator: David Platt
 Accredited Facilitator: Yes

Version no: 13
 Initial Problem Definition Workshop: 15/07/2013
 Last modified by: David Platt 29/10/2013
 Template version: 5.0

Appendix 2: Bowel cancer quick statistics

Incidence

In 2009:

- bowel cancer was more common in men
- the average age of bowel cancer diagnosis was 69.3 years
- the risk of developing bowel cancer increases with age
- the risk of developing bowel cancer before the age of 85 was 1 in 12
- between 1982 and 2009, incidence rates for bowel cancer in men have increased from 66.7 cases per 100,000 in 1982 to 73.0 cases per 100,000 in 2009, whereas incidence rates for bowel cancer in women have remained stable (52.0 cases per 100,000 in 1982 and 50.5 cases per 100,000 in 2009) [47].

Mortality

In 2010:

- there were 3982 deaths from bowel cancer (2205 men and 1777 women), accounting for 9.3 per cent of all cancer deaths in Australia
- the age-standardised mortality rate for bowel cancer was higher for men:
 - there were 20.1 deaths per 100,000 from bowel cancer compared to women with 13.0 deaths per 100,000
- between 1982 and 2010, the age-standardised mortality rate for bowel cancer has decreased from 31.5 deaths per 100,000 in 1982 to 16.2 deaths per 100,000 in 2010.^{1,2}
- the risk of dying from bowel cancer before the age of 85 was 1 in 45 [47].

Prevalence

At the end of 2007, it was estimated that there were 105,144 people in Australia who were diagnosed with bowel cancer in the previous 26 years, including 45,763 people diagnosed in the previous 5 years [48].

Burden of disease

- Cancer is estimated to be the leading cause of the burden of disease in Australia.
- In 2012, bowel cancer was estimated to account for 13 per cent of the burden of disease due to cancer in men, and 12 per cent of the burden of disease due to cancer in women in Australia.
- In 2012, bowel cancer was estimated to account for 69,400 disability adjusted life years (DALYs) of these 56,900 were years lost due to premature death and 12,500 were years of healthy life lost due to disease, disability or injury [48].

In Queensland

In 2013, it is estimated that 3325 new cases of invasive CRC will be diagnosed among Queensland residents while it is expected that 1170 Queenslanders will die of the disease. Colon cancers are expected to make up 70% of new CRC cases and 68% of colorectal deaths [49].

Figure 32 Estimated international colorectal incidence and mortality by world ASR, selected countries, 2008 [50]



	ASR (W) Incidence	ASR (W) Mortality
Slovakia	42	19
Queensland	41	12
New Zealand	41	15
Australia	39	13
Canada	38	12
Denmark	38	16
Italy	37	12
Germany	36	12
Rep. of Korea	35	10
Japan	31	12
USA	29	9
World	17	8
India	4	3

Appendix 3: Demand drivers for endoscopy

Population

Endoscopy is a procedure that is now accessible and used by all cohorts of the population. If past historical trends continue then the population will grow by 11.3% by 2018, i.e. 2.26% per annum for five years.

Ageing

The age cohort over 50 is growing about 1.06% per annum—faster than the background population growth. This cohort is also by far the greatest consumer of endoscopy services. The demand model estimates that 80% of endoscopy services are consumed by the over 50s. Therefore, the contribution from ageing is $80\% \times 1.06\% \times 5 \text{ years} = 4.2\%$.

Practice change

The increased use of endoscopy for diagnosis and therapeutic treatment as a substitute for more invasive surgical procedures is growing. For the upper bound value it has been assumed that the annual growth is 4.0%, which equates to a doubling of service demand every 18 years. Technological advances and the increased supply of public health endoscopists could both radically accelerate the use of endoscopy and the forecast of 4% could look extremely conservative.

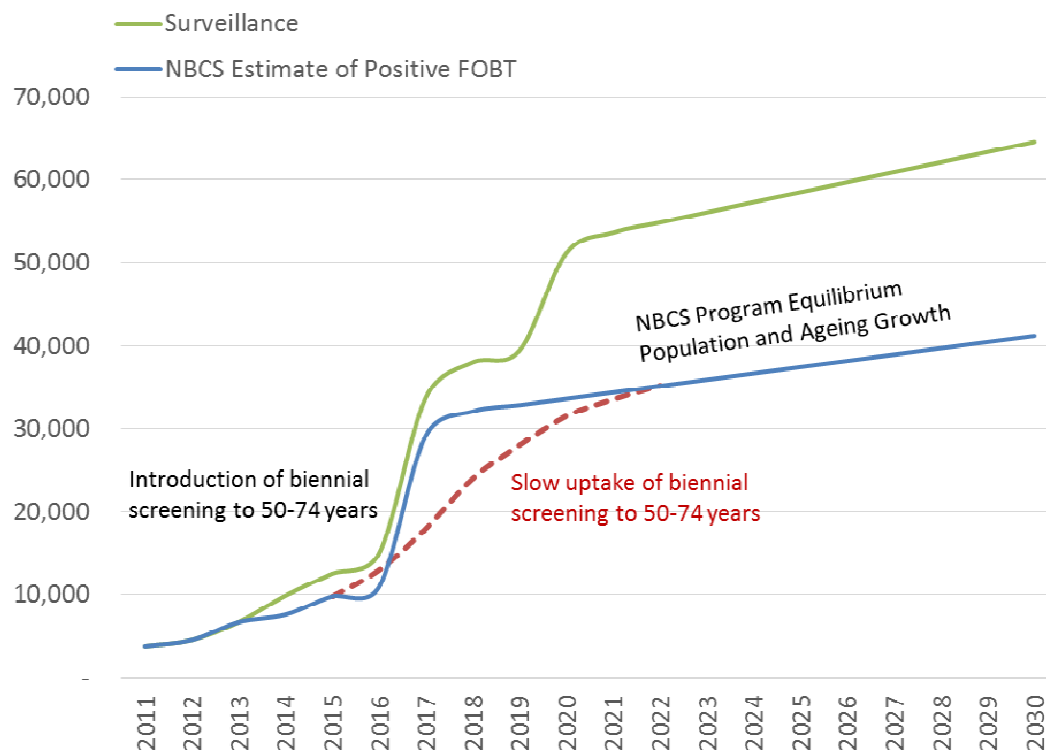
As a way of comparison, a 4% growth roughly equates to about 50% of the over 55–60 years cohort that choose not to be involved in the NBCS program. For example, if half of the people who chose not to respond to the FOBT instead had a one-off endoscopy around the age of 60 years, a 4% per annum growth would be created. This aligns with many of the North American strategies.

National Bowel Cancer Screening

The impact of the NBCS program will be a temporal acceleration in the demand until the program reaches its new equilibrium around invitations to participate and acceptances. Also impacting on the overall impact of the NBCS are evidence-based clinical guidelines increasing general practitioner referrals. Once increased uptake targets are reached by the NBCS program, growth will be driven by population and ageing. The assumption in the demand model is that this equilibrium will be reached around 2018 as shown in Figure 22. A slower uptake is assumed for the lower bound model.

The NBCS demand is comprised of two parts. Firstly, an expected increase in participation in the FOBT will influence a proportionate increase in expected positive FOBTs that require diagnosis with endoscopy. Using the Queensland positive FOBT rate of 7.0% and a 65% participation rate by 2018, an additional demand of 25,380 endoscopic procedures is projected. Of these, 60% will potentially require ongoing surveillance (one return at three years), (see Figure 20Table 2). This assumed surveillance schedule equates to an additional 5887 endoscopies by 2018. The expected increase in annual positive FOBTs and necessary surveillance are anticipated to create an additional 31,267 endoscopy referrals. It should be noted, however that literature indicates a three year surveillance timeframe may be too long [38]. This calculation also assumes only 54.8% of uninsured people will seek endoscopy services in the public service—equating to a projected demand of 17,134.

Figure 33 National Bowel Cancer Screening program long-term endoscopy demand from positive Faecal Occult Blood Test and surveillance



Source: Derived from *NBCS Program monitoring report 2011–12*

Improved health

This is a negative growth taken from the rate of decline in incidents of cancer. The average annual decline in incident rates for colorectal, gastric and oesophageal cancers per 100,000 population were taken as the basis for improved health. For CRC, the decline is around 1.2% per annum for 3325 incidents annually whereas, as for gastric and oesophageal cancers, the decline is about 0.4% per annum for 600 incidents. A weighted annual reduction of -1.08% per annum was used.

Improved triage

Improved triage may reduce the number of inappropriate referrals, such as patients being referred for surveillance after one year when the recommended referral period for the given indicators may be longer.

Appendix 4: Literature review

Uptake of population-based flexible sigmoidoscopy screening for colorectal cancer: a nurse-led feasibility study.

Brotherstone, H.; Vance, M.; Edwards, R.; Miles, A.; Robb, K.A.; Evans, R.E.; Wardle, J. and Atkin, W. *Journal of Medical Screening*. 14(2):76-80, 2007.

OBJECTIVE: To assess uptake of once-only flexible sigmoidoscopy (FS) in a community sample to determine whether FS would be viable as a method of population-based screening for colorectal cancer.

METHODS: All adults aged 60-64 years registered at three General Practices in North West London, UK (510 men and women) were sent a letter of invitation to attend FS screening carried out by an experienced nurse, followed by a reminder if they did not make contact to confirm or decline the invitation. The primary outcome was attendance at the endoscopy unit for a FS test.

RESULTS: Of the 510 people invited to attend, 280 (55%) underwent FS. Among non-attenders, 91 (18%) were ineligible for screening or did not receive the invitation, 19 (4%) accepted the offer of screening but were unable to attend during the study period, 52 (10%) declined the offer, 41 (8%) did not respond to the invitation, and 27 (5%) accepted the offer of screening but did not attend. Attendance among those eligible to be screened, who had received the invitation, was 67%. People from more socioeconomically deprived neighbourhoods were less likely to attend (odds ratio [OR] = 0.90; confidence interval [CI] = 0.84-0.96; P = 0.003). Women were more likely to attend than men (OR = 1.44; CI = 1.01-2.05; P = 0.041).

CONCLUSIONS: Attendance rates in this pilot for nurse-led, population-based FS screening were higher than those reported in other FS studies and comparable with adherence to faecal occult blood testing (FOBT) in the UK FOBT pilot. Having a female nurse Endoscopist may have been responsible for increasing female uptake rates but this warrants confirmation in a larger study

What are the clinical outcome and cost-effectiveness of endoscopy undertaken by nurses when compared with doctors? A Multi-Institution Nurse Endoscopy Trial (MINuET).

Williams J. Russell I. Durai D. Cheung WY. Farrin A. Bloor K. Coulton S. Richardson G. *Health Technology Assessment (Winchester, England)*. 10(40): iii-iv, ix-x, 1-195, 2006 Oct.

OBJECTIVES: To compare the clinical outcome and cost-effectiveness of doctors and nurses undertaking upper and lower gastrointestinal endoscopy.

DESIGN: The study was a pragmatic randomised controlled trial. Zelen's randomisation before consent was used to minimise distortion of existing practice in the participating sites. An economic evaluation was conducted alongside the trial, assessing the relative cost-effectiveness of nurses and doctors.

SETTING: The study was undertaken in 23 hospitals in England, Scotland and Wales. In six hospitals nurses undertook both upper and lower gastrointestinal endoscopy, yielding a total of 29 'centres'. The study was coordinated and managed from Swansea. Randomisation, data management and analysis were undertaken at York. Analysis was by intention-to-scope.

PARTICIPANTS: Sixty-seven doctors and 30 nurses took part in the study. Of 4964 potentially eligible patients, 4128 (83%) were randomised. Of these, 1888 (45%) were recruited to the study from 29 July 2002 to 30 June 2003.

INTERVENTIONS: The procedures under study were diagnostic upper gastrointestinal endoscopy and flexible sigmoidoscopy undertaken by nurses or doctors, with or without sedation, using the preparation, techniques and protocols of participating hospitals.

MAIN OUTCOME MEASURES: Primary outcome measure was the Gastrointestinal Symptom Rating Questionnaire (GSRQ). The secondary outcome measures were EuroQol (EQ5D), Gastrointestinal Endoscopy Satisfaction Questionnaire (GESQ), State-Trait Anxiety Inventory (STAI), cost-effectiveness, immediate and delayed complications, and quality of examination by blinded assessment of endoscopic video recordings, quality of procedure reports, patients' preferences for operator 1 year after endoscopy, and new diagnoses at 1 year.

RESULTS: The two groups were well matched at baseline for demographic and clinical characteristics. Significantly more patients changed from a planned endoscopy by a doctor to a nurse than vice versa, mainly for staffing reasons. There was no significant difference between the two groups in the primary or secondary outcome measures at 1 day, 1 month or 1 year after endoscopy, with the exception of patient satisfaction at 1 day, which favoured nurses. Nurses were significantly more thorough in the examination of stomach and oesophagus, but no different from doctors in the examination of duodenum and colon. There was no significant difference in costs to the NHS or patients, although doctors cost slightly more. Although quality of life measures showed improvement in some scores in the doctor group, this did not reach traditional levels of statistical significance. Even so, the economic evaluation, taking account of uncertainty in both costs and quality of life, suggests that endoscopy by doctors has an 87% chance of being more cost-effective than endoscopy by nurses.

CONCLUSIONS: There is no statistically significant difference between doctors and nurses in their clinical effectiveness in diagnostic endoscopy. However, nurses are significantly more thorough in the examination of oesophagus and stomach, and patients are significantly more satisfied after endoscopy by a nurse. Endoscopy by doctors is associated with better outcome at 1 year at higher cost, but overall is likely to be cost-effective. Further research is needed to evaluate the clinical outcome and cost-effectiveness of nurses undertaking a greater role in other settings, to monitor the cost-effectiveness of nurse Endoscopists as they become more experienced and to assess, the effect of increasing the number of nurse Endoscopists on waiting times for patients, and the career implications and opportunities for nurses who become trained Endoscopists. Evaluation of the clinical outcome and cost-effectiveness of diagnostic endoscopy for all current indications is also needed.

<http://www.hta.ac.uk/fullmono/mon1040.pdf>

Doctors and the nurse Endoscopist issue in New Zealand.

Khan MI. Khan R. Owen W. *New Zealand Medical Journal*. 125(1357):88-97, 2012 Jun 29.

AIM: Training and recruitment of Nurse Endoscopists (NEs) is currently actively debated in medical circles. The aim of this survey was to obtain the views of doctors regarding the role of NEs in New Zealand (NZ).

METHODS: A web-based, self-administered questionnaire was sent to 84 Endoscopists currently working in 25 public hospitals across all the 20 District Health Boards. The survey period was July 2011. Data was analysed using descriptive statistics.

RESULTS: The response rate was 47.5%. Fifty per cent of the respondents worked in tertiary hospitals. Only 30% had a positive attitude towards the introduction of NEs in NZ. The majority (62%) believed that doctors would deliver better quality of endoscopy services than NEs. Only 37% thought that the introduction of NEs will reduce the cost of services. Forty-one per cent thought it was inappropriate for the NEs to be enrolled in the Bowel Cancer Screening Programme and only 6 doctors (18%) thought that NEs should be allowed to perform therapeutic endoscopic procedures.

CONCLUSION: Only a minority of doctors had a positive attitude towards the role of NEs. The majority considered doctors to deliver 'higher' quality of service and only a minority thought that the introduction of NEs will lower the cost of services.

Patient satisfaction with lower gastrointestinal endoscopy: doctors, nurse and nonmedical Endoscopists.

Maslekar S. Hughes M. Gardiner A. Monson JR. Duthie GS. *Colorectal Disease*. 12(10):1033-8, 2010 Oct.

AIM: Assessment of patient satisfaction with lower gastrointestinal endoscopy (LGE) comprising colonoscopy and flexible sigmoidoscopy is gaining increasing importance. We have now trained non healthcare professionals such as nonmedical Endoscopists (NMEs) to perform LGE to overcome shortage of trained Endoscopists. The aim of this study was to prospectively determine patient satisfaction, factors affecting satisfaction with LGE and to compare with nurses, NME and medical Endoscopists, in terms of patient satisfaction.

METHOD: Consecutive patients undergoing LGE answered specially developed patient satisfaction questionnaire at discharge and 24 h thereafter. This questionnaire was a modification of m-Group Health Association of America questionnaire. Construct and face validity of questionnaire were tested by an expert group. Demographic and clinical data was prospectively collected. Multivariate regression analysis was performed to determine factors influencing patient satisfaction.

RESULTS: Some 503 patients were surveyed after LGE. Examinations were performed by nurse (n = 105), doctor (n = 191), or NMEs (n = 155). There were no differences between three groups in terms of completion rates/complications. No differences were detected between Endoscopists in patient rating for overall satisfaction (P = 0.6), technical skills (P = 0.58), communication skills (P = 0.61) or interpersonal skills (0.59). Multivariate regression analysis showed that higher pre-procedure anxiety, history of pelvic operations/hysterectomy and higher pain scores were associated with adverse patient satisfaction and pre-procedure anxiety, history of hysterectomy and female gender were associated with higher pain scores.

CONCLUSION: This study has shown that there are no differences in patient satisfaction with LGE performed by nurse, doctor or NME. The most important factor affecting patient satisfaction is degree of discomfort/pain experienced by patient.

**Propofol sedation in gastrointestinal endoscopy: a gastroenterologist's perspective.
[Review] [22 refs]**

Wehrmann, T. and; Triantafyllou, K. *Digestion*. 82(2):106-9, 2010.

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<http://proquest.umi.com/pqdweb?TS=1092025720&clientId=67476&RQT=317>

The present article describes the recommendations regarding the use of propofol by non-anaesthesiologists from published guidelines. Furthermore, safety and efficacy data regarding the use of propofol in the hands of gastroenterologists are also reviewed. Although there are no studies comparing the safety and efficacy of propofol administration by anaesthesiologists versus non-anaesthesiologists for sedation during endoscopy, there is strong evidence that propofol administration by non-anaesthesiologists is safe and efficacious for the majority of patients undergoing routine endoscopic procedures.

Endoscopy: a guide for the registered nurse.

Scholten, S.R. *Critical Care Nursing Clinics of North America*. 22(1):19-32, 2010 Mar.

As an invasive procedure, endoscopic studies require patient care and considerations that are very similar to minor surgical procedures. There are some general guidelines that are applicable to all endoscopic procedures, and there are special considerations that are dictated by the specific endoscopic procedure. It is important for the critical care nurse to understand the procedures because the differences and similarities of each procedure guide nursing actions to effect the best patient outcomes

Exploring the nurse Endoscopist role: a qualitative approach.

Chapman, W. Cooper, B. *British Journal of Nursing*. 18(22):1378, 1380-4, 2009 Dec 10-2010 Jan 13.

BACKGROUND: Previously, gastrointestinal endoscopy was undertaken only by medical staff. The nurse Endoscopist role has recently been developed and is now in great demand. Barriers and facilitators are identified in similar nursing roles, though little research has been undertaken on the nurse Endoscopist role.

AIM: To examine perceptions of UK nurse Endoscopists regarding their experience of the role. This qualitative study involved semi-structured interviews with eight UK nurse Endoscopists. Data gained were analysed qualitatively. The following categories emerged: role structure, collaboration, experience, and education and training.

RESULTS: The 'role structure' category showed that patient services were better where the nurse Endoscopist role encompassed a more holistic approach. In the 'collaboration' category, the importance of relations with medical, nursing and management colleagues was observed. It was found that nurse Endoscopists may be providing an inferior service due to being given lower priority than medical Endoscopists. The 'experience' category showed nurse Endoscopists valued their nursing experience, while specific endoscopy nursing experience prior to becoming an Endoscopist was also useful. The 'education' category showed that degree-level education and training were important when accessed, in addition to prescribing courses.

CONCLUSION: Nurses undertaking endoscopy have potentially satisfying roles, which allow them to perform effectively. The roles should be planned adequately and practitioners should

receive appropriate degree-level education. Furthermore, patients should receive equitable treatment regardless of which profession undertakes the endoscopy.

Endoscopy nurse as a patient care coordinator: the expanded role of the competent nurse in the gastroenterology setting.

Vuorinen, R. Heino, E. and Meretoja, R. *Gastroenterology Nursing*. 32(6):410-3, 2009 Nov-Dec.

Several methods are used to describe and evaluate competence profiles of registered nurses. A clinical ladder program based on P. Benner's (1984; P. Benner et al., 1996) competency framework has been used for 20 years in a Finnish university hospital; to ensure the nurses' strategic competencies and capability profiles, the Nurse Competence Scale (NCS) was developed for the self-assessment and the superiors' review purposes (R. Meretoja, H. Isoaho, & H. Leino-Kilpi, 2004; R. Meretoja, H. Leino-Kilpi, & A. M. Kaira, 2004). In the gastroenterological endoscopy unit, competent nurses' work role has been expanded to the proficient level. These nurses are working as patient care coordinators in multi-professional groups. This expanded work role requires mastery of nursing care for the gastroenterological patients and also familiarity of the endoscopy processes and the clinical pathways. These endoscopy nurse coordinators' most important work role is the effective management of situations, and they are also remarkable resources as preceptors and mentors to less experienced nurses and nursing students. This article describes endoscopy nurse coordinators' expanded work role and competence profile in the frame of the clinical ladder program.

Position statement: Non-anaesthesiologist administration of propofol for GI endoscopy. [Review] [74 refs]

Vargo JJ. Cohen LB. Rex DK. Kwo PY. *American Journal of Gastroenterology*. 104(12):2886-92, 2009 Dec.

This statement on the use of non-anaesthesiologist administered propofol (NAAP) for GI endoscopy is issued jointly by The American Association for the Study of Liver Diseases, American College of Gastroenterology, American Gastroenterological Association, and American Society for Gastrointestinal Endoscopy. A 4-member committee, composed of a representative from each society, prepared the first draft of this document, which was then reviewed and approved by the governing board of each organization. This document is designed to provide an evidence-based assessment of propofol-mediated sedation by properly trained gastroenterologists and other non-anesthesiologists. The safety, efficacy, cost-effectiveness, and training issues involved with non-anesthesiologist administration of propofol for GI endoscopy are reviewed, and a series of concluding statements and recommendations are provided. Whenever possible, these summary conclusions are graded based upon the strength of the supporting evidence (Table1).

Effect of GI endoscopy nurse experience on screening colonoscopy outcomes.

Dellon, E.S. Lippmann QK. Galanko, J.A. Sandler, R.S. Shaheen, NJ. *Gastrointestinal Endoscopy*. 70(2):331-43, 2009 Aug.

BACKGROUND: The effect of the GI endoscopy nurse experience on colonoscopy outcomes is unknown.

OBJECTIVE: To determine whether the nurse experience was associated with screening colonoscopy complications, procedure length, and cecal intubation.

DESIGN: A retrospective analysis of screening colonoscopies performed by attending physicians between August 2003 and August 2005. Nurse experience was measured in weeks.

SETTING: University of North Carolina Hospitals.

SUBJECTS: Twenty-nine nurses were employed during the study period, 19 of whom were newly hired. A total of 3631 eligible screening colonoscopies were analysed.

MAIN OUTCOME MEASUREMENTS: The primary outcome was any immediate complication; secondary outcomes included time to cecum, total procedure time, and cecal intubation rate.

RESULTS: In procedures staffed by nurses with 2 weeks of experience or less, 3.2% had complications compared with 0.3% for procedures with more experienced nurses (odds ratio [OR] 10.4 [95% CI, 3.55-30.2]). For nurses with 6 months or less of experience, 18% of procedures had cecal-intubation times more than 1 standard deviation above the mean compared with 12% for more experienced nurses (OR 1.60 [95% CI, 1.30-1.97]). Similar results were seen for the total procedure duration (OR 1.61 [95% CI, 1.32-1.97]) and cecal-intubation rates (OR 1.81 [95% CI, 1.37-2.39]). All relationships held after adjusting for potential confounding factors.

LIMITATIONS: A retrospective, single-center study.

CONCLUSIONS: GI endoscopy nurse inexperience is associated with an increase in immediate complications, prolonged procedure times, and decreased cecal-intubation rates for screening colonoscopies. These findings have implications for nurse training, procedure efficiency, colonoscopy quality assessment, and patient safety.

Study authors respond to editorial. Nurse delivered endoscopy.

Williams, J. Richardson, G. Bloor, K. *BMJ*. 338:b1082, 2009. [Comment. Letter]

The multicentre randomised controlled trial by Williams and colleagues (doi:10.1136/bmj.b231) compares the clinical effectiveness of doctors and nurses undertaking upper and lower gastrointestinal endoscopy. The study by Richardson and colleagues (doi:10.1136/bmj.b270) assesses the cost effectiveness of this approach. The studies found no significant difference in clinical outcomes, although doctors seemed to be more cost effective. Nurse-led services in the United Kingdom have been encouraged by government policy, a shortage of doctors, a willingness of nurses to adopt expanded roles, and a salaried NHS workforce where professionals are not in competition for income from patients. Evaluations of substituting doctors with nurses have consistently found little difference in performance. In primary care, no appreciable differences between doctors and nurses have been found in health outcomes for patients, process of care, or use and cost of resources, whereas nurse led care has resulted in higher patient satisfaction. These findings have been reported across a wide range of diseases. Nurse Endoscopists are firmly established in the UK, with 350 nurses currently in practice.

The multi-institution nurse endoscopy trial carried out by Williams and colleagues found no significant difference at one day, one month, or one year in gastrointestinal symptoms, complications, anxiety, or new diagnoses between nurses and doctors. Nurses were more thorough than doctors in examining the upper gastrointestinal tract and patients were more satisfied with nurses the day after the examination. However, it does not mention the number or type of diagnoses found, diagnostic accuracy, or subsequent treatments. It is unclear if the

endoscopies were for screening or diagnosis. The primary end point of symptoms and quality of life at one year must be influenced by diagnoses found in this heterogeneous population. A diagnosis of cancer might worsen quality of life but might ultimately save a life. The economic analysis claims that doctors are more cost effective than nurses, although this conclusion arises from a non-significant difference in quality adjusted life years. Purchasers of endoscopy are more likely to purchase on the basis of cost per test (lower for nurses, with no difference in quality of examination, complications, or subsequent symptoms) than quality adjusted life years.

Cost effectiveness of nurse delivered endoscopy: findings from randomised multi-institution nurse endoscopy trial (MINuET).

Richardson G. Bloor K. Williams J. Russell I. Durai D. Cheung WY. Farrin A. Coulton S. *BMJ*. 338:b270, 2009.

http://www.bmj.com/highwire/filestream/369155/field_highwire_article_pdf/0/bmj.b270.full.pdf

OBJECTIVE: To compare the cost effectiveness of nurses and doctors in performing upper gastrointestinal endoscopy and flexible sigmoidoscopy.

DESIGN: As part of a pragmatic randomised trial, the economic analysis calculated incremental cost effectiveness ratios, and generated cost effectiveness acceptability curves to address uncertainty.

SETTING: 23 hospitals in the United Kingdom.

PARTICIPANTS: 67 doctors and 30 nurses, with a total of 1888 patients, from July 2002 to June 2003.

INTERVENTION: Diagnostic upper gastrointestinal endoscopy and flexible sigmoidoscopy carried out by doctors or nurses.

MAIN OUTCOME MEASURE: Estimated health gains in QALYs measured with EQ-5D. Probability of cost effectiveness over a range of decision makers' willingness to pay for an additional quality adjusted life year (QALY).

RESULTS: Although differences did not reach traditional levels of significance, patients in the doctor group gained 0.015 QALYs more than those in the nurse group, at an increased cost of about pound56 (euro59, \$78) per patient. This yields an incremental cost effectiveness ratio of pound3660 (euro3876, \$5097) per QALY. Though there is uncertainty around these results, doctors are probably more cost effective than nurses for plausible values of a QALY.

CONCLUSIONS: Though upper gastrointestinal endoscopies and flexible sigmoidoscopies carried out by doctors cost slightly more than those by nurses and improved health outcomes only slightly, our analysis favours endoscopies by doctors. For plausible values of decision makers' willingness to pay for an extra QALY, endoscopy delivered by nurses is unlikely to be cost effective compared with endoscopy delivered by doctors.

Effectiveness of nurse delivered endoscopy: findings from randomised multi-institution nurse endoscopy trial (MINuET).

Williams, J.; Russell, I.; Durai, D.; Cheung, W.Y.; Farrin, A.; Bloor, K.; Coulton, S. and Richardson G. *BMJ*. 338:b231, 2009.

OBJECTIVE: To compare the clinical effectiveness of doctors and nurses in undertaking upper and lower gastrointestinal endoscopy.

DESIGN: Pragmatic trial with Zelen's randomisation before consent to minimise distortion of existing practice.

SETTING: 23 hospitals in the United Kingdom. In six hospitals, nurses undertook both upper and lower gastrointestinal endoscopy, yielding a total of 29 centres.

PARTICIPANTS: 67 doctors and 30 nurses. Of 4964 potentially eligible patients, we randomised 4128 (83%) and recruited 1888 (38%) from July 2002 to June 2003.

INTERVENTIONS: Diagnostic upper gastrointestinal endoscopy and flexible sigmoidoscopy, undertaken with or without sedation, with the standard preparation, techniques, and protocols of participating hospitals. After referral for either procedure, patients were randomised between doctors and nurses.

MAIN OUTCOME MEASURES: Gastrointestinal symptom rating questionnaire (primary outcome), gastrointestinal endoscopy satisfaction questionnaire and state-trait anxiety inventory (all analysed by intention to treat); immediate and delayed complications; quality of examination and corresponding report; patients' preferences for operator; and new diagnoses at one year (all analysed according to who carried out the procedure).

RESULTS: There was no significant difference between groups in outcome at one day, one month, or one year after endoscopy, except that patients were more satisfied with nurses after one day. Nurses were also more thorough than doctors in examining the stomach and oesophagus. While quality of life scores were slightly better in patients the doctor group, this was not statistically significant.

CONCLUSIONS: Diagnostic endoscopy can be undertaken safely and effectively by nurses.

Nurse delivered endoscopy.

Norton C. Grieve A. Vance M. *BMJ*. 338:a3049, 2009.[Comment. Editorial]

The multicentre randomised controlled trial by Williams and colleagues compares the clinical effectiveness of doctors and nurses undertaking upper and lower gastrointestinal endoscopy. The study by Richardson and colleagues assesses the cost effectiveness of this approach. The studies found no significant difference in clinical outcomes, although doctors seemed to be more cost effective. Evaluations have shown that in primary care, that no appreciable differences between doctors and nurses have been found in health outcomes for patients, process of care, or use and cost of resources, whereas nurse-led care has resulted in higher patient satisfaction. As at 2009, there were 350 nurse Endoscopists in the United Kingdom. The paper highlights the need for more research on not only patient satisfaction but the collection and examination of data on patient outcomes. It was noted that large sample sizes are necessary to show the independent contribution of testing compared with other influences on outcomes. Nurses were more thorough than doctors in examining the upper gastrointestinal tract and patients were more satisfied with nurses the day after their treatment. The economic analysis claims that doctors are more cost effective than nurses, arises from a non-significant difference in quality adjusted life years. The study notes that purchasers of endoscopy are more likely to purchase services on the basis of cost per test (lower for nurses, with no difference in quality of examination, complications, or subsequent symptoms) than quality adjusted life years. The polyp detection rate is usually considered a primary measure of how accurate the Endoscopist performs Sigmoidoscopy. A study by Schoenfeld and colleagues (1999) showed nurses and gastroenterologists have similar rates of missed detection and complications. It concluded that further research is needed on ways

of working together that make the optimum use of each professions' talents and don't just substitute isolated aspects of care.

The role of the endoscopy nurse or assistant in endoscopic sedation. [Review] [17 refs]

Voynarovska M. Cohen LB. *Gastrointestinal Endoscopy Clinics of North America*. 18(4):695-705, viii, 2008 Oct.

Properly trained nursing personnel and allied staff are essential to the safe and effective practice of endoscopic sedation. Such individuals should possess a thorough understanding of the pharmacology of sedation agents, as well as the ability to monitor patients under sedation, recognize potential complications, and initiate appropriate and timely interventions. The endoscopy nurse or assistant must also understand their institutional policies and procedures pertaining to procedural sedation.

Nurse-administered propofol sedation for upper endoscopic ultrasonography.

Fatima H. DeWitt J. LeBlanc J. Sherman S. McGreevy K. Imperiale TF. *American Journal of Gastroenterology*. 103(7):1649-56, 2008 Jul.

BACKGROUND: Limited data exist regarding the safety of nurse-administered propofol sedation (NAPS) for advanced endoscopy.

AIMS: To evaluate the frequency of and the risk factors for complications associated with NAPS for upper endoscopic ultrasound (EUS).

METHODS: Consecutive upper EUS examinations using NAPS were retrospectively identified. Clinical data and adverse events were recorded. Univariate and multivariable repeated measures logistic regression models were used to identify independent risk factors for complications.

RESULTS: Among 806 EUS procedures, the mean procedure duration, time for sedation induction, and post procedure recovery time were: 34 +/- 20 min, 3.6 +/- 1.4 min, and 27 +/- 23 min, respectively. A decline in systolic blood pressure (SBP) to <90 mm Hg occurred in 104 patients (13%). Six patients (0.7%) had a decline in oxygen saturation (SpO₂) to <90%. Four patients (0.5%; 95% confidence interval [CI] 0.14-1.27) required assisted positive pressure ventilation. There were no major complications. The minor complication rate from sedation was 21% (95% CI 17.2-25.3). All of the complications were clinically insignificant. Overall complication risk was not related to age, dose, or procedure time. Sedation-related complication rates for advanced experience-level (> or =100 NAPS procedures) nurses were lower compared to the least-experienced (< or =30 NAPS procedures) nurses (17.2%vs 25.4%, odds ratio [OR] 0.61, 95% CI 0.41-0.92).

CONCLUSIONS: NAPS for upper EUS is safe and may be performed without major complications. Four patients (0.5%) required assisted ventilation. Minor complications occurred in 21% of patients, but were not associated with patient age, propofol dose, or procedure time.

Efficacy and safety of nurse-administered propofol sedation during emergency upper endoscopy for gastrointestinal bleeding: a prospective study.

Tohda G. Higashi S. Sakumoto H. Sumiyoshi K. Kane T. *Endoscopy*. 38(7):684-9, 2006 Jul.

BACKGROUND AND STUDY AIMS: Recent studies have documented the safety of propofol sedation for endoscopic procedures, but many endoscopists are reluctant to use propofol for

high-risk patients because of adverse effects. The aim of this study was to demonstrate the safety and efficacy of nurse-administered propofol sedation during emergency upper endoscopy for patients with gastrointestinal bleeding.

PATIENTS AND METHODS: Over a period of 18 months, 120 patients suffering from acute upper gastrointestinal bleeding received propofol sedation administered by a registered nurse. Among these, 15 patients were classified into American Society of Anaesthesiologists (ASA) class IV, 84 were ASA class III, and 21 were ASA class II. Patients without gastrointestinal bleeding, who also received propofol during the same period and were matched for age, gender, and ASA class, served as controls.

RESULTS: Endoscopic homeostasis was achieved in 98.3 % of patients and 97.5 % were satisfied with the procedure. In patients with gastrointestinal bleeding, the rates of hypotension (systolic blood pressure < 90 mmHg) and hypoxemia (peripheral oxygen saturation < 90 %) were 8.3 % and 6.7 % respectively, values higher than those in the control group. However, neither mask ventilation nor endotracheal intubation was necessary. Although two patients with gastrointestinal bleeding developed pneumonia, most likely due to aspiration during the procedure, they recovered within 5 days of treatment. There were no sedation-associated severe complications or mortalities.

CONCLUSION: Using a strict protocol designed to protect the patient's airway and cardiovascular function, nurse-administered propofol sedation during emergency upper gastrointestinal endoscopy is safe and appropriate in cases of acute gastrointestinal bleeding.

Playing games: doctors and nurses and musical chairs.

Meenan J. *Endoscopy*. 38(6):621-3, 2006 Jun. [Comparative Study. Editorial]

Nurses perform flexible Sigmoidoscopy. Nurses also perform colonoscopy, oesophageal dilation, variceal ligation, and endosonography; they treat patients in emergency departments and many other conditions. Aside from nurses, non-medically trained technicians perform gastroscopy. Nearly all doctors in the UK work for the National Health Service (NHS). The NHS is government run and funded entirely from general taxation. In response to recent pressure to change structure and to remove traditional lines of demarcation, has meant nurses are now allowed to perform procedures previously only performed by doctors; extending also into prescribing specialty-specific medications. Endoscopic ultrasound (EUS) is an example of an advanced endoscopic technique. Clinical staff who perform EUS come from a broad range of disciplines, including gastroenterology, radiology and surgery; with no particular background known to afford a distinct advantage. The UK health service needs both physicians and nurse specialists in order to function efficiently. Nurse specialists manage many patients who might be described as falling into the "mainstream" category. Would UK specialists have been so willing to develop and support non-physician endoscopy services if they were self-employed and dependent on private practice? Of course not, but the genie is out of the bottle and arguments about nurses not being capable of performing advanced endoscopy or of understanding their findings are unfounded, specious and insulting to all concerned.

A randomized controlled trial comparing the accuracy of general diagnostic upper gastrointestinal endoscopy performed by nurse or medical Endoscopists.

Meaden C. Joshi M. Hollis S. Higham A. Lynch D. *Endoscopy*. 38(6):553-60, 2006 Jun.

BACKGROUND AND STUDY AIMS: Rising demand for general diagnostic upper gastrointestinal endoscopy in the UK is outgrowing the capacity of doctors to provide this service within a reasonable time. One solution is to train nurses to carry out the procedure, but it is not known whether nurses can perform general diagnostic upper gastrointestinal endoscopy as competently as doctors.

PATIENTS AND METHODS: A randomized controlled non-inferiority trial compared the adequacy and the accuracy of diagnostic upper gastrointestinal endoscopies performed by five medical and two nurse endoscopists. The videotaped procedures were assessed by a consultant gastroenterologist blinded to the identity of the endoscopist.

RESULTS: 641 patients were randomly allocated (before attendance and consent procedure) to endoscopy carried out either by a doctor or a nurse. Of these, 412 were enrolled and 367 (89 %) were included in the analysis. An adequate view was obtained throughout in 53.4 % (93/177) of doctor endoscopies and 91.6 % (174/190) of nurse endoscopies (difference 38.2 %, 95 % CL 30.5 %, 47.2 %). In adequately viewed areas, the mean agreement between doctor and expert was 81.0 % and between nurse and expert it was 78.3 % (difference between the means 2.7 %, 95 % CL - 1.0 %, 6.4 %). There was no difference between doctors and nurses in the rate of biopsy performance (90.4 % and 91.1 %, respectively, $P = 0.862$). Nurses took longer (8.1 minutes vs. 4.6 minutes, $P < 0.001$) and used intravenous sedation more often (57.6 %, $P = 0.027$). Adequacy of view correlated positively with endoscopy duration ($P < 0.001$), but diagnostic accuracy correlated inversely with duration ($P < 0.001$). Neither adequacy nor accuracy correlated significantly with use of intravenous sedation.

CONCLUSIONS: In endoscopies performed by nurses, the proportion of adequate examinations was much higher than that found for doctors. In areas with an adequate view, there is no significant difference in accuracy between nurses and doctors. Nurses can provide an accurate general diagnostic upper gastrointestinal endoscopy service as competently as doctors.

Role delineation of the Registered Nurse in a staff position in gastroenterology.[Erratum appears in Gastroenterology Nursing. 2006 May-Jun;29(3):256-7]

SGNA Practice Committee. *Gastroenterology Nursing*. 29(1):62-3, 2006 Jan-Feb.

The role of the RN has expanded with the changes in advancing technology and newly defined patient needs. Recognising that the role of the staff nurse in gastroenterology is still evolving so too will the scope of role delineation of the RN. The RN is accountable for the quality of nursing care rendered to patients. The RN assumes responsibility for assessing, planning, implementing, directing, supervising, evaluating direct and indirect nursing care, and identifying outcomes for patients in the gastroenterological setting.

The accuracy of an endoscopy nurse in interpreting capsule endoscopy.

Levinthal GN. Burke CA. Santisi JM. *American Journal of Gastroenterology*. 98(12):2669-71, 2003 Dec.

OBJECTIVE: The average physician time required to view a wireless capsule endoscopy study at our institution is 50 min. It is unknown whether a nurse could preview the capsule endoscopy video and accurately detect all significant lesions. If so, it may allow the physician to review only the predetected abnormalities and thereby greatly reduce physician reading time. Our aim was to evaluate whether a nurse can accurately detect lesions on capsule endoscopy.

METHODS: An endoscopy nurse who was trained to read capsule endoscopy reviewed 20 consecutive capsule endoscopy studies and recorded all findings. The same studies were viewed independently by a gastroenterologist. The two sets of recorded findings were reviewed, and a comparison of the accuracy in detecting landmarks and clinically significant lesions was made.

RESULTS: The nurse missed two of 27 significant lesions seen by the gastroenterologist (93% sensitivity, 95% CI = 74-99%), and the gastroenterologist missed three seen by the nurse. The nurse accurately recorded gastric emptying time and time of passage through the ileocecal valve to within 1 min of the times recorded by the gastroenterologist in 18 of 20 patients (90% agreement, 95% CI = 67-98%).

CONCLUSIONS: In this study, the endoscopy nurse detected 93% of the clinically significant lesions seen by the gastroenterologist. The clinical implication of this is that a physician extender could preread capsule endoscopies, allowing the gastroenterologist to view only the demarcated abnormalities. This could improve the cost effectiveness of capsule endoscopy and lead to wider physician acceptance of the test.

Upper gastrointestinal endoscopy performed by nurses: scope for the future?

Smale S. Bjarnason I. Forgacs I. Prasad P. Mukhood M. Wong M. Ng A. Mulcahy HE. *Gut*. 52(8):1090-4, 2003 Aug.

BACKGROUND: Previous researchers have shown that non-medical Endoscopists can perform lower gastrointestinal endoscopy as safely and effectively as medical staff. However, it is not known if upper gastrointestinal endoscopy performed by medical and non-medical Endoscopists in clinical practice yields similar results in terms of performance, patient discomfort, and satisfaction.

AIM: To determine differences in the yield of diagnosis for significant disease during upper gastrointestinal endoscopy performed by nurse and medical Endoscopists and to measure patient discomfort, satisfaction, and attitudes towards future endoscopy.

PATIENTS: This two part study included 3009 patients in a retrospective analysis and 480 in a prospective study.

METHODS: The first part of the study assessed indications for endoscopy, diagnoses, and procedures performed by medical and nurse Endoscopists. In a second prospective study, 480 patients were included to determine the association between Endoscopist type and sedation, patient anxiety, discomfort, satisfaction, and attitudes towards future sedation.

RESULTS: No patient refused endoscopy by either a nurse or medical Endoscopist and there were no complications in either group. Nurses performed 1487 procedures and reported fewer endoscopies as "normal" than medical staff ($p=0.006$). Multivariate analysis

showed that male sex, older age, inpatient status, dysphagia, and gastrointestinal bleeding, but not Endoscopist type, were all associated with significant disease. In relation to discomfort and satisfaction, a similar proportion of patients received sedation in both groups (p=0.81). There were no differences in pre-procedure anxiety (p=0.61), discomfort during intubation (p=0.97), discomfort during examination (p=0.90), or post-procedure examination rating (p=0.79) in patients examined by medical or nurse Endoscopists.

CONCLUSION: Experienced nurses perform routine diagnostic gastroscopy safely in everyday clinical practice and with as little discomfort and as much patient satisfaction as medical staff.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1773769/pdf/gut05201090.pdf>

The role of the nurse Endoscopist. [Review] [16 refs]

McCallum J. *Hospital Medicine* (London). 64(6):337-9, 2003 Jun.

Colorectal nurse specialist roles have developed since the publication of the Calman-Hine report, with most of the post-holders dealing specifically with patients with a diagnosis of colorectal cancer. While posts vary, many of these nurses also perform endoscopy as part of their role. [References: 16]

Nurse endoscopy in a district general hospital.

Goodfellow PB. Fretwell IA. Simms JM. *Annals of the Royal College of Surgeons of England*. 85(3):181-4, 2003 May.

INTRODUCTION: This study describes the first full year of independent practice by a newly appointed nurse Endoscopist in a district general hospital.

PATIENTS AND METHODS: Patients underwent either 'one stop' flexible Sigmoidoscopy and barium enema or flexible Sigmoidoscopy alone. Barium enema results, video photography, clinical follow-up, and histology were used to validate the results of the flexible Sigmoidoscopy. One stop clinic: 161 endoscopies were performed, with 104 female patients (65%), and a mean age of 64 years. There was one failed endoscopy due to poor bowel preparation. Abnormalities were identified in 84% of endoscopies. Flexible Sigmoidoscopy detected abnormalities not seen on the barium enema in 28 cases, all of which were polyps (18%). Barium enema identified one abnormality within reach of the flexible sigmoidoscope not identified at endoscopy (small polyp in sigmoid; 1%). Elective flexible Sigmoidoscopy list: 121 endoscopies were performed, with 65 female patients (54%), and a mean age of 59 years. There were two failed endoscopy procedures, both attributed to poor bowel preparation. Two-thirds of patients had an abnormality on investigation. There were no complications in either group of patients.

CONCLUSIONS: The nurse-led endoscopy service has been successfully initiated with a high completion rate for flexible sigmoidoscope. All significant conditions were identified with 99% sensitivity. Nurse endoscopy is a safe, useful and practical procedure in the setting of this district general hospital.

Nurse Endoscopists in United Kingdom healthcare: a survey of prevalence, skills and attitudes.

Pathmakanthan S. Murray I. Smith K. Heeley R. Donnelly M. *Journal of Advanced Nursing*. 36(5):705-10, 2001 Dec.

OBJECTIVES: To assess the prevalence and potential benefits of attitudes towards nurse endoscopy in the United Kingdom (UK).

DESIGN: Postal questionnaire.

SUBJECTS: All hospitals in the UK with accident and emergency, general medical and general surgical services in October 2000.

MAIN OUTCOME MEASURES: Number of teaching or district general hospitals employing nurse Endoscopists, range of diagnostic and therapeutic endoscopic skills and potential benefits to the endoscopy unit and patients.

RESULTS: Seventy-six hospitals employed 102 nurse Endoscopists. Forty-four nurse Endoscopists performed both oesophago-gastroduodenoscopy (OGD) and flexible sigmoidoscopy with solitary OGD and flexible sigmoidoscopy performed by 17 and 31, respectively. Three performed full colonoscopy while seven could perform all three procedures. Nurse endoscopists were found to provide good patient care in the majority of endoscopy units with no compromise in safety. Lead clinicians were keen to restrict nurse endoscopy to diagnostic OGD and flexible sigmoidoscopy only in the majority of units.

CONCLUSIONS: Nurse Endoscopy is widely practised in the UK and is not limited to one procedure or solely for diagnostic purposes. Benefits include good patient acceptability, improved care and safety. Most clinicians predict an important but restricted role for nurse endoscopy in contributing to endoscopic services.

A description of the gastroenterology nurse endoscopist role in the United States.

Wright KB. *Gastroenterology Nursing*. 23(2):78-82, 2000 Mar-Apr.

The use of nurse Endoscopists in the specialty of gastroenterology has gained recent support in the United States. While studies using nurse Endoscopists have documented positive patient outcomes, including cost effectiveness, public access to cancer screening, and patient satisfaction, research regarding the training and experiences of nurse Endoscopists is almost non-existent. This article presents findings from an exploratory, descriptive study of 17 gastroenterology nurse Endoscopists in the United States. Study subjects describe their role as nurse Endoscopists, their experiences, and their opinions about basic job and curriculum requirements for further development. These findings support the viability and future expansion of this advanced practice role in gastroenterology nursing.

Doctors and the nurse Endoscopist issue in New Zealand

Khan, M.I; Khan, R & Owen, W. *The New Zealand Medical Journal*, 29 June 2012, Vol 125 No 1357

Aim: Training and recruitment of nurse Endoscopists (NEs) is currently actively debated in medical circles. The aim of this survey was to obtain the views of doctors regarding the role of NEs in New Zealand (NZ).

Methods: A web-based, self-administered questionnaire was sent to 84 Endoscopists currently working in 25 public hospitals across all the 20 District Health Boards. The survey period was July 2011. Data was analysed using descriptive statistics.

Results: The response rate was 47.5%. Fifty per cent of the respondents worked in tertiary hospitals. Only 30% had a positive attitude towards the introduction of NEs in NZ. The majority (62%) believed that doctors would deliver better quality of endoscopy services than NEs. Only 37% thought that the introduction of NEs will reduce the cost of services. Forty-one per cent thought it was inappropriate for the NEs to be enrolled in the Bowel Cancer Screening Programme and only 6 doctors (18%) thought that NEs should be allowed to perform therapeutic endoscopic procedures.

Conclusion: Only a minority of doctors had a positive attitude towards the role of the NEs. The majority considered doctors to deliver 'higher' quality of service and only a minority thought the introduction of NEs will lower the costs of services.

The nurse endoscopist: reality or fiction?

Froerer R. *Gastroenterology Nursing*. 21(1):15-20, 1998 Jan-Feb.

In this article, the author describes a study conducted to determine whether advanced practice registered nurses (APRNs) should perform endoscopic procedures, such as colonoscopy and esophagogastroduodenoscopy. Questionnaires were mailed to APRNs belonging to the Society of Gastroenterology Nurses and Associates. Questionnaire items pertained to demographics, current activities, interest in performing GI endoscopic procedures, and barriers to performing GI endoscopic procedures. Over 70% of respondents approved of nurses performing diagnostic endoscopic procedures, yet 80.6% did not think that nurses should perform therapeutic endoscopic procedures. Training opportunities were limited. The barriers to performing endoscopic procedures included liability, third-party reimbursement, lack of physician support, lack of policies, and lack of education. APRNs should develop policies and establish acceptable training guidelines and competency rates in performing GI endoscopic procedures.

Role of the nurse endoscopist in colorectal practice.

Foster ME. Davies PS. West J. *British Journal of Surgery*. 84(2):279, 1997 Feb. [Comment. Letter]

We have adopted the training of the nurse Endoscopist in colorectal practice and have been running an open access flexible Sigmoidoscopy service. We believe that the use of video-recordings is particularly important, not only in the training of nurse practitioner Endoscopists, but in the maintenance of a high-quality service. We routinely video all open-access flexible Sigmoidoscopy procedures and these are reviewed within 48h by either a consultant surgeon or gastroenterologist. Our nurse practitioner generates a computer-aided report which is sent direct to general practitioners for all patients.

Role of the nurse endoscopist in colorectal practice.

Moshakis V. Ruban R. Wood G. *British Journal of Surgery*. 83(10):1399, 1996 Oct.

Recent changes in the provision of colorectal services have led the authors to train a nurse Endoscopist in colorectal practice. A registered general nurse was trained in flexible Sigmoidoscopy and clinical coloproctology in accordance with an agreed protocol. Theoretical training covered the anatomy, physiology, pathology and clinical aspects of gastrointestinal disease, with special emphasis on the colorectum. Endoscopy equipment training covered the mechanisms. Cleaning and maintenance of flexible sigmoidoscopes; the principles and practice of infection control and the function and organisation of endoscopy units. Trainees observed and then conducted fifty supervised procedures. Both observed and

performed procedures were videoed. Scores for the pupil and trainer were compared. The pupil was considered able to perform competent and safe flexible Sigmoidoscopy when scores were equal to or within 15 per cent of the trainer. The study concluded that a nurse can be taught to practice flexible Sigmoidoscopy efficiently and safely and that with expert training and continuing education, the nurse Endoscopist can become a vital resource in the colorectal team.

The use of nurse practitioners in the endoscopy unit.

Westaby D. *European Journal of Gastroenterology & Hepatology*. 8(7):623-4, 1996 Jul.
[Comment. Journal Article]

Key issues in the introduction of nurse endoscopy.

Hughes M. *Nursing Times*. 92(8):38-9, 1996 Feb 21-27.

The inspection technique of gastrointestinal endoscopy is becoming increasingly popular and services in this area are expanding. Conditions which could only be treated by surgery can now be done endoscopically and this requires suitably trained medical staff. Consequently, there are demands from the medical and nursing professions to develop the role of the nurse endoscopist. This paper raises issues of concern to nurses who wish to undertake diagnostic endoscopy and suggests how the necessary skills and knowledge to gain competence can be obtained.

The nurse practitioner endoscopist. [Review] [18 refs]

Basnyat PS. West J. Davies P. Davies PS. Foster ME. *Annals of the Royal College of Surgeons of England*. 82(5):331-2, 2000 Sep.

<http://europepmc.org/articles/PMC2503642/pdf/annrcse01627-0043.pdf>

Most upper and lower gastrointestinal endoscopies in Great Britain and Ireland are performed by surgeons, physicians or radiologists. Since the introduction of the 'nurse endoscopist' by the British Society of Gastroenterology Working Party, few centres in the UK have adopted this policy. We have reviewed the anxiety about nurse practitioner endoscopists among patients and physicians. Finally, the role and future of the nurse practitioner endoscopist in the UK is discussed. [References: 18]

Training in radial EUS: what is the best approach and is there a role for the nurse endoscopist?.

Meenan J. Anderson S. Tsang S. Reffitt D. Prasad P. Doig L. *Endoscopy*. 35(12):1020-3, 2003 Dec.

BACKGROUND AND STUDY AIMS: The aim of this study was to determine the relative contribution of previous endoscopic experience, case observation, and hands-on experience to skill acquisition in radial EUS.

METHODS: In EUS trainees, four senior gastroenterology fellows, and a nurse endoscopist, the ability to reproduce set views from the mediastinum, stomach, and duodenum was assessed. Points were ascribed to static and dynamic stations and to the use of console controls.

RESULTS: Trainees observed 55 - 170 cases and conducted 25 - 124 examinations. Competence was demonstrated after performing approximately 25 examinations in the mediastinum, 35 examinations in the stomach, and 78 examinations in the duodenum. The number of previous examinations conducted correlated with the ability to scan the duodenum

($P < 0.01$). Observation of 100 or more further procedures early in training did not accelerate learning. The nurse Endoscopist showed a comparable degree of competence in mediastinal scanning to that of the other trainees after performing a similar number of examinations.

CONCLUSIONS: Proficiency in radial endosonography is greatly influenced by the numbers of examinations performed. Observing large numbers of cases early in training does not appear to translate into competence. A background in advanced therapeutic endoscopy is not a prerequisite for acquiring endoscopic ultrasound skills. Nurse Endoscopists may be expected to train successfully in mediastinal imaging at the same pace as senior gastroenterology fellows.

Audit of a nurse Endoscopist based one stop dyspepsia clinic.

Melleney EM. Willoughby CP. *Postgraduate Medical Journal*. 78(917):161-4, 2002 Mar.

As a response to the UK Health Department's "two week cancer wait" initiative a one stop dyspepsia clinic based on a nurse Endoscopist was introduced, and the first 100 cases attending this clinic have been audited. After referral on a purpose designed form, patients were assessed by a gastroenterologist and then investigated at the same visit--where possible and appropriate--by endoscopy or ultrasound scan. All endoscopies were performed by a trained nurse specialist. Of the 100 patients, 84 were gastroscoped the same day and 11 had an ultrasound scan. Inappropriate tests were avoided in 16% of referrals. The commonest endoscopic diagnoses were minor oesophageal or gastroduodenal inflammation (64% of gastroscopies). Only six oesophageal or gastric cancers were found—all at an advanced stage and three further malignancies were diagnosed. Only a minority (12%) of the patients with "alarm symptoms" had cancer. The waiting time for an appointment rose progressively during the first six months of the clinic. The system was popular with patients as most of them (70%) were dealt with at a single hospital attendance. Basing the endoscopy practice on a trained nurse specialist not only facilitated the creation of the service by maximising the use of scarce resources, but also improved communication and overall management of patients.

Nurse Endoscopist training: the next step.

Sprout J. *Gastroenterology Nursing*. 23(3):111-5, 2000 May-Jun.

Nurses have been successfully performing flexible sigmoidoscopy since the early 1970s. There are numerous studies, in both medical and nursing literature, indicating that nurses can perform this traditional physician role safely and efficiently. Both the American Society of Gastroenterology Endoscopists (ASGE) and Society of Gastroenterology Nurses and Associates (SGNA) have endorsed this practice. Programs appropriate for training the nurse Endoscopist, however, have not been defined. Although similarities exist in the literature about how nurses and other non-physician Endoscopists are trained, there are also many discrepancies. If nurses are to take a proactive stance in overseeing nursing practice, objective criteria and clinical competencies need to be established. This is the next step in establishing standard acceptance by the medical community and public.

Accuracy of polyp detection by gastroenterologists and nurse Endoscopists during flexible sigmoidoscopy: a randomized trial.

Schoenfeld P. Lipscomb S. Crook J. Dominguez J. Butler J. Holmes L. Cruess D. Rex D. *Gastroenterology*. 117(2):312-8, 1999 Aug.

BACKGROUND & AIMS: The use of nurse Endoscopists to perform flexible Sigmoidoscopy is expanding, increasing the availability of colorectal cancer screening. However, the effectiveness of this practice has not been studied in randomized trials. The aim of this trial was to examine the miss rate of polyps, the depth of sigmoidoscope insertion, and the incidence of complications during flexible Sigmoidoscopy performed by nurse Endoscopists and by gastroenterologists.

METHODS: Three hundred twenty-eight patients were randomized to undergo screening flexible Sigmoidoscopy performed by a nurse Endoscopist or by a gastroenterologist. Frequency of missed polyps was determined by repeat Sigmoidoscopy, performed by a gastroenterologist blinded to the identity of the first Endoscopist. Multiple logistic regression analysis identified characteristics associated with missed polyps.

RESULTS: Gastroenterologists and nurse Endoscopists had equivalent miss rates for adenomatous polyps (20% vs. 21%, respectively; $P = 0.91$). No complications occurred in any patient. Gastroenterologists inserted the sigmoidoscope further than nurse Endoscopists (61 vs. 55 cm, respectively; $P < 0.00001$). Polyp location in the descending colon (odds ratio, 4.1; 95% confidence interval, 1.7-10.3) was highly associated with missed polyps.

CONCLUSIONS: No differences in detection of adenomatous polyps or frequency of complications were found. These data suggest that experienced nurse Endoscopists may perform screening flexible Sigmoidoscopy as safely and as effectively as gastroenterologists.

The role of the gastroenterology nurse in colorectal cancer screening. [Review] [13 refs]

Smith PA. *Gastroenterology Nursing*. 22(5):217-20, 1999 Sep-Oct.

This article provides an overview of the incidence of colorectal cancer in the United States and describes personal and familial factors that increase a person's risk for developing colorectal cancer. Recommendations for each classification of patient risk group are outlined. An in depth review of screening justification for colorectal cancer is presented as well as the American Cancer Society's recommendations for screening. Descriptions of and recommended frequency for faecal occult blood tests, flexible Sigmoidoscopy, double contrast barium enema, and colonoscopy are explained as well as the advantages and disadvantages of each test. The role and fundamental responsibilities of the nurse Endoscopist are presented based on the author's personal experience. Factors that influence patient compliance are also described, including the role of the gastroenterology nurse in facilitating colorectal cancer screening. [References: 13]

Colonoscopy training for nurse endoscopists: a feasibility study.

Koornstra JJ. Corporaal S. Giezen-Beintema WM. de Vries SE. van Dullemen HM. *Gastrointestinal Endoscopy*. 69(3 Pt. 2):688-95, 2009 Mar.

BACKGROUND: Screening by using colonoscopy is recommended in many countries to reduce the risk of death from colorectal cancer. Given the limited supply of medical Endoscopists, nurse Endoscopists may represent an economic alternative.

OBJECTIVE: To develop a colonoscopy training program for nurse Endoscopists and to evaluate the feasibility of this program.

DESIGN: Two nurse Endoscopists and 1 first-year GI fellow were enrolled in a colonoscopy training protocol, including computer-simulator training, flexible sigmoidoscopies, and colonoscopies under direct supervision.

SETTING: A single-center prospective study.

PATIENTS: The first 150 complete colonoscopies of each trainee Endoscopist were evaluated and compared with 150 colonoscopies performed by an experienced Endoscopist.

MAIN OUTCOME MEASUREMENTS: Objective criteria for competency were diagnostic accuracy, cecal-intubation rate, cecal-intubation time, the need for assistance, and complications. Subjective criteria included patient satisfaction, pain, and discomfort scores.

RESULTS: The nurse Endoscopists' unassisted cecal-intubation rate was 80% for the first 25 procedures, gradually increasing in subsequent cases to 96% for the last 25 procedures. The mean cecal-intubation time at the end of the training period was 10 minutes. Cecal-intubation rates and times were comparable between the nurse trainees and the fellow. The patients reported low degrees of pain and discomfort, and high satisfaction scores, irrespective of the type of Endoscopist. Diagnostic accuracy of the trainees was good. The complication rate was 0.3%.

LIMITATION: Nonrandomized design.

CONCLUSIONS: This pilot study suggests that nurses can be trained to perform colonoscopy in an effective manner, with results similar to a GI fellow. The learning curve indicated that 150 procedures are required before independent examinations are attempted.

Nurse led flexible sigmoidoscopy in primary care--the first thousand patients.

Maruthachalam K. Stoker E. Nicholson G. Horgan AF. *Colorectal Disease*. 8(7):557-62, 2006 Sep.

OBJECTIVES: Secondary care Trusts have traditionally been providers of flexible Sigmoidoscopy services in the United Kingdom. The aim of this study was to establish a Nurse-led flexible Sigmoidoscopy clinic that would provide a patient orientated service in a primary care setting.

PATIENTS AND METHODS: A protocol driven flexible Sigmoidoscopy clinic was established in a primary care setting. The first thousand patients who underwent flexible Sigmoidoscopy at the community clinic were prospectively studied.

RESULTS: A nurse Endoscopist performed 1002 procedures on 1000 patients. Median time from referral to flexible Sigmoidoscopy was 35 days (Range 1-180 days). Two hundred and twenty-two (22%) patients were diagnosed with significant colonic pathology including 25 (2.5%) patients with colorectal cancer. Median time from referral to histological diagnosis of colorectal cancer was 26 days (range 7-87 days). No complications were encountered. Patients who required further follow-up were referred to a Consultant led (29%) or Nurse led clinic (5%) in secondary care. Patient satisfaction as assessed by postal questionnaire indicated that 447 (99%) patients were satisfied with the service.

CONCLUSIONS: A community endoscopy clinic can provide a safe and effective flexible sigmoidoscopy service with high levels of patient satisfaction. Nurse Endoscopists can

extend their role in primary care with adequate training and support from secondary care hospitals.

Endoscopy by non-physicians

Guideline *Gastrointestinal Endoscopy* Volume 69, No. 4 : 2009 767-

http://www.asge.org/uploadedFiles/Publications_and_Products/Practice_Guidelines/endo%20non%20physicians%281%29.pdf

ESGENA Statement on Nurse Endoscopists

Christiane Neumann, Diane Campbell, Ulrike Beilenhoff, Michael Ortmann. European Society of Gastroenterology and Endoscopy Nurses and Associates

http://www.esgena.org/assets/downloads/pdfs/general/esgena_statement_endo_nurses.pdf

Is there a role for nurse Endoscopists in New Zealand?

Evidence from overseas shows nurses are as good as doctors at performing endoscopy procedures. But are nurses in New Zealand willing to take on the role, should a training programme become available?

<http://www.thefreelibrary.com/Is+there+a+role+for+nurse+endoscopists+in+New+Zealand%3F+Evidence+from...-a0276720731>

Nurses working in GI and endoscopic practice: a review

Els M. L. Verschuur, MSc, Ernst J. Kuipers, MD, PhD, Peter D. Siersema, MD, PhD (*Gastrointestinal Endoscopy* 2007;65:469-79.)

<http://camerapil.eu/verpleegkundig/documenten/Gastrointest%20Endosc%2004-07%20Verschuur.pdf>

In total, 19 studies were identified that evaluated performance and participation of nurses in GI and endoscopic practice. Of these, 3 were randomized trials on the performance of nurses in flexible Sigmoidoscopy (n = 2) and upper endoscopy (n = 1). Fourteen nonrandomized studies evaluated performance in upper endoscopy (n = 2), EUS (n = 1), flexible Sigmoidoscopy (n = 7), capsule endoscopy (n = 2), and percutaneous endoscopic gastrostomy placement (n = 2). In all studies, it was found that nurses accurately and safely performed these procedures. Two further studies demonstrated that nurses adequately managed follow-up of patients with Barrett's oesophagus and inflammatory bowel disease. Four of the 19 studies showed that patients were satisfied with the type of care nurses provided. Finally, it was suggested that costs were reduced if nurses performed a Sigmoidoscopy and evaluated capsule endoscopy examinations compared with physicians performing these activities. The findings of this review support the involvement of nurses in diagnostic endoscopy and follow-up of patients with chronic GI disorders. Further randomized trials, however, are needed to demonstrate whether this involvement compares at least as favourably with gastroenterologists in terms of medical outcomes, patient satisfaction, and costs.

Evaluation Of The Non-Medical Endoscopy Workforce Development Project

Kay Currie, David Cochrane, Marty Wright School Of Nursing, Midwifery & Community Health

http://www.nes.scot.nhs.uk/media/198248/evaluation_of_non-medical_endoscopy_workforce_development_project_oct_2008.pdf

A model for collaborative endoscopy research

Gastrointestinal Nursing vol 9 no 5 June 2011

http://www.internurse.com/cgi-bin/go.pl/library/article.cgi?uid=84525;article=gn_9_5_23_27;format=pdf

The Northern Region Endoscopy Group (NREG) is a region wide endoscopy research network, which aims to bring together local enthusiastic Endoscopists as one research group and provide the opportunity to develop and participate in high quality, clinically meaningful research. In this article, Colin Rees, Carolyn Davison, Clare Westwood and Matt Rutter describe how the NREG works, its achievements and the contributions that endoscopy nurses and nurse Endoscopists have had to the group.

E Redondo-Cerezo and J García-Cano *Gut*. 2004 March; 53(3): 469.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1773981/pdf/gut05300469.pdf>

Endoscopy by non-physicians

Elaine R Gossman *Can J Gastroenterology*. 2007 January; 21(1): 17–18.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2656625/pdf/cjg21017.pdf>

Guidelines for the practice of endoscopy are developed by the American Society for Gastrointestinal Endoscopy using an evidence based methodology. A literature search is performed to identify relevant studies on the topic. Each study is then reviewed for both methodology and results. Controlled clinical trials are emphasized, but information is also obtained from other study designs and clinical reports. In the absence of data expert opinion is considered. When appropriate, the guidelines are submitted to other professional organizations for review and endorsement. As new information becomes available revision of these guidelines may be necessary.

These guidelines are intended to apply equally to all who perform gastrointestinal endoscopic procedures, regardless of specialty or location of the service. Practice guidelines are meant to address general issues of endoscopic practice. By their nature they cannot encompass all clinical situations. They must be applied in the appropriate context for an individual patient. Clinical considerations may justify a course of action at variance to these recommendations.

The promises and perils of nurse-led flexible Sigmoidoscopy screening

Paul Moayyedi *Can J Gastroenterol*. 2007 May; 21(5): 280–282.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2657707/pdf/cjg21280.pdf>

Public awareness of the need for colorectal cancer (CRC) screening is growing thanks to media personalities such as Katie Couric (1), and other publicity drives. Many Canadian provinces have responded to this by developing CRC screening programs. The model most provinces have considered is the faecal occult blood test (FOBT), in line with recommendations by Health Canada (2). These initiatives are welcomed, although FOBTs only reduce CRC mortality by 15% to 25%, and screening programs that prevent CRC, as well as detect the disease early, may be of greater benefit. The current alternative screening modalities are flexible sigmoidoscopy (FS) and colonoscopy (3). FS detects adenomatous polyps and malignancy up to the splenic flexure, where two-thirds of all CRCs are located. Therefore, the removal of adenomatous polyps should reduce the incidence of CRC. FS is currently being evaluated in three randomized controlled trials (RCTs) (4–6) assessing almost 360,000 patients. The stage that CRC is detected is earlier than seen with

symptomatic cancers (4–6). The impact of FS on CRC incidence and mortality during follow-up will be reported in the near future. The advantage of FS is that the bowel preparation required is less rigorous, and the procedure is easier and quicker to perform than a colonoscopy, with no sedation required. On the other hand, FS will potentially miss right-sided lesions but colonoscopy views the whole colon; thus, colonoscopy is probably the most effective strategy. However, the cost of offering colonoscopy as a screening program is prohibitive in the Canadian healthcare setting. FS would also be difficult to deliver in Canada because there are insufficient clinicians to provide the service (7) and their time would be expensive. FS is relatively straightforward to perform, and if a less expensive section of the healthcare workforce could deliver this service then FS could be a viable screening option.

Christine Norton and Michael A Kamm *J R Soc Med.* 2002 July; 95(7): 331–335.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1279936/pdf/0950331.pdf>

The nurse Endoscopists contribution to service delivery.

Douglass, A., A. Powell, and M. Bramble, *Gastrointestinal Nursing*, 2004. 2(8): p. 21-24.

Nurses working in GI and endoscopic practice: a review

Verschuur, E.M., E.J. Kuipers, and P.D. Siersema. *Gastrointestinal Endoscopy*, 2007. 65(3): p. 469-79.

BACKGROUND: Over the last 10 years, nurses increasingly perform tasks and procedures that were previously performed by physicians.

OBJECTIVE: In this review, we investigated what types of GI care and endoscopic procedures nurses presently perform and reviewed the available evidence regarding the benefits of these activities.

DESIGN: Review of published articles on nurses' involvement in GI and endoscopic practice.

RESULTS: In total, 19 studies were identified that evaluated performance and participation of nurses in GI and endoscopic practice. Of these, 3 were randomized trials on the performance of nurses in flexible Sigmoidoscopy (n = 2) and upper endoscopy (n = 1). Fourteen nonrandomized studies evaluated performance in upper endoscopy (n = 2), EUS (n = 1), flexible Sigmoidoscopy (n = 7), capsule endoscopy (n = 2), and percutaneous endoscopic gastrostomy placement (n = 2). In all studies, it was found that nurses accurately and safely performed these procedures. Two further studies demonstrated that nurses adequately managed follow-up of patients with Barrett's oesophagus and inflammatory bowel disease. Four of the 19 studies showed that patients were satisfied with the type of care nurses provided. Finally, it was suggested that costs were reduced if nurses performed a Sigmoidoscopy and evaluated capsule endoscopy examinations compared with physicians performing these activities.

CONCLUSIONS: The findings of this review support the involvement of nurses in diagnostic endoscopy and follow-up of patients with chronic GI disorders. Further randomized trials, however, are needed to demonstrate whether this involvement compares at least as favourably with gastroenterologists in terms of medical outcomes, patient satisfaction, and costs.

Cost effectiveness of nurse delivered endoscopy: findings from randomised multi-institution nurse endoscopy trial (MINuET).

Richardson, G., et al., *BMJ*, 2009. 338: p. b270.

Gastrointestinal endoscopy is a common clinical procedure, and its use is increasing over time. To meet the increasing demand, endoscopy is becoming widely practised by nurses in the United Kingdom. There has been little evaluation of the cost effectiveness of procedures undertaken by nurses rather than by doctors. Consideration of the economics of diagnostic procedures can be complex as the cost effectiveness of the consequent treatment of any discovered condition needs to be considered. Economic evaluations of screening tests often estimate a “cost per condition detected,” which is determined partly by the sensitivity and specificity of the test. We focused not on the cost effectiveness of endoscopy itself but on whether or not there is a difference in endoscopy delivered by doctors or nurses. We took a pragmatic approach to the evaluation of this complex intervention, in which we assumed that it is the method of delivery (nurse or doctor) that is under consideration, not the intervention itself. We assessed relative cost effectiveness as part of a pragmatic randomised controlled trial undertaken in the UK. The clinical study, of which this economic evaluation was part, was a pragmatic randomised trial in 23 hospitals in England, Scotland, and Wales.⁶ A total of 1888 patients were allocated at random to either a doctor or a nurse for upper gastrointestinal endoscopy or flexible Sigmoidoscopy. We collected health outcome measures at baseline, one day, one month, and one year after the intervention. Further details of the trial conduct, and patient sample and characteristics, are described elsewhere.³ We take a UK National Health Service (NHS) perspective with effects assessed in terms of health gains measured in QALYs. As the time horizon of the study was one year, discounting was not appropriate. We did not extrapolate beyond one year as the study was not powered to detect differences between groups in factors influencing long term health outcomes. We used Bayesian analysis in which the parameters have probability distributions. Thus it was possible, and appropriate, to compute the probability of an event being effective or cost effective.

We used a randomised trial to compare the cost effectiveness of doctors and nurses performing endoscopy. There were missing data both on resource use and patients’ utility. While imputing these data is not ideal, the results of that imputation are robust, as analysis limited to complete cases yields similar results. The study lasted only one year, though there is potential for later effects in this population—for example, missed diagnoses. A longer trial would be ideal, but the similarity of immediate and delayed complications between nurses and doctors suggests there is little difference in their long term performance.

Nurse Endoscopists might not have reached “steady state” in experience and confidence. As their experience grows, they might become more confident and therefore order fewer follow-up tests. The higher frequency of tests and interventions in the nurse group, however, might reflect intrinsic differences between the professions in terms of attitudes to risk. The choice of skill mix in endoscopy might be influenced by factors other than cost effectiveness, such as affordability, staff shortages, and access to healthcare, all of which enter into policy decisions. At the start of this trial there was concern about shortages of medical staff but, after the expansion of medical schools, concerns shifted to surpluses and potential unemployment of junior doctors.¹⁷ Endoscopy delivered by nurses, in the current state of their training and experience, is unlikely to be cost effective compared with endoscopy delivered by doctors. As nurses grow in experience over time it will be important to continue to monitor both effectiveness and cost effectiveness

Nurse endoscopists perform colonoscopies according to the international standard and with high patient satisfaction.

van Putten, P.G., et al., *Endoscopy*, 2012. 44(12): p. 1127-32.

BACKGROUND AND STUDY AIMS: Colonoscopy is increasingly performed by nurse endoscopists. We aimed to assess the endoscopic quality and patient experience of these procedures.

PATIENTS AND METHODS: This prospective multicentre study analysed 100 consecutive colonoscopies each for 10 trained nurse Endoscopists with respect to endoscopic quality and patient experience. Colonoscopies were performed under the supervision of a gastroenterologist, using the techniques and protocols of the participating hospitals. Patient experience was assessed using a questionnaire.

RESULTS: Most nurse Endoscopists were female (90%; median age 43 [range 35-49]). Before the start of the study, they had performed a median of 528 colonoscopies (range 208-2103). For the 1000 patients, mean age was 56 ± 15 years; 55% were women; and 96% were in class I or II according to the American Society of Anaesthesiologists' physical status classification system. Colonoscopies were performed for screening or surveillance in 42%; for symptomatic indications in 58% of patients. The unassisted cecal intubation rate was 94%; the mean withdrawal time was 10 ± 5 minutes. The adenoma detection rate was 26.7%. In 229 of the colonoscopies (23%), the nurse Endoscopists required assistance from the supervising gastroenterologist. The complication rate was 0.2%: one perforation and one cardiopulmonary complication. The questionnaire was completed by 734/1000 patients (73%) and of these 694/734 (95%) were satisfied with the endoscopic procedure. Among the respondents 530/734 (72%) had no specific preference for a physician or nurse Endoscopist, whereas 113/734 (15%) preferred a physician Endoscopist, and 91/734 (12%) preferred a nurse Endoscopist.

CONCLUSION: The nurse Endoscopists performed colonoscopies according to the internationally recognized quality standards and with high patient satisfaction.

Comparing Quality, Safety, and Costs of Colonoscopies Performed by Nurse vs Physician Trainees.

Massl, R., et al., *Clinical Gastroenterology and Hepatology*, 2014.

BACKGROUND & AIMS: We evaluated the quality and safety of colonoscopies performed by nurse and physician endoscopy trainees as well as the cost differences.

METHODS: We performed a study of 7 nurse and 8 physician (gastroenterology fellows) endoscopy trainees at 2 medical centres in the Netherlands from September 2008 through April 2012. At the beginning of the study, the subjects had no experience in endoscopy; they were trained in gastrointestinal endoscopy according to the regulations of the Dutch Society of Gastroenterology, performing a minimum of 100 colonoscopies. Each trainee then performed 135 consecutive colonoscopies (866 total by nurse trainees and 1080 by physician trainees) under supervision of a gastroenterologist; the colonoscopies were evaluated for quality and safety. We performed statistical analyses of data, assessing multilevel and cost minimization. The mean age of the patients was 57 years, and about half were women in each group.

RESULTS: The endoscopic quality and safety were comparable between nurse and physician trainees. Overall rates of cecal intubation were 95% for nurses and 93% for physicians ($P = .38$), including procedures that required assistance from a supervisor; mean withdrawal times were 10.4 and 9.8 minutes, respectively ($P = .44$). Each group detected 27% of adenomas and had a 0.5% rate of complication. In both groups, the rates of unassisted cecal intubation gradually increased with the number of colonoscopies performed,

from 70% for nurses and 74% for physicians at the beginning to 89% and 86%, respectively, at the end of the assessment period. Using a strategy in which 1 gastroenterologist supervises 3 nurses, the personnel costs decreased from \$64.65 to \$54.58.

CONCLUSIONS: In a supervised setting, nurse Endoscopists perform colonoscopies according to quality and safety standards that are comparable with those of physician Endoscopist and can substantially reduce costs.

Referring patients to nurses: outcomes and evaluation of a nurse flexible sigmoidoscopy training program for colorectal cancer screening.

Dobrow, M.J., et al., *Can J Gastroenterology*, 2007. 21(5): p. 301-8.

Colorectal cancer is a significant health burden. Several screening options exist that can detect colorectal cancer at an early stage, leading to a more favourable prognosis. However, despite years of knowledge on best practice, screening rates are still very low in Canada, particularly in Ontario. The present paper reports on efforts to increase the flexible Sigmoidoscopy screening capacity in Ontario by training nurses to perform this traditionally physician-performed procedure. Drawing on American, British and local experience, a professional regulatory framework was established, and training curriculum and assessment criteria were developed. Training was initiated at Princess Margaret Hospital and Sunnybrook and Women's College Health Sciences Centre in Toronto, Ontario. (During the study, Sunnybrook and Women's College Health Sciences Centre was deamalgamated into two separate hospitals: Women's College Hospital and Sunnybrook Health Sciences Centre.) Six registered nurses participated in didactic, simulator and practical training. These nurses performed a total of 77 procedures in patients, 23 of whom had polyps detected and biopsied. Eight patients were advised to undergo colonoscopy because they had one or more neoplastic polyps. To date, six of these eight patients have undergone colonoscopy, one patient has moved out of the province and another patient is awaiting the procedure. Classifying the six patients according to the most advanced polyp histology, one patient had a negative colonoscopy (no polyps found), one patient's polyps were hyperplastic, one had a tubular adenoma, two had advanced neoplasia (tubulovillous adenomas) and one had adenocarcinoma. All these lesions were excised completely at colonoscopy. Overall, many difficulties were anticipated and addressed in the development of the training program; ultimately, the project was affected most directly by challenges in encouraging family physicians to refer patients to the program. As health human resource strategies continue to evolve, it is believed that lessons learned from experience make an important contribution to the knowledge of how non-traditional health services can be organized and delivered.

Upper gastrointestinal endoscopy performed by nurses: scope for the future?

Smale, S., et al., *Gut*, 2003. 52(8): p. 1090-4.

Background: Previous researchers have shown that non-medical Endoscopists can perform lower gastrointestinal endoscopy as safely and effectively as medical staff. However, it is not known if upper gastrointestinal endoscopy performed by medical and non-medical Endoscopists in clinical practice yields similar results in terms of performance, patient discomfort, and satisfaction.

Aim: To determine differences in the yield of diagnosis for significant disease during upper gastrointestinal endoscopy performed by nurse and medical Endoscopists and to measure patient discomfort, satisfaction, and attitudes towards future endoscopy.

Patients: This two part study included 3009 patients in a retrospective analysis and 480 in a prospective study.

Methods: The first part of the study assessed indications for endoscopy, diagnoses, and procedures performed by medical and nurse Endoscopists. In a second prospective study, 480 patients were included to determine the association between Endoscopist type and sedation, patient anxiety, discomfort, satisfaction, and attitudes towards future sedation.

Results: No patient refused endoscopy by either a nurse or medical Endoscopist and there were no complications in either group. Nurses performed 1487 procedures and reported fewer endoscopies as “normal” than medical staff ($p=0.006$). Multivariate analysis showed that male sex, older age, inpatient status, dysphagia, and gastrointestinal bleeding, but not Endoscopist type, were all associated with significant disease. In relation to discomfort and satisfaction, a similar proportion of patients received sedation in both groups ($p=0.81$). There were no differences in pre-procedure anxiety ($p=0.61$), discomfort during intubation ($p=0.97$), discomfort during examination ($p=0.90$), or post-procedure examination rating ($p=0.79$) in patients examined by medical or nurse endoscopists.

Conclusion: Experienced nurses perform routine diagnostic gastroscopy safely in everyday clinical practice and with as little discomfort and as much patient satisfaction as medical staff.

Position statements

New Zealand

The New Zealand Society of Gastroenterology (NZSG) supports the introduction of nurse Endoscopists in line with the recommendations of the Gastroenterology Health Workforce Review. Following publication of the gastroenterology health workforce review in 2011, the NZSG found in a survey of its members that more than half would support the appointment of nurse Endoscopists to perform diagnostic and therapeutic upper and lower endoscopies; and most are willing to train nurses to perform these procedures.[51]

“During its deliberations, the Gastroenterology Health Workforce Review Group recognised that in some countries, such as the United Kingdom, nurses have been trained to perform both diagnostic and therapeutic gastroscopy and colonoscopy. Subsequent studies have reported that nurses can be trained to the same technical skill level as their medical counterparts with regards to adequate completion of procedures, diagnosis, treatment and patient safety [51].”

United Kingdom (Wales)

The United Kingdom model for training and education of Endoscopists are based on Joint Advisory Group Gastrointestinal (JAG) guidelines as outlined by the Royal College of Gastroenterologists. In their position statement, the UK model states that nurses and advanced health professionals (AHPs) are well placed to undertake bowel cancer screening and some diagnostic endoscopies. It recognises that nurses and AHPs have good communication and counselling skills to inform those users within the service. It also recognises that nurses and AHPs are good at interpreting and following instructions; following the quality cycle through to audit; monitoring their own work; interpreting and using evidence based practice and using a holistic approach to care.

The training for a nurse Endoscopist is based on the training of the medical model but has additional training attached. Trainees in colonoscopy are required to have acquired basic endoscopic skills, usually by prior training in upper GI endoscopy. Trainees need to

understand appropriate techniques of patient preparation, the mechanics of the procedure and its indications, limitations and complications. Each trainee should complete a minimum of 100 procedures in one year and can demonstrate intubation skills in at least 50 per cent of procedures. The trainees are required to be competent in the techniques of hot biopsy, polypectomy and treatment of colonic bleeding. In addition trainees need to be familiar with balloon dilation of strictures and techniques to stop bleeding and treat angiodysplastic lesions. Further the JAG recommends that nurse Endoscopists training is the same as that for a medical Endoscopist and includes a recognised teaching course in endoscopy [52].

Europe

The European Society of Gastrointestinal Endoscopy (ESGE) developed a position statement with a working group with representation from Italy, France, the United Kingdom, Switzerland, Egypt and Germany. In addition online discussions with members from the entire community were undertaken during 2009 and 2010. The position statement specifies the minimum experience of colonoscopists. A minimum benchmark for annual screening examinations is set at 300 colonoscopies. A population-based study from Canada found that the risk of complications such as perforation and bleeding was increased threefold with colonoscopists who performed fewer than that threshold of 300 colonoscopies per year. The English NHS Bowel Cancer Screening Program set requirements of a minimum lifetime experience of 1000 examinations and a minimum of 150 screening colonoscopies per year [53].

The 2010 paper refers to colonoscopists, which encompasses advanced health practitioners – nurses, as opposed to gastroenterologists alone. They emphasise that in the long term an experienced multi-skilled nurse or other professional working at an advanced practitioner level would be able to assist with colonic surveillance and diagnostic programs. The position statement also reiterates that ongoing support once training has been undertaken is fundamental for Nurses and advanced health practitioners [53].

United States

The recommendations from the American Society for gastrointestinal endoscopy [54] were:

- The performance of flexible Sigmoidoscopy for colorectal cancer screening by non-physician Endoscopists is supported when intensive training occurs by a certified Endoscopist.
- There are data to support the use of non-physician personnel to pre-read VCE when subsequent review occurs by a trained physician.
- There are insufficient data to support non-physician Endoscopists to perform colonoscopy and upper endoscopy.

It should be noted that an analysis was only undertaken of published literature from the United States of America and excluded international evidence (pg. 769 [54]).

Australia

The gastroenterology nursing practice in Australia (GENCA) maintains that registered nurses, educated and trained in the techniques of flexible endoscopy, may assume the responsibility of performing flexible endoscopy in an appropriate environment and with access to medical staff. GENCA recognises that this is an advanced nursing practice role and as such recommends that the Registered Nurse has or is working towards appropriate tertiary education, such as clinical Masters levels with Nurse Practitioner component or

Nurse Practitioner Masters, and is current Australian Credentialed Gastroenterology Nurse (ACGEN) [55].

Sample Position description: Nurse Endoscopist [56]

TITLE: Nurse Endoscopist

BAND: 8A

REPORTS TO: Senior Service Line Manager / Senior Matron Theatres and endoscopy

RESPONSIBLE TO: Lead Consultant for Endoscopy

ACCOUNTABLE TO: Director of Nursing

ROLE SUMMARY

Undertake diagnostic and therapeutic upper and lower GI endoscopy using advanced and specialist clinical skills in endoscopy as an independent autonomous practitioner in accordance with defined protocols. Working within endoscopy the post holder will identify the need for and request further investigations as appropriate and advise on further investigations as required. The post holder would provide regular endoscopy sessions and on a flexible basis so as to cover unfilled lists. The post holder will provide professional leadership by personal example and ensure the delivery of a high quality, patient centred service across Endoscopy services. Provide teaching and training of nurse Endoscopists and junior medical staff in line with JAG standards. The post holder will undertake the clinical validation of the endoscopy waiting lists. To lead on the unit's Global Rating Scale process and standards and have the ability to develop services, assist with achievement of JAG accreditation.

The nurse Endoscopist will act as the clinical expert and professional resource to the multi-professional team, patients and carers within their specialist service. This will include the management of a caseload of patients, as appropriate, including specialist clinics. His / her own working practice should be developed to a level whereby they can directly or indirectly influence all aspects of care and management of patients within the speciality. The post holder will ensure the delivery of high quality, clinically effective care, prioritising and utilising research and collaborating with colleagues in everyday practice. The role involves clinical leadership, working in partnership to enhance professional standards of care across the speciality. The post holder will review, assess and consent inpatients requiring Endoscopy. Be involved in developing endoscopy pathway development and review of departmental policies and procedures in line with BSG and GRS requirements.

KEY RESPONSIBILITIES

1 Patient Care

- 1.1 Perform upper and lower gastrointestinal endoscopy according to local and national protocols, as an independent autonomous practitioner.
- 1.2 Administer conscious sedation/local anaesthesia within agreed protocols to patients requiring Endoscopy. Identify abnormal GI pathology, perform biopsies, photographs and complete pathology requests as required.
- 1.3 Assess individuals, families and populations holistically using a range of different methods, some of which may not be usually exercised by nurses such as physical assessment and history taking, ordering and interpreting diagnostic tests or advanced health needs assessments.

- 1.4 Contribute to the development of pathways and protocols that are in place to enhance the patient experience in line with local and national agendas e.g. Essence of Care, Clinical Governance.
- 1.5 Contribute to ensure all appropriate support and action is taken to enhance the environment and quality of care provided to patients and relatives across the department.
- 1.6 Ensure robust clinical leadership within the sphere of responsibility and accountability.
- 1.7 Perform advanced and specialised clinical skills in assessment, diagnosis and treatment of Endoscopy patients to enhance the patient/carer experience.
- 1.8 Perform diagnostic and therapeutic interventions as per agreed competency level, as agreed by the clinical lead for endoscopy, by DOPS monitoring and continual assessment.
- 1.9 Record all episodes of endoscopy related procedures on the National JAG Endoscopy Training System (JETS) by using the electronic portfolio for the 'National Nurse Endoscopist Programme' (NNEP).
- 1.10 Undertake endoscopy procedures and be aware of the associated responsibilities and accountabilities. Clinical decision making skills and legal accountability must be understood together with the principles of precarious liability.

2. **Clinical Role:**

- 2.1 Work within agreed protocols and patient group directives for administration of relevant drugs for appropriate endoscopy procedures.
- 2.2 Perform therapeutic procedures in accordance with agreed clinical protocols and clinical governance approval from appropriate directorates.
- 2.3 Collect, collate, evaluate and report information, maintaining accurate patient records in line with clinical governance and risk management.
- 2.4 Involve patients and carers/relatives in the planning and delivery of care and development of services to enhance the patient/care experience.
- 2.5 Use advanced communication skills in a variety of settings.
- 2.6 Develop clinical pathways and protocols, to operate at departmental, Trust level and beyond, to inform diagnosis and treatment, utilising evidence based practice throughout the processes and the delivery of care.
- 2.7 Understand and implement the principles of informed consent and perform relevant consent procedures for approved endoscopy interventions.
- 2.8 Train nurse Endoscopists and junior medical staff in line with JAG standards.
- 2.9 Using NICE / BSG Guidelines for surveillance endoscopy procedures, clinically validate all planned endoscopy referrals 3 months prior to the planned procedure date against the latest guidance, in accordance with GRS standards for clinical quality.
- 2.10 Maintain adequate patient documentation to NMC requirements for all patients seen and advice given in any practice setting and contribute to clinical activity/data collection as required. Follow local and national policies, where appropriate,

undertake to prescribe for patients in their care, adhering to the Queen Elizabeth Hospital King's Lynn Trust (QEHL) and Nursing and Midwifery Council (NMC) guidance by fulfilling the role of a non-medical independent or supplementary prescriber in line with the Chief Nursing Officer's 10 key roles – NHS Plan (Department of Health (DH), 2000)

3 Management Role:

- 3.1 Initiate, lead and contribute to developing strategies to promote and improve Endoscopy services, working with the endoscopy management team.
- 3.2 Evaluate service delivery, identifying areas within the service needing improvement and initiate change. Be an active member of the endoscopy users group and have responsibility for designated audits.
- 3.3 Envisage future service/patient needs and take a lead in developing practice/services as appropriate.
- 3.4 Have their own 6 lists a week working flexibly and in addition will back fill lists during times of other Endoscopists' absence.
- 3.5 Demonstrate an awareness of political/national agendas in own field of practice, e.g. The NHS Plan at a Local/Regional/National level and take a lead in their implementation.
- 3.6 Recognise ethical and legal issues, which have implications for nursing practice and take a lead in ensuring appropriate action.

4 Education & Development

- 4.1 Identify own learning needs, plan, implement and evaluate programmes of education to meet identified need.
- 4.2 Address specific health targets e.g. cancer waits related to own area of practice through education.
- 4.3 Ensure own compliance with regards to mandatory training requirements.
- 4.4 Ensure minimal numbers for JAG accreditation are performed, ensure JAG and GRS key performance indicators are in line with recommended minimal standards.
- 4.5 Provided support and education to associated staff and other agencies as a clinical expert, in particular relation to Endoscopy services, including adherence to policies and guidelines.
- 4.6 Have involvement and responsibility for the endoscopy department input into the National endoscopy nursing training (GIN) electronic portfolio.

5 Clinical Governance

- 5.1 Responsible for leading on, driving and maintaining the Endoscopy Unit's Global Rating Scale (GRS) quality programme by developing, implementing and monitoring an action plan to increase quality within Endoscopy which can be reflected in improved GRS ratings. Aim for the Unit to be A classed in all areas.
- 5.2 Work closely with the Clinical Lead, Directorate Manager and Endoscopy Unit Manager in achieving improved GRS Scores sufficient to achieve Joint Advisory

Group (JAG) accreditation. Regularly update the Clinical Lead and Directorate Manager of progress against the action plan.

- 5.3 Work with Consultant Endoscopists in implementing new clinical systems and processes, including those for medical training to meet the GRS quality standards required for JAG accreditation process and for improved quality standards for the Unit.
- 5.4 Lead on assessing and improving the patient experience of endoscopy (including the consent process) Drive the departments bi annual patient surveys and the development and implementation of action plans resulting from the surveys. Present findings to the joint GI group and other relevant forums. Support the clinical lead/clinical governance lead in collection and analysing the Endoscopist quality and safety data and ensure anonymised data is fed back to individual Endoscopists. Work collaboratively with colleagues to develop effective documentation, pathways, protocols and guidelines for care. Demonstrate a commitment to share expertise and disseminate information.
- 5.5 Monitor adverse clinical events in the endoscopy unit and produce quarterly reports to the unit clinical lead. Prepare action plans in response with auditable outcomes. Include in this report incidence of hospital deaths within 30 days of an endoscopic procedure and all non-elective operations required within 8 days following the endoscopic procedure.
- 5.6 To ensure that clinical risks are identified relating to your own practice, reported and managed within the department and adhere to local clinical governance policies.
- 5.7 Identify and undertake, research, clinical audit and benchmarking in order to improve effectiveness of patient care within the department.
- 5.8 Disseminate research and audit findings through presentation to professional groups and publication.
- 5.9 Contribute to the development and implementation of policies, procedures and guidelines relevant to own area of work.
- 5.10 Promote people's equality, diversity and rights.

6 **Professional**

- 6.1 In accordance with professional code, maintain own professional development and competence to practice.
- 6.2 At all times ensure that one's own actions support and promote equality, diversity and the rights of patients, the public and colleagues within the healthcare environment.
- 6.3 With the MDT contribute, develop and implement clinical audits and research projects, ensuring that the findings are disseminated and good practice is shared across the Trust and beyond.
- 6.4 Respond to any requirements identified by the bi-annual key performance indicators monitored by the endoscopy lead clinician.