



**Health
Information
and Quality
Authority**

An tÚdarás Um Fhaisnéis
agus Cáilíocht Sláinte

Report of the evaluation of the use of resources in the national population- based cancer screening programmes and associated services

14 October 2009

Safer Better Care

About the Health Information and Quality Authority

The Health Information and Quality Authority (the Authority) is the independent Authority which has been established to drive continuous improvement in Ireland's health and social care services. The Authority was established as part of the Government's overall Health Service Reform Programme.

The Authority's mandate extends across the quality and safety of the public, private (within its social care function) and voluntary sectors. Reporting directly to the Minister for Health and Children, the Health Information and Quality Authority has statutory responsibility for:

Setting Standards for Health and Social Services – Developing person-centred standards, based on evidence and best international practice, for health and social care services in Ireland (except mental health services)

Monitoring Healthcare Quality – Monitoring standards of quality and safety in our health services and implementing continuous quality assurance programmes to promote improvements in quality and safety standards in health. As deemed necessary, undertaking investigations into suspected serious service failure in healthcare

Health Technology Assessment – Ensuring the best outcome for the service user by evaluating the clinical and economic effectiveness of drugs, equipment, diagnostic techniques and health promotion activities

Health Information – Advising on the collection and sharing of information across the services, evaluating information and publishing information about the delivery and performance of Ireland's health and social care services

Social Services Inspectorate – Registration and inspection of residential homes for children, older people and people with disabilities. Monitoring day- and pre-school facilities and children's detention centres; inspecting foster care services.

Foreword

Colorectal cancer is the second most frequently diagnosed cancer in men and women in this country. During the time period 2002 to 2005, an average of 2,040 new cases of colorectal cancer were diagnosed each year. During the same time period, an average of 925 people died each year from the disease. The incidence rates of colorectal cancer for men and women are among the highest in Europe and in Ireland we have the highest mortality rate for colorectal cancer for men in Western Europe. Recent evidence has indicated that the introduction of a population-based colorectal cancer screening programme in Ireland would result in an estimated lifetime reduction in the incidence (14.7%) and mortality (36.0%) from colorectal cancer.

In Ireland, there are established national population-based screening programmes for the detection of breast and cervical cancer. Currently, no such programme exists for colorectal cancer screening.

In June 2009, the Minister for Health and Children requested the Authority to:

- undertake an evaluation of the resources assigned to the current national population-based cancer screening programmes by the National Cancer Screening Service to identify efficiencies that may be achieved within the present models
- evaluate colonoscopy services and resources within the Health Service Executive (HSE) to examine how they could be used, or built upon.

The purpose of the evaluation was to assess the feasibility of commencing a national colorectal cancer screening programme from within existing resources.

The evaluation was conducted in a short time frame and therefore the findings and recommendations are at a relatively high level. They outline the possibilities for enabling the implementation of a national colorectal cancer screening programme – within a challenging fiscal climate – and indicate how existing resources can contribute to that end.

To assist it in performing this evaluation, the Authority established an Expert Advisory Group comprising of representation from relevant stakeholders including the Department of Health and Children, National Cancer Screening Service, National Cancer Control Programme, Health Service Executive, Irish Cancer Society, clinicians with specialist expertise, specialist nurses, patient representatives, National Cancer Registry Ireland and the Economic and Social Research Institute. An ethical commentary on the results was provided by Dr Deirdre Madden, Faculty of Law, University College Cork. Other organisations assisted us in conducting the evaluation, including a Focus Group nominated by the Health Service Executive. On behalf of the Authority, I would like to thank all of the individuals and organisations who provided support and assistance to us in conducting this evaluation.

As a result of this evaluation, a number of cost savings have been identified, within the existing National Cancer Screening Service programmes, that may be used to contribute to the resources and cost base of a new colorectal cancer screening programme. Additionally, a model for the implementation of that programme, drawing on existing capacities in the health system, has been developed and described. Cost savings in the existing programmes, together with an efficient model of operating the service, would provide the population with the maximal health gain at the least cost. And, in so doing, there is potential to not only provide a high quality national colorectal cancer screening programme, but also to drive improvements in the existing symptomatic colonoscopy services – together they should work in a complementary way to provide better services for our population.

The successful implementation of a national colorectal cancer screening programme will require a concerted drive, passion and commitment from the public, healthcare professionals, policy makers and other key stakeholders. In the challenges of our current environment where efficiencies and cost saving opportunities are increasingly relevant, it is important that we focus on the “can do” to make this happen. When successfully implemented, the programme will have a significant impact on saving lives in Ireland.



Dr Tracey Cooper

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Executive Summary

1 Introduction

In June 2009, the Minister for Health and Children requested the Authority to:

- undertake an evaluation of the resources assigned to the current national population-based cancer screening programmes by the National Cancer Screening Service to identify efficiencies that may be achieved within the present models
- evaluate colonoscopy services and resources within the Health Service Executive (HSE) to examine how they could be used, or built upon.

This was in order to assess the feasibility of commencing a national colorectal cancer screening programme from within existing resources. The aim of this evaluation was to maximise the overall population health gain and cancer-programme efficiencies across the selected range of available cancer screening technologies, while maintaining the quality and safety of those services

The terms of reference for the evaluation were to:

- (a) Examine the BreastCheck screening programme of the National Cancer Screening Service and assess whether efficiencies can be achieved without compromising the quality and safety of the service provided.
- (b) Examine the CervicalCheck screening programme of the National Cancer Screening Service and assess whether efficiencies can be achieved without compromising the quality and safety of the service provided.
- (c) Identify the resources assigned to colonoscopy services within the hospital system and assess the potential to apply, or build upon these resources effectively within a national colorectal cancer screening programme.
- (d) Advise on a model for a national colorectal cancer screening programme, including options for phased implementation as set out in the HTA of a population-based colorectal cancer screening programme in Ireland.
- (e) Advise how the national colorectal cancer screening programme can be run effectively in a quality assured manner within the existing resources available to the National Cancer Screening Service and the HSE.
- (f) Examine potential synergies between the current and proposed population-based cancer screening programmes with a view to maximising and optimising efficiencies.

The time frame for conducting the project was four months. In this time frame, it was not possible to perform a comprehensive analysis of all aspects of the services evaluated. Therefore, the findings and recommendations contained within this report are at a relatively high level. They indicate the possibilities for enabling the implementation of a national colorectal cancer screening programme – within a challenging fiscal climate – and indicate how existing resources can contribute to that end.

2 Background

Colorectal cancer is the second most frequently diagnosed cancer in both men and women. Between 2002 and 2005, an average of 2,040 new cases of colorectal cancer were diagnosed each year in Ireland. During the same time period, an average of 925 people died from the disease each year in Ireland. The incidence rates of colorectal cancer for men and women are among the highest in Europe, and Ireland has the highest mortality rate for colorectal cancer for men in Western Europe.

In Ireland, there are established national population-based screening programmes for the detection of breast and cervical cancer. Currently, no such programme exists for colorectal cancer screening.

On 17 June 2009, the Authority published a report entitled *Health technology assessment (HTA) of a population-based colorectal cancer screening programme in Ireland*. On the same day, the National Cancer Screening Service (NCSS) also published a report, *Recommendations for a colorectal cancer screening programme in Ireland*.^{1,2}

The Authority's report concluded that a population-based screening programme for colorectal cancer, based on biennial faecal immunochemical testing (FIT), in individuals aged 55 to 74 years, would be highly cost-effective. This strategy would result in an estimated lifetime reduction in the incidence (14.7%) and mortality (36.0%) from colorectal cancer in Ireland. In addition to screening, increased resource requirements in the first 10 years of a programme would include colonoscopy, computerised tomography (CT) colonography, pathology services, and surgeries for diagnosed cancers.

The NCSS's report, *Recommendations for a colorectal cancer screening programme in Ireland*, described a business model upon which the proposed screening service could be developed. It recommended that four screening centres, each with two endoscopy suites, would be initially required to provide the necessary 11,000 to 12,000 colonoscopies per year for immediate national implementation of the programme.

The pre-implementation costs of this model would be €1 million in year one and €6 million in year two. The operating costs in the first full year of operation were estimated at €15 million. In addition to the total operating costs, the capital cost estimate for developing four screening centres was estimated at €13 million to €14 million.

Following publication of these two reports, the Minister for Health and Children requested the Authority to undertake this evaluation.

3 Methodology

This evaluation was conducted using the principles of health technology assessment (HTA) combined with a value for money review of the existing resources, in order to assess the best use of resources for the maximum patient outcomes. In summary:

- an expert advisory group was established
- an evaluation team was appointed (comprising of internal staff and external support)
- a literature review of national and international screening programmes was conducted
- a series of documents received from relevant parties was reviewed and a survey of hospitals providing colonoscopy services was performed
- a focus group to discuss the models for colorectal cancer screening implementation was conducted
- an efficiency review of existing services was conducted
- a wide range of stakeholder meetings was conducted.

4 Review of National and International Programmes

In 2003, the European Union (EU) Council of Health Ministers unanimously adopted a recommendation on cancer screening.¹² Although the Council recommendation is not legally binding on member states, it has widespread political support in the EU. The recommendation is that member states should adopt population-based screening programmes to prevent cervical, breast and colorectal cancer.

In Ireland, established programmes for screening of breast cancer and cervical cancer have been developed over a number of years into population-register based call/re-call systems.

Having reviewed the national and international evidence-base for cancer screening programmes, the evaluation concluded that:

- the age ranges and screening intervals adopted in the current population-based cervical and breast cancer screening programmes in Ireland would appear to be consistent with the international evidence base.

The current evidence points to the effectiveness of introducing a population-based colorectal cancer screening programme in Ireland. Such a programme would be expected to bring significant benefits to the population in terms of reduced incidence of the disease and mortality, if it is appropriately constructed and if it meets its targets in terms of uptake.

5 The National Cancer Screening Service

Since the establishment of the National Cancer Screening Service (NCSS), there has been significant development of cancer screening services in Ireland. Expansion of BreastCheck, the national breast cancer screening programme, has taken place throughout 2007 and 2008, including the opening of two regional centres in Cork and Galway, and is expected to be available in all counties by October 2009. The NCSS has also been responsible for the establishment of the national cervical screening programme. The interim cervical cancer screening programme in the mid-west ceased in September 2008, and was replaced by CervicalCheck – the National Cervical Screening Programme. A call/re-call structure was introduced in September 2009. The development of the NCSS cancer screening services since 2007 has been accompanied by considerable increases in annual expenditure in pay and non-pay costs.

The evaluation concluded that there are a number of potential efficiencies and cost savings opportunities within the corporate NCSS structure, and within the costings of the individual screening programmes, which could be realised. These should be considered by the NCSS Board and include:

- a full analysis of non-pay spend to identify areas where more savings are possible
- implementation of year-on-year cost improvement programmes to deliver at least 2% per year efficiencies in cost. Consideration should be given to enable the NCSS retain cost improvements achieved to offset against the implementation of the colorectal screening programme
- use of the existing managerial and administrative staffing within the NCSS in the development of the new colorectal cancer screening service.

BreastCheck – the National Breast Screening Programme

The governance and management of breast screening programmes in Ireland were transferred to the NCSS on its formation, and the service has expanded rapidly since. Four regional centres are charged with service delivery and these in turn are supported by a number of mobile screening units. Invited women, aged 50 to 64 years, are identified from a maintained population register and invited for screening every two years in accordance with the programme. It is planned that 140,000 women will be screened by the service in 2009, although this number may not be achieved.

The identified efficiencies and opportunities to optimise the existing breast screening programme include the following:

- mechanisms to optimise attendance at screening clinics, including women confirming attendance, should be explored as possible ways of increasing the utilisation of the clinics to support the potential expansion of the age group screened
- the unit cost of breast screening in Ireland appears high compared to other European countries such as the Netherlands and England. A detailed analysis of the differences between the systems, and an evaluation of where cost savings could be derived, should be considered.

CervicalCheck – the National Cervical Screening Programme

The governance and management of the former Irish Cervical Screening Programme - Phase 1 transferred to the Board of the NCSS following its establishment in 2007. In September 2008, this programme ceased and CervicalCheck, the National Cervical Screening Programme, was established.

CervicalCheck targets women between the ages of 25 and 60 years, who undergo screening every three years from 25 to 44 years, and thereafter every five years to age 60, assuming the woman has previously had two consecutive “no abnormality detected” reports. A call/re-call structure was introduced in September 2009. At any point in time, the estimated eligible population for CervicalCheck is 1.1 million women between the ages of 25 and 60 years. There are currently over 4,000 registered smertakers in more than 1,600 locations throughout every county in Ireland.

The identified efficiencies and cost savings opportunities within the CervicalCheck programme which should be considered include the following:

- in Ireland, the unit cost for providing cervical cancer screening and assessment within the programme is €112. This should be examined in detail to identify those drivers within the costs where a reduction could be achieved. Significant savings could be realised with any reduction. A €10 reduction in the unit cost would yield an overall saving of up to €3 million annually
- the biggest single cost driver within the unit cost above is the fee payable to GPs, and other contract providers, for providing smear testing services. A reduction in this fee poses an opportunity for significant savings
- alternative proposals for smertaking, as described above, could be explored. The model based on primary care teams (PCTs)/primary care networks (PCNs) could potentially be rolled out in tandem with the current arrangement until the PCTs/PCNs are fully operational. However, substantial savings may only be realisable with this model if the smertaking workload can be absorbed to a large extent by the nurses working currently in primary, community and continuing care
- there may be some scope in which the costs payable in respect of cytology services could be reviewed, particularly in the current economic climate where other laboratories may likely compete for the service. The NCSS should consider re-tendering for cytology services at the completion of the current contract in 2010.

Synergies between programmes

The evaluation identified potential synergies between the current and planned screening programmes, including:

- the information and communications technology (ICT) management of both screening programmes within a HSE network should be considered and could lead to cost savings. Although CervicalCheck applications are currently deployed over a HSE network, BreastCheck applications are deployed over a network specific to that programme
- an assessment should be undertaken of efficiencies that may accrue from alignment of the BreastCheck Picture Archiving and Communications System (PACS) and the planned National Integrated Medical Imaging System (NIMIS) project
- it is recommended that the Board of the NCSS undertakes an assessment of the cost and resources required to develop a single register to support the business processes within the current programmes and any future programmes
- any future investment in the implementation of a national Unique Health Identifier could be leveraged by the NCSS and lead to greater efficiency.

6 Existing Services for Colonoscopy and Colorectal Surgery

There is an opportunity to utilise the existing colonoscopy services in order to meet the needs of a colorectal cancer screening programme. In so doing, the quality of the existing symptomatic colonoscopy services may be further improved.

The survey of the acute hospitals providing colonoscopy and colorectal surgical services, that was conducted by the Authority as part of this evaluation, has indicated that:

- 37 publicly funded hospitals within the State are performing colonoscopy procedures
- there is potential to expand the utilisation of the existing colonoscopy capacity using an extended working day, optimising unused sessions and scheduling sessions at weekends
- colonoscopy activity is increasing year on year. Approximately 42,000 publicly funded colonoscopies plus flexible sigmoidoscopies were performed in public hospitals in 2008 and approximately 2,000 more publicly funded colonoscopies were performed in private hospitals via the National Treatment Purchase Fund (NTPF)
- approximately 43,000 privately funded colonoscopies were performed in 2008. Approximately 31% were privately funded colonoscopies performed in public hospitals

- NTPF data indicates 2,334 patients waiting for colonoscopies up to three months in April 2009
- the extent to which colonoscopies currently performed in the symptomatic services will be absorbed by a screening programme is unknown
- approximately 1,500 colorectal cancer surgeries were performed in public hospitals in 2008. Currently 23 hospitals perform colorectal surgery. The National Cancer Control Programme is centralising rectal surgery to eight designated centres with the expectation that colon surgery will also be centralised in a smaller number of hospitals.

7 Models for the Colorectal Cancer Screening Programme

National Cancer Screening Service model

The proposed NCSS model for the introduction of colorectal cancer screening had:

- an estimated cost of €13 million to €14 million for capital investment
- a pre-implementation cost of €7.2 million in the two years prior to screening commencement
- an annual operational cost of €15 million once fully implemented.

On analysis of this model, it was concluded that:

- the proposed NCSS model for the introduction of colorectal cancer screening is based on a centrally planned model involving the creation of new facilities dedicated to the programme. It is unlikely that this could be implemented in the current economic climate. Accordingly, any new programme would have to be based upon using existing facilities more economically, effectively and efficiently
- operational cost reductions can be identified in the proposed NCSS four-centre model. These include management/administrative costs, elimination of contingency, and more favourable costs on the non-pay elements of the programme
- underestimated costs in the NCSS proposal include the extra costs for consultant sessions not spent on the screening programmes and the additional costs for CT colonography. These are likely to increase the annual revenue costs to the health system from €15.2 million up to approximately €18 million.

Alternative Model for a Colorectal Cancer Screening Programme

As a result of this evaluation, an alternative and more cost-effective model for the delivery of the colorectal cancer screening programme has been proposed. This optimises and builds on the existing capacity within the health system, utilises a number of cost savings/efficiencies that have been previously outlined and identifies a number of additional options that may contribute to the costs of a high quality national colorectal cancer screening service for the population. A summary of the key elements of the model are as follows:

- the colonoscopies generated from the screening programme could be delivered in 8 to 12 symptomatic service locations across the country
- the NCSS will set the minimum specification for the provision of colorectal screening services and locally-determined proposals will be invited from individual hospitals to become centres to take referrals from the new colorectal cancer screening programme
- it would be appropriate for individual hospitals, and their networks, to decide upon and propose the most effective solution that matches implementation of the programme within their context in terms of the available facilities, resources, staff and activity
- a series of output-based service-level agreements (SLAs) would be established between each individual hospital and the NCSS to deliver the increased work arising from a colorectal cancer screening programme. Under the terms of the SLAs, the NCSS would have responsibility for setting quality assurance and accreditation standards and for auditing the service against these standards
- use of advanced nurse practitioners in the delivery of service, as well as longer working days and weekend working should be considered by each hospital in arriving at its proposal
- appropriate diagnostic and treatment pathways should be in place for other procedures required as part of the programme (for example CT colonography or surgery)
- in the pre-implementation phase a gap analysis to determine any additional consultant radiologist and radiographer expertise and investment in specialised equipment required should be undertaken and addressed
- the additional primary treatments generated by the screening programme should be considered in the work plans for the eight designated cancer centres
- it will be necessary for the NCSS and the wider HSE to work together in order to ensure that quality and time-based performance indicators are developed for the symptomatic colonoscopy service as well as the screening service in order to effectively manage the relationship between the services.
- a national quality assurance (QA) programme, incorporating a robust QA model and QA committee, should be further developed. This programme should provide support and advice to the NCSS executive and Board in regards to the programme's clinical efficacy and QA in all clinical and technical disciplines. All aspects of quality data from each unit should be reported to the QA committee

- the principles of good client care established within the breast screening programme should also be encompassed within this screening model
- the colorectal screening programme should operate a multidisciplinary team approach to the screening of individuals including endoscopists, surgeons, pathologists and advanced nurse practitioners. The team members should all have expertise and qualifications in colorectal cancer. Any endoscopist providing the service should be accredited to do so
- the laboratories utilised for histology should have appropriate internal quality control and external quality assurance.

The costs of this model are likely to be less than with the NCSS model. In summary:

- there would not be a requirement for a €13 million to €14 million capital investment for new buildings
- an assessment of colonoscopy services and equipment in each of the acute hospitals would be required prior to commencement to establish to what extent these would need to be upgraded, or would need additional equipment, in order to meet the service demands and quality standards
- the pre-implementation costs in the lead into the programme are estimated at €1.8 million (reduced from €7.2 million proposed in the NCSS model)
- the operational costs are estimated at €12 million in year one of screening rising to €15 million in year 10 (reduced from an estimated €15 million to €18 million in year one in the NCSS model).

Phased Implementation

A phased implementation of the colorectal cancer screening programme, as has occurred in other countries, would provide screening centres with an opportunity to develop capacity, experience and put in place appropriate governance arrangements and implementation plans for quality assurance and training.

This evaluation concluded that:

- in order to enable the centres of referral to build up the necessary infrastructure, equipment and expertise, it is recommended that the colorectal cancer screening programme be introduced incrementally. The medium implementation option described in the HTA, in which the programme would be phased in over five years, could be considered as an example
- although a reduced number of procedures would be required in year one of screening under a phased implementation option, it cannot be assumed that the reduced costs of such a programme would be proportionate with this number. This is because the screening centres would need to put in place the appropriate infrastructure, services, personnel and training to facilitate the build-up of capacity.

Private Health Insurance

It is reasonable to assume that approximately 50% of the eligible population who are in the target range for this screening programme (55 to 74 years of age) may have private health insurance policies.

There are ongoing benefits to the private insurance sector, and its members, in having its members participate in a population-based colorectal cancer screening service. In addition to the overall population benefits, there are financial gains in the medium to long-term associated with the reduced number of surgeries required to be reimbursed and the reduced number of secondary treatments required for more advanced stages of the disease as well as the reduced cost of colonoscopies in the screening programme compared to the costs in the private sector.

The potential for private health insurance companies to contribute to the development of a national population-based screening programme, for the benefit of their members, should be explored, given the benefits that may be realised by these companies in the medium to long-term.

- If 50% of colonoscopies and CT colonographies provided by the screening programme were funded by private health insurance, this would lead to savings of up to €4 million in the first year of full implementation. There would be further savings if the FIT-based screening was paid for by private insurers.

The Irish Cancer Society

The Irish Cancer Society has an established role in the pursuit of world-class cancer services in Ireland. The stated goals of the Society are focused around prevention, survival and quality of life with three programme areas to achieve them. These are advocacy, cancer services and research.

The Irish Cancer Society has offered to fund the roll-out of the national screening programme to an amount of €1 million over two years. This is a significant contribution. The Evaluation Team has not examined this proposal in significant detail and the decision to avail of this funding must rest with the Minister for Health and Children.

8 Conclusions

All available evidence, including studies carried out in the Irish context and referred to in this report, support the introduction of a population-based colorectal cancer screening programme. Such a programme for individuals aged between 55 to 74 years, when fully implemented, is anticipated to reduce the lifetime incidence of colorectal cancer in Ireland by 14.7% and deaths from colorectal cancer by 36%.

Despite the successes of the existing cancer screening programmes in Ireland referred to above, the overall costs for these programmes are high relative to those in other countries.

As a result of this evaluation, a number of costs have been identified within the NCSS's proposed model for a colorectal cancer screening programme that may not be required in an alternative model. Similarly, cost saving opportunities have been identified within the existing NCSS programmes that could be used to contribute to the resource and cost base of a new colorectal cancer screening programme. These have been taken into account in costing the alternative model that has been put forward by this evaluation.

These include savings represented in Table I.

Table I Cost savings identified from NCSS model for colorectal cancer screening

Cost Type	Saving (€ million)	NOTES
Capital costs for new buildings	€13m to €14m	This cost will not be required although there may be a small amount of capital required for upgrading existing facilities to meet service demands and quality standards.
Pre-implementation costs	€7.2m reduced to €1.8m	This represents a reduction in the equipment costs for new buildings and utilisation of existing NCSS management and administration capacity.
Recurrent revenue operational costs	Up to €18m in year 1 reduced to €12m in year 1. (Recurrent costs will increase from €12m in year 1 to €15m in year 10 in line with increased demand for colonoscopies)	This cost reduction is contributed to by the absorption of a considerable amount of the administrative and management costs of the programme within the existing NCSS corporate arrangements and the nature of the output-driven SLA with screening centres.

The evaluation also identified opportunities for cost savings and efficiencies that, if realised, could further contribute to the costs required to implement and maintain a national colorectal cancer screening programme.

These are shown in Table II.

Table II – Funding opportunities from existing screening programmes and other services

COST TYPE	VALUE (€ million)	NOTES
Reduction in unit costs for CervicalCheck	€3m	For example: a reduction of €10 in the unit cost of providing cervical cancer screening and assessment could save €3 million. (A reduction of €5 to €15 in the unit cost could save €1.5 million to €4.5 million.)
Contribution of private health insurers	€2m to €4m	This contribution in cost savings could be realised if up to 50% of colonoscopies and CT colonography within the programme were funded by private health insurers for their members. The benefits to insurers would include a potential reduction in the costs of procedures and in costs of future colorectal cancer treatment.
Contribution by Irish Cancer Society	€1m	This represents a one-off donation that has been committed by the Irish Cancer Society.

If the funding opportunities identified by reducing the unit costs of CervicalCheck, and by contributions from private health insurance, can be realised, the total generated towards funding a colorectal cancer screening programme would be in the range of €5 million to €7 million per year. Therefore, considering recurrent revenue costs of €12 million for the alternative model, an additional €5 million to €7 million would be required on an ongoing basis. (This is based on a €10 reduction in the unit cost of providing cervical cancer screening and assessment. The final figures would need to be re-adjusted should a higher or lower reduction in the unit cost of cervical cancer screening and assessment be achieved.) The contribution by the Irish Cancer Society of €1 million over two years could be used towards upgrading existing facilities to meet service demands and quality standards, for pre-implementation costs or towards operational costs in the first years of screening.

Throughout this evaluation the drive has been to objectively and realistically identify potential cost savings and efficiencies, where they can be identified, in order to deliver one thing – better health outcomes for our population.

In the current economic climate it is more important that the health system ensures that the way services are provided is continually reviewed. This may involve re-designing systems, processes and adapting behaviours where required and exploring innovative ways to deliver high quality safe services more efficiently and effectively; making the best use of resources for the greatest benefit of patients.

The evaluation has undertaken a high level approach to such an exercise in order to explore how existing resources for cancer screening and colorectal cancer services can be maximised, to consider how a national population-based cancer screening service can be implemented.

From an ethical perspective, provision of robust, validated and effective screening programmes for cancer should be an integral part of the Irish healthcare system.

The successful implementation of a national cancer screening programme, through the proposed model, will require a concerted drive, passion and commitment from the public, healthcare professionals, policy makers and other key stakeholders. In the challenges of the current economic environment, it is important to focus on the “can do” to make it happen. When successfully implemented, the programme will have a significant impact on saving lives in Ireland.

1 Introduction

On 17 June 2009, the Minister for Health and Children requested the Health Information and Quality Authority (the Authority) to undertake an evaluation of the resources assigned to the current population-based national cancer screening programmes to identify efficiencies that may be achieved within the present models and to evaluate colonoscopy services, and associated resources, within the Health Service Executive (HSE) in order to support the resourcing of a national colorectal cancer screening programme in Ireland.

The Minister requested this evaluation following the publication, on 17 June 2009, of the Authority's report, *Health technology assessment (HTA) of a population-based colorectal cancer screening programme in Ireland* and the publication on the same day of the National Cancer Screening Service's (NCSS) report on the *Recommendations for a colorectal cancer screening programme in Ireland*.^{1,2}

The purpose of this evaluation was to determine if the existing resources available to the NCSS, and the existing colonoscopy and colorectal surgery resources within the HSE, could be utilised or built upon to facilitate the introduction of a national population-based colorectal cancer screening programme.

1.1 Health Technology Assessment of a Population-based Colorectal Cancer Screening Programme

This HTA was carried out following a request from the NCSS in November 2007. Its purpose was to evaluate various options for a population-based colorectal cancer screening programme in Ireland with a view to establishing the:

- cost-effectiveness of these options compared with the current policy of no screening, and relative to each other
- key additional resource implications and health outcomes associated with these options in the first 10 years of the screening programme
- ethical considerations arising from these findings.

The assumptions underpinning the HTA were based on international evidence, and advice from an expert advisory group, convened in 2008.

The aim of a cancer screening programme is to save lives by preventing premature deaths from cancer. Population-based colorectal cancer screening involves systematically inviting individuals in a pre-defined population to participate in a programme aimed at detecting colorectal cancer and pre-cancerous lesions that may develop into colorectal cancer. Organised screening for colorectal cancer is already underway or under development in several countries, either at a regional or national level.

The Authority's HTA report concluded that a population-based screening programme for colorectal cancer in Ireland, in individuals aged 55-74 years, would be highly cost-

effective. Of the various screening options examined, a screening programme based on biennial faecal immunochemical testing (FIT) for those aged 55-74 years was found to provide the greatest health gain compared with a policy of no screening. Compared with the other options evaluated, this strategy would result in the highest:

- percentage of screening detected cancers
- estimated lifetime reduction in the incidence (14.7%) and mortality (36.0%) from colorectal cancer.

A screening programme, based on FIT, at ages 55-74 years would detect the highest number of adenomas and cancers in the first 10 years of commencement. In addition, compared with a policy of no screening, it would result in more colorectal cancer cases and deaths being averted in the population than other screening options evaluated. In the case of deaths averted, the benefit would be seen by the second year of programme implementation.

All screening options would be associated with increased resource requirements in the first 10 years of a programme, with FIT placing the greatest demand on resources due to the large number of colonoscopies and the additional resources required to diagnose, treat and provide follow-up for cancers and adenomas detected during screening and surveillance. A summary of the estimated screening-related resources required is shown in Table 1.1 and these figures are derived from the HTA report.

Table 1.1 Estimated screening-related resources for colorectal screening

Resource/health outcome	FIT at 55 to 74 years	
	Year 1	Year 10
Participants		
Invited to screen	357,812	417,464
Screened	189,640	220,999
Diagnostic requirements		
Diagnostic/surveillance colonoscopies	11,095	14,820
Diagnostic/surveillance CT colonography	1,442	1,927
Pathology		
Number of adenomas requiring pathology	6,308	8,222
Number of colorectal cancers requiring pathology	853	687
Adenomas and cancers detected		
Screen-/surveillance-detected adenomas	3,320	4,327
Screen-/surveillance-detected colorectal cancers	853	687
Procedures required		
Colorectal resections	779	635

However, compared with a policy of no screening, the programme's benefits include:

- reduction in deaths from colorectal cancer, starting from year two and increasing year on year
- savings in the total number of cancers requiring diagnostic radiology — including positron emission tomography (PET), magnetic resonance imaging (MRI) and computerised tomography (CT) scans — from year six onwards
- savings in the total number of cancers requiring pathology from year six onwards
- reduction in the total number of colorectal cancer patients requiring pre-operative radiotherapy and/or chemotherapy from year six onwards
- reduction in the overall number of surgeries for colorectal cancer required in the healthcare system, noted from year nine onwards.

The Authority's HTA also concluded that, if alternative options to full and immediate implementation of biennial FIT in ages 55-74 years needed to be considered, staggered implementation of screening in this age group over several years would be cost-effective once fully implemented, and would allow screening capacity to be built gradually into the system.

The ethical commentary in the HTA report highlighted the importance of an effective and comprehensive informed consent process, appropriately trained personnel and robust quality assurance procedures in relation to the handling and communication of risks associated with implementation of a screening programme in asymptomatic patients.

1.2 National Cancer Screening Service Recommendations for a Colorectal Cancer Screening Programme

In April 2007, the NCSS established an expert advisory group on colorectal cancer screening. In its report, *Recommendations for a colorectal cancer screening programme in Ireland*, the NCSS Board approved that:

- individuals aged 55-74 years should be invited to participate in the screening programme
- a faecal immunochemical occult blood test (FIT) which operates on an automated testing platform, should be the primary screening tool for a population-based colorectal cancer screening programme in Ireland
- biennial screening should be the recommended screening interval
- patients with a positive result from the primary screening test should be offered a total colonoscopy
- when a screen-detected cancer is diagnosed, the screening process should continue until the end of primary treatment, after which time the patient should join the symptomatic services for clinical follow up.

The NCSS report described a business model upon which the proposed screening service could be developed. In this model, a number of assumptions were made and these are illustrated in Table 1.2.

Table 1.2 NCSS planning assumptions for a colorectal cancer screening programme⁽²⁾

Eligible population (at any point in time)	700,000
Response rate	60%
FIT positivity	6%
Colonoscopy acceptance	90%
Colonoscopy outcome – normal	50%
Colonoscopy outcome – polyp	40%
Colonoscopy outcome – cancer	10%

Based on the figures in Table 1.2, the number of people aged 55-74 years that would present for colonoscopy would be 25,200 every two years. Therefore, there would be invitations for 12,600 screening colonoscopies per year. With the uptake for these screening colonoscopies likely to be 90%, there would be an additional requirement for 11,340 colonoscopies per year.

The Board of the NCSS recommended that four screening centres, each with two endoscopy suites, would be initially required to provide the necessary 11,000 to 12,000 colonoscopies per year for immediate national implementation of the programme. It also recommended that screening centres should be designed, equipped and operate independently of the symptomatic service and be located in proximity to a designated cancer centre to form part of the cancer networks, so that ancillary facilities of a symptomatic service would be available. Additional consultant staff, specialist nurses, radiographers, administrative and technical staff would be required.

Based on the previous experience of the implementation of the BreastCheck and CervicalCheck programmes, it was estimated that it would take a minimum of a 24 to 30 month lead-in period from approval to the commencement of screening. The pre-implementation costs in accordance with this timetable would be €1.05 million in year one and €6.13 million in year two. The operating costs in the first full year of operation were estimated at €15 million. In addition to the total operating costs, the capital cost estimate for developing four screening centres was estimated at €13 million to €14 million.

The Board of the NCSS also considered the inherent linkages that exist between a population-based screening programme and symptomatic (non-screening) colonoscopy services. The Board was aware of the need to design a screening programme which was compatible and consistent with best practice, and where the demand for other colonoscopy services would not be excessively impacted. In that context, the NCSS report presented an alternative implementation model that would have the potential to

address both the requirements for screening and deficits in symptomatic colonoscopy services. This model consisted of the development of an eight-colonoscopy-centre model, managed by the NCSS, based on a 50% utilisation by the screening service and a 50% utilisation for symptomatic purposes. From a population screening perspective this would provide the desirable objective of having the screening locations more widely distributed and more accessible, therefore maximising uptake. From a symptomatic service perspective, it would have the advantage that deficits in the symptomatic services would be addressed in tandem with, and parallel to, the development of a screening service. However, the fundamental principle that a screening programme operates separately from colonoscopy services for patients with symptomatic gastrointestinal complaints would remain.

The estimated operating costs presented for the screening service in this alternative model would ultimately be distributed among eight as opposed to four centres. There would, however, be additional costs related to developing and enhancing symptomatic services operating from these centres. It was anticipated that these additional operational costs would range from €8 million to €15 million per year. There would also be additional capital costs of €6.5 million to €14 million. The eight-centre model would therefore require a total capital investment of €18.5 million to €28 million and annual running costs of €23 million to €30 million.

1.3 Current Evaluation

Following publication of these two reports, both of which highlight the potential benefits of introducing a colorectal cancer screening programme into Ireland, the Minister for Health and Children requested the Authority to undertake this evaluation.

The Health Information and Quality Authority was established under the Health Act 2007³ with the primary statutory role of promoting safety and quality in the provision of health and personal social services for the benefit of the health and welfare of the public.

Under the Act, the functions of the Authority include:

- **section 8 (1) (e):**
at the request or with the approval of the Minister to review and make recommendations as the Authority thinks fit in respect of the services, to ensure the best outcomes for the resources available to the Executive*
- **section 8 (1) (h):**
to evaluate the clinical and cost effectiveness of health technologies including drugs and provide advice arising out of the evaluation to the Minister and the Executive
- **section 8 (1) (i):**
to evaluate available information respecting the services and the health and welfare of the population.

Furthermore, under section 8 (2) (c) there is a requirement that “in carrying out its functions, the Authority shall have regard to the resources available to the Executive”.

* Executive refers to Health Service Executive

This current evaluation focuses on organisational issues associated with the implementation and funding of a national colorectal cancer screening programme. It involves the application of HTA and value for money principles, whilst focusing on the maximum population health gain. Decisions made regarding existing and new technologies, such as population-based cancer screening programmes, require ethical consideration and therefore an ethical commentary has been undertaken on the recommendations arising from the evaluation (see chapter 10).

The terms of reference for the evaluation were to:

- (a)** Examine the BreastCheck screening programme of the National Cancer Screening Service and assess whether efficiencies can be achieved without compromising the quality and safety of the service provided.
- (b)** Examine the CervicalCheck screening programme of the National Cancer Screening Service and assess whether efficiencies can be achieved without compromising the quality and safety of the service provided.
- (c)** Identify the resources assigned to colonoscopy services within the hospital system and assess the potential to apply, or build upon these resources effectively within a national colorectal cancer screening programme.
- (d)** Advise on a model for a national colorectal cancer screening programme, including options for phased implementation as set out in the HTA of a population-based colorectal cancer screening programme in Ireland.
- (e)** Advise how the national colorectal cancer screening programme can be run effectively in a quality assured manner within the existing resources available to the National Cancer Screening Service and the HSE.
- (f)** Examine potential synergies between the current and proposed population-based cancer screening programmes with a view to maximising and optimising efficiencies.

In keeping with the terms of reference of the evaluation, this report outlines the current organisation of cancer screening services in Ireland with particular reference to the BreastCheck and CervicalCheck screening programmes. It evaluates the cost drivers for the existing systems and services with a view to identifying what efficiencies and savings can be recommended. Finally, it evaluates how the existing colonoscopy services can best be used to support the introduction of a national population-based colorectal screening programme in Ireland.

In the requested four-month time frame allocated to undertake this work, it has not been possible to perform a comprehensive analysis of all aspects of the services evaluated. Therefore, the findings and recommendations are at a relatively high level. They indicate the possibilities for enabling the implementation of a national colorectal cancer screening programme – within a challenging fiscal climate – and indicate how existing resources can contribute to that end.

2 Methodology

2.1 Overall Approach

The terms of reference for the evaluation, and the specific questions to be addressed, were agreed between the Authority, the Minister for Health and Children and her Department.

The Authority established an Expert Advisory Group (EAG) comprising of representation from relevant stakeholders including the Department of Health and Children, National Cancer Screening Service (NCSS), National Cancer Control Programme (NCCP), Health Service Executive (HSE), Irish Cancer Society, clinicians with specialist expertise, specialist nurses, patient representatives, National Cancer Registry Ireland and the Economic and Social Research Institute (ESRI). The EAG was chaired by the Director of Healthcare Quality and Safety within the Authority. The role of the EAG was to inform and guide the process, provide expert advice and information, and to provide access to data as appropriate. A full listing of the membership of the EAG can be seen on page 6 and 7 of this report. The terms of reference for the Expert Advisory Group were to:

- contribute to the provision of high quality and considered advice to the Authority
- review the project plan outline and advise on priorities as required on project initiation, or during the course of the project if required
- contribute fully to the work, debate and decision-making processes of the Evaluation Team by providing expert guidance at each of the scheduled meetings
- be prepared to occasionally provide expert advice on relevant issues outside of Group meetings, as requested
- provide advice to the Authority on the refinement of the scope of the evaluation if appropriate
- review the draft report from the Evaluation Team and recommend amendments as appropriate
- contribute to the Authority's development of its approach to this project by participating in an evaluation of the process on the conclusion.

The Authority appointed a project team comprised of internal staff with external support from the Audit Commission of England*, National Centre for Pharmacoeconomics and the Centre for Advanced Clinical Therapeutics, St James's Hospital, Dublin.

Interim findings and a draft report were presented to the EAG for discussion. The final report was approved by the Board of the Authority on 14 October 2009 and subsequently submitted to the Minister for Health and Children.

** The Audit Commission was established in 1983 in England, and has many years' experience of assessing value for money initiatives across publicly funded organisations in England and Wales, including in healthcare. It has the power to provide advice and assistance to public bodies anywhere in the world by virtue of paragraph 9 of Schedule 2A of the Audit Commission Act 1998.*

2.2 Literature Review

A review of the relevant literature on existing cancer screening programmes nationally and internationally was undertaken to inform the evaluation process. Primary and review articles and other published information were identified using the following sources:

- electronic databases including Medline, Science Direct, Cochrane Library
- archives of peer-reviewed cancer journals
- websites of the World Health Organization (WHO), International Agency for Research on Cancer (IARC), EU Commission, national and international cancer screening systems, National Institute for Health and Clinical Excellence (NICE)
- reference text books, including IARC handbooks of cancer prevention; DeVita, Hellman and Rosenberg's *Cancer: Principles & Practice of Oncology, Eight Edition*.

No time limit was put on the earliest date for acceptability of data and studies were evaluated from 1986 onwards. The data lock-point for inclusion in the review was 15 August 2009. Once identified, all studies (including interventional and observational studies) were evaluated for relevance to the review. Only papers and published information in the English language were included in the review.

Data from clinical studies were systematically reviewed to critically evaluate the evidence base for existing cancer screening systems worldwide.

2.3 Documentation and Data Review

A list of information and documentation was requested from a number of sources to inform the evaluation, and these sources included the:

- National Cancer Screening Service (NCSS)
- Department of Health and Children
- Health Service Executive
- National Cancer Control Programme (NCCP)
- National Cancer Registry Ireland (NCRI)
- Economic and Social Research Institute (ESRI)
- National Treatment Purchase Fund (NTPF)
- Voluntary Health Insurance (VHI)
- Quinn Healthcare Limited
- Hibernian Aviva Health.

Requests for information were broken down in the categories shown in Appendix 1.

Where further information or clarification was required during the course of the evaluation, this was requested from the correspondents.

2.4 Survey to Hospitals

One of the terms of reference of the evaluation was to identify the existing resources assigned to colonoscopy and colorectal surgical services within the hospital system and assess the potential to apply, or build upon, these resources effectively within a national colorectal cancer screening programme.

In order to perform this assessment, a survey designed by the Authority was circulated to 37 publicly funded hospitals. These hospitals are shown in Appendix 2. Orthopaedic, maternity and paediatric hospitals were excluded. Additional data were sourced from the Hospital In-Patient Enquiry (HIPE) unit of the ESRI, the NTPF, and the NCRI.

The aim of the survey was to inform the Authority about the colonoscopy and colorectal surgery activity at the 37 hospitals. The survey was divided up into a number of sections including administrative information, services provided, facilities available, sessions, activity, waiting times and staffing levels. The survey was circulated to the chief executive officer, or hospital manager, of each hospital with a one-week period to complete and return to the Authority. All of the 37 hospitals responded. Once received, the Authority clarified the content of the survey data with each hospital as required and proceeded to data analysis. Data were analysed using Statistical Package for Social Science (SPSS) and Microsoft Excel.

2.5 Meetings with Key Stakeholders

Meetings with key stakeholders were a major part of the evaluation, and served to inform and clarify many of the issues that arose during the process. Each member of the EAG was contacted individually by the project team and provided advice and expertise in relation to the project and its scope. Meetings were also held with a large number of other relevant stakeholders who provided advice and assistance.

The lines of enquiry pursued at these meetings were developed from the terms of reference of the evaluation and included discussion on the existing national screening services, the existing capacities within the acute services and potential ways in which the new colorectal cancer screening service could be delivered.

2.6 Efficiency Review

On commencement of this evaluation, the Authority requested the Audit Commission of England to assist it in the conduct of the evaluation, particularly in relation to the potential for efficiencies and improved value around the existing resources within the current services.

The Audit Commission's remit was to examine the existing screening services and their use of resources, the existing colonoscopy capacities in the acute sector, and the proposed models for the implementation of the colorectal screening programme, in order to provide assistance to the Evaluation Team in the completion of the Authority's report. In order to fulfil this remit, members of the Commission's team attended many of the meetings with the key stakeholders to assist in their understanding and assimilation of the key issues and evaluated much of the information received by the Authority on foot of the information requests.

2.7 Focus Group Session

An integral part of this evaluation was the analysis of existing and alternative models for the provision of diagnostic services in a new colorectal cancer screening programme, particularly in colonoscopy. The HSE was requested to nominate a group of experts who would come together and discuss, during a collective meeting, the advantages, disadvantages and general feasibilities of the proposed models, taking into account their own services and experiences. These experts included gastroenterologists, specialist nurses and hospital and network managers.

3 Cancer Screening

3.1 Introduction

This chapter aims to:

- provide a brief overview of cancer screening
- review cancer screening from an international perspective (including the screening activities occurring in breast, cervical and colorectal cancer)
- review the evidence base for optimal age ranges and screening intervals for breast and cervical cancer screening programmes.

3.2 Overview of Screening

The primary aim of screening for disease is to identify individuals at risk of developing a specific disease.^{4,5} In the case of cancer, the ultimate aim is to reduce mortality in the population.^{6,7} Criteria for the assessment of whether a screening programme should be put in place are outlined in Table 3.1.⁸

Table 3.1 Criteria for implementation of a screening programme⁸

Disease	Is the disease an important public health problem?
	Is the natural history understood?
	Is there an identifiable latent or early stage?
Screening test	Is the test effective?
	Is it safe and acceptable to the population?
Diagnosis and treatment	Is there a strategy for determining who should be treated?
	Is there effective treatment for early stage disease?
	Are the diagnostic test and treatment safe and acceptable?
Organisation and cost	Are facilities for diagnosis and treatment available?
	Is the psychological impact on participants not too high?
	Is the economic cost acceptable?

Based on Wilson and Junger, 1968

An ideal screening test should be able to discriminate between individuals who have or do not have the specific disease. It should have a high sensitivity (identify true cases) and high specificity (exclude those without the disease). For a screening programme to be effective, robust systems must be in place at every stage of the screening process.⁴ Population-based screening ensures that all persons in the eligible target population in the area served by a programme are individually identified and personally invited to attend screening, resulting in significant societal benefits.⁹

Cancer is the second largest cause of death in the European Union (EU), accounting for two out of 10 deaths in women, and three out of 10 deaths in men in 2006.⁹ The International Agency for Research on Cancer (IARC) issued the following estimates for the EU for 2006:¹⁰

- 331,000 new cases and 90,000 deaths due to breast cancer
- 36,500 new cases and 15,000 deaths due to cervical cancer
- 310,000 new cases (140,000 in women and 170,000 in men) and 68,000 / 78,000 deaths respectively, due to colorectal cancer.

These numbers are expected to increase in future years due to the demographic trends in Europe, leading to a major increase in the cancer burden.¹¹

Use of screening for early detection and treatment has been shown to reduce mortality from certain cancers, including breast, cervical and colorectal cancer.^{6,9} In addition to early detection, screening for colorectal and cervical cancers can identify precancerous abnormalities, which are amenable to treatment, thereby preventing cancer altogether.⁶ Therefore, cancer screening programmes have the potential to significantly reduce the burden of breast, cervical and colorectal cancer in screened populations.

In 2003, the EU Council of Health Ministers unanimously adopted a recommendation on cancer screening.¹² Although the Council recommendation is not legally binding on member states, it has widespread political support in the EU.

The EU Council Recommendation from 2003 recommended the following screening tests:¹²

- Papanicolau (pap) smear screening for cervical cancer precursors starting not before the age of 20 years and not later than the age of 30 years
- mammography screening for breast cancer in women aged 50 to 69 years in accordance with European guidelines on quality assurance in mammography
- faecal occult blood screening for colorectal cancer in men and women aged 50 to 74 years.

In 2008, the European Commission issued a review of the impact of the 2003 Council recommendation on cancer screening in EU member states.⁹ This report showed that most member states had established or were establishing population-based breast, cervical and colorectal screening programmes. The report noted that considerable effort will be required over the coming years to successfully implement current policies and to overcome existing barriers to programme implementation throughout the EU. It recommended that the current screening services should be monitored and improved, as appropriate, on an ongoing basis.

3.3 Breast Cancer

3.3.1 Introduction

Breast cancer is the commonest cancer to affect women.¹³ In 2000, it accounted for 22% of all new cancers in women worldwide.¹³ It is the leading cause of death from cancer in women in Europe.¹¹ In Ireland each year, there are approximately 2,000 incident cases of breast cancer with approximately 650 deaths recorded annually.¹⁴ Breast cancers are derived from the epithelial cells lining the terminal duct lobular unit.¹⁵ Cancer cells that remain within the basement membrane of the elements of the terminal duct lobular unit and the draining duct are classified as in-situ or non-invasive, while those in which there is dissemination of cancer cells outside the basement membrane of the ducts and lobules into the surrounding tissue are classified as invasive.¹⁶ Prognosis in breast cancer relates to the stage of the disease at presentation.

There are several risk factors which are thought to be associated with the development of breast cancer including: increasing age, nulliparity, geographical variation, racial differences, age at menarche and menopause, family history, hormone replacement therapy and lifestyle factors such as alcohol intake and physical activity.¹⁶⁻¹⁸

3.3.2 Breast Cancer Screening Programmes

The ultimate goal of breast cancer screening is to reduce mortality from the disease, while the immediate goal is to detect cancers before they become clinically evident.¹³ Mammography remains the cornerstone of population-based breast cancer screening.¹⁹ Several countries implemented national mammography screening programmes in the 1980s and 1990s, following evidence from randomised controlled clinical trials which showed a 25-30% reduction in breast cancer mortality with mammography screening.^{19,20} Breast cancer mortality reductions range from 24% to 48% in women having attended at least one screening, even after correcting for selection bias.²⁰ The reduced mortality is attributed to the combined effect of earlier detection due to screening and improving treatment for breast cancer.¹¹ A recent review showed that the reductions in mortality are maintained 10 years after implementation of mammography screening programmes.²⁰

The EU Advisory Committee on Cancer Prevention recommends that asymptomatic women, aged 50-69 years, should be offered mammography examination every two to three years. In women aged 40-49 years, the benefit versus risk of mammography screening is less certain due to the lower predictive value of mammography in this age group, the possible detection of non-progressive cancers and the higher radiation hazard.⁷

The EU review, published in 2008, noted that breast cancer screening programmes were running or being established in 26 of the 27 EU member states, of which the majority were population-based programmes.⁹ Table 3.2 summarises the age ranges and screening intervals in breast screening programmes in the EU and also includes recommendations on breast screening for Australia, New Zealand, Canada and the United States.

Table 3.2 Breast cancer screening programmes by country^{9,21-24}

Country/Region	Age Range Targeted	Recommended Screening Interval
Austria	40-69	1(2) years
Belgium	50-69	2 years
Cyprus	50-69	2 years
Denmark	50-69	2 years
Estonia	50-59	2 years
Finland*	50-(59)69	2 years
France	50-74	2 years
Germany	50-69	2 years
Hungary	45-65	2 years
Italy	50-69	2 years
Luxembourg	50-69	2 years
Malta*	50-59(69)	3 years
Netherlands	50-75	2 years
Portugal	45-69	2 years
Romania	50-69	2 years
Slovenia	50-69	2 years
Spain*	(45)50-64(70)	2 years
Sweden*	40(50)-(69)74	2 years
UK*	50-(64)70	3 years
Australia*	(40)50-69(70+)	2 years
New Zealand	45-69	2 years
Canada	50-69	2 years
United States*	(40) 50-69(70+)	12-33 months

* These countries have different regional screening programmes.

3.3.3 Age-range and Screening Interval in Breast Cancer

In Ireland, the BreastCheck programme aims to offer women aged 50-64 years mammography every two years.²⁵ The programme is described in detail in chapter 5. A systematic review of the existing evidence base for the optimal age range and screening interval for breast screening was undertaken in order to determine if the current age range (50-64 years) could be narrowed or the screening interval (every two years) be increased. Full details of the clinical evidence are described in Appendix 3.

Based on the literature review,²⁶⁻⁴⁷ the current age range and screening interval adopted in the BreastCheck programme in Ireland would appear to be consistent with the international evidence base. It may however be appropriate to extend the age range to 69 years to meet with current EU Advisory Committee on Cancer Prevention recommendations and this is in line with NCSS Board policy.

3.4 Cervical Cancer

3.4.1 Introduction

Cervical cancer is the second most common cancer affecting women worldwide, primarily those between the ages of 35 and 50 years.^{48,49} Almost 80% of cases occur in developing countries where it is responsible for approximately 15% of new cancers in women, compared with an estimated figure of 4% of cancers in women in developed countries.⁵⁰ Each year in Ireland, approximately 180 new cases of cervical cancer are diagnosed (average age at diagnosis of 46 years) with approximately 73 deaths from cervical cancer recorded per year.⁵¹

Overwhelming evidence links cervical cancer to infection with human papillomavirus (HPV).⁴⁹ Persistent infection with one of 13 to 16 oncogenic HPVs is necessary but not sufficient for the development of cervical cancer. Other risk co-factors include smoking, high parity, decreased immunity, HIV infection, infection with chlamydia and oral contraception.^{49,52} The main route of HPV transmission is sexual, and evidence suggests that HPV 16 in particular has a high potential for malignant transformation of infected cervical cells. The factors that determine progression of HPV infection to high-grade cervical lesions are poorly understood. Cervical cancer progresses through a number of early stages (cervical intraepithelial neoplasia – CIN) that are asymptomatic and invisible to the naked eye but can be identified by cytology and/or colposcopy.⁵² CIN is divided into three grades (CIN 1-3). Prognosis in cervical cancer relates to the stage of the disease at presentation.⁵²

3.4.2 Cervical Cancer Screening Programmes

Cervical cancer may be effectively controlled by screening, since the detection of cytological abnormalities by microscopic examination of pap smears, and subsequent treatment of those with high-grade cytological abnormalities, prevents the development of cancer.⁴⁹ Cytology screening has been shown to be effective in reducing the incidence and mortality from cervical cancer in developing countries.⁵³ The incidence of cervical cancer screen-detected abnormalities can be reduced by as much as 80% in the screened population if the quality, coverage and follow up of screening are high.

Cytology-based cervical cancer screening is widely accepted as a public health policy in the EU.⁹ The EU Advisory Committee on Cancer Prevention recommends that women from 20-25 years up to 59-64 years be targeted for cervical screening. If limited screening resources are available, these should be concentrated in the

age range of 30-60 years. Screening should be undertaken with a three- to five-year interval. Prolonged intervals may be considered in women with a history of negative tests. The benefits of more frequent screening are limited and may increase the risk of over-treatment of otherwise regressing lesions.⁹ Population-based screening programmes have been shown to be more effective in reducing morbidity and mortality from cervical cancer than opportunistic screening.⁵⁴⁻⁵⁶

The 2008 EU review noted that cervical screening programmes were running or being established in 25 of the 27 EU member states⁹, of which 15 were population-based programmes. Differences were noted in the way programmes were implemented in the different EU member states^{9,55} in terms of identification-sources used for target population, age groups included in the screening population, time intervals between screening (ranging from one to five years) and professional background of the smetakers. Table 3.3 summarises the age ranges and the screening intervals of the cervical screening programmes in the EU and also includes recommendations on cervical screening for Australia, New Zealand, Canada and the United States.

Table 3.3 Cervical cancer screening programmes by country^{21-23,56-72}

Country/region	Age range targeted	Recommended screening interval
Austria	20+	one year
Belgium	25-64	three years
Czech Republic	Not specified	one year
Denmark	23-59	three years (some counties five years in > 45 years or 50)
Finland	30-60	five years
France*		
- Bas-Rhin	25-65	three years
- Doubs	20-65	three years (after two normal exams with one year interval)
- Isere	50-69	three years
Germany - Saarland	20-85 +	one year
Greece	25-64	initially two smears one year apart, then every two to three years
Hungary	25-65	three years (after one negative smear)
Iceland	20-69	two years
Italy*		
- Florence, Genova, Parma, Ragusa, Torino, Varese	25-64	three years
Lithuania	30-60	five years
Luxembourg	15 +	one year

Country/region	Age range targeted	Recommended screening interval
Netherlands	30-60	five years
Norway	25-69	three years
Portugal	20-64	initially two smears one year apart, then every three years
Slovakia	20-64	three years
Spain - Catalonia	20-65	initially two smears one year apart. Then, three years in ages 20-34 years and five years in ages 35-65 years
Sweden	23-60	three years in ages 23-50; five years in ages 51-60 years
Switzerland	18-69	three years
UK*		
- England	25-64	three years in ages 25-49; five years in ages 50-64 years
- Scotland	20-64	
Australia*	(18-20) -70	two years
New Zealand	20-70	three years
Canada	18-69	initially two smears one year apart, then every three years
United States*	21 - (65-70)	initially two smears one year apart, then every three years

* These countries have different regional screening programmes.

3.4.3 Age-range and Screening Interval in Cervical Cancer

In Ireland, CervicalCheck targets women between the ages of 25 and 60 years, who undergo screening every three years from 25-44 years, and thereafter every five years to age 60 years, assuming the woman has previously had two consecutive “no abnormality detected” reports.²⁵ The programme is described in detail in chapter 6. A systematic review of the existing evidence base for the optimal age-range and screening interval for cervical screening was undertaken in order to determine if the current age-range (25-60 years) could be narrowed or the screening intervals increased.

Based on the literature review,⁷³⁻⁸⁸ the current age range and screening interval adopted in the CervicalCheck programme in Ireland would appear to be consistent with the international evidence base.

3.5 Colorectal Cancer

3.5.1 Introduction

Carcinoma of the large bowel and rectum, known as colorectal cancer, is the fourth most commonly diagnosed cancer worldwide with more than one million new cases diagnosed each year, one-third of which occur outside industrialised countries⁸⁹, therefore it is an important global public health problem. The incidence of colorectal cancer increases with increasing age. This means that the number of incident cases will rise as a country's population ages.^{90,91} The mortality rates for colorectal cancer have decreased worldwide in recent years.⁹² This is due to diagnosis at an earlier stage of disease, which is associated with greater likelihood of long-term survival.¹

Most colorectal cancers are thought to arise from benign, adenomatous polyps lining the wall of the bowel;⁹³ certain characteristics of the polyps (e.g. large, villous architecture, flat or with dysplastic cells, presence of multiple polyps) appear to indicate a higher risk of progression.⁹³ There are several steps along the so-called adenoma-carcinoma sequence and the development of colorectal cancer may take 10 to 15 years.^{2,90,93} Once cancer has developed, it can spread through the lining of the bowel wall to the lymph nodes and to distant sites.⁹⁴ The degree of spread is used to classify the stage of the disease, which will determine the type of treatment that is required and the prognosis.

Approximately 75% of patients with stage I disease (localised to within the lining of the bowel wall) are alive five years after diagnosis, compared with less than 10% with stage IV disease (distant metastases).¹ Persisting change in bowel habit, with or without abdominal pain, rectal bleeding and blood in the stool are the commonest symptoms of colorectal cancer.⁹⁵⁻⁹⁷ However, the early symptoms may not be severe or clear-cut and could have a variety of other causes.⁹⁶

The majority of colorectal cancers arise sporadically but there are several known risk factors associated with development of the disease. The most important risk factor is increasing age.⁹⁵ Other risk factors include dietary factors such as high calorie intake, higher body mass index, smoking and physical inactivity.⁹⁵⁻⁹⁹ This might explain the much higher incidence of colorectal cancer in more affluent countries. In terms of family history, there are two well-recognised conditions (familial adenomatous polyposis and hereditary non-polyposis colorectal cancer) that are known to predispose to the development of colorectal cancer. However, these account for less than five percent of all cases. About 10% to 20% of patients describe a family history of colorectal cancer, although the pattern of inheritance and clinical features are not consistent with any recognised familial syndrome.⁹⁵ These familial factors are thought to contribute to the risk of sporadic colorectal cancer.⁹⁴

3.5.2 Colorectal Cancer Screening Programmes

Colorectal screening is widely accepted as a public health policy in the EU.^{9,100} Programmes are currently running or being developed in 19 of the 27 member states.⁹ Twelve of the member states have adopted a population-based approach while seven member states have established non-population-based programmes. Faecal occult blood testing (FOBT) was recommended as the primary screening test for colorectal cancer in men and women aged 50 to 74 years in the European Council recommendation; this has been adopted by 18 member states. Other screening tests (colonoscopy or flexible sigmoidoscopy) have been adopted in a limited number of member states. Among existing EU programmes, there is considerable variation in the type of programme offered in terms of the time interval between the chosen screening test and the age-range targeted for colorectal cancer screening.⁹ In summary, although the majority of EU member states have implemented, or are currently developing, colorectal cancer screening programmes, colorectal cancer screening in the EU is less well developed compared with breast and cervical screening programmes. Table 3.4 summarises the age ranges and the screening intervals of the colorectal screening programmes in the EU and also includes recommendations on colorectal screening for Australia, Canada and the United States.

Table 3.4: Colorectal screening programmes by country^{9,21,23,72}

Country/region	Screening test	Age range targeted	Recommended screening interval
Austria*	FOBT	50+	1 - 2 years
	COL	50+	10 years
Bulgaria*	FOBT	31+	1 year
Cyprus	FOBT	50	1 in lifetime
	COL	55	1 in lifetime
Czech Republic*	FOBT	50+	2 years
Finland	FOBT	60-69	2 years
France	FOBT	50-74	2 years
Germany*	FOBT	50+	1 and 2 years
	COL	55-74	10 years (2 in lifetime)
Greece*	FOBT	50+	5 years
	COL	50+	5 years
Hungary	FOBT	50-70	2 years
Italy	FOBT	50-69 (70-75)	2 years
	FS	58 or 60	1 in lifetime
Latvia*	FOBT	50+	1 year
Poland	COL	50-65	10 years

Country/region	Screening test	Age range targeted	Recommended screening interval
Portugal	FOBT	50-70	2 years
Romania	FOBT	50-74	2 years
Slovak Republic*	FOBT	50+	N/A
	COL	50+	10 years
Slovenia	FOBT	50-69	2 years
Spain	FOBT	50-69	2 years
Sweden	FOBT	60-69	2 years
UK	FOBT	60-69	2 years
Australia	FOBT	50, 55, 65	**
Canada	FOBT	50+	2 years
United States***	COL	50+	10 years
	FS	50+	5 years
	FOBT	50+	1 year

COL = colonoscopy; FS = flexible sigmoidoscopy

* non-population-based approach

** the second phase of the National Bowel Cancer Screening Programme commenced on 1 July 2008 and offers testing to people aged 50, 55 or 65 years of age between January 2008 and December 2010

*** non-population-based approach, various screening tests recommended

3.5.3 Colorectal Cancer in Ireland

In Ireland, colorectal cancer is the second most common cancer in men (after prostate cancer) and the second most common cancer in women (after breast cancer).¹⁴ An average of 2,040 new cases of colorectal cancer were diagnosed each year during the period 2002 to 2005, with an average of 925 deaths annually from the disease during the same period. By 2020, the number of new cases diagnosed each year in Ireland is projected to increase by 79% in men and 56% in women, compared to the average annual number recorded in the period 1998 to 2002. In recent years, deaths from colorectal cancer have reduced in Ireland, in line with international figures.⁹² However, the incidence rates of colorectal cancer in Ireland rank among the highest in Western Europe for both men and women, while the death rate (mortality) from colorectal cancer is higher for men in Ireland than elsewhere in Western Europe. Survival is known to be associated with stage of disease at time of diagnosis. In Ireland, during 2002 to 2005, only 11% of colorectal cases were stage I at diagnosis, while 24% were stage II, 26% were stage III and 22% stage IV. Stage was not recorded for the remaining 17%.¹

3.5.4 Colorectal Cancer Screening in Ireland

The two published reports^{1,2} have outlined the potential benefits of introducing population-based colorectal cancer screening in Ireland (see chapter 1). A research study funded by the Authority, *The Tallaght Hospital-Trinity College Dublin Colorectal Cancer Screening Programme*, was established to determine the feasibility of screening for colorectal cancer in the Tallaght population in Dublin.⁹¹ The programme, which is due to run over two years, published results for its first year recently.⁹¹ Two FIT kits have been issued to 6,000 of the 10,000 eligible participants with a response rate of 58%; this includes 17% of individuals who declined, were deemed unsuitable or did not reside at the original address. A total of 42% of participants returned the FIT kits (1,074 males; 1,466 females) of which 11% had positive samples (n=278) requiring colonoscopy. At the time the report was drawn up, 205 colonoscopies had been undertaken, which identified colorectal cancer in 14 subjects (7%), hyperplastic polyps in 25 subjects (12%), tubulovillous adenoma in 17 subjects (16%) and tubular adenoma in 33 subjects (16%). The colonoscopies in the study were done out-of-hours on Saturdays using the existing facilities in Tallaght Hospital.¹⁰¹

The results of this feasibility study have shown the effectiveness of FIT as a first-step screening tool. The low rate of uptake (42%) indicates the need to improve awareness among the general public of the benefits of participation in such a screening programme. This feasibility study, due to run for another year, will provide important information to guide the implementation of an Irish national colorectal programme.

3.6 Summary

All available evidence points to the effectiveness of population-based cancer screening programmes for the early detection of breast, cervical and colorectal cancers or pre-cancers. Many such programmes already exist internationally or are in development. In Ireland, established programmes for screening of breast cancer and cervical cancer have been developed over a number of years into population-register based call/re-call systems.

Having undertaken a review of the literature regarding population-based screening programmes, the age ranges and screening intervals adopted in the population-based screening programmes in Ireland would appear to be consistent with the international evidence base.

The current evidence points to the cost-effectiveness of introducing a population-based colorectal cancer screening programme in Ireland, as identified by the aforementioned HTA, undertaken by the Authority, and the review undertaken by the NCSS. Such a programme would be expected to bring significant benefits to the population in terms of reduced incidence of the disease and mortality, if it is appropriately constructed and it meets its targets in terms of uptake.

4 The National Cancer Screening Service

4.1 Overview

The Board of the National Cancer Screening Service was established by the Minister for Health and Children in January 2007, under Statutory Instrument 632 of 2006,¹⁰² following the launch, by the National Cancer Forum and the Department of Health and Children, of *A Strategy for Cancer Control in Ireland 2006*.¹⁰³ This strategy advocated a comprehensive cancer control policy programme in Ireland and set out recommendations regarding prevention, screening, detection, treatment and management of cancer in Ireland in future years. It also recommended the establishment of a National Cancer Screening Service Board.

The functions of the National Cancer Screening Service are to:¹⁰⁴

- carry out, or arrange to carry out, a national breast screening service for the early diagnosis and primary treatment of breast cancer in women
- carry out, or arrange to carry out, a national cervical cancer screening service for the early diagnosis and primary treatment of cervical cancer in women
- advise on the benefits of carrying out other cancer screening programmes where a population health benefit can be demonstrated
- advise the Minister, from time to time, on health technologies, including vaccines, relating to the prevention of cervical cancer
- implement special measures to promote participation in its programmes by disadvantaged people.

The mandate of the Board of NCSS also includes a policy, development and advice role.¹⁰⁴

Since the establishment of the NCSS, there has been significant development of cancer screening services in Ireland. The governance and management arrangements for BreastCheck, the national breast cancer screening programme, and the former Irish Cervical Screening Programme (ICSP) - Phase 1 were transferred to the Board of the NCSS on its establishment.

Expansion of the breast cancer screening programme has taken place throughout 2007 and 2008, including the opening of two regional centres in Cork and Galway. It is expected that the service will be in all counties by October 2009. The NCSS has also been responsible for the establishment of the national cervical screening programme. The interim cervical cancer screening programme in the mid-west ceased in September 2008, and was replaced by CervicalCheck – the National Cervical Screening Programme. A call/re-call structure was introduced in September 2009. Detailed analysis of each programme takes place in subsequent chapters of this report.

4.2 Corporate Structure and Governance

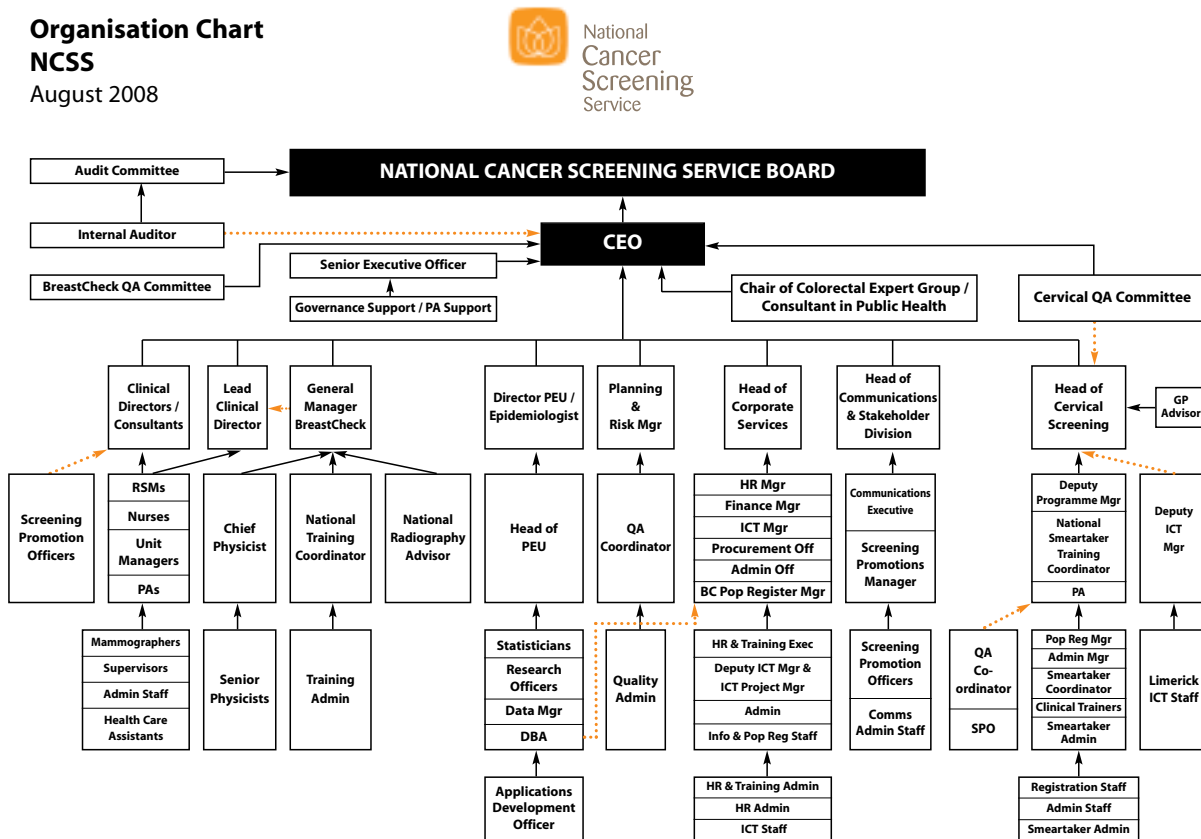
Under the *Code of Practice for the Governance of State Agencies*, the Chief Executive Officer (CEO) and management of the NCSS have primary responsibility for internal control within the organisation.¹⁰⁵ The primary function of the Audit Committee of the NCSS is to assist the Board in fulfilling its oversight responsibilities, under this code, by reviewing the:¹⁰⁴

- financial reports and other financial information provided by the organisation
- organisation's systems of internal controls for finance and accounting that management and the Board of the NCSS have established and the system on risk management
- organisation's auditing, accounting, financial reporting and corporate governance processes generally.

In October 2008, the Government announced the rationalisation of a number of agencies. This included the subsuming of the functions of the NCSS and the National Cancer Registry Ireland into the HSE. It was stated that the primary aim of these measures was to streamline service delivery, professional registration and policy making in a number of areas in the health sector, through the integration and/or amalgamation of functions. It is envisaged that efficiencies would derive over time from economies of scale and the elimination of duplication in areas such as recruitment, procurement, payroll and information and communications technology (ICT) systems. Primary legislation has been passed which allows for the NCSS to be subsumed at a date to be decided by the Minister for Health and Children.

The current organisational structure of the NCSS is illustrated in Figure 4.1.

Figure 4.1 NCSS organisational chart*



* Reproduced with permission of NCSS

4.3 Review of Information and Communications Technology (ICT) Systems and Infrastructure

The breast and cervical cancer screening programmes are supported by bespoke information communications technology (ICT) systems, to support their individual business needs.¹⁰⁶ BreastCheck also maintains a Picture Archiving and Communications System (PACS) to manage medical digital images and related information.¹⁰⁷ The NCSS runs a single ICT department, having consolidated the ICT departments of the breast screening and the cervical screening programmes.

The ICT management of both screening programmes within a HSE network should be considered and could lead to cost savings. Although CervicalCheck applications are currently deployed over a HSE network, BreastCheck applications are deployed over a network specific to that programme.

The National Integrated Medical Imaging System (NIMIS) project is a national project aiming to procure and centrally support implementation of PACS systems in the acute hospital sector, although this has not been implemented as yet. BreastCheck has

invested significantly in digital imaging technologies and has converted all breast screening equipment to digital mammography (including the mobile units). The PACS system is closely aligned with the BreastCheck register. An assessment should be undertaken on efficiencies that may accrue from alignment of the BreastCheck PACS and the planned NIMIS project.

The development of a single population-based register is considered to afford the greatest opportunity for synergies and efficiencies across all programmes. In 2007, the NCSS undertook a review of its current registers with the goal of considering a single register for current and future programmes. The NCSS consensus was that neither of the existing systems could be used as a base to develop a single register for all screening programmes. It was recommended that new solutions be developed to support both current programmes and any future programme. Initial investment in the development of a single register may in time lead to cost savings. It is recommended that the Board of the NCSS undertakes an assessment of the cost and resources required to develop a single register to support the business processes within the current programmes and any future programmes.

The absence of a national Unique Health Identifier requires the individual programme registers to undertake significant work in identifying their specific cohorts of eligible participants¹⁰⁸. Different processes are utilised in the identification of these cohorts and in data cleansing. Although CervicalCheck performs this activity in-house, BreastCheck outsources it to a private company. Any future investment in the implementation of a national Unique Health Identifier could be leveraged by the NCSS and lead to greater efficiency.

In respect of the optimisation of the systems to provide synergies within the programmes, the following are opportunities for efficiencies:

- the ICT management of both screening programmes within a HSE network should be considered and could lead to cost savings. Although CervicalCheck applications are currently deployed over a HSE network, BreastCheck applications are deployed over a network specific to that programme
- an assessment should be undertaken of efficiencies that may accrue from alignment of the BreastCheck PACS and the planned NIMIS project
- it is recommended that the Board of the NCSS undertakes an assessment of the cost and resources required to develop a single register to support the business processes within the current programmes and any future programmes
- any future investment in the implementation of a national Unique Health Identifier could be leveraged by the NCSS and lead to greater efficiency.

4.4 Costs and Resources

The main cost drivers of the cancer screening services are summarised in Table 4.1.

Table 4.1 Cost drivers associated with a cancer screening service

Cost Drivers	
Screening modality	<ul style="list-style-type: none"> ■ Process steps ■ Skill mix
Volume	<ul style="list-style-type: none"> ■ Invitation ■ Uptake ■ Scope (e.g. age range)
Frequency	<ul style="list-style-type: none"> ■ Call/re-call
Value added	<ul style="list-style-type: none"> ■ Clinical benefits (e.g. numbers of cancers detected) ■ Service benefits (e.g. waiting time for results)
Quality control systems	<ul style="list-style-type: none"> ■ Reliability/resilience (e.g. audit, double-reading)

The growth of the NCSS since 2007 is reflected in the activity of the screening programmes, and this is illustrated in Table 4.2.

Table 4.2 Numbers of women screened ^{51,109,110}

	2007	2008*	End May 2009*
BreastCheck women screened	66,527	90,834	48,726
Irish Cervical Screening Programme - Phase 1 women screened	12,410	17,717	Programme ceased
CervicalCheck women screened		59,903	166,752

* These numbers are preliminary and yet to be validated and published by the NCSS

The development of the services since 2007 has also been accompanied by large increases in annual expenditure. The projected annual expenditure of the NCSS in 2009 is €68.7 million (€67.5 million allocation from Department of Health and Children plus €1.2 million pension income). These figures are illustrated in Table 4.3.

Table 4.3 NCSS expenditure for 2007 and 2008 and projected expenditure for 2009¹¹¹⁻¹¹³

	2007 €	2008 €*	2009 €
Pay	11,396,379	17,538,147	28,934,000
Non-pay	16,473,566	22,116,754	39,816,000
Total expenditure	27,869,945	39,654,901	68,750,000

* These accounts are still in draft format.

4.4.1 Pay Costs

An analysis of the pay costs for the NCSS over the same period is illustrated in Table 4.4

Table 4.4 Pay costs in NCSS 2007 – 2009¹¹¹⁻¹¹³

	2007	2008	2009
Number of employees (whole-time equivalents)	187	247	263
	€	€	€
Payments to consultants	2,871,441	4,644,375	5,913,361
Paramedical*	2,755,864	3,991,951	6,150,207
Management and administration costs	4,531,040	6,885,129	7,766,895
NCHDs (non-consultant hospital doctors)	456,061	791,104	1,104,637
Nursing costs*	400,831	839,102	687,979
HSE colposcopy and other funding**			7,046,835
Other***	381,142	386,486	264,086
Total Pay	11,396,379	17,538,147	28,934,000

* Paramedical costs increase significantly in 2009 as a result of both programme's development. In 2009, some nursing costs are reclassified as "paramedical" by virtue of their actual role in the organisation (e.g. smear taking training)

** Includes a one-off payment of up to €1.2 million to the HSE to support the redeployment of staff previously engaged in cervical cytology

*** The other items on the pay accounts include provision for support services, pensioners and superannuation refunds.

The pay costs in respect of the BreastCheck and CervicalCheck programmes are discussed in the relevant sections of this report dealing with those services. An analysis of the staff-related management and administration costs associated with the 2009 expenditure forecast is shown in Table 4.5.

Table 4.5 Breakdown of planned management and administration costs of NCSS 2009¹¹³

Category	Total
Unit-based customer service/support staff	2,842,886
Screening promotion/outreach staff	449,602
Information line staff	267,584
ICT/PACS staff	687,551
Management/administration	3,519,272
Total	7,766,895

4.4.2 Non-pay Costs

There were similar increases in non-pay costs over the period 2007 to 2009, and this is reflective of the additional development of services over that period. These costs are illustrated in Table 4.6.

Table 4.6 Non-pay costs NCSS 2007 – 2009¹¹¹⁻¹¹³

	2007 €	2008 €	2009 €
Medical and surgical supplies	51,632	95,561	76,591
Smeartaker payments*	1,424,649	3,719,673	15,903,136
X-ray/imaging	1,099,360	1,155,692	2,120,539
Professional services	3,422,278	3,334,589	2,805,620
Audit and accountancy	38,957	83,947	36,540
Legal	247,457	257,376	250,000
Other**	10,189,233	13,469,916	18,623,579
Total	16,473,566	22,116,754	39,816,000

* The large rise in smeartaker payments in 2009 expenses is associated with expansion of the CervicalCheck programme.

** The other category includes laboratory, cervical cancer screening supplies, office costs, computers, transport and travel, maintenance, training, mobile unit costs, catering, cleaning, washing, waste and a range of other non-pay items. Laboratory costs have not been identified individually due to commercial sensitivity.

4.5 Cost Improvement Programmes

During the evaluation, some cost-improvement programmes and initiatives were identified by the NCSS as follows:¹¹⁴

- the employment of a procurement officer in early 2007 has continued to consolidate purchasing arrangements and reduce ad hoc purchasing
- a fresh round of competitive tenders has been invited for, amongst others, print distribution, printing, mail-room services, medical consumables and stationery
- negotiation with providers of clinical consumables lower than the EU thresholds for public procurement tendering resulted in a projected overall saving for 2009 in the region of €130,000
- the system of collecting and delivering material and film from mobile units back to the regional centres has been changed to achieve a projected saving of €260,000 in 2009
- off-site storage was reviewed in 2009 and negotiation achieved a potential saving of €6,000
- a purchasing card was introduced in 2009, to be used for transport and travel bookings instead of via a travel agency. This has resulted in the elimination of administration costs and is expected to achieve a saving in the region of €5,000 in 2009
- in May 2009, the NCSS was obliged to seek a reduction of 8% in professional fees as a result of the *Financial Emergency Measures in the Public Interest Act Ireland, 2009*¹¹⁵
- the NCSS also took the opportunity to seek a similar reduction from non-professional suppliers and this is likely to yield some savings by the end of 2009.

4.6 Review of Expenditures and Accounts

The Audit Commission of England has been responsible for assessing the value for money (VFM) delivered by NHS organisations since 1991 and has extensive experience in undertaking efficiency reviews across a wide range of public services. The Authority engaged the Audit Commission in an advisory capacity to support the assessment of efficiencies in the screening services in line with the terms of reference for the evaluation. The key lines of enquiry used by the Audit Commission are illustrated in Appendix 5.

The NCSS has grown significantly in recent years, achieving much in the process. In the Audit Commission's experience, it typically takes several years for organisations to fully embed all the attributes of consistently high-achieving organisations in terms of financial planning and control and value for money.

Although the Audit Commission did not undertake a comprehensive assessment of the NCSS as part of this evaluation, from the information reviewed there is scope to further improve efficiencies. In part, these opportunities arise because:

- there are high overhead costs in management and administrative staff and buildings
- headcount and costs have grown rapidly in recent years (Table 4.7)
- there is no medium-term integrated business plan
- synergies between the two screening programmes have not been fully exploited.

There are a number of synergies where there is scope for improved economy, efficiency and effectiveness. These include information and communications technology, health promotion, information-line services, programme evaluation and developing and maintaining a population register and database.

The rate of increase in whole-time equivalents (WTEs) and a sample of costs are outlined in Table 4.7.

Table 4.7 The rate of increase in WTEs and sample costs from 2007-2008¹¹¹⁻¹¹³

	2007	2008	Percentage Increase
Staff costs			
Employees (WTEs)	187	247	37
Payments to clinical consultant staff	€2,900,000	€4,600,000	57
Nursing costs	€401,000	€839,000	109
Management and administration costs*	€4,500,000	€6,900,000	53
NCHDs	€456,000	€791,000	73
Paramedical	€2,800,000	€4,000,000	43
Non-pay costs			
Medical and surgical supplies	€52,000	€96,000	85
GP payments	€1,400,000	€3,700,000	164
Travel	€646,000	€987,000	53
Mobile units	€84,000	€204,000	143

* Management and administration costs include screening centre-based staff, corporate management and administration, promotion/outreach, ICT and information lines. The large year-on-year increases in the costs between 2007 and 2008 coincide with the expansion of the programmes over this period.

The Executive and Board of the NCSS, and its audit committee, may wish to review the Audit Commission's approach to reviewing value for money in public service organisations (Appendix 5) and consider where there is scope for improvement.

4.7 Potential for Efficiencies

It is recognised that individual elements of the BreastCheck and the CervicalCheck programmes could lead to potential cost efficiencies in themselves and these items are dealt with in later sections of the report. However, in more general terms, there are opportunities for efficiencies and money saving that could be derived from the overall operating expenditures of the NCSS corporate division and these are dealt with here. Such efficiencies and cost savings would be additional to any efficiencies and cost savings that could be derived from the operational processes of the individual screening programmes, and might be used to offset the costs associated with the implementation of a colorectal cancer screening programme.

The recent *Report of the Special Group on Public Service Numbers and Expenditure Programmes*¹¹⁷ published for the Government states:

“In addition, the Group recommends that the HSE accelerates its efforts to achieve better operational performances, without as far as possible impacting on patient care, by setting specific cost saving or expenditure reduction targets for each budget holder (e.g. local health office and hospital manager) within the HSE system, including organisations funded by the HSE. This would require the delivery of additional economies in expenditure on non-clinical costs (such as food and laundry), activity related costs (such as surgical supplies, laboratory consumables, blood, gas and X-rays) and other costs like energy, legal costs, insurance, advertising, travel and subsistence, consultancy and public relations. Such economies should be achieved through a combination of reductions in price (better procurement) and usage (e.g. better travel management systems). The Group recommends that a target reduction of two percent in the 2009 budgets be set for each of the years 2010 to 2012.”

An initiative that could be undertaken by the NCSS would be the development and implementation of a cost improvement programme, similar to that described for the HSE above, for 2010 and beyond, and this should look to reduce at least 2% off its budgetary allocation in each year. A full expenditure analysis of non-pay spend should be undertaken to identify areas where further savings are possible.

The *Report of the Special Group on Public Service Numbers and Expenditure Programmes* also suggests possible efficiencies within the overall staffing of the Department of Health and Children and its agencies.¹¹⁷ The report states “that the staffing complement of the Department of Health and Children be reduced by 10% a year for the next three years as demand allows, and that staff reductions of 6,000, at a minimum, be targeted for the HSE under the *Employment Control Framework for the Health Sector*. Furthermore, the Group recommends that staff flexibility and redeployment, on a compulsory basis if necessary, be introduced in the best interest of patients”.

The administrative and managerial capacity of the NCSS corporate body, which is additional to other managerial and administrative staff located within each of the service delivery units, would suggest that, going forward, there is significant

opportunity to utilise the existing resource in the organisation and management of the proposed colorectal cancer screening programmes, and that budgetary provision for additional staff for the management of this service would be minimised.

This review indicates that savings opportunities could be achieved within the corporate aspects of the NCSS and these are summarised as follows:

- a full expenditure analysis of non-pay spend should be undertaken to identify areas where more savings are possible
- implementation of year-on-year cost improvement programmes to deliver at least 2% per year efficiencies in cost. Consideration should be given to enable the NCSS to retain cost improvements achieved to offset against costs of implementation of the colorectal screening programme
- use of the existing managerial and administrative staffing within the NCSS in the development of the new colorectal cancer screening service.

5 Review of BreastCheck – the National Breast Screening Programme

5.1 Overview

5.1.1 Background

Following the success of a pilot scheme called the Eccles Breast Screening Programme (and similar programmes in five other EU member states), a steering group and a quality assurance committee were established in 1997 to report on the establishment of a national breast screening programme.¹⁰⁹

The National Breast Screening Board was established in 1998 as a joint health board initiative with the then health board chief executive officers serving as members of this Board. In 2005, the National Breast Screening Board was re-established. This followed the passage of the 2004 Health Act and the establishment of the HSE, as this Act included the abolition of the health boards and a number of specialist agencies.

The National Breast Screening Board was dissolved in December 2006 and became part of the NCSS in January 2007. The governance and management of the service was transferred to the NCSS at this time and the service has expanded rapidly since. In the latter part of 2007, newly commissioned centres in Galway and Cork began screening eligible women and 2008 was the first full year of operation of these centres. Geographical expansion of the service has continued, and is expected to be in all counties by October 2009.

Four regional centres are charged with service delivery, and these are located as follows:

- **Eccles Unit** – covering North Dublin (and County Dublin), Cavan, Carlow, Kilkenny, Longford, Louth, Meath, Monaghan, Offaly, Westmeath
- **Merrion Unit** – covering South Dublin (and County Dublin), Kildare, Laois, Wexford, Wicklow
- **Southern Unit** – covering Cork, Kerry, Limerick, Tipperary South, Waterford
- **Western Unit** – covering Clare, Donegal, Galway, Leitrim, Mayo, Roscommon, Sligo, Tipperary North.

Mobile units operate from each centre, and offer screening services locally to women in counties and locations convenient to where they live.

5.1.2 Screening Process

Invited women, aged 50-64 years, are drawn from a maintained population register and are screened every two years in accordance with the programme.²⁵ Screening activities are undertaken within the regional centres and by mobile units which are located in pre-determined areas of the country. Women identified from the register are issued with appointments by the service in line with where they live. When screening is underway, letters of invitation are sent to women living in the area at least seven days in advance of the scheduled appointment time.¹⁰⁹ Although women can formally opt out of the programme once they receive their appointment, there is no formal requirement for them to opt in, or to confirm that they will be attending an appointment slot allocated to them. One further invitation letter is sent to those who do not attend on the scheduled appointment.

To avoid inefficiency in this system, the screening centres issue invitations to a fixed number of women in a given area, based on their prior knowledge of the attendance rates for the localities. As it is impossible to predict how many women will actually attend for screening, appointments are sent to additional women in order to compensate for those who may elect not to present.

Each woman has a two-view mammography examination: each breast is X-rayed from the side and from the top by the radiographer. The maximum number of mammography examinations that may be undertaken by a radiographer on a daily basis is 20.¹¹⁸ The mobile units are usually staffed by two senior radiographers; each performing 20 mammograms per day if 40 women attend. The hours of operation of the mobile units are dependent on their location, and the requirement for the radiographers to travel to them. It is possible also for the staff to stay overnight in the areas where they are located, with payment of appropriate subsistence rates. At each of the four regional centres, screening is arranged in two three-hour sessions daily, one in the morning and one in the afternoon.

A number of activities take place in addition to screening at the regional screening centres. These include film review and reporting, assessment clinics, results clinics, stereotactic localisation procedures, multidisciplinary meetings, daily, weekly and monthly quality assurance procedures, and training as part of the postgraduate mammography course. This is in addition to management, administration and other operational activities. Screening does not take place when assessment clinics are being held (normally one or two assessment clinics each week).

All follow-up procedures, up to and including primary surgery for a detected cancer, are covered under the screening programme and BreastCheck's budget includes payment for certain aspects of these procedures, for example, consultant surgeon sessions but not the other costs of surgery.¹¹⁹

A notable feature of the programme is the *Women's Charter*.¹²⁰ This is a widely distributed document designed to inform women of what to expect from the programme. The charter outlines the commitments to, and the parameters of, service delivery. It also encourages women to give feedback to the National Breast Screening Programme for ongoing quality improvement.

5.1.3 Eligible Population

At any point in time, the eligible population for breast screening in the 50-64 year old population in Ireland is estimated to be 340,000 women.²⁵ Of these, more than 149,000 live in the southern and western regions of the country, and the remainder in the regions of the country served by the eastern units¹⁰⁹ The programme aims to screen in excess of 70% of eligible women every two years.

Approximately 63,000 women attended for screening in BreastCheck in 2006¹⁰⁴ and in 2007 this figure rose to almost 67,000.¹⁰⁹ This modest increase is due in part to the opening of the new western and southern centres late in 2007. The uptake of first screening invitations continues to be highest in the youngest age range (50-54 years), whilst for subsequent screening invitations (women who have previously attended a screening appointment) there is little difference between the age groups with a high rate of uptake recorded across all groups. It is estimated that the expanded service will have screened up to 90,000 in 2008, and a target of 140,000 screens in 2009 has been set (although may not be fully achieved). The numbers of women screened and breast cancers detected during the years 2007-2009 are listed in Table 5.1.

Table 5.1 Number of women screened and breast cancers detected 2007 to 2009^{25,109}

	2007	2008*	End May 2009*
Women screened	66,527	90,834	48,726
Cancers detected	396	635	N/A

* These numbers are preliminary and yet to be validated and published by the NCSS

N/A = not applicable

5.2 Corporate and Clinical Governance

The programme has a national lead clinical director. This is a rotational post of five years' duration, and is held by one of the clinical directors from the four regional centres. The function of the post is to support and foster clinical cohesion across the entire programme network. The lead clinical director reports to the Chief Executive Officer (CEO) of the NCSS on a monthly basis.

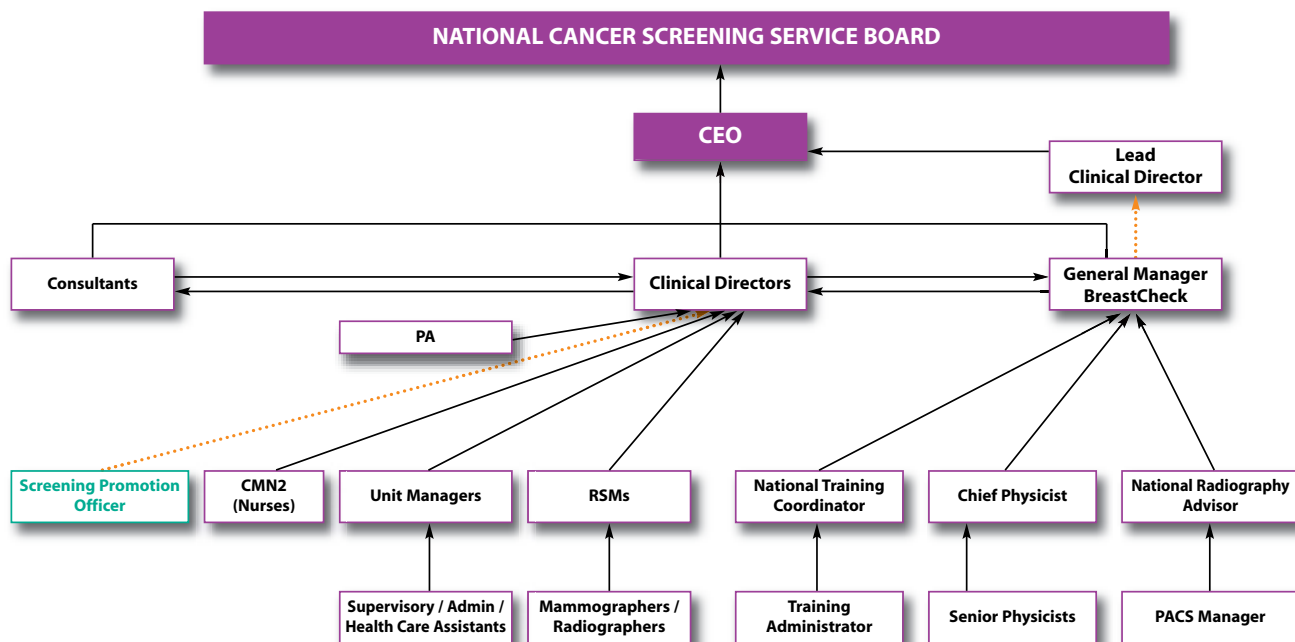
Within each of the regional centres, there is a clinical director, who is the lead radiologist, with responsibility for ensuring that all of the clinical parameters in breast cancer screening are achieved. The clinical director reports to the CEO on behalf of his/her own centre. Clinical care is provided by the multidisciplinary team including consultant radiologists, surgeons, pathologists and anaesthetists, radiographers, clinical nurse specialists and healthcare assistants. Multidisciplinary meetings are held weekly to undertake radiological, pathological and clinical correlation of all results and to discuss and agree patient pathways.

Unit managers are responsible for the administrative functions of each of the centres and they report to the clinical director. A National Breast Screening Programme general manager, who is based in the NCSS headquarters, supports and facilitates the clinical directors and unit managers in the optimal delivery of the BreastCheck programme. There is also a national radiography advisor employed across the service.

This organisational structure of BreastCheck is illustrated in Figure 5.1.

Figure 5.1 BreastCheck – organisational chart*

Organisation Chart
Division: Breast Screening
 September 2008



* Reproduced with permission of NCSS

5.3 Quality Assurance Systems

BreastCheck outlines in detail, in *Guidelines for Quality Assurance in Mammography Screening (third edition)*, a comprehensive multidisciplinary quality assurance (QA) system.¹¹⁸ The programme is audited against a range of quality-led criteria, as published in the *Women’s Charter* and these are reported every year in the annual report. Programme standards, against which performance is measured, are based on the *European Guidelines for Quality Assurance in Mammography Screening (fourth edition)*.¹²¹ External validation is also provided by the European Reference Organisation for Quality Assured Breast Screening and Diagnostic Services (EUREF).

There is a multidisciplinary team approach involving staff who have expertise and qualifications in breast cancer and breast surgery. The clinical director is responsible for QA.

Mammograms are read independently by two specially trained radiologists and if a woman requires a further review the team uses a “triple assessment” approach. This is a combination of clinical examination, additional imagery (mammography or ultrasound) and biopsy.

There is a national QA committee composed of a multidisciplinary team from the programme who provide advice and recommendations to the NCSS Executive and Board in regard to the programme's clinical efficacy and QA in all clinical and technical disciplines. All aspects of quality data from each unit are reported to the QA committee. There is a QA multidisciplinary consultants' group and a mono-specialty radiology QA group who support and report into the national QA committee.

Clearly, QA processes are an important aspect of any screening programme, but they consume resources; the scale and nature of QA are a significant contributing factor that drives unit costs. However, these costs are not separately identifiable in NCSS budgets and the Evaluation Team is not in a position to quantify or comment on whether these costs represent good value for money.

5.4 Costs and Resources

The predicted expenditure for the breast screening programme in 2009 is stated at €25.6 million (€24.7 million allocation from Department of Health and Children plus €0.9 million pension income).¹¹³

This is divided as €17,867,829 for pay costs and €7,770,691 for non-pay.

A sample of the breakdown of pay costs for 2009 is shown in Table 5.2.

Table 5.2 Breakdown of pay costs in the BreastCheck Programme 2009¹¹³

	2009 €
Screening unit-based customer service/support staff	2,424,190
Screening promotion outreach, information line, ICT/PACS staff	858,949
Management and administration costs	2,583,284
Nursing costs	687,979
Consultants	5,820,310
NCHDs	1,104,637
Paramedical	5,702,264
Support services	160,651
Pensioners, superannuation	103,596
Head office reallocation*	(-1,578,031)
Total Pay Costs	17,867,829

* Certain pay costs in head office have in the past been borne solely by BreastCheck. A review of these costs has resulted in the CervicalCheck programme now bearing a percentage of these costs.

A number of consultants, employed on the BreastCheck programme, have sessional commitments to symptomatic services in hospitals or to universities. It is estimated that the unrecoverable costs to the BreastCheck programme (and the NCSS) as a result of these commitments amounts to €1,262,508 per year.¹¹⁹

A breakdown of non-pay costs for 2009 is not shown due to commercial sensitivities.

5.5 Cost Drivers

Calculation of the unit cost for providing breast screening and assessment of persons on the programme has been carried out by the NCSS. This is based on the net expenditure on the programme for the first five months of 2009, and attributing proportions of this net expenditure to different elements of the programme. Applying this methodology, 47.5% of the expenditure on the programme can be attributed to screening activity, and 22.5% attributed to assessment activity. Using data from the first five months of 2009, the unit cost of screening was €97 and the unit cost of further assessment was €921.¹¹⁰

It is acknowledged that there may be differences in the costs and resource infrastructure underpinning the unit costs in different countries. The unit cost of breast screening in Ireland, at €97, appears high compared with a unit cost of €51 in the Netherlands and €52 (GBP 46) in England.^{122,123} The relatively higher cost in Ireland may be reflective of the manner in which the service is delivered. Some of the factors contributing to these costs include:

- the breast screening programme in Ireland is consultant delivered, rather than consultant led
- the relatively high cost of consultant salaries compared with salaries in other European countries
- the philosophy of the programme in going out to the community. The low population density of Ireland results in substantial costs associated with transport and travel
- recruitment of senior radiographers – for example, two senior radiographers are required to run a mobile unit.

5.6 Activity and Utilisation of Mobile Screening Units

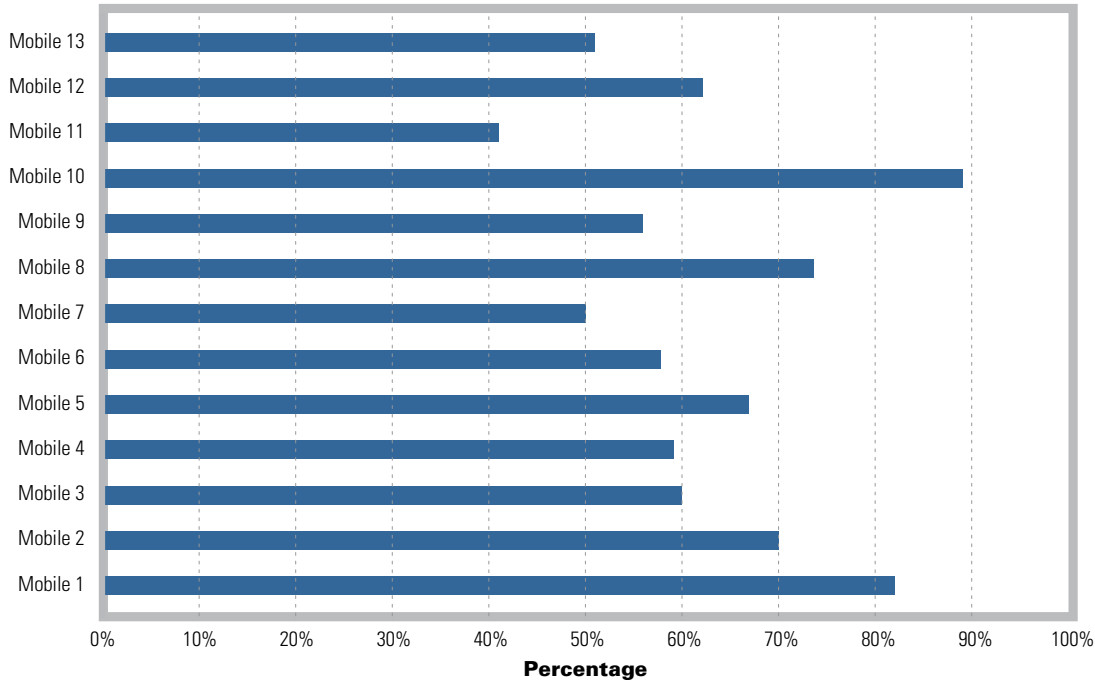
Mobile units are staffed by two radiographers who each may screen up to a maximum target of 20 women per day.¹¹⁸ An assessment was performed on the activities of the mobile units during the month of March 2009 in respect of the number of days that the units actually operated during the month, and the number of women screened during each operational day.¹²⁴

On analysis of the data, during 21 potential working days in March 2009, 6,633 of the potential 10,480 screening slots in the 13 mobiles were used equating to 63.29% utilisation*. Percentage utilisation across the mobile units is shown in Figure 5.2.

* One of the 13 mobiles was deployed mid month and therefore potentially available for 10 rather than 21 days in March.

It is not possible without further detailed analysis to determine the utilisation in the regional screening units.

Figure 5.2 Utilisation of mobile units



One hundred percent utilisation rate for any mobile unit is difficult if not impossible to achieve. For example:

- logistical/operational reasons may prevent the unit operating on a particular day
- the service may be in transit to a new location
- a number of radiographers may be in training for whom capacity is reduced from 20 to 10 mammograms per day
- not all women, who are invited, will attend for screening
- some women will require longer appointment times than others depending on their needs.

This analysis is limited to a one-month period only, and therefore does not represent a full-year-activity analysis. The figures indicate an average utilisation rate of approximately 63% which suggests that an analysis of the reasons for this, and measures to increase utilisation and productivity, could lead to greater efficiencies in the system.

The current arrangements, whereby a woman is scheduled for an appointment but does not need to confirm it, present potentially an opportunity for efficiency. It might be possible that if a requirement for a woman to confirm her intention to attend a scheduled appointment was introduced, this utilisation rate could be increased. For example, this could be achieved by pre-paid letters of confirmation, text messaging or

other online means. In addition, mechanisms other than a confirmation of intention to attend should be explored to optimise further utilisation of these clinics.

The Board of the NCSS supports a policy of extending the age range of women screened in the programme from 65 years to 69 years. The NCSS should undertake an analysis of mobile unit utilisation and consider whether improvements in productivity could provide some of the additional capacity to support this extension of the programme.

5.7 Potential for Efficiencies

The following are potential areas for increased efficiency within the BreastCheck process:

- mechanisms to optimise attendance at screening clinics, including women confirming attendance, should be explored as possible ways of increasing the utilisation of the clinics and contributing to the potential expansion of the age group screened
- the unit cost of breast screening in Ireland appears to be high compared to other European countries such as the Netherlands and England and some of the drivers of these costs are listed above. A detailed analysis of the differences between the systems, and an evaluation of where cost savings could be derived, should be considered.

6 Review of CervicalCheck – the National Cervical Screening Programme

6.1 Overview of Existing Programme

6.1.1 Background

Arising from the 1996 *Report of the Department of Health Cervical Screening Committee*,¹²⁵ a decision was taken in 1997 to establish a national cervical screening programme. The Irish Cervical Screening Programme (ICSP) - Phase 1 commenced in the Mid-Western Health Board region in 2000 and served eligible populations in Limerick, North Tipperary and Clare.²⁵ The purpose of a phased implementation was to enable the establishment and testing of operational elements of the programme prior to the eventual national roll-out of the programme. The programme was provided through a primary care model, and smertakers were registered with the ICSP.

The governance and management of the ICSP was transferred to the Board of the NCSS, following its establishment in 2007. The NCSS was charged with developing the plan to implement the cervical cancer screening programme nationwide and, based on a review of the Phase 1 programme, proposed that significant criteria for the implementation should include:

- putting in place a formal contractual relationship between the programme and each of the key service providers, including smertakers, and providers of cytology and colposcopy services
- bringing together the funding of these under the governance of the NCSS
- putting in place a *Women's Charter* with deliverable commitments on a range of key quality considerations.

The CervicalCheck programme began operations in September 2008.

6.1.2 Screening Process

CervicalCheck targets women between the ages of 25 and 60 years, who undergo screening every three years from 25 to 44 years, and thereafter every five years to age 60 assuming the woman has previously had two consecutive “no abnormality detected” reports.²⁵ A call/re-call structure was introduced in September 2009.

There are currently over 4,000 registered smertakers in more than 1,600 locations throughout every county in Ireland. Registered smertakers in the current programme include general practitioners (GPs) – who have overall responsibility for smertaking in their practice – practice nurses, Dublin Well Woman Clinics and the Irish Family Planning Association clinics.

A Smertaker Training Unit was established at the programme office in Limerick and has responsibility for the coordination and delivery of all smertaker educational initiatives.

CervicalCheck also has a *Women's Charter*.¹⁰⁴ This outlines the commitments to, and the parameters of, service delivery. It also encourages women to give feedback for ongoing quality improvement.

6.1.3 Eligible Population

At any point in time, the estimated eligible population for CervicalCheck is 1.1 million women between the ages of 25 and 60 years.²⁵ Because the programme has been based on the self-presentation of eligible women to a registered smertaker, this has led to varying demand on the services, and the number of smears taken on a monthly basis is unpredictable. From September 2009, the programme will operate on a call/re-call basis – eligible women, identified from the population register, will receive a formal letter of invitation from the NCSS to participate in the programme. It is expected that, on average, 25,000 smears will be performed every month.

The numbers of women undergoing cervical cancer screening from 2007-2009 are outlined in Table 6.1.

Table 6.1 Number of women screened^{51,110}

	2007	2008*	End May 2009*
Irish Cervical Screening Programme - Phase 1 women screened	12,410	17,717 (Jan – Aug)	N/A
CervicalCheck women screened	N/A	59,903 (Sep – Dec)	166,752

* These numbers are preliminary and yet to be validated and published by the NCSS

N/A = not applicable

6.2 Corporate and Clinical Governance

On establishment of the NCSS in January 2007, a head of cervical screening and a deputy manager were appointed.⁵¹ An interim clinical director was also appointed to provide appropriate clinical governance and leadership for the programme. A quality assurance coordinator is based in the regional office.

CervicalCheck is based on contracts with external providers as follows:¹⁰⁴

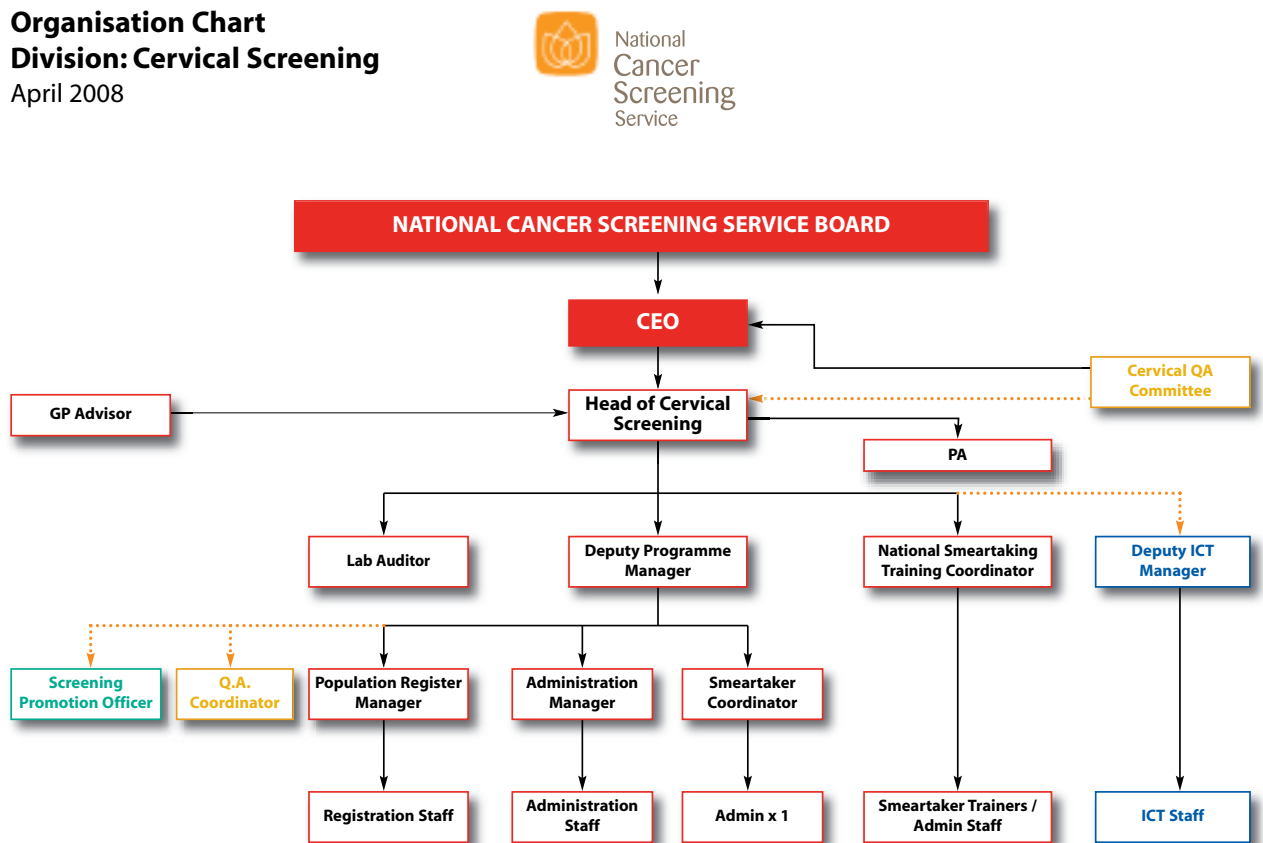
- during the Phase 1 programme a contract for the provision of smear taking services was issued to GPs in the mid-west who had registered with the ICSP. Following the cessation of that programme and the commencement of

CervicalCheck, a new contract for a three-year period was issued directly to participating GPs nationwide. Under the terms of the contract for the provision of smertaking services in the programme, the GP has clinical responsibility to follow through each patient’s care on each cycle of the screening process¹²⁶

- in 2008, a private laboratory was contracted for two years to provide a cytology service for all smears undertaken in the screening programme and in colposcopy clinics
- a network of 15 colposcopy clinics has been selected in the event of a woman requiring further investigation or treatment following her smear test.

The organisational structure of CervicalCheck is illustrated in Figure 6.1.

Figure 6.1 CervicalCheck– organisational chart*



* Reproduced with permission of NCSS

6.3 Quality Assurance Systems

A QA committee for the programme, which reports to the Chief Executive Officer of the NCSS, was established in 2007 to review international standards and recommend best practice.¹⁰⁴ The QA committee, supported by specialist sub-groups, has developed draft QA Standards for CervicalCheck which have been reviewed by an international peer review group and are due to be approved by the Board of the NCSS before the end of 2009. These QA standards will include performance measurements on:

- programme administration
- primary care
- cytology
- histopathology
- colposcopy.

CervicalCheck administration has achieved the ISO 900 - 2000 quality certification and maintains this standard through regular internal and external audit.

A comprehensive smearer training prospectus has been developed and underpins a smear taking training programme developed and delivered in partnership with the Royal College of Surgeons in Ireland (RCSI), the National University of Ireland, Galway and the Irish College of General Practitioners (ICGP).¹²⁷ As of September 2009, a total of 841 smearers have undertaken smearer training programmes.¹²⁸

CervicalCheck provides registered smearers with feedback on the quality of the smears taken within two contexts:

- in the course of training, feedback is provided by identifying the presence/absence of transformation-zone sampling on a minimum of 30 smears taken during the training period
- in the course of daily practice, CervicalCheck issues summary reports for individual smearers on cytology outcomes for all the smears taken by them together with the programme averages.

The method of making a complaint or providing feedback was reported to be via the information line or to a PO box number. All complaints and feedback are forwarded to the complaints officer. These are then followed up and feedback provided to the service user, smearer and the programme so that the programme can be continuously improved.

As the QA standards are at an approval stage and have not been widely disseminated, the Evaluation Team are not in a position to comment on whether the QA costs represent good value for money.

6.4 Costs and Resources

The predicted expenditure for the cervical screening programme in 2009 is stated at €43.12 million (€42.9 million allocation from the Department of Health and Children plus €0.2 million pension income) for the first full year of its operation.¹¹³ This is divided as pay costs of €11.07 million and non-pay costs of €32.05 million.

A sample of the breakdown of pay costs from the projected expenditure for 2009 is shown in Table 6.2.

Table 6.2 Projected breakdown of pay costs in CervicalCheck 2009¹¹³

	2009 €
Programme office-based customer service/support staff	418,696
Screening promotion outreach, information line, ICT staff	545,788
Management and administration costs	935,988
Consultants	93,051
Paramedical	447,943
Head office reallocation*	1,578,031
HSE colposcopy and other funding**	7,046,835
Total pay costs	11,066,332

* Certain pay costs in head office have in the past being borne solely by the BreastCheck Programme. A review of these costs has resulted in CervicalCheck now bearing a percentage of these costs.

** This includes a one-off payment in 2009 to the HSE to support the redeployment of staff previously engaged in cervical cytology

A breakdown of non-pay costs for 2009 is not shown due to contractual commercial sensitivities. Based on an annual uptake of approximately 300,000 smears per annum in a population-based cervical screening programme, the projected expenditure for payment to GPs and other contractors would be €15.9 million per annum in accordance with the fee schedule at the beginning of 2009.

6.4.1 General Practitioner and Other Contractor Costs

The current contract with GPs and other contractors was developed by the NCSS during 2007-2008, by way of consultation with a variety of interested stakeholders, providing them with an opportunity to contribute views regarding a national cervical cancer screening programme.¹⁰⁴ A draft contract for the provision of smearing services was published by the NCSS in January 2008 inviting comment and feedback from potential service providers. On completion of this consultation process, the NCSS published a final contract for the provision of smearing services as part of the national programme.

Under the existing contract, GPs and other healthcare professionals in the primary care setting who provide cervical screening services are requested to register with CervicalCheck. Under the NCSS arrangements, the GP taking on smear testing enters into a contract with the NCSS. The contract lists the qualified person(s) on the registration form, who is/are "suitable, competent and qualified to carry out smear tests under the programme".¹²⁶ The contract sets out the relative responsibilities of the NCSS and of the GP around the provision of the contract. Either party may terminate the contract provided that three months' written notice is given to the other party.

The current fee under CervicalCheck is €51.69 per smear. This fee is for professional services. In addition to the performance of the smear test itself, the GP is responsible for the appropriate follow-up and communication with the woman. This includes provision of results, undertaking of a repeat smear, referral for colposcopy and counselling of the woman as required. The fee for the service is included as an article of the contract, and it is payable monthly in arrears following notification from the designated laboratory that it has received a smear sample (taken by the GP or by a qualified person in the practice) and a cytology referral form in respect of an eligible client.

During this evaluation, the fees paid to contractors providing this service were examined. The fee dates back to the commencement of the Irish Cervical Screening Programme - Phase 1, in 2000. At that time, the Irish Medical Organisation (IMO) negotiated a fee of approximately IR£30 for the provision of smear tests with the Department of Health and Children. This fee has undergone incremental increases over the years in line with existing policies and has been converted into euro. Prior to the implementation of the new nationally-based cervical screening programme in 2008, the NCSS undertook a consultative process with a number of stakeholders (including the Irish College of General Practitioners and the IMO) in respect of the provision of smearing services in primary care. The contract allows fees to increase in line with percentage increases under the national pay agreements. Therefore, the fee of €54.81 in August 2008 was increased by 2.5% on 1 September 2008, bringing the fee to €56.18 from that time onwards.¹²⁹

On 1 May 2009, smearer contractors were required under the Financial Emergency Measures in the Public Interest Act Ireland 2009¹¹⁵ to take an 8% reduction in professional fees, thereby reducing the figure to the present day fee of €51.69.

Many smear tests are carried out in general practice by the practice nurse, and these nurses are registered as qualified persons under the programme. Figures provided by the NCSS in August 2009,¹³⁰ indicate that 47% of smear tests provided under the scheme have been carried out by practice nurses.

The contract states that discussions may be initiated with the IMO GP Committee in the first quarter of 2011 concerning any proposed extension, renewal or replacement of the contract.¹²⁶

6.4.2 Cytology Costs

A procurement process for the provision of cytology laboratory services commenced in December 2007 with the publication of a notice in the *Official Journal of the European Communities* in line with public procurement regulations. The requirement of the NCSS was that each potential contractor would need to meet certain criteria, including that they must:²⁵

- hold third party accreditation from a recognised accreditation body to International Standard ISO 17025 or ISO 17011
- have capacity to screen a minimum of 25,000 cervical smear samples per year
- have capacity and ability to process smears within a 10-day turnaround in order to facilitate the delivery of results to women within four weeks of their smear test
- hold independent quality accreditation of the service.

On completion of the procurement process, a private sector provider of laboratory services was appointed for the provision of cytology laboratory services. In addition to the criteria above, each slide analysed by the laboratory is examined twice by two separate cytologists.

The contract with the provider is due for renewal in June 2010, although the NCSS retains the option to extend the contract for a further two years. There may be some scope in which the costs payable in respect of cytology services could be reviewed, particularly in the current economic climate where other laboratories may likely compete for the service. The NCSS should consider re-tendering for cytology services at the completion of the current contract in 2010.

In addition to the contract, a one-off payment of up to €1.2 million will be paid by the NCSS to the HSE in 2009 to support the re-deployment of staff previously engaged in cervical cytology.¹³¹ If this funding is available in 2010, then it could in theory be considered for use to offset against the costs of a new colorectal cancer screening programme.

6.4.3 Colposcopy Costs

Colposcopy services are an integral part of a population-based screening programme. Of the expected 300,000 women to be screened annually, approximately 2% to 5% will require access to colposcopy services. In December 2007, members of the NCSS Colposcopy/Gynae Oncology Group undertook a colposcopy service review, that examined facilities, staffing, systems management, information management, information technology and governance.¹⁰⁴

Fifteen colposcopy clinics have been identified as most capable of meeting the requirements for a national cervical screening programme.²⁵ The NCSS supported the development of services in each location by means of a performance agreement¹³² and the NCSS will be responsible for the monitoring and audit of colposcopy

services to ensure adherence to “quality assured standards”.²⁵ The performance agreement includes a number of HSE hospitals as well as the Adelaide and Meath Hospital Incorporating the National Children’s Hospital (AMNCH), the Coombe Women’s Hospital, the Rotunda Hospital and the National Maternity Hospital. Under the agreement, the named hospitals agree to provide colposcopy services for the CervicalCheck programme and agree to perform these services to certain standards that may be determined by the NCSS from time to time.

The performance agreement provides for a one-off non-recurrent payment to each signatory hospital to enable it to upgrade its service to meet the standards and increased demand. The total value of this payment was €2.2 million, in 2008.

The recurrent revenue costs, from 2009 onwards, are estimated at €2.5 million for existing colposcopy staff plus an additional €3.42 million, based on the staffing gap in each colposcopy clinic. These planned costs for additional colposcopy staff in 2009 are summarised in Table 6.3.

Table 6.3 Recurrent revenue costs for additional colposcopy staff (2009)¹³²

	€
Costing of nurse, administration and healthcare assistant WTEs	2.669 million
Lead colposcopist sessions	0.262 million
Clinical colposcopist sessions	0.489 million
Total revenue costs	3.420 million

6.5 Cost Drivers

The overall manner in which GP services are configured and reimbursed varies considerably from country to country and therefore it would not be appropriate to directly compare figures relating to unit costs. In Ireland, calculation of the unit cost for providing cervical screening and assessment of persons on the programme has been carried out by the NCSS.¹³³ It is stated to be €112 per screen, consisting of a €51.69 fee per smear to the contractor as well as administration, screening promotion, laboratory, consumables, support services, population register and data collection and evaluation costs. The cost paid in Ireland per smear test appears high at €51.69. In the Netherlands, a cost of €10.95 (2005 costs) is paid.¹³⁴

The overall cost to the Irish health service of delivering the CervicalCheck programme, based on the current information, is estimated to be €43.12 million annually to screen approximately 300,000 women. In the UK, the annual cost to the National Health Service (NHS) of providing such a service to 3.8 million women is estimated to be €175.95 (GBP 157) million.¹³⁵ The average cost per woman screened in the UK is therefore €45.95 (GBP 41) compared to the average cost per woman screened in Ireland of €144. Again, differences in the costs between countries may reflect differences in service configuration and reimbursement. However, the degree of variation in costs between countries is unlikely to be explained by these differences alone, suggesting that the costs of CervicalCheck are high.

6.6 Examination of Alternative Proposals for Smarttaking

Based on an annual uptake of approximately 300,000 smears per annum in a developed population-based cervical screening programme, the NCSS 2009 projected expenditure for payment to GPs and others with whom it has entered into contracts with is €15.9 million per annum in accordance with the fee schedule (€56.18) at the beginning of 2009. These costs are based on a fee which covers smarttaking as well as clinical responsibility for the woman including follow up of abnormal smears.

There are clear benefits associated with the provision of cervical smear tests in primary care and these include:¹³⁶

- the holistic relationship established between the woman and her GP/practice nurse, which is beneficial for other aspects of her healthcare
- ready availability of the full medical history and case records for the woman if previously seen within that primary care practice
- continuity of care including the follow up of abnormalities
- support of the GP for the practice nurse, and immediate access to the GP for a second opinion if required.

The following are potential opportunities for savings on the current cost of smarttaking:

- reducing fees payable to practitioners for smarttaking but retaining the same structures
- examining alternative models for the provision of smear tests under the programme.

These options are discussed briefly below.

6.6.1 Reducing Fees Payable to Practitioners for Smarttaking

Under the current arrangements, the GP or other contract provider assumes clinical responsibility for all smear tests taken.¹²⁶ The test itself may be taken by a qualified person (defined in the contract, and is usually a medical doctor or practice nurse registered with the service). Current data from the NCSS indicate that 47% of all smear tests carried out under the programme are performed by practice nurses, and 53% by doctors.¹³⁰

Fees payable in respect of smear tests present an opportunity for cost efficiencies in the overall screening service. A significant withdrawal from the programme by any contractor due to a fee reduction could however limit the choice of smarttaking locations.

6.6.2 Examination of Alternative Arrangements for Smarttaking

Following a request from the Department of Health and Children to explore possible alternative models for the delivery of smartaker services for the programme, the NCSS in turn requested the Primary Community and Continuing Care (PCCC) Directorate of the HSE to examine its structures to see if this would be possible.^{136,137} This was on the basis of the existing structures and networks within the PCCC delivering a smear-testing capacity for greater than 300,000 smear tests per year on a broad geographical basis.

The HSE Primary Care Strategy¹³⁸ outlines the establishment of primary care teams (PCTs) and primary care networks (PCNs) covering the country. The hypothesis then was that the cervical smear tests required under the programme could be delivered by public health nurses or registered general nurses (RGNs) employed in PCCC. By 2012, it is expected that there will be 530 PCTs established across the country, and that 134 PCNs will be in existence.

PCTs are a defined group of primary care providers coming together to form an interdisciplinary team and serving a defined population. Each PCT will serve a population of some 8,000 to 12,000 persons, estimated to be equivalent to two to three GP practices currently.

It is envisaged that a wider network of health and social care professionals will be formed who will work with a number of PCTs. One hundred and thirty four of these PCNs will be established. A cervical smartaker service could be provided more centrally in the PCNs.

Following the request above, PCCC costed the delivery of the cervical smear tests required under the screening service on both a PCT and PCN basis. The recurrent costs are summarised in Table 6.4 and the one-off costs in Table 6.5. (These costs have not been validated as part of this evaluation.)

Table 6.4 Estimated pay costs of providing smear tests under PCTs or PCNs¹³⁶

	Primary care teams	Primary care networks	Notes
Number of smear tests to be provided under the programme	300,000	300,000	
Projected number of groups nationally according to the Primary Care Strategy	530	134	
Number of smear tests required annually per group	566	2,239	1
Estimated WTE required for delivery	0.3	0.8	2
Cost of WTE required per group	€15,800	€42,134	3
Estimated total pay costs using this model	€8,374,212	€5,646,010	4

Table 6.5 One-off capital and training costs required under the programme¹³⁶

	Primary care teams	Primary care networks	Notes
Training costs	€371,000	€93,800	5
Capital costs	€530,000	€134,000	6
Total one-off costs	€901,000	€227,800	

Notes for tables 6.4 and 6.5

1. The number of smear tests per group is based on the total number required under the programme divided by the number of groups, and assumes uniform distribution.
2. The estimate of WTE for each group was carried out by PCCC in deriving this model. For PCTs it is based on 0.3 nursing WTE. For PCNs it is based on a 0.8 nursing WTE.
3. The cost of a full WTE under this model has been stated as €52,668. This has been estimated based on the mid-point of a staff nurse salary scale, plus PRSI contribution, plus locum replacement costs. No allowance has been provided for other staff overheads e.g. HSE usually apply a 70:30 rule to pay:non-pay costs. To what extent non-pay costs would be covered already in funding the PCTs and PCNs would require further analysis e.g. costs of clinic buildings, office equipment etc..
4. This is the estimated cost of the required fraction of a WTE in each group, multiplied by the number of groups.
5. PCCC estimated that a training cost of €700 per group be assigned.
6. A one-off capital cost of €1,000 per group was estimated. This is based on one-off location set-up, equipment, angle-poise, light etc..

The disadvantages of the PCT model described above relate to the early stage of their development. In 2009, there are only a small number of these teams which are fully functional although 220 will have been established by the end of the year.¹³⁹ With 530 teams proposed, the total number of locations available to women for smearing might be potentially reduced; there are currently greater than 1,400 locations. The PCN option could restrict the number of locations further. There also remains the possibility that other services, which the primary care team would like to develop, might be compromised due to the time required for this programme.

The framework for clinical governance has not been described in this model. Responsibility for clinical follow-up of the woman and referral to colposcopy would need to remain with a medical practitioner and would need to be clearly defined. This may represent an additional cost. The additional costs payable for clinical accountability (possibly in the form of a new GP contract) plus the staff overheads, as yet unquantified, might bring the total cost closer to that currently being paid.

However, in the future, if the additional workload associated with the smearing programme can be absorbed to a large extent by the primary care team nurses within their current workload, then substantial savings would be realised as the marginal cost to the programme would be only those costs payable to GPs for the provision of overall clinical accountability for the woman. A separate analysis of the workload of primary care nurses and of all costs involved would be required if this model is to be considered further.

6.7 Potential for Efficiencies

On review of the expenditure for the programme, €11.07 million is associated with pay costs, and €32.05 million is associated with non-pay costs. The costs associated with smearing and the costs associated with cytology are the largest constituent costs in the service.

An analysis of the €112 unit cost of cervical screening, and potential for its reduction, would provide an opportunity for cost savings from the programme. Table 6.6 illustrates the potential savings that could be achieved with such a reduction.

Table 6.6 Potential savings associated with unit cost reduction

Reduction €	Potential saving €
5	1.5 million
10	3 million
15	4.5 million

The potential for efficiencies within the CervicalCheck programme is as follows:

- in Ireland, the unit cost for providing cervical cancer screening and assessment within the programme is €112. This should be examined in detail to identify those drivers within the costs where a reduction could be achieved. Significant savings could be realised with any reduction. A €10 reduction in the unit cost would yield an overall saving of up to €3 million annually
- the biggest single cost driver within the unit cost above is the fee payable to GPs, and other contract providers, for providing smear testing services. A reduction in this fee poses an opportunity for significant savings
- alternative proposals for smearing, as described above, could be explored. The model based on PCTs/PCNs could potentially be rolled out in tandem with the current arrangement until the PCTs/PCNs are fully operational. However, substantial savings may only be realisable with this model if the smearing workload can be absorbed to a large extent by the current nurses employed by the primary care teams or networks. In addition, the PCN option reduces the number of locations available for smearing compared to the PCT option
- there may be some scope in which the costs payable in respect of cytology services could be reviewed, particularly in the current economic climate where other laboratories may likely compete for the service. The NCSS should consider re-tendering for cytology services at the completion of the current contract in 2010.

7 Existing Services for Colonoscopy and Colorectal Surgery

7.1 Introduction

One of the terms of reference of the evaluation was to identify the existing resources assigned to colonoscopy services within the hospital system and assess the potential to apply, or build upon, these resources effectively within a national colorectal cancer screening programme. To meet this objective, data on the demand, capacity and utilisation of services, as well as quality assurance and accreditation, was sought by way of a survey.

7.2 Hospital Survey

7.2.1 Overview

The Authority's survey on current colonoscopy and colorectal surgery activity was divided up into a number of sections including:

- administrative information
- services provided
- facilities
- sessions
- activity
- waiting times
- staffing levels.

Although detailed, and with a short turnaround time of one week, all 37 hospitals surveyed (Appendix 2) responded. The quality of the data returned to the Authority for particular sections such as the activity, staffing information and waiting times varied greatly across the hospitals.

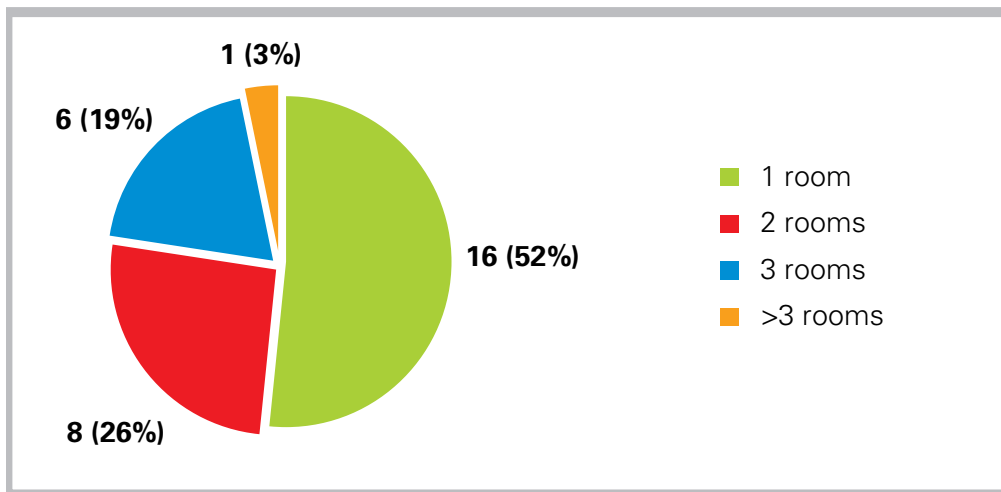
7.2.2 Facilities

All hospitals surveyed performed colonoscopy and sigmoidoscopy procedures while 36 out of 37 hospitals indicated that they performed oesophagogastroduodenoscopy (OGD).

Of the 37 hospitals, 31 had an endoscopy suite while six had no dedicated suite. One hospital indicated that it was due to expand its current suite by opening three additional rooms and one hospital indicated that it had one room in its suite that was not open due to human resources issues. One of the six hospitals currently without a dedicated suite was due to open a two-room facility in February 2010.

The number of rooms in suites varied from one to nine rooms; 16 of the 31 hospitals indicated that they had only one room in their suite, eight had two rooms, six had three rooms and one hospital had a suite with nine rooms (Figure 7.1).

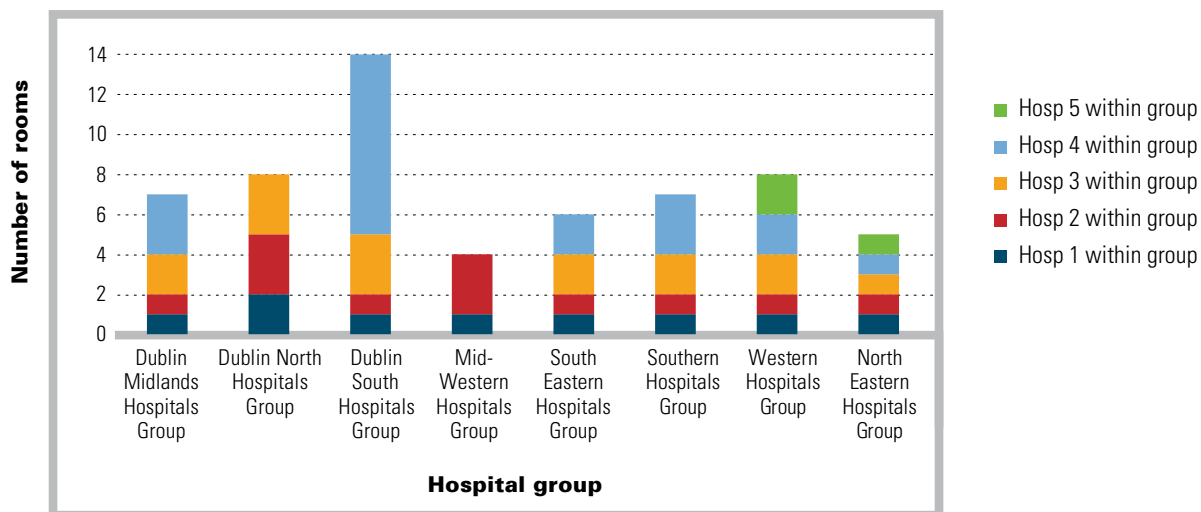
Figure 7.1 Number of rooms in endoscopy suites.



Survey on colonoscopy and colorectal surgery activity

Suites were situated in each of the eight HSE hospital groups, with variation in the number of rooms available across the groups. The Dublin South Hospital Group had the greatest number of rooms, 14 in total. The Mid-Western Hospital Group had the smallest number of rooms, four in total, the remaining hospital groups had between five and eight rooms each (Figure 7.2).

Figure 7.2 Number of rooms in endoscopy suites by hospital within hospital group.



Survey on current colonoscopy and colorectal surgery activity

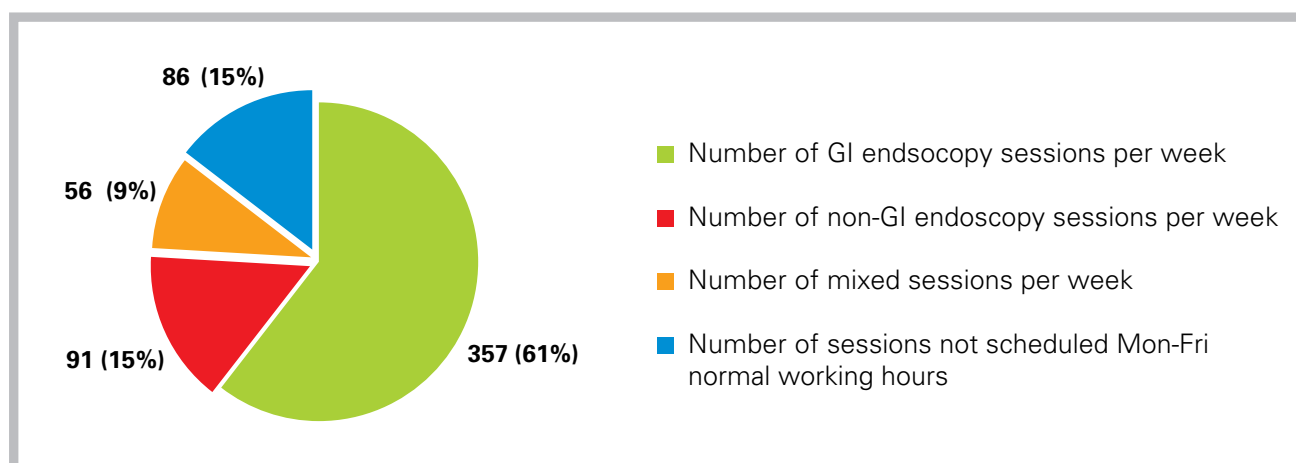
Thirty-four of the 37 hospitals indicated that they performed endoscopy procedures in a location in the hospital other than the endoscopy suite. Of the 31 hospitals with an endoscopy suite, 28 had endoscopy sessions scheduled elsewhere in the hospital, generally in the operating theatre (OT).

Twenty-two hospitals (62%) indicated that there was a specific clinical lead person for the endoscopy services within the hospital.

7.2.3 Opening Times and Endoscopy Suite Activity

Gastrointestinal (GI) endoscopy comprises colonoscopy, sigmoidoscopy and OGD. Endoscopy suites were predominantly used for gastrointestinal endoscopy. Overall 61% of scheduled sessions were specific to this activity and another 9% of sessions had some GI activity (Figure 7.3).

Figure 7.3 Collated session information with regard to session type and non-scheduled sessions: all hospitals.



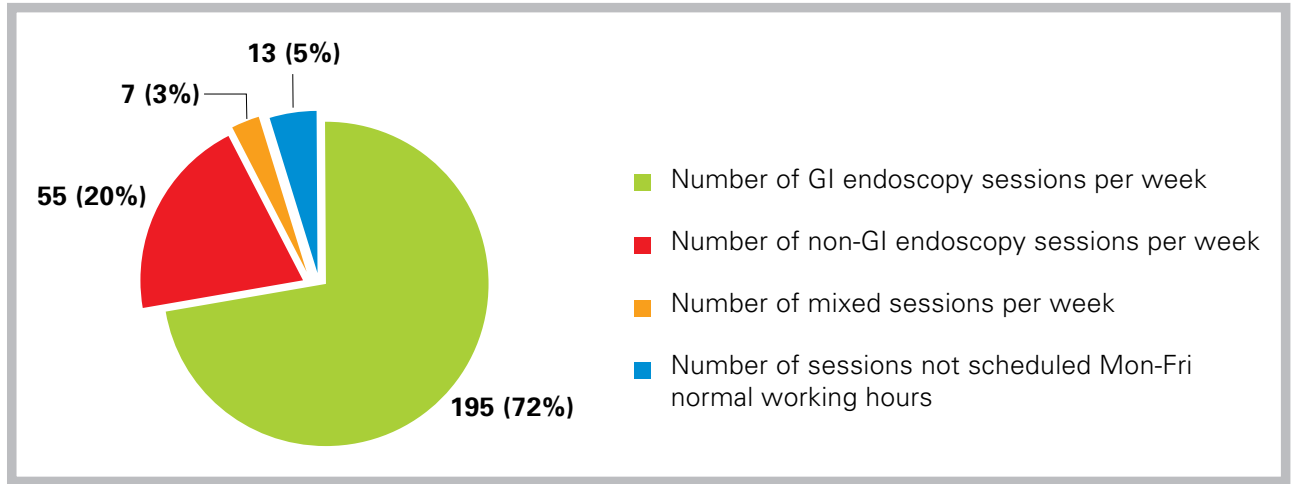
Survey on current colonoscopy and colorectal surgery activity

Detailed information was compiled regarding the sessions in each of the rooms in the endoscopy suites. The data indicates that the sessions were generally scheduled morning and afternoon, Monday to Friday. Three hospitals identified that their endoscopy suite had scheduled activity at the weekends.

A total of 86 sessions per week were identified where there was no activity in a room in an endoscopy suite using a scheduling model of morning and afternoon sessions, opening days Monday to Friday (Figure 7.3). The unscheduled sessions represent latent infrastructure capacity which would require additional personnel and possibly equipment to be operational.

All of the eight designated cancer centres had dedicated endoscopy suites containing either two or three rooms. One centre had a suite with nine rooms. There would appear to be very little spare capacity currently in the suites located at the designated cancer centres – only 13 unscheduled sessions were identified in the survey across all the centres (Figure 7.4).

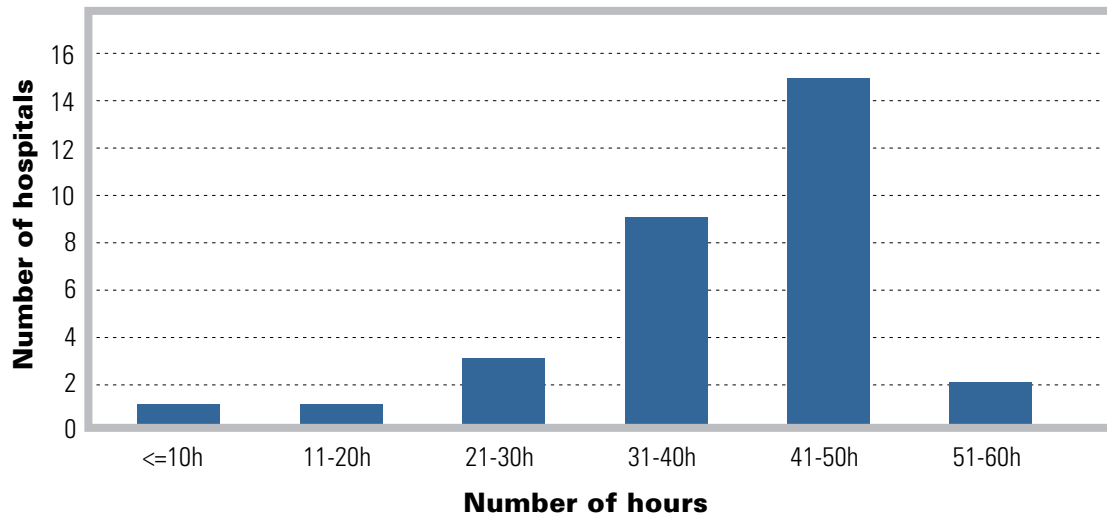
Figure 7.4 Collated session information with regard to session type and non-scheduled sessions: eight designated cancer centres.



Survey on current colonoscopy and colorectal surgery activity

Nineteen of the 31 hospitals indicated that their endoscopy suite opened five days a week with the average opening hours' duration of 45.4 hours per week. This included scheduled sessions, opening hours pre- and post-sessions (i.e. recovery time for patients) and lunch breaks. Of the remaining 12 hospitals, four of the suites opened for 4.5 days a week, three of the suites opened for 3.5 days a week and five of the suites were open three days a week or less (Figure 7.5).

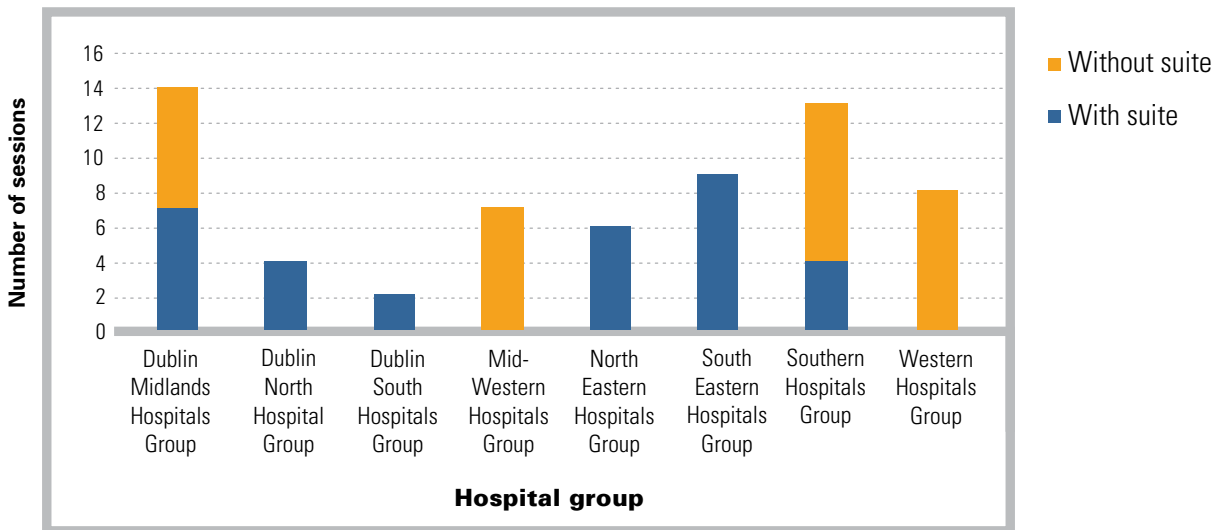
Figure 7.5 Weekly opening hours for hospital suites (Monday-Friday).



Survey on current colonoscopy and colorectal surgery activity

Sixty-three endoscopy sessions were scheduled in facilities other than dedicated suites on a weekly basis. Of these, 32 were in hospitals with an endoscopy suite and 31 in hospitals without. A breakdown of these sessions in accordance with the hospital groups is shown in Figure 7.6.

Figure 7.6 Gastrointestinal endoscopy sessions outside of endoscopy suite by hospital group.



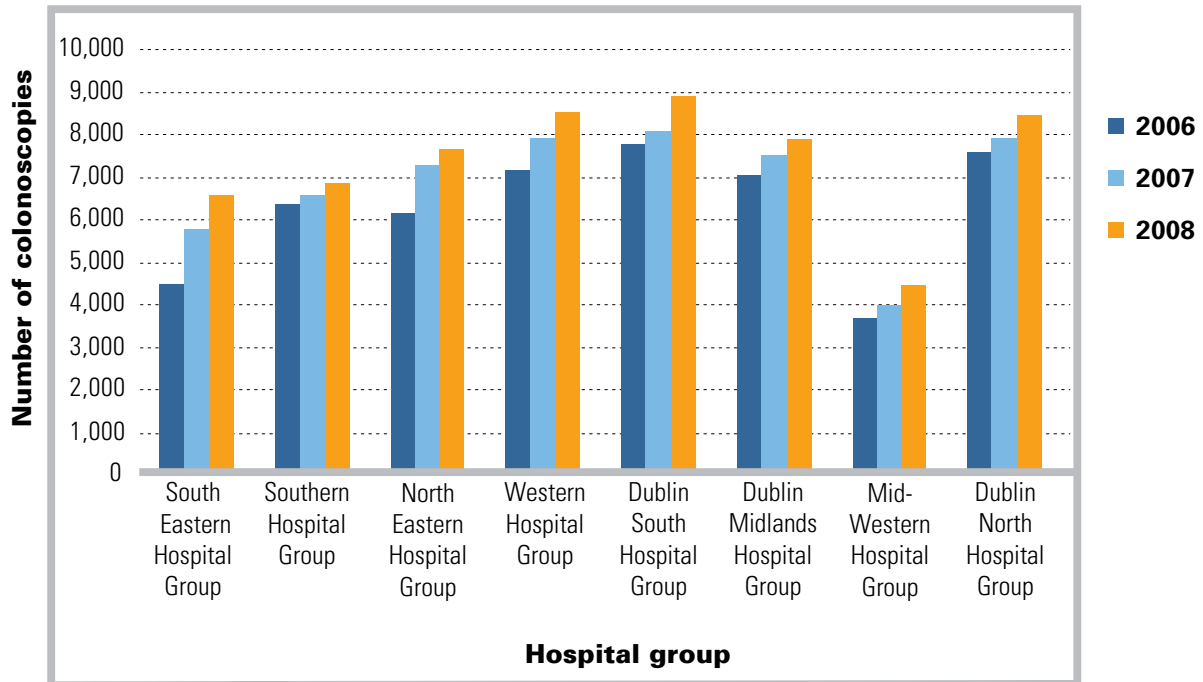
Survey on current colonoscopy and colorectal surgery activity

7.2.4 Colonoscopy Activity

Information was sourced from the Hospital In-Patient Enquiry (HIPE) unit in the Economic and Social Research Institute (ESRI) relating to colonoscopy activity across the hospital groups for the years 2006 to 2008.¹⁴⁰ Of note, flexible sigmoidoscopies are assigned the same code as colonoscopies in HIPE data.

A total of 50,320 procedures were reported in 2006, this number increasing to 55,071 procedures in 2007 and provisional data indicates that 59,343 procedures were performed in 2008. Activity in all of the hospital groups is increasing year on year (Figure 7.7).

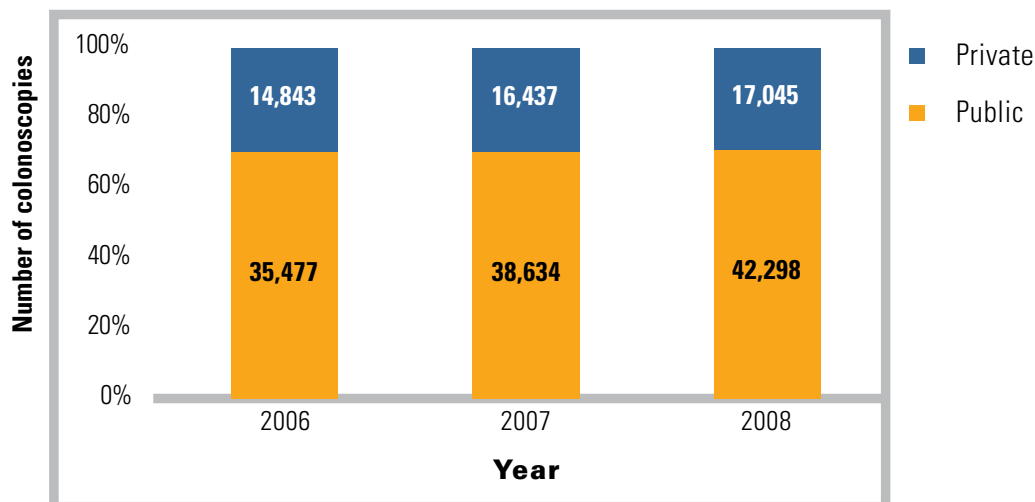
Figure 7.7 Numbers of colonoscopies and flexible sigmoidoscopies by hospital group by year (2006-2008).



Hospital In-Patient Enquiry (ESRI)

Information received from HIPE indicates that approximately 30% of the colonoscopy/flexible sigmoidoscopy activity that takes place in the acute public hospitals sector was coded as private procedures, with 14,843 procedures performed privately in 2006, 16,437 procedures performed privately in 2007 and 17,045 procedures performed in 2008 (Figure 7.8).

Figure 7.8 Percentages and numbers of colonoscopies and flexible sigmoidoscopies funded publicly and privately in public hospitals by year (2006-2008).



Hospital In-Patient Enquiry (ESRI)

Information received from the VHI indicates that 36,486 colonoscopies were claimed for in 2008. The Evaluation Team therefore assumed that approximately 43,000 colonoscopies were funded privately, that is paid for by the insurance companies, occupational schemes and private individuals, each year, given the 85% estimated coverage by VHI.¹⁴¹ Of the 36,486 colonoscopies claimed for, 11,248 (31%) were performed in publicly-funded hospitals. An analysis of the referral pathways for private patients to public facilities for a colonoscopy procedure, or the revenue implications for the hospitals in respect of these, has not been performed as part of this evaluation.

7.2.5 Access to Services

The National Treatment Purchase Fund (NTPF) receives referrals for patients waiting in excess of three months for a procedure or treatment.

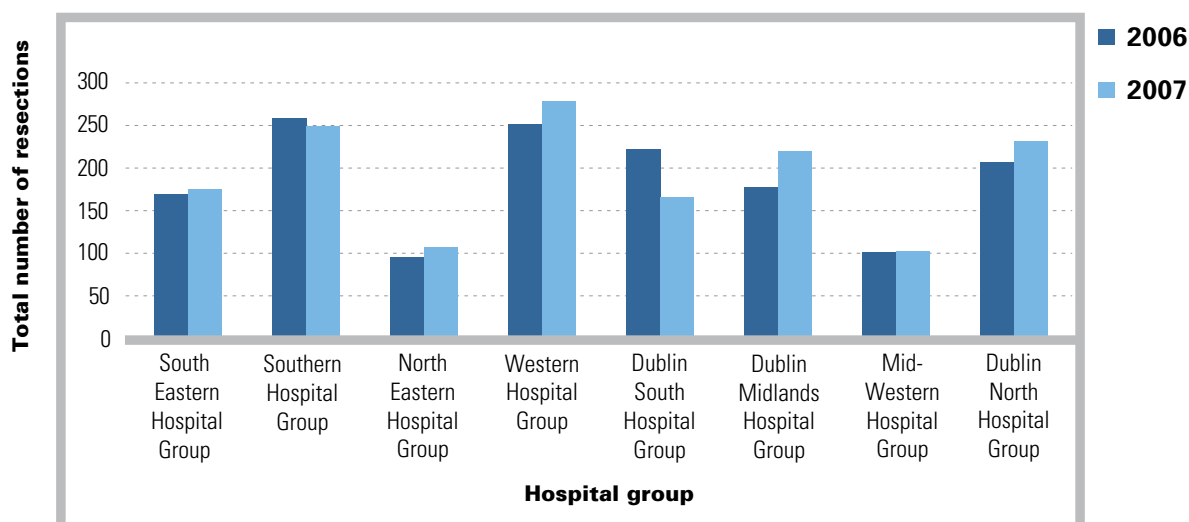
Waiting list data provided by the NTPF indicates that as of 23 April 2009 a total of 930 patients were waiting for a colonoscopy for less than one month and 1,404 patients were waiting between one to three months in 28 HSE and voluntary hospitals.¹⁴² However, it is understood that the HSE has introduced measures since April 2009 which aim to reduce these waiting times.

Colonoscopies were provided for 1,986 patients by the NTPF in 2008; 90% of these were performed in private hospitals. An additional 5,190 patients were referred for colonoscopy but were not considered eligible under the criteria.¹⁴² The majority of these patients had surveillance as the indication for colonoscopy.

It is unknown to what extent current demand for colonoscopy in the symptomatic services will be offset by a fully implemented population-based screening programme.

7.2.6 Colorectal Cancer Surgery Services

Information was sourced from the National Cancer Registry Ireland (NCRI) relating to colorectal cancer surgery activity across the hospital groups for the years 2006 to 2007.¹⁴³ Provisional data indicates that a total of 1,746 procedures were reported in 2006, this number increasing to 1,792 procedures performed in 2007. Approximately 1,500 surgeries (85% to 86%) took place in public hospitals and the remainder in private hospitals. Public hospital activity in all of the hospital groups remained at a reasonably consistent level year on year (Figure 7.9).

Figure 7.9 Numbers of colorectal resections by hospital group

National Cancer Registry Ireland

Twenty-three of 37 hospitals surveyed provided colorectal surgery. The policy of the NCCP is to centralise rectal surgery to the eight designated cancer centres. It can be expected that expertise in colon surgery will also be centralised in a smaller number of hospitals.

7.2.7 Summary of Findings

The following summarises the findings from the survey and other information sources:

- 37 publicly funded hospitals within the State were performing colonoscopy procedures
- there is potential to expand the utilisation of the existing colonoscopy capacity using an extended working day, optimising unused sessions and scheduling sessions at weekends
- colonoscopy activity was increasing year on year. Approximately 42,000 publicly funded colonoscopies, plus flexible sigmoidoscopies, were performed in public hospitals in 2008 and, approximately, a further 2,000 publicly funded colonoscopies were performed in private hospitals via the NTPF
- approximately 43,000 privately funded colonoscopies were performed in 2008. Of these, approximately 31% were privately funded colonoscopies performed in public hospitals
- NTPF data indicates 2,334 patients waiting for colonoscopies up to three months in April 2009
- the extent to which colonoscopies currently performed in the symptomatic services will be absorbed by a screening programme is unknown
- approximately 1,500 colorectal cancer surgeries were performed in public hospitals in 2008. Currently 23 hospitals perform colorectal surgery. The National Cancer Control Programme is centralising rectal surgery to eight designated centres with the expectation that expertise in colon surgery will also be centralised in a smaller number of hospitals.

7.3 Quality Assurance and Accreditation of Current Services

Currently, national initiatives in respect of clinical governance arrangements are generic in nature and do not relate specifically to colonoscopy or colorectal surgery, for example, the HSE Quality, Safety and Risk Management strategy.

Within the hospital survey, facilities providing colonoscopy services were asked whether their endoscopy units had been externally accredited. The responses to the survey indicated that the majority of endoscopy units had not had external validation. There was reported variation in the extent to which QA was being undertaken. In relation to audit, organisations reported that they carry out clinical audit, hygiene audits and decontamination audits.

The survey indicates that the practitioners who perform colonoscopy are, in the main, consultant physicians or surgeons. The current practice is for medical practitioners, with the appropriate qualifications and experience, to be placed on the Medical Council's specialist register. There are also two advanced nurse practitioners (ANPs) in Ireland who are involved in these services and perform colonoscopy.¹⁴⁴ Their role has been approved by the National Council for the Professional Development of Nurses and Midwives. There are no specific accreditation programmes for endoscopists in Ireland.

7.4 Arrangements for Non-Medical Practitioners in Colonoscopy

Given the limited supply of medical endoscopists, advanced nurse practitioners (ANPs) in endoscopy may represent an alternative to the existing model of predominantly medical-practitioner delivered colonoscopy service. In recent years, the role of the nurse has undergone substantial change and in particular has been extended to provide specialist nurse skills in such areas as critical care, coronary care, oncology, nutrition, diabetes, stoma care and gastroenterology. As nurses are an integral part of the endoscopy team, it would seem logical that they should move towards undertaking GI endoscopy.

Nurse endoscopy originated in the United States in the 1970s and has been evaluated in several papers by comparing the nurse endoscopist to medical colleagues.^{145,146} In the USA a master's degree is expected for nurse specialists.¹⁴⁷ Many of the first nurse endoscopists received a more demanding and lengthy training in the procedure than existing medical endoscopists.¹⁴⁸

In the UK, nurse endoscopy evolved in the 1990s. The UK has no recordable qualification for ANPs. However, in the case of endoscopy for the UK, the Joint Advisory Group (JAG) in endoscopy provides strong national guidance with defined pathways for training.¹⁴⁹ It requires that all endoscopists (doctors and nurses) are trained to the same standard. Nurse colonoscopists have been particularly successful in the English colorectal cancer screening programme.¹⁵⁰

Studies have found no statistically significant difference between doctors and nurses in their clinical effectiveness in diagnostic endoscopy.^{151,152} A pilot study in the Netherlands suggested that nurses can be trained to perform colonoscopy in an effective manner, with results similar to a GI fellow.¹⁵³

In Ireland, the role of the nurse endoscopist has the support of the Department of Health and Children and the National Council for the Professional Development of Nurses and Midwives (NCNM). The NCNM states that advanced nursing and midwifery practice must be carried out by autonomous, experienced practitioners who are competent, accountable and responsible for their own practice.¹⁵⁴ They must be highly experienced in clinical practice and educated to master's degree level (or higher). The postgraduate programme must be in nursing/midwifery or an area which is highly relevant to the specialist field of practice. Educational preparation must include substantial clinical modular component(s) pertaining to the relevant area of specialist practice. ANP and advanced midwife practitioner (AMP) roles are developed in response to patient/client need and healthcare service requirements at local, national and international levels.

The NCNM set out criteria for accreditation as an ANP/AMP including registration with An Bord Altranais, minimum of seven years post-registration experience, to include five years experience in the chosen area of special practice, have substantive hours at supervised advanced practice level, have the competence to exercise high levels of judgement, discretion and decision-making in the clinical area above that expected of the nurse/midwife working at primary practice level or of the clinical nurse/midwife specialist and evidence of continuing professional development.

To date two nurses have been accredited, by the NCNM, as ANPs in gastroenterology and they perform routine endoscopy procedures on adults. In addition to performing endoscopy, they also assess patients, arrange follow-up care and attend the multidisciplinary meetings.¹⁴⁴

The British Society of Gastroenterology has recommended that the ANP in gastroenterology should follow the same training schedule required for medical personnel in endoscopy which should include attendance at a recognised teaching course.¹⁵⁵ The training should include anatomy and physiology relevant to the type of endoscopy being performed. It is difficult to define precise numbers of procedures required before an ANP is competent to endoscope without a medical endoscopist being present all the time. As with trainee medical endoscopists, this will very much depend on the individual's skills and will need to be left to the discretion of the supervising medical endoscopist in the individual units. However the ANP should undergo a prolonged and closely supervised apprenticeship prior to embarking upon independent endoscopy. This should include principles of safety and instrument care.¹⁵⁵

8 Models for the Colorectal Cancer Screening Programme

8.1 Introduction

The NCSS's proposed model for the introduction of colorectal cancer screening is based on a centrally-planned model involving the creation of new facilities dedicated to the programme. These would be located in association with the designated cancer centres and would form part of the cancer networks so that ancillary facilities of a symptomatic service would be available. A four-centre model dedicated to screening only would have an estimated cost of:

- €13 million to €14 million in capital investment
- €15 million operating costs in year three, the first year of screening, with €1.05 million cost in year one and €6.13 million in year two.

In addition, the NCSS proposed an alternative eight-centre model designed to address, to some extent, the deficits in the symptomatic services. This would be managed by the NCSS, and would have a 50% utilisation for symptomatic purposes and a 50% utilisation in screening. The costs of this model included:

- €6.5 million to €14 million in capital investment in addition to the capital cost above
- €8 million to €15 million operational costs in addition to the costs above.

It would be unlikely in the current economic climate that projects requiring this level of capital investment would be funded by the Government. Additionally, there may be some benefits in aligning a colorectal cancer screening programme and its additional resource requirements with the existing symptomatic services.

These issues are dealt with in the next section.

8.2 Costs of the National Cancer Screening Service Model

The costs presented in this section represent the four-screening-centre option only, published by the NCSS. Additional estimates in respect of the eight-screening-centre option are provided in the publication *Recommendations for a colorectal cancer screening programme in Ireland*.²

There would be a capital cost investment of €13 million to €14 million in year one of the programme. The operational costs (based on the four-screening-centre option) are shown in Table 8.1, and the first full year of operation of the programme would be year three.

Table 8.1 Operational costs of NCSS four-centre model

Total operational costs	Year 1 €	Year 2 €	Year 3 €
Total direct operational costs (labour and non-labour)	735,000	2,412,270	13,800,709
Contingency @10%	73,500	241,227	1,380,070
Net operating cost	808,500	2,653,497	15,180,779
One time only operating cost	250,000	3,481,000	65,000
Total operating costs	1,058,500	6,134,497	15,245,779

The estimated pay costs of this programme are shown in Table 8.2.

Table 8.2 Pay costs of NCSS four-centre model

Staffing category	Year 1 €	Year 2 €	Year 3 €
Management/admin	0	2,002,270	2,719,013
Medical total	0	0	3,215,687
Nursing total	0	0	1,855,236
Other patient care and client care	0	0	882,504
Health and social care professionals	0	0	143,969
Total pay costs	0	2,002,270	8,816,409

The non-pay costs associated with the model are shown in Table 8.3.

Table 8.3 Non-pay costs of NCSS four-centre model

Category	Year 1 €	Year 2 €	Year 3 €
Quality Assurance infrastructure	250,000	50,000	50,000
Communication and market research	100,000	150,000	450,000
Clinical research	50,000	50,000	50,000
Recruitment and training	50,000	75,000	50,000
Legal and professional fees	250,000	50,000	25,000
Administrative expenses	25,000	25,000	25,000
Travel and accommodation	10,000	10,000	10,000
Letter printing and dissemination (1 million letters in year 3)	0	0	1,000,000

Kits, lab reagents, disposables, envelopes, stamps	0	0	787,500
Processing (disseminate and receive and process kit, send out results)	0	0	2,100,000
Medical supplies for colonoscopy	0	0	238,800
Maintenance of screening centre equipment and software	0	0	198,000
Total	735,000	410,000	4,984,300

On analysis of the figures in Tables 8.1 to 8.3, the following points are noted:

- this model will require a total operational cost of €7.2 million in the two years prior to screening including €2 million management/administration, €300,000 on legal and professional fees, €250,000 on market research and communication, €300,000 on QA and €3.7 million one-time-only operating costs broken down as €275,000 on ICT and €3.4 million on equipment for the colonoscopy centres
- the total operational cost in the first full year of screening is estimated at €15.2 million
- a contingency of 10% is allowed in the model, which may be unnecessary
- the management and administration figures require €2 million in year two and €2.7 million in the first full year of screening. However, saving on screening centre costs with an alternative model based on the existing symptomatic infrastructure and usage of the existing managerial / administrative capacity in the NCSS could significantly reduce this figure to a minimal cost
- costs for letter printing and dissemination, currently stated as €1 million may be closer to €600,000¹²⁸
- the allowed costs for kits, disposables and kit processing may come down in the future when subjected to competitive tendering approaches
- the costs of medical staff are based on sessional costs for those staff. Given that medical staff employed in this service are likely to have sessional commitments in other services as currently happens with consultants employed by the breast screening programme, the true overall cost to the health service is likely to be substantially higher, for example, the model allows for approximately 4,000 consultant gastroenterologist sessions coming to €1.5 million.¹⁵⁶ A diversification in duties beyond screening colonoscopy alone would be required to maintain competency and to provide attractive positions. If new consultant gastroenterologists spent 50% of their time performing colonoscopies, the additional cost to the health service not costed in this model would be €1.5 million. If 33% of time was spent on screening colonoscopies, the additional cost to the health service would be €3 million

- implementation of the colorectal cancer screening programme would potentially require the availability of up to an additional 1,400 to 1,900 CT colonographies per year. In the NCSS model, a proportion of the cost of the additional CT colonographies required under the programme was allowed for in the form of €288,000 per annum for consultant CT radiologist and CT radiographer sessions.¹⁵⁶ This does not reflect the full cost of the procedure in that non-pay costs have not been accounted for. The estimated annual recurrent costs of CT colonographies required is €0.8 million to €1.1 million per annum¹
- primary treatment for colorectal cancer comprises surgery with or without adjuvant radiotherapy and chemotherapy. Implementation of the screening programme would result in up to 800 additional colorectal surgeries in year one of screening.¹ This number would begin decreasing by year two leading to an overall reduction in the total number of surgeries required in the system by year nine (compared to a policy of no screening). The NCSS model provides for €576,000 per year for consultant surgeon, consultant anaesthetist, consultant medical oncologist and consultant radiation oncologist sessions. The full cost to the health system of these additional primary treatments will be substantially higher as only consultant time had been included in the costs.

In conclusion:

- the proposed NCSS model for the introduction of colorectal cancer screening is based on a centrally-planned model involving the creation of new facilities dedicated to the programme. It is unlikely that this could be implemented in the current economic climate. Accordingly, any new programme would have to be based upon using existing facilities more economically, effectively and efficiently
- operational cost reductions can be identified in the proposed NCSS four-centre model. These include management/administrative costs, elimination of contingency, and more favourable costs on the non-pay elements of the programme
- underestimated costs in the NCSS proposal include the extra costs for consultant sessions not spent on the screening programmes and the additional costs for CT colonography. These are likely to increase the annual revenue costs to the health system from €15.2 million up to approximately €18 million.

Sections 8.3 to 8.5 outline the design components of an alternative model for a national colorectal cancer screening programme that is being proposed following this evaluation. Section 8.6 then proceeds to outline the costs identified in order to implement and maintain such a model.

8.3 Alternative Model for a Colorectal Cancer Screening Programme

In this alternative model as in the original NCSS model, colorectal cancer screening is based on the self-administered FIT test. The difference between models relates to the patient pathway after a positive FIT test.

8.3.1 Design of the Model

Following an analysis of the utilisation and capacity of the current colonoscopy and colorectal services, an alternative to the four-centre model described above would be to operate the screening colonoscopy programme and the symptomatic services on the same sites, building on the existing symptomatic infrastructure. It may lead to more effective coordination of services, integration of screening and treatment pathways and presents a significant opportunity to develop quality assured services across the range of symptomatic and screening colonoscopy activity.

Using this alternative, the screening colonoscopy programme would be delivered in 8 to 12 locations across the country. Limiting the number to a maximum of 12 may be required to enable those centres to build the necessary resources, expertise and caseload numbers to maintain competence and accreditation while potentially retaining a reasonable geographic spread. However, such a geographic spread would have to take into account the population densities in different parts of the country as well as consideration that the incidence of the disease is greater in areas of social deprivation, in order to ensure full coverage across the country. Becoming a screening centre would however greatly benefit the existing symptomatic colonoscopy services already established in those centres.

It would be appropriate for individual hospitals, and their networks, to decide upon and propose the most effective solution that matches implementation within their context in terms of the available facilities, resources, staff and activity. The model, therefore, would require determined proposals from individual hospitals, or their networks, to become screening centres that would receive colonoscopy referrals from the new colorectal screening programme in an organised and managed way. Assessment and selection of the proposal would be under the control of the NCSS using criteria that it would develop.

A series of output-based service level agreements (SLAs) would be established, between each individual hospital (or network) and the NCSS, to deliver the increased work arising from a colorectal cancer screening programme. Under the terms of the SLAs, the NCSS would have responsibility for setting quality assurance and accreditation standards, and for performance management and ensuring the service complies with these standards.

The HSE is engaged in a programme of work to review the role of acute hospitals. This review will see new roles emerging for all hospitals. A smaller number of hospitals will be engaged in the provision of more complex and specialised services,

which are less commonly required. The role of other hospitals will be enhanced to ensure that the population will have easy access to, for example, diagnostic and screening services. The HSE would need to consider how best to support the provision of colonoscopy services in a population-based colorectal cancer screening programme within the context of the review of the configuration of the acute hospitals¹⁵⁷.

Hospitals, participating as colorectal cancer screening centres would not necessarily be the designated cancer-referral centres. However, for such hospitals, there would have to be clear referral pathways and arrangements for onward management and referral of appropriate patients for further diagnostic and treatment procedures into the symptomatic cancer services. Appropriate quality assurance and training arrangements would be put in place, and such screening centres would be staffed by a diversity of professionals including ANP endoscopists.

It would be important that, where necessary and in advance of commencing as a screening centre, hospitals modernise and re-design their current services, working patterns and behaviours in order to provide maximum utilisation of quality assured services for the best outcomes for the screening population and patients with symptomatic disease.

The survey indicates that no hospital is currently operating suites outside of the standard model of morning and afternoon sessions and only two hospitals have one scheduled session each at weekends. In addition, there were only two advanced nurse practitioner colonoscopists in the service. Re-configuration of services to develop further capacity could involve:

- extended working days (for example 8am to 8pm, based on three endoscopy sessions per day)
- weekend working
- utilisation of ANPs as colonoscopists, working alongside medical practitioners, to further increase the available personnel to perform the procedure. Individual hospitals would determine how to utilise its medical/nursing skill mix to decide how best to deliver its overall endoscopy and colonoscopy service effectively and safely.

It would be a fundamental requirement that the implementation of a national colorectal cancer screening programme would need to complement and not compromise the symptomatic colonoscopy services. Similarly, the implementation of such a programme has the ability to drive improvements in the quality of the symptomatic service. It would be necessary for the NCSS and the wider HSE to work together in order to ensure that quality and time-based performance indicators are developed for the symptomatic colonoscopy service as well as the screening service in order to effectively manage this relationship.

The policy of the NCCP in relation to using existing endoscopy facilities for screening colonoscopies is that, were it to occur, it would require a clear separation of the roles

and responsibilities of institutions and the NCSS in relation to providing a screening colonoscopy service on multiple hospital sites.¹⁵⁸ Current NCCP policy is to centralise rectal cancer surgery to eight centres with the expectation that colon surgery will also be centralised to a smaller number of hospitals than currently. There would, therefore, have to be appropriate referral pathways to the designated centres for participation in multidisciplinary team (MDT) assessment, and for treatment in the case of screening detected cancers. The additional demand for primary treatment should be factored in the workplans being developed for the designated cancer centres.

8.3.2 Associated Colorectal Specialist Services

Surgical services

The screening programme-generated primary treatment workload would equate to 16 additional surgeries with or without adjuvant radiotherapy/chemotherapy per week for the designated colorectal cancer centres in year one, and decreasing over time. There would be a reduction in the total number of colorectal cancer surgeries required by year nine of the programme compared to no screening. This additional surgical work would need to be included in the activity planning for the designated centres. As with the NCSS model above, the additional costs of surgeries have not been fully evaluated as part of costing this proposed model.

Pathology services

Ideally, pathology services would be provided locally, facilitating easy participation of the pathologist in MDTs. However, if an individual hospital was unable to provide the quality-assured pathology service required, this work could be sub-contracted conditional upon clearly defined, quality-driven commissioning contracts being in place within effective governance arrangements in order to ensure that the service provided is appropriately quality assured and accreditation standards are complied with.

CT colonography

The cost of CT colonography was based on a unit cost of €550 derived from the Authority's HTA report which is assumed to represent pay costs, non-pay costs and capital amortization.¹ The capacity of the health services to meet the additional demand for CT colonography has not been evaluated in the time frame of this study. However, it is clear that there would need to be appropriate referral pathways from the screening programme to this diagnostic resource, and availability of sufficient equipment and expertise to meet the demand. In the pre-implementation phase, a gap analysis to determine any additional consultant radiologist and radiographer expertise and investment in specialised equipment required should be undertaken and addressed as this is likely to be the most cost-effective approach in the long term.

In the event that the capacity deficits of publicly funded hospitals cannot be addressed, the abilities of the private hospitals to meet the demand could be considered, conditional upon clearly defined, quality-driven commissioning contracts being in place

within effective governance arrangements in order to ensure that the service provided is appropriately quality assured and accreditation standards are complied with.

Acknowledging that international evidence and guidance continues to be developed in this area, if suitable alternatives to CT colonography for incomplete colonoscopy are accepted, within international best practice, then these should be considered at that time.

8.3.3 Summary of the Design of the Model

A summary of the key elements of the model are as follows:

- the colonoscopies generated from the screening programme could be delivered in 8 to 12 symptomatic service locations across the country
- the NCSS will set the minimum specification for the provision of colorectal screening services and locally-determined proposals will be invited from individual hospitals to become centres to take referrals from the new colorectal cancer screening programme
- it would be appropriate for individual hospitals, and their networks, to decide upon and propose the most effective solution that matches implementation of the programme within their context in terms of the available facilities, resources, staff and activity
- a series of output-based service-level agreements (SLAs) would be established between each individual hospital and the NCSS to deliver the increased work arising from a colorectal cancer screening programme. Under the terms of the SLAs, the NCSS would have responsibility for setting quality assurance and accreditation standards and for auditing the service against these standards
- use of advanced nurse practitioners in the delivery of the service, as well as longer working days and weekend working should be considered by each hospital in arriving at its proposal
- appropriate diagnostic and treatment pathways should be in place for other procedures required as part of the programme (for example CT colonography or surgery)
- in the pre-implementation phase, a gap analysis to determine any additional consultant radiologist and radiographer expertise and investment in specialised equipment required should be undertaken and addressed
- the additional primary treatments generated by the screening programme should be considered in the work plans for the eight designated cancer centres
- it would be necessary for the NCSS and the wider HSE to work together in order to ensure that quality and time-based performance indicators are developed for the symptomatic colonoscopy service as well as the screening service in order to effectively manage the relationship between the services.

8.4 Scope for Innovation in Delivering Colonoscopy Service

Colonoscopy is a potential diagnostic bottleneck in the colorectal cancer screening process. It is also the single most expensive component of the proposed new service. The unit-cost of colonoscopy in Ireland is estimated to be €650 by Casemix.¹⁵⁹ Costs for the procedure through private health insurance are likely to be higher. These figures are higher than the unit cost of a colonoscopy in England of €567 (GBP 522).¹⁶⁰ The difference in cost relates in part to the higher salaries and richer skill-mix (that is, the use of doctors to perform the procedure) in Ireland. Following discussions with relevant stakeholders, there would appear to be a consensus that there is a need to review the model of delivery of the colonoscopy service in Ireland. This could include provision of colonoscopy services by a suitably qualified and accredited individual (for example ANPs as well as qualified physicians), provided there are appropriate arrangements for quality and safety. This would suggest that there is significant scope to improve value for money in delivering colonoscopies over time through the development of multidisciplinary teams that are suitably qualified and accredited.

In total, there are estimated to be 59,000 colonoscopies/sigmoidoscopies performed each year within publicly funded hospitals, and a further 25,000 to 30,000 in private hospitals. It is not known to what extent any of the 59,000 procedures currently performed in public hospitals would fit more appropriately into a screening programme.

Assuming that a full roll-out of the screening programme was to be implemented this would result in a:

- requirement for an additional 11,000 colonoscopies per year in the system rising to 15,000 colonoscopies per year by year 10
- requirement for 916 procedures at each of the proposed screening centres in year one assuming 12 centres, (equivalent to 18 colonoscopies per week per centre, assuming equal distribution between the centres).

Assuming that each colonoscopy takes an average of 45 to 60 minutes, this translates into an additional 14 to 19 hours work per week per centre. These additional hours could be accommodated by the introduction of longer working days for the units and other more efficient ways of operating the current services.

The Evaluation Team is also aware that there is ongoing work within the HSE in the development of guidance on appropriate referral for colonoscopy, including classification of urgency with the intention of reducing the burden on the symptomatic services.¹⁶¹

8.5 Quality Assurance

A national colorectal screening programme would depend on effective governance, and management to define, document, implement, maintain and review the quality system. Each individual involved in the programme would be required to understand his/her contribution to quality, and must be sufficiently trained and motivated to

make this contribution effectively. A culture of continuous quality improvement, with openness and accountability, should be encouraged among all stakeholders. The overall aim should be that each person, invited to join the programme, receives the personal care that he/she requires in a sensitive, appropriate and timely manner, with due regard given to his/her safety, comfort and dignity throughout the screening process.

It is proposed that effective arrangements for quality assurance are built into any SLA between the NCSS and the HSE. It is recognised that the European Guidelines for Quality Assurance in Colorectal Cancer Screening are nearing completion, and are due for publication in the autumn of 2009.

The establishment of a QA committee to oversee and develop a concurrent QA framework for the national colorectal cancer screening programme would need to commence as soon as possible.² There are well established EU guideline subgroups with which the developed QA committee could collaborate.

Endoscopists require a mix of technical, knowledge and judgement competencies to identify and successfully remove high risk lesions. They should be skilled in the complete examination of the mucosa and in recognising both cancerous and precancerous lesions. Rabeneck et al (2008) identified that adequate volume was essential to maintain skills and effectively monitor performance.¹⁶²

There are two potential models of QA that could be adopted for the colonoscopy screening programme which would involve either:

- a model similar to the Joint Advisory Group (JAG) peer review accreditation scheme and/or
- a nominated clinical lead with specific responsibility.

8.5.1 Joint Advisory Group Model

Within the UK, the peer-review accreditation process is an assessment of the endoscopy service as a whole including a competency based assessment for practitioners, an assessment of the environment, decontamination facilities and processes.¹⁴⁹ This model accredits colonoscopy screening units initially and then once the unit is accredited, practitioners working within these units can go forward to be accredited.

The endoscopy unit is peer reviewed under four domains:

- clinical quality
- patient experience
- workforce
- training (if a training site).

The competency-based assessment for the practitioner requires that he/she maintains a portfolio containing the following:

- certificates of courses attended and endoscopic development
- a simple log of all procedures performed (date, procedure, whether performed with or without assistance)
- all formative directly observed procedural skills (DOPS) forms completed for that procedure
- a running total of rates of:
 - success
 - sedation doses
 - complications
 - specific procedural data (for example polyp detection).

There is a requirement that practitioners should be performing at least 150 colonoscopies a year. They are also required to complete a knowledge-assessment and to perform two DOPS (as outlined above) while being assessed by two endoscopists, competent in that procedure.

8.5.2 Clinical Lead Model

In the absence of a competency-based assessment process as outlined above, the clinical lead for colorectal screening should be satisfied that:

- the practitioner has the necessary competence
- the unit has the necessary equipment
- in the event of a serious adverse event it is possible to manage the patient locally or that the patient can be transferred safely to an appropriate facility.

Services used for colorectal screening should have the facilities and level of competence required to remove high-risk lesions. This would include a competent support team and equipment. Robust guidelines and processes should be in place to enable patients to be resuscitated effectively, to assess risks and to develop the ability to respond to emergencies.

Continuing professional development in all aspects of the colorectal screening process is essential to gain information on new developments and improve the quality of screening and diagnostic therapeutic processes. Compliance with continuous professional development may be through educational meetings/seminars away from the employment setting and/or in-service sessions designed to meet the needs of the facility. Processes should be in place to ensure that individuals involved in the programme are meeting the expectations outlined in their job descriptions and the programmes goals.

Outcomes should be monitored including:

- completion rates
- polyp detection rates
- comfort of patient
- sedation rates
- interval cancer rates
- adverse events, for example perforation or bleeding.

The unit should also monitor resource utilisation and waiting times.

The environment should be designed to allow good patient-flow in order to maximise efficiency, privacy and dignity. It should be physically comfortable and conducive to a good patient experience and efficient processing. The reception and assessment areas should be separate to the recovery area.

The centre should have adequate and appropriate equipment, ideally standardised to reduce the risk of clinical errors, with a robust competency training system. Decontamination policies and procedures should be compliant with national and/or pan EU guidelines based on accepted, published recommendations and standards and should be audited against defined indicators.¹⁶³⁻¹⁶⁵

8.5.3 Recommendations for Quality Assurance

- a national QA programme, incorporating a robust QA model and QA committee, should be further developed. This programme should provide support and advice to the NCSS executive and Board in regards to the programme's clinical efficacy and QA in all clinical and technical disciplines. All aspects of quality data from each unit should be reported to the QA committee
- the principles of good client care established within BreastCheck should also be encompassed within this screening model¹¹⁸
- the colorectal screening programme should operate a multidisciplinary team approach to the screening of individuals including endoscopists, surgeons, pathologists and ANPs. The team members should all have expertise and qualifications in colorectal cancer. Any endoscopist providing the service should be accredited to do so
- the laboratories utilised for histology should have appropriate internal quality control and external quality assurance.

8.6 Proposed Cost of Alternative Model

Costings of the alternative model described above can be divided into pre-implementation costs associated with the planning stages prior to the commencement of screening, and the ongoing annual operational costs. In providing these costs within the broad headings of capital, pre-implementation and operational costs, comparisons are also made with the capital costs, pre-implementation and operational costs included in the NCSS model to illustrate where cost savings can be achieved with the alternative model.

8.6.1 Capital Costs of the Alternative Model

The €13 million to €14 million in capital investment to build four new screening centres is not required under the alternative model. However, an assessment of colonoscopy services and equipment in each of the acute hospitals will be required prior to commencement to establish to what extent these will need to be upgraded, or will need additional equipment, in order to meet the service demands and quality standards. The costs associated with this upgrade or additional equipment have not been examined as part of this evaluation.

8.6.2 Pre-implementation Costs of Alternative Model

Pre-implementation refers to the preparatory period of up to two years from the decision to implement a colorectal cancer screening programme until screening commences. The likely pre-implementation costs associated with the alternative model are illustrated in Table 8.4.

Table 8.4 Pre-implementation costs of proposed model

	Proposed costs in alternative model €	Notes
One-time-only operational costs	300,000	1
Management/admin costs	500,000	2
Non-pay costs	1,000,000	3
Total	1,800,000	

Notes:

1. One-time-only operational costs factored in the alternative model include €300,000 (stated in the NCSS model as being the IMIT – information management information technology – interface and population programme cost plus office equipment).
2. It is expected that the management/administration costs originally included in the NCSS would now be borne to some extent by the existing capacity within the NCSS. The sum included reflects an estimate of the costs associated with some additional staffing, including a clinical lead for the programme.
3. Non-pay costs included in this figure include quality assurance infrastructure, communications and market research, legal/professional fees, clinical research and other administration. The total of these figures are derived from the NCSS model.

By comparison with the pre-implementation costs of the NCSS model, the Evaluation Team are of the view that the €7.2 million pre-implementation costs described can be reduced to €1.8 million in this alternative model.

8.6.3 Operational Costs of Alternative Model

The likely operational costs associated with the alternative model are illustrated in Table 8.5.

Table 8.5 Operational cost of proposed colorectal cancer screening model

	Notes	Cost (€) Year one of full implementation	Cost (€) Year 10 of full implementation
Colonoscopies	1	7,150,000 (based on 11,000 procedures)	9,750,000 (based on 15,000 procedures)
Non-pay costs within NCSS for running programme including costs associated with FIT testing	2	3,500,000	3,500,000
CT colonography	3	770,000 (based on 1,400 procedures)	1,045,000 (based on 1,900 procedures)
Management and administration costs	4	500,000	500,000
Total		11,920,000	14,795,000

Notes:

1. This is based on a unit cost of €650 per colonoscopy procedure. This cost is derived from Casemix as a weighted average of Diagnosis Related Group (DRG) G44C, G44D and G430.¹⁵⁸ This budget would cover pay costs for multidisciplinary teams including medical and nurse colonoscopists, running costs of endoscopy suites, disposables and pathology. Delivery of colonoscopies by multidisciplinary teams comprising medical and nursing personnel would be expected to reduce the unit cost of colonoscopies compared to a medical only model. However, these reductions would be offset to some extent by the increased costs of the new consultant contract and the cost of meeting quality assurance and accreditation standards.
2. This figure is derived from the non-pay costs described in the NCSS model. It includes figures for kits and their processing. Savings now identified in letter printing and dissemination¹²⁸ and the costs of disposables and maintenance for equipment have been removed. The largest single cost relates to the FIT kits and processing (€2.9 million). This figure will likely be less in the prevailing economic conditions following competitive tendering. Other non-pay costs should also be considered for reduction under cost containment programmes and tendering arrangements.
3. The estimated unit cost for CT colonography is €550. This is based on expert opinion and on fees paid to private hospitals for the test.¹
4. This model assumes that the management administration capacity required for this revised programme can be absorbed to a large extent within the existing NCSS structures. The original estimate of the NCSS was €2.7 million. With the removal of screening centre based staff from these figures, the amount can be reduced to €1.4 million, and to €1.1 million with the further removal of additional HR staff.

DRG based unit costing underpins funding calculations for the acute hospitals and is the best estimation of unit cost available without a detailed microcosting study. Limitations in this costing model need to be considered before finalising the funding allocation to the hospitals for screening colonoscopies. The DRG unit cost is assumed to provide for pay and non-pay costs as well as capital amortization. While the total value and funding requirements for each SLA with each participating screening centre can be calculated by reference to DRG costs and the anticipated volume of referrals, it will be necessary that the funding provided to the NCSS (and through the NCSS onto each SLA holder) is in a manner that recognises that the costs to be met will be in the categories of pay, non-pay, and equipment. The mix of funding to be provided in each case will become identifiable following an assessment of each prospective service provider by the NCSS. This would have to be agreed between the hospital, the NCSS and the Department of Health and Children as necessary.

The capacity analysis carried out by the Authority identified potential spare capacity in publicly funded hospitals in terms of non-utilisation of existing infrastructure. In the event that this infrastructure were to be adapted for the provision of colonoscopy under this programme, additional staffing may be required. The mechanism to allow for this, funded through SLAs with the NCSS, is a key requirement for the viability of this model.

By comparison with the NCSS model, the operational costs of the alternative model are reduced in that the likely operational costs of €15.2 million to €18 million can be reduced to approximately €12 million in year one of screening rising to €15 million in year 10.

The costs of QA to be borne by the NCSS are included in the non-pay costs above. Other costs to be borne by the hospital such as costs of training and costs of development of the necessary procedures and documentation required to support quality assurance are included in the DRG based payment to the hospitals above.

A summary of the key elements of the costs associated with the alternative model are as follows:

- the capital investment (€13 million to €14 million) envisaged with the NCSS model is not required
- an assessment of colonoscopy services and equipment in each of the acute hospitals will be required prior to commencement to establish to what extent these will need to be upgraded, or will need additional equipment, in order to meet the service demands and quality standards
- the pre-implementation costs of the alternative model are of the order of €1.8 million, and these are reduced from the €7.2 million in the NCSS model
- the operational costs of full implementation of the alternative model are of the order of €12 million in year 1 to €15 million in year 10, and these are reduced from the estimated €15 million to €18 million in year 1 in the NCSS model
- the funding allocation for the provision of service must be available for use by the selected hospitals to employ new staff and invest in capital equipment as required. This would have to be agreed between the hospital, the NCSS and the Department of Health and Children as necessary.

8.7 Phased Implementation

A phased implementation of the colorectal cancer-screening programme, as has occurred in other countries, would provide screening centres with an opportunity to develop capacity, experience and put in place appropriate governance arrangements and implementation plans for quality assurance and training.

Although a reduced number of procedures would be required in year one of screening under a phased implementation option, it cannot be assumed that the reduced costs of such a programme would be proportionate with this number. This is because the screening centres would need to put in place the appropriate infrastructure, services, personnel and training to facilitate the build-up of capacity. Within the scope of this report, it is not possible at this time to provide a costing estimate of a phased implementation.

There are a number of phased implementation options, including some considered in the HTA report.¹ For example, the “medium” implementation option, described in that report, would involve inviting individuals aged 55 and 65 years in year one; ages 55, 57, 65 and 67 in year two; ages 55,57,59,65,67,69 in year three; ages 55,57,59,61,65,67,69,71 in year four; and including the full age range by year five.

This approach is illustrated in Table 8.6.

Table 8.6 Medium implementation option – biennial FIT, 55 to 74 years

AGE	YEAR									
	1	2	3	4	5	6	7	8	9	10
55	X	x	x	x	x	x	x	x	x	x
56										
57		x	x	x	x	x	x	x	x	x
58										
59			x	x	x	x	x	x	x	x
60										
61				x	x	x	x	x	x	x
62										
63					x	x	x	x	x	x
64										
65	X	x	x	x	x	x	x	x	x	x
66										
67		x	x	x	x	x	x	x	x	x
68										
69			x	x	x	x	x	x	x	x
70										
71				x	x	x	x	x	x	x
72										
73					x	x	x	x	x	x
74										

The resource requirements associated with a medium implementation are compared with those of full implementation in Table 8.7.

Table 8.7 Resource requirements: phased implementation versus full implementation

Resource/health outcome	FIT at 55 to 74 years – full implementation			FIT at 55 to 74 years – medium implementation		
	Year 1	Year 5	Year 10	Year 1	Year 5	Year 10
Participants						
Invited to screen	357,812	382,043	417,464	82,602	249,474	418,242
Screened*	189,640	202,301	220,999	43,779	132,157	221,473
Endoscopy requirements						
Diagnostic/surveillance colonoscopies	11,095	12,744	14,820	2,441	7,728	14,070
Diagnostic/surveillance CT colonography	1,442	1,656	1,927	317	1,005	1,829
Pathology						
Number of adenomas requiring pathology	6,308	6,918	8,222	1,195	3,961	7,722
Number of colorectal cancers requiring pathology	853	664	687	150	434	754
Adenomas and cancers detected						
Screen-/surveillance-detected adenomas	3,320	3,641	4,327	629	2,085	4,064
Screen- /surveillance-detected colorectal cancers	853	664	687	150	434	754
Procedures required						
Colorectal resections	779	612	635	137	399	695

*Assuming 53% uptake of FIT

The table above relates to actual resource requirements associated with medium implementation when compared to full implementation. When compared to a policy of no screening, it would be expected that by year six of the programme there would be a decreased requirement for pathologies for colorectal cancer, and by year nine a decreased requirement for surgeries.

The resource requirements associated with alternative age-based implementation options could also be estimated from the model in the HTA, which would help inform estimation of the costs of phased implementation.¹ Alternative geographical area-based implementation options would result in inequities of access and would not be considered a suitable option for phased implementation of the programme.

In consideration of the phased implementation of this programme:

- in order to enable the centres of referral to build up the necessary infrastructure, equipment and expertise, it is recommended that the colorectal cancer screening programme be introduced incrementally. The medium implementation option described in the HTA could be considered as an example
- although, a reduced number of procedures would be required in year one of screening under a phased implementation option, it cannot be assumed that the reduced costs of such a programme would be proportionate with this number. This is because the screening centres would need to put in place the appropriate infrastructure, services, personnel and training to facilitate the build-up of capacity.

8.8 Private Health Insurance

It is estimated that the national eligible population (55 to 74 years of age) for the colorectal cancer screening programme is 700,000. In discussions with the largest private insurance company VHI,¹⁴¹ it stated that it has 400,000 subscribers in the 50-79 year age category. Since there are other private insurers, it is reasonable to assume that approximately 50% of the eligible population who are in the target range for this screening programme may have private health insurance policies.

There are ongoing benefits to the private health insurance sector if its insured members have access to a national population-based colorectal cancer screening service. In addition to the overall population health benefits, there are financial gains in the medium to long-term associated with the reduced number of surgeries required to be reimbursed and the reduced number of secondary treatments required for more advanced stages of the disease.

The potential for private health insurance companies to contribute to the development of a national population-based screening programme should therefore be explored, given the benefits that may be realised by these companies in the medium- to long-term. Additionally, in the absence of a formal relationship between the insurance companies and a national screening programme, there remains a possibility that insured members of the population will divert to private healthcare pathways when they require a colonoscopy procedure. (Approximately 30% of women requiring primary treatment in BreastCheck opt for private healthcare.¹⁶⁶) It is noted that the cost of colonoscopies to private insurers is substantially higher than the DRG based cost in the publicly funded hospitals.

Although the fundamental principle remains that a national population-based programme for cancer screening should be free for its citizens, and that there should be a single national based programme, there would be significant savings for private insurers.

- If 50% of colonoscopies and CT colonographies provided by the screening programme were funded by private insurance, this would lead to savings of up to €4 million in the first year of full implementation (based on the predicted costs of these procedures within the programme). There would be further savings if the FIT-based screening was paid for by private insurers.

8.9 The Irish Cancer Society

The Irish Cancer Society has an established role in the pursuit of world-class cancer services in Ireland. The stated goals of the Society are focused around prevention, survival and quality of life with three programme areas to achieve them. These are advocacy, cancer services and research.

The Irish Cancer Society has offered to partially fund the roll-out of the national screening programme, to an amount of €1 million over two years. This is a considerable contribution. The Evaluation Team has not examined this proposal in significant detail and the decision to avail of this funding must rest with the Minister for Health and Children.

9 Conclusions

9.1 Introduction

The use of cancer screening programmes have the potential to significantly reduce the burden of breast, cervical and colorectal cancer in populations that are screened. There has been a significant development of cancer screening services in Ireland both prior to and since the formation of the NCSS in 2007. The geographic extension of BreastCheck has continued throughout the country and is expected to be available in all counties by October 2009. In the area of cervical cancer screening, the Irish Cervical Screening Programme enabled the concept to be proven within the Irish setting and CervicalCheck, as part of the NCSS, has increased its uptake steadily since September 2008. The NCSS has demonstrated ongoing commitment to developing these services, and to ensuring that they are quality assured and well governed programmes.

All available evidence, including studies carried out in the Irish context and referred to in this report, supports the introduction of a population-based colorectal cancer screening programme. Such a programme for individuals aged between 55 to 74 years, when fully implemented, is anticipated to reduce the lifetime incidence of colorectal cancer by 14.7% and deaths from colorectal cancer by 36%.

The implementation of a national population-based colorectal cancer screening programme would be an obvious extension to the role of the NCSS which has an established track record in this area. This evaluation has been commissioned to

assess the resources assigned to the current national population-based cancer screening programmes operated by the NCSS, to identify efficiencies that may be achieved within the present models, to assess the colonoscopy services and resources within the HSE and to examine how they could be used, or built upon, in order to assess the feasibility of commencing a national colorectal cancer screening programme from within existing resources.

This would maximise the overall health gain for patients in Ireland and have the potential to enable further efficiencies in the way programmes are currently delivered across the selected range of available cancer screening technologies, whilst maintaining the quality and safety of these services.

It would be important that, where necessary and in advance of establishing screening centres within this model, NCSS commissioned hospitals modernise and re-design their current services, working patterns and behaviours in order to provide maximum utilisation of quality assured services for the best outcomes for the screening population and patients with symptomatic disease.

It would be a fundamental requirement that the implementation of a national colorectal cancer screening programme would need to complement and not compromise the symptomatic colonoscopy services. Similarly, the implementation of such a programme has the ability to drive improvements in the quality of the symptomatic service. It would be necessary for the NCSS and the wider HSE to work together in order to ensure that quality and time-based performance indicators are developed for the symptomatic colonoscopy service as well as the screening service in order to effectively manage this relationship.

Despite the successes of the existing cancer screening programmes in Ireland referred to above, the overall costs for these programmes are high relative to those in other countries. The NCSS has a projected expenditure for 2009 of €68.7 million, of which approximately €43.12 million is associated with CervicalCheck and €25.64 million associated with BreastCheck. Although it may not be possible to directly compare the screening programmes in Ireland with other countries due to the manner of service delivery, it is possible to examine the existing cost drivers and operating modes within the Irish systems and identify possible efficiencies or savings that might be realised from them.

In an increasingly challenging economic situation, it is also reasonable to examine the existing resources within the HSE, and voluntary hospitals, to see how they could be utilised or built upon in order that the diagnostic resources required from the colorectal screening programme could be integrated with the existing services to optimise efficiencies. In so doing, the need for capital investment associated with a new programme would not be required, and mutual efficiencies for the screening and symptomatic services could be realised. In examining the resources assigned to the HSE, with a view to establishing if the colorectal cancer screening programme diagnostic resources could be integrated within it, it is vital that the existing quality and safety of the services would not be compromised.

In the requested timeframe to undertake this work, it has not been possible to perform a comprehensive analysis of all aspects of the services evaluated. Therefore, the findings and recommendations are at a relatively high level in order to indicate the potential possibilities for enabling the implementation of a national colorectal cancer screening programme, within a challenging fiscal climate, and to indicate how existing resources can contribute to that end. It is envisaged that further analysis in relation to detailed plans for implementation at a local level will be required by the NCSS, the HSE and the voluntary hospitals during the implementation period of the programme within the model proposed.

9.2 Summary of Findings and Recommendations

The main findings from this evaluation are described.

9.2.1 The National Cancer Screening Service

NCSS Corporate Structure

There are a number of areas within the corporate NCSS structure, and within the costings of the individual screening programmes, where efficiencies could be realised. These efficiencies could lead to opportunities for cost savings for the existing programmes or could be utilised in the further development of the colorectal cancer screening programme.

The identified efficiencies or cost saving opportunities within the NCSS corporate structure which should be considered by the NCSS Board include the following:

- a full analysis of non-pay spend to identify areas where more savings are possible
- implementation of year-on-year cost improvement programmes to deliver at least 2% per year efficiencies in cost. Consideration should be given to enable the NCSS retain cost improvements achieved to offset against the implementation of the colorectal screening programme
- use of the existing managerial and administrative staffing within the NCSS in the development of the new colorectal cancer screening service.

BreastCheck Programme

The identified efficiencies and opportunities to optimise the existing service, within the breast screening programme which should be considered by the NCSS Board include the following:

- mechanisms to optimise attendance at screening clinics, including women confirming attendance, should be explored as possible ways of increasing the utilisation of the clinics and contributing to the potential expansion of the age group screened

- the unit cost of breast screening in Ireland appears high compared to other European countries such as the Netherlands and England. A detailed analysis of the differences between the systems, and an evaluation of where cost savings could be derived, should be considered.

CervicalCheck Programme

The identified efficiencies, or cost saving opportunities within the CervicalCheck programme which should be considered by the NCSS Board include the following:

- in Ireland, the unit cost for providing cervical cancer screening and assessment within the programme is €112. This should be examined in detail to identify those drivers within the costs where a reduction could be achieved. Significant savings could be realised with any reduction. A €10 reduction in the unit cost would yield an overall saving of up to €3 million annually
- the biggest single cost driver within the unit cost above is the fee payable to GPs, and other contract providers, for providing smear testing services. A reduction in this fee poses an opportunity for significant savings
- alternative proposals for smearing, as described above, could be explored. The model based on PCTs/PCNs could potentially be rolled out in tandem with the current arrangement until the PCTs/PCNs are fully operational. However, substantial savings may only be realisable with this model if the smearing workload can be absorbed to a large extent by the nurses working currently in primary, community and continuing care
- there may be some scope in which the costs payable in respect of cytology services could be reviewed, particularly in the current economic climate where other laboratories may likely compete for the service. The NCSS should consider re-tendering for cytology services at the completion of the current contract in 2010.

Synergies Between Programmes

There are potential synergies between the current and planned screening programmes. These include the following:

- the ICT management of both screening programmes within a HSE network should be considered and could lead to cost savings. Although CervicalCheck applications are currently deployed over a HSE network, BreastCheck applications are deployed over a network specific to that programme
- an assessment should be undertaken of efficiencies that may accrue from alignment of the BreastCheck PACS and the planned NIMIS project
- it is recommended that the Board of the NCSS undertakes an assessment of the cost and resources required to develop a single register to support the business processes within the current programmes and any future programmes
- any future investment in the implementation of a national Unique Health Identifier could be leveraged by the NCSS and lead to greater efficiency.

9.2.2 Existing Colonoscopy and Associated Services

There is an opportunity to utilise the existing colonoscopy services in order to meet the needs of a colorectal cancer screening programme.

The survey of the acute hospitals providing colonoscopy and colorectal surgical services conducted by the Authority has indicated that:

- 37 publicly funded hospitals within the State are performing colonoscopy procedures
- there is potential to expand the utilisation of the existing colonoscopy capacity using an extended working day, optimising unused sessions and scheduling sessions at weekends
- colonoscopy activity is increasing year on year. Approximately 42,000 publicly funded colonoscopies plus flexible sigmoidoscopies were performed in public hospitals in 2008 and approximately 2,000 more publicly funded colonoscopies were performed in private hospitals via the National Treatment Purchase Fund (NTPF)
- approximately 43,000 privately funded colonoscopies were performed in 2008. Approximately 31% were privately funded colonoscopies performed in public hospitals
- NTPF data indicates 2,334 patients waiting for colonoscopies up to three months in April 2009
- the extent to which colonoscopies currently performed in the symptomatic services will be absorbed by a screening programme is unknown
- approximately 1,500 colorectal cancer surgeries were performed in public hospitals in 2008. Currently 23 hospitals perform colorectal surgery. The National Cancer Control Programme is centralising rectal surgery to eight designated centres with the expectation that colon surgery will also be centralised in a smaller number of hospitals.

9.2.3 Review of the Proposed NCSS Model for a Colorectal Cancer Screening Programme

An examination of the NCSS model for implementation of a national colorectal cancer screening programme has indicated that:

- the proposed NCSS model for the introduction of colorectal cancer screening is based on a centrally-planned model involving the creation of new facilities dedicated to the programme. It is unlikely that this could be implemented in the current economic climate. Accordingly, any new programme would have to be based upon using existing facilities more economically, effectively and efficiently

- operational cost reductions can be identified in the proposed NCSS four-centre model. These include management/administrative costs, elimination of contingency, and more favourable costs on the non-pay elements of the programme
- underestimated costs in the NCSS proposal include the extra costs for consultant sessions not spent on the screening programmes and the additional costs for CT colonography. These are likely to increase the annual revenue costs to the health system from €15.2 million up to approximately €18 million.

9.2.4 Alternative Model for a Colorectal Cancer Screening Programme

As a result of this evaluation, an alternative and more cost effective model for the delivery of the colorectal cancer screening programme has been proposed. This optimises and builds on the existing capacity within the health system, utilises a number of cost savings/efficiencies that have been previously outlined and identifies a number of additional options that may contribute to the costs of a high quality national colorectal cancer screening service for the population. A summary of the key elements of the model are:

- the colonoscopies generated from the screening programme could be delivered in 8 to 12 symptomatic service locations across the country
- the NCSS will set the minimum specification for the provision of colorectal screening services and locally-determined proposals will be invited from individual hospitals to become centres to take referrals from the new colorectal cancer screening programme
- it would be appropriate for individual hospitals, and their networks, to decide upon and propose the most effective solution that matches implementation of the programme within their context in terms of the available facilities, resources, staff and activity
- a series of output-based service-level agreements (SLAs) would be established between each individual hospital and the NCSS to deliver the increased work arising from a colorectal cancer screening programme. Under the terms of the SLAs, the NCSS would have responsibility for setting quality assurance and accreditation standards and for auditing the service against these standards
- use of advanced nurse practitioners in the delivery of service, as well as longer working days and weekend working should be considered by each hospital in arriving at its proposal
- appropriate diagnostic and treatment pathways should be in place for other procedures required as part of the programme (for example CT colonography or surgery)
- in the pre-implementation phase a gap analysis to determine any additional consultant radiologist and radiographer expertise and investment in specialised equipment required should be undertaken and addressed.

- the additional primary treatments generated by the screening programme should be considered in the work plans for the eight designated cancer centres
- it will be necessary for the NCSS and the wider HSE to work together in order to ensure that quality and time-based performance indicators are developed for the symptomatic colonoscopy service as well as the screening service in order to effectively manage the relationship between the services
- a national QA programme, incorporating a robust QA model and QA committee, should be further developed. This programme should provide support and advice to the NCSS executive and Board in regards to the programme's clinical efficacy and QA in all clinical and technical disciplines. All aspects of quality data from each unit should be reported to the QA committee
- the principles of good client care established within the breast screening programme should also be encompassed within this screening model
- the colorectal screening programme should operate a multidisciplinary team approach to the screening of individuals including endoscopists, surgeons, pathologists and ANPs. The team members should all have expertise and qualifications in colorectal cancer. Any endoscopist providing the service should be accredited to do so
- the laboratories utilised for histology should have appropriate internal quality control and external quality assurance.

This model would include an annual cost for the full implementation of the programme in the order of €12 million in year one, rising to €15 million in year 10, in line with the increased number of colonoscopies required. The following are the main components of the costing:

- the capital investment (€13 million to €14 million) envisaged with the NCSS model is not required
- an assessment of colonoscopy services and equipment in each of the acute hospitals will be required prior to commencement to establish to what extent these will need to be upgraded, or will need additional equipment, in order to meet the service demands and quality standards
- the pre-implementation costs of the alternative model are of the order of €1.8 million, and these are reduced from the €7.2 million in the NCSS model
- the operational costs of full implementation of the alternative model are of the order of €12 million in year 1 to €15 million in year 10, and these are reduced from the estimated €15 million to €18 million in year 1 in the NCSS model
- the funding allocation for the provision of service must be available for use by the selected hospitals to employ new staff and invest in capital equipment as required. This would have to be agreed between the hospital, the NCSS and the Department of Health and Children as necessary.

Phased implementation of the colorectal cancer screening programme is recommended.

- In order to enable the centres of referral to build up the necessary infrastructure, equipment and expertise, it is recommended that the colorectal cancer screening programme be introduced incrementally. The medium implementation option described in the HTA could be considered as an example
- Although, a reduced number of procedures would be required in year one of screening under a phased implementation option, it cannot be assumed that the reduced costs of such a programme would be proportionate with this number. This is because the screening centres would need to put in place the appropriate infrastructure, services, personnel and training to facilitate the build up of capacity.

A contribution from the health insurance companies towards the costs of a national colorectal cancer screening programme should be sought. Up to 50% of the target population for the programme have health insurance policies, and there are long-term cost benefits to the insurers in having their eligible members screened under the programme.

- If 50% of colonoscopies and CT colonographies provided by the screening programme were funded by private health insurance, this would lead to savings of up to €4 million in the first year of full implementation (based on the predicted costs of these procedures within the programme). There would be further savings if the FIT-based screening was paid for by private health insurers.

9.3 Summary of Cost Savings

As a result of this evaluation, a number of costs that were contained within the NCSS's proposed model for a colorectal cancer screening programme have been identified that may not be required in an alternative model and similarly, a number of cost savings have been identified within the existing NCSS programmes that may be used to contribute to the resource and cost base of a new colorectal cancer screening programme. These have been taken into account in costing the alternative model that has been put forward by this evaluation.

These include savings represented in Table 9.1

Table 9.1 Cost savings identified from NCSS model for colorectal cancer screening

Cost type	Saving (€ million)	Notes
Capital costs for new buildings	€13m – €14m	1
Pre-implementation costs	€7.2m reduced to €1.8m	2
Recurrent revenue operational costs	Up to €18m in year 1 reduced to €12m	3

Notes:

1. This cost will not be required although there may be a small amount of capital required for local refurbishing of existing facilities. An assessment of colonoscopy services and equipment in each of the acute hospitals will be required prior to commencement to establish to what extent these will need to be upgraded, or will need additional equipment, in order to meet the service demands and quality standards.
2. This represents a reduction in the equipment costs previously envisaged for new buildings and utilisation of existing NCSS management and administration capacity. Costs include some additional staff, one-off costs required for a population register, market research and communications, legal and professional fees and development of QA and accreditation.
3. This cost reduction is contributed to by the absorption of a considerable amount of the administrative and management costs of the programme within the existing NCSS corporate arrangements and the nature of the output-driven SLA with screening centres. Recurrent costs will increase from €12 million in year 1 and €15 million in year 10 in line with increased demand for colonoscopies.

The evaluation also identified further opportunities for cost savings and efficiencies that, if realised, could contribute to the costs required to implement and maintain a national colorectal cancer screening programme. These are as identified in Table 9.2.

Table 9.2 Funding opportunities from existing screening programmes and other services

Cost type	Value (€ million)	Notes
Reduction in unit costs for CervicalCheck	€3m	1
Contribution of private health insurers	€2m – €4m	2
Contribution by Irish Cancer Society	€1m	3

Notes:

1. A reduction of €10 in the unit cost of providing cervical cancer screening and assessment could save €3 million. (A reduction of €5 to €15 in the unit cost could save €1.5 million to €4.5 million.)
2. This contribution in cost savings could be realised if up to 50% of colonoscopies and CT colonographies within the programme were funded by private health insurers for their members. The benefits to insurers would include a potential reduction in the costs of procedures and in costs of future colorectal cancer treatment.
3. This represents a one-off donation (provided over a two-year period) that has been committed by the Irish Cancer Society.

If the funding opportunities identified by reducing the unit costs of CervicalCheck, and by contributions from private health insurance, can be realised, the total generated towards funding a colorectal cancer screening programme would be in the range of €5 million to €7 million per year. Therefore, considering recurrent revenue costs of €12 million for the alternative model, an additional €5 million to €7 million would be required on an ongoing basis. (This is based on a €10 reduction in the unit cost of providing cervical cancer screening and assessment. The final figures would need to be re-adjusted should a higher or lower reduction in the unit cost of cervical cancer screening and assessment be achieved.) The contribution by the Irish Cancer Society of €1 million over two years could be used towards upgrading existing facilities to meet service demands and quality standards, for pre-implementation costs or towards operational costs in the first years of screening.

9.4 Concluding Remarks

Throughout this evaluation the drive has been to objectively and realistically identify potential cost savings and efficiencies, where they can be identified, in order to deliver one thing – *better health outcomes for our population*.

In the current economic climate it is particularly important that the health system ensures that the way services are provided are continually reviewed. This may involve re-designing systems, processes and adapting behaviours where required and exploring innovative ways to become more efficient and effective to deliver higher quality safe services. This would make the best use of resources for the greatest benefit of patients.

The evaluation has undertaken a high level approach to such an exercise in order to explore how existing resources for cancer screening and colorectal cancer services can be maximised, to consider how a national population-based cancer screening service can be implemented.

In conclusion, resources used in the national population-based cancer screening programmes and the associated services have been evaluated. A high-level review indicates that there are cost saving opportunities (Tables 9.1 and 9.2) and efficiencies to be harnessed in the existing screening programmes. There is an opportunity to further utilise, and build upon, the capacity in the existing colonoscopy, and associated colorectal services. This approach will have the potential to not only deliver a national population-based colorectal cancer screening programme to reduce the incidence and mortality from colorectal cancer, but will also enable further improvements in the quality of the symptomatic services that are currently provided for people with colorectal conditions.

The successful implementation of a national cancer screening programme, through the proposed model, would require a concerted drive, passion and commitment from the public, healthcare professionals, policy makers and other key stakeholders. In the challenges of the current fiscal environment, it is important to focus on the “can do” to make it happen. When successfully implemented, the programme will have a significant impact on saving lives in Ireland.

10 Ethical Commentary

Medical ethics is an important aspect of the consideration of modern advances in medical technology, including cancer screening. At its simplest, screening may be described as a process of searching for disease in the absence of symptoms. Debates in relation to screening ethics have generally revolved around two issues: ensuring the voluntary and informed consent of those who are being screened, and the balancing of benefit and harm to those who participate.

There are many factors that must be taken into account as part of decision making in the healthcare system. An ethical assessment of relevant issues contributes to healthcare decision making by looking at societal and patient expectations as well as the objectives and values underpinning the decision at issue. Although there are a number of ethical theories that might be used in such an assessment, the most influential theory in the context of medical ethics in recent years has been the “Four Principles Approach” suggested by Beauchamp and Childress (2001) as representative of widely accepted common morality.¹⁶⁷ The four principles are:

- respect for autonomy
- non-maleficence
- beneficence
- justice.

The first three of these principles are particularly relevant to the doctor-patient relationship and the fourth principle is important in looking at wider societal relationships and, in particular, the allocation of resources in the healthcare system. The four principles are not absolute and are not to be used in isolation but should be balanced with each other. Other principles, such as human dignity, may also be relevant in various healthcare contexts.

- **Autonomy:**

Autonomy literally means “self-rule” or self-determination. In the healthcare context, respect for autonomy is generally understood as the principle that decisions made by a competent individual regarding his or her healthcare must be respected. There are a number of pre-requisites that exist in relation to this principle such as disclosure of relevant information to the person making the decision, ability to understand and weigh up that information in reaching a decision, and freedom from external pressure. These factors have led to the development of the doctrine of informed consent which is in common use in Irish healthcare.

- **Non-maleficence:**

This has evolved from the traditional principle enshrined in medical practice: “first do no harm.” In the context of healthcare, harm is a wide concept that generally means pain, injury or death. Difficulties may arise where this principle comes into conflict with respect for autonomy, for example where a patient

wishes to avoid further pain and suffering and asks for euthanasia. The challenge here is between respecting the choice of the patient and not causing the patient harm.

■ **Beneficence:**

This principle encourages doing good, living well and balancing possible benefits against possible harms. In the healthcare context, it relates to encouraging people to live a healthy life but again this principle may come into conflict with respect for autonomy where patients choose to disregard medical advice to their detriment.

■ **Justice:**

Justice is probably the least developed of the four principles and may have a number of different meanings. In the context of healthcare it is most commonly used in relation to the allocation of resources, i.e. distributive justice. This examines the way in which basic social burdens and benefits are distributed in a just society. This is a very complex issue as there may not be consensus on what is to be considered a basic social burden or benefit, and it may similarly be difficult to reach agreement on what a fair distribution of those burdens or benefits might be. For example, some people argue that every citizen should be entitled to an equal share of the state's resources, and others insist that the distribution of resources must take into account the different healthcare needs of the population and allocate more to those who need more due to particular health conditions.

The relationship between ethics and economic analysis is one of balancing beneficence to individuals and beneficence to society. It is generally accepted that an ethical distribution of the public finances demands that society should get the greatest benefit possible for the money spent on basic social needs such as health and education. This means that public health spending should be efficient and effective to minimise waste and endeavour to maximise available resources for the provision of health services. The ethical analysis also examines the consequences of implementing and not implementing a health intervention or technology.

It is inevitable that as demand for resources in healthcare increasingly exceeds supply, the need to identify priorities becomes more urgent. The capacity of health services to absorb resources is unlimited and choices therefore have to be made about the best use of available funds. There is no agreed measure by which priorities can be assessed. Preventative medicine is promoted as a means of tackling the causes of illness and thereby keeping people out of hospitals. Cancer screening is one of those means and clearly offers immense potential benefits through early detection and referral for specialist management of cancer. However, as with all medical procedures there are also possible harms that must be taken into account in planning screening services and which must be disclosed to those who choose to participate in the screening programme.

Specific ethical issues raised in cancer screening programmes could include:

- false positives
- false negatives resulting in delay, false sense of security which may cause screened individuals to ignore warning symptoms
- psychological effects of screening
- increased anxiety or fear of positive results
- introduction of screened individuals into the treatment system unnecessarily
- physical effects of the performance of invasive diagnostic procedures
- diagnosis of non-lethal lesion
- exposure to X-rays
- risk of over-diagnosis and over-treatment of ductal carcinoma in-situ of the breast in breast screening programmes (non-invasive cancer)
- physical effects of invasive procedures, including colonoscopy (sedation, bowel perforation) in colorectal cancer screening programmes.

Given that cancer screening is carried out on persons who are not generally ill and who have not initiated the request, it is particularly important to examine relevant ethical issues in this context. For the individual, screening can potentially cause harm as well as benefit; there may be a risk attached to the screening test or subsequent diagnostic test, a false-positive result can cause unnecessary anxiety, there may be other unplanned effects of a positive test, and a false-negative result will give false reassurance.¹⁶⁷

Screening involves balancing the potential risks to the population against the potential adverse risks to the individual. Cancer screening can offer huge benefits to those who participate by ensuring early diagnosis and protecting against cancer. The advantage of early detection followed by effective management of the patient's condition when cancer is detected is undoubtedly of crucial importance in our healthcare system, for patients and their families, but also, ultimately, resulting in cost savings for the system. However, it is vital that individuals must be fully informed prior to their participation in any screening programme, and the programme must follow validated, robust, audited protocols to ensure the maximisation of benefit and minimisation of patient harm.

Healthcare resources are almost always scarce, and they somehow have to be allocated. The allocation of healthcare resources is a difficult question with ethical, economic, social and political dimensions. "Explicating the demands of justice in allocating public health resources and in setting priorities for public health priorities, or in determining whom they should target, remains among the most daunting challenges in public health ethics."¹⁶⁸

Debates take place nationally and internationally about how to formulate rational and justifiable procedures for prioritising healthcare. The question remains: "what does it mean to be a just and caring society so far as meeting public healthcare needs is concerned when we have only limited resources to meet virtually unlimited healthcare

needs of all sorts?"¹⁶⁹ Concepts of justice vary widely across the political spectrum and there are many different theories that might be applied here, from utilitarianism to contractarianism, libertarianism and egalitarianism.

It is clear that efforts to rid the healthcare system of waste and inefficiency will not magically generate sufficient resources to obviate the need for priority setting. In this context public health needs inevitably also have to compete with individualised medical needs for resources.¹⁶⁹

One of the aims of a just and effective healthcare service is to ensure as far as possible that preventative measures are promoted and supported to enable serious disease to be avoided or detected at the earliest possible stage of the disease. One of the traditional tasks of public health is the prevention and control of disease through various means including vaccination, health screening, promotion and education, all of which are aimed at efficiently and effectively preventing injury, disability or disease in the population. Huge health gains have been achieved as a result of investment in public health measures over the last century in Ireland and elsewhere, including childhood vaccination programs, control of infectious diseases, decrease in infant mortality, decrease in deaths from coronary heart disease and so on. Despite the costs involved, public health interventions such as population screening are eminently worthy of funding in terms of the goals sought, i.e. early detection of disease followed by appropriate referral for effective treatment. However, some forms of screening may not be productive if effective therapeutic intervention were not available, or if the screening process were not scientifically sufficiently robust to be of practical significance.

In 2003, the Council of Ministers of the European Union recommended to Member States that there should be national implementation of evidence-based cancer screening in accordance with European guidelines on best practice.¹² In June 2008, the Council stressed that statistically one in three Europeans will develop cancer during his or her lifetime and that one third of cancer cases could be avoided by prevention, pointing to the need to raise awareness among the population in this respect and highlight prevention as the most effective long-term strategy in the fight against cancer, with the following main lines of action:

- promotion of a healthy lifestyle
- early diagnosis by screening
- reduction of occupational and environmental exposure to carcinogenic risks
- food safety.

Breast and cervical cancer screening programmes are currently provided in the Irish health system. Screening for colorectal cancer is acknowledged internationally to be a valuable and effective tool in early detection, leading to health gains for individuals and cost-efficiencies for the health system. From an ethical perspective, the provision of a robust, validated and effective screening programme for cancer should be an integral part of the Irish healthcare system.

The recommendations in this Report in relation to breast and cervical cancer screening

do not propose changes in the age cohorts or screening intervals currently in operation in Ireland. Therefore the recommendations do not directly negatively affect any person who might be invited for screening under the current system.

It is noted that any integration of screening services for colorectal cancer with existing diagnostic services would have to ensure that the existing quality and safety of services would not be compromised. This complies with the obligation to prioritise patient welfare in accordance with the principle of beneficence by which all health services must be organised and offered to the public.

The areas in which it is suggested that potential opportunities for savings may occur are largely organisational and contractual arrangements through which efficiencies might be achieved. Although the negotiation of such efficiencies is a matter outside of the scope of this Report, it must also be noted that a negative outcome to contractual negotiations which might result in the withdrawal of medical practitioners from existing screening programmes could potentially have a negative impact on the capacity of the screening programme to continue to meet current targets, leading to delays or inaccessibility for women who might otherwise benefit from such screening. Therefore the recommendations may indirectly raise ethical concerns in this regard.

The proposal to explore funding issues with private health insurers may at first glance appear to advantage those who are in a position to afford private insurance, and therefore this may raise ethical issues in relation to equity of access. However, private insurance has long been accepted in this country and elsewhere as a legitimate option for those who choose to avail of it and the potential savings for the national health system which could result from funding by health insurers would lead to the ability of the programme to facilitate a more comprehensive implementation of a national screening programme across the population. Therefore the recommendation to explore this possible route of funding is not ethically objectionable.

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12 Glossary of Terms and Abbreviations

ADENOCARCINOMA

A cancer which develops in glandular tissue, usually of the lining or inner surface of an organ (e.g. the colon).

ADENOMA/ADENOMATOUS POLYP

A particular type of benign (non-invasive) neoplasm (tumour) in the epithelial tissue of the colorectum.

ADJUVANT THERAPY

A treatment, such as chemotherapy or radiotherapy, which is given in addition to the main treatment (usually surgery) for cancer. It may be given before or after surgery; if given before it is often called neo-adjuvant therapy. The aim of adjuvant therapy is to increase the chances of curing the disease or to stop it spreading.

AMP

Advanced midwife practitioner.

ANP

Advanced nurse practitioner.

ASYMPTOMATIC

Having no symptoms of disease.

BENEFIT

The sum of the effects on wellbeing (positive or negative) which a particular intervention or programme bestows upon society. May be expressed in money terms to make it commensurate with cost.

BIAS

A systematic error.

BIOPSY

The examination of tissue removed from a patient to discover the presence, extent and cause of disease.

CANCER REGISTRY

Collection of information about the types of cancer that have been diagnosed and treated in a given area or region. Governments and health services run cancer registries so that they can keep a count of cancer rates and monitor how effective their prevention, diagnosis and treatment strategies are.

CARCINOMA

A malignant tumour derived from epithelial tissue. Carcinomas are the most common type of cancer.

CARCINOMA IN-SITU

An early cancer that has not invaded (grown into) surrounding tissues. Considered as the most severe cell change just prior to invasive cervical cancer.

CASE-CONTROL STUDY

A type of study in which individuals who have a disease of interest (e.g. cancer) are compared with those who are free from the disease, to identify factors associated with increased or reduced risk of developing the disease.

CERVICAL CYTOLOGY

A microscopic examination of a single layer of cells scraped from the surface of the cervix.

CERVIX

Neck of the womb.

CHEMOTHERAPY

The treatment of disease, usually cancer, using chemical substances (drugs), the aim of which is to destroy cancer cells.

CIN (CERVICAL INTRAEPITHELIAL NEOPLASIA)

A condition of the cervix, in which abnormal cells are present on the surface of the cervix. Over time, these cells may become cancerous. CIN is classified as 1, 2 or 3, depending on its severity. CIN 1 often clears up without treatment, but a repeat smear test is needed to check.

COLONOSCOPY

An examination of the colon with a long, flexible, lighted tube called a colonoscope.

COLPOSCOPY

A test performed using a colposcope to examine the surface of the cervix, in order to identify abnormal areas that require treatment. Usually done after an abnormal smear test.

CO-MORBIDITY/CO-MORBID CONDITION

The presence of one or more health condition/disease in an individual at the same time (e.g. cancer plus another condition such as diabetes or heart disease).

COMPUTERISED TOMOGRAPHY (CT SCAN)

An image produced by a CT scanner. X-rays are taken from different angles and are put together by a computer to generate a series of cross-sections of the part of the body being scanned. This can build up a very detailed picture of the inside of the body, and provide accurate information on the size and position of a tumour.

CONFIDENCE INTERVAL

This refers to the range of values within which the true prevalence or percentage is likely to lie. These intervals provide an estimate of the uncertainty about underlying parameters given data. For example a 95% confidence interval has a 95% chance of including the true value for that parameter. As the amount of data increases, confidence intervals for parameters get narrower in width.

CONFOUNDING

When the effects of two factors on an outcome (e.g. results of a study) cannot be separated.

CT

Computerised tomography.

CT COLONOGRAPHY/VIRTUAL COLONOSCOPY

A procedure that uses CT scanning (see above) to obtain an interior view of the colon.

CYTOLOGY

The study of cells. Cervical cytology screening is commonly referred to as a smear test.

DOPS

Directly observed procedural skills.

DRG

Diagnosis related group.

EAG

Expert Advisory Group.

ECONOMIC EVALUATION

The systematic appraisal of costs and benefits of projects, normally undertaken to determine the relative economic efficiency of interventions or programmes.

EFFECTIVENESS

The extent to which an intervention, procedure, regimen, when used in routine circumstances, does what it is intended to do for the specified population.

EFFICACY

The extent to which an intervention, procedure or regimen, when assessed in ideal circumstances, (usually in a randomised controlled trial) does what it is intended to do.

ENDOSCOPE

Instruments for the visual examination of interior parts of hollow structures of the body.

ENDOSCOPY

Endoscopic examination, therapy or surgery performed on interior parts of the body.

ESRI

Economic and Social Research Institute.

EU

European Union.

EUREF

European Reference Organisation for Quality Assured Breast Screening and Diagnostic Services.

EVIDENCE-BASED

Based on valid empirical information.

FALSE NEGATIVE

A negative test result in a person who does have the condition being tested for.

FALSE POSITIVE

A positive test result in a person who does not have the condition being tested for.

FIT

Faecal immunochemical test used to identify occult blood in a faecal sample.

FLEXIBLE SIGMOIDOSCOPY (FSIG)

A procedure in which a slender, hollow, flexible, lighted tube is placed into the rectum, to help find polyps or cancers in the rectum and part of the colon.

FOBT

Faecal occult blood test.

GI

Gastrointestinal.

HIPE

Hospital In-Patient Enquiry.

HISTOLOGICAL

Study of a biopsy.

HSE

Health Service Executive.

HTA

Health technology assessment.

IARC

International Agency for Research on Cancer.

ICSP

Irish Cervical Screening Programme.

ICT

Information and communications technology.

IMO

Irish Medical Organisation.

INCIDENCE

Number of new cases during a period of time, typically specified in number per year. May also be expressed as a rate (i.e. number of cases per 100,000 population).

MARKOV PROCESS

A mathematical model/random process in which the distribution of future states depends only on the present state and not on any past states (i.e. the system is “memoryless”).

MDT

Multidisciplinary team.

MEDIAN

Any value that divides the probability distribution of a random variable in half. For a finite population or sample, the median is the middle value of a odd number of values (arranged in ascending order) or any value between the two middle values of an even number of values.

META-ANALYSIS

The process of using statistical methods to combine the results of different studies.

MORTALITY RATE

The number of deaths from a specified disease that are diagnosed or reported during a defined period of time in a given population.

MRI

Magnetic resonance imaging.

NATURAL HISTORY

The course of disease from onset to resolution.

NCNM

National Council for the Professional Development of Nurses and Midwives.

NCSS

National Cancer Screening Service.

NEOPLASM

A growth of abnormal tissue. Maybe be benign or invasive. Also known as a tumour.

NHS

National Health Service, UK.

NICE

National Institute for Health and Clinical Excellence.

NIMIS

National Integrated Medical Imaging System.

NTPF

National Treatment Purchase Fund.

OBSERVATIONAL STUDY

A type of study in which individuals are observed or certain outcomes are measured. No attempt is made to affect the outcome (for example, no treatment is given and no intervention is made).

OCCULT BLOOD

Blood which is not visible to the naked eye, but which may be detectable by chemical means. The term usually relates to blood in the stool (faeces).

OGD (OESOPHAGODUODENOSCOPY)

A diagnostic endoscopic procedure that visualises the upper part of the gastrointestinal tract up to the duodenum.

ONCOLOGIC

Related to cancer (oncology is the study of tumours, their origin, development and treatment).

OT

Operating theatre.

PACS

Picture Archiving and Communications System.

PCCC

Primary Community and Continuing Care.

PCN

Primary care network.

PCT

Primary care team.

PET

Positron emission tomography.

PET SCAN

Short for positron emission tomography scan. A PET scan is a way to find cancer in the body. In a PET scan, the patient is given radioactive glucose (sugar) through a vein. A scanner then tracks the glucose in the body. The scanner's pictures can be used to find cancer, since cancer cells tend to use more sugar than other cells.

POLYP

A benign (non-invasive) neoplasm (tumour) in the epithelial tissue of the colorectum. There are various types of polyps including adenomas (see above), hyperplastic polyps, serrated adenomas, and flat polyps.

POPULATION-BASED SCREENING PROGRAMME

A programme in which screening is systematically offered by invitation to a defined population.

PREVALENCE

The proportion of the population with the disease at a given point in time.

QA

Quality assurance.

RADIOTHERAPY

Cancer treatment that uses high-energy electromagnetic radiation such as X-rays to kill cancer cells. During radiotherapy, a significant amount of healthy normal tissue is sometimes irradiated. To reduce the side effects caused by this, the radiation dose is often split into a number of treatments, enabling the normal healthy tissue to recover before the next treatment is given.

RANDOMISED CONTROLLED TRIAL (RCT)

A study in which participants are randomly (i.e. by chance) assigned to one of two or more interventions.

RGN

Registered general nurse.

SCREENING

A search for cancer, or precancerous lesions, in people who do not have symptoms.

SD

Screen detected.

SENSITIVITY

The proportion of truly diseased persons in a screened population who are identified as diseased by a screening test.

SIGMOIDOSCOPY

Inspection of the rectum and lower colon, using a thin lighted tube, called a sigmoidoscope.

SLA

Service-level agreement.

SPECIFICITY

The proportion of truly non-diseased persons in a screened population who are identified as disease free by a screening test.

STAGING/STAGE

Staging is a process of finding out whether a cancer had spread from the site or origin and, if so, how far it has spread.

SURVIVAL

The proportion/percentage of people with a disease who are still alive at a specified time (e.g. five years) after diagnosis.

SYMPTOMATIC

Individuals who have one or more symptoms (e.g. rectal bleeding) that may be due to a disease (e.g. colorectal cancer).

UHI

Unique Health Identifier.

VFM

Value for money.

VHI

Voluntary Health Insurance.

WHO

World Health Organization.

WTE

Whole-time equivalents.

Appendix 1

Documentation and Data Review

A list of information and documentation was requested from a number of sources to inform the evaluation, and these sources included:

- National Cancer Screening Service
- Department of Health and Children
- Health Service Executive
- National Cancer Control Programme
- Economic and Social Research Institute (ESRI)
- National Treatment Purchase Fund (NTPF)
- Voluntary Health Insurance Board (VHI)
- National Cancer Registry Ireland (NCRI).

Information requested from each of the organisations above was broken down as shown below. Meetings between the project team and all of these organisations were conducted and clarifications, updates and further information was provided to the team during those meetings.

National Cancer Screening Service

- current BreastCheck and CervicalCheck services
- staffing, education, training and development
- financial information
- corporate and clinical governance
- procurement and contracting
- information and notification systems
- synergies across the screening programmes
- proposed colorectal cancer screening programme
- activity and utilisation report on all of the regional centres and mobile units for the month of March 2009
- breakdown of smears taken in CervicalCheck according to smearer profession
- the NCSS multi-year strategy plan.

Department of Health and Children

Relevant documentation in respect of the terms of reference to the project, that would benefit the Evaluation Team in conducting the project including:

- information in respect of the National Cancer Screening Service
- information in respect of its predecessor programmes
- background to the establishment of screening programmes
- associated services within the Health Service Executive and other providers.

National Hospitals Office, HSE and HSE Finance

- current hospital configuration
- education training and development
- financial information
- corporate and clinical governance
- activity
- capacity.

National Cancer Control Programme

- information regarding the potential impact on symptomatic breast disease services of increasing the age range covered by BreastCheck
- the strategic direction in terms of location, configuration (including staffing) and quality assurance of symptomatic colorectal cancer services
- any work done on the relationships and interaction between CervicalCheck and the resources needed to deal with women found as a result of screening to have changes requiring follow up (for example colposcopy).

Economic and Social Research Institute

- information in respect of the total number of colonoscopies coded under the HIPE system, including a breakdown of public versus private procedures, in the years 2006 to 2008.

National Cancer Registry Ireland

- information in respect of colorectal cancer surgery activity in hospitals in the years 2006 and 2007.

National Treatment Purchase Fund

- information on how the Fund operates in respect of providing colonoscopy activity
- information on demand for colonoscopy to the Fund, and activity.

Private Health Insurance Companies

- information on the estimated number of people insured by the organisation
- information in respect of the number of colonoscopies covered by the organisation within a given time frame, broken down between publicly and privately funded hospitals
- information in respect of the philosophy of the organisation in respect of cancer screening programmes generally, and colorectal cancer screening programmes specifically.

Appendix 2

List of Hospitals Providing Survey Information

Adelaide and Meath Hospital Dublin Incorporating the National Children's Hospital

Bantry General Hospital

Beaumont Hospital

Cavan General Hospital

Connolly Hospital

Cork University Hospital

Kerry General Hospital

Letterkenny General Hospital

Louth County Hospital

Mallow General Hospital

Mater Misericordiae Hospital

Mayo General Hospital

Mercy University Hospital

Mid-Western Regional Hospital, Limerick

Mid-Western Regional Hospital, Ennis

Mid-Western Regional Hospital (St Joseph's Hospital)

Midlands Regional Hospital, Mullingar

Midlands Regional Hospital, Portlaoise

Midlands Regional Hospital, Tullamore

Monaghan General Hospital

Naas General Hospital

Our Lady of Lourdes Hospital, Drogheda

Our Lady's Hospital, Navan

Portiuncula Hospital, Ballinasloe

Roscommon County Hospital

Sligo General Hospital

South Infirmary Victoria University Hospital

South Tipperary General Hospital

St Columcille's Hospital, Loughlinstown, Co Dublin

St James's Hospital, Dublin

St John's Hospital, Limerick

St Luke's Hospital, Kilkenny

St Michael's Hospital, Dun Laoghaire

St Vincent's University Hospital

University College Hospital, Galway

Waterford Regional Hospital

Wexford General Hospital

Appendix 3

Systematic review of rationale for choice of screening intervals and age groups in breast cancer screening

(Available on www.hiqa.ie or from the Authority on request)

Appendix 4

Systematic review of rationale for choice of screening intervals and age groups in cervical cancer screening

(Available on www.hiqa.ie or from the Authority on request)

Appendix 5

Key lines of enquiry to assess organisational value for money (adapted): Audit Commission

Approach

The Audit Commission of England compared the arrangements that the National Cancer Screening Service have in place to deliver value for money, with the attributes of best performing health service organisations in England.

The approach was adapted from the Key Lines of Enquiry for 2009/10, which are available from the following website:

<http://www.audit-commission.gov.uk/health/audit/auditorslocalevaluation/Pages/ale200910.aspx>

Key Line of Enquiry	Attributes of best performing organisations
The organisation has put in place proper arrangements for securing strategic and operational objectives.	The organisation can provide evidence that its documented process is dynamic, with reviews of business objectives and performance undertaken on an ongoing basis as part of an overall drive for improvement.
	All objectives are supported by quantifiable and measurable outcomes.
	Barriers and levers to success have been identified and critical pathways have been defined to identify key milestones and risks.
The organisation has put in place proper arrangements to ensure that services meet the needs of patients and taxpayers, and for engaging with the wider community.	The organisation undertakes detailed and ongoing capacity reviews in conjunction with relevant partners. It is aware of any weaknesses it faces in skills and capacity and has costed action plans in place to address them.
	The organisation can demonstrate the positive impact of the communication strategy in driving corporate objectives and the results of improvements made as a consequence of engaging with specific communities and diverse groups.
	The organisation reports back to patients and the public where their feedback has improved services. Patient feedback is shared with local partners where relevant.
	The views of minority user and “hard to reach” groups are actively sought and their active involvement in service design has increased.
	There is a clear process for considering and prioritising their needs and views. Improvements as a result of increased engagement can be demonstrated.

<p>The organisation has put in place proper arrangements for monitoring and reviewing performance, including arrangements to ensure data quality.</p>	<p>Milestones are set for monitoring policies and improving performance. There is evidence that action plans have been implemented, delivering modified policies or improvements in performance.</p> <p>The organisation can demonstrate that actions resulting from internal and external reviews have been implemented and have led to improvements being made.</p> <p>There is a real-time performance management system in place that identifies significant future risks and links to these to the risk register.</p>
	<p>The organisation has thorough and robust data checking procedures and systems in place to ensure data validity that do not interfere with the timely production of information. It can demonstrate that it has good quality data across all its functions.</p> <p>There is a training programme for existing staff to ensure latest changes in procedures and guidance are disseminated and acted upon in a timely manner. All procedure notes are regularly reviewed and staff receive timely updates on any changes.</p>
<p>The organisation has established arrangements for managing its financial and other resources which demonstrate value for money is being managed and achieved.</p>	<p>The organisation can demonstrate sustained and regular improvements in economy and efficiency at all levels.</p>
	<p>The organisation has delivered savings and more efficient working practices in its corporate/back office functions.</p>
	<p>The organisation can demonstrate the use of efficiency and productivity metrics has improved its comparative position or maintained its existing high performance and has directly led to efficiency improvements.</p>
	<p>The organisation can demonstrate the use of benchmarking, efficiency indicators and best practice has improved its comparative position or maintained its existing high performance and has directly led to efficiency improvements. It undertakes continuous benchmarking throughout the organisation and looks beyond the health sector and abroad for improvement opportunities.</p>
	<p>The organisation can demonstrate that improvements to its cost position can be attributed to the work and actions taken following the review of cost data or service line reporting.</p>
	<p>The organisation has set a target for savings from procurement and the board receives regular reports which demonstrate that this has been delivered.</p> <p>It has benchmarked both the price it is paying for the goods, services it purchases and the transaction costs it incurs. It can demonstrate that it is delivering good value for money compared to similar organisations.</p>

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