

Projections Model for Colonoscopies for Tasmanians Aged 55 & 65 years from 2006 to 2031

Introduction

The Australian Institute of Welfare reported that in 2000-01, bowel cancer had the highest health system cost after non-melanoma skin cancer. The total expenditure in that year was \$235 million.¹ In response to this issue, in the 2005-06 Budget, the Australian Government announced the phased introduction of a national bowel cancer screening program. The program is due to commence in May 2006.

Key components of the Program

People who turn 55 or 65 years of age will be invited to participate in the program. Invitees will be identified using Medicare data and invitations will be sent directly to them by mail. Participants will be requested to complete a faecal occult blood test (FOBT). A FOBT is a simple, take-home test that requires collection of a number of faecal samples. These samples are then sent to a laboratory for processing. A FOBT cannot diagnose bowel cancer, but it will help decide if a person needs further tests. Overseas trials of FOBT screening demonstrate that mortality reductions of between 15 and 30 per cent can be achieved through population screening of people aged 55 to 75 years for bowel cancer. Once completed, the kits will be mailed in for pathology analysis. Results will be sent directly to the participant, as well as to their nominated general practitioner (GP). There will be a range of safety net mechanisms such as reminder letters for people with positive results to see their GP.

Through the program, the Australian Government has stated it will fully fund:

- the register, including invitation and follow-up;
- faecal occult blood tests (FOBTs) mailed to eligible people;
- pathology analysis of FOBTs;
- a national helpline;
- information materials for invitees and GPs; and
- national monitoring and evaluation of the program.

In addition, the Australian Government has stated it will provide all the government funding of:

- all GP visits that may result from the program;
- colonoscopies and histopathology provided in the private sector; and
- any other follow-up (such as specialist visits) provided in the private sector.

State Governments are being asked to provide those colonoscopies where the person is referred as a public patient. Current data indicates that around 70% of all in-patient colonoscopies are provided to privately funded patients, either in private facilities or public hospitals and 30% to public patients.

¹ Australian Institute of Health and Welfare 2005. *Health system expenditures on cancer and other neoplasms in Australia, 2000-01*. AIHW cat. No. HWE 29. Canberra: AIHW (Health and Welfare Expenditure Series no.22).

Potential workforce implications

Between the middle of 2006 and the middle of 2008 nearly a million people nationwide will be invited to participate in the program. Of these, around 40 per cent are expected to participate, based on the findings of a pilot study of the program.

It is unclear whether the program will result in net additional colonoscopies within the State of Tasmania, or will divert some people from using a colonoscopy as a method of quasi-screening for bowel cancer to a more appropriate FOBT screening approach.

The purpose of the following analysis is to estimate the number of colonoscopies which may be required each year as a result of the national bowel cancer screening initiative.

Details of the model

The latest ABS population projections, *Population Projections Australia 2004 to 2101, Series B* were used to determine the number of Tasmanians aged 55 and 65 each year who would be invited to participate in bowel cancer screening. The population projections traditionally rely upon trend data, which may have underestimated the growth of the Tasmanian population aged 55 and 65 years due to changes in interstate migration. Therefore, caution must be exercised when considering the projections of annual colonoscopy numbers.

Assumptions of the model

The model requires the following proportions (which can be varied) as inputs. These proportions were estimated from a nationwide pilot study conducted in three sites around Australia²:

- The expected proportion of those invited for screening who actually have a FOBT (assumed to be 45%)
- The estimated proportion of FOBTs that are positive (assumed to be 9%)
- The estimated proportion of those testing positive by FOBT who go on to have a colonoscopy which is subsequently negative (assumed to be 80%)

Two implicit assumptions of the model are:

- Those Tasmanians who had a negative FOBT are returned to the FOBT screening program every two years
- Those Tasmanians who had a negative colonoscopy are returned to the FOBT screening program after 5 years.

Model Scenarios

Two scenarios are presented in the model. The first is the simplest scenario (Scenario 1).

In Scenario 1, the total number of colonoscopies is obtained by adding the “new” number of colonoscopies, resulting from Tasmanians aged 55 and 65 invited for screening for the first time to those Tasmanians who have been *returned* to screening

² Australian Government Department of Health and Ageing 2004. *The Australian Bowel Cancer Screening Pilot Program: Analysis of routinely collected screening data*, ISBN 0 642 82813 X

for the first time. To clarify this, consider the following example, derived from the model.

Example 1

For the year 2011, 5,211 Tasmanians aged 55 and 65 had an FOBT screening test for the first time. Of these, 469 underwent a colonoscopy. In addition, it is anticipated that there will be *another* 31 colonoscopies resulting from those Tasmanians who had a negative FOBT result *two* years earlier and who were returned to screening in 2011. Further, there is an additional 414 colonoscopies resulting from those Tasmanians who had a negative colonoscopy *five* years earlier, and were returned to screening in 2011. In total, an additional 445 colonoscopies would be required for that year.

In Scenario 2, which is probably more realistic than Scenario 1, the total number of colonoscopies is obtained by adding the “new” number of colonoscopies, resulting from Tasmanians aged 55 and 65, invited for screening for the first time to the number of colonoscopies resulting from those Tasmanians who have been *returned* to screening as a result of screening in any preceding year since 2006. The fundamental assumptions behind this model are: (a) that every time a person is returned to FOBT screening, there is a 91% chance that the FOBT screening test will be negative, and then that person will, in the event of a negative FOBT, *again* be returned to screening two years later. This is assumed to continue indefinitely. The second assumption (b) is that every time a person has a colonoscopy, there is an 80% chance that the colonoscopy will be negative, and then that person will be returned to screening in five years time. Again, that is assumed to continue indefinitely.

Because it is assumed that persons are returned to screening indefinitely, the number of required colonoscopies increases significantly. To clarify this, consider the following example, derived from the model.

Example 2

For the year 2011, there were 445 colonoscopies resulting from Tasmanians aged 55 and 65 receiving an FOBT screening test for the first time. In addition, there were 811 colonoscopies resulting from those Tasmanians returned to screening from preceding years, almost double the number of colonoscopies from those Tasmanians being screened for the first time. These additional colonoscopies are derived as follows: 9% of the 4,601 Tasmanians returned to screening from 2 years earlier due to a negative FOBT + $(9\%)*(91\%)$ of the 4,460 Tasmanians returned to screening from 2007 due to a negative FOBT + 9% of the 347 Tasmanians returned to screening from 5 years earlier due to a negative colonoscopy.

It should be noted that Scenario 2 is *also* incomplete, as, due to the complexity involved, it does not include extra colonoscopies which would result from people “changing streams”. By this it is meant, that a Tasmanian who initially had a negative FOBT and was therefore to be re-screened in 2 years time, might, upon subsequent re-screening require a colonoscopy, which then turned out to be negative, meaning that that person is again to be re-screened, but now at five yearly intervals, rather than two. The converse outcome of changing from the five year re-screening interval to the two year re-screening interval is also a possibility. Relative to the other scenarios, particularly Scenario 2, neither of these outcomes would be expected to increase the total number of annual colonoscopies significantly. An initial estimate would put this increase in the order of 50 to 70 extra colonoscopies per annum.

Summary

The number of extra colonoscopies resulting on an annual basis from the national bowel cancer screening initiative may change dramatically, depending on the assumptions made. If the simplest scenario is adopted, in which only colonoscopies resulting from new invitees and those who are being re-screened for the first time are considered, then the total number of annual colonoscopies is reasonably modest. However, if the model is made more complicated by including persons who have been re-screened more than once, then the total number of expected annual colonoscopies increases by around a factor of 3 by the year 2031. If the additional element of persons “changing re-screening streams”, as mentioned above, is also included, the total number of annual colonoscopies will increase further, but not by a significant amount.

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