5 GP pathology ordering

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This chapter investigates changes in pathology ordering by general practitioners for the morbidities in the National Health Priority Areas, and other selected problems that commonly involve pathology ordering in their management.

Changes in pathology ordering behaviour are considered using two data points April 2000–March 2002 and April 2006–March 2008. While BEACH began in April 1998, pathology data from the first 2 years are not comparable because the pathology codes were expanded to incorporate greater specificity from April 2000 onward.

This chapter explores the relationship between changes in pathology ordering for the selected problems and: the management rate of the problem; the likelihood of pathology being ordered in the management of the problem; the number of pathology tests/batteries of tests being ordered.

The types of pathology tests by Medicare Benefits Schedule (MBS) group and individual pathology tests/batteries of tests ordered in Australian general practice are not investigated in this chapter but have been published elsewhere.[1]

5.1 Background

Pathology plays a critical role in more than 70% of clinical diagnoses and in many of the decisions around the optimal treatment for patients.[2]

Pathology services in Australia are provided by laboratories in both public and private sectors. Public laboratories are primarily based in public hospitals and are state-run. Private laboratories are predominately community based, and their eligible testing services are charged to the Australian Government-funded MBS.

General practice is community based, and therefore pathology tests requested by GPs are primarily MBS funded. MBS services and expenditure statistics reflect both specialist and GP requests. In 2007–08, pathology tests requested by GPs accounted for 70% of MBS pathology services and generated 67% of the pathology costs to Medicare.[5]

There are a number of MBS claim and payment rules that mean the MBS data are not an exact reflection of pathology requests. In particular:

- episode coning restricts the number of MBS pathology item numbers that can be claimed per episode of care for pathology tests requested by GPs in non-hospitalised patients, to a maximum of three items. Some MBS pathology item numbers are exempt from the coning rule (for example, Pap smear items).[3]
- each MBS pathology item number can represent multiple pathology tests (a group of tests) or a single analyte.[3]

These rules have not significantly changed over the period of this study.

In 1996, recognising the growth in pathology costs the Australian Government introduced a Memorandum of Understanding (a risk-sharing agreement) with the pathology industry and profession, which aimed to cap the growth in Medicare expenditure for pathology to an agreed amount. The current Memorandum of Understanding is the third, covering 1 July 2004 to 30 June 2009, and it includes cost outlays, the quality and safety of pathology ordering and workforce training.[6]

A number of adjustments (up and down) have been made to the funding arrangements since the MoUs were first introduced. The most recent were made to selected MBS pathology items in the 2008–09 budget (outside the Memorandum of Understanding).

- The maximum number of tests funded per sample was reduced from six to five producing an estimated saving of $21.6 million in 2008–09, with estimated cumulative savings of $95.8 million over 4 years.
- Pathology collection fees were also reduced, producing a one-off forecast saving of $17 million in 2008–09.[7]

Over the 8-year period investigated in this chapter, 2000–01 to 2007–08, the cost and number of MBS pathology items claimed in Australia increased significantly.

- In the 2000–01 financial year, the cost of pathology services to the MBS was $1.2 billion (15.8% of total MBS benefits paid), and in 2007–08, the cost was $1.9 billion, (14.4% of MBS benefits paid). From 2000–01 to 2007–08, the total cost increased by 62.2%, and the per capita cost increased by 47.5%.[4]
- In 2000–01, there were 62 million pathology services claimed (3.2 per capita) and in 2007–08, there were 96 million (4.5 per capita). Representing a 54.1% increase in the number of claimed services and a 40.6% increase in the number of services per capita.[4]

From 2000–01 to 2007–08, the number of GP encounters paid through the MBS in Australia increased. In the 2000–01 financial year, there were 100.6 million GP encounters, and in 2007–08, there were 109.5 million encounters.[4]

In general practice, total pathology ordering can be influenced by a number of factors:

- a change in the number of GP encounters nationally (increased volume of encounters without a change in the distribution of GPs' workload)
- a change in the management rate of a problem
- a change in GPs' pathology ordering behaviour in the management of the problem. This is measurable as a change in the rate of pathology orders, caused by a change in the likelihood of pathology ordering for the problem (more or fewer episodes of testing) and/or a change in the number of pathology tests ordered per tested problem (more or fewer tests per episode).

The drivers of change in these factors are a complex combination of GP characteristics (for example, years of experience, size and location of practice), patient characteristics (for example, age, morbidity), and environment factors (for example, ageing population, increased survival time and long-term monitoring, new technologies and new tests, change in disease incidence or prevalence).

5.2 Method

Pathology tests ordered at the GP encounter are recorded in free text on the BEACH form. Each test or battery of tests is linked by the GP to the related problem or problems under management at the encounter (see Appendix 1). Each pathology test can be linked to up to four problems managed (the maximum number of problems recorded per encounter). Some problem labels in this chapter include grouped ICPC-2 and ICPC-2 PLUS codes (see Chapter 2). A full list of code groups is provided in Appendix 3.

Pathology tests can either be recorded as a single test (for example, fasting glucose test) or as a battery of tests (such as full blood count), and each of these counts as one order. All BEACH data are secondarily coded. The pathology tests are coded using the terminology ICPC-2 PLUS (see Chapter 2).

BEACH data report the pathology test(s) requested by the GP (to a maximum of five tests/batteries of tests per encounter). In contrast, data from pathology laboratories list the organisation's interpretation of the GP's order. The MBS data report the number of MBS pathology items claimed by pathologists. As noted above, for GP-requested tests, pathologists can only claim the three most expensive items due to episode coning.

Limitations

When a GP places an order for pathology at the encounter, each test may relate to more than one problem being managed. Therefore, it is possible for a single pathology order to be linked to more than one problem. This chapter uses a problem base, and consequently it looks at the linkages of pathology tests to the problem. A single pathology test will be counted more than once if it is linked to more than one problem.

- In 2000–02, there were 2.7% more links than tests (66,429 pathology–problem links and 64,643 pathology tests/batteries of tests)
- In 2006–08, there were 3.8% more links than tests (90,753 pathology–problem links and 87,444 pathology tests/batteries of tests).

It is likely that a single pathology test/battery of tests could be counted more than once in the large morbidity groups (for example, cardiovascular disease, psychological disease and musculoskeletal problems). Therefore, the number of tests/batteries for the large morbidity groups and total problems is likely to be a small overestimation. However, it is very unlikely that a single pathology test would be counted twice within an individual morbidity group (for example, hypertension, Type 2 diabetes).

There is space for up to five individual tests or batteries of tests to be recorded per encounter. If more than five tests/batteries of tests are recorded, the five tests that represent the breadth of testing ordered by the GP are coded, with priority given to batteries of tests over single tests. The pathology data are coded at the same level of specificity that the GP records whenever possible. However, on occasions where GPs specify all the analytes from a battery of tests, these have been coded as the battery of tests to allow space for any other tests recorded by the GP to be coded. This coding decision would also contribute to an underestimation of the number of tests ordered by GPs. However, this underestimation applies to all data years investigated.

Over time there was a significant increase in the number of encounters where five pathology tests were recorded. In 2000–02, 11.5% of encounters (95% CI: 10.9–12.1) that involved at least one pathology test had five pathology tests recorded by the GP, and in 2006–08, this had increased significantly to 19.0% (95% CI: 18.2–19.8). This increase suggests that BEACH data are likely to underestimate the number of pathology tests/batteries ordered by GPs, and more so in 2006–08 than in 2000–02.

Extrapolations

The method used to extrapolate BEACH data are described in Chapter 2. The numbers of GP encounters used in the extrapolations in this chapter are different from those described in Chapter 2 because two data years are combined. The numbers used are the average for the two years in each time point: 100.3 million in 2000–02 and 106.5 million in 2006–08.[4]

Extrapolations are based on the problem–pathology links for the selected problem(s) rather than the number of pathology tests/batteries of tests. The extrapolated numbers for each data point are average annual estimates. For example, the number of encounters at which hypertension is managed by GPs is estimated to be 10.1 million encounters per annum in 2006–08. Extrapolation estimates are rounded to the nearest 100,000 if more than a million and to the nearest 10,000 if less than a million.

The extrapolated changes reported throughout this chapter are calculated as the difference between the average annual estimates in each 2-year time point.

5.3 Changes in pathology ordering 2000–02 to 2006–08

In 2000–02, there were 198,200 encounters recorded by 1,982 GPs, and in 2006–08, there were 188,300 encounters recorded by 1,883 GPs. During this time, there was a significant increase in the number of problems managed per GP encounter, from 147.3 per 100 encounters (95% CI: 146.1–148.4) to 153.3 per 100 (95% CI: 151.9–154.7).

Pathology test ordering of GPs has increased significantly.

- The rate of pathology tests/batteries of tests increased from 32.6 per 100 encounters in 2000–02 to 46.4 per 100 in 2006–08. This was due to significant increases in:
  - the likelihood of at least one pathology test/battery being ordered at encounters (14.9% of encounters in 2000–02 and 18.7% in 2006–08)
  - the number of pathology tests ordered per encounter once the decision to order was made (217.8 per 100 tested encounters in 2000–02 and 247.8 in 2006–08) (Table 5.1).
- The rate of pathology tests/batteries ordered per 100 problems managed increased from 22.2 per 100 in 2000–02 to 30.3 in 2006–08. This was due to a significant increases in:
  - the likelihood of at least one pathology test/battery being ordered in the management of problems (11.4% of problems in 2000–02 and 14.2% in 2006–08)
  - the number of pathology tests ordered per problem once the decision to order was made (200.1 per 100 tested problems in 2000–02 and 221.3 in 2006–08) (Table 5.1).

When these pathology ordering data are extrapolated to the GP encounters claimed through Medicare (100.3 million per year in 2000–02 and 106.5 million per year in 2006–08), these data suggest that in 2006–08 there were:

- 6.4 million additional problems for which the GP ordered at least one pathology test/battery of tests (23.2 million per year in 2006–08 compared with 16.8 million per year in 2000–02)
- 17.7 million additional tests/batteries of tests ordered by GPs (51.3 million per year in 2006–08 compared with 33.6 million per year in 2000–02).

For interested readers, the pathology ordering rates for each year measured in BEACH from 2000–01 to 2007–08 have been published in *General practice in Australia 1998–99 to 2007–08: 10 year data tables*, available from <www.aihw.gov.au/publications/index.cfm/title/10661>.

Table 5.1: Summary of pathology ordering, 2000–02 and 2006–08

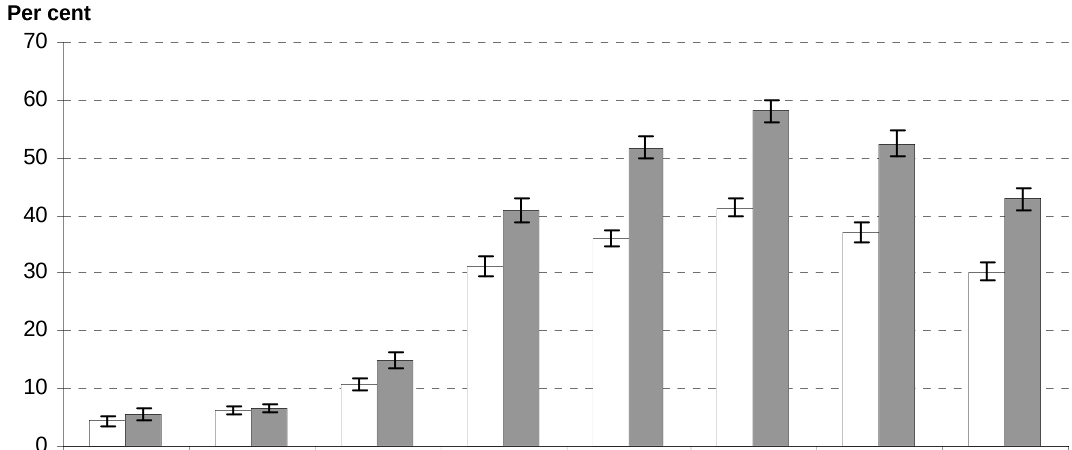
	2000–02 (*n* = 198,200)		2006–08 (*n* = 188,300)	
Pathology ordering	**Number**	**Rate/per cent (95% CI)**	**Number**	**Rate/per cent (95% CI)**
Pathology order rate per 100 encounters[(a)]	64,389	32.6 (31.7–33.5)	87,444	46.4 (45.2–47.7)
At least one pathology order per encounter (percentage of all encounters)	29,559	14.9 (14.6–15.3)	35,284	18.7 (18.3–19.2)
Test order rate per 100 tested encounters	. .	217.8 (214.9–220.6)	. .	247.8 (244.6–251.1)
Pathology test rate per 100 problems managed[(b)]	64,389	22.2 (21.6–22.7)	87,444	30.3 (29.6–31.0)
At least one pathology order per problem (percentage of total problems managed)	33,196	11.4 (11.1–11.6)	41,019	14.2 (13.9–14.5)
Number of tests ordered per 100 tested problems (rate)	. .	200.1 (197.6–202.6)	. .	221.3 (218.5–224.0)

(a) This is a rate of pathology test/batteries ordered per 100 encounters based on the number of pathology tests/batteries over the number of encounters rather than the number of problem–pathology links.

(b) This is a rate of pathology test/batteries ordered per 100 problems managed (in 2000–02, *n* = 291,890 and in 2006–08, *n* = 288,610) based on the number of pathology tests/batteries over the number of problems rather than the number of problem–pathology links. There are more links than tests because each test can be linked to more than one problem under management (see Section 5.2).

Note: CI—confidence interval.

The age-specific rate of pathology ordering is shown in Figure 5.1. In 2006–08, the rate of testing was highest at encounters with patients aged 45–64 years (58.1 pathology tests/batteries per 100 encounters), followed by those with patients aged 65–74 years (52.5 per 100) and 25–44 years (51.8 per 100).



	<1	1–4	5–14	15–24	25–44	45–64	65–74	75+
□ 2000–02	4.4	6.2	10.7	31.2	36.0	41.3	37.0	30.3
■ 2006–08	5.6	6.6	14.8	40.8	51.8	58.1	52.5	42.9

Age group (years)

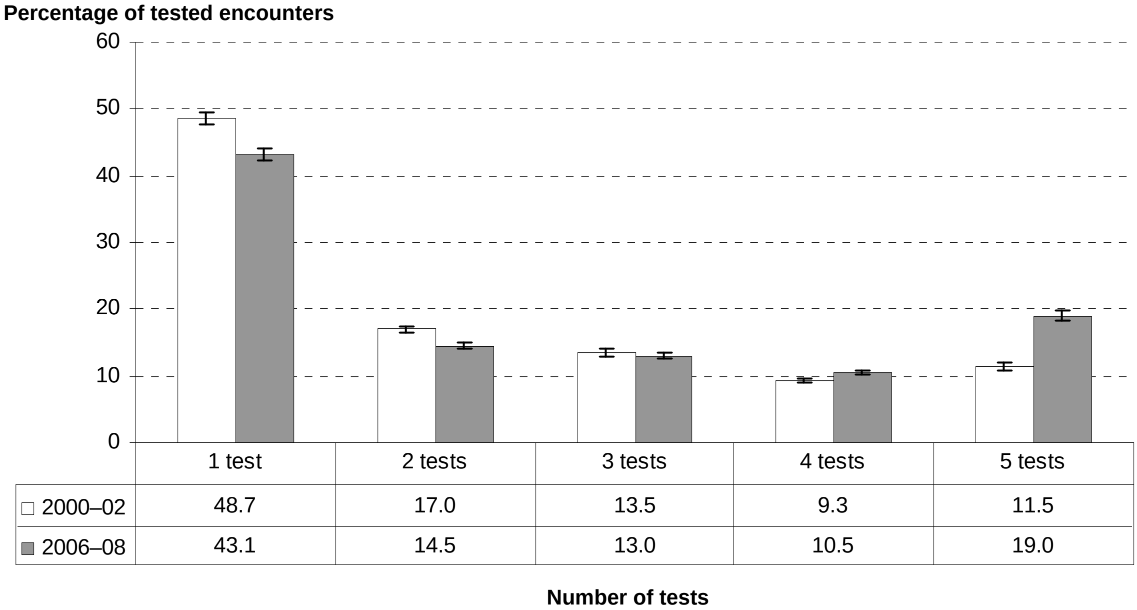
Figure 5.1: Age-specific rate of pathology ordering per 100 encounters, 2000–02 to 2006–08 (95% CI)

Between 2000–02 and 2006–08, there were significant increases in the age-specific rates of pathology ordering at encounters with all patient age groups except in those with children aged less than 5 years. Patients with the highest age-specific rates of pathology testing (45–64, 65–74 and 25–44 years) showed the largest age-specific increases in pathology ordering rates from 2000–02 to 2006–08 (Figure 5.1). The age groups accounting for the highest volume of pathology tests/batteries ordered were the 45–64 year age group (34.9% of tests/batteries) and the 25–44 year age group (26.5%) (results not shown).

There was a significant increase in the number of pathology tests/batteries ordered per encounter where at least one test/battery was ordered (tested encounter), and per tested problem in 2006–08 compared with 2000–02 (figures 5.2 and 5.3).

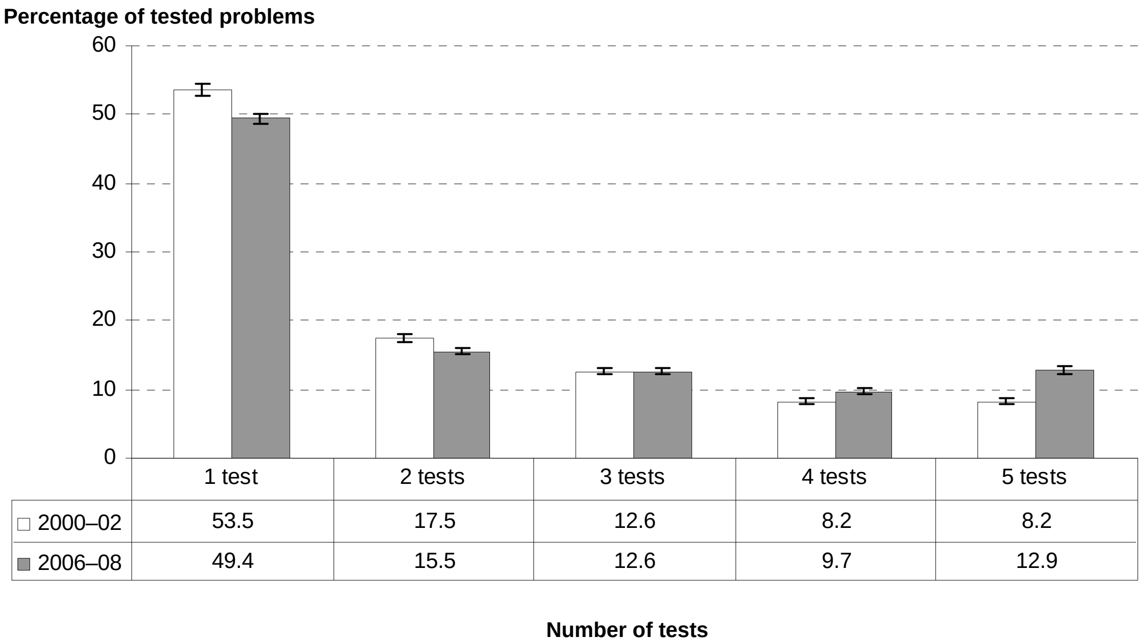
There was a significant decrease in the proportion of tested encounters with one or two tests/batteries ordered, in 2000–02, 48.7% of tested encounters had one test and 17.0% had two compared with 43.1% (one test) and 14.5% (two tests) in 2006–08. Simultaneously, there was a significant increase in the proportion with four or five tests/batteries ordered (Figure 5.2).

The distribution of number of tests per tested problem shows the same pattern of change. In 2006–08 compared with 2000–02, there was a significant decrease in the proportion of tested problems where one or two tests/batteries were ordered and a significant increase in the proportion where four or five tests/batteries were ordered (Figure 5.3). The proportions are smaller per tested problem, as more than one problem involving pathology tests can be managed per encounter.



	1 test	2 tests	3 tests	4 tests	5 tests
2000–02	48.7	17.0	13.5	9.3	11.5
2006–08	43.1	14.5	13.0	10.5	19.0

Figure 5.2: Number of pathology tests ordered per encounter when at least one test is ordered, 2000–02 to 2006–08 (95% CI)



	1 test	2 tests	3 tests	4 tests	5 tests
2000–02	53.5	17.5	12.6	8.2	8.2
2006–08	49.4	15.5	12.6	9.7	12.9

Figure 5.3: Number of pathology tests ordered per problem when at least one test is ordered, 2000–02 to 2006–08 (95% CI)

5.4 National Health Priority Areas

Type 2 diabetes

GP pathology ordering behaviour in the management of Type 2 diabetes is looked at from 2000–02 to 2006–08 in this section. Changes in the management of Type 2 diabetes over the last decade (1998–99 to 2007–08) are looked at in detail in Chapter 10. The management rate of all diabetes (including types 1 and 2) increased significantly from 2.6 per 100 encounters in 1998–99 to 3.9 per 100 in 2007–08[8], primarily due to the significant increase in the management of Type 2 diabetes (see Chapter 10).

The management rate of Type 2 diabetes increased significantly from 2.6 per 100 encounters in 2000–02 to 3.3 per 100 in 2006–08 (Table 5.2). There was no change in the diagnosis or detection rate of new cases of Type 2 diabetes during this time. Pathology tests/batteries ordered for Type 2 diabetes accounted for 4.9% of all pathology orders in 2000–02 and 6.0% in 2006–08 (results not shown).

The rate of pathology ordering increased significantly from 63.6 tests/batteries of tests ordered in 2000–02 per 100 contacts with Type 2 diabetes to 88.4 per 100 in 2006–08. This was due to significant increases in both the likelihood of pathology testing being ordered for Type 2 diabetes (27.3% in 2000–02 to 31.6% in 2006–08 of diabetes problems), and the number of tests ordered once the decision to order tests was made (232.9 per 100 tested Type 2 diabetes contacts in 2000–02 and 280.2 in 2006–08) (Table 5.2).

When these data are extrapolated to the number of GP encounters claimed through Medicare nationally, it is estimated there were about:

- 850,000 more encounters involving the management of Type 2 diabetes in 2006–08 (3.5 million per year) than in 2000–02 (2.6 million per year)
- 380,000 additional Type 2 diabetes contacts that involved the ordering of at least one pathology test/battery of tests (tested contacts) in 2006–08 (1.1 million per year) compared with 2000–02 (720,000 per year)
- 1.4 million additional pathology tests/batteries of tests ordered for Type 2 diabetes in 2006–08 (3.1 million per year) than in 2000–02 (1.7 million per year). Type 2 diabetes accounted for 8% of the increase in pathology ordering that occurred between 2000–02 and 2006–08 (Table 5.2) (results not shown).

Summary of findings

There was a 50% increase in the volume of GP requests for pathology tests/batteries attributable to Type 2 diabetes. Due to a combination of factors:

- the increase in the total number of GP encounters
- the increased management rate of Type 2 diabetes
- changes in GP pathology ordering behaviour for Type 2 diabetes, that is:
  - increased likelihood of pathology being ordered for Type 2 diabetes
  - increased number of tests ordered once the decision to order was made.

There are likely to be many contributors to the increase in the encounters involving the management of Type 2 diabetes, and to the pathology ordering behaviour of GPs. As discussed in Chapter 10, the diagnosed prevalence of Type 2 diabetes is increasing in

Australia. In recognition of the growing burden/risks associated with diabetes, it was made a National Health Priority Area in 1996.

A number of national initiatives (such as the MBS Diabetes annual cycle of care MBS items, chronic disease MBS item numbers, Australian Primary Care Collaboratives) and state-based policies have been developed to improve the management of diabetes (see Chapter 10 for more details). The annual cycle of care MBS item introduced in November 2001 requires 'at least' annual testing of HbA1c, cholesterol, high-density lipoprotein, triglycerides and testing for microalbuminuria. The promotion of management guidelines that include testing, consumer education and the initiatives above have contributed to the increase in pathology ordering for diabetes.

Overweight/obesity

The overweight/obesity analysis in this section includes problems managed that were labelled by the GP as obesity or overweight for patients aged 18 years and over. This does not represent all encounters with overweight/obese patients, only those who were being actively managed for overweight or obesity at the encounter. It also does not include GP management of overweight/obesity when it occurs in the management of other morbidity (for example, weight management advice to a hypertensive patient).

GP pathology ordering behaviour for overweight/obesity among adult patients is looked at from 2000–02 to 2006–08 in this section. During this time, there was no significant change in the management rate of overweight/obesity, remaining at 1.2 per 100 adult encounters (Table 5.2). However, there was a significant increase in the management of obesity (alone) from 1998–99 to 2007–08.[8] In Chapter 7, the prevalence of overweight and obesity among patients at GP encounters is investigated, and related policies are discussed.

Pathology tests/batteries of tests attributed to overweight/obesity accounted for 1% of all pathology at both time-points, 2000–02 and 2006–08 (results not shown). The rate of pathology tests orders in the management of overweight/obesity among adult patients increased between 2000–02 and 2006–08 by more than 50% (30.7 to 47.1 per 100 overweight/obesity contacts). This increase was due to an increased likelihood that at least one test/battery of tests was ordered (11.7% of contacts for overweight/obesity in 2000–02 and 16.5% in 2006–08). The number of tests ordered per tested problem did not change significantly (262.3 per 100 tested contacts in 2000–02 and 285.9 per 100 in 2006–08) (Table 5.2).

When these results are extrapolated to national GP encounters it is estimated that, compared with 2000–02, in 2006–08 there were about:

- 90,000 more encounters involving the management of overweight/obesity (1 million per year in 2000–02 and 1.1 million per year in 2006–08)
- 60,000 additional tested overweight/obesity contacts (120,000 per year in 2000–02 and 180,000 per year in 2006–08)
- 210,000 additional tests/batteries requested for overweight/obesity (310,000 per year in 2000–02 and 520,000 per year in 2006–08) (results not shown).

Summary of findings

Of the total increase in pathology, 1.2% was attributable to pathology ordering in the management of overweight/obesity. The increase in pathology ordering for overweight/obesity problems in general practice is due solely to an increase in the likelihood of pathology tests being ordered for overweight/obesity problems. There was no corresponding significant change in the number of tests/batteries ordered per tested overweight/obesity problem.

Also affecting the increase in the estimated extrapolated number of tests/batteries for overweight/obesity is the national increase in the number of GP encounters (100.3 million per year in 2000–02 and 106.5 million per year in 2006–08). There was no contributing change in the management rate of overweight/obesity problems.

The prevalence of overweight and obesity among adult patients at GP encounters in 2006–08 was 58.8% (see Chapter 7). There is a large gap between the prevalence and the management rate. For each occasion of management of overweight/obesity by GPs (as a separate clinical problem), there have been 49 GP encounters with overweight/obese adult patients. If the management rate of overweight/obesity increases in the future there will be a corresponding increase in pathology ordering for overweight/obesity based on the current pattern.

Cardiovascular disease

GP pathology ordering behaviour for cardiovascular (CVD) problems is looked at from 2000–02 to 2006–08 in this section. The management of CVD problems in general practice from 1998–99 to 2007–08 is investigated in detail in Chapter 9. BEACH data show that there was a marginally significant increase in the management of CVD problems over the decade.[8] CVD was responsible for 18% of the total burden of disease and injury in Australia in 2003.[9]

There was no significant change in the management rate of CVD problems between 2000–02 (16.7 per 100 encounters) and 2006–08 (17.3 per 100) (Table 5.2). However, new CVD problems increased by 21%, the increase in diagnosis/detection rate being from 1.86 per 100 encounters (95% CI: 1.78–1.93) in 2000–02 to 2.24 (95% CI: 2.15–2.33) in 2006–08.

Pathology ordering for CVD problems accounted for 12.7% of the pathology tests/batteries ordered by GPs in BEACH in 2000–02 and 12.8% in 2006–08 (results not shown). There was a significant increase in the ordering of pathology tests/batteries of tests for CVD problems from 25.4 per 100 contacts with CVD problems in 2000–02 to 35.6 per 100 contacts in 2006–08. This increase was due to significant increases in:

- the proportion of CVD problems involving at least one pathology order (12.1% of CVD problems in 2000–02 to 15.0% in 2006–08)
- the number of tests/batteries of tests per tested CVD problem (210.3 per 100 tested CVD problems in 2000–02 to 238.3 per 100 in 2006–08) (Table 5.2).

When these results are extrapolated to national GP encounters, it is estimated that, compared with 2000–02, in 2006–08 there were about:

- 1.7 million additional encounters involving the management of CVD problems (15.5 million encounters per year in 2000–02 and 17.2 million per year in 2006–08). This increase does not reflect a significant change in the proportion of GP encounters that are for CVD problems; rather it reflects the increase in the number of GP encounters claimed through Medicare
- 740,000 more CVD problems managed for which pathology was ordered
- 2.4 million additional tests ordered for CVD problems. This indicates that more than one-tenth (13.1%) of the total 17.7 million (estimated) additional tests ordering by GPs in 2006–08, compared with 2000–02, was attributable to CVD (results not shown).

Summary of findings

The increase in pathology ordering in the management of CVD problems in 2006–08 compared with 2000–02 was due to increases in the total number of GP encounters, and to two changes in GP pathology ordering behaviour—an increase in the likelihood of pathology ordering, and an increase in the number of pathology tests ordered per tested problem.

Pathology ordering behaviour is examined below for three specific CVD problems that each account for more than 1% of pathology tests/batteries of tests ordered by GPs (in either 2000–02 or 2006–08): hypertension, ischaemic heart disease and atrial fibrillation. Pathology ordering for these three conditions together accounted for two-thirds of all pathology ordered for CVD.

Hypertension

Hypertension is the most commonly managed individual problem in general practice in Australia. BEACH data show that there was a significant increase in the management of hypertension from 1998–99 to 2007–08.[8] High blood pressure was responsible for 7.6% of the total burden of disease and injury in Australia in 2003.[9]

Pathology ordering for non-gestational hypertension is considered between 2000–02 and 2006–08. During this time, there was no significant change in the management rate of hypertension (9.1 per 100 encounters in 2000–02 and 9.5 per 100 in 2006–08) (Table 5.2). However, the management rate of new hypertension problems increased by 24%, indicating an increase in the diagnosis or detection rate, from 0.48 per 100 encounters (95% CI: 0.44–0.52) in 2000–02 to 0.60 (95% CI: 0.56–0.64) in 2006–08.

Pathology ordering for hypertension accounted for 5.9% of the pathology ordered in 2000–02 and 6.3% in 2006–08 (results not shown). The rate of pathology ordering per 100 hypertension contacts increased significantly, from 21.6 per 100 contracts in 2000–02 to 32.3 per 100 in 2006–08. This increase was due to significant increases in:

- the likelihood of pathology being ordered in the management of hypertension (8.7% of hypertension contacts in 2000–02 compared with 11.9% in 2006–08)
- the number of pathology tests ordered per tested hypertension problem (248.2 per 100 tested contacts in 2000–02 compared with 270.4 per 100 in 2006–08) (Table 5.2).

When these results are extrapolated to national GP encounters, it is estimated that, in 2006–08, compared with 2000–02 there were about:

- 950,000 more encounters involving the management of hypertension problems
- 410,000 more hypertension contacts involving at least one pathology request
- 1.3 million more tests/batteries of tests ordered for hypertension problems (7.2% of the total increase in pathology tests) (results not shown).

Summary of findings

The increase in pathology ordering in the management of hypertension was due to increases in the total number of GP encounters, and to two changes in GP pathology ordering behaviour for hypertension problems—an increase in the likelihood of pathology ordering, and an increase in the number of pathology tests ordered per tested problem.

Ischaemic heart disease

Pathology ordering for ischaemic heart disease (IHD) is looked at between 2000–02 and 2006–08. During this time, there was a marginal decrease in the management rate from 1.4 per 100 encounters to 1.2 per 100 (Table 5.2). There was no change in the management rate of new IHD problems.

Pathology ordering for IHD accounted for 1.4% of tests in 2000–02 and 1.2% in 2006–08 (results not tabled). The rate of pathology per 100 contacts with IHD increased significantly, from 33.3 per 100 IHD contacts in 2000–02 to 46.7 per 100 in 2006–08. This was due to a significant increase in the number of tests/batteries ordered for IHD problems once the decision to order had been made (231.3 tests/batteries per 100 tested IHD problems in 2000–02 compared with 272.6 tests per 100 in 2006–08). However, there was no change in the likelihood of pathology ordering being involved in the management of IHD problems (Table 5.2).

When these results are extrapolated to national GP encounters, it is estimated that in 2006–08, compared with 2000–02, there were about:

- 90,000 fewer encounters involving the management of IHD problems
- 20,000 more encounters with IHD problems for which pathology was requested
- 140,000 more tests/batteries ordered for IHD problems (0.8% of the total increase in pathology tests) (results not shown).

Summary of findings

The increase in pathology ordering attributable to IHD was due to an increase in the total number of GP encounters, and to an increase in the number of pathology tests ordered per tested IHD problem. This increase in number of pathology tests ordered for IHD outweighed the effect of the decrease in the management rate of IHD, even with the likelihood of pathology being ordered for IHD remaining constant.

Atrial fibrillation

Pathology ordering for atrial fibrillation is looked at between 2000–02 and 2006–08. During this time, there was a significant increase in the management rate of atrial fibrillation, from 0.7 per 100 encounters to 1.0 per 100 (Table 5.2). There was no change in the management rate of new atrial fibrillation problems.

Pathology ordering for atrial fibrillation accounted for 1% of total pathology tests in both 2000–02 and 2006–08 (results not shown). There was no change in the pathology ordering behaviour for atrial fibrillation—the likelihood of pathology ordering and number of pathology tests/batteries of tests ordered per tested atrial fibrillation problem remained constant (Table 5.2).

When these data are extrapolated to national GP Medicare encounters, it is estimated that in 2006–08, compared with 2000–02, there were about:

- 360,000 more encounters involving atrial fibrillation
- 130,000 more encounters with atrial fibrillation problems for which pathology was requested
- 180,000 more tests/batteries of tests ordered for atrial fibrillation (1% of the total increase in pathology tests/batteries of tests) (results not shown).

Summary of findings

The increase in the number of pathology orders for atrial fibrillation nationally was due to a small increase in the management rate of atrial fibrillation, and to the increase in the number of total national GP encounters between 2000–02 and 2006–08, not to any change in the pathology ordering behaviour of GPs in the management of atrial fibrillation.

Lipid disorders

Lipid disorders are one of the National Health Priority Area risk factors. It is a risk factor for cardiovascular disease, particularly in patients with diabetes and obesity. High blood cholesterol was responsible for 6.2% of the total burden of disease and injury in Australia in 2003.[9] Changes in the management of lipid disorders between 1998–99 and 2007–08 are looked at in the cardiovascular chapter (see Chapter 9).

Pathology ordering for lipid disorders is investigated from 2000–02 to 2006–08 in this section. During this time, there was a significant increase in the management rate of lipid disorders, from 2.9 per 100 encounters to 3.5 per 100 (Table 5.2). The management rate of new lipid disorders also increased—a 37 increase in diagnosis/detection rate, from 0.35 per 100 encounters (95% CI: 0.32–0.38) in 2000–02 to 0.48 (95% CI: 0.44–0.52) in 2006–08.

Pathology ordering for lipid disorders accounted for 5.1% of pathology orders in 2000–02 and 4.9% in 2006–08 (results not shown). The rate of pathology ordering increased from 58.2 per 100 contacts with lipid disorders in 2000–02 to 66.5 per 100 in 2006–08. This increase was due to a significant increase in the number of tests ordered per tested lipid problem (191.4 tests/ batteries per 100 tested contacts in 2000–02 compared with 219.4 per 100 in 2006–08). There was no change in the likelihood of pathology tests being ordered in management of lipid disorders (30.4% of lipid disorder contacts in 2000–02 and 30.3% in 2006–08) (Table 5.2).

When these data are extrapolated to national GP Medicare encounters, it is estimated that, compared with 2000–02, in 2006–08 there were about:

- 820,000 more encounters involving lipid disorders, and 250,000 more lipid disorder problems for which pathology was requested
- 790,000 more tests/batteries ordered for lipid disorders (4.5% of the total increase in pathology tests/batteries of tests) (results not shown).

Summary of findings

The national increase in pathology ordering in the management of lipid problems in 2006–08, compared with 2000–02, was due to the increase in the management rate of lipid disorders, the increase in number of total GP encounters, and an increase in the number of pathology tests/batteries ordered per tested lipid problem.

Musculoskeletal conditions

Pathology ordering for all musculoskeletal problems (in particular arthritis) is investigated from 2000–02 to 2006–08 in this section. The management of musculoskeletal problems in general practice from 1998–99 to 2007–08 is investigated in detail in Chapter 11.

The management rate of musculoskeletal problems did not change between 2000–02 (17.5 per 100 encounters) and 2006–08 (17.1 per 100) (Table 5.2). However, the rate of new musculoskeletal problems increased by 7%, indicating an increase in the diagnosis or detection rate, from 5.6 per 100 encounters (95% CI: 5.4–5.7) in 2000–02 to 6.0 (95% CI: 5.8–6.2) in 2006–08.

Pathology ordering for musculoskeletal conditions accounted for 5.4% of all pathology tests/batteries of tests in 2000–02 and 5.1% in 2006–08 (results not shown). The ordering rate of pathology for musculoskeletal problems increased significantly, from 10.3 per 100 contacts in 2000–02 to 14.4 per 100 in 2006–08. This was due to significant increases:

- in the likelihood of pathology tests/batteries of tests being ordered for musculoskeletal conditions (from 3.8% of musculoskeletal problems in 2000–02 to 4.9% in 2006–08)
- in the number of tests/batteries of tests ordered per tested musculoskeletal problem (274.3 per 100 tested contacts in 2000–02 to 294.0 per 100 in 2006–08) (Table 5.2).

When these results are extrapolated to national GP encounters, it is estimated that in 2006–08, compared with 2000–02, there were about:

- 620,000 more encounters involving the management of musculoskeletal problems
- 230,000 more musculoskeletal problems involving at least one pathology request
- 810,000 more tests/batteries of tests ordered for musculoskeletal problems (4.6% of the total increase in pathology tests) (results not shown).

Summary of findings

The national increase in pathology ordering in the management of musculoskeletal problems in 2006–08, compared with 2000–02, was due to the increase in the total number of GP encounters, and to two changes in pathology ordering behaviour of the GPs—the increase in the likelihood of ordering and the number of pathology tests ordered per tested problem.

Arthritis

The management rate of arthritis per 100 encounters decreased significantly between 2000–02 (3.9 per 100 encounters) and 2006–08 (3.6 per 100) (Table 5.2). There was no change in the rate at which arthritis problems were diagnosed.

Pathology ordering for arthritis accounted for 1.9% of pathology orders in 2000–02 and 1.5% in 2006–08 (results not shown). GP pathology ordering behaviour in the management of arthritis (rate of pathology per 100 arthritis problems, likelihood of pathology orders and numbers of tests per tested arthritis problem) did not change between 2000–02 and 2006–08 (Table 5.2).

When these results are extrapolated to the national GP encounters, it is estimated that in 2006–08, compared with 2000–02, there were about:

- 140,000 fewer encounters involving the management of arthritis
- 30,000 more arthritis problems involving at least one pathology request
- 110,000 more tests/batteries of tests ordered for arthritis (0.6% of the total increase in pathology tests) (results not shown).

Summary of findings

The national increase in pathology ordering in the management of arthritis problems in 2006–08, compared with 2000–02, was due solely to the increase in the number of GP encounters. The pathology ordering behaviour of GPs in the management of arthritis did not change.

Mental health

Pathology ordering for psychological problems (referred to as mental health problems) (in particular depression) is looked at between 2000–02 and 2006–08 in this section. Chapter 14 investigates GP management of mental health problems from 1998–99 to 2007–08.

The management rate of mental health problems did not change (11.5 per 100 encounters in 2000–02 and 12.0 per 100 in 2006–08) (Table 5.2). There was no change in the diagnosis or detection rate of new cases of mental health problems during this time.

Pathology ordering for mental health conditions accounted for 3.8% of all pathology tests/batteries of tests in 2000–02 and 3.7% in 2006–08 (results not shown). There was a significant increase in the ordering rate of pathology for mental health problems, from 11.0 contacts with mental health problems in 2000–02 to 15.0 in 2006–08. This increase was due to a significant increase in the likelihood of pathology being ordered (from 4.0% of mental health problems in 2000–02 to 5.1% in 2006–08). There was no change in the number of tests/batteries ordered per problem once the decision to order had been made (Table 5.2).

When these results are extrapolated to the national GP encounters, it is estimated that in 2006–08, compared with 2000–02, there were about:

- 1.1 million more encounters involving the management of mental health problems
- 190,000 more mental health problems involving at least one pathology request
- 640,000 more tests/batteries of tests ordered for mental health problems (3.6% of the total increase in pathology tests) (results not shown).

Summary of findings

The national increase in GP pathology ordering attributable to mental health problems was due to the increase in the number of national GP encounters, and an increased likelihood of pathology being ordered in the management of mental health.

Depression

The management rate of depression increased marginally between 2000–02 (3.9 per 100 encounters) and 2006–08 (4.2 per 100) (Table 5.2). There was no change in the diagnosis or detection rate of new cases of depression during this time.

GP pathology ordering in management of depression accounted for 1.1% of all pathology tests/batteries ordered in 2000–02 and 1.3% in 2006–08 (results not shown). There was a significant increase in the ordering of pathology tests for depression, from 9.8 per 100 contacts with depression in 2000–02 to 14.7 per 100 in 2006–08. This was due to a significant increase in the likelihood of pathology tests/batteries being ordered for depression problems (from 3.3% of depression problems in 2000–02 to 4.6% in 2006–08). There was no change in the number of tests/batteries ordered per tested depression problem (299.6 per 100 tested depression problems in 2000–02 and 322.4 per 100 in 2006–08) (Table 5.2).

When these results are extrapolated to the national GP encounters, it is estimated that in 2006–08, compared with 2000–02, there were about:

- 590,000 more encounters involving the management of depression problems
- 80,000 more depression problems involving at least one pathology request
- 280,000 more tests/batteries of tests ordered for depression problems (1.6% of the total increase in pathology tests) (results not shown).

Summary of findings

The national increase in pathology ordering in the management of depression problems from 2000–02 to 2006–08 was due to the increase in the number of total GP encounters, the increase in the management rate of depression, and an increase in the likelihood of GPs ordering pathology for depression problems.

Cancer

Pathology ordering for all malignant neoplasm problems (referred to as cancer problems) (in particular skin cancer) is looked at between 2000–02 and 2006–08 in this section. Chapter 13 investigates the management of cancer in general practice from 1998–99 to 2007–08.

The management rate of cancer problems increased significantly, from 1.9 per 100 encounters in 2000–02 to 2.4 per 100 in 2006–08 (Table 5.2). The rate at which new cancer problems were diagnosed increased by 38%, from 0.58 new cases per 100 encounters (95% CI: 0.52–0.64) in 2000–02 to 0.80 (95% CI: 0.72–0.87) in 2006–08.

Pathology ordering for cancer accounted for 1.6% of total pathology tests in 2000–02 and 1.5% in 2006–08 (results not shown). There was no change in the pathology ordering behaviour for cancer; that is, there was no change in the likelihood of pathology ordering or in the number of pathology tests/batteries ordered per tested cancer problem (Table 5.2).

When these results are extrapolated to the national GP Medicare encounters, it is estimated that, compared with 2000–02, in 2006–08 there were about:

- 660,000 more encounters involving the management of cancer
- 170,000 more cancer problems involving at least one pathology request
- 230,000 more tests/batteries of tests ordered for cancer problems (1.3% of the total increase in pathology tests/batteries of tests) (results not shown).

Summary of findings

The increase in pathology tests/batteries was due to an increase in the management rate of cancer, and the increase in the number of GP encounters between 2000–02 and 2006–08, not to any change in the pathology ordering behaviour of GPs in the management of cancer.

Skin cancer

The management rate of skin cancer increased significantly from 0.9 per 100 encounters in 2000–02 to 1.2 per 100 in 2006–08 (Table 5.2). The management rate of new skin cancer problems also increased—a 38% increase in diagnosis/detection rate, from 0.46 per 100 encounters (95% CI: 0.40–0.51) in 2000–02 to 0.63 (95% CI: 0.56–0.69) in 2006–08.

Pathology ordering for skin cancer accounted for 0.6% of total pathology tests in 2000–02 and 0.7% in 2006–08 (results not shown). There was no change in GP pathology ordering behaviour for skin cancer; that is, the likelihood of pathology ordering and number of pathology tests/batteries of tests ordered per tested skin cancer problem did not change (Table 5.2).

When these results are extrapolated to the national GP Medicare encounters, it is estimated that, compared with 2000–02, in 2006–08 there were about:

- 370,000 more encounters involving the management of skin cancer
- 120,000 more skin cancer problems involving at least one pathology request
- 120,000 more tests/batteries of tests ordered for skin cancer problems (0.7% of the total increase in pathology tests/batteries of tests) (results not shown).

Summary of findings

The increase in pathology tests/batteries was due to an increase in the management rate of skin cancer, and the increase in the number of GP encounters between 2000–02 and 2006–08, not to any change in the pathology ordering behaviour of GPs in the management of skin cancer.

Respiratory problems

GP pathology ordering in the management of respiratory problems (in particular asthma) is looked at between 2000–02 and 2006–08 in this section. The management of respiratory problems in general practice from 1998–99 to 2007–08 is investigated in detail in Chapter 8.

The management rate of respiratory problems decreased significantly from 21.2 per 100 encounters in 2000–02 to 18.9 per 100 in 2006–08 (Table 5.2). There was no change in the diagnosis or detection rate of new cases of respiratory problems during this time.

Pathology ordering for respiratory problems accounted for 3.0% of total pathology tests in 2000–02 and 2.9% in 2006–08 (results not shown). The pathology ordering rate per 100 respiratory problem contacts increased significantly (4.8 per 100 contacts in 2000–02 compared with 7.3 per 100 in 2006–08). This was due to significant increases in:

- the likelihood of pathology being ordered in the management of respiratory problems (2.3% of contacts in 2000–02 compared with 3.2% in 2006–08)
- the number of pathology tests/batteries ordered per 100 tested respiratory problems (205.9 per 100 in 2000–02 compared with 230.6 per 100 in 2006–08) (Table 5.2).

When these results are extrapolated to the national GP encounters, it is estimated that in 2006–08, compared with 2000–02, there were about:

- 890,000 fewer encounters involving the management of respiratory problems
- 140,000 more respiratory problems involving at least one pathology request
- 440,000 more tests/batteries of tests ordered for respiratory problems (2.5% of the total increase in pathology tests) (results not shown).

Summary of findings

The national increase in pathology ordering in the management of respiratory problems from 2000–02 to 2006–08 was due to the increase in the number of total GP encounters, and to two changes in GP pathology ordering behaviour for respiratory problems—increases in the likelihood of pathology ordering and in the number of tests ordered per tested problem. These changes in GP pathology ordering behaviour outweighed the effect of the decrease in the management rate of respiratory problems.

Asthma

The management rate of asthma decreased significantly from 2.8 per 100 encounters in 2000–02 to 2.2 per 100 in 2006–08. There was no change in the diagnosis or detection rate of new cases of asthma during this time.

Pathology ordering for asthma problems accounted for 0.2% of total pathology tests in both 2000–02 and 2006–08 (results not shown). There was a significant increase in the rate of pathology ordering per 100 asthma contacts, from 2.0 per 100 in 2000–02 to 4.4 per 100 in 2006–08. This was due to a significant increase in the likelihood of pathology being ordered in the management of asthma problems (1.1% of asthma contacts in 2000–02 compared with 1.9% in 2006–08). There was no change in the number of pathology tests/batteries of tests ordered for asthma once the decision to test had been made (Table 5.2).

When these results are extrapolated to the national GP encounters, it is estimated that, compared with 2000–02, in 2006–08 there were about:

- 430,000 fewer encounters involving the management of asthma problems
- 10,000 more asthma problems involving at least one pathology request
- 50,000 more tests/batteries of tests ordered for asthma problems (0.3% of the total increase in pathology tests).

Summary of findings

The national increase in pathology ordering in the management of asthma problems was due to the increase in the number of total GP encounters, and the increase in the likelihood of GPs ordering pathology tests/batteries in the management of asthma. These increases outweighed the effect of the decrease in the management rate of asthma, even with the number of pathology ordered per tested encounter remaining constant.

Table 5.2: Pathology ordering for management of problems classed as National Health Priority Areas, 2000–02 and 2006–08

Problem	2000–02 Rate per 100 encs (95% CI)[b]	2000–02 Path per 100 probs (95% CI)[c]	2000–02 % at least 1 path (95% CI)[d]	2000–02 Path per 100 tested probs (95% CI)	2006–08 Rate per 100 encs (95% CI)[b]	2006–08 Path per 100 probs (95% CI)[c]	2006–08 % at least 1 path (95% CI)[c]	2006–08 Path per 100 tested probs (95% CI)	Change from 2000–02 to 2006–08[a] Rate per 100 encs	Change Path per 100 probs	Change Per cent at least 1 path	Change Path per 100 tested probs	Per cent of national change[e]
Cardiovascular problems	16.7 (16.2–17.2)	25.4 (24.1–26.7)	12.1 (11.5–12.6)	210.3 (204.7–216.0)	17.3 (16.8–17.8)	35.6 (34.1–37.2)	15.0 (14.4–15.5)	238.3 (232.6–243.9)	—	↑	↑	↑	13.1
Hypertension (excl gestational)	9.1 (8.8–9.4)	21.6 (20.0–23.2)	8.7 (8.1–9.3)	248.2 (239.5–257.0)	9.5 (9.1–9.8)	32.3 (30.3–34.2)	11.9 (11.3–12.6)	270.4 (262.5–278.4)	—	↑	↑	↑	7.2
Ischaemic Heart disease	1.4 (1.3–1.5)	33.3 (29.2–37.5)	14.4 (12.9–15.9)	231.3 (216.3–246.3)	1.2 (1.1–1.3)	46.7 (41.3–52.1)	17.1 (15.4–18.8)	272.6 (257.5–287.8)	↓	↑	—	↑	0.8
Atrial fibrillation	0.7 (0.6–0.7)	48.5 (43.9–53.1)	37.4 (34.4–40.5)	129.7 (121.8–137.6)	1.0 (0.9–1.0)	49.6 (45.3–54.0)	37.4 (34.6–40.2)	132.7 (125.6–139.9)	↑	—	—	—	1.0
Lipid disorders	2.9 (2.8–3.0)	58.2 (54.7–61.7)	30.4 (28.9–31.9)	191.4 (184.6–198.2)	3.5 (3.4–3.7)	66.5 (62.5–70.6)	30.3 (28.9–31.8)	219.4 (211.6–227.3)	↑	↑	—	↑	4.5
Type 2 diabetes	2.6 (2.5–2.8)	63.6 (59.6–67.6)	27.3 (25.8–28.8)	232.9 (224.8–241.0)	3.3 (3.1–3.4)	88.4 (83.7–93.2)	31.6 (30.1–33.0)	280.2 (272.4–288.1)	↑	↑	↑	↑	8.0
Musculoskeletal problems	17.5 (17.1–17.9)	10.3 (9.6–11.1)	3.8 (3.5–4.0)	274.3 (265.9–282.7)	17.1 (16.7–17.5)	14.4 (13.5–15.3)	4.9 (4.6–5.2)	294.0 (285.5–302.4)	—	↑	↑	↑	4.6
Arthritis all	3.9 (3.8–4.1)	16.4 (14.6–18.2)	5.5 (5.0–6.1)	296.3 (283.7–308.9)	3.6 (3.4–3.7)	20.1 (18.0–22.1)	6.5 (5.9–7.1)	308.5 (294.2–322.8)	↓	—	—	—	0.6
Mental health problems	11.5 (11.1–11.9)	11.0 (10.1–11.9)	4.0 (3.8–4.3)	272.3 (261.5–283.2)	12.0 (11.6–12.4)	15.0 (13.8–16.1)	5.1 (4.8–5.5)	292.4 (280.8–304.0)	—	↑	↑	—	3.6
Depression	3.9 (3.7–4.0)	9.8 (8.4–11.2)	3.3 (2.8–3.7)	299.6 (280.2–319.0)	4.2 (4.0–4.4)	14.7 (12.8–16.7)	4.6 (3.9–5.2)	322.4 (300.6–344.3)	↑	↑	↑	—	1.6
Cancer	1.9 (1.8–2.0)	28.4 (25.6–31.3)	19.6 (17.5–21.7)	145.3 (136.8–153.8)	2.4 (2.3–2.6)	30.1 (27.6–32.6)	21.0 (19.2–22.9)	143.2 (135.5–150.9)	↑	—	—	—	1.3
Skin cancer	0.9 (0.8–1.0)	23.6 (19.7–27.5)	23.0 (19.3–26.7)	102.7 (100.5–104.8)	1.2 (1.1–1.3)	26.0 (22.9–29.1)	25.5 (22.4–28.6)	102.1 (100.4–103.7)	↑	—	—	—	0.7
Overweight/obesity (adults)	1.2 (1.1–1.3)	30.7 (24.6–36.8)	11.7 (9.7–13.7)	262.3 (241.4–283.3)	1.2 (1.1–1.3)	47.1 (39.9–54.4)	16.5 (14.1–18.9)	285.9 (268.2–303.6)	—	↑	↑	—	1.2

(continued)

Table 5.2 (continued): Pathology ordering for management of problems classed as National Health Priority Areas, 2000–02 and 2006–08

Problem	2000–02 Rate per 100 encs (95% CI)[b]	2000–02 Path per 100 probs (95% CI)[c]	2000–02 % at least 1 path (95% CI)[d]	2000–02 Path per 100 tested probs (95% CI)	2006–08 Rate per 100 encs (95% CI)[b]	2006–08 Path per 100 probs (95% CI)[c]	2006–08 % at least 1 path (95% CI)[d]	2006–08 Path per 100 tested probs (95% CI)	Change from 2000–02 to 2006–08[a] Rate per 100 encs	Change Path per 100 probs	Change Per cent at least 1 path	Change Path per 100 tested probs	Per cent of national change[e]
Respiratory	21.2 (20.8–21.6)	4.8 (4.4–5.2)	2.3 (2.2–2.5)	205.9 (197.4–214.4)	18.9 (18.5–19.3)	7.3 (6.7–7.9)	3.2 (2.9–3.4)	230.6 (221.3–239.9)	↓	↑	↑	↑	2.5
Asthma	2.8 (2.7–2.9)	2.0 (1.4–2.6)	1.1 (0.8–1.4)	181.7 (155.3–208.0)	2.2 (2.1–2.3)	4.4 (3.1–5.6)	1.9 (1.5–2.4)	230.4 (197.5–263.2)	↓	↑	↑	—	0.3
Total problems	**147.3 (146.1–148.4)**	**22.8 (22.2–23.4)**	**11.4 (11.1–11.6)**	**200.1 (197.6–202.6)**	**153.3 (151.9–154.7)**	**31.4 (30.7–32.2)**	**14.2 (13.9–14.5)**	**221.3 (218.5–224.0)**	↑	↑	↑	↑	**100.0**

(a) The direction and type of change is indicated for each measure between 2000–02 and 2006–08: ↑/↓ indicates a statistically significant change, ↑/↓ indicates a marginal change, and — indicates no change.

(b) Management rate of the problem, expressed as a rate per 100 encounters. In 2000–02, the total number of encounters was 198,200. In 2006–08 the total number of encounters was 188,300.

(c) In 2000–02 there were 66,429 pathology tests/batteries of tests linked to problems, and in 2006–08 there were 90,753.

(d) Proportion of each problem with at least one pathology test/battery of tests ordered.

(e) The proportion of the total national increase in pathology tests/batteries (n = 17.7 million) that was attributable to each problem.

Note: %—percentage; Encs—encounters; CI—confidence interval; path—pathology; probs—problems.

Table 5.3: Changes in pathology ordering for selected problems, 2000–02 and 2006–08

Problem	2000–02 Rate per 100 encs (95% CI)[ba]	2000–02 Path per 100 probs (95% CI)[c]	2000–02 % at least 1 path (95% CI)[d]	2000–02 Path per 100 tested probs (95% CI)	2006–08 Rate per 100 encs (95% CI)[b]	2006–08 Path per 100 probs (95% CI)[c]	2006–08 % at least 1 path (95% CI)[d]	2006–08 Path per 100 tested probs (95% CI)	Change from 2000–02 to 2006–08[a] Rate per 100 encs	Change Rate of new cases	Change Path per 100 probs	Change Per cent at least 1 path	Change Path per 100 tested probs	Per cent of national change[e]
General check-up	1.9 (1.8–2.0)	70.8 (63.6–78.1)	28.5 (25.9–31.0)	248.9 (234.9–262.9)	2.7 (2.5–2.9)	98.1 (90.2–106.0)	31.1 (28.8–33.3)	315.8 (303.2–328.3)	↑	↑	↑	—	↑	8.2
Female genital check-up	2.0 (1.8–2.1)	79.1 (76.4–81.8)	70.1 (62.2–72.0)	112.9 (110.7–115.1)	2.4 (2.2–2.6)	93.1 (90.2–96.0)	77.9 (76.2–79.7)	119.5 (116.7–122.2)	↑	↑	↑	↑	↑	4.4
Weakness/ tiredness	0.8 (0.7–0.8)	177.9 (164.0–191.8)	50.3 (46.7–53.9)	353.6 (343.2–364.0)	0.7 (0.7–0.8)	233.0 (217.3–248.7)	62.2 (58.5–65.9)	374.6 (363.5–385.7)	—	—	↑	↑	—	2.5

(continued)

Table 5.3 (continued): Changes in pathology ordering for selected problems, 2000–02 and 2006–08

	2000–02				2006–08				Change from 2000–02 to 2006–08[(a)]					
Problem	Rate per 100 encs (95% CI)[(b)]	Path per 100 probs (95% CI)[(c)]	% at least 1 path (95% CI)[(d)]	Path per 100 tested probs (95% CI)	Rate per 100 encs (95% CI)[(b)]	Path per 100 probs (95% CI)[(c)]	% at least 1 path (95% CI)[(d)]	Path per 100 tested probs (95% CI)	Rate per 100 encs	Rate of new cases	Path per 100 probs	Per cent at least 1 path	Path per 100 tested probs	Per cent of national change[(e)]
Blood test—all	0.6 (0.5–0.6)	147.6 (136.3–159.0)	68.8 (65.7–71.8)	214.7 (201.6–227.8)	0.8 (0.7–0.9)	199.1 (186.4–211.8)	75.0 (72.2–77.8)	265.4 (253.1–277.8)	↑	↑	↑	↑	↑	4.9
STI	0.6 (0.5–0.6)	105.0 (95.3–115.7)	42.6 (39.3–45.9)	246.5 (231.4–261.6)	1.0 (0.8–1.1)	125.2 (115.3–135.2)	46.6 (43.9–49.3)	268.7 (251.2–286.2)	↑	↑	—	—	—	3.9
UTI	1.6 (1.6–1.7)	61.6 (58.9–64.3)	53.4 (51.4–55.4)	115.3 (112.5–118.0)	1.7 (1.6–1.7)	64.3 (61.4–67.1)	55.7 (53.7–57.7)	115.4 (112.6–118.2)	—	↑	—	—	—	0.7
Pregnancy	0.9 (0.8–1.0)	66.5 (60.5–72.6)	34.5 (31.9–37.1)	192.8 (180.6–240.9)	1.5 (1.3–1.6)	74.1 (68.6–79.6)	35.0 (33.0–37.0)	211.7 (200.8–222.6)	↑	↑	—	—	—	3.0
Abnormal test result	0.7 (0.7–0.8)	68.6 (62.7–74.5)	42.3 (39.4–45.1)	162.9 (154.1–171.7)	1.1 (1.0–1.1)	88.5 (83.2–93.9)	52.5 (50.2–54.9)	168.6 (161.6–175.6)	↑	↑	↑	↑	—	3.0
Menstrual problems	0.8 (0.7–0.8)	60.6 (54.3–66.9)	28.9 (26.5–31.4)	209.3 (196.1–222.4)	0.8 (0.7–0.8)	80.2 (72.2–88.2)	31.8 (29.1–34.5)	252.3 (238.4–266.2)	—	—	↑	—	↑	1.1
Anaemia	0.6 (0.6–0.7)	79.2 (71.8–86.6)	34.9 (32.2–37.7)	226.8 (215.4–238.2)	0.6 (0.6–0.7)	90.7 (82.3–99.0)	37.3 (34.4–40.2)	243.1 (230.4–255.8)	—	—	—	—	—	0.6
Hypothyroidism	0.5 (0.5–0.6)	68.9 (62.3–75.5)	43.0 (39.7–46.2)	160.4 (150.7–170.1)	0.7 (0.7–0.8)	74.2 (68.2–80.1)	44.4 (41.5–47.2)	167.1 (158.2–176.0)	↑	—	—	—	—	1.2
Abdominal pain	0.6 (0.6–0.7)	57.5 (50.8–64.3)	25.6 (23.0–28.2)	224.8 (210.0–239.6)	0.6 (0.6–0.7)	79.1 (70.4–87.8)	27.9 (25.3–30.6)	283.1 (265.7–300.5)	—	↑	↑	—	↑	1.0
Menopausal complaint	1.6 (1.5–1.7)	33.0 (28.9–37.0)	13.4 (12.0–14.7)	247.0 (231.4–262.5)	1.0 (0.9–1.1)	44.5 (37.9–51.1)	19.6 (15.2–23.9)	227.7 (191.1–264.2)	↓	—	↑	↑	—	–0.2
Viral illness	1.4 (1.3–1.5)	26.7 (22.8–30.6)	10.6 (9.3–12.0)	250.8 (232.9–268.8)	1.1 (1.0–1.2)	37.4 (32.0–42.7)	13.4 (11.7–15.1)	279.6 (261.2–298.0)	↓	—	↑	—	—	0.3

(a) The direction and type of change is indicated for each measure between 2000–02 and 2006–08: ↑/↓ indicates a statistically significant change, and — indicates no change.

(b) Management rate of the problem, expressed as a rate per 100 encounters. In 2000–02, the total number of encounters was 198,200. In 2006–08 the total number of encounters was 188,300.

(c) In 2000–02 there were 66,429 pathology tests/batteries of tests linked to problems, and in 2006–08 there were 90,753.

(d) Proportion of the problem with at least one pathology test/battery of tests ordered.

(e) The proportion of the total national increase in pathology tests/batteries (n = 17.7 million) that was attributable to each problem.

Note: %—percentage; Encs—encounters; CI—confidence interval; path—pathology; probs—problems; STI—sexually transmitted infection; UTI—urinary tract infection. Problems that account for more than 1% of problem–pathology links in either 2000–02 or 2006–08 have been included in this table.

5.5 Other problems with high rates of pathology ordering

This section investigates pathology ordering for 14 other selected problems that each accounted for 1% or more of pathology orders recorded in BEACH in 2000–02 or 2006–08. It explores the relationship between changes in pathology ordering for the selected problems and:

- the management rate of the problem per 100 GP encounters
- the pathology ordering behaviour of GPs for the problem (Table 5.3).

The increase in the total number of Medicare-claimed GP encounters in Australia from 100.3 million per annum in 2000–02 to 106.5 million per annum in 2006–08 is an independent contributing factor to the increase in the estimated number of pathology tests.

General check-ups

Pathology ordering for general check-ups accounted for 4.0% of tests/batteries of tests in 2000–02 and 5.5% in 2006–08. The proportion of the national increase in pathology tests/batteries of tests ordered by GPs in 2006–08, compared with 2000–02, attributable to general check-ups was 8% (results not shown). This increase was due to significant increases in:

- the management rate of general check-ups per 100 encounters (the rate of new general check-ups also significantly increased, doubling from 0.6 to 1.3 per 100 encounters)
- pathology ordering for general check-up problems, due to an increased likelihood of pathology tests being ordered, and an increased number of tests being ordered once the decision to order had been made (Table 5.3).

Female genital check-ups

Pathology ordering for female genital check-ups accounted for 4.7% of tests/batteries of tests in 2000–02 and 4.6% in 2006–08. The proportion of the national increase in pathology tests/batteries of tests ordered by GPs in 2006–08, compared with 2000–02, attributable to female genital check-ups was 4.4% (results not shown). This increase was due to significant increases in:

- the management rate of female genital check-ups per 100 encounters (the rate of new cases of female genital check-ups also significantly increased, doubling from 0.1 to 0.2 per 100 encounters)
- pathology ordering for female genital check-ups, due to an increased likelihood of pathology tests being ordered, and an increased number of tests being ordered once the decision to order had been made (Table 5.3).

Weakness and tiredness

Pathology ordering for weakness/tiredness problems accounted for 4.0% of tests/batteries of tests in 2000–02 and 3.5% in 2006–08. The proportion of the national increase in pathology tests/batteries of tests ordered by GPs in 2006–08, compared with 2000–02, attributable to weakness/tiredness was 2.5% (results not shown). This increase was due to a significant increase in the rate of pathology ordering for weakness/tiredness, due to increased likelihood of pathology tests being ordered (Table 5.3). The data also showed a trend toward increased numbers of tests ordered per tested weakness/tiredness problem, but this did not reach statistical significance. There was no change in the management rate of weakness/tiredness or presentation rate of new cases.

Blood test problems

Pathology ordering for problems labelled as blood test accounted for 2.5% of tests/batteries of tests in 2000–02 and 3.3% in 2006–08. The proportion of the national increase in pathology tests/batteries of tests ordered by GPs in 2006–08, compared with 2000–02, attributable to blood test problems was 4.9% (results not shown). This increase was due to significant increases in:

- the management rate of blood tests per 100 encounters (the rate of new blood test problems significantly increased, doubling from 0.1 to 0.2 per 100 encounters)
- the rate of pathology tests/batteries for blood test problems, due to increased likelihood of pathology tests being ordered, and increased numbers of tests ordered per tested problem (Table 5.3).

Abnormal test result problems

Pathology ordering for problems labelled as abnormal tests result accounted for 1.4% of tests/batteries of tests in 2000–02 and 2.0% in 2006–08. The proportion of the national increase in pathology tests/batteries of tests ordered by GPs in 2006–08, compared with 2000–02, attributable to abnormal test result problems was 3.0% (results not shown). This increase was due to significant increases in:

- the management rate of abnormal test results (0.7 per 100 encounters in 2000–02 and 1.1 per 100 in 2006–08) (the rate of new abnormal result problems increased significantly from 0.3 to 0.5 per 100 encounters)
- the rate of pathology tests/batteries of tests for abnormal test result problems, due to an increased likelihood of pathology tests being ordered (Table 5.3).

Implications of the increase in abnormal test result problems are discussed in Section 5.6.

Menstrual problems

Pathology ordering for menstrual problems accounted for 1.4% of tests/batteries of tests in 2000–02 and 1.3% in 2006–08. The proportion of the national increase in pathology tests/batteries of tests ordered by GPs in 2006–08, compared with 2000–02, attributable to menstrual problems was 1.1% (results not shown). This increase was due to a significant increase in the rate of pathology for menstrual problems, due to increased numbers of tests ordered per tested problem (Table 5.3).

Abdominal pain

Pathology ordering in the management of abdominal pain accounted for 1.1% of tests/batteries of tests in 2000–02 and 1.0% in 2006–08. The proportion of the national increase in pathology tests/batteries of tests ordered by GPs in 2006–08, compared with 2000–02, attributable to abdominal pain was 1.0% (results not shown). This increase was due to a significant increase in the rate of pathology tests/batteries of tests for abdominal pain, due to increased numbers of tests ordered per tested problem (Table 5.3). While there was no change in the management rate of abdominal pain, there was a significant increase in the rate of new cases from 0.28 to 0.34 per 100 encounters.

Viral illness

Pathology ordering for viral illness problems accounted for 1.1% of tests/batteries of tests in 2000–02 and 0.9% in 2006–08. The proportion of the national increase in pathology tests/batteries of tests ordered by GPs in 2006–08, compared with 2000–02, attributable to viral illness was 0.3% (results not shown). This increase was due to:

- a significant decrease in the management rate of viral illness per 100 encounters
- a significant increase in the rate of pathology tests/batteries of tests for viral illness (Table 5.3). The data also showed a trend toward increased likelihood of tests being ordered for viral illness, but this did not reach statistical significance.

The increase in pathology ordering outweighed the effect of the decrease in the management rate, creating a net increase in pathology ordering attributable to viral illness.

Menopausal complaint

Pathology ordering for menopausal complaints accounted for 1.5% of tests/batteries of tests in 2000–02 and 0.9% in 2006–08. The proportion of the national change in pathology tests/batteries of tests ordered by GPs in 2006–08, compared with 2000–02, attributable to menopausal complaints was –0.2% (results not shown). This decrease was due to:

- a significant decrease in the management rate of menopausal complaints per 100 encounters
- a significant increase in the rate of pathology tests/batteries for menopausal complaints, due to increased likelihood of pathology tests being ordered (Table 5.3).

The decrease in management rate outweighed the effect of the increased pathology ordering by GPs, creating a net decrease in pathology ordering attributable to menopausal complaints.

Problems for which there was no change in GP pathology ordering

Problems for which GP pathology ordering behaviour did not change are listed below. The proportion of pathology tests accounted for by each problem, and the proportion of the 17.7 million additional tests ordered nationally between 2000–02 and 2006–08 attributable to the problem and the management rate are noted for each problem (results not shown). Any national change was due to the increase in the total number of GP encounters with or without a simultaneous change in the management rate of the problem between 2000–02 and 2006–08.

- **Sexually transmitted infections (STIs)**—pathology for STIs accounted for 1.8% of tests in 2000–02 and 2.5% in 2006–08; 3.9% of the national increase was attributable to STIs. There were significant increases in the management rate and rate of new cases of STIs.
- **Urinary tract infection (UTI)**—pathology tests for UTIs accounted for 3.0% of tests in 2000–02 and 2.2% in 2006–08; 0.7% of the national increase was attributable to UTIs. There was no change in the management rate of UTIs. However, there was a 15% increase in the rate of new UTI problems from 0.9 to 1.0 per 100 encounters.
- **Pregnancy**—pathology for pregnancy accounted for 1.8% of tests in both 2000–02 and 2006–08; 3.0% of the national increase was attributable to pregnancy. There were significant increases in the management rate and rate of new cases of pregnancy.
- **Anaemia**—pathology tests for anaemia accounted for 1.5% of tests in 2000–02 and 1.2% in 2006–08; 0.6% of the national increase was attributable to anaemia. There was no change in the management rate of anaemia.
- **Hypothyroidism**—pathology tests for hypothyroidism accounted for 1.1% of tests in both 2000–02 and 2006–08; 1.2% of the national increase was attributable to hypothyroidism. There was a significant increase in the management rate of hypothyroidism.

5.6 Implications of high volume of tests

The volume of pathology items paid through the MBS increased by 54.1% from 2000–01 to 2007–08. However, this does not accurately reflect changes in GP pathology ordering behaviour, as only 70% of the pathology MBS items are generated by GPs.[5] In addition, only three pathology item numbers can be claimed per episode of care (due to episode coning), and multiple tests may be included in each MBS item.[3]

The BEACH data reflect actual GP requests. These data suggest that in 2006–08, compared with 2000–02, there was a national increase of approximately 17.7 million tests/batteries of tests ordered by GPs, an increase of 34.5%. However, it is likely that BEACH data underestimate the true number of pathology tests/batteries of tests ordered by GPs, as there is only space for up to five tests to be recorded per encounter. There was a significant increase in the proportion of tested encounters with five pathology tests recorded, from 11.5% of encounters in 2000–02 to 19.0% in 2006–08 (Figure 5.2).

The increasing volume of pathology tests/batteries of tests ordered by general practitioners is caused by many factors. Some of these factors are beyond the control of the GPs (for example, increasing management rates of conditions caused by changes in disease incidence or prevalence). Others are due to 'good' (for example, in response to new evidence) and 'bad' changes (for example, inappropriate test choice) in the pathology ordering behaviour of GPs.

GP motivation for ordering tests is not just limited to clinical applications.[11-14] Van der Weijden et al. (2002) investigated GP motivation for ordering pathology tests in diagnostic uncertainty in The Netherlands.[12] They found that (among other factors) time pressure was a cause for ordering tests, as requesting a laboratory test was a quick non-verbal way of signalling the end of the consultation.[12] An Australian study investigating motives for pathology testing in GP encounters found that GP-related factors (including time pressures) accounted for 3.2% of reasons for ordering tests.[11] Given that the GP workforce in Australia is experiencing shortages, pressures on GPs' time are likely to increase. While this may be a small factor influencing GP pathology ordering behaviour it should be acknowledged.

Regardless of the cause of the increase, the implications of the increase are the same. These include:

- the increased cost to the health system
- the strain of increased workload to the pathology workforce, which currently has workforce shortages
- the increased likelihood of false positive test results.

Cost to the health system

Over the 8 years from 2000–01 to 2007–08, the total cost of pathology services claimed through the MBS increased by 62.2%, and the per capita cost increased by 47.5%.[4] These data reflect the total cost of pathology to the MBS, but two-thirds (67%) of this cost is generated by GP orders.[5]

This cost is not a reflection of the true cost of pathology ordering as the Memorandum of Understanding between the Australian Government and the pathology industry and pathology profession limits the total pathology expenditure, and the number of MBS pathology items claimable per GP-requested episode of care is limited to the three most expensive items.

Pathology workforce shortages

The increasing volume of tests being ordered by both GPs and specialists[5] places an increasing workload on the pathology industry.[10] The pathology workforce in Australia is currently experiencing shortages.[2] The increase in pathology workload coupled with workforce shortages has the potential to cause a significant impact on service quality and timeliness, with serious consequences for safety and efficiency in the whole health system.[2]

Increased likelihood of false positive results

A false positive result, also referred to as type 1 error, is caused when a test result incorrectly shows an 'abnormal' test result; that is, the result is outside the reference range (too high or too low).

Each test has a reference range of results that is incorporated in reports by pathology laboratories and used to show whether the tested sample is normal or abnormal. Reference ranges are established by testing healthy individuals to determine the range of results that are considered 'normal'. In most cases, a 95% population reference range is used; this means that 95% of non-diseased persons are expected to have a pathology result within this range. The effect is that 5% of normal patients have a result that is outside this reference range (2.5% above and 2.5% below).[15-17] For each test on a normal sample there is a 95% chance that the result will be normal and a 5% chance that the result will be inappropriately reported as abnormal (a false positive result).

For each additional independent test (referred to as an analyte) that is performed the probability that any abnormal result will be incorrectly detected by chance increases.[15-17] For example, if 10 analytes are tested using the 95% reference range, the chance of at least one false positive result occurring by chance is 40%, if 15 analytes are tested the chance is 54%.[15]

There has been some debate about changing the reference range from a 95% reference range to a 99.9% reference range, thereby reducing the proportion of normal patients outside the reference range from 5% to 0.1%. Jorgensen et al. (2004) suggest using the 99.9% reference range while testing well patients, and when the pretest probability of disease is low, to reduce the likelihood of false positive results.[15] However, Smellie argues that increasing the reference range to 99.9% would increase the number of false negative results (that is, type 2 error, where the result is incorrectly reported as normal), increasing the risk of failing to diagnose clinical disease.[17] Another reason that use of the 99.9% reference range is not feasible is that clinical significance for some tests includes results that lie between the 95% and 99.9% reference interval.[17] Smellie suggests using a graphic indicator (already used by some laboratories) to display how far outside the reference range a result is, to differentiate between tests results that are likely (and those unlikely) to be occurring by chance.[17] Most general practitioners do this intuitively—that is, they are likely to automatically (and even subconsciously) ignore an abnormal result that lies just outside the reference range.

Each pathology test or battery of tests recorded in BEACH is not equivalent to a single analyte; batteries of tests have multiple analytes (for example, a full blood count often includes five analytes: haemoglobin, haematocrit, red blood cell count, white blood cell count, and platelet count[18]). The most common batteries of tests ordered by GPs in BEACH (full blood count, lipid profile, liver function test, multibiochemical analysis, hormone assay) accounted for 41.8% of total pathology tests/batteries of tests ordered by GPs in 2006–08 and 41.2% in 2000–02 (results not shown).

An increase in the number of tests being ordered per encounter by GPs will increase the likelihood of false positive results. The significant increase in the management rate and pathology order rate for general check-ups may also contribute to the likelihood of false positive results. Patients having a general check-up are likely to be well patients with a low pretest probability of disease. High rates of pathology testing in well patients increases the likelihood of false positives.

These factors may contribute to the significant increase in the management rate of abnormal test results seen in the BEACH data. GP pathology ordering for abnormal test result problems increased significantly, due to a higher likelihood of at least one pathology test being ordered in the management of abnormal test results, but there was no change in the number of pathology tests ordered per tested encounter.

There is varied opinion on whether GPs should explain the likelihood of an abnormal result being created by a statistical anomaly, and whether patients would accept this explanation. Phillips (2003)[16] and Smellie (2006)[17] both suggest that this should be discussed with the patient to reassure them that a one-off abnormal result is unlikely to be clinically relevant. Winkens and Dinant (2002)[13] also suggest patient education to inform patients that not all results are reliable. Phillips (2003)[16] suggests doing this before the tests are ordered to avoid creating 'worried well' patients. However, Jorgensen et al. (2004)[15] contends that most patients are unfamiliar with the concept that an abnormal result may be caused by statistical chance, and this leads those patients with a clinically insignificant abnormal finding to return for retesting to 'renew their status of wellness'.[15]

A small qualitative study by van Bokhoven et al. (2006)[19] investigating patient beliefs in blood tests in The Netherlands found that patients believed blood tests to be extremely reliable, with false positive or negative results being rare or non-existent. Patients also felt that if a test result was abnormal (even if their symptoms were unrelated to the result) this needed to be further investigated to determine the cause. This supports the comments made by Jorgensen et al. (2004)[15] that patients are unfamiliar with the concept of statistical outliers and want to be further investigated after an abnormal test result.

Given that one of the reasons GPs request pathology tests[11,12] and that patients desire tests[19] is to reassure the patient that there is no serious disease present, it seems counterintuitive to continue to request increasing numbers of tests at encounters, hence increasing the likelihood of false positive results that potentially create patient anxiety associated with an abnormal result.[15-17]

The BEACH data show the increasing management rate of abnormal test results and the increase in pathology ordering behaviour of GPs in the management of abnormal test result problems. It is likely that the increasing volume of tests ordered per encounter, and increased testing as part of check-ups (in presumably well patients) have contributed to this change. Perhaps, as suggested by others[13,16,17], further attempts should be made to educate GPs and patients (such as the patient information about reference ranges available on the 'lab tests online' website[18]) about the statistical likelihood of abnormal test results being obtained by chance when ordering high numbers of tests per patient, to reduce additional unnecessary investigations.

5.7 Conclusion

BEACH data demonstrate the rate of pathology ordering by GPs increased significantly from 2000–02 to 2006–08. In 2000–02, there were an estimated 33.6 million tests/batteries of tests ordered per year, and by 2006–08, this had increased to 51.3 million per year, a national increase of approximately 17.7 million tests/batteries of tests ordered by GPs, or 34.5%. This is likely to be an underestimation of the total GP-pathology ordering rate, as there has been a significant increase in the proportion of BEACH encounters with the maximum allowed number of pathology tests recorded (five tests/batteries of tests).

The National Health Priority Areas that are significant contributors to the increase include: cardiovascular disease (13.1% of the total 17.7 million increase), especially hypertension (7.2%); Type 2 diabetes (8.0%), and lipid disorders (4.5%). Other problems that are significant contributors include general check-ups (8.2% of the total 17.7 million increase), blood tests (4.9%) and female genital check-ups (4.4%).

In general practice, pathology ordering can be influenced by a number of factors: a change in the number of GP encounters nationally; a change in the management rate of a problem; and a change in GPs' pathology ordering behaviour in the management of the problem. This is measurable as a change in the rate of pathology orders, caused by a change in the likelihood of pathology ordering for the problem and/or a change in the number of pathology tests ordered per tested problem.

The drivers of change in these factors are due to a complex combination of GP, patient, and environment factors. The implications of the increase in pathology ordering include: the increased cost to the health system; the strain of increased workload on the pathology workforce, which currently has workforce shortages; and the increased likelihood of false positive test results.

To date, national policies aiming to limit growth in pathology expenditure have involved the pathology industry and profession; they have not directly been aimed at the health professionals who order the tests. National policy has not focused on GPs, to limit or reduce their pathology ordering behaviours. In contrast, a number of the disease-orientated policies aiming to improve patient care may have served to increase GP-pathology ordering in line with evidence-based best practice. For example, the Practice Incentives Program includes incentive payments to GPs for completing the requirements of an annual diabetes cycle of care, which includes (at least) annual testing of HbA1c and lipids, and testing for microalbuminuria, for patients with Type 2 diabetes. It is possible that these evidence-based policies may reduce long-term health costs in other areas of the health budget (for example, through avoidable hospital admissions) while increasing pathology expenditure in the short term. However, the current increasing volume of pathology testing and the testing done as part of general check-ups (in well patients) are likely to increase false positive results. In turn, this will increase the workload of general practitioners in follow-up consultations, and pathology workload in further investigations. On the other hand, if any future policies were to focus on GPs directly to reduce pathology ordering, there would be a risk of jeopardising quality health care unless the reductions were only in inappropriate testing.

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