

Analysis of Pathology Funding Arrangements in Australia - Update

This report was prepared for the
Australian Association of Pathology
Practices.

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ADVISORY

Inherent Limitations

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This report only takes into account information available to KPMG up to the date of this report and so its findings may be affected by new information.

The findings in this report have been formed on the above basis.

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In the course of our work, projections have been prepared on the basis of assumptions and methodology which have been described in our report. It is possible that some of the assumptions underlying our projections may not materialise. Nevertheless, we have applied our professional judgement in making these assumptions, such that they constitute an understandable basis for estimates and projections. Beyond this, to the extent that certain assumptions do not materialise, then you will appreciate that our estimates and projections of achievable results will vary.

Contents

Executive Summary	3
1 Estimating Pathology Outlays	5
1.1 Measuring pathology outlays	5
1.2 The Long-Run	6
1.2.1 Framework for Estimating Pathology Outlays	6
1.2.2 Unpacking the composition of pathology outlays	6
1.2.3 Updated Results	7
1.3 The Short-Run	12
1.3.1 Step 1: Running the Error Correction Model	12
1.3.2 Step 2: Converting Pathology Demand to Outlays	13
1.3.3 Step 3: Calibrating the Quarterly Result	13
1.3.4 Step 4: Converting the Quarterly Rates to Monthly Rates	13
1.3.5 Step 5: Converting Monthly Rates Back to Quarterly Rates	14
1.3.6 Step 6: Forecasting the March and June Quarters 2011	14
1.3.7 Step 7: Aggregating the Results	14
2 Dynamic Analysis	16
References	17

Executive Summary

In October 2010, KPMG Econtech was commissioned to estimate the growth in pathology outlays, focusing specifically on the next five financial years and developing estimates over the next 40 years, to provide some context to the health expenditure projections presented in the Government's most recent Intergenerational Report (IGR).

Following the delivery of that report, AAPP commissioned KPMG Econtech to provide an update to its five-year projections based on recently released Medicare data on pathology expenditure. Additionally, KPMG Econtech was commissioned to provide a dynamic analytical tool based on its modelling output, its overarching framework and the updated Medicare data; and intensive briefing sessions with key personnel from AAPP on KPMG Econtech's modelling, framework and analysis.

In line with the scope of this engagement, the following is a short report which presents the results of the modelling based on the updated data.

Updated Results

KPMG Econtech's original estimates of growth in pathology outlays were modelled on Medicare data as at end-October 2010. KPMG Econtech updated these estimates at the request of AAPP based on Medicare data as end-February 2011.

For the updated estimates, KPMG Econtech focused on growth in pathology outlays over the coming five financial years, with an additional focus on estimating growth for the remaining financial year. Using the same methodology as previously reported, a three-component framework was applied, where growth in unit price, per person usage and population were used to estimate growth in pathology outlays. Again, supplementary quarterly and monthly analysis was also undertaken to assist with the estimation process.

Table A compares the original estimates of growth in pathology outlays against those estimated using the updated monthly Medicare data, and those estimated for the dynamic analytical tool which was developed as part of this engagement. The profile presented for the dynamic analysis tool was the estimated profile used by the Department of Health and Ageing for its forward estimate calculations.

Table A: Updated Estimates of Nominal Growth in Pathology Outlays to 2015-16

	*2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Total Pathology Outlays, %							
Original Estimates	2.1%	3.1%	6.8%	7.0%	7.0%	7.0%	7.1%
Updated Estimates	2.1%	3.8%	6.8%	7.0%	7.0%	7.0%	7.1%
Dynamic Analysis	2.1%	3.5%	5.1%	5.5%	6.5%	6.9%	6.9%

* Represents growth rates for actual outlays.

Conclusion

The additional four months of Medicare data presented some upside risk to the original 2010-11 forecasts, this was also consistent with the demand modelling analysed on a quarterly basis. The updated estimate for pathology outlays in 2010-11 represented a mid-point between an estimated lower- and upper- bound forecasts for pathology outlays in

201011. The remaining forecast profile was unchanged by the four months of new data. The profile estimated for the dynamic analysis reflected calculated deviations from the updated estimates.

Importantly, it is estimated that pathology outlays are still expected to experience a period of subdued growth, albeit less subdued than originally estimated. Growth in outlays is then expected to strengthen and continue along a path to return to trend growth rates by 2012-13, which are reflective of per capita historical trends, combined with demographic change.

1 Estimating Pathology Outlays

Outlays on pathology services represent around 13 per cent of government expenditure on the MBS, with pathology expenditure of around \$2.0 billion annually.¹ To properly estimate future government expenditure on pathology services, it is important to identify the main drivers of pathology outlays. This section provides a definition on pathology outlays and details of the framework used to model the projections of growth in pathology over the long- and short- runs.

1.1 Measuring pathology outlays

Pathology is the most accessible and affordable medical service and has the highest bulk-billing rate of any medical service.² In measuring total pathology outlays by the Australian Government, the definition from the original report was used, which defined the types of services covered according their Medicare item listing. There were around 430 individual pathology services listed under Medicare that were identified as eligible to receive a rebate. These individual items are classified according to the following 13 main categories.

- | | |
|---------------------|---|
| 1. Haematology | 8. Infertility and Pregnancy Tests |
| 2. Chemical | 9. Simple Basic Tests |
| 3. Microbiology | 10. Patient Episode Initiation |
| 4. Immunology | 11. Specimen Referred |
| 5. Tissue Pathology | 12. Management of Bulk Billed Services |
| 6. Cytopathology | 13. Bulk Billed Pathology Episode Incentive Items |
| 7. Cytogenetics | |

Medicare expenditure and service data by age and gender on individual pathology items were analysed on a monthly, quarterly and financial year basis starting from July 1993 through to February 2011. This provided a rich dataset for interrogation and modelling purposes.

¹ Medicare Australia Statistics (2011)

² Pathology has few barriers in terms of how patients access pathology and how any patient can have any test virtually at any place and any time. Pathology has the highest bulk-billing rate of any medical service (Medicare Australia Statistics 2011).

1.2 The Long-Run

1.2.1 Framework for Estimating Pathology Outlays

Given the large volume of pathology services provided in Australia each year, estimation of total outlays lends itself to being best analysed through the construction of a robust economic framework. The framework developed in the original report for estimating pathology outlays, and again used here, is consistent with the framework used for the IGR and for future health expenditure. That is, the framework used defines growth in pathology outlays as a function of:

- growth in non-demographic factors (intensity and unit cost); and
- growth in demographic factors (population growth).

While the demographic and non-demographic factors are underpinned by economic models and econometric analysis, the overarching framework used to estimate pathology outlays is very simple, yet very powerful. That is, the framework allows for:

- total outlays to be unpacked;
- trends in key drivers to be more easily identified;
- projections to be made; and
- sensitivity analyses to be undertaken.

1.2.2 Unpacking the composition of pathology outlays

Expenditure on pathology services is a function of three main components:

- unit price – the average annual MBS rebate per service;
- intensity – the average annual usage of services per person per annum; and
- population – capturing dynamic changes in the population.

For illustrative purposes, the table below constructs total government expenditure on pathology outlays using the three components of the framework.

Table 1: Example of Framework

	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
Total Pathology Outlays, \$m	1,522	1,642	1,742	1,876	1,972	2,013
% Change	8.1%	7.9%	6.1%	7.7%	5.1%	2.1%
Average Unit Price	19.58	19.81	19.89	19.59	19.63	19.41
% Change	2.6%	1.2%	0.4%	-1.5%	0.2%	-1.2%
Per Person usage	3.81	4.00	4.15	4.47	4.59	4.66
% Change	4.0%	5.1%	3.7%	7.5%	2.8%	1.5%
Population, '000s	20,395	20,698	21,072	21,432	21,875	22,255
% Change	1.3%	1.5%	1.8%	1.7%	2.1%	1.7%

Source: Medicare Australia Statistics (2011) and KPMG Econtech Estimates

1.2.3 Updated Results

Projections of the three components of the framework for analysing pathology outlays are determined by economic models, econometric analysis, and demographic and economic assumptions. The updated results are a function of these three components.

Unit Price

Unit price in the framework is defined as the average rebate received for a single pathology service weighted by volume, price and frequency. Changes in the unit cost of pathology services reflect principally two drivers:

- growth in the MBS rebate; and
- patient enrichment of pathology tests;

Any changes in the MBS rebate provided to pathology services has reflected periods when the Government has elected to change the nominal benefit of each Medicare item. While the MBS rebate for pathology services has experienced ad hoc changes following government decision, the unit price of pathology services has historically continued to grow at a regular pace. The continued growth of around 1.25 per cent per annum on average has primarily reflected the second component driving price growth – patient enrichment.

- Patient enrichment refers to the phenomenon that, on an average weighted basis, more expensive pathology services are being undertaken more often relative to all other pathology services. This upwards trend in average price reflects such things as referral preferences and technological advancements in testing.
- The impact of Government price changes has been very small, with the average change slightly less than zero, that is, Government increases in MBS rebates have effectively been offset by decreases.

In estimating the unit price over the period to 2015-16, non-demographic growth rates based on historical trends were used in the modelling. In the case of the current financial year,

actual monthly data to February 2011 was utilised. This resulted in growth in the unit price for 2010-11 changing from -0.7% as original estimated to -0.9% in the updated estimates.

Intensity

“Intensity” refers to the average annual usage of services per person per annum. Again, there are two key components that drive growth in intensity, namely:

- preferences for pathology services; and
- the compositional effects of preferences at different age groups;

Changes in preferences of pathology services have seen a steady increase in demand for pathology services over the historical series. On average there were 2.6 tests per capita per annum undertaken in 1993, which increased to an average of 4.66 tests per capita per annum in 2009-10.

Pathology testing differs from many other health and medical services in that it is a referred service. This means that GPs and medical specialists request pathology tests on behalf of their patients and pathologists respond to these requests. There are a number of things that could influence doctors’ preferences for requesting pathology tests. These can be broadly grouped into three categories:

- increases in referring doctors' own activity (i.e. referring doctors seeing more patients);
- increases in the rate that referring doctors initiate pathology investigations (i.e. referring doctors ordering tests for a higher proportion of patients); and
- increases in the number of tests requested on each occasion (i.e. referring doctors ordering more tests per patient).

These three mechanisms can operate separately, but more often occur simultaneously to result in a combined effect on demand for pathology testing. These mechanisms are themselves influenced by a number of factors, both internal and external to the health and medical sector. Some of these are as follows:

- changes in population demographics (for example, the ageing of the population resulting in an increase in chronic disease, an increasing birth rate resulting in a need for more pregnancy care);
- the development of new treatments for existing conditions (for example, more sophisticated treatments for breast cancer which require targeting of drugs to specific types of tumours);
- the implementation of new government health policies (for example, support for the introduction of practice nurses into general practices);

- the introduction of screening programs for specific diseases (for example, the faecal occult blood testing program for colorectal cancer); and
- changes in guidelines for the management of specific conditions (for example, new and lower targets for cholesterol in certain patients).

Importantly, it is also recognised that different age groups have different per person usage rates of pathology services in Australia. Given the rich Medicare dataset that was available for all pathology services across all age groups, it was possible to establish non-demographic trend rates of intensity on a per capita basis by age cohort. In general, per person usage rates for pathology services are higher for older age groups than for younger age groups, the exception is the 0-4 age group (Table 2).

Table 2: Intensity Rates of Pathology Services – Average Per Capita Usage Per Annum by Age Cohort

	1993-94	1999-00	2004-05	2009-10
0-4	0.88	0.82	0.83	1.01
5-14	0.50	0.50	0.54	0.74
15-24	1.71	1.82	1.86	2.27
25-34	2.48	2.70	2.98	3.56
35-44	2.35	2.79	3.26	3.99
45-54	2.84	3.59	4.31	5.04
55-64	3.91	5.07	6.25	7.24
65-74	4.70	7.24	9.38	10.71
75-84	5.42	7.25	10.43	14.07
>=85	5.29	7.60	9.37	10.97
Weighted Total	2.40	3.07	3.81	4.66

Source: Medicare Australia Statistics (2011)

As the population grows and ages, more people will fall into the age groups that are more frequent users of pathology services. The non-demographic growth rates of usage for each age group are projected forward and applied to changes in the population.

As a result of the updated Medicare data, growth in the average per person usage of pathology for 2010-11 changed from the 2.2% that was originally estimated to 3.0% in the updated estimates.

1.2.3.1 Estimating demand for pathology services

In recent history, it was observed in the data that usage rates deviated from long-term trend. Additional econometrical analysis was undertaken to model the demand for pathology services based on other observable data.

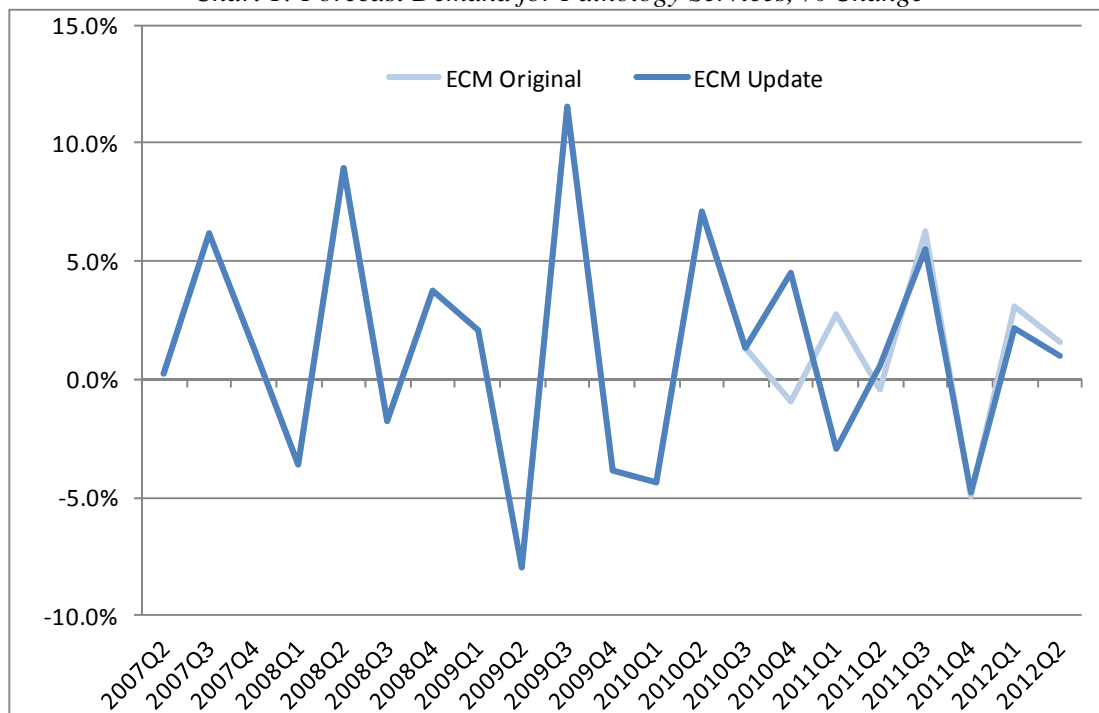
In addition to the key drivers of demand for pathology services listed above, there are a number of environment and economic factors which influence decisions to visit a GP and, by extension, a specialist. As economies expand and household incomes increase, the proportion of the budget spent on services tends to increase relative to purchases of goods in the economy. This is true for Australia and expenditure on health services has steadily increased

over time.³ The purchase of health services can be split into those that are a necessity or urgent and those that can be discretionary or non-urgent. That is, there is likely to be some flexibility in demand for GP visits (and consequently pathology referrals) during periods of volatility for households.⁴

In its original report KPMG Econtech presented an error correction model it had developed to better understand the demand for pathology services at the aggregate level and to better inform projections of usage over the next two financial years. The model which uses Australian Bureau of Statistics (ABS) sources and the projections from KPMG Econtech’s highly regarded MM2 forecasting model, was rerun using the latest quarterly data available.

The updated results from the error correction model compared with the original estimates are presented in Chart 1.

Chart 1: Forecast Demand for Pathology Services, % Change



Source: ABS Cat Nos: 5206.0, 6401.0 and 3201.0 and KPMG Econtech Estimates

Population

The inclusion of demographic changes in the modelling captures dynamic changes in the population through:

³ According to the 2003–04 HES, health expenditure, as a proportion of total household expenditure on goods and services, rose from 3.9% in 1984 to 5.1% in 2003–04. Additionally, 31% of household’s overall medical care and health expenditure were spent health practitioner’s fees, and 25% spent on and medicines, pharmaceutical products and therapeutic appliances. ABS Cat No. 4836.0.55.001.

⁴ In an analysis of the main areas of household expenditure, health was ranked in the middle of the nine broad areas of household expenditure. This ranking as a ‘big-ticket’ household expenditure item did not change between 1998-99 and 2003-04. NATSEM (2008)

- increases in the population size; and
- compositional changes resulting from demographic change across age groups and an ageing population.

The demographic assumptions about fertility, mortality and migration affects the number of total number and the aged and gender composition of the population. The composition of the population in turn affects usage rates of pathology services because different age-gender cohorts have different patterns of usage rates. Changes in these patterns of usage rates of individual cohorts over time will also affect aggregate usage rates and total expenditure on pathology services.

In order to estimate future usage rates the pathology services, the age-specific usage rates for pathology services have been applied to ABS population projections, which have been adjusted according to KPMG Econtech assumptions. The population projections used in the update estimates of growth in pathology outlays remain unchanged from the original estimates.

Updated Results

Table 3 details the projected growth in pathology outlays and the growth rates of the underlying components.

Table 3: Total Pathology Outlays, by the Three Components

	*2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Total Pathology Outlays, %	2.1%	3.8%	6.8%	7.0%	7.0%	7.0%	7.1%
Average Service Fee, %	-1.2%	-0.9%	1.3%	1.3%	1.3%	1.3%	1.3%
Per Person usage, %	1.5%	3.0%	3.9%	4.1%	4.2%	4.2%	4.3%
Population, %	1.7%	1.6%	1.5%	1.5%	1.4%	1.4%	1.4%

* Represents growth rates for actual outlays.

Consistent with the original estimates, the updated modelling results presented in Table 3 are based on trend growth rates from the historical data, and as such, assume that the average service fee will continue to grow at a rate less than inflation. This implies that:

- the average service fee will continue to fall in real terms over the forecast horizon;
- continued productivity gains will need to be delivered by the pathology industry; and
- the associated efficiency gains will be returned to the Australian Government.

Overall, this price assumption represents a conservative approach to the modelling and for growth in total outlays. Essentially, it assumes the discipline placed on price growth in the pathology industry over the previous MoU period is maintained over the forward estimates.

The growth in the intensity rate moderated sharply in 2008-09 and 2009-10. It is possible that the onset of the global financial crisis and its impact on the Australian economic environment and on household budgets was one cause of this moderation. The growth path in usage rates in 2010-11 and 2011-12 reflects its formal econometric relationship with variables in the

economy and household budget. The medium growth rate reflects a move back to its historical trend.

Population has grown at a more rapid rate recently due to an increase in the fertility rate. Fertility peaked at 3.5 births per woman in 1961. Subsequently, the total fertility rate of Australian women declined rapidly during the 1960s and 1970s, stabilised during the 1980's, then declined further until 2001. Since that time, fertility has been generally increasing to reach almost 2 births per woman in 2008, the highest fertility rate since 1977. While the population has experienced a moderate expansion of late, it is expected that population growth will return to historical trend rates over the projection period.

A detailed description of the modelling approach and results for growth over the current financial year is presented in Section 1.3.

1.3 The Short-Run

KPMG Econtech, as part of this engagement, produced detailed estimates on the growth in outlays for the financial year 2010-11. This involved additional detailed analysis to forecast growth over the remaining months in the current financial year. This was achieved using the following steps:

- **Step 1:** Running the error correction model;
- **Step 2:** Converting pathology demand to outlays;
- **Step 3:** Calibrating the quarterly result;
- **Step 4:** Converting the quarterly rates to monthly rates;
- **Step 5:** Converting monthly rates back to quarterly rates;
- **Step 6:** Forecasting the March and June quarters 2011; and
- **Step 7:** Aggregating the results.

These steps are explained in more detail below.

1.3.1 Step 1: Running the Error Correction Model

The error correction model developed by KPMG Econtech to estimate the demand for pathology services was rerun using updated quarterly data. The raw model output showed services growing at: -2.9% in the March quarter 2011 and 0.6% in the June quarter 2011.

1.3.2 Step 2: Converting Pathology Demand to Outlays

Historical quarterly growth rates in the demand for services were mapped against the growth in outlays using regression analysis. The relationship showed an R^2 of around 0.96, indicating a very tight fit – the difference being the movement in implied price (principally, the fluctuations in patient enrichment). The relationship $y = 1.0051x + 0.0024$ was used to forecast total outlays for pathology services against quarterly growth in the demand for services from the error correction model. This implied that total outlays were growing at: -2.7% in 2011 Q1 and 0.8% in 2011 Q2.

These growth rates for total outlays implied an annual growth rate of 4.8% for 2010-11, which appeared to be too high.

1.3.3 Step 3: Calibrating the Quarterly Result

A factor was applied to the quarterly demand model outputs to moderate the annual results. This judgment was based on the following factors:

- the impact of the floods along the East coast of Australia on economic activity; and
- market intelligence indicating soft demand for pathology services; and

The growth rates following recalibration showed total outlays growing at: -4.8% in the March quarter 2011 and 0.2% in the June quarter Q2. This implied growth of 3½% in 2010-11 (and considered to be at middle of the bandwidth for annual growth in outlays for 2010-11 after conducting some scenario analysis).

1.3.4 Step 4: Converting the Quarterly Rates to Monthly Rates

The results from the quarterly growth rates, which were initially generated from the demand modelling, provided a target for an estimate of the annual growth rate. The analysis then turned to examining the likely growth rates for individual months in order to achieve annual target. In converting the quarterly growth rates to monthly rates, while taking into consideration the impact on annual rates, the historical rates in Table 4 were taken into consideration.

Table 4: Historical Growth Rates in Pathology Outlays

	Maximum Growth	Minimum Growth	Average Growth
Frequency			
Monthly	80.2%	-39.7%	1.5%
Quarterly	11.4%	-7.5%	1.8%
Annually	10.8%	2.1%	6.8%

Source: Medicare (2011)

January was very weak (-39.1%) and that February was the second highest on record (68.6%). This meant that March 2011 would need to show no growth to achieve a quarterly growth rate of -4.8% in 2011 Q1. At the time, a model assumption of the average growth rate for the month of March for the past 5 years was used. As such, this rate of 19.3% for March was used and presented some upside risk the annual growth rate in outlays exceeding 3½%.

The average monthly growth rate of all months (1.5%) was also used in a scenario analysis, which presented a lower bound forecast.

1.3.5 Step 5: Converting Monthly Rates Back to Quarterly Rates

The monthly rates were then aggregated to quarterly rates and checked against the historical data in Table 4. It was noted that the lowest quarterly growth occurred in the June quarter 2009, with growth at -7.5%, and this was at the height of the GFC.

Given that January 2011 was the second lowest monthly growth rate on record and February was the second highest on record, a quarterly growth rate of -7.5% in the March quarter 2011 was set as a minimum tolerance threshold.

If we left March 2011 at the average of 1.5%, this would mean that March quarter 2011 would grow at -4.2%. If the March monthly average growth rate was applied, this implied growth in the March quarter 2011 of 2.3%.

1.3.6 Step 6: Forecasting the March and June Quarters 2011

A quarterly growth rate of 0.2% was targeted in the June quarter 2011, consistent with the output of Step 3, and also well within the tolerance ranges for quarterly growth as presented in Table 4. Given the monthly rates for the March quarter 2011, this implied growth of -7.0% for each month across the June quarter 2011. This resulted in an annual growth rate of 3.6% for 2010-11, again well within tolerance and below average annual growth rates.

Rather than using the same average growth rate for each month in the June quarter 2011, the average growth rates for each month over the past five years were used. These were then adjusted by a factor to achieve the targeted 0.2% for the quarter and 3.6% for the year.

A lower and higher bound forecast for annual growth in 2010-11 was achieved by changing the assumption used to calculate the March 2011 monthly growth rate, from a range of flat growth to average for that month over the past 5 years.

As a cross-check, other economic forecasts on the wider economy (from state and commonwealth treasuries and the RBA) were also researched, and in terms of the wider economy, there was some upside risk to growth in the June quarter 2011. As such, it was considered that 3.6% was an appropriate lower bound of our forecasts for 2010-11 with 4.0% being our upper bound based on Medicare data as at end-February 2011.

1.3.7 Step 7: Aggregating the Results

The above steps were then pulled together to generate the monthly profiles as presented in Table 5.

Table 5: Updated Results: Projections for Growth Pathology Outlays

	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11
Lower Bound						
Monthly	-39.1%	68.6%	0.0%	-17.4%	14.7%	-12.9%
Quarterly			-4.8%			0.2%
Annually						3.6%
Upper Bound						
Monthly	-39.1%	68.6%	19.3%	-37.2%	31.4%	-27.6%
Quarterly			2.3%			-12.1%
Annually						4.0%

It is noted that since these estimates were calculated, the March monthly data has been made available by Medicare. The actual growth rate for March 2011 was 16.6%. Using the same methodology, it places the estimated annual growth rate for 2010-11 at around 3.7% and well within the bandwidth presented in Table 5.

2 Dynamic Analysis

A dynamic analytical tool based on the model output, its overarching framework and the updated Medicare data was developed and delivered as part of this engagement. The dynamic analytical tool allowed the analysis of incremental changes in key inputs to be measured. These impacts were measured as deviations from the baseline scenario and measured in percentage changes and dollars saved in the current year and over the forward estimates. The dynamic tool allowed inputs to be entered as either changes at the total outlays level or changes at the unit pricing level. This allows analysis from either a government or industry perspective.

The dynamic tool was first calibrated using the profile from the updated estimates. Following discussions with the Department, a baseline was estimated to reflect the likely forward estimates that were used by the Department in their forward estimates calculations.

Table 6 presents the original estimates of growth in pathology outlays and compares these against those estimated using the updated monthly Medicare data, and those estimated for the dynamic analytical tool.

Table 6: Updated Estimates of Nominal Growth in Pathology Outlays to 2015-16

	*2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Total Pathology Outlays, %							
Original Estimates	2.1%	3.1%	6.8%	7.0%	7.0%	7.0%	7.1%
Updated Estimates	2.1%	3.8%	6.8%	7.0%	7.0%	7.0%	7.1%
Dynamic Analysis	2.1%	3.5%	5.1%	5.5%	6.5%	6.9%	6.9%

* Represents growth rates for actual outlays.

The dynamic analytic tool is an interactive Excel-based spreadsheet and was delivered to AAPP separately to this short report of the modelling update.

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