UPGRADING AND MAINTENANCE OF THE MANUAL OF USE AND INTERPRETATION OF PATHOLOGY TESTS (RCPA MANUAL)

A Final Report by
The Royal College of Pathologists of Australasia

To the
Australian Department of Health

March 2015
1. Executive Summary

This document is the Final Performance Report for the Upgrading and Maintenance of the *Manual of Use and Interpretation of Pathology Tests* (RCPA Manual), as specified in Item F.6 of the Milestones / Reporting Requirements / Payment Schedule in the Standard Funding Agreement between the Department of Health and the Royal College of Pathologists of Australasia.

It is now 25 years since the first edition of The Manual was published, and it remains an indispensable aid, not only for pathologists, but for clinicians of all disciplines, specialists in training, junior medical officers and medical students. Each edition of the RCPA Manual has been generously supported by the Department of Health, including the move from paper-based to online publication some years ago. This new version of the RCPA Manual has seen not only the comprehensive updating of the clinical information contained within it but also a much improved website with enhanced search functions and linkages, as well as mobile device capability.

The project faced challenges when concurrent updates to the new RCPA website were necessary before commencement of the Manual website as well as some need to integrate with the Electronic Decision Support project (also funded by the Department) which is not yet complete. The project team also identified mobile compatibility over app as the preferred enhancement part way through the project. These issues were dealt with by Contract Variation. Other challenges included staff turnover, RCPA organisational restructure and pathologist availability.

The new RCPA Manual was successfully launched on-time and in budget. It can be viewed at RCPA Manual. The new site meets the QUPP objectives of Quality Referrals (Requesting/Ordering) and the QUPP strategic goal of educating requesters as well as improving the quality of pathology for improved patient outcomes. It provides an easy to use interface with a future-proofed design and compatibility with other important projects relating to the standardisation of pathology terminology, units and coding.

2. Project Statement

**QUPP Objectives**

The goal of the Quality Use of Pathology Program (QUPP) is to achieve improvement in health and economic outcomes from the use of pathology in healthcare, through the pursuit of better practice amongst requesters (or referrers) and providers of pathology services and knowledgeable and engaged consumers.

The Quality Use of Pathology Program has three sub-programs and objectives:

- **Quality Consumer Services**: to develop and improve consumer-focussed, accessible and coordinated services that promote informed choice and meet consumer needs

- **Quality Referrals (Requesting/Ordering)**: to support referral practices that are informed and facilitated by best practice professional relationships and protocols between referrers and providers; that:
  - Are informed by evidence
  - Maximise health benefits, and
- Inform and engage consumers.

- **Quality Pathology Practice**: to support professional practices standards that meet consumer and referred needs and provide evidence-based, best practice, quality-assured services that are safe, cost effective, and efficient.

**Project Objective**

To update and upgrade the Manual of Use and Interpretation of Pathology Tests (RCPA Manual) to ensure that it remains a current resource for referring practitioners, to guide them in selection and interpretation of pathology tests for various medical conditions.

**Project Outcomes**

- Revised and updated pathology clinical content of the RCPA Manual online.
- The delivery of the upgraded RCPA Manual website in line with the new RCPA website and in a mobile-compatible format with increased search functionality.
- Increased volume of monthly “hits” and page views on the RCPA Manual website

**3. Meeting QUPP Objectives**

The goal of the QUPP is to achieve improvement in health and economic outcomes from the use of pathology in health care, through the pursuit of better practice amongst requesters (or referrers) and providers of pathology services and knowledgeable and engaged consumers. This project addresses the Quality Use of Pathology Program “Quality Pathology Practice”, *being to support professional practice standards that meet consumer and referrer needs and provide evidence-based, best practice, quality-assured services that are safe, cost effective and efficient.*”

The review and upgrade of the RCPA Manual aligns with the QUPP objectives as follows:

Ensuring the quality, accuracy and relevance of the RCPA Manual will:

- Address the *Quality Referrals (Requesting/Ordering)* objective of QUPP by supporting referral practices that are informed and facilitated by evidence and maximise health benefit.
- Prevent unnecessary testing which is both invasive to patients and costly to the community. It also assists referring practitioners to not miss potential diagnoses through omitting to request an important test; this is vital for good patient care and saves on the overall costs of health care as effective management can be instigated at an earlier stage of disease.
- Address the element of the QUPP Strategic Work Plan ‘Education of requesting practitioners – training and continuing education’. This project fits well with this objective given that an updated RCPA Manual will guide referring practitioners in the selection and interpretation of pathology tests for various conditions and thus promoting quality referrals.
Address a need of requesters for pathology information in an environment of shortages and time pressures on the pathology workforce where pathologists frequently find it difficult to respond to individual inquiries due to time constraints. Being able to refer requesters to the RCPA Manual saves time and assists pathologists in educating their medical colleagues.

Address the fact that the field of pathology and medicine in general changes rapidly and therefore it is important that the information contained in the RCPA Manual be comprehensively reviewed and updated by pathologist experts.

4. Project Governance

An Editorial Committee of discipline experts was established to oversee the revision of the RCPA Manual. The Committee first met in November 2013 where the main Agenda item was to allocate updating of the pathology content of the existing Manual to the various disciplines. Upgrading of the presentation of the RCPA Manual Website was also discussed.

The Editorial Committee members were:

- Brett Delahunty – Chair/ Editor
- Diane Kenwright – Anatomical Pathology
- John Burnett – Chemical Pathology
- Nelson Tang – Genetics
- David Gillis – Immunopathology
- Robert Baird – Microbiology
- Zoe McQuilten – Haematology
- Bronwen Ross – DCEO RCPA
- Belinda Neill – Project Assistant

The Editorial Committee enlisted assistance from other Fellows from their disciplines where necessary, and in the final stages the entire Manual was proof read by two highly experienced pathologists.

The operational aspects of the project were overseen by the DCEO of the RCPA, and initially by her Executive Assistant but for most of the project by the RCPA Editorial Manager (Project assistant – Belinda Neill).

The RCPA IT team were responsible for liaising with the developers of the RCPA website and for the design and technical aspects of upgrading of the Manual website to bring it in line with the recently upgraded RCPA website. The PITUS Project Officer assisted with ensuring consistency with the RCPA approved standards for units and terminology and assisted generally with ensuring links were active and other functionality was in place.

5. Implementation Milestones

- First Meeting of the Manual Editorial Committee, 14 November 2013;
- Templates and design for new Manual website complete, 02 June 2014;
- Manual Editorial Committee workshop, 21 June 2014;
- Clinical Problems data transferred to the new site, 28 July 2014;
- Data conversion, data cleansing and import of corrected Pathology Tests data, 1 September 2014;
• Clinical Problems and Pathology Tests Committee amendments finalised, 10 October 2014;
• Search functionality – optimized search functionality via analysers and indexes, 31 October 2014;
• Styling and aesthetic design (stylesheets and icon designs finalised), 7 November 2014;
• All amendments/corrections from Committee and proofreaders finalised, 12 December 2014- 02 February 2015;
• Testing and final content changes, 06 February 2015; and

6. Detailed Work Report

The first Meeting of the Manual Editorial Committee was held on Thursday 14 November 2013 at the RCPA in Sydney. The format of the RCPA Manual divides the clinical content up into three sections; ‘Pathology Tests’, ‘Clinical Problems’ and ‘Pathology Decision Support Tools (PDSTs)’. At this meeting it was decided that as the ‘Pathology Tests’ entries were already divided into disciplines on the website, each Committee member could work on the Tests appropriate for their discipline. However, the ‘Clinical Problems’ were more difficult to allocate and there was some overlap, hence time was spent at the meeting allocating ‘Clinical Problem’s to the appropriate Committee member and discussing areas where there was overlap. The PDSTs had been authored separately and these were returned individually to the original authors for revisions. The Chair recommended that each Committee member form a group or call on relevant experts for each entry under their responsibility, so that the most current information could be obtained. The meeting agreed on processes for reviewing working group outputs as well as liaising with RCPA IT regarding formatting of the new website.

After the meeting, the Editorial Manager distributed the relevant pages of the Manual to each Committee member in word format and these were edited by those Committee members and returned. The Chair, the DCEO and others were given smaller tasks such as the introduction to complete. Some areas of content needed specific expert input (eg Forensic toxicology) or re-writing by the Editor or the Editorial Manager.

The second meeting of the Manual Editorial Committee was held on Saturday 21 June 2014 at the RCPA in Sydney as an all day workshop. Committee members were asked to prepare a list of issues or items to discuss at this meeting (ie, controversial amendments, those that impact on other disciplines, items that may need to be checked/approved by an advisory committee, etc). The proposed amendments and new entries were reviewed, discussed and either approved by the Committee or returned for further revision. Approved new content went from the Committee members went to the Editorial Manager for amendment on the new site.

From January 2014 onwards, there were regular meetings with the RCPA Webmaster to plan the workflow for the changes to the Manual website. The development of the site was undertaken by Linda Vinski, the RCPA Webmaster, with assistance from the RCPA Visual and Online Communication Designer. The old content was transferred across to the new website format. The Pathology Tests data conversion involved a preliminary data cleansing, conversion and import to the new template format. The Clinical Problems transfer involved a transfer into the new template with data corrections made at a later date. The process required the new templates to be designed, set-up, tested and refined. Specific web parts
were created to increase the functionality of the site through an alphabetic pager-selector and a glossary/web part to include Pathology Test/Clinical Problem url links and glossary tooltip feature. Numerous internal RCPA meetings were held to review and refine the look, formatting and functionality.

Three key changes to the project were approved by Contract Variation with the Department. Firstly, a request for a time extension was approved. Secondly, it became apparent that users prefer a mobile compatible website format to an app format (originally one of the deliverables of the project). The objective was changed to mobile compatibility and this worked well with the functionality of the content management system of the new website. The look and functionality was designed and tested on multiple mobile devices. Thirdly, the PDSTs are currently the subject of a parallel project and may soon be converted from a 'Decision tree' format to a coded solution that integrates with GP desktops and becomes part of the electronic requesting workflow for GPs (whilst still being governed clinically by the RCPA Manual). This potentially exciting development may render the current decision trees, which were difficult to transfer to the new site, obsolete. The Department approved the limitation on the amount of work done to the PDSTs in light of this context. Having agreed this, the RCPA IT team found a way to correct and reproduce most of the PDST decision trees into the new site.

All current and new entries were revised in line with the Pathology Units and Terminology Standardisation (PUTS), Pathology Information, Terminology and Units Standardisation (PITUS) and Electronic Decision Support projects currently being undertaken by the RCPA by Donna Moore, Pathology Information, Terminology and Units Standardisation (PITUS) Senior Project Officer, who also assisted with checking functionality of links and other technical aspects.

Once much of the clinical content was amended and in the new format, pages were sent to the two externally contracted pathologists for final checking and proofreading for errors in the clinical information. When all editorial/content amendments were complete, testing was undertaken by several staff members, including testing all internal and external links, testing the site on different Web browsers and testing the site on a number of mobile devices. All hyperlinks, glossary terms and definitions are managed in a centralised location; enabling links to be updated in one place and reducing the capacity for broken links and extra time spend editing links in many locations. These were finalised prior to the launch. Extensive search criteria were used to test the search capability during the testing phase. Once testing had been done, including testing on a number of mobile devices, the new Manual website was launched on 9 February.

7. Achievement of Project Outcomes

- Updating of the content and upgrading of the presentation of the RCPA Manual website

The new online mobile-compatible RCPA Manual, with updated clinical content was successfully launched on 9 February 2015. The site can be viewed by following this link: [RCPA Manual](#)

The previous online version of the Manual contained 724 Clinical Problems, 760 Pathology Tests, and 43 PDSTs. The new version contains 623 Clinical Problems, 600 Pathology Tests and 34 PDSTs.

All entries in the Manual were assessed by the Committee and either updated or deleted if obsolete. Many entries that only pointed to another page were deleted and the title of the
The page added to the keywords of the page to which they redirected. This streamlined the search process and meant that fewer click throughs were needed to find the correct entry. Many new entries were also identified as necessary and were provided by the Committee.

The PDSTs were returned to the original authors who were asked to update them for publication on the new site. Although 9 of these are awaiting the outcomes of the Electronic Decision Support for Pathology Requesting by General Practitioners project, 34 were able to be published prior to the launch date.

Some other special features of the content revision include:

1. 244 pathology tests had titles updated to the "Preferred term" as documented in the APUTS Requesting Pathology terminology reference set v2.1.xlsx published in November 2014 by the PITUS-14 project.
   Examples include:
   - Aspartate aminotransferase – (previously ‘Aspartate aminotransferase (AST) - plasma or serum’)
   - Creatinine – (previously ‘Creatinine - plasma or serum’)
   - Creatinine clearance – (previously Was ‘Creatinine clearance – Measured’)
   - Creatinine urine – (previously ‘Creatinine – urine’)
   - Free T4 – (previously ‘Thyroxine (free) - serum’)
   - Haematocrit – (previously ‘Packed cell volume (PCV), haematocrit (Hct)’)

2. The newly published harmonised reference intervals published by the PITUS-14 project have been listed for the pathology tests for Sodium, Potassium, Chloride, Bicarbonate, Creatinine, Calcium, Phosphate, Magnesium, Lactate dehydrogenase, Alkaline phosphatase and Protein – listed in APUTS Chemical Pathology Harmonised Reference Intervals tables v1.1.xlsx.

- Implementation of a new CMS that increases search functionality

The implementation of the new CMS enables the entire RCPA Manual website to be searched, as well as from the main RCPA site. This is a vast improvement from the old website where only individual searches within a section, such as a Clinical Problem, Pathology Test or PDST, were possible.

The smart search has the ability to find criteria inside attachments – the previous website could not do this. It also has the facility to do partial match search, ie entry of Metanephrine will find Metanephrines.

Keywords have been listed against pathology tests and clinical problems to provide a more thorough search facility to the user. These keywords included abbreviations, previously ‘known as’ variations, and included all 'Synonyms' listed in APUTS Requesting Pathology terminology reference set v2.1.xlsx were placed as keywords to enhance the searching process for tests. For example:
- Alanine aminotransferase – Keywords: ‘ALT, Alanine transaminase, Glutamic pyruvic transaminase, SGPT’. The user could search for any of these variations and ‘Alanine aminotransferase’ will be found.

The displayed result gives more information than previously and now includes relevance, keywords, search criteria and hit sentence, where applicable. This enables users to more easily select the correct result.

The previous RCPA Manual listed appropriate tests and related clinical problems, but there was no link between these, requiring the user to do a separate search for this information.
The new Manual has hyperlinks directly between the pathology tests and related clinical problems, providing users with a fully integrated search facility.

The RCPA Manual includes a glossary and hyperlink management function that populates hyperlinks and relevant glossary definitions on all Manual pages to Pathology Test and Clinical Problem pages. All hyperlinks, glossary terms and definitions are managed in a centralised location; enabling links to be updated in one place and reducing the capacity for broken links and extra time spent editing links in many locations.

**Update for final report on RCPA Manual Search Engine functionality**

Of the 29,553 total unique page views in the RCPA Manual site in its first month of operation, 3,231 (11%) represented the RCPA Manual Search Results page indicating that the RCPA Manual keyword search engine is a popular and common way to locate information in the site. There were 1,082 unique page views of the search function in the old site at the same last year (2014) indicating a ~300% increase in usage of the search function.

- **Increase volume of monthly “hits” and page views on the RCPA Manual website**

The launch of the new RCPA Manual site has been advertised through Pathology Today and the news function on the RCPA website. In addition, it will be promoted through regular meetings and events, such as Pathology Update Conference in Melbourne in late February.

The RCPA Manual has been developed within the RCPA website and therefore integrates with the 'global' search function (as well as having its own local search described above). Users searching for content on the RCPA website may also receive pages from the RCPA Manual website in the search results if relevant to the keyword search. Given this, the RCPA Manual is likely to receive increased traffic through the RCPA website global search.

Positive feedback has already been received regarding the test site which is encouraging and it is expected that there will be a natural increase in its use overtime. It is intended that the RCPA webmaster will monitor hits using Google Analytics and this information will form part of the final report.

**Update on Post-implementation page views for Final report**

Since the RCPA Manual launch on February 9th, 2015, the number of unique page views in the RCPA website has increased by 37% when comparing to the previous month. The RCPA website has increased 17% in size due to the RCPA Manual and has also increased in rate of usage by 16%.

In order to measure the increase in page views of the new RCPA Manual site, it is not appropriate to measure overall or individual page visits due to the many changes from the previous website. The most valid comparisons available are to compare the unique page views of the common landing pages in the old and the new versions. The data has also been treated to remove hits from RCPA testing and development staff.

The new RCPA Manual home page ranks as the second most popular part of the RCPA website (behind the RCPA homepage) with the RCPA Manual Pathology Tests and Clinical Problems landing pages following closely thereafter.
The Table below compares the number of unique page views of the common landing pages between the old and the new version of the Manual for the same one month period before and after launch. This shows there has been an increase of 1693 unique page views of the RCPA Manual homepage and a collective increase in all other landing pages.

### Unique Page views (Old vs new RCPA Manual sites)

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Homepage</td>
<td>5,154</td>
<td>6,847 (58)</td>
<td>+1,693</td>
<td>+33%</td>
</tr>
<tr>
<td>Pathology Tests</td>
<td>2,282</td>
<td>3,961 (-22)</td>
<td>+1,660</td>
<td>+73%</td>
</tr>
<tr>
<td>Clinical Problems</td>
<td>2,150</td>
<td>2,926 (-28)</td>
<td>+799</td>
<td>+36%</td>
</tr>
<tr>
<td>Pathology Decision Support Tools</td>
<td>166</td>
<td>472 (-7)</td>
<td>+299</td>
<td>+180%</td>
</tr>
</tbody>
</table>

### User Groups

The largest geographical user groups to access the RCPA Manual are Australia (86%) and New Zealand (4%) followed by India (2%) and the United Kingdom (~2%). Within Australia, the RCPA Manual user groups are located in Sydney (27%), Melbourne (22%), Brisbane (14%), Perth (8%), Adelaide (5%), Canberra (4%), Hobart (3%), Newcastle (2%), Gold Coast (1.5%), Darwin (1%), Geelong (1%) and so on.

### Acquisition

Users are finding the RCPA Manual through a number of channels including search engine queries such as through Google, Bing and Yahoo (48%), direct traffic via a link from an email, bookmark, browser, PDF or word document (39%) and referral traffic, including social media sites (15%). The high success rate with search engines suggests that the RCPA Manual ranks well in search results and that the site also has high ‘brand capital’ leading users to search for the appropriate key terms such as “RCPA Manual" to find the website. High rates of direct traffic indicate the strength of the brand also. Currently the highest rate of referral traffic is from Labtests Online, another Australian government funded (QUPP) activity, supporting the complementary nature of the two projects.

A promotional news item released on the RCPA website on February 10th, 2015 lead to 53 unique sessions of the RCPA Manual. *Pathology Today*, the bimonthly newsletter of the RCPA lead to 59 unique clicks (individual people) to the RCPA Manual following the February 12, 2015 edition.

The RCPA has found this analytical activity useful and will continue to monitor usage of the Manual via unique page views and acquisitions.
8. Implementation Issues:

Any difficulties, problems or delays experienced in performing the activity and how they were dealt with

The timing and content of the project ultimately overlapped with the implementation of the College’s new website which caused some delays for the RCPA Manual website development requiring the College to request a variation to the timing of the deliverables in the contract with the Department.

The College has recently scoped and implemented a new website using Kentico CMS which integrates with a number of platforms including our database, our Education Online portal and The RCPA Manual. Due to the nature of College activities two key projects assigned to the webmaster ahead of the RCPA Manual Project took longer than expected, mainly due to experience and complexities of navigating, developing and implementing a new system. The College underwent a strategic staff review to address staffing requirements and structural change required to meet our growing organisational needs. The structure of the College’s IT department has been addressed as part of this review and a new Project Division was also established at the RCPA. The new structure enhanced our ability to deliver the Manual project.

As mentioned earlier, the College is awaiting the outcomes of the Electronic Decision Support for Pathology Requesting by General Practitioners Project which is funded by the Department of Health under the Pathology Funding Agreement, the results of which are due in March 2015. This project will influence how the College approaches the Pathology Decision Support Tools (PDSTs) in the Manual and as a result the Grants Services Division allowed for the non-finalisation of the PDSTs.

In addition the IT Department identified that the technological solution favoured by users and better able to be maintained, is a mobile compatible website with functionality that will allow dynamic interaction with subsequent additions to the RCPA website, future proofing its relevance and usage. The College proposed this solution rather than the outdated iPad app from the previous version of the RCPA Manual and this variation was also approved by the Department.

This project relied on the expertise of pathologists to provide input. These experts at times had conflicting commitments and so it was important to communicate regularly and bring in additional assistance as required. There were particular delays with respect to the Haematology discipline and the Forensic Toxicology page and these changes were only able to be uploaded in January 2015.

The medical proof reader who assisted with checking the RCPA Manual revisions in the past declined to be involved this time. The RCPA subsequently approached two recently retired pathologists to proofread the RCPA Manual. Fortunately, both agreed to assist and played a crucial role in reviewing content, correcting errors and suggesting further amendments to the Committee.

Some turnover in staff occurred and new staff and assistance was sourced as quickly as possible to minimise disruption and delay.

**Post-implementation issues identified for the Final Report**
Feedback on the new RCPA Manual has been positive and is reflected in the large increases in page views described above. It has come to the attention of the RCPA that many users had bookmarked or linked individual pages of the old RCPA Manual for their
internal use and that these links were unavoidably “broken” and no longer functioned after
the launch of the new website. Links to the home page continued to work, however those to
individual pages could not be sustained. LabTests Online have notified us of their having
updated their links to the RCPA Manual. The project team is in the process of emailing all
laboratories, utilising the email list of RCPA QAP, to notify them of the need to update their
links to the RCPA Manual. It is envisaged that once various external users have updated
their links, unique page views via direct acquisition will further increase.

9. The extent to which the Activity achieved the Quality Use of Pathology Program
Objectives

This project mainly targets the QUPP objective of Quality referrals (requesting/ordering).

The primary purpose of the revision and upgrading of the RCPA Manual has been to ensure
that it remains an up-to-date evidence-based resource for referring practitioners, to guide
them in selection and interpretation of pathology tests for various medical conditions and
thus promote quality referrals. Use of the RCPA Manual helps to prevent unnecessary
testing which is both invasive to patients and costly to the community. It also means referring
practitioners do not miss potential diagnoses through omitting to request an important test;
this is vital for good patient care and saves on the overall costs of health care as effective
management can be instigated at an earlier stage of disease.

The delivery of the RCPA Manual via mobile devices such as phones, tablets and laptops
enables busy doctors to access the RCPA Manual even at the patient’s bedside. The on-
going maintenance such as checking the website’s content online and aligning it to new
information available means that up-to-date information is available on mobile devices and
the website for referring practitioners and medical students.

The updated RCPA Manual guides referring practitioners in the selection and interpretation
of pathology tests for various conditions and thus promotes quality referrals. It provides a
valuable educational resource in an easy to use format that can be comprehensively
searched and is more amenable to future updates. The RCPA Manual is now well placed to
integrate with other electronic requesting projects with inbuilt linkages and compatibility with
the standardisation of pathology terminology, units and coding.

Approved by: Bronwen Ross, Deputy CEO, The Royal College of Pathologists Australasia.

(Signed)   (Date) 15 March 2015