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## APPENDICES

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1 PURPOSE OF DOCUMENT

This document forms part of the Primary Care Practice Management System (PMS) evaluation. It contains vendor self-assessments to detailed questions across the five key focus areas for the 2011 PMS systems review. It includes a commentary and assessment of the vendor responses and systems undertaken by an independent panel working with the Patients First Programme and the National Institute for Health Innovation (NIHI).

The report is designed to be a “consumer style” review whereby an independent panel reviewed responses to structured questions across a subset of areas for each of the four New Zealand General Practice PMS systems (Houston’s VIP 2000, Medtech’s Medtech 32, MyPractice and Intrahealth’s Profile).

The review is, by necessity, limited in scope and will be supplemented by further areas of focus in future reviews.

Note
One PMS vendor, Medtech, declined the opportunity to provide a self-assessment of their product.

Evaluation of Medtech was based upon knowledge of Medtech PMS obtained through experience of its use and through inspection of its user interface. In compiling this report, the panel did not have access to technical descriptions of the Medtech system, architecture, internal workings or its interfaces.

Throughout the report, statements expressed represent the conclusions reached by observation of the Medtech user interface, limited information provided in documentation (e.g., help files) and the company website, and by deduction. It is therefore possible some statements may be factually incorrect.

A copy of the draft detailed report was provided to Medtech and the company was given an opportunity to respond. Feedback from Medtech has been factored into this report and corresponding star rating.

Apart from this variance, the review process was applied in precisely the same manner to all participants.

2 CONTEXT

<table>
<thead>
<tr>
<th>Document</th>
<th>Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMS-Requirements Executive Summary v1.1</td>
<td>Summary of the PMS requirements and focus areas – how the project arrived at the approach and initial set of focus areas.</td>
</tr>
<tr>
<td>PMS Review Findings 2011 - Executive Summary (final) (this document)</td>
<td>A high level summary of the process and findings across the 4 PMS systems.</td>
</tr>
<tr>
<td>PMS Review Detailed Report 2011</td>
<td>The detailed questions across the five key focus areas, including the vendor responses (with the exception of Medtech) and independent panel assessment.</td>
</tr>
</tbody>
</table>

These documents can be found on the Patients First website [www.patientsfirst.org.nz/reports](http://www.patientsfirst.org.nz/reports) under the PMS Review section.

3 INTRODUCTION

This report from the Primary Care Practice Management System (PMS) Requirements project is provided for primary care clinicians, general practices, general practice networks, those procuring general practice IT systems, Primary Health Organisations, District Health Boards and PMS vendors.

It sets out the first in a series of assessments of PMS systems currently available in New Zealand and comprises a summary of the detailed review of each system against predefined areas of focus.

This is the first comprehensive evaluation of primary care IT systems produced in New Zealand. The process will be repeated in future at regular intervals and encompass 3-5 new review areas per review and an update
against previous areas of review where there have been substantive changes made to the software or evidence of factual error in an earlier review.

It should be noted that this is not a comprehensive review of all PMS functionality. This process and report represents the first step in a journey around quality, safety and the role of information and increasingly, integration to enable this.

4 BACKGROUND

In 2010, the PMS Requirements Project was commissioned by the National Health IT Board to define and prioritise the desired functional and non-functional requirements of a PMS. That report recommended the evolution of a process toward certification starting with a vendor evaluation process that involved the vendors in a self-assessment that was evaluated by an independent expert panel. The evaluation framework enabled objective assessment of progress by vendors towards systems that can support delivery of quality care both today and in the future.

The validation process was based on independent review by a multi-disciplinary team of primary healthcare professionals whose role was to evaluate the four PMS products - VIP2000 (Houston), Medtech32, MyPractice and Profile (Intrahealth) - against the top criteria outlined in the PMS requirements report, and to act as an on-going advisory and review board for future focus areas for PMSs.

The objective was to publish, in a public forum, an evaluation that had been derived through:

* vendor self-assessment of their respective PMS product(s) against the criteria; and

* an independent and facilitated process of evaluation by the Review Panel against the criteria.

The intent is to provide:

* for the sector: a credible, independent and accurate appraisal of PMS systems to help inform purchasing decisions; and

* for vendors: clearer understanding as to the requirements and priorities of the market and identify areas for quality improvement.

5 CERTIFICATION / VALIDATION PROCESS

A fully robust certification regime is likely to be a substantial investment, and take time to put in place.

Given that detailed PMS requirements are evolutionary, the project was initiated by identifying a subset of five areas of focus. Going forward, there is planned to be a rolling six month process of review, with additional areas of focus and detailed PMS requirements added over time.

The review process will be refined over time. As the process is largely subjective, based on the opinions of the Panel, the project sought to remove the possibility of bias by providing vendors with equal opportunity to self-assess, with these assessments reviewed by multiple panel members across both functional and technical areas.

As each new review takes place, the vendors will have the opportunity to advise the Panel where areas covered in earlier reviews may have undergone development or enhancement and warrant a re-assessment of the relevant functional area. Over time, the PMS review takes a cumulative and up-to-date view of the areas reviewed to-date.

6 WHO WAS INVOLVED?

- **Patients First Programme**
  - Developed an initial set of requirements based on sector review and consultation.
  - In October 2010, published a process for review and evolution of requirements over time.

- **National Institute for Health Innovation (NIHI), University of Auckland**
  - Has recently supported the evaluation of several national systems.
  - Was contracted by Patients First, to be the moderator of this review process and repository.
PMS Review Findings 2011

- **PMS Vendors**
  - Invited to participate by way of responding to the RFI developed for the review.
  - Houston, Intrahealth and MyPractice responded to the original RFI document then to the subsequent vendor review of the draft detailed report relating to their respective products.
  - Medtech declined the invitation to respond to the original RFI document and took the opportunity to respond to the subsequent vendor review of the draft detailed report related to their product.

- **Independent multi-disciplinary review panel**
  - Consisted of general practitioner, nurse, practice manager and technical experts.

7 THE REVIEW PROCESS AND TIMELINE

- The diagram below outlines the review process and corresponding timeline.

PMS Review Process

- **Issue of RFI and voluntary self-assessment by vendors**: vendors responded to a set of defined questions outlined in a Request for Information (RFI). Vendors were offered the opportunity to respond to the RFI on the basis that, where vendors did not elect to be part of the process, the panel would make best efforts to review the relevant product. Houston, Intrahealth and MyPractice responded to the RFI. MedTech declined the opportunity to respond to the RFI and the panel completed the RFI questions based on a best-efforts analysis of available information.

- **Vendor responses reviewed by the independent panel**. The panel provided comments where appropriate.

- **Initial allocation of star ratings**: the panel allocated a star rating to each of the five areas as an illustration of findings as they related to the primarily functional aspects of the system, and to the technical aspects.

- **Review of draft report and findings by vendors** - the draft report and findings for each product (excluding star ratings) were provided to each vendor with an opportunity to review the report and correct errors of fact. All four vendors engaged in this stage of the process.

- **(Draft) Summary Report**: the summary report was published to the sector. Future iterations of the review will publish both Summary and detailed reviews of the final report at the same time.

The process included:

- **Issue of RFI and voluntary self-assessment by vendors**: vendors responded to a set of defined questions outlined in a Request for Information (RFI). Vendors were offered the opportunity to respond to the RFI on the basis that, where vendors did not elect to be part of the process, the panel would make best efforts to review the relevant product. Houston, Intrahealth and MyPractice responded to the RFI. MedTech declined the opportunity to respond to the RFI and the panel completed the RFI questions based on a best-efforts analysis of available information.

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- **(Draft) Summary Report**: the summary report was published to the sector. Future iterations of the review will publish both Summary and detailed reviews of the final report at the same time.
— **Final report and star ratings**: the panel updated the detailed report where relevant based on reviewing the vendor feedback. The panel reviewed the star ratings based on material changes from this process.

*Note: report findings and commentary are subjective and represent the opinions of the panel members who reviewed the products.*

### 8 INITIAL (HIGH FIVE) SET OF REQUIREMENTS

A full review of the functionality of each product was regarded as being too ambitious for this first iteration. As a starting point, the investigation undertaken by the Patients First Programme highlighted an initial subset of areas and priorities the review should focus on for the evaluation\(^1\). Referred to as the “High Five”, these are:

<table>
<thead>
<tr>
<th>Area</th>
<th>Brief description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structured data within the PMS</td>
<td>Use of defined code-sets that are common across the sector (e.g. LOINC for Lab coding)</td>
</tr>
<tr>
<td>Published (standards based) APIs (application programming interface)</td>
<td>The ability to share structured information across different systems</td>
</tr>
<tr>
<td>Support for interoperability standards, with e-Discharge, e-Referral e-Community Prescribing as the priorities</td>
<td>Supporting the structured flow of information between secondary and primary care</td>
</tr>
<tr>
<td>Information security, access and privacy</td>
<td>How information is protected and access to and updates of information are controlled and recorded</td>
</tr>
<tr>
<td>Usability – with an initial focus on “alert fatigue”</td>
<td>How alerts are presented to PMS users based on their role and the ability for the user to easily differentiate between high priority clinical alerts and lower priority and non-clinical alerts</td>
</tr>
</tbody>
</table>

### 9 FINDINGS

It should be pointed out that the review is not, at this stage, comprehensive. It does not look at many areas of functionality; some of the additional functions that some PMS systems offer and that others don’t; or commercial aspects such as total cost of ownership or support. The review was only concerned with current systems and current versions and no account has been taken of future enhancements or planned replacement systems.

With these caveats, the review identifies significant variations in the results of the assessments of each system. These variations are illustrated in the star rating matrix below.

<table>
<thead>
<tr>
<th>Star Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are two ratings for four of the product/focus areas. The first line of stars relates to the views of the functional panel, the second line reflects the ratings of the technical panel.</td>
</tr>
<tr>
<td>★★★★★</td>
</tr>
<tr>
<td>★★★</td>
</tr>
</tbody>
</table>

---

Falls short of required level of function, design and/or technical approach in a number of areas, considerable work required in specified areas to meet standard.

Substantially fails to meet required level of function, design and/or technical approach.

This matrix provides a high level view of the assessment panel. It is recommended that any person or organisation interested in understanding how ratings were determined, should review the full report.

Although this review is intended to provide guidance to those selecting PMS systems and to provide suppliers with guidance in terms of their future development strategies and areas for quality improvement, it is stressed that many other dimensions relating to these are currently outside the scope of this report and should be taken into account.

It should be noted that this is a point-in-time review. Although the Patients First Programme will attempt to maintain the currency of these assessments, it cannot guarantee its accuracy in the future. Vendors will be provided with the opportunity to advise, in future reviews, where they have made material changes to the areas of functionality reviewed previously. Where this is done, the panel will re-assess those areas and provide an updated rating based on new evidence.

<table>
<thead>
<tr>
<th></th>
<th>Structured data</th>
<th>Published API</th>
<th>Interoperability</th>
<th>Security</th>
<th>Usability (of alerts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Houston</td>
<td>★★</td>
<td>★</td>
<td>★★</td>
<td>★</td>
<td>★★★★★</td>
</tr>
<tr>
<td></td>
<td>★</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intrahealth/Profile</td>
<td>★★★★</td>
<td>★★★</td>
<td>★★★★</td>
<td>★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td></td>
<td>★★★★</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medtech 32</td>
<td>★★</td>
<td>★★</td>
<td>★★</td>
<td>★[*][**]</td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>★★</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MyPractice</td>
<td>★★★★</td>
<td>★★★★</td>
<td>★★★★</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
</tbody>
</table>

* As Medtech declined the opportunity to respond to the RFI, the report relating to Medtech is based upon knowledge of Medtech PMS obtained through experience of its use and through inspection of its user interface. In compiling this report, the panel did not have access to technical descriptions of the Medtech system, architecture, internal workings or its interfaces.

Throughout the report, statements expressed represent the conclusions reached by observation of the Medtech user interface, limited information provided in documentation (e.g. help files) and the company website, and by deduction. It is therefore possible some statements may be factually incorrect.

A copy of the draft detailed report was provided to Medtech and the company was given an opportunity to respond. Feedback from Medtech has been factored into the report and corresponding star rating.

** Note as of March 2012, the project has been advised that a fundamental security issue assessed at the time of the review has now been addressed as part of Medtech’s Version 20 now in general release.

10 REVIEW APPROACH AND COVERAGE

One of the PMS suppliers, Medtech, declined the opportunity to respond to the RFI and to provide a self-assessment of their product. Initial assessment of their Medtech32 system was carried out by a number of expert users of the system, based upon their experience of the system. Technical experts, also familiar with the system provided additional inputs.

Apart from this variance, the review process was applied in precisely the same manner to all participants.
The panel acknowledges the support and participation of MyPractice, Intrahealth and Houston and Medtech in the latter stages of the review. All vendors, including Medtech, were given the opportunity to review the findings of the panel to correct any matters of fact.

This is the first example of comprehensive PMS review carried out in New Zealand, and while there was some in-flight process refinement, the review process worked well and has resulted in consistent and valuable set of results.

11 COMMENTARY – HOW DID THE PMS PRODUCTS STACK UP?

Vendor products were reviewed through two lenses:

- Functional - what do end users think of the usability of the system?
- Technical - how well is the underlying architecture and technology put together?

In the New Zealand environment, most PMS installations are based at practices and are reliant on practices upgrading to the most current release. The user base is not a level playing field, even when comparing general practices who ostensibly ‘use the same software’.

Three vendors asked the panel to factor in new/upcoming software versions; however, this review was focused on products currently available to the market. The panel believes vendors are placing greater focus on delivery of new software versions rather than maintaining legacy systems currently in use.

Vendors are encouraged to advise how their new versions will improve functionality and the panel looks forward to reviewing these once they are available for general release.

There is an increasing awareness of, and interest in, a hosted or “cloud” computing option for PMS which will address keeping functionality current, backup and availability and introduce new challenges. This is likely to be one of the topics for a future PMS review in this series.

The body of this report includes a detailed section for each vendor containing a detailed set of questions per focus area, vendor self-assessment and panel commentary. A summary of some of the key points from the review are outlined below.

11.1 Structured data

Being specific about data at item rather than text block level provides the foundation for interaction with other systems and practices and unlocks the ability to provide refined reporting and clinical decision support.

- Intrahealth and MyPractice scored highly in this area though it was noted that Intrahealth are yet to make GP2GP available for general release.
- Both MyPractice and Intrahealth have strong clinical coding functionality.
- The functional review of Houston highlighted that while the end-users could generate templates and forms easily, from a technical perspective, there is a lack of structure in the data model.
- The panel observed a high degree of free text use in Medtech (e.g. alerts), and no published data model (which Medtech advise is their Intellectual Property, proprietary and confidential).

11.2 Published API (a common way of interfacing with the PMS)

API (Application Programming Interface) is a technical way of saying ‘vendors publishing their data structure to enable sharing of structured information to/from different software products and across different systems’.

In the New Zealand market, there is increasing recognition of the need for information to be shared and for different systems to be able to be “linked-up”.

- Intrahealth’s predominant versions of their Profile product in use in New Zealand (7.0 and 7.2) have a degree of structured interface and some specific examples of custom interfaces were provided.
Medtech uses their Advanced Forms interface for web-based connectivity to third party systems. GP2GP for Medtech has been successfully tested though is not due to be in general release until February 2012 [subsequent note – now part of Version 20 in General Availability from March 2012].

There is a limited set of clinical information Medtech provide access to via a read-only interface they have called their “HISO interface”. The technical assessment by the panel noted that “It appears that all the available interfaces are bespoke [and] with the exception of HISO forms and GP2GP, that there is no general-purpose I/O API exposed.”

Houston provides GP2GP functionality now in general release though does not provide any general-purpose API.

MyPractice has a published comprehensive API for read and write of key data.

11.3 Interoperability priorities

Vendors were asked to outline work done to enable information sharing between systems. This largely focussed on adoption and use of current standards and on eReferral and eDischarge, although it did traverse into shared care.

- MyPractice is very active in all of these spaces and have strong technical alignment.
- Houston are compliant with many of the standards though are not active in the emerging development of standards and interoperability.
- Medtech’s approach to inter-operability appears to be focussed on integration with their ManageMyHealth portal and a number of commercial relationships they have with third party products including bpac, HealthStat, Enigma among others and the licensing of their proprietary Advanced Forms mechanism to provide practices, PHOs and IPAs with the ability to build their own web forms interfaces. Medtech are compliant with the various standards that exist in the interoperability space.
- Intrahealth show a commitment to and involvement in the standards space in the sector though has indicated their focus for enabling these is in versions of the software not in general use currently in the New Zealand market.

11.4 Information security, access and privacy

As the market moves into shared care and better integration, sector discussions on information security and privacy are becoming increasingly active and relevant. Much of this needs to be driven by the clinical community rather than the vendors but it is useful to know the vendors’ current approach and philosophy.

- IntraHealth, MyPractice and Houston provide the ability to design role-based security and access levels in addition to user level including in the case of IntraHealth, the ability for “break the glass” access (which is audited/recorded).
- Medtech’s security is based at individual user level which provides user based security. MedTech have some significant technical exposures and weaknesses in the area of security. Under a ‘do-no-harm’ principle, the vendor has been advised of the panel’s findings in this area and the detail has deliberately not been published in our report. [subsequent note – the significant technical exposure has now been remedied as part of Version 20 made available in March 2012]
- Three of the four vendors (all except Houston) are working with some level of web based portal this review did not focus on this.

11.5 Functionality relating to Alerts

The topic of usability is broad and the review was restricted to the key area of alerts. Intrahealth, MyPractice and Houston have the capability to accommodate different alerts. Due to the complexity of configuring this in the Intrahealth product some are not configured at practice level. Medtech does not differentiate between key/critical alerts and other alerts – creating a ‘noise to signal’ issue for the user.
12 STRUCTURE OF THIS DOCUMENT

There is a section for each vendor. For each of the “high five” areas of review, there are a series of questions (similar to a Request for Information/RFI document). The report format is illustrated below:

<table>
<thead>
<tr>
<th>1. SECTION HEADING (the ‘high five’ requirements)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 General area of focus</td>
</tr>
<tr>
<td>Specific area of focus – description of information sought from vendors</td>
</tr>
<tr>
<td>Vendor self-assessment [vendor self-assessment/response]</td>
</tr>
<tr>
<td>Functional Review [comment from the Functional Review Panel]</td>
</tr>
<tr>
<td>Technical Review [comment from the Technical Review Panel]</td>
</tr>
<tr>
<td>Panel query [request from the Panel for further information/clarification]</td>
</tr>
<tr>
<td>Vendor response [feedback/response from the vendor]</td>
</tr>
<tr>
<td>Section star rating [rating between 1-4 stars (1 low, 4 high) as determined by the independent review panel across the dimensions of functional and technical review]</td>
</tr>
</tbody>
</table>

Note:
The section for Medtech differs slightly from this format to indicate where the Panel provided an initial assessment and any subsequent feedback provided by Medtech when sent the draft detailed report.

13 ONLINE REPORT

The individual reports on each vendor product including the detailed questions, vendor responses and panel comments are available in this report which is also available in electronic format in the Reports section on the Patients First website at: www.patientsfirst.org.nz

14 HOW TO HAVE YOUR SAY

Have your input to what you think should be on our next review list. A set of proposed areas will be discussed and voted on by the panel to determine what gets into the next review. Please send any suggestions for focus areas to be considered by the Panel to: Andrew.Terris@patientsfirst.org.nz

15 ACKNOWLEDGEMENTS

The project would like to thank the following people for contributing to the review

Prof Bruce Arroll
Dr Koray Atalag
Dr Karl Cole
Dr Dianne Davis
Barb Fredericksen
Dr Sandra Hicks
Dr Douglas Kingsford
Symon McHerron
Ros Rowarth
Dr Jim Vause (Chair)
Dr Jan Whyte
16 WANT MORE INFORMATION?

For further information, please contact:

Andrew.Terris@patientsfirst.org.nz or m.pollock@auckland.ac.nz

Disclaimer

The findings of this review represent the genuine opinion of the Review Panel. In releasing its findings, no members of the Panel, Patients First, the Royal New Zealand College of General Practitioners, General Practice New Zealand, or the National Institute for Health Innovation accept or assume any liability, whether that liability arises by tort (including negligence), statute, or otherwise, to any PMS vendor (whether that vendor participated in the review process or not) or any other person that relies on the Panel’s findings.
PMS Review Findings 2011
Evaluation Review of Vendor Self-Assessment

HOUSTON MEDICAL

April 2012
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   4.1 Contribution to interoperability environment ....................................................................................... 14
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6 Usability – Alerts management only ..................................................................................................... 21
   6.1 Alerts management ................................................................................................................................. 21
   6.2 Overall Star Rating: Usability ................................................................................................................. 22
We have examined the request for information documents (RFI) for the evaluation of our Practice Management System.

We have read and understood the terms and conditions set out in Section 2 of the RFI document.

We attach our RFI response in accordance with your request for RFI.

Signed by: Derek Gower Dated: 14 August 2011
On behalf of: Houston Medical (the submitting organisation)

1 OVERVIEW

Thank you for the invitation and opportunity to submit our responses to the Patients First Practice Management System Requirements RFI.

Houston Medical has been a supplier of General Practice Primary Care Practice Management Systems since 1994. Some of our existing clients have been clients for nearly 20 years. We remain committed to serving the needs of our clients and are concentrating on an emerging product, VIP.net. We are currently assessing whether we will add required functionality to offer this to the General Practice user community in New Zealand as we do in Australia.

We distribute two software programs in New Zealand: VIP2000 and VIP.net. Given the origins of the RFI and nature of the questions we have assumed that the RFI is focussed on General Practice Primary Care Practice Management Systems. The self-assessment responses provided in the RFI are applicable to General Practice settings and VIP2000 clients only. We have not self-assessed our VIP.net program, which addresses many of the issues identified below in this RFI.

1.1 Certification / Validation process

We note the intention to publish vendor self-assessment in a central (moderated) repository available to the market for information. Whilst comfortable with our self-assessment being available in this way, the RFI also requests copies of end-user and architecture documentation.

We have declined to provide documentation under the terms indicated by the RFI. Our user documentation and architecture is copyright and we regard this as commercially sensitive information. We are happy to make a program presentation to the evaluation panel in order to assist with the independent review of our self-assessment.
2 STRUCTURED DATA

PMS are required to support structured data for medication lists, problems, allergies, etc. To better support information sharing / interoperability there is a need for use of common terminology (where there are standards that state this). As such, use of NPOCS codes (NZ adaptation of LOINC) for lab orders and results and New Zealand Medicines Terminology (NZMT) through New Zealand Universal List of Medicines (NZULM) service and in near future consequent New Zealand Medicines Formulary are proposed to be included as PMS requirements.

In general, the expectation is that where a messaging standard mandates use of a particular coding system the PMS will need to support it (e.g. LOINC). Where no code system is mandated (such as is currently the case with diagnosis codes) use of such coding systems in the PMS is proposed to not require semantic equivalence or interoperability, but rather that the code, the coding system and meaning of the code be available, consistent with but not limited to the approach being taken for GP2GP.

Vendors are expected to engage with the Health IT Cluster and the Sector Architects Group and align with the more recent works in the sector (such as the new Health Identity Project and the draft interoperability reference architecture).

Interoperability should be at a structured data item level, rather than at a text block level (even though text may explain the data or coding). As standards are agreed these need to be adopted or adapted. Vendors are encouraged to outline how their system is architected to support the adoption of such future requirements.

2.1 Non clinical (demographic and administrative/financial information)

<table>
<thead>
<tr>
<th>Describe the level of structuring of data in your PMS for patient demographics, administration and financial information.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vendor self-assessment</strong></td>
</tr>
<tr>
<td><strong>Functional review</strong></td>
</tr>
<tr>
<td><strong>Technical review</strong></td>
</tr>
</tbody>
</table>

2.2 Clinical (core clinical dataset)

<table>
<thead>
<tr>
<th>Describe how your PMS represents and stores a core set of patient-centric clinical data with a structure and minimum level of detail required for information exchange, e.g. at a minimum that supports a level of detail that can produce the GP2GP data set.</th>
</tr>
</thead>
</table>
| **Vendor self-assessment** | VIP2000 supports and complies with the minimum level of detail required by the GP2GP dataset. There is more information we could supply to a greater level of specificity than requested by GP2GP e.g. ACC Injury Claim details, Maternity.

Encounter Notes are detailed using a Subjective (Reason for Encounter), Objective (Examination), Assessment and Plan (Management). Each encounter note can be coded to a problem/diagnosis (commonly READ2 Code, but can be Custom, ICPC2, ICD10 or ACC Read Code).

We allow our clients a high level of customisation/freedom with regard to observations made in clinical setting (which we call monitoring). Monitoring encompasses smoking and alcohol use, as well as blood pressure, height, weight etc. Recall information (Cervical Smears, Breast Screening) is recorded as specified by the DHBNZ Clinical Performance Indicators, Service Utilisation and Data Transfer Specification.

We assess VIP2000 as highly patient-centric. The Medical Desktop provides our clients with readily available access to Investigations, Prescriptions (allergy) and Immunisation data. |
| **Functional review** | Notes structured on the old record system with easy to see at a glance on-going problems, FH, PH and screening all on one page, mostly both key and mouse driven.

Easy to access the prescriptions, labs etc. locums manage to pick up these details quickly and find it easy to use and see what is important.

GP2GP is working but there are still some teething problems being ironed out, partly as there are so few other programs working with this at the moment. |
| **Technical review** | All mandatory data included, some optional data included. |
| **Describe how this core set can be extended when additions or modifications are needed; particularly:** | - The ease with which these changes could be applied
- How to ensure backward data compatibility and preservation of semantics
- How related parts of PMS, especially APIs and reporting components will be affected. |
| **Vendor self-assessment** | This core set can be readily extended by VIP2000. The program has powerful user defined forms functionality and Houston promotes the sharing of forms and templates within our user community. Some clients have developed advanced clinical consultation records and care plans.

Backward data compatibility and preservation of semantics can only be ensured by information models, data mapping and the adoption of terminology, such as SNOMED.

We are waiting for standards, terminology datasets and confirmation of the direction of travel. Addition to the core set is straightforward. Modification is more difficult. In our opinion it is a mistake to modify historical data: historical data should be appended to reflect current changes to codes or interoperability requirements. |
| **Functional review** | Hard to comment on this as the ease at which things occur may be depend on the questions asked and are more able to be commented on by the software developer.

However users are able to get the forms they require and can generate own templates in most cases. To date users have been able to produce what is required by their local PHOs in a timely manner, and with self-populating fields where required. Able to produce required reports. This is solely done by users or Houston. |
| **Technical review** | There is no underlying reference model. The data model is ad hoc. There is a data dictionary, but this contains atomic field definitions, not structured objects. Mappings to external specifications (such as CCD) are done in an ad hoc, bespoke manner. |
### Explain how data elements and data set definitions are defined (e.g. ISO 11179)

**Vendor self-assessment**

Data elements and data set definitions are defined by our national and international stakeholders, notably Ministry of Health (Data Dictionaries and specifications), ACC, IHTSDO (SNOMED), HISo, NeHTA, Department of Health and Ageing (DOHA). We develop to meet compliance from these agencies and take an active interest in participating in projects and collaborating with our clinicians, clients and the wider vendor community.

We do not see it as our role to define data elements and data set definitions. Our role is to implement, support accurate data capture and the maintenance of data quality in our PMS. In the future we will be conducting our own research and taking regular stock to ensure that we support and recognise data concepts. We are very mindful of the importance of ISO 11179 and intend to comply with definitions as they are published.

**Functional review**

Again more appropriate for a programmer to comment however users have been able to supply reports and use coding required.

**Technical review**

There is no compliance with ISO11179 and, given the lack of an underlying information model, little ability to do so going forward.

### Describe the use of New Zealand Pathology Observation Code Sets (NZPOCS) standard by your PMS during ordering and reporting of laboratory tests.

**Vendor self-assessment**

Houston Medical spent considerable time and resources, as a member of a Health IT Cluster project several years ago, doing concept work for pathology ordering and receipting.

Despite the best efforts of all this did not progress beyond the design stage so now we are waiting for LOINC to become an established standard in all pathology labs before going down this path again.

We have recently commenced implementation of NZPOCS datasets (with the advent of GP2GP).

We continue to base the grouping and presentation of results by lab test name in our user interface as this gives our clients the best information and use of the results.

**Functional review**

The pathology is easy to read, easy to send tasks to self or others to act on and notify patients of results directly from the desktop. The coding has long been a frustration and this appears to be a lab problem as even from the same lab results of tests are entered differently.

One reviewer commented “I used to try to correct and ensure each result was the same so I could ask for the last e.g. LFT’s and it would give all but this required an enormous amount of time so have stopped doing it. Hence the system of bringing up just one type of result is limited and this is made worse when results come from three labs. The programming seems to be there just not able to implement because of the labs”

**Technical review**

Lab tests and results are uncoded and are indexed only using the free text labels provided by the lab. There is a capability to define synonyms to link different descriptors. This means that equivalent results from multiple labs, or from the same lab where the free text descriptor has changed, cannot be shown in a data series unless multiple synonyms are configured by the user to group as desired.
## 2.3 Health record organisation

### Elaborate on PMS health record structure and application functionality which would support:

- Traditional long case format clinical history (past history, family history, social history etc)
- Goal (health programme) based records
- Problem-based records (longitudinal / episodic based-records versus single visit based records)

#### Vendor self-assessment

Past history, family history and social history is not structured in VIP2000. It is a text ‘blob’. In the future we will be looking to structure this data – probably along the lines specified in the HL7 CDA Standard. We would welcome Patients First advice on their recommended approach.

Goal based records (Care Plans) can be readily created by our VIP2000 user community and distributed by us. Care Plans can be associated with specific consultation/record types e.g. Injury Rehabilitation, Stroke, Chronic Conditions or with specific Problems/Diagnosis.

We would assess our problem-based records to be adequate. Encounter notes and prescribing can be coded. The program can produce a problem history which details all consultation notes recorded with the assigned problem/diagnosis. We have included episodes in our database design but it is complex to represent. We are reviewing both multiplicity of codes/encounter and how to best represent the episodic nature of chronic disease. This will most likely be featured in our VIP.NET program.

#### Functional review

The blob of text is not ideal and yet one can search on it and pick up patients with alcohol, family history etc. One reviewer has reported putting an additional READ code in the problem list where this is important to the information available at a consultation.

Prescribing is attached to the presenting complaint and exam and management. The issue of coding of patients with multiple problems is managed inconsistently among clinicians. Some provide a single code for the most important problem addressed in the consultation, whereas others create multiple note entries relating to each separate presenting problem and code each separately.

For example for one clinician if the cardiac condition was because of diabetes then diabetes would be the code. However, if they had diabetes and the major reason for presentation that day was poorly controlled heart failure regardless of the factors contributing to it, the problem would go under heart failure.

#### Technical review

In terms of coding, only limited structure is available in the clinical record. However, in terms of free text sections, the record is highly structured and configurable.

It does not appear to be possible to obtain a view of past consultation notes that relate to a particular problem.

There is a free text search of clinical notes.

A consultation note can only have one diagnostic code, but more than one consultation note can be created within a single clinical encounter.
## 2.4 Structured and coded data

State the chosen health information structure and coding systems in the PMS (this should include the ability to include time-series data). It is expected, at a minimum, the following types of clinical information be captured in structured and coded form where and when possible:

- Reason for encounter (also secondary reasons if present)
- Problem or diagnosis
- Vitals
- Allergies and adverse reactions
- Substance use
- Treatment and procedures
- Ordering and results
- Medications (past and current)
- Injury details (ACC)
- Past history
- Family history
- Basic maternity history
- Immunisations

### Vendor self-assessment

<table>
<thead>
<tr>
<th>Table Entry</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason for encounter</td>
<td>(also secondary reasons if present) – Structure: separately coded field. Coding systems supported are READ2, ICPC 2, Custom, ACC Read, ICD9, ICD10 or SNOMED.</td>
</tr>
<tr>
<td>Problem or diagnosis</td>
<td>– Structure: Date of onset, date of resolution, ongoing, resolved and summary notes. Coding systems supported are READ2, ICPC 2, Custom, ACC Read, ICD9, ICD10 and SNOMED,</td>
</tr>
<tr>
<td>Vitals</td>
<td>– Structure: Observation, record date completed, provider completing, value and result interpretation (if appropriate), any follow on cycle. The coding is user defined (numeric, text, range and unit).</td>
</tr>
<tr>
<td>Allergies and adverse reactions</td>
<td>– Structure: Allergy type and notes. Can be medication, drug classification, generic or Other.</td>
</tr>
<tr>
<td>Substance use</td>
<td>– VIP2000 does not have a specific record for substance use.</td>
</tr>
<tr>
<td>Treatment and procedures</td>
<td>– Surgical history text box for treatment and procedures performed externally. Can code encounter notes to ICD9 or ICD10 for internal treatment and procedures.</td>
</tr>
<tr>
<td>Ordering and results</td>
<td>– HL7 structure to record lab results. Results are not coded using LOINC but are filed using lab test name recognising synonyms. Numeric results can be graphed over time.</td>
</tr>
<tr>
<td>Medications (past and current)</td>
<td>– Prescribing data is structured according to national guidelines/statutory requirements. VIP2000 supports MIMS and a custom formulary (user can optionally input classification, brand and generic details).</td>
</tr>
<tr>
<td>Injury details (ACC)</td>
<td>– ACC information is structured as per ACC specification and requirements. We are an accredited vendor and are ACC45 eClaim registration and eSchedule enabled.</td>
</tr>
<tr>
<td>Past history</td>
<td>– e.g. Social History is a text ‘blob’ and is not structured or coded.</td>
</tr>
<tr>
<td>Family history</td>
<td>- text ‘blob’ and is not structured or coded.</td>
</tr>
<tr>
<td>Basic maternity history</td>
<td>can be recorded as an obstetric history text ‘blob’. The programme has comprehensive maternity record screens which are well structured (check boxes and text) but not coded.</td>
</tr>
<tr>
<td>Immunisations</td>
<td>– Records are structured and coded according to the NIR and Immunisation Claiming specifications.</td>
</tr>
</tbody>
</table>

### Functional review

The reviewer reported that this is the easiest area to use in the product, ensured clarity of notes, and assisted the user to focus on relevant information.
<table>
<thead>
<tr>
<th>Technical review</th>
<th>VIP2000 contains a data dictionary consisting of individual field definitions, and users can define forms containing fields from the dictionary. These forms are commonly used for collection of structured data, which can be reported on. Some of these forms are shared (configured by Houston) but it appears that most are hand-configured at individual practices. Coding can be done using ICD, Read 2, SNOMED and other code sets. The SNOMED solution is inadequate in that it treats the vocabulary structure in the same manner as Read 2 (e.g. as a simple hierarchy). Allergies can be coded with MIMS or Read codes. Free text notes can be attached. Severity and other details can only be recorded in free text. Problems can be coded with ICD, Read 2 etc. Free text notes can be attached. Other details, such as &quot;confirmed&quot; vs. &quot;suspected&quot;, can only be recorded in free text. Lab tests and results are not coded but, instead, are identified with their free-text labels only.</th>
</tr>
</thead>
<tbody>
<tr>
<td>How can the PMS enable assigning multiple codes / terms (possibly from different terminologies) on the same data item?</td>
<td>Vendor self-assessment: VIP2000 cannot assign multiple codes / terms on the same data item. This has been an item of discussion since the beginning. Some users like the idea that each note is individually coded so there are no mixed references whereas others want to be able to write up a comprehensive note and then add multiple codes. It is our opinion that the latter approach makes data mining difficult so we have stuck with the former.</td>
</tr>
<tr>
<td>Functional review</td>
<td>Nothing more to add</td>
</tr>
<tr>
<td>Technical review</td>
<td>One code per consultation note or data item, but can have multiple consultation notes per clinical encounter.</td>
</tr>
<tr>
<td>Describe how the structured and coded data enable decision support functions such as:</td>
<td>VIP2000 interacts with MIMS to alert the provider of any contraindications e.g. allergies, recent medication history. VIP2000 practices can specify warning messages that will appear when the patient presents in the consultation room (e.g. allergies, recalls due). Reports can be run on codes and data elements to support patient-centric management and actions (e.g. disease surveillance). Incoming lab results are colour coded to highlight reported abnormalities. Overdue recall or Immunisations Due reports can be run at any time to advise which patients are due for recall.</td>
</tr>
<tr>
<td>Vendor self-assessment</td>
<td>VIP2000 interacts with MIMS to alert the provider of any contraindications e.g. allergies, recent medication history. VIP2000 practices can specify warning messages that will appear when the patient presents in the consultation room (e.g. allergies, recalls due). Reports can be run on codes and data elements to support patient-centric management and actions (e.g. disease surveillance). Incoming lab results are colour coded to highlight reported abnormalities. Overdue recall or Immunisations Due reports can be run at any time to advise which patients are due for recall.</td>
</tr>
<tr>
<td>Functional review</td>
<td>On the consultation page there is a web interface that allows for immediate support access. In the Christchurch environment, this has been enhanced by providing access to the HealthPathways website, making it very easy to access support required for problems addressed by that website.</td>
</tr>
</tbody>
</table>
| Technical review | Has simple alerting.  
VIP2000 has bespoke integration with BPAC for decision support.  
Houston simply brings up the homepage of HealthPathways site, with no context. |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Explain how the structured and coded data supports aggregation of identifiable patient records into clinical datasets for population health and research purposes</strong></td>
<td>VIP2000 conforms to the DHBNZ Clinical Performance Indicators and Service Utilisation technical specifications. The program has an inbuilt report writer and data can be readily extracted in an aggregated CSV form. This would obviously depend on patient and practice consent. We are not aware of limitations on the part of the software to provide this information.</td>
</tr>
<tr>
<td><strong>Vendor self-assessment</strong></td>
<td>As stated above most reports able to be generated – occasionally there are fields that are not available and in that case we ask for help desk support for the field to be added into the list. Certainly the common clinical performance indicators are easily available.</td>
</tr>
</tbody>
</table>
| **Technical review** | VIP2000: Has a “report writer” module they have written.  
Simple queries can be constructed that apply constraints to system-defined fields or the names and values of user-defined fields. Joins are not supported.  
More complex queries can be accomplished by entering SQL queries directly into the system.  
There is no control over access to individual data elements by these queries, e.g. access control applied in the user interface to restrict who can see what is not applied here. |

### 2.5 Medication management

| **Explain how your PMS keeps an up-to-date list of medications available for prescribing. It is expected that NZMT is to be used as the single source for medications (through NZULM).** | VIP2000 provides details of regular medications and medication history in a single, user interface. Information is viewable in a structured form (Prescriber, Medication/formulation, dose, quantity, repeat and use. Each prescription has a unique identifier and printed status. Medications are not coded (i.e. NZMT SCID). Information about adverse reaction history would be recorded in an encounter note. |
| **Vendor self-assessment** | The majority of our clients use the MIMS formulary through practice subscription to MIMS. We have not yet implemented NZULM. We are currently assessing NZULM implementation as part of the ePrescribing project.  
NZULM is not a formulary so these two are not the same but NZULM in conjunction with MIMS is being implemented as part of ePrescribing. |
<p>| <strong>Functional review</strong> | Nothing more to add. |
| <strong>Technical review</strong> | Uses MIMS, not NZULM. |
| <strong>How does your PMS provide list of current medications, past medications and adverse reactions in structured and coded form?</strong> | |</p>
<table>
<thead>
<tr>
<th><strong>Functional review</strong></th>
<th>This is a very good part of the program only unsure when trying a new medication whether to place it in the regulars or not – that has to be a practice decision unless there was a trial area in addition. A cease date would be useful</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Technical review</strong></td>
<td>Medications are coded with MIMS and fully structured.</td>
</tr>
<tr>
<td><strong>How does your PMS provide links to commonly used drug references; such as MIMS etc</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Vendor self-assessment</strong></td>
<td>A prescriber can indicate their preferred system (Custom or MIMS) as a default. Custom or MIMS can be used interchangeably when prescribing is invoked (user selects a radio button).</td>
</tr>
<tr>
<td><strong>Functional review</strong></td>
<td>Nothing more to add.</td>
</tr>
<tr>
<td><strong>Technical review</strong></td>
<td>MIMS is integrated into the user interface.</td>
</tr>
<tr>
<td><strong>Describe how you keep medicines lists up-to-date.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Vendor self-assessment</strong></td>
<td>MIMS maintain the formulary our clients subscribe to. The formulary is distributed to our clients monthly via our Live Update website.</td>
</tr>
<tr>
<td><strong>Functional review</strong></td>
<td>Nothing more to add.</td>
</tr>
<tr>
<td><strong>Technical review</strong></td>
<td>Updates are obtained from MIMS and can be downloaded from the MIMS website or from Houston’s own website.</td>
</tr>
</tbody>
</table>

### 2.6 Overall Star Rating: Structured Data

| **Functional** | ⭐⭐⭐ |
| **Technical** | ⭐⭐ |

### 3 PUBLISHED, STANDARDS BASED APIS

To support additional and external specialist applications (such as decision support, user defined special purpose assessments or integration with other systems) the PMS should support a published API that such applications can use to extract data from and write data back to the PMS.

Ease of data extraction and analysis from some PMS are expressed as being an associated priority issue, but to some extent both are by limitations in terms of available structured data.

The most likely and pragmatic approach is a phased one whereby:

- Vendors are required to expose a defined set of (patient and clinical) information in a structured and published way
- Over time, this moves to a standards based API defined as a sector standard to which vendors need to comply

The main commercial consideration that needs to accompany this requirement is that this is a requirement for being a recognised “certified” product in the market – and should be part of the core product and corresponding standard license and maintenance pricing rather than an additional module.
The way in which patients may wish commercial PHR services to interact with the systems in the practice is still evolving, as is the willingness or otherwise of practices to share or use information in that way. At issue for patients is the extent to which selection of a PHR promoted by a practice or selected by themselves has the potential to lock them into that PHR or to PMS used by the practice (and hence to practices using that PMS).

GP2GP is a standard aimed at making it easier for patients to shift practices. We would expect commercial PHRs to be encompassed by a future PMS API standard / guideline and future plans to interface with Regional CDRs and Shared Care Records.

3.1 APIs and details

| Vendor self-assessment | GP2GP – Medical note transferring via Healthlink |
| Dr Info – External data mining via SQL |
| Best Practice – Web based ‘eForm’ application providing module based access |
| Functional review | All available – use has been minimal as GP2GP is new, more use web interface at personal websites – e.g. HealthPathways |
| Technical review | There are no general purpose APIs exposed. Some data is exposed via DrInfo (effectively making DrInfo a data access layer), and there is a bespoke interface to BPAC. |

How are these interfaces presented (e.g. Web services, REST, direct invocation etc.)?

| Vendor self-assessment | GP2P - Direct invocation |
| Dr Info – external SQL |
| Best Practice – direct URL access |
| Functional review | Nothing more to add |
| Technical review | See above |

3.2 Behaviour of APIs

Describe the behaviour of APIs; e.g. one way read-only or two-way which can update information on PMS. Elaborate on input, processing, output and states. How can the 3rd party applications work with the PMS in terms of single click icon for launching the 3rd application, and exposure relevant patient data via API in given context?

| Vendor self-assessment | GP2GP – 2 ways, export or import medical notes |
| Dr Info – 1 way, External program directly gather information from VIP database |
| Best practice – 2 way, upload existing information and write back new entry from Bpac website |
| Functional review | Nothing more to add |
| Technical review | See above. There are bespoke examples of invoking 3rd party applications (e.g. work Houston has done in Australia) but no general purpose capability. |
Present typical use cases and describe how these APIs are used by other systems.

| Vendor self-assessment | | |
|------------------------|-----------------|
| ▪ GP2GP - medical note transferring, mostly for complete medical history | |
| ▪ Dr Info – no local screen, completely external | |
| ▪ Carepad – no local screen completely external | |
| ▪ Best practice – user can access Bpac website directly from VIP, depends on the module they selected, BPAC will send ‘request tag’ to VIP (for patient information), VIP will upload these information in BPAC website, once user finish their entry on the website, another set of information will be ‘written back’ into VIP | |

| Functional review | Can use these systems but have not worked with Best practice as additional cost and have enough in the current patient management system; e.g. it would not help additional management of patients at this time. |

| Technical review | Inadequate as there are no general purpose APIs exposed, in the general case no integration use cases are supported. Where bespoke integration has been implemented, such as GP2GP, BPAC and DrInfo, use cases supported are as specified in those projects. |

3.3 Access and licensing

Describe how other systems can access your APIs. What, if any, restrictions do you place on the use of any of the interfaces described?

<table>
<thead>
<tr>
<th>Vendor self-assessment</th>
<th>Dr Info, Read only, cannot modify / add any record, all SQL were coded by our programmers.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional review</td>
<td>Works well – cannot modify something only add notes to explain any reason for something if it needs further explanation</td>
</tr>
<tr>
<td>Technical review</td>
<td>Database access is all-or-nothing. If an application is given access to the database, it has an unrestricted ability to query any data in the system. Inadequate - where third party applications are granted access to PMS data, this is implemented by way of direct SQL database queries. Where such access is granted, access to individual data items is not restricted. It is possible to restrict such access to read-only queries however, and if this is done, third party applications are rendered unable to alter data held in the database.</td>
</tr>
</tbody>
</table>

What is the licensing model and price for each of the interfaces you outline where these are not bundled with the standard PMS license charge?

<table>
<thead>
<tr>
<th>Vendor self-assessment</th>
<th>N/A. Interfaces are bundled with the standard PMS license charge.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional review</td>
<td>Seems satisfactory</td>
</tr>
<tr>
<td>Technical review</td>
<td>N/A</td>
</tr>
</tbody>
</table>

3.4 Standards / specifications

Which interface standards does the PMS support and how are they implemented (e.g. HSSP, HISO Online Forms etc.)?
Vendor self-assessment: N/A. We are awaiting the completion of the Auckland eReferrals project before implementing the Healthlink/Orion HIS Online Forms solution.

Functional review: This section is all about software interaction – with other systems and safety. It appears the system does not allow transfer of data unless for patient help or non-identifiable for population health.

Technical review: Houston chooses to be reactive to market forces rather than to innovate in the area of interfaces, implementing solutions defined elsewhere (such as HIS Online eReferrals, ePrescribing, Éclair on line forms) in response to customer requirements.

### 3.5 Overall Star Rating: Published, standards based APIs

<table>
<thead>
<tr>
<th></th>
<th>Functional</th>
<th>Technical</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N/A</td>
<td>☆</td>
</tr>
</tbody>
</table>

### 4 INTEROPERABILITY PRIORITIES

A significant number of sector initiatives and projects which require interoperability have been recently initiated. Some, such as GP2GP, have already produced important artefacts and experience. There is continuing work to enable sharing of health information with the focus on achieving semantic interoperability. It was recognised that execution under the BSMC business cases would lead to increased clinical network information sharing that may make it desirable to quickly move to a standard for record sharing rather than to have different solutions developed in different regions.

### 4.1 Contribution to interoperability environment

Describe how you position your company and PMS within the New Zealand health IT interoperability environment. Explain which national / regional projects you are part of and level of contribution.

Vendor self-assessment: Houston Medical positions itself as a forward-thinking, innovative supplier of medical software within the New Zealand health IT interoperability environment. We develop innovative solutions and actively participate and engage in collaborative, information sharing projects.

Over the years we have invested heavily in software development and participation in national eBusiness initiatives. This has often been at enormous cost – there have been changes in policy and lack of understanding and of the implication for our clients. We are currently reassessing our strategic direction and welcome any inquiries from PHOs and regional projects who are interested in what our software can do.

We are currently one of three vendors approved for GP2GP messaging and are an approved ACC vendor – VIP2000 is approved for eSchedule claiming. We provide retinal diabetes screening software to 4 DHBs.

Functional review: Nothing more to add

Technical review: Houston has chosen to be reactive to market forces, rather than proactively implementing emerging standards and specifications. They do have work in progress on eReferrals and ePrescribing.
### 4.2 Standards

Which national and international standards for interoperability are currently supported by your PMS (e.g. for patient / provider identification, messaging, record organisation etc.) and how?

What are your plans for implementing relevant standards?

Of the initiatives you outline in your Vendor self-assessment to question IO1a, what standards are being applied to each of these?

<table>
<thead>
<tr>
<th>Vendor self-assessment</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>- We are fully committed to implementing relevant standards and our participation in Connectathons, trade and industry initiatives and national projects, such as GP2GP and ACC eBusiness development demonstrate this.</td>
<td></td>
</tr>
<tr>
<td>- National standards supported by VIP2000 are:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- HIS0 (10005) Health Provider Index – all 3 indexes and check sum algorithms are recorded. Data types are complied with.</td>
</tr>
<tr>
<td></td>
<td>- NHI – patient index algorithm and duplicate checked is supported.</td>
</tr>
<tr>
<td></td>
<td>- Messaging Exchange: we support HL7 v2.4 and earlier.</td>
</tr>
<tr>
<td></td>
<td>- HIS0 (10008) Pathology and Radiology Messaging Standard – our PMS can process unsolicited lab results from messaged in this format.</td>
</tr>
<tr>
<td></td>
<td>- RSD – we support the HIS0 10011.2 standard.</td>
</tr>
<tr>
<td></td>
<td>- We comply with HL7 2.4 standards for pathology, radiology and RSD messaging.</td>
</tr>
<tr>
<td></td>
<td>- With ACC, eSchedules are available. Cardiovascular and Diabetes risk assessments are sent to Best Practice and results imported back into VIP. Dr Info reports are available for Nurse activity claiming.</td>
</tr>
<tr>
<td></td>
<td>- Complying with standards is challenging, not because we choose not to and want to set our own, but because not everyone else complies and we have to support backward compatibility and variation between Australia and New Zealand. There needs to be stronger leadership and direction in the Standards area but equally important is that the Standards themselves are recognised as fit for purpose by the vendor community.</td>
</tr>
<tr>
<td></td>
<td>- We know the future is ‘Standards based’ and have an ambitious development program in place to ensure that our clients and software can seamlessly interoperate to support patient care and share health records.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Functional review</th>
<th>Nothing more to add</th>
</tr>
</thead>
</table>

| Technical review | Support for HL7 v2.4 and RSD. Implemented coding (ICD 10, Read 2, SNOMED (though inadequately), working on LOINC), HIS0 Forms (almost finished), GP2GP (mostly). Have participated successfully in an IHE Connectathon, but this seems to have been simply sending an HL7 v2 message which was mapped by Orion into a CDA document. |

### 4.3 Overall Star Rating: Interoperability

<table>
<thead>
<tr>
<th>Functional</th>
<th>★★</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical</td>
<td>★★</td>
</tr>
</tbody>
</table>
5 INFORMATION SECURITY, ACCESS AND PRIVACY

A defined (and refined) set of privacy and security guidelines should be provided to the vendors and refined over time to ensure security and privacy requirements can be met — that align with legislation. There is also a need to define the data governance and privacy principals as they relate to personal health records and shared care records/plans. The proliferation of cloud computing drives a need for a set of principles around data governance across the sector.

Whilst this issue goes beyond primary care, as systems become connected up, broader debate on access and privacy are required. Historic rules have been adjusted by allowing “opt out” of Test Safe, and this seems to be becoming a default option.

As PHRs become used, and patient / whānau access to records increases, a more complex consent / deny access model is potentially needed.

For now, the capabilities of the PMS around (role based) security, information privacy, access and audit of records need to be clearly understood. Where there are add-on products or extensions to the PMS (e.g. Portals), any difference between core PMS functionality and the add-on products should be clear; this includes the way in which data is stored and accessed for such add-on products.

5.1 Access control

<table>
<thead>
<tr>
<th>Define how you identify users; e.g. make sure users are really the intended persons (authentication). How the PMS can integrate with LDAP (e.g. Active Directory) authentication frameworks and enable single sign-on?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vendor self-assessment</strong></td>
</tr>
<tr>
<td><strong>Functional review</strong></td>
</tr>
<tr>
<td><strong>Technical review</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Explain how you allow access to patient records by authorised users. How do you support role based access?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vendor self-assessment</strong></td>
</tr>
<tr>
<td><strong>Functional review</strong></td>
</tr>
<tr>
<td><strong>Technical review</strong></td>
</tr>
</tbody>
</table>
## How does your PMS allow remote access to authorised users?

<table>
<thead>
<tr>
<th>Vendor self-assessment</th>
<th>Functional review</th>
<th>Technical review</th>
</tr>
</thead>
<tbody>
<tr>
<td>As we are not web based, any remote access is through client’s own VPN/RDP setup.</td>
<td>Correct. Practice users access through local system which is protected, VIP accesses through the same system initiated by them.</td>
<td>Remote access is via remote network access to a local client.</td>
</tr>
</tbody>
</table>

### Describe third party access to PMS data (if any).

<table>
<thead>
<tr>
<th>Vendor self-assessment</th>
<th>Functional review</th>
<th>Technical review</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Info – data mining / KPI &amp; CPI analysis. PHO data transfers. Best Practice.</td>
<td>Nothing more to add</td>
<td>Have only ad hoc bespoke and SQL-based mechanisms for third party systems to access data. Where SQL is used, there is no ability to control access beyond database account credentials. Examples of bespoke interfaces are BPAC and Concerto integration. BPAC integration, at least, is handled within the application and does not have direct access to the database, so Houston has control over what BPAC can access. DrInfo are permitted to write their own SQL queries to access Houston data, with no security restrictions.</td>
</tr>
</tbody>
</table>

### Describe your patient consent mechanism and how it is embedded into the workflow

<table>
<thead>
<tr>
<th>Vendor self-assessment</th>
<th>Functional review</th>
<th>Technical review</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient consent can be included on the consultation slip printed when patient arrives. Also certain printed forms contain patient consent, e.g. ACC32, GP2GP notes request. Patient consent for immunisations is indicated on the PMS Immunisation screen as NIR Enabled/NIR opted off. When consent is disabled/enabled, the user is asked to confirm and acknowledge the outcome of disabling/enabling. We have not been asked to implement consent for investigation results to be sent to a clinical data repository.</td>
<td>Nothing more to add</td>
<td>There is no electronic representation of patient consent other than the scanning of paper documents that record consent.</td>
</tr>
</tbody>
</table>

### Privacy and confidentiality

Describe how your PMS protects patients’ privacy and confidentiality of health records - specifically elaborate on programme level security on management and use of patient records. This should protect confidentiality and integrity of data as well as ensure that users who alter health records cannot falsely deny they made those changes (non-repudiation)
## Vendor self-assessment

Only security provided by Vendor self-assessment to SC1a. Medical encounter notes can be marked as confidential and can be excluded from GP2GP message transfer. The GP2GP message can be encrypted.

VIP2000 has database wide time-limited modification for medical desktop encounter notes, prescriptions, outgoing correspondence and non-clinical contacts. The practice can specify the days/hours records can be modified to.

### Functional review

Confidential works well. A relatively new feature.

### Technical review

There are no access control features beyond marking of consultation notes as "confidential.

The database permits modification of records for a configurable finite time period after they are saved, which can occur days later. In VIP2000, if such changes are made, no record of the old versions of data are retained, which creates significant issues around authentication and non-repudiation.

Houston believe that is for the doctor to decide, in that if the time period is set to zero then as soon as a note is saved it cannot be altered and a full record of any repudiation is kept.

---

### Explain how attachments are managed (e.g. pdf investigation results, scanned documents)

**Vendor self-assessment**

An image can be imported via RSD or manual scanning, RSD will be saved as correspondence while manual scanning can be assigned as an image.

We made a decision not to support Healthdocs as a proprietary standard and use PDFs embedded in an HL7 2.4 message as being the best way forward.

**Functional review**

This works well

**Technical review**

Access restrictions can be applied at group and individual level, to a record overall and to individual consultation notes and associated data. This control cannot be applied, however, to imported documents. Handles PDFs and images, but not HealthDocs.

---

### How does your PMS protect privacy when generating reports and data sets (e.g. clinical data sets for population health research and reporting to Ministry etc.)? Describe how identifiable personal information is anonymised (if supported).

**Vendor self-assessment**

Clinical datasets and reporting follows any Ministry /DHBNZ specifications and guidelines. Aggregated data is commonly submitted. We are not aware of directly supplying datasets for population health research and reporting (other than CVD Get Checked data, which is supplied as per MOH specifications). Identifiable personal information is not anonymised. An Age Sex Register report contains full patient details (age, name, addresses, NHI) however we generate and save the output file into a specific folder (ready for Healthlink transmission). It, and other messages sent by Healthlink, are encrypted by Healthlink software when messaged.

**Functional review**

We believe this works well and are unaware of any data going across that could be identified when sending for research or reporting for MOH

**Technical review**

There appears to be no available mechanism for controlling what data is included in any report generated within the system, whether system-defined or user-defined. Access to reports overall, however, is controlled with passwords.
### 5.3 Auditing

Describe your auditing mechanism during creation, amendment and access to health records and how you maintain an audit trail. Describe who has access to the audit results and the security around this.

**Vendor self-assessment**

VIP2000 has comprehensive audit functionality. All records track the creator, creation date/time and last modified creator and modification date/time.

We would prefer not to disclose a detailed description of audit mechanisms under the terms of this written Vendor self-assessment. As to do so, given the publicly accessible intent of the RFI, could compromise security. More details can be provided on request, conditional that they are not released into the public domain.

Access to audit logs is restricted to users with System Administrator access rights.

<table>
<thead>
<tr>
<th>Functional review</th>
<th>A useful tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical review</td>
<td>Allows changes to clinical records within a configured time interval (e.g. 4 days); within that time interval, if data is changed the previous version is not retained anywhere; no access log. All changes to financial and appointments data are recorded.</td>
</tr>
</tbody>
</table>

### 5.4 Patient / whanau access

Describe how your system enables patients and their caregivers access to their own records (aka Personal Health Records)

**Vendor self-assessment**

VIP2000 does not have a patient portal.

**Functional review**

As per the Vendor’s response.

**Technical review**

No patient portal.

Describe differences (if any) in security mechanisms (especially relating to privacy and confidentiality) between integrated products / components (e.g. patient portal, mobile apps and client PMS)

**Vendor self-assessment**

Not applicable.

**Functional review**

Nothing more to add

**Technical review**

N/A

### 5.5 Care team access

Describe how your PMS provides access in a multi-site, multi-professional, integrated/shared care setting.

**Vendor self-assessment**

In a multi-professional integrated / shared care setting, access to a care team is based on a user’s security level. Our database is multi-discipline and in shared care settings all providers have a login and password.
**Functional review**

- Shared within the practice

**Technical review**

- Houston is already used in multidisciplinary settings, but these installations appear to have been more geared towards shielding one set of users from the data of another set of users, rather than multidisciplinary collaboration.

  Group-based access control is available for controlling access to the record.

  There are “care plans”, but these appear to simply be tags applied to consultations/data. By associating care plans with a problem code (such as diabetes), full on-going documentation can be obtained for the specified condition. However, this does not include management of workflow in relation to the condition.

  In VIP2000, BPAC is used for disease management workflow.

**Vendor self-assessment**

- All access to the PMS requires a login and password. The program does not keep an audit of record access. Record creation and maintenance is logged. What can be defined at system level is answered in SC1a-c and SC3a. VIP2000 is not a shared care portal.

**Functional review**

- Nothing more to add

**Technical review**

- This appears to be inadequate (for reasons addressed in previous responses).

---

### 5.6 Location of data

**Are you taking copies of patient’s identifiable information and storing it in a separate location other than at the practice? If so what security and audit controls do you have over this and where is the information being stored?**

**Vendor self-assessment**

- Where VIP2000 clients are having issues with their data that we are unable to resolve using site access, we may request that clients send a copy of their backup. This data is stored on our company network and is only used for the purposes of issue definition. A company firewall and network security prevents access to third parties.

  All data is deleted from the network and backup media is returned to the client immediately. Houston Medical staff are bound by company business rules around the handling of client’s data.

**Functional review**

- Nothing more to add

**Technical review**

- Houston has a hosted solution offered to a small number of customers. The server is in their building in a locked room with a hardware firewall. They outsource security to an external IT firm. There does not appear to be any intrusion detection capability. Their security solution is based on “common sense” (sic) and has not followed any accepted data security standards.

  There is intrusion alarm monitored by Armourguard but this is a small scale trial to assess market demand before moving to a server farm.
5.7 Overall Star Rating: Information security, access and privacy

<table>
<thead>
<tr>
<th>Functional</th>
<th>⭐⭐</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical</td>
<td>⭐⭐</td>
</tr>
</tbody>
</table>

6 USABILITY – ALERTS MANAGEMENT ONLY

Usability is among the most critical success factors in acceptance of software systems by clinicians. While there is a multitude of guidelines and references for good user interface design there is no definitive standard. It is our assumption that if a system is difficult to use, (e.g. can’t find features, or misunderstand what the feature is used for) this practically indicates that functionality will either not be used or will be misused.

In the near future it is desirable to achieve consistent GUI and data entry/visualisation functionality including, but not limited to, the following aspects:

- Patient selection and identification
- Diagnostic test orders / prescribing
- Log In and log out
- Record navigation
- Patient documentation
- Error messages and handling
- Medication management (e.g. prescribing, medication lists etc.)
- Clinical coding (tools and automatic / assisted encoding functionality to help reduce clinician workload)

We have identified alerts management in PMS as the top priority usability issue as it is a well known fact that if they are too frequent, the user stops reading them and moves immediately past them. This has serious safety and quality implications.

6.1 Alerts management

Describe how your PMS provides patient alerts and manages them effectively.

How are clinical related alerts presented in terms of severity? How are different alerts differentiated (i.e. the ability to easily separate out clinical, environmental or practice related alerts)?

How does the PMS support role-based management of alerts of all types, whether they be user-created, other-user created or generated by third parties?

Is the behaviour of alerts able to be defined at a practice, role or user level? If so, describe what level of user-defined customisation of alert types is available?

| Vendor self-assessment | VIP2000 records an administrative warning in a patient’s personal details screen. This warning will display in the patient banner and is visible when the patient’s health records are in focus.  
When an appointment is made, the receptionist can be alerted to overdue recalls or immunisations or account balances. Similarly when the patient arrives or enters the consultation room, a warning banner can be configured by the Practice to alert the user of any relevant information. These warnings are user-definable. There are visual alerts (for example we use colour to highlight abnormal lab results). Allergy contraindications display when the program interacts with the MIMS formulary.  
Any client hosting we do (not applicable to General Practice at this point) involves our hosted sites being backed up as virtual machine images. Standard windows security applies to these images (username/password). |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Functional review</strong></td>
<td>Nothing more to add</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td><strong>Technical review</strong></td>
<td>Have interfaces that look very dated (“1990’s feel”). Overall, however, the user interface is easy to use and has a high degree of functionality, The user interface is highly configurable, both at practice level and individual level, with group-based access control to all functions. Alerts can be configured to fire based on clinical measurement values, can be configured to apply to individuals or to the practice overall, and can contain free text comments.</td>
</tr>
</tbody>
</table>

### 6.2 Overall Star Rating: Usability

<table>
<thead>
<tr>
<th><strong>Functional</strong></th>
<th>★★★★</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Technical</strong></td>
<td>★★★★</td>
</tr>
</tbody>
</table>
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We have examined the request for information documents (RFI) for the evaluation of our Practice Management System.

We have read and understood the terms and conditions set out in Section 2 of this document.

We attach our RFI response in accordance with your request for RFI.

We attach all information required by the RFI.

Signed by:................................................................. Dated:..............................................

On behalf of
(the submitting organisation)
1 STRUCTURED DATA

PMS are required to support structured data for medication lists, problems, allergies, etc. To better support information sharing / interoperability there is a need for use of common terminology (where there are standards that state this). As such, use of NPOCS codes (NZ adaptation of LOINC) for lab orders and results and New Zealand Medicines Terminology (NZMT) through New Zealand Universal List of Medicines (NZULM) service and in near future consequent New Zealand Medicines Formulary are proposed to be included as PMS requirements.

In general, the expectation is that where a messaging standard mandates use of a particular coding system the PMS will need to support it (e.g. LOINC). Where no code system is mandated (such as is currently the case with diagnosis codes) use of such coding systems in the PMS is proposed to not require semantic equivalence or interoperability, but rather that the code, the coding system and meaning of the code be available, consistent with but not limited to the approach being taken for GP2GP.

Vendors are expected to engage with the Health IT Cluster and the Sector Architects Group and align with the more recent works in the sector (such as the new Health Identity Project and the draft interoperability reference architecture).

Interoperability should be at a structured data item level, rather than at a text block level (even though text may explain the data or coding). As standards are agreed these need to be adopted or adapted. Vendors are encouraged to outline how their system is architected to support the adoption of such future requirements.

1.1 Non-clinical (demographic and administrative / financial information)

Describe the level of structuring of data in your PMS for patient demographics, administration and financial information.

<table>
<thead>
<tr>
<th>Vendor self-assessment</th>
<th>Intrahealth meets the recommended compliance criteria for structured data.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intrahealth’s underlying data model is a flexible object oriented design which allows new entities and relationships to be created dynamically.</td>
</tr>
<tr>
<td></td>
<td>Intrahealth solution supports the Person–Organisation Data Model by using a combination of configurations and functions, including Customised Domain Values:</td>
</tr>
<tr>
<td></td>
<td>- Organisation Types</td>
</tr>
<tr>
<td></td>
<td>- Relationship types</td>
</tr>
<tr>
<td></td>
<td>- Multiple Address Types</td>
</tr>
<tr>
<td></td>
<td>- Multiple Registry keys for organisations and people</td>
</tr>
<tr>
<td></td>
<td>- User defined Patient preferences</td>
</tr>
<tr>
<td></td>
<td>Validation Rules including Object level triggers to:</td>
</tr>
<tr>
<td></td>
<td>- Enforce mandatory data</td>
</tr>
<tr>
<td></td>
<td>- Check pre-requisite and co-requisite data requirements</td>
</tr>
<tr>
<td></td>
<td>- Issue Warnings and error messages to users</td>
</tr>
<tr>
<td></td>
<td>Duplicate Check available when creating/altering patient demographic record. Results of likely matches are presented to user.</td>
</tr>
<tr>
<td></td>
<td>Duplicate user codes detected for Profile users and external providers and not allowed.</td>
</tr>
<tr>
<td></td>
<td>Object macro to enforce business rules for Organisation (external) and Payer types. As noted above our system is designed to support workflow and business rules with macros to be written for this purpose.</td>
</tr>
<tr>
<td></td>
<td>NHI, Date of Birth and Gender included in Duplicate Check for patients</td>
</tr>
<tr>
<td></td>
<td>We support soundex e.g. “Sounds like” where date of birth is the same e.g. First name of Claire vs Clare</td>
</tr>
<tr>
<td></td>
<td>Object macro to enforce business rules around identifying duplicates for providers with regards to Identifiers.</td>
</tr>
</tbody>
</table>
- Object macro to add business rule of transpose date of birth and check for aliases/historical names for patients.
- Person or Organisation records can be deactivated. For a Patient Record, you can:
  - Set an Inactivation Date
  - Select an Inactivation Reason (Reference set maintained by Organisation)
  - Flag status as Deceased
  - Check and cancel future activity e.g. appointments, recalls etc.
- Hapu and Iwi fields are part of the patient demographic record. An Iwi reference set is initially populated by Intrahealth.
- Use of “Additional addresses” area, which includes relationship can be extended to record many different relationships.
- Full versioning is supported
- Before and After images of clinical and demographic data are retained
- Users are able to compare and review pre- and post-change versions of Forms, Clinical notes and other clinical information
- The Intrahealth solution supports logical deletion of Clinical and demographic data.
- This ensures historical data is always available for audit and medico-legal reasons

<table>
<thead>
<tr>
<th>Functional review</th>
<th>Profile allows for the recording and maintenance of detailed demographic, administrative and financial information, catering well for practices operating across multiple sites.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical review</td>
<td>Good object-based design (based on GEHR), though dated reference model. Insufficient information provided to confirm compliance with GP2GP. Note — at the time of publication, IntraHealth have yet to have Profile for Windows tested and rolled-out for GP2GP functionality.</td>
</tr>
</tbody>
</table>
| Vendor clarification | **GP2GP Status**

- As of 11 Dec 2011, Intrahealth is working with Andre Bredenkamp of Patients First to finalise Testing of GP2GP. However, organisational issues with the testing environment have delayed formal testing until 2012 (from Meeting with Andre week ending 11 Dec 2011). It should be noted that other vendors have imported Profile’s GP2GP export successfully, but the other way around is proving challenging due to the high degree of structure of Profile and the relatively “loose” structure of the other vendor’s DBs. Work has been completed however, and we are waiting reconstruction of the GP2GP test environment.

**Where are the GP2GP data items stored in the clinical repository?**

- The GP2GP data items are sourced from elements in both the GEHR clinical framework and in data structures that sit outside GEHR. When importing data, it is stored in the same locations, but because so much data is received unstructured, a separate termset is created to store supplied textual elements (these are created automatically based on a textual exact match).

- Because GEHR defines “cross-references” these can be crossed referenced to the correct SNOMED CT or Read items, thereafter, being indistinguishable from them. See screenshots below:
1.2 Clinical (core clinical dataset)

Describe how your PMS represents and stores a core set of patient-centric clinical data with a structure and minimum level of detail required for information exchange, e.g. at a minimum that supports a level of detail that can produce the GP2GP data set.

Vendor self-assessment

- Intrahealth meets the supports GP2GP data exchange protocols
- Our products are patient-centric thus comply. Our system core health record design has been modelled on the Good European Health Record standard, now known as openEHR.
- All clinical transactions are versioned. Users with appropriate access can see Before and After images of each transaction.
- Each transaction is recorded with author and time stamp
- Audit function also record Update, insert, Delete and View-only access: Start Date/time and End Date/Time
- Transactions cannot be physically deleted from the database. Only logical delete from the user interface is available

Functional review

Profile allows for the collection of highly structured clinical data. This can be entered through various user interface screens, through free-text shortcuts that are parsed as coded data, and through user-defined forms.

The user interface is very powerful and feature rich, but can be counterintuitive from a clinical perspective. For example, there are separate screens for “results” and “documents”, but some incoming documents can appear under “results”.
In general, users are able to configure which folder various document types (such as scanned documents or results) are placed, but the reviewer is aware of at least one example (an electronic discharge summary) where it was not possible for the technical support person to prevent this appearing in the Results folder rather than the Documents folder.

| Technical review | Detailed, highly structured clinical information. Insufficient information provided to confirm compliance with GP2GP.  

In the technical reviewer’s opinion the reference model (GEHR), whilst a distinct improvement on systems lacking a reference model, is nonetheless somewhat dated. While it is a known fact that openEHR has evolved from original GEHR work, the statement that GEHR is now known as openEHR is misleading (similar to saying that MS-DOS is now known as Windows 7).  

This is important because Profile should not be assumed to have the strengths of openEHR which has clearly a more advanced and fit-for-purpose reference model. In particular, openEHR contains a well-engineered invariant top-level information model, supplemented by user-definable and shareable archetype definitions. Much of this is absent from the GEHR specification, and we are unable to determine whether, or how much of, this additional capability is implemented in Profile.  

Intrahealth state that they support CDA but have not as yet been required to implement CCR or CCD. This should not be difficult to implement, however.  

Good solution if the standard is GP2GP, but less so if a robust reference model approach is considered important (Profile is nonetheless one of the best on the market in this regard). |
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Panel query</td>
<td>Has the openEHR specification actually been implemented, or is the original GEHR architecture still being used? If the former, which version of the specification?</td>
</tr>
</tbody>
</table>
| Vendor clarification | The GEHR implementation has evolved consistently with openEHR. Before openEHR defined the differences with versions and status, Intrahealth had already extended GEHR to add this ability. We are not fully openEHR compliant even though we are fully original GEHR compliant. If GEHR is MS DOS and openEHR is Win7 (in the reviewers analogy), one might say our implementation is WinXP or Win Vista. We always claim GEHR compliance (and then say GEHR is now termed openEHR) for this reason. Describe how this core set can be extended when additions or modifications are needed; particularly:  

|  
| -- The ease with which these changes could be applied  
| -- How to ensure backward data compatibility and preservation of semantics  
| -- How related parts of PMS, especially APIs and reporting components will be affected. |
| Vendor self-assessment | Intrahealth provides easy-to-use tools to manage core reference data.  

Core reference information (such as READ, LOINC, MIMS, DSMIV, PRMHD, Ethnicity, Language, Religion etc) is stored in independently of transaction data.  

Core datasets can be updated by importing “jaffa” files as and when needed.  

Maintenance of user data structures is done using Termset maintenance function through as simple user interface.  

Changes to Data Entities and Attributes (within a Termset) and Domain values (short Codes) is a System Administration function.  

Changes to the underlying physical data structures are managed by Intrahealth and are only changed as part of a software version upgrade. |
Data Integrity of historical records is preserved. The system keeps a track of all versions of a record (together with timestamps and authors details). Historical data remains unchanged despite changes to Data Definitions.

The collection of data entities and its hierarchy is preserved.

We support SNOMED CT, IPCP2+, and a number of other termsets.

No item in the reference area can be physically deleted. Termset items (e.g. SNOMED CT) can be made “extinct, replaced, redundant, expired, etc” as defined by GEHR.

It is possible to lock out the ability to edit standard reference sets (e.g. users should not be able to edit SNOMED), but items added by a user can be added, altered or “deleted” by a simple user interface (caveats about deleting noted above),

Referential integrity and ensuring consistency of data is thus preserved

For information about APIs - see section below

<table>
<thead>
<tr>
<th>Functional review</th>
<th>From the user's perspective, the core data set can be extended through new user-defined forms that contain structured data, and through new free-text shortcuts that are parsed as coded data.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Technical review</th>
<th>Handles multiple terminologies plus locally defined code sets. Does not describe if or how local extensions of externally defined code sets are managed (as is required for SNOMED), or how code deletion/retirement is handled.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>It is not described how local code sets are defined and managed.</td>
</tr>
<tr>
<td></td>
<td>Profile has effective mechanisms for defining and maintaining arbitrary data sets.</td>
</tr>
<tr>
<td></td>
<td>Whilst there is good management of historical data and change records, it is not clear what happens if changes are made to underlying code sets (particularly the locally-defined codes) after data has been stored, which is important to ensure that the meaning of the data is not altered.</td>
</tr>
<tr>
<td></td>
<td>The code implementation does not appear adequate for implementing SNOMED-CT (though we doubt any NZ PMS vendor’s is yet), and navigating the terminologies is difficult.</td>
</tr>
<tr>
<td></td>
<td>Good solution if this is about data sets, less so if this is about coding.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel query</th>
<th>Please list the capabilities of Profile’s vocabulary server component</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Vendor clarification</th>
<th>SNOMED CT has been implemented because it is a mandatory requirement in markets in which we operate. However, we have not implemented full sophistication of the multi concept and linkage meanings for compound SNOMED CT Codes because we do not think this is practical, nor has there been any demand for it.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Core capabilities:</td>
</tr>
<tr>
<td></td>
<td>- Built around termsets</td>
</tr>
<tr>
<td></td>
<td>- Uses Concepts, Preferred Terms, Synonyms</td>
</tr>
<tr>
<td></td>
<td>- Each item in the EHCR structure therefore always is coded with at least two items (the concept and a display term)</td>
</tr>
<tr>
<td></td>
<td>- Terms can be current, extinct, expired, duplicate, etc</td>
</tr>
<tr>
<td></td>
<td>- Supports N termsets concurrently (e.g. SNOMED CT and ICD9 can coexist)</td>
</tr>
<tr>
<td></td>
<td>- Cross-referencing between termsets</td>
</tr>
<tr>
<td></td>
<td>- Termset/term translation (see figure)</td>
</tr>
</tbody>
</table>
Local terms and reference terms
- User can create proprietary termsets
- Termsets can be exported and automatically imported
- No item can be deleted
- Items include output codes (see figure)

User Reference Lists core capabilities:
- Add or alter reference lists
- “Delete” items (logical deletion only)
- Add new lists to the reference list
- Export one or more reference lists

Include Text and code from the point of time when included in a GEHR clinical transaction to avoid data changing if reference list are maintained

**Explain how data elements and data set definitions are defined (e.g. ISO 11179).**

**Vendor self-assessment**
- Intrahealth Clinical Data object model is patient-centric and has been modelled on the Good European Health Record standard, now known as Open EHR.
- Where data is shared externally, standard datasets and codes are used to ensure consistency and semantic integrity.
- Where available international datasets such as SNOMED, READ, ICPC, DSM and LOINC are used.
- The application also supports a Termset cross-reference Mapping function to allow users to map items between different coding sets.
- Intrahealth’s solution implements user-defined Data Entities using an object model can be designed and managed through the application’s user interface.
- Users can create their own Data Dictionary or ‘Termset’
- A Termset consists of atomic data elements called Health Record Items (HRI’s) and collections of data elements called Health Record Collections (HRC’s).
- Configurable data element properties include: data types, validation rules, units of measure.
Edit Rules can be applied at different levels in the application:

- **Data element level**: for example, to enforce numeric only, date only values, numeric values within range.
- **User Interface**: for example, to Enable / Disable data entry fields on a window or form.

- **Object Level**: for example, to enforce mandatory data validation rules and cross validation between objects. Domain values can be user defined using “Short codes.”
- **System defined Short code lists (eg Language, Ethnicity)** can be extended and or modified.
- **Domains** can be filtered so that only the relevant subset is visible to users at a particular location (for example, the list of Service Locations will be different).
- **Maintenance of the Data Entities and Attributes (Termset) and Domain values (short Codes)** is System Administration function.
- **Where changes are made to Domains / Data Entities values, the integrity of historical data is ensured. Because all clinical transactions are versioned, references to previous Domains values will not be affected by subsequent changes to these values.**

<table>
<thead>
<tr>
<th>Functional review</th>
<th>Multiple code sets can be defined, including multiple local code sets. Structured data objects can be defined by users.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical review</td>
<td>Profile’s information model could be described using ISO11179 formalism, and is richer than the METeOR implementation.</td>
</tr>
</tbody>
</table>

**Describe the use of New Zealand Pathology Observation Code Sets (NZPOCS) standard by your PMS during ordering and reporting of laboratory tests.**

<table>
<thead>
<tr>
<th>Vendor self-assessment</th>
<th>NZPOCS Codes are supported for participating laboratories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional review</td>
<td>N/A</td>
</tr>
<tr>
<td>Technical review</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### 1.3 Health record organisation

**Elaborate on PMS health record structure and application functionality which would support:**

- Traditional long case format clinical history (past history, family history, social history etc)
- Goal (health programme) based records
- Problem-based records (longitudinal / episodic based records versus single visit based records)

| Vendor self-assessment | Intrahealth’s solutions meet the requirement for both Case-based and problem oriented views.  
                          | Case Summary and EHR Summary views can be configured to present and / or highlight relevant patient information.  
                          | - Current compliance to Care Plan (completed still due and overdue events)  
                          | - Recent clinical notes  
                          | - Clinical measures (in textual or graphical format)  
                          | - Diagnosis specific views (eg. for Diabetic patients) |
|------------------------|---------------------------------------------------------------------------------------------------------------|
### Intrahealth Evaluation Review of Vendor Self-Assessment

- **Case Oriented management functions:**
  - A list of patients with Cases assigned to a specific Case manager or Clinical lead can be used.
  - A report showing current case load by Case Manager can be used to determine best way to re-allocate Cases.
- Care Plan Interventions window allows users to review current status at a glance
- Interventions trigger reminders automatically when due
- Care plan design allows for relevant assessment or clinical review forms to be automatically presented when user attempts to complete an intervention.
- Our system also provides Treatment Guidelines function which may also be used to assist users in determining appropriate course of action in the context of patient EHR. Guidelines may recommend specific course of action or refer a user to more detailed contextual information (eg. reference to website URL or relevant documentation)

**Functional review**

- Capable of displaying clinical notes as a single block of rich text, split out into a SOAP note, or as a GEHR “Contact Form”. Configurable as to which format users are allowed to use:

![Functional review](image)

- Features highly structured order entry and management. For example, inbound lab results can be checked off against individual line items on lab forms.

- There is a formal problem list maintained separately to the clinical notes. A free-text summary can be added to each problem.

- Consultations can be associated with a problem on the problem list, or alternatively can be tagged with a coded or free-text diagnosis.

- Contains separate sections for past history, family history etc.

- Explicitly declares “cases”, which associate a series of consultations with a particular episode of care for a problem. Staff can be explicitly associated with relevant cases.

- Has a configurable summary screen that brings together key elements of the patient’s record into one page, such as problem list, current medications, allergies, immunisations, recent visits. Multiple summary views can be defined.

**Technical review**

- Supports SOAP notes. Profile allows for multiple, problem-based entries per clinical encounter, and records actions taken as individual line items of structured objects when these are forms, tasks, recalls, prescriptions, lab orders etc. Some of the plan is free texted but much is structured. One can also get problem-based longitudinal views of the record.

- Contains clearly marked user interface areas for past history, family history, social history etc.

- Has tools for case management over time. Allows case-based filtering (the ability to view a series of encounters relating to the same problem), but this is difficult to use in practice because cases do not automatically map to diagnosis codings (which are separately
entered) – that is, an encounter is not recognized as being part of a case unless it is explicitly tagged as such, even if it relates to the same diagnosis within the same timeframe.

This results in (i) case views not being the same as problem-oriented views, and (ii) practical difficulty (because of errors in failing to code encounters as being part of a case, older encounters not coded with a case where the need for a case was not be recognized until a few encounters had occurred, and the inability to automatically include encounters coded with a particular diagnosis in views of a case) in obtaining a complete historical view of a problem’s management.

Can generate a clinical summary of the patient dynamically.

### 1.4 Structured and coded data

**State the chosen health information structure and coding systems in the PMS (this should include the ability to include time-series data).** It is expected, at a minimum, the following types of clinical information be captured in structured and coded form where and when possible:

- Reason for encounter (also secondary reasons if present)
- Problem or diagnosis
- Vitals
- Allergies and adverse reactions
- Substance use
- Treatment and procedures
- Ordering and results
- Medications (past and current)
- Injury details (ACC)
- Past history
- Family history
- Basic maternity history
- Immunisations

**Vendor self-assessment**

- Clinical information may be viewed in both textual and coded formats.
- All of the above are available through structured / coded clinical data elements.
- We support the use of termsets including external termsets such as ICD9, READ, ICPC2+, SNOMED, DSM IV.
- The selected terminology would need to be converted into a termset and imported into the Intrahealth solution.
- The termset can be used directly when coding or internal ‘user friendly’ codes can be created and linked to the termset terms and concepts.

**Functional review**

A single code or free text entry is provided for reason for encounter / problem / diagnosis.

Vitals are recordable as structured data.

Allergies, medications, treatments, investigations, accident details and immunisations are all well structured.

Past history is divided into a free-text section and “inactive” coded problems.

Family history is unstructured.

**Technical review**

Well supported in general. Has partial support for SNOMED-CT. SNOMED is stored as complex linked structures, not merely as lookup tables. Supports poly-hierarchy navigation, but not multi-coding with relationships. The SNOMED termset itself is compatible with Profile. Fully supports Read 3, which is now a component of SNOMED-CT.
Good solution if the current level of coding is the standard, less so if SNOMED is the standard. However, it is one of the most advanced PMS SNOMED implementations of SNOMED-CT currently available.

<table>
<thead>
<tr>
<th>Panel query</th>
<th>From a technical perspective, describe how you support SNOMED-CT?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendor clarification</td>
<td>SNOMED CT is treated as with any other termset. Termsets are not stored as simple reference tables, but complex linked structures. By way of example, prior to SNOMED CT, we fully supported Read v3. The class structure of this can be provided on request, but it allows recursion, multiple iterations through a hierarchy, synonyms, and multiple terms associated with the same concept, etc. Each item has at a minimum 3 relationships: Concept, LinkTC and Preferred Term. See Figures below:</td>
</tr>
</tbody>
</table>

![Figure 1](image1.png)

Because of the size of SNOMED CT and lack of user demand for such a large termset (including linkages), we supply it on request.

How can the PMS enable assigning multiple codes/terms (possibly from different terminologies) on the same data item?

| Vendor self-assessment | It is possible to assign multiple codes and associated terms to a single data item. The application supports a Termset cross-reference Mapping function to allow users to map items between different coding sets. This allows the recording of clinical measures using different coding systems which can then be mapped for reporting purposes. |

![Figure 2](image2.png)
### Functional review

The review could not see how to assign multiple codes to a single data item.

### Technical review

It is claimed that it is possible to assign multiple codes to a single data item; however we have not observed this in the user interface.

### Panel query

**From a technical perspective, describe how you manage mapping between code sets and how mappings are used in clinical data display, storage and reporting. How are codes in legacy data handled that are retired in subsequent releases of a code set / vocabulary?**

### Vendor clarification

- The GEHR data structure just adds additional HRIs to a transaction when multiple coding is required, so there is little to see.
- There is a cross-reference tool that establishes relationships between like concepts in different termsets. From them on, the system treats one as the other.
- In the business reporting and display layer, there are two methods, the default conceptually being “loadCrossReferencedConcept”, but if for some reason, you do not wish this to occur you can call a “LoadSpecificConcept”.
- There are tools to help the user cross reference (see below)
- There are tools to examine the cross referenced relationships
- Concepts are never deleted or reused as per the standards but can have these attributes:

**See Figures below:**

![Figure 1](image1.png)

![Figure 2](image2.png)
Describe how the structured and coded data enable decision support functions such as:

- Presenting appropriate management guidelines during assessment based on clinical context
- Generating medical warnings based on context and record status and actions taken
- Recalls such as for screening, immunisation and disease surveillance

**Vendor self-assessment**

Treatment Guidelines functionality is supported and users are prompted with selected guidelines and medical warnings at appropriate steps.

It may be used to assist users in determining appropriate course of action in the context of patient EHR. Guidelines may recommend specific course of action or refer a user to more detailed contextual information (eg. reference to website URL or relevant documentation)

Alerts and warnings can be configured to prompt users based on certain actions. For example, when creating a new clinical note, opening an appointment etc.

Such prompts can relate to:
- Clinical warnings: Adverse reactions to prescribed drug, overdue immunisation, enrolment to a Care plan etc.

In addition to reminders described above, Alerts based on clinical rules can also be developed. Rules can generate warnings based on data recorded for this patient including:
- Clinical measures
- Diagnoses
- Prescribed medications
- Referrals
- Or a combination of the above

**Functional review**

One reviewer commented that “I have experience with a large Profile installation but have not observed any decision support functionality beyond simple alerts, access to a library of resources, and MIMS database integration.”

A variety of alert, warning and reminder pop-ups occur, which are configurable.

**Technical review**

A variety of points of activation exist for alerts and warnings.

A “Scenario-Recommendation-Action” model for clinical decision support is supported, with multiple interrelationships. This is a configurable rules-based system and includes formal alerts. Such functionality, however, was not available to the reviewers.

Intrahealth advise that this functionality, whilst in use overseas, is not widely used in New Zealand because proprietary CDS tools (eg. Predict, BPAC) dominate the NZ landscape.

*Explain how the structured and coded data supports aggregation of identifiable patient records into clinical datasets for population health and research purposes.*
Vendor self-assessment

Specific coded clinical data sets can be generated from person centric records and exported for various purposes.

- Ad hoc reporting using Simple Find Objects query builder.
- COM based reports for Complex reporting requirements (grouping, sorting, filtering, formatting)
- Built-in Graphical reporting: KPI’s, Care Plan Compliance, Disease based Incidence and Prevalence, Patient Groups, Geo-coding and mapping
- Dynamically generated HTML views (graphical or textual)
- Export to Excel (for extended reporting such as Pivot tables, Pie Charts etc.)
- Where required, third party reporting tools (such as Crystal Reports / Business Objects) can use direct access to the Database to generate reports
- Customised Extracts for Data warehouse applications
- The application’s Key Performance Indicators (KPI) reporting function can be used to generate output based on attributes of Providers and / or Patients
- The KPI function allows the user to define an indicator, for example: Number of Contacts in the last month, or count of Completed Appointments. The KPI calculator then iterates through a list of providers and applies the calculator to each. The result is a matrix of numeric values for providers across one or more services
- KPI’s can be scheduled to run automatically
- KPI results may be displayed graphically
- KPI’s can be used as a basis for comparison between Services, Providers, Groups of Providers or combinations of these.

Functional review

A tool is provided with which database queries can be constructed. The database cannot be directly queried using SQL; queries must be set up using the tools provided. These tools leverage Profile’s underlying object model.

Technical review

Profile has very good capabilities for ad hoc reporting across populations, with the ability to generate user-defined clinical data sets.

1.5 Medication management

Explain how your PMS keeps an up-to-date list of medications available for prescribing. It is expected that NZMT is to be used as the single source for medications (through NZULM).

Vendor self-assessment

Medications formulary content is consistent and based on the current version of NZULM. Profile currently uses national standard MIMS based Formulary and provides updates on a regular (monthly) basis.

Functional review

Regular MIMS updates.

Technical review

Uses MIMS which is consistent with NZULM. Intrahealth indicate that there is a cross mapping tool available for transforming data when the drug file changes, but that this is hidden from users by default. Any codes that cannot be mapped are either converted to text or remain using the old formulary for reference.
<table>
<thead>
<tr>
<th>How does your PMS provide list of current medications, past medications and adverse reactions in structured and coded form?</th>
</tr>
</thead>
</table>
| **Vendor self-assessment** | The Medications view is structured and coded consistently. 
Patient Clinical view includes a list of Current, Prior and Discontinued medications. 
Adverse reactions can be created for a patient to ensure that a provider is warned at the time of prescribing. Warnings are also issued based on detailed information embedded in the active formulary (eg Contraindications, Interactions, Adverse Reactions) 
Warnings level thresholds can be configured per Role, per user, or Organisation-wide |
| **Functional review** | Current and past medications are well structured and easily and clearly accessible. The current medication list exists separately to the prescription items constituting the actual prescribing of these medications in a consultation. 
Adverse reactions are clear and well structured. |
| **Technical review** | Drug information is well structured and coded. Not specified what happens to legacy data when the drugs file changes. See comment from SD5a. |

<table>
<thead>
<tr>
<th>How does your PMS provide links to commonly used drug references; such as MIMS etc?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vendor self-assessment</strong></td>
</tr>
<tr>
<td><strong>Functional review</strong></td>
</tr>
<tr>
<td><strong>Technical review</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Describe how you keep medicines lists up-to-date.</th>
</tr>
</thead>
</table>
| **Vendor self-assessment** | Manual import or automated update of medicines list from external formulary providers (such as MIMS, NZULM) is supported. 
Formulary updates are provided on a regular (monthly) basis in the form of an update file which can be imported into the application data base. |
| **Functional review** | N/A |
| **Technical review** | Manual drug file updates are in place |

### 1.6 Overall Star Rating: Structured Data

| Functional | ★★☆☆☆ |
| Technical | ★☆☆☆☆ |
2 PUBLISHED, STANDARDS BASED API S

To support additional and external specialist applications (such as decision support, user defined special purpose assessments or integration with other systems) the PMS should support a published API that such applications can use to extract data from and write data back to the PMS.

Ease of data extraction and analysis from some PMS are expressed as being an associated priority issue, but to some extent both are by limitations in terms of available structured data.

The most likely and pragmatic approach is a phased one whereby:

- Vendors are required to expose a defined set of (patient and clinical) information in a structured and published way
- Over time, this moves to a standards based API defined as a sector standard to which vendors need to comply

The main commercial consideration that needs to accompany this requirement is that this is a requirement for being a recognised "certified" product in the market – and should be part of the core product and corresponding standard license and maintenance pricing rather than an additional module.

The way in which patients may wish commercial PHR services to interact with the systems in the practice is still evolving, as is the willingness or otherwise of practices to share or use information in that way. At issue for patients is the extent to which selection of a PHR promoted by a practice or selected by themselves has the potential to lock them into that PHR or to PMS used by the practice (and hence to practices using that PMS).

GP2GP is a standard aimed at making it easier for patients to shift practices. We would expect commercial PHRs to be encompassed by a future PMS API standard / guideline and future plans to interface with Regional CDRs and Shared Care Records.

2.1 APIs and details

<table>
<thead>
<tr>
<th>Vendor self-assessment</th>
<th>APIs are provided to enable an extensive level of interoperability.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Profile implements the Microsoft COM (Component Object Model) technology. This allows external applications to access its data programatically using a well-defined set of API’s (COM methods and properties).</td>
</tr>
<tr>
<td></td>
<td>While it is possible, direct access to the physical database by third party application is NOT encouraged. The database has a complex object-oriented structure and is subject to change as part of ongoing system evolution.</td>
</tr>
<tr>
<td></td>
<td>Since the COM interface interacts with the application’s business layer, it ensures that data integrity and security is maintained.</td>
</tr>
<tr>
<td></td>
<td>Web Services interfaces can also be developed (at runtime) within the application using COM. Web Services can be written in C# or VB.NET.</td>
</tr>
<tr>
<td></td>
<td>Web Services can be hosted by Intrahealth solution providing interface for consuming by external services</td>
</tr>
<tr>
<td></td>
<td>The Intrahealth solution enables web services framework to enable inter-application communication.</td>
</tr>
<tr>
<td></td>
<td>There are no ready to go web services. Interoperability web services are always customized for a specific purpose.</td>
</tr>
<tr>
<td></td>
<td>Logging/authentication/encryption is up to the custom implementation and so can be configured to meet the specific access requirements.</td>
</tr>
<tr>
<td></td>
<td>The framework supports different authentication methods.</td>
</tr>
<tr>
<td></td>
<td>The framework has built-in support for basic SSL and mutual SSL authentication.</td>
</tr>
</tbody>
</table>
- Using firewall to prevent unauthorized access is also recommended.

<table>
<thead>
<tr>
<th><strong>Functional review</strong></th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Technical review</strong></td>
<td>Exposes COM APIs, but no details have been provided regarding what is exposed. There is an abstraction layer between the logical object model serviced by the API and the database schema. It is appropriate to not directly query this database. Web services appear to be implemented as wrappers around a COM API but there appear to be no standard web service interfaces out of the box.</td>
</tr>
<tr>
<td><strong>Panel query</strong></td>
<td>Please provide specifications for the exposed APIs and the behaviour of available methods</td>
</tr>
<tr>
<td><strong>Vendor clarification</strong></td>
<td>View of the type library explorer in Profile 7.6.1 (also present in the Special menu of 7.0, but has been made more extensive since then)</td>
</tr>
</tbody>
</table>

How are these interfaces presented (e.g. Web services, REST, direct invocation etc.)?

<table>
<thead>
<tr>
<th><strong>Vendor self-assessment</strong></th>
<th>As above Profile provides the ability for users to define API’s using combination of scripting languages embedded in the application.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Functional review</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Technical review</strong></td>
<td>No information is provided regarding data exchange or system behaviour around APIs, or how state is passed or maintained. No mention on whether DCOM is supported or what the intended model is for inter-process communication between different servers.</td>
</tr>
<tr>
<td><strong>Panel query</strong></td>
<td>Please describe the capabilities of the scripting language, and how this can be embedded in the application</td>
</tr>
</tbody>
</table>
| **Vendor clarification**  | - A manual on how to use and access it is publically provided. Considered open and is a public interface anyone can use without additional charge. Available to the reviewers on request  
- A built in type library can be copied to other development environments and so integrate seamlessly with other development tools – screen shot below  
- The number of properties and methods exposed is huge, also enumerated lists. |
A copy of the TLB is publically provided.

- DCOM is not supported for a variety of technical and security reasons (historically it was supported but proved problematic, unstable and insecure). The interface is COM and to deliver these across a network, a Web Services service is able to be developed using the scripting language, COM and Web Services SOAP format.
- Web Service Responders can be written in the scripting language and are then available as a call to the Service by other Profile clients. The Screen shot below shows Intrahealth itself using this to deliver Web Services for its Web and iPad interfaces. These can be written by the users (typically would be written by an IPA or similar and published to members).

See screenshots below:

![Screenshot](image_url)

Intrahealth implemented a shared care plan for chronic disease in Canada using Profile, Maestro [a transaction free messaging layer] and Accession (all Intrahealth products). This was highly configured but we used our own “API” (COM and Web Services) to deliver the exact design.

### 2.2 Behaviour of APIs

*Describe the behaviour of APIs; e.g. one way read-only or two-way which can update information on PMS. Elaborate on input, processing, output and states. How can the 3rd party applications work with the PMS in terms of single click icon for launching the 3rd application, and exposure relevant patient data via API in given context?*

<table>
<thead>
<tr>
<th>Vendor self-assessment</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>APIs provide bidirectional access including interoperability with compatible 3rd party applications.</td>
<td></td>
</tr>
<tr>
<td>API’s can be invoked from user defined triggers, for example</td>
<td></td>
</tr>
<tr>
<td>- ON Patient Update/delete</td>
<td></td>
</tr>
<tr>
<td>- On Case update / delete</td>
<td></td>
</tr>
<tr>
<td>- Webservice Hosted</td>
<td></td>
</tr>
<tr>
<td>Scheduled batch tasks</td>
<td></td>
</tr>
<tr>
<td>Third party applications can access application data through COM interface which exposes underlying clinical and demographic objects or by the use of purpose build hosted Webservice.</td>
<td></td>
</tr>
</tbody>
</table>

| Functional review | N/A |
### Technical Review

Claims bidirectional access but no details provided. Provides COM API for querying the repository but it is not stated what capability is provided for writing data to the repository or how this is managed/authenticated.

Appears to provide hooks for a variety of event handlers that can then call system methods, presumably via a scripting language.

Unclear what happens if a 3rd party application is hosted on a separate server (e.g. DCOM vs. COM) and needs to invoke an interface on Profile other than through a custom-built web service interface.

Silent on whether Profile can launch 3rd party applications or invoke their interfaces.

### Panel Query

**What capability exists for Profile to launch 3rd party applications or invoke their interfaces?**

### Vendor Clarification

- **COM**
  - DCOM is not supported (ineffective, insecure, difficult technology, losing favour – we use COM, which can be wrapped in a scripting language which can be wrapped in a web service)
  - Scripting language can be: VBScript, JavaScript or C#
  - COM provides read and write methods as per above
  - Examination of the type library or type library explorer will show which methods support Read and which support both Read and Write.

- **Web Services**
  - Users can write their own Web Service Servers
  - Users can import WSDLs
  - Calls have been added to COM when Profile consumes web services (whether its own or others)
  - There is a maintenance screen (in the example, we are running the web services to support Accession and the iPad)

- To respond to the specific “Unclear what happens if a 3rd party application is hosted on a separate server”, Profile would access this by web services using industry standard methodologies and technologies.

- In large scale, dedicated middleware Profile servers can handle these using Profile’s Enterprise Architecture clustering.

### Present typical use cases and describe how these APIs are used by other systems.

**Vendor self-assessment**

In a Prison context, on creation of new appointment for a patient, a Webservice interface queries the Prisoner Management system to check whether the patient is free to attend the clinic and blocks the appointment if there is a conflict.

In Community hospital outpatient setting, patient demographics are pulled from the hospital PMS system using a combination of file based and web service based interfaces.

In Auckland Regional Mental Health service, Mental Health Legal status updates are pushed to Profile using combination of file-based and web service-based interfaces.

### Functional Review

N/A

### Technical Review

The examples given are of bespoke solutions to specific integration problems, implemented within custom web service wrappers outside the Profile product itself. Intrahealth provides rich API and scripting capabilities which enable third parties to integrate with Profile, but such integration does require development work on the part of Intrahealth and/or the third party, and is specific to Profile rather than being reusable with other target systems. It is likely, however, that compliance with future
open EHR interface standards (such as HISO Forms), that were usable across multiple systems, would be straightforward.

No information is provided to enable assessment of functional capacity against other use cases.

<table>
<thead>
<tr>
<th>Vendor clarification</th>
</tr>
</thead>
<tbody>
<tr>
<td>In addition to the above examples, the following can be offered as observations;</td>
</tr>
<tr>
<td>- Predict was implemented in a more traditional way, with us writing customer interfaces, and took a long time and substantial resources</td>
</tr>
<tr>
<td>- DocInfo was implemented using traditional approaches, was very simple so was done quickly and has been used in West Auckland, however, it was slowed by us having to write it – this shows the benefits of making an open EHR available.</td>
</tr>
<tr>
<td>- MDCare was implemented using traditional API approaches</td>
</tr>
<tr>
<td>- BPAC has interfaced to Profile using established COM methods to both query Profile and to push back alerts, reminders and documents. We provided them with the documentation, Type Library and then answered some questions. The delay was while they moved to a Web Service approach and away from a web site philosophy with direct access to the physical layer of the other products</td>
</tr>
<tr>
<td>- Copeman health developed their patient portal on top of Profile using COM and Web Services</td>
</tr>
</tbody>
</table>

**Additional Clarification Points**

- COM is read/write except where writing is dangerous
- The range of published classes is very large
- The Type Library is considered open and is a public interface anyone can use without additional charge. Available to the reviewers on request
- A third party application that launches COM or a Web Service constructed with COM must be provided with authentication credentials within Profile (in effect, it logs on as a “user” and all logs and audits record that)
- Profile is used to launch many third party applications, and be launched by them. A trusted environment can be defined; see screenshot below:

- Currently adding CCOW methodologies for two way integration and coordination
- COM can launch applications as well and CCOW is currently under implementation.
- BPAC has built their interface to Profile using COM to obtain information from the EHCR and to push back tasks, documents and encounter notes.

### 2.3 Access and licensing

*Describe how other systems can access your APIs. What, if any, restrictions do you place on the use of any of the interfaces described?*
### Vendor self-assessment

In addition to standard network access restrictions, third party applications can access Profile data through the use of user-defined Webservice interface and/or COM.

External application access is restricted by username/password which is further restricted by predefined user Roles.

The Web Services framework has built-in support for basic SSL and mutual SSL authentication.

Logging/authentication/encryption is up to the custom implementation and so can be configured to meet the specific access requirements.

<table>
<thead>
<tr>
<th>Functional review</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical review</td>
<td>Standard role-based username/password security within the application.</td>
</tr>
<tr>
<td></td>
<td>No other authentication mechanisms described, such as token-based, certificate-based, Kerberos, etc.</td>
</tr>
<tr>
<td>Vendor clarification</td>
<td>Security model is based on ISO TC215 – so in this respect, the Access Control Matrix is bespoke, but security is not</td>
</tr>
<tr>
<td></td>
<td>Supports Windows Domain authentication and bypass of the logon challenge Supports LDAP services using Scripting.</td>
</tr>
<tr>
<td></td>
<td>Allows other applications to launch and bypass the logon challenge if they are designated as being in the same trusted environment.</td>
</tr>
</tbody>
</table>

### Functional review

N/A

### Technical review

No separate licensing. However, it appears that significant bespoke development is required in practice to use these interfaces, which is an issue both in terms of cost and interoperability.

Whilst Intrahealth provides rich API and scripting capabilities which enable third parties to integrate with Profile, such integration does require development work on the part of Intrahealth and/or the third party, and is specific to Profile rather than being reusable with other target systems.

It is likely, however, that compliance with future open EHR interface standards (such as HISO Forms), that were usable across multiple systems, would be straightforward.

| Vendor clarification | Industry standard methods of interoperability are available, and are being further extended with CCOW. |

## 2.4 Standards / specifications

Which interface standards does the PMS support and how are they implemented (e.g. HSSP, HISO Online Forms etc.)?
### Vendor self-assessment

- Profile supports a variety of messaging methodologies, including:
  - HISOR Referrals, Status and Discharges (RSD)
  - Health Level 7 (HL7): labs, ADT
  - Webservice Protocols: Auckland Regional Patient Demographics update
  - GP2GP
  - Customized Publication. For example, a Discharge Summary can be automatically "published" whenever a certain business rules are satisfied. The Publication Method defines the message protocol, message content and recipient.
  - ePrescribing (WIP)

<table>
<thead>
<tr>
<th>Functional review</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical review</td>
<td>Supports a range of synchronous and asynchronous interfaces. However, they are essentially HL7 v2 messaging plus a couple of ad hoc protocols.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vendor clarification</th>
</tr>
</thead>
<tbody>
<tr>
<td>In general, Profile has suffered from interoperability due to the Medtech dominance (and example: ACC chose to work with one vendor only). We are committed to the PatientFirst approach and this was reaffirmed last week with Andre Bredenkamp that we will support eReferral (once the industry has chosen which of the 5 different approaches they will adopt) and eDischarges which appear likely to be based on CCD. A variety of other interfaces are supported, e.g. Capitation, CPI, HBL, etc Other current work includes being an early adopter of the Health Identify services (through the Plunket project, which uses Profile – this will in turn mean it’s available to all GPs).</td>
</tr>
</tbody>
</table>

### 2.5 Overall Star Rating: Published, standards based APIs

<table>
<thead>
<tr>
<th>Functional</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical</td>
<td>★★★</td>
</tr>
</tbody>
</table>

### 3 Interoperability Priorities

A significant number of sector initiatives and projects which require interoperability have been recently initiated. Some, such as GP2GP, have already produced important artefacts and experience. There is continuing work to enable sharing of health information with the focus on achieving semantic interoperability. It was recognised that execution under the BSMC business cases would lead to increased clinical network information sharing that may make it desirable to quickly move to a standard for record sharing rather than to have different solutions developed in different regions.

### 3.1 Contribution to interoperability environment

Describe how you position your company and PMS within the New Zealand health IT interoperability environment. Explain which national / regional projects you are part of and level of contribution.

<table>
<thead>
<tr>
<th>Vendor self-assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrahealth solutions already comply with most of the required interoperability standards:</td>
</tr>
<tr>
<td>- HL7 messaging for RSDs</td>
</tr>
</tbody>
</table>
MoH has yet to make available a standard interface for public access to the NHI or HPI, however, Intrahealth is actively involved in discussions to support these functions as part of the GP2GP project.

For Generic Interoperability, the preferred solution is WebService API which could be implemented using existing system configuration options.

The system is used in a wide variety of settings in NZ, Australia and Canada, including: General Practice, Community Outpatient, Community Mental Health, Maori Community Health, NZ Defence Forces, Dept of Corrective services, Occupational Health and many more.

### 3.2 Standards

**Which national and international standards for interoperability are currently supported by your PMS (e.g. for patient / provider identification, messaging, record organisation etc.) and how?**

**What are your plans for implementing relevant standards?**

**Of the initiatives you outline in your response to question IO1a, what standards are being applied to each of these?**

| Vendor self-assessment | Messaging Standard 10011.2 v2.1.  
|                        | - Specifically implemented using HL7 v2.4 for Referrals, Status Discharge messages  
|                        | - Inward Referrals with embedded PDF documents are also supported  
|                        | XML messaging is supported in the following context:  
|                        | - Web Services interfaces  
|                        | - Embedded components within HL7 messages (eg GP2GP)  
|                        | Intrahealth will ensure that the system complies with changes to standards that affect the application  
|                        | We are a member of the National Vendor Forum for Practice Management systems. This forum provides a good link to health sector information where notifications and discussions about proposed standards changes are frequently on the agenda  
|                        | CDAC  
|                        | COW (WIP)  
|                        | ePrescribing (WIP)  
|                        | Currently negotiating to be early adopter of Health Identity services |

| Functional review | N/A |
| Technical review | Committed to, and actively involved with, standards-based initiatives in the sector. |
3.3 **Overall Star Rating: Interoperability**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional</td>
<td>★★☆</td>
</tr>
<tr>
<td>Technical</td>
<td>★☆☆</td>
</tr>
</tbody>
</table>

4 **INFORMATION SECURITY, ACCESS AND PRIVACY**

A defined (and refined) set of privacy and security guidelines should be provided to the vendors and refined over time to ensure security and privacy requirements can be met – that align with legislation. There is also a need to define the data governance and privacy principals as they relate to personal health records and shared care records/plans. The proliferation of cloud computing drives a need for a set of principles around data governance across the sector.

Whilst this issue goes beyond primary care, as systems become connected up, broader debate on access and privacy are required. Historic rules have been adjusted by allowing “opt out” of Test Safe, and this seems to be becoming a default option.

As PHRs become used, and patient / whānau access to records increases, a more complex consent / deny access model is potentially needed.

For now, the capabilities of the PMS around (role based) security, information privacy, access and audit of records need to be clearly understood. Where there are add-on products or extensions to the PMS (e.g. Portals), any difference between core PMS functionality and the add-on products should be clear; this includes the way in which data is stored and accessed for such add-on products.

4.1 **Access control**

*Define how you identify users; e.g. make sure users are really the intended persons (authentication)*

*How the PMS can integrate with LDAP (e.g. Active Directory) authentication frameworks and enable single sign-on?*

| Vendor self-assessment | Application can be configured to include password  
|                        | Intrahealth Solutions compatible with Active Directory (AD) and Forefront Identity Manager (FIM).  
|                        | Applications can be configured to use domain validation on logon  
|                        | The application defines a global preference to allow bypassing the logon prompt. In this case Windows Domain Authorization is used.  
|                        | When Domain Authorization is used, user accounts in the application may be set up to reference their Domain account.  
|                        | Logon process can be configured to include:  
|                        | - First time logon Acceptance of Terms and conditions  
|                        | - Ask Security question  
|                        | - Must provide min. x questions and answers  
|                        | - Allow x attempts then force log out  
|                        | - System defined password validation functions (including password recycling limits)  

| Functional review | Standard logon process with username and password.  

| Technical review | Capable of integration with multiple identity management solutions.  
|                  | Capable of credentialing using Windows Domain Authorization.  
|                  | Multiple additional security measures can be implemented within the login process.  

...
<table>
<thead>
<tr>
<th><strong>Intrahealth Evaluation Review of Vendor Self-Assessment</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- No mention is made of certificate- or biometric-based credentialing.</td>
</tr>
<tr>
<td>- Password storage is not described.</td>
</tr>
<tr>
<td><strong>Vendor clarification</strong></td>
</tr>
<tr>
<td>- Certificates can be stored enabling SSL based interoperability</td>
</tr>
<tr>
<td>- Passwords are stored with strong encryption technology</td>
</tr>
</tbody>
</table>

**Explain how you allow access to patient records by authorised users. How do you support role based access?**

<table>
<thead>
<tr>
<th><strong>Vendor self-assessment</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- The application supports a comprehensive Role based configuration.</td>
</tr>
<tr>
<td>- Roles control access to functional areas within the application</td>
</tr>
<tr>
<td>- Roles can also be associated with Access matrix to determine Read/Write/Delete/Create permissions for each object.</td>
</tr>
<tr>
<td>- A default Sys Admin account is set up in the application. Typically this allows access to all functions and within the application.</td>
</tr>
<tr>
<td>- Sub Roles can be defined which inherit stetting's from the “Parent Role”. This can be useful to define sub-categories of administration role such as “Service Staff”, “Systems Admin”, “Super User”</td>
</tr>
</tbody>
</table>

**Functional review** |

| - Individual and role-based access control can be applied to Individual consult notes and to the record overall. |
| - Role-based access can be configured to various functions in the user interface. |
| - A hierarchy of user roles can be defined, with inheritance of privileges. |

**Technical review** |

| - Implements appropriate role-based security configuration. |
| - “Break the glass” is implemented, requiring entry of a reason and password. |
| - There is limited ability to control data sharing: |

![Image](image.png)

**How does your PMS allow remote access to authorised users?**

<table>
<thead>
<tr>
<th><strong>Vendor self-assessment</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- “Provider Portal” and “Patient Portal” are available to authorised users</td>
</tr>
<tr>
<td>- Provider / Patient portal accounts are set up by systems administrator.</td>
</tr>
<tr>
<td>- 1.5 factor authentication is implemented.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Functional review</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional reviewers had experienced remote access to Profile using the Citrix remote desktop solution, but had no experience of the provider or patient portal.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Technical review</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote access to both providers and patients is supported.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Panel query</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What capabilities are provided in the patient portal?</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Vendor clarification</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Browser an OS agnostic and does not need downloaded plug-ins (e.g. Java applets). External Provider (clinicians outside the practice) portal is a web portal talking directly to a practice’s middleware server real time, as much real time as the provider rich client user interface.</td>
</tr>
</tbody>
</table>
Intrahealth Evaluation Review of Vendor Self-Assessment

<table>
<thead>
<tr>
<th>Capabilities are:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Headlines (manual)</td>
</tr>
<tr>
<td>- Alerts (rule based)</td>
</tr>
<tr>
<td>- Similar to below but based on a provider perspective</td>
</tr>
</tbody>
</table>

Patient portal is a web portal talking directly to a practice’s middleware server real-time, as much real time as the provider user interface. Capabilities are:

<table>
<thead>
<tr>
<th>Capabilities are:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Headlines (manual)</td>
</tr>
<tr>
<td>- Alerts (rule based)</td>
</tr>
<tr>
<td>- Review results (once signed)</td>
</tr>
<tr>
<td>- Review flowcharts and clinical outcomes</td>
</tr>
<tr>
<td>- Review problem list and see doctor’s specific instructions</td>
</tr>
<tr>
<td>- Review care plans, objectives and interventions</td>
</tr>
<tr>
<td>- Review encounters (doctors can redact)</td>
</tr>
<tr>
<td>- Enter encounter notes and structured observations (triggers real time rules to alert clinicians)</td>
</tr>
<tr>
<td>- Book appointments directly (not by email)</td>
</tr>
<tr>
<td>- Ask a question including attaching files, pictures, etc (and see answers)</td>
</tr>
<tr>
<td>- Change demographic details</td>
</tr>
<tr>
<td>- View referrals</td>
</tr>
<tr>
<td>- View Care team</td>
</tr>
<tr>
<td>- Change password and security questions</td>
</tr>
<tr>
<td>- See what’s new in the records</td>
</tr>
<tr>
<td>- Review access logs</td>
</tr>
<tr>
<td>- View the account</td>
</tr>
<tr>
<td>- Pay the account by paypal and credit cards</td>
</tr>
<tr>
<td>- Reorder usual medications</td>
</tr>
<tr>
<td>- Consent forms</td>
</tr>
<tr>
<td>- Qualified information and referral to high quality web sites can be established and shared with other providers allowing direction and self-guided learning by patients</td>
</tr>
</tbody>
</table>

All this is under the clinician control, and there are various billing models: Membership (monthly fee), Transactional, Based on asking a question

With data entry, a queue is kept allowing the practice to review and roll back if necessary. Large numbers of rules control access, which screens are available, etc. Separate document available on request.

NOTE: Solution is not like Medtech’s but is more akin to online banking, creating a direct connection always under the doctor’s control

A separate document is available on request.

Describe third party access to PMS data (if any).

<table>
<thead>
<tr>
<th>Vendor self-assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Web Services framework has built-in support for basic SSL and mutual SSL authentication. Logging/authentication/encryption is up to the custom implementation and so can be configured to meet the specific access requirements.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Functional review</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical review</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insufficient information is provided to enable assessment of the robustness of the security measures that are in place beyond basic authentication, but based on the response to SC1a, this does appear to be robust.</td>
</tr>
</tbody>
</table>
**Vendor clarification**

The following tools (among others) are employed:
- Uses HTTPS
- Uses a Proxy Server in IIS
- Privacy consistent with ISO TC 215 (cannot even show data exists because knowing something exists gives information)
- Privacy is managed by role definition including nested AND/OR/NOT statements (e.g. “(Doctor OR (Nurse AND NOT WorkingFromHome))”
- Access privileges (Create, Read, Write, Delete) are managed by Roles or Provider Groups
- Role Actions determine WHAT a user can do
- Access control determines whether a user can “get at something” if theoretically they are able to see it

**Describe your patient consent mechanism and how it is embedded into the workflow**

<table>
<thead>
<tr>
<th><strong>Vendor self-assessment</strong></th>
<th>Patient consent templates are part of system resources and accessible to anyone with appropriate access rights. Specific templates will need to be designed and built. Consent forms can be “triggered’ by user defined events (such as on save of New Patient, renewal of PHO Enrolment etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Functional review</strong></td>
<td>Functional reviewer is not aware of any explicit patient consent functionality.</td>
</tr>
<tr>
<td><strong>Technical review</strong></td>
<td>Explicitly supports patient consent, and can invoke this through event handlers.</td>
</tr>
</tbody>
</table>

**Vendor clarification**

Consent documents can be stored as explicit consent

![Image of consent document storage interface]

**Diagram:**

- Patient consent templates are part of system resources and accessible to anyone with appropriate access rights. Specific templates will need to be designed and built.
- Consent forms can be “triggered’ by user defined events (such as on save of New Patient, renewal of PHO Enrolment etc.).

**Diagram:**

- Functional reviewer is not aware of any explicit patient consent functionality.
- Explicitly supports patient consent, and can invoke this through event handlers.
### 4.2 Privacy and confidentiality

Describe how your PMS protects patients’ privacy and confidentiality of health records; Specifically elaborate on programme level security on management and use of patient records. This should protect confidentiality and integrity of data as well as ensure that users who alter health records cannot falsely deny they made those changes (non-repudiation).

<table>
<thead>
<tr>
<th>Vendor self-assessment</th>
<th>Functional review</th>
<th>Technical review</th>
<th>Panel query</th>
<th>Vendor clarification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Versioning is available on the Electronic Medical Record, Patient (Demographic) Record, Forms, Documents etc. Users can visually compare one version with another.</td>
<td>Consult nodes are fully versioned and it is easy to view old versions of notes.</td>
<td>Authentication, access control, masking, access and change audit and change history are all well supported.</td>
<td>Is there any mechanism to ensure non-repudiation given administrator access to the database?</td>
<td>Profile does not allow the user direct access to the DB, only via the middleware which turns requests into SQLs</td>
</tr>
<tr>
<td>Logically deleted encounters and patient records can be viewed.</td>
<td>Role-based access control restricts who can view particular records or consult notes.</td>
<td>Masked data is indicated to the user.</td>
<td>Because of the three tier design, it is not possible for a user to run an SQL directly against the DB</td>
<td>Because of the three tier design, it is not possible for a user to run an SQL directly against the DB</td>
</tr>
<tr>
<td>Audit views are available to authorised users and show who accessed the record, from which computer, date/time viewing started and ended plus any user explanation that was requested.</td>
<td>Access logs are maintained, making it possible to audit who has looked at what records.</td>
<td>“Break the glass” functionality is available, requiring entry of a reason and password.</td>
<td>In our ASP hosting, we record access to the DB and this is governed by active directories.</td>
<td>In our ASP hosting, we record access to the DB and this is governed by active directories.</td>
</tr>
<tr>
<td>Reporting can also be used to compare changes.</td>
<td>Access to Reporting functions also defined by Role Actions.</td>
<td>Notes that are private to a clinician can be created in the clinical interface by assigning an appropriate access control level to the note.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Configuration of final views available for multi-view windows e.g. the Electronic Medical Record, the Patient Record is then finalised.</td>
<td>If a user attempts to access a record outside of their usual area then the system response can be two fold</td>
<td>The impact of access control on database query results is not specified.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a message box appears warning them that their access will be tracked. If user proceeds then details are recorded within that record. Find Objects report can also be run to identify records accessed in appropriately.</td>
<td>It is not clear whether non-repudiation is achieved, given that it may still be possible for a database administrator to falsify records.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Explain how attachments are managed (e.g. pdf investigation results, scanned documents)

| Vendor self-assessment | Relevant external documents can be scanned and attached to the Referral for future reference  
| | HL7 messages with embedded PDF also supported  
| Functional review | No direct experience by reviewers of sending an attachment with a referral.  
| Technical review | The Intrahealth response addresses the attachment of documents to referrals and HL7 messages, which is a reasonable interpretation of the question but not was intended. From reviewer experience, access to these documents is well managed.  

### How does your PMS protect privacy when generating reports and data sets (e.g. clinical data sets for population health research and reporting to Ministry etc.)? Describe how identifiable personal information is anonymised (if supported).

| Vendor self-assessment | Profile supports the National standard Clinical datasets for reporting to the PHO Performance programmes (Clinical Performance, Service Utilisation and Immunisation). Transactional data can also be reported using built-in anonymisation protocols which remove patient identifiers (such as NHI or Patient Id’s) if required. Patients may opt to make specific clinical transactions “private” which exclude them from being included in patient-identifiable reports.  
| Functional review | Unable to comment on Profile reporting with respect to privacy aspects.  
| Technical review | Whilst there is support for producing reports across de-identified aggregated data, it is not clear how the access control settings on individual data items impact on database reports being executed by various users. The rendering of reports (e.g. confidentiality disclaimers) is not described. It is possible to export/print a restricted view of the individual patient chart, taking access control settings into account.  
| Panel query | Describe how access is controlled to individual data items falling within the scope of a report.  

| Vendor clarification | Information is based on ISO TC 215 secrecy  
| | Each clinical object is “stamped” with a privacy attribute – this can be varied within the user’s permitted rights  
| | The roles of the person running the report are reviewed against each clinical data object they are accessing, and if they do not have credentials, the item is not returned from the middleware (“secrecy”)  
| | Non permitted data is not presented to the reporting system at all.  
| | Other tools:  
| | − Reports can be limited to user roles or places  
| | − Attributes can be set against the patient to, by default, export no data, no data for certain problems, or only if anonymised  
| | − Patients have the right to flag encounters containing data with their own privacy settings (set via the Web Portal)  
| | − Reports can have a standard confidentiality footer  

4.3 Auditing

Describe your auditing mechanism during creation, amendment and access to health records and how you maintain an audit trail.

Describe who has access to the audit results and the security around this.

| Vendor self-assessment | ▪ Audit views are available to authorised users which show who accessed the record, from which computer, date/time viewing started and ended plus any user explanation that was requested.
  ▪ Audits for all users can be exported to a .txt file and saved on Server machine.
  ▪ A Role must have the appropriate role action granted so that users can potentially see the Audit view.

| Functional review | ▪ Logs are maintained of creation, access and deletion of records.
  ▪ Log files appear to only be accessible to users with administrator privileges.

| Technical review | ▪ Extensive auditing is provided within Profile. Log content is not specified.
  ▪ It is not specified whether Profile can dynamically monitor for “unusual” access events, but from reviewer experience this can be readily detected from the logs.

| Vendor clarification | ▪ Attributes captured:
  ▪ User
  ▪ Patient
  ▪ Date Time
  ▪ IP Address
  ▪ Computer name
  ▪ NIC Card
  ▪ Event
  ▪ Warnings presented to user if any
  ▪ etc
  ▪ Users have developed automated rules to monitor for unusual activity based on their security policies; however, we do not supply any as standard.

4.4 Patient / whanau access

Describe how your system enables patients and their caregivers access to their own records (aka Personal Health Records)

| Vendor self-assessment | ▪ See Patient Portal above
  ▪ The Patient portal is currently being extended to support extended family (whanau) access to caregiver access

| Functional review | ▪ Unable to comment – have not seen patient portal.

| Technical review | ▪ A Patient Portal is provided, but no details are specified.

Describe differences (if any) in security mechanisms (especially that relates to privacy and confidentiality) between integrated products / components (e.g. patient portal, mobile apps and client PMS)
The Patient Portal has extensive access and security features to control access and functionality for patients based on their role. This enables different levels of access to be defined depending on requirements.

Extensions are being developed to support access to child records for authorised care-givers.

Unable to comment.

Insufficient information provided to assess this, but it appears that access control uses the same mechanisms throughout.

The assumption is correct. All Access Control is handled by the middleware, and all rich client, web interfaces, mobile interfaces use this single consistent control point.

The system can be configured to define multiple Places of Service (POS) so that users are members of POS and each POS has its own access and security rules.

For example in Auckland Regional Mental Health environment, a single instance defines hundreds of POS's across 3 DHB’s. In this environment POS’s can also be used to restrict access to patient Case notes to those in the current patient’s Care Team.

Privacy settings can be configured based on a combination of Role, Care Team membership, Place of service (location) or user-defined business rules (for example Case status, time since last contact etc.)

For example, in multi-disciplinary environments, access to clinical data can restricted to Clinical users (so administrative staff cannot access it).

“Break Glass” access can also be provided for emergency access (for authorised users) enabling access to otherwise restricted information.

Multiple locations of service can be defined, and separate access and security rules can be set up for each either overall or for particular user roles; providers can be associated with particular locations of service.

Reviewers have not experienced ‘break the glass’ functionality.

Profile provides a robust solution for multi-site, multi-professional access.

Reviewer feedback is that Profile does not implement any formal workflow engine /solution. A reviewer described integrated care workflow being managed using an (inadequate), atomic task-based messaging model.

All clinical transactions are versioned. Users with appropriate access can see Before and After images of each transaction.

Each transaction is recorded with author and time stamp

Audit function also record Update, insert, Delete and View-only access: Start Date/time and End Date/Time
Transactions cannot be physically deleted from the database. Only logical delete from the user interface is available. Audit views are available to authorised users which show who accessed the record, from which computer, date/time viewing started and ended plus any user explanation that was requested.

- Audits for all users can be exported to a .txt file and saved on Server machine
- When the “Break Glass” function is activated for a patient, the user must enter a reason and password. All break-glass activity is logged by the system, and messages are sent to all system administrators

<table>
<thead>
<tr>
<th>Functional review</th>
<th>Separate access and security rules can be set up for each location of service, either overall or for particular user roles. Logs are maintained of creation, access and deletion of records.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical review</td>
<td>Access control and audit is well implemented and described elsewhere.</td>
</tr>
</tbody>
</table>

### 4.6 Location of data

Are you taking copies of patient’s identifiable information and storing it in a separate location other than at the practice? If so what security and audit controls do you have over this and where is the information being stored?

| Vendor self-assessment | No – we are not currently offering a Cloud based solution. Predominantly practices operate self hosted infrastructure models though our partners such as Rotorua General Practice Group provide hosting and support services to their membership
|                       | The location of the Practice’s database is determined by the practice.
|                       | Data is physically stored in your SQL server relational database and direct access to the database is controlled by the system Database Administrator.
|                       | Physical security is provided by secure server facility room with controlled access to authorised users. |
| Functional review     | All data held within the practice. |
| Technical review      | Data is always hosted with the practice, and database security is delegated to them. There is no Cloud-based solution in the New Zealand context.
|                       | Intrahealth advise that a Cloud-based solution exists but that in practice this would require using versions of Profile that are more recent than those widely available in New Zealand. |
| Vendor clarification  | A few sites in New Zealand have elected to be delivered by the cloud but use third party hosters
|                       | The business case for hosting in NZ is unsophisticated and falls well short of best practice cloud delivery
|                       | There is a significant cost to setting up a cloud infrastructure and with the IPAs, PHOs and other organisations supporting Medtech so strongly the business case simply does not exist for Intrahealth to make this investment until the behaviour of these organisations changes.
|                       | Examples of the changes required:
|                       | Business continuity server built in with continuous trickle update as data changes so that if the connectivity fails (the data centre should not if the ASP host has been correctly designed), the practice can continue functioning albeit with limited functionality. |
**Intrahealth Evaluation Review of Vendor Self-Assessment**

- Note this does not require a DB in the practice is secure and allows access to a summary of patient and business continuity functions, including adding notes, which synchronised back when connection is established.

- Optimising document management for an ADSL network
- Modifications to optimise Citrix performance
- Printer management, back end Email, Fax and SMS services, device management
- Statistics gathering to support SLA’s.
- Statistics reporting into the performance system of windows, to detect early warnings of problems
- “Call for help ”technologies in which the system itself can call Intrahealth if it detects a potential problem before it manifests
- Determining some Windows OS calls are “Cloud hostile” and rewriting to avoid those
- Enabling real time end user migration to another server without failure of service, thus enabling machine maintenance while continuing service
- Enabling strong security policies and credentials
- Gaining ISO 13485 certification

### 4.7 Overall Star Rating: Information security, access and privacy

| Functional | ★★★★★ |
| Technical  | ★★★★★ |

### 5 USABILITY – ALERTS MANAGEMENT ONLY

Usability is among the most critical success factors in acceptance of software systems by clinicians. While there is a multitude of guidelines and references for good user interface design there is no definitive standard.

It is our assumption that if a system is difficult to use, (e.g. can’t find features, or misunderstand what the feature is used for) this practically indicates that functionality will either not be used or will be misused.

In the near future it is desirable to achieve consistent GUI and data entry/visualisation functionality including, but not limited to, the following aspects:

- Patient selection and identification
- Diagnostic test orders / prescribing
- Log In and log out
- Record navigation
- Patient documentation
- Error messages and handling
- Medication management (e.g. prescribing, medication lists etc.)
- Clinical coding (tools and automatic / assisted encoding functionality to help reduce clinician workload)

We have identified alerts management in PMS as the top priority usability issue as it is a well known fact that if they are too frequent, the user stops reading them and moves immediately past them. This has serious safety and quality implications.

### 5.1 Alerts management

Describe how your PMS provides patient alerts and manages them effectively.

How are clinical related alerts presented in terms of severity? How are different alerts differentiated (i.e. the ability to easily separate out clinical, environmental or practice related alerts)?

How does the PMS support role-based management of alerts of all types, whether they be user-created, other-user created or generated by third parties?

Is the behaviour of alerts able to be defined at a practice, role or user level? If so, describe what level of user-defined customisation of alert types is available?

<table>
<thead>
<tr>
<th>Vendor self-assessment</th>
<th>Alerts and warnings can be configured to prompt users based on certain actions. For example, when creating a new clinical note, opening an appointment etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Such prompts can relate to:</td>
</tr>
<tr>
<td></td>
<td>- Clinical warnings: Adverse reactions to prescribed drug, overdue immunisation, enrolment to a Care plan etc.)</td>
</tr>
<tr>
<td></td>
<td>Warnings can also be activates at the individual, role or organisation level</td>
</tr>
<tr>
<td></td>
<td>Administrative warnings are distinct from Clinical warnings. These might include: Needs assistance with wheelchair, to be attended by female staff only, Beware of Dog!</td>
</tr>
<tr>
<td></td>
<td>In addition to reminders described above, Alerts based on clinical rules can also be developed. Rules can generate warnings based on data recorded for this client including :</td>
</tr>
<tr>
<td></td>
<td>- Clinical measures</td>
</tr>
<tr>
<td></td>
<td>- Diagnoses</td>
</tr>
<tr>
<td></td>
<td>- Prescribed medications</td>
</tr>
<tr>
<td></td>
<td>- Referrals</td>
</tr>
<tr>
<td></td>
<td>- Or a combination of the above</td>
</tr>
<tr>
<td></td>
<td>- Users can define the threshold levels for warnings relating to Drug Interactions, Contraindications and Adverse reactions (None, High, Medium)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Functional review</th>
<th>A variety of alert pop-ups occur. These can be intrusive and lead to “alert fatigue”. There is a tendency for the same alert to appear multiple times, depending on the particular sequence of tasks being undertaken.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The user interface is powerful, and this can lead to the impression that Profile can be used to automate complex business processes. However, it lacks a proper workflow engine and so business processes must be set up in an ad hoc fashion using its Task system and other features. The interface is cumbersome when used in this way, tends to have a steep learning curve, and is prone to user error until the user becomes sufficiently familiar with the practice's particular configuration. In addition, confusingly, there can sometimes be multiple ways to achieve the same result (such as the creation of a referral letter) but with subtly different system behaviours for each method.</td>
</tr>
<tr>
<td>Technical review</td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td></td>
</tr>
<tr>
<td>• In reviewer experience, alerting is annoying and promotes alert fatigue. It is configurable to some degree, such as defining alerts for user roles.</td>
<td></td>
</tr>
<tr>
<td>• Alerts and warnings are displayed in a large window that must be “clicked through” and then disappears. If they are organised by severity, this is not apparent to the reviewers who have used the system.</td>
<td></td>
</tr>
<tr>
<td>• No mechanism is apparent to respond to alerts or to divert them to other users.</td>
<td></td>
</tr>
<tr>
<td>• Alerts do not appear to be integrated into a wider decision support process.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vendor clarification</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Alerts are configured to appear with “Events” so if they appear multiple times, the preferences have been set up to present them at each of those events.</td>
</tr>
<tr>
<td>• Alerts do not have to popup, they can be added to a background area as described in the CDS section. It would seem that the system was configured with too many alerts all with the popup option.</td>
</tr>
<tr>
<td>• Pressing F3 can close the window</td>
</tr>
<tr>
<td>• Select a line and press F3 opens a task window for the patient, where the alert can be passed to someone else.</td>
</tr>
<tr>
<td>• However, the alerts are largely rule based</td>
</tr>
<tr>
<td>• Alerts are integrated with and part of a generic CDS process as described earlier. See screenshot:</td>
</tr>
</tbody>
</table>

The CDS is not in use in New Zealand, because it needs some entity such as an IPA to manage and distribute it (this is by design to avoid dependency on the software vendor and allow local variation). |

• Alerts can be turned into “Notifications” which is a list that is held rather than a popup appearing which cause popup fatigue. This is a user preference and the two areas it can be displayed in the EHCR are shown in Figure below:
NOTE: The alert system has become much more sophisticated since v7.0 including:
- More events
- More alerts (similar to 7.0 but expanded)
- CDS also presenting alerts
- Patient Alerts participating (static alerts)
- The ability to avoid the popup and have the items appear in notification lists

5.2 Overall Star Rating: Usability

<table>
<thead>
<tr>
<th></th>
<th>Star Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional</td>
<td>★★★</td>
</tr>
<tr>
<td>Technical</td>
<td>★★★</td>
</tr>
</tbody>
</table>
PMS Review Findings 2011

MEDTECH

(Independent Review – not completed by Medtech)

April 2012
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PROVIDER DETAILS

<table>
<thead>
<tr>
<th>Name of organisation</th>
<th>Medtech</th>
</tr>
</thead>
</table>

**Disclaimer**

As noted in the Executive Summary, Medtech declined the opportunity to provide a response to the RFI. As a consequence, the Medtech response was developed by members of the panel.

This response is based upon knowledge of Medtech PMS obtained through experience of its use and through inspection of its user interface. In compiling this report, the panel did not have access to technical descriptions of the Medtech system, architecture, internal workings or its interfaces.

Throughout the report, statements expressed represent the conclusions reached by observation of the Medtech user interface, limited information provided in documentation (e.g. help files) and the company website, and by deduction. It is therefore possible some statements may be factually incorrect.

A copy of this report was provided to Medtech and the company was given an opportunity to respond. Feedback from Medtech has been factored into the report and corresponding star rating.

---

KEY TO REVIEW CONTENT

Medtech did not respond to the original RFI and engaged in the process at the point of reviewing and commenting on the draft detailed report. In the interests of clarity and transparency this document provides a history of this dialogue in the following layout:

<table>
<thead>
<tr>
<th>Section Header</th>
<th>Panel assessment in lieu of vendor response to RFI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vendor Assessment</strong></td>
<td>Where vendor clarification was received based on the draft detailed report, this document includes the Panel’s original draft text</td>
</tr>
<tr>
<td><strong>Original text sent to vendor</strong></td>
<td>Where vendor clarification was received based on the draft detailed report Medtech’s Response / clarification subsequent to reviewing the panel’s detailed report has been included in this document</td>
</tr>
<tr>
<td><strong>Vendor clarification</strong></td>
<td>The Panel’s final view taking into account the vendor’s clarification.</td>
</tr>
</tbody>
</table>
1 STRUCTURED DATA

PMS are required to support structured data for medication lists, problems, allergies, etc. To better support information sharing / interoperability there is a need for use of common terminology (where there are standards that state this). As such, use of NPOCS codes (NZ adaptation of LOINC) for lab orders and results and New Zealand Medicines Terminology (NZMT) through New Zealand Universal List of Medicines (NZULM) service and in near future consequent New Zealand Medicines Formulary are proposed to be included as PMS requirements.

In general, the expectation is that where a messaging standard mandates use of a particular coding system the PMS will need to support it (e.g. LOINC). Where no code system is mandated (such as is currently the case with diagnosis codes) use of such coding systems in the PMS is proposed to not require semantic equivalence or interoperability, but rather that the code, the coding system and meaning of the code be available, consistent with but not limited to the approach being taken for GP2GP. Vendors are expected to engage with the Health IT Cluster and the Sector Architects Group and align with the more recent works in the sector (such as the new Health Identity Project and the draft interoperability reference architecture).

Interoperability should be at a structured data item level, rather than at a text block level (even though text may explain the data or coding). As standards are agreed these need to be adopted or adapted. Vendors are encouraged to outline how their system is architected to support the adoption of such future requirements.

1.1 Non-clinical (demographic and administrative / financial information)

Describe the level of structuring of data in your PMS for patient demographics, administration and financial information.

| Vendor Assessment (Functional) | Demographics well structured – age, gender, ethnicity, registration, residential status, NHI, GeoCode (structured), employer (as free text), insurer (coded). Lacks specificity in ethnicity (e.g. Asian and African races), CS Card, HU Card, Next of Kin, Care Plus data.  
Vendor clarification: Ethnicity can be fully user defined, but instructions from MoH several years ago asked primary care to code using NZ Census codes. Medtech provides the ability to capture three levels of ethnicity  
Financial information – standard accounting structures, coded suppliers, services, schedules of prices for services  
Administration - account details are well structured as expected |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendor Assessment (technical)</td>
<td>N/A</td>
</tr>
</tbody>
</table>
| Functional Review | No employer history.  
Vendor clarification: Tab 5 in Patient Register has current employment information and is linked to ACC45 form, so it is referenced by the PMS. What reason is there to collect other employment history  
The financial is largely invoicing, no expenditure or budgeting.  
Vendor clarification: Full banking module is provided for within the application |
| Technical Review | Adequate |
1.2 **Clinical (core clinical dataset)**

Describe how your PMS represents and stores a core set of patient-centric clinical data with a structure and minimum level of detail required for information exchange, e.g. at a minimum that supports a level of detail that can produce the GP2GP data set.

<table>
<thead>
<tr>
<th>Vendor Assessment (Functional)</th>
<th>We were unable to determine the presence of any underlying reference model. The following is an overview – more detail is provided in subsequent answers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>History/Examination</strong></td>
<td>A free text block and a separate list of coded entries as per classifications list (see below)</td>
</tr>
</tbody>
</table>

**Problem List (“Classifications”)**

*Original text sent to vendor:*

Problem list (“Classifications”) – coded: allows qualification (confirmed, interim, probable, and suspected.) This is a list of occurrences of codes, not a problem list – lots of duplication because of multiple visits, and can declare the same disease twice in the list. There is no problem list. No clean way to say that a consultation is about a specific problem on a problem list.

*Vendor clarification:*

Classification ticked as long term sit at top of list. Ones most recently ticked to apply to a given consultation (ie very easy to assign a problem to a consult) go to the top of the list. Other problem sits at top of non long-term in chronological order. The result is that you get a good demonstration of issues from most recent long-term (e.g. recent asthma, angina, visit for diabetes) down to long-term but no active, e.g. cholecystectomy, and then recent but less consequential, e.g. tonsillitis, and then to more distant and inconsequential. You can filter on the classification to see dates the patient came with this problem. If you try to code a classification that is there already, it will prompt you to repeat the previous code. Of course you can also filter the daily record based on consultation.

**Final report**

**Problem list (“Classifications”)** - coded; allows qualification (confirmed, interim, probable, and suspected). This is a list of occurrences of codes. Classifications marked as long term appear at the top of the list and function as a problem list. Classifications not marked as long term appear as a chronological list of disorder occurrences. If not used correctly, there can be considerable duplication because of multiple visits, as the provider can declare the same disease multiple times in the list. However, regardless of how this coding is done, the daily record can be filtered to show all consultations with a given classification code.

**Prescription items** – coded drug (MIMS), structured amount and repeats, dose or route optionally structured (problems with non-tablet quantities e.g. liquid antibiotic dose); can associate a problem list entry with prescription. Flagged long term vs. not.

**Lab tests, Radiology** - unstructured requests, coded/trendable results

**Referral letters** – Referral letters can contain prepopulated fields and text templates unstructured
<table>
<thead>
<tr>
<th><strong>Documents</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Original text sent to vendor</strong></td>
<td></td>
</tr>
<tr>
<td>Documents – it is possible to separate documents from results using filters, but this is not easy. Can assign a problem to a document, and a source (defined in an internal address book), and a status drop down (empty).</td>
<td></td>
</tr>
<tr>
<td><strong>Vendor clarification</strong></td>
<td></td>
</tr>
<tr>
<td>Status Drop Down is configurable by user to ensure they can create own status lists. Filter enables quick selection of documents/results to be viewed. Easy selection from drop down/selection lists.</td>
<td></td>
</tr>
<tr>
<td><strong>Final report</strong></td>
<td></td>
</tr>
<tr>
<td>Documents - It is possible to separate documents from results using filters. Can assign a problem to a document, and a source (defined in an internal address book), and a status drop-down (configurable list).</td>
<td></td>
</tr>
</tbody>
</table>

| **Vendor Assessment** |  |
| **(Functional)** |  |
| ACC – coded forms as expected. |  |
| Alerts - free text. |  |
| **Warnings** |  |
| - allows free text warnings; coded drugs and drug classes; nature of adverse reactions or certainty are not coded. |  |
| **Vendor clarification** |  |
| No standard for this. Usual practice for Medical32 users is to put some detail in the notes |  |
| **Recalls** |  |
| - type, code (MedTech + local code list), dates, repetition. |  |
| **Screening** |  |
| - code (as per Recalls), date, outcome (empty drop-down), associated follow-up recall. Can set up codes that can be parsed from text (e.g. `phq`), these are written into the Screening database. Can tabulate but not graph these. |  |
| **Vendor clarification** |  |
| User can select to graph and trend a single screening term or multiple screening terms together. Some functionality applied to lab results. |  |
| **Final report** |  |
| Screening – code (as per Recalls), date, outcome (empty drop-down), associated follow-up recall. Can set up codes that can be parsed from text (e.g. `phq`), these are written into the Screening database. Can tabulate and graph these. |  |
| Immunisations – well structured. |  |

<p>| <strong>Vendor Assessment</strong> |  |
| <strong>(Technical)</strong> |  |
| MedTech has been a major player in the GP2GP project and contributed to its design. MedTech32 is able to populate core GP2GP data set completely; and also cover rest of the specification as good as any other PMS can. |  |
| While essential clinical information, such as diagnoses, prescriptions etc., are captured and stored in structured and coded form, laboratory results received from external systems are stored in the format received – as a document. There is the means to map and convert certain data items from these documents into corresponding structured screening data elements but how robust and accurate this process needs to be assessed. |  |</p>
<table>
<thead>
<tr>
<th>Vendor Assessment (Technical)</th>
<th>It should be noted that GP2GP specification has been developed pragmatically and project constraints mandated drawing a line before some structured data set definitions could be agreed on. Therefore the level of structuring and granularity could have been much tighter if it was developed today and it is expected that the specification will evolve as will MedTech's ability to record structured information. Therefore MedTech's continuation as being an active contributor will be critical.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MedTech32 has an ad-hoc data model which has evolved during extensive clinical use; therefore we expect it to be optimised for key aspects such as reliability, performance, ease of querying, extensibility etc.</td>
<td></td>
</tr>
<tr>
<td>Vendor clarification</td>
<td>Medtech32 has an extensive data model that has evolved over many years of extensive use by the majority of GP users in the marketplace.</td>
</tr>
<tr>
<td>Based on examination of &quot;DBstruct.sql&quot; file which provides the SQL statements representing the data model we have the following observations:</td>
<td></td>
</tr>
<tr>
<td>(i) There are more than 300 tables</td>
<td></td>
</tr>
<tr>
<td>(ii) Database level referential integrity rules .....</td>
<td></td>
</tr>
<tr>
<td>Original text sent to vendor</td>
<td>Database level referential integrity rules have not been used (There were no foreign keys defined which is used to reference related tables). Therefore the integrity of the database is left to application and any direct intervention to the database might render it inconsistent and should be avoided. As we did not have access to the database it was not possible to assess whether triggers were in place to ensure data integrity.</td>
</tr>
<tr>
<td>Vendor clarification</td>
<td>Referential integrity is implanted at a different level, within the Medtech Application.</td>
</tr>
<tr>
<td>Final report</td>
<td>Database level referential integrity rules have not been used (There were no foreign keys defined which is used to reference related tables). Therefore the integrity of the database is left to application and any direct intervention to the database might render it inconsistent and should be avoided. As we did not have access to the database it was not possible to assess whether triggers were in place to ensure data integrity. Referential Integrity is implanted at a different level, within the Medtech Application.</td>
</tr>
<tr>
<td>(iii) Database doesn’t seem to be normalised to the fullest extent; however we understand the need for this due to a number of real world constraints such as performance considering the many sites running on old and low end hardware systems. The iterative development over time resulted in an optimised scheme.</td>
<td></td>
</tr>
<tr>
<td>Vendor clarification</td>
<td>Again, the Medtech Database is normalised to the extent needed to optimise the use of the application.</td>
</tr>
<tr>
<td>(iv) In tables where structured data is stored the semantics of data is shared between the application and database; for example in MEASUREMENT table there are 36 separate fields to denote each item, value and date for each observation. The meaning of the values is indicated by a field enumerating corresponding Screening Data item. Any modification by the application to these codes needs to be carefully made to preserve the semantics</td>
<td></td>
</tr>
</tbody>
</table>
When there is a need to capture a clinical screening entry which requires more than 36 data items, such as results of a detailed anatomical pathological assay or genetic testing, it is not clear how this can be stored other than adding extra fields as needed.

**Vendor clarification**
This is achieved using the Advanced Forms module.

It wasn’t possible to assess how other types of structured clinical information usually recorded as medical narratives, such as medical history or physical exam, can be represented.

Additional text sent to vendor (deleted from final report following receipt of Vendor clarification)
While the current data model seems fit for purpose at the moment, based on the observations on the data model above, it seems difficult to evolve and provide a patient centred longitudinal and lifelong EHR without significant reworking.

**Vendor clarification**
Medtech offers a Patient Centred Longitudinal and Lifelong HER through its ManageMyHealth Product Suite.

This section has not changed (from the clinician’s perspective) to any great extent in the last 15 years.

Whilst it is possible to separate documents from results in the Inbox (this being important in clinical workflow), in practice this is difficult to do because the method provided is cumbersome and time consuming.

Whilst there is a data model, there does not appear to be any conceptual information model overlying this, which means that additions to the data model are all ad hoc.

Need to check whether referential integrity has been done with triggers instead. This is a valid alternate method that is sometimes more performant than using foreign keys because of index efficiency issues.

**Vendor clarification**
The Medtech’s PMS has over 20+ years’ proven performance and reliability in the marketplace. Medtech does have a conceptual data model which is the IP of Medtech. The data model and more importantly the implementation of that data model is the IP of Medtech. Furthermore, there is no need for Medtech32 end users to understand the data model in order to use the application.

**Final Report**
MedTech’s PMS does have over 20 years of proven performance and reliability in the marketplace, and MedTech have developed their own data model which supports this. In terms of interoperability, however, a “longitudinal and lifelong shareable EHR” requires data representation that makes use of a conceptual model that will work across multiple, uncoupled systems and survive the evolution of the source system.

Whilst the MedTech data model appears well optimised for local operations, performance and querying, additional work will be required before their data model will facilitate general purpose interoperability with non-MedTech systems.

This is evident in the ad hoc way in which additions can be made by users to the data model. Instead, it appears that bespoke mapping solutions will be required for all interoperability projects that involve systems outside MedTech and ManageMyHealth.
Describe how this core set can be extended when additions or modifications are needed; particularly:
- The ease with which these changes could be applied
- How to ensure backward data compatibility and preservation of semantics
- How related parts of PMS, especially APIs and reporting components will be affected.

### Vendor Assessment (Functional)

- Unable to assess internal architecture.
- No user-configurable coding identified.
- Part of the system includes user-defined data fields and templates containing aggregations of these data fields. These are used for structured documents and “screening” data entry, and can be invoked from within clinical notes to enable structured clinical data entry. They can be used for tracking KPIs of conditions but limited ability to display and interrogate. It is straightforward to extend these data models by adding fields, but there appears to be no way to extend the semantics of individual fields (e.g. going from general to specific). That is, the structures relate to document structure, not document semantics.

**Vendor clarification**

The Medtech’s PMS has over 20+ years’ proven performance and reliability in the marketplace. Medtech does have a conceptual data model which is the IP of Medtech. The data model and more importantly the implementation of that data model is the IP of Medtech. It is Medtech policy not to expose the data models to prevent IP theft. Furthermore, there is no need for Medtech32 end users to understand the data model in order to use the application. Query Builder can be used to perform queries over all sets of data within the application. Extension of the Application can be performed using Advanced Forms without the need for Data Model or Structural Changes to be completed.

### Vendor Assessment (Technical)

Original text sent to vendor

Limited level of extensibility by user without modifying data model and software as most structure and semantics is represented by a combination of software code and data model.

**Vendor clarification**

Medtech32 is a commercial of the shelf software. Extension of the Application can be performed using Advanced Forms without the need for Data Model or Structural Changes to be completed.

**Final report**

- Extension of the Application can be performed using Advanced Forms without the need for Data Model or Structural Changes to be completed. However default data set is hardcoded into software code and data model.

- When there is a need to make changes updates are provided by MedTech which contain SQL update scripts which handle mostly additions to the data schema. Data migration support is also provided if necessary.
- Possible to add new screening entries and mapping existing concepts
- Limited user definable fields (4 user definable fields in Patient Register) – can lead to the same information being recorded in different places by different people.
- Key structured data entries kept in reasonably generic tables; such as MEASUREMENTS table holds all observations from screening entries.
- Overall this aspect is considered adequate

**Functional Review**

Agreed
Medtech (independent review)

Evaluation Review of Vendor Self-assessment

<table>
<thead>
<tr>
<th>Technical Review</th>
</tr>
</thead>
</table>
| Original text sent to vendor
Regarding extensibility it is possible for users to define arbitrary templates/objects and put arbitrary fields in these, and to populate these from text shortcuts within the consultation notes. But there appears to be inadequate representation of the semantics of those fields outside the context of the template they are defined within (e.g. that a BP in one template means the same thing as a BP in another template).

Agree it is overall adequate as a baseline, but appears to lack a proper data dictionary.

Vendor clarification
There is no current NZ data dictionary in agreement. Clearly this is desired by the sector and is of some priority to HISO. Once there is a defined dataset Medtec will be glad to move systems toward it via mappings and updates.

The mapping across terms, forms, template, and labs is present, so if the system is setup correctly a BP in the daily record is the same as the BP in the screening term, the same as the BP in the diabetes annual review etc. Enter once, use many times.

Medtech has a Data Dictionary available internally within the HISO Referrals Engine.

Final report

Regarding extensibility it is possible for users to define arbitrary templates/objects and put arbitrary fields in these, and to populate these from text shortcuts within the consultation notes. But there appears to be inadequate representation of the semantics of those fields outside the context of the template they are defined within (e.g. that a BP in one template means the same thing as a BP in another template).

MedTech's PMS does have over 20 years of proven performance and reliability in the marketplace, and MedTech have developed their own data model which supports this. In terms of interoperability, however, a “longitudinal and lifelong shareable EHR” requires data representation that makes use of a conceptual model that will work across multiple, uncoupled systems and survive the evolution of the source system.

Whilst the MedTech data model appears well optimised for local operations, performance and querying, additional work will be required before their data model will facilitate general purpose interoperability with non-MedTech systems.

This is evident in the approach to Advanced Forms and in the ad hoc way in which additions can be made by users to the data model. With regards to Advanced Forms, this appears to be rather like HL7 v2 messaging – it works well if all participants agree to use only MedTech and to use the same form definitions in the same way, but if broader interoperability is required, this is missing reference to an underlying information model that can be understood by a non-MedTech receiving system without bespoke interfaces. Having said that, there is as yet no central NZ data dictionary in agreement that could be leveraged by MedTech.

Therefore, at this point in time, it appears that bespoke mapping solutions will be required for all interoperability projects that involve systems outside MedTech and ManageMyHealth.

<table>
<thead>
<tr>
<th>Explain how data elements and data set definitions are defined (e.g. ISO 11179).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unable to assess internal architecture. Nothing observed within user interface (including admin screens) that suggests support of ISO 11179 or other metadata standards.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vendor Assessment (Technical)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not supported – data items as part of data model with implicit semantics and metadata</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Functional Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nothing more to add</td>
</tr>
</tbody>
</table>
Describe the use of New Zealand Pathology Observation Code Sets (NZPOCS) standard by your PMS during ordering and reporting of laboratory tests.

**Vendor Assessment (Functional)**

It was not apparent whether or not NZPOCS was being used.

*Vendor clarification*

It is well recognised that NZ labs do not consistently use NZPOCS version of LOINC, so, one has to do what one can with the data. Certainly in inbox screening you can map the results to screening terms. Multiple codes can be mapped to one term. Given that you can map and group from the lab results in a file it is picking up the metadata in a meaningful way.

It is the Labs that create lab results. Medtech is able to import and use any code set supplied as part of the incoming message. Compliance with LOINC is an issue for the labs.

**Vendor Assessment (Technical)**

N/A

**Functional Review**

Nothing more to add

**Technical Review**

Nothing more to add

### 1.3 Health record organisation

Elaborate on PMS health record structure and application functionality which would support:

- Traditional long case format clinical history (past history, family history, social history etc)
- Goal (health programme) based records
- Problem-based records (longitudinal / episodic based-records versus single visit based records)

**Vendor Assessment (Functional)**

The ability to create structured clinical notes is poor. Consult notes are divided into two sections, each with a configurable caption (defaulting to “subjective” and “objective”). It is possible to define “templates” for creating narrative structure, but this is entirely implemented as free-text (e.g. typing shortcuts), not structured in terms of data. There is therefore no means for writing a structured long case if it is anticipated that content within the long case would be persisted within the appropriate sections of the database (such as the structured past history section).

*Vendor Clarification*

You can code the consultations and filter on those codes. You can filter the text based on role, classification, keyword, ACC number etc.

Problem-based notes are restricted to two sections, not the usual four (S/O/A/P). Consult notes can be assigned a Read 2 code representing the disease being dealt with. More than one consult note can be defined for a single clinical encounter and each can have its own disease classification. Consultation notes can be filtered on diagnosis code, role, keyword, ACC number and so forth.

There is no problem list as such. There is a list of “classifications”, which is a time-ordered list of all codings applied to clinical notes. A classification can be marked as “long term”, but there is no clear list of the current “problems” per se, and considerable duplication and repetition occurs within this list. We suspect that GPs would tend to not put “problems” on this list, only “diagnoses”.

There are no goal-based notes. Notwithstanding that, the same issues would occur with goal-based notes as has been described for problem-based notes.
<table>
<thead>
<tr>
<th>Vendor Assessment (Functional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is a Front Page that includes family details, family history, personal past history, demographics, long term problems, long term meds, screening (structured data entries), recalls, and personal history. There is a variable amount of structure apparent. Much of the data is free text with a single code associated. The “screening” section allows for the definition and entry of richer data structures, containing aggregations of administrator-defined typed fields. The “screening” section can be populated by way of text shortcuts in the clinical notes (e.g. <code>\bp</code> for blood pressure), by filling in a structured document (such as an immigration template), or by filling in a dialog box containing the fields from within the “screening” section itself.</td>
</tr>
<tr>
<td>Screening data structures can be manually configured by the system administrator. They contain a structured list of user-selected and user-defined fields, and include mapping with units specified. The coded screening terms are also used to pre-populate text fields defined within forms, but it appears that the result is stored as document free text rather than as structured data. No evidence was seen for coding of the semantics of data items or fields, or for units.</td>
</tr>
<tr>
<td>“Screening” data also contains “outcomes” data, which includes fields such as a code for what was done (e.g. “drug given”), a provider, a date, and an optional associated recall.</td>
</tr>
<tr>
<td>Original text sent to vendor</td>
</tr>
<tr>
<td>‘Advanced Forms’ configuration allowed specification of a list of code sources (e.g. ProCare) and a list of codes. However, no reference to SNOMED or Read was observed.</td>
</tr>
<tr>
<td>Vendor Clarification</td>
</tr>
<tr>
<td>Read codes can be used in Adv Forms if configured and set up as read code fields within the form.</td>
</tr>
<tr>
<td>“Advanced Forms” configuration allowed specification of a list of code sources (e.g. ProCare) and a list of codes. A “Concept Map” can be defined from a third party publisher, which contains a list of concepts and descriptions. Mappings can also be defined from an external code to a specific MedTech table column, and within that, individual values can also be mapped.</td>
</tr>
<tr>
<td>Original text sent to vendor</td>
</tr>
<tr>
<td>Whilst lab results are structured and coded (though the code scheme used is not apparent), the lab ordering does not appear to be structured. It appears to be stored as free text on a lab form, and tracked at the level of the form rather than the test.</td>
</tr>
<tr>
<td>Vendor response</td>
</tr>
<tr>
<td>Tasks can be appended to each lab service and the lab results as a whole. This is configurable by the practice.</td>
</tr>
<tr>
<td>Final report</td>
</tr>
<tr>
<td>Whilst lab results are structured and coded (though the code scheme used is not apparent), the lab ordering does not appear to be structured. It appears to be stored as free text on a lab form, and tracked at the level of the form rather than the test. Tasks can be automatically generated in response to creation of lab/rad orders (configurable by the practice), but there does not appear to be any mechanism to manually associate a task with an order or result.</td>
</tr>
<tr>
<td>Documents contain structured metadata, but in this data, incoming documents do not auto-populate with information from the internal address book (e.g. the “from” field remains empty when a document is received unless this is manually configured). The address book itself is local, with an initial data set provided by MedTech. It appears that MedTech does not maintain this. There appears to be no mechanism to associate a task with a particular document.</td>
</tr>
</tbody>
</table>
### Functional Review

**Vendor Assessment (Technical)**

Nothing more to add

**Vendor Assessment (Functional)**

Agreed. “Screening terms” is incorrect terminology medically. A lot of difficulties controlling screen display and content of the screen. Filtering of clinical data are possible but hard to execute.

Whilst there is division into Subjective and Objective, lack of Assessment and Plan divisions is annoying as this must be entered into the S or A boxes.

*Vendor Clarification*

Boxes in consultation screen do not have to be called S & O; can be labelled for each provider, each section can also have a provider template applied to enable to be defined further.

Inability to delete orders entered by accident, before the consult is closed, is annoying.

Difficult to review old notes, especially by problem or if the notes are more than a year old.

UI terminology - “Screening terms”, “Inbox”, “Outbox” - is incorrect or clunky. Lacks sensible divisions into “lab results”, “letters” etc.

### Technical Review

Contains structure no doubt arrived at iteratively through experience.

---

1.4 **Structured and coded data**

State the chosen health information structure and coding systems in the PMS (this should include the ability to include time-series data).

It is expected, at a minimum, the following types of clinical information be captured in structured and coded form where and when possible:

- Reason for encounter (also secondary reasons if present))
- Problem or diagnosis
- Vitals
- Allergies and adverse reactions
- Substance use
- Treatment and procedures
- Ordering and results
- Medications (past and current)
- Injury details (ACC)
- Past history
- Family history
- Basic maternity history
- Immunisations

*Vendor comment:*

Why is coding ordering relevant? The lab order items are used to create a document that is hand entered by the lab. Lab orders can have tasks attached.

**Vendor Assessment (Functional)**

The primary code set is Read 2. Here, code search is poor e.g. “Polyp” does not return hits on “polyps” and vice versa. Code hierarchy traversal is not logical, for example it is possible to not be able to get back to where you came from as you traverse a tree.
| **Vendor Assessment (Functional)** | Multiple external coding systems are defined within MedTech (apparently only used in “Advanced Forms”), and there is a facility for mapping between externally-defined fields and MedTech table columns. Within this, there is a facility for mapping individual values. However, no formal reference terminology / code mapping capability were observed.

Prescriptions and medication lists are coded using the MIMS drug file.

We were unable to determine what other codes (e.g. lab tests / results) are being used.

There does not appear to be any mechanism for localising/extending code sets, or for defining/using local code sets. Code set updates is supplied by MedTech.

*Vendor clarification*

Can make local codes in Read code setup. Can also group them with added keywords, make common. Eg in our practice we changed IDDM to Type 1 diabetes and NIDDM to type 2 diabetes.

In the “classifications” list, the user can specify whether the code is interim, probable, definite etc. |

| **Vendor Assessment (Technical)** | N/A |

| **Functional Review** | Agreed. The classification search is poor and has not improved over time. |

| **Technical Review** | Nothing more to add |

| **How can the PMS enable assigning multiple codes / terms (possibly from different terminologies) on the same data item?** | It is possible to add more than one “classification” to a consult note, but it appears that in all other circumstances, only a single code can be added to a data item. The codes used appear to be Read 2 codes. There is no indication of any capability to support SNOMED or the types of terminology searches that would be required for SNOMED.

* There is no apparent mechanism for adding codes from different coding systems.

* There is no apparent mechanism for defining post-coordinations of codes. |

| **Vendor Assessment (Technical)** | N/A |

| **Functional Review** | Agreed |

| **Technical Review** | Nothing more to add |

| **Describe how the structured and coded data enable decision support functions such as:** | Allergies/alerts are displayed that relate to relevant prescription items. Other content is made available via integration with third party systems (such as BPAC). No other mechanism was observed for the provision of context-specific content. |

- Presenting appropriate management guidelines during assessment based on clinical context
- Generating medical warnings based on context and record status and actions taken
- Recalls such as for screening, immunisation and disease surveillance |
<table>
<thead>
<tr>
<th>Vendor Assessment (Technical)</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional Review</td>
<td>Agreed</td>
</tr>
<tr>
<td>Technical Review</td>
<td>Nothing more to add</td>
</tr>
</tbody>
</table>

Explain how the structured and coded data supports aggregation of identifiable patient records into clinical datasets for population health and research purposes.

Vendor Assessment (Functional)

It is possible to create *ad-hoc* queries across the database to construct datasets from available structured data, but it is not easy to use. This is done using “Query Builder”. In this interface, users select a variety of fields from system-defined objects, and the results are ANDed together to form a query (for example, constraining patient AND prescription for a specific drug).

**Vendor Clarification**

Medtech provides this capability through HealthStat and LinkTech applications as well as integration with Clinical Audit Tool.

Vendor Assessment (Technical)

N/A

Functional Review

Agreed. SQLs can also be written but this requires SQL programming knowledge

Technical Review

If arbitrary SQL statements can be added as queries and if database access by the application is done under a database administrator account then this is concerning from a security and database integrity as default Interbase security allows such queries to execute even statements that modify the underlying database schema (Data Definition Language (DDL) statements).

Third party tools such as HealthStat can be used to extract data directly from the MedTech database. It should be noted that the value of information extracted using these tools cannot be assessed without an audit of data quality within MedTech implementations.

### 1.5 Medication management

Explain how your PMS keeps an up-to-date list of medications available for prescribing. It is expected that NZMT is to be used as the single source for medications (through NZULM).

Vendor Assessment (Functional)

Original text sent to vendor

Monthly updates of formulary are provided. Updates are downloaded and installed, and then are available. It is unclear about how Pharmac updates are handled.

The drug information appears to be the MIMS drug file. It is not apparent whether or not this is NZULM, or what is done with legacy data should the drug file be modified.

Vendor clarification

Pharmac updates are combined and delivered as part of the MIMS updates. Data comes from one source at the moment and that is MIMS.

Final report

Monthly updates of formulary are provided. Updates are downloaded and installed, and then are available. Pharmac updates are delivered as part of the MIMS updates.

The drug information appears to be the MIMS drug file. It is not apparent whether or not this is NZULM, or what is done with legacy data should the drug file be modified.
<table>
<thead>
<tr>
<th>Vendor Assessment (Technical)</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Functional Review</strong></td>
<td>Updates are provided monthly</td>
</tr>
<tr>
<td><strong>Technical Review</strong></td>
<td>Nothing more to add</td>
</tr>
</tbody>
</table>

**How does your PMS provide list of current medications, past medications and adverse reactions in structured and coded form?**

<table>
<thead>
<tr>
<th>Vendor Assessment (Functional)</th>
<th>Drugs are coded, prescriptions are structured, past medications are structured in the same manner as new prescription items, adverse reactions are coded but nature of reaction is not (this is expressed as free text), nor is its certainty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendor Assessment (Technical)</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Functional Review</strong></td>
<td>Difficult to search for an old prescription: the different search fields are unintuitive</td>
</tr>
<tr>
<td><strong>Technical Review</strong></td>
<td>Nothing more to add</td>
</tr>
</tbody>
</table>

**How does your PMS provide links to commonly used drug references; such as MIMS etc?**

<table>
<thead>
<tr>
<th>Vendor Assessment (Functional)</th>
<th>A button on the prescribing dialog links to MIMS.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendor Assessment (Technical)</td>
<td>N/A</td>
</tr>
</tbody>
</table>
| **Functional Review** | Original text sent to vendor  
Poorly presented, sometimes hyperlinks to PDFs in the medicines database do not work.  
Vendor clarification  
Data is from MIMS. Datasheets direct links to Medsafe. This is not configurable by Medtech. It is part of the MIMS dataset.  
Final Report  
Poorly presented, sometimes hyperlinks to PDFs in the medicines database do not work. The datasheets are supplied by MIMS and MedSafe. It appears that a drug must be selected before drug information can be obtained, so there is no ability to browse MIMS prior to making a drug selection. |
| **Technical Review** | Nothing more to add |

**Describe how you keep medicines lists up-to-date.**

<table>
<thead>
<tr>
<th>Vendor Assessment (Functional)</th>
<th>Periodic computer downloads are obtained.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendor Assessment (Technical)</td>
<td>N/A</td>
</tr>
</tbody>
</table>
1.6 **Overall Star Rating: Structured Data**

| Functional | 2
| Technical | 2 |

2 **PUBLISHED, STANDARDS BASED APIs**

To support additional and external specialist applications (such as decision support, user defined special purpose assessments or integration with other systems) the PMS should support a published API that such applications can use to extract data from and write data back to the PMS.

Ease of data extraction and analysis from some PMS are expressed as being an associated priority issue, but to some extent both are by limitations in terms of available structured data.

The most likely and pragmatic approach is a phased one whereby:

- Vendors are required to expose a defined set of (patient and clinical) information in a structured and published way
- Over time, this moves to a standards based API defined as a sector standard to which vendors need to comply

The main commercial consideration that needs to accompany this requirement is that this is a requirement for being a recognised “certified” product in the market – and should be part of the core product and corresponding standard license and maintenance pricing rather than an additional module.

The way in which patients may wish commercial PHR services to interact with the systems in the practice is still evolving, as is the willingness or otherwise of practices to share or use information in that way. At issue for patients is the extent to which selection of a PHR promoted by a practice or selected by themselves has the potential to lock them into that PHR or to PMS used by the practice (and hence to practices using that PMS).

GP2GP is a standard aimed at making it easier for patients to shift practices. We would expect commercial PHRs to be encompassed by a future PMS API standard / guideline and future plans to interface with Regional CDRs and Shared Care Records.

2.1 **APIs and details**

<table>
<thead>
<tr>
<th>Vendor Assessment (Functional)</th>
<th>Unable to assess</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendor Assessment (Technical)</td>
<td>MedTech32 HISO interface (‘Forms Server’) used by eReferrals in Auckland region. This API is read-only (with SOAP interface) GP2GP API which is supports both read/write operations, with write operations being controlled by the user. Working on to extend GP2GP Toolkit for use in EDS and ePrescribing projects. This will add more detail and finer granularity to the original GP2GP data set however expected to be backward compatible.</td>
</tr>
</tbody>
</table>
| Document Object Model exposed by a dispatch interface within Medtech32 – Read / Write (limited availability)  
Advanced Forms interface – not standard - used for providing web based form applications and connectivity to third party applications such as PREDICT, POAC and Bestpractice |
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Functional Review</strong></td>
</tr>
<tr>
<td><strong>Technical Review</strong></td>
</tr>
</tbody>
</table>

**How are these interfaces presented (e.g. Web services, REST, direct invocation etc.)?**

| **Vendor Assessment** (Functional) | Unable to assess |
| **Vendor Assessment** (Technical) | MedTech32 exposes a SOAP web service on demand for MedTech32 HISO interface, and also requires Advanced forms (and web forms) to be installed  
ManageMyHealth portal communication with MedTech32 is bespoke. However it uses GP2GP toolkit to generate certain information such as clinical summaries for EC in a standard CDA format |
| **Functional Review** | Nothing more to add |
| **Technical Review** | Nothing more to add |

### 2.2 Behaviour of APIs

Describe the behaviour of APIs; e.g. one way read-only or two-way which can update information on PMS. Elaborate on input, processing, output and states.  
How can the 3rd party applications work with the PMS in terms of single click icon for launching the 3rd application, and exposure relevant patient data via API in given context?

| **Vendor Assessment** (Functional) | Unable to assess |
| **Vendor Assessment** (Technical) |  
- MedTech HISO API is read-only with the following characteristics:  
  - responds to locally installed components  
  - supports most of the concepts required by the ARDHB eReferrals project  
- GP2GP API is read/write with these characteristics:  
  - allows the user to generate the GP2GP message, with some control over data items included  
  - allows a recipient to import selected parts of the GP2GP document. The user has control over the data elements to be imported, and can review these prior to import.  
- MedTech32 will allow the activation of a 3rd party application via a toolbar button, subject to licensing requirements. |
| **Functional Review** | Nothing more to add |
| **Technical Review** | HIS and GP2GP deal with specific use cases and have defined behaviours. No other APIs are apparent. |
### Panel query

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
</table>
| How do 3rd party applications invoke the application? Is it configurable without coding? Can patient data be passed? How? | **Vendor clarification**  
No vendor response |

### Present typical use cases and describe how these APIs are used by other systems.

<table>
<thead>
<tr>
<th><strong>Vendor Assessment</strong> (Functional)</th>
<th>Unable to assess</th>
</tr>
</thead>
</table>
| **Vendor Assessment** (Technical) | HISO API is available for a number of uses such as e-Referrals and claiming.  
Advanced forms – typically used for local forms within MedTech32 for data entry, but can link to external services where required (e.g. POAC). |
| **Functional Review**             | Nothing more to add |
| **Technical Review**              | Specific use cases catered for – eReferrals, Predict, POAC. Presumably this is bespoke. |

### 2.3 Access and licensing

Describe how other systems can access your APIs. What, if any, restrictions do you place on the use of any of the interfaces described?

<table>
<thead>
<tr>
<th><strong>Vendor Assessment</strong> (Functional)</th>
<th>Unable to assess</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vendor Assessment</strong> (Technical)</td>
<td>Via Advanced forms, webforms and HISO interface. Advanced forms and webforms have limited write back, but the HISO interface is read only</td>
</tr>
<tr>
<td><strong>Functional Review</strong></td>
<td>Nothing more to add</td>
</tr>
<tr>
<td><strong>Technical Review</strong></td>
<td>Nothing more to add</td>
</tr>
</tbody>
</table>

What is the licensing model and price for each of the interfaces you outline where these are not bundled with the standard PMS license charge?

<table>
<thead>
<tr>
<th><strong>Vendor Assessment</strong> (Functional)</th>
<th>Unable to assess</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vendor Assessment</strong> (Technical)</td>
<td>Separate from application license or standard maintenance and support arrangement. All interfaces typically charged on a per practice per month (or annual basis)</td>
</tr>
<tr>
<td><strong>Functional Review</strong></td>
<td>Nothing more to add</td>
</tr>
<tr>
<td><strong>Technical Review</strong></td>
<td>Nothing more to add</td>
</tr>
</tbody>
</table>

### 2.4 Standards / specifications

Which interface standards does the PMS support and how are they implemented (e.g. HSSP, HISO Online Forms etc.)?

---

**Medtech (independent review)**

**Evaluation Review of Vendor Self-assessment**
<table>
<thead>
<tr>
<th>Vendor Assessment (Functional)</th>
<th>HISO Online Forms is supported. Unable to assess otherwise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendor assessment (Technical)</td>
<td>HISO Online forms standard supported via MedTech32 HISO interface</td>
</tr>
<tr>
<td>Functional Review</td>
<td>Nothing more to add</td>
</tr>
<tr>
<td>Technical Review</td>
<td>Nothing more to add</td>
</tr>
</tbody>
</table>

2.5 Overall Star Rating: Published, standards based APIs

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional</td>
<td>N/A</td>
</tr>
<tr>
<td>Technical</td>
<td>★★</td>
</tr>
</tbody>
</table>

3 INTEROPERABILITY PRIORITIES

A significant number of sector initiatives and projects which require interoperability have been recently initiated. Some, such as GP2GP, have already produced important artefacts and experience. There is continuing work to enable sharing of health information with the focus on achieving semantic interoperability. It was recognised that execution under the BSMC business cases would lead to increased clinical network information sharing that may make it desirable to quickly move to a standard for record sharing rather than to have different solutions developed in different regions.

3.1 Contribution to interoperability environment

Describe how you position your company and PMS within the New Zealand health IT interoperability environment. Explain which national / regional projects you are part of and level of contribution.

<table>
<thead>
<tr>
<th>Vendor Assessment (Functional)</th>
<th>Third party modules have been implemented that are obtained from ProCare, mEnigma and other sources. Auckland regional eReferrals has been implemented. A patient portal, ManageMyHealth has been implemented. MedTech has participated in relevant standards development work and stakeholder meetings. Vendor clarification Medtech provides a large number of interfaces. What practices see is based on utilities that have been installed by them, as well as the Adv forms / web forms / interface that have been made available to them. Every practice is different</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendor Assessment (Technical)</td>
<td>MedTech is a major player in this space and has played a leading role in the development of GP2GP standard. Other aspects under this heading is difficult to assess</td>
</tr>
<tr>
<td>Functional Review</td>
<td>Agreed. Also suggest including BPAC and also Canterbury Pathways eReferrals. Third party modules are not available outside of their immediate jurisdiction.</td>
</tr>
<tr>
<td>Technical Review</td>
<td>MedTech has been a significant player in standards work. The BPAC integration is bespoke and involves hand-written mappings. Not seen integration with Canterbury Pathways, if there is any, so unable to assess. Vendor clarification BPAC is available to those that have a license to run it. Canterbury Pathways is also available through dynamic icons to those that have been installed with it.</td>
</tr>
</tbody>
</table>
3.2 Standards

Which national and international standards for interoperability are currently supported by your PMS (e.g. for patient/provider identification, messaging, record organisation etc.) and how?

What are your plans for implementing relevant standards? Of the initiatives you outline in your response to question IO1a, what standards are being applied to each of these?

<table>
<thead>
<tr>
<th>Vendor Assessment (Technical)</th>
<th>Functional Review</th>
<th>Technical Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>∀ HL7 v2.x – HealthLink standard for transport of laboratory and radiology results</td>
<td>Nothing more to add</td>
<td>Whilst supports interface standards such as HL7 v2.x and RSD, does not adequately support content standards within that which would support semantic interoperability of the data (such as proper coding of lab tests and results, or common data dictionary data definitions for fields other than those explicitly defined in the messaging standards). Lack of coherent information model makes interoperability difficult, requiring bespoke adapters and mappings.</td>
</tr>
<tr>
<td>∀ GP2GP standard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>∀ Terminology standards:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>∀ LOINC for laboratory results and ordering,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>∀ READ codes for diagnoses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>∀ MIMS for drugs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.3 Overall Star Rating: Interoperability

<table>
<thead>
<tr>
<th></th>
<th>2 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional</td>
<td>2 2</td>
</tr>
<tr>
<td>Technical</td>
<td>2 2</td>
</tr>
</tbody>
</table>

4 INFORMATION SECURITY, ACCESS AND PRIVACY

A defined (and refined) set of privacy and security guidelines should be provided to the vendors and refined over time to ensure security and privacy requirements can be met – that align with legislation. There is also a need to define the data governance and privacy principals as they relate to personal health records and shared care records/plans. The proliferation of cloud computing drives a need for a set of principles around data governance across the sector.

Whilst this issue goes beyond primary care, as systems become connected up, broader debate on access and privacy are required. Historic rules have been adjusted by allowing “opt out” of Test Safe, and this seems to be becoming a default option.
As PHRs become used, and patient / whānau access to records increases, a more complex consent / deny access model is potentially needed. For now, the capabilities of the PMS around (role based) security, information privacy, access and audit of records need to be clearly understood. Where there are add-on products or extensions to the PMS (e.g. Portals), any difference between core PMS functionality and the add-on products should be clear; this includes the way in which data is stored and accessed for such add-on products.

4.1 **Access control**

<table>
<thead>
<tr>
<th>Vendor Assessment (Functional)</th>
<th>Users are authenticated by way of username and password. No other capabilities, such as use of certificates or tokens, were observed.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weak passwords are permitted. It is not known how passwords are stored.</td>
</tr>
<tr>
<td></td>
<td>No LDAP integration was apparent.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vendor Assessment (Technical)</th>
<th>MedTech32 uses simple username and password for authentication</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Users identified by shorthand user code</td>
</tr>
<tr>
<td></td>
<td>- Password not mandatory, nor any password policy rules regarding length, composition etc.</td>
</tr>
<tr>
<td></td>
<td>- Not integrated with LDAP</td>
</tr>
<tr>
<td></td>
<td>- There are high risk security deficiencies in the storage of passwords within the system</td>
</tr>
<tr>
<td></td>
<td>No single sign on options.</td>
</tr>
<tr>
<td></td>
<td>Database access by the application is via a single account with administrative privileges which allows for anyone with local access to view and alter contents</td>
</tr>
</tbody>
</table>

**Functional Review**

Agreed.

**Technical Review**

There are serious concerns regarding the handling of passwords in the database, and use by the application of a database account with administrator privileges to access the database. The latter is particularly risky from a security and database integrity point of view as default Interbase security allows such queries to execute even statements that modify the underlying database schema (Data Definition Language (DDL) statements).

**Vendor clarification**

- Medtech is a commercial off the shelf software product.
- Users are never required to ever work at the database level or modify the database.
- There are multiple layers to security. Physical security of the database is the responsibility of the customer. Our guidelines recommend having a comprehensive security policy to protect the server room, actual servers hosting the database, the operating system access to the server etc.
- Medtech guidelines recommend use of strong passwords. Actually password policy at each practice is the responsibility of the customer.

**Explain how you allow access to patient records by authorised users. How do you support role based access?**

<table>
<thead>
<tr>
<th>Vendor Assessment (Functional)</th>
<th>Access privileges are defined at the level of the individual. This is fairly granular and allows control over access to various screens, database elements and functions, including administrator functions.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Individual users can mark individual consultation notes as “confidential”. If this is done, access is restricted to a list of users defined by that user.</td>
</tr>
</tbody>
</table>
### Vendor Assessment (Technical)

No group-based access privileges were observed and there was no apparent means to define user groups or assign users to them.

<table>
<thead>
<tr>
<th>Vendor Assessment (Technical)</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional Review</td>
<td>Agreed</td>
</tr>
<tr>
<td>Technical Review</td>
<td>Nothing more to add</td>
</tr>
</tbody>
</table>

**How does your PMS allow remote access to authorised users?**

**Vendor Assessment (Functional)**

This evaluation was conducted based on an instance of MedTech installed on a server on a local area network. We understand that a hosted solution exists, but we have no knowledge of its implementation.

In the local server configuration, remote access is achieved by way of Windows Remote Desktop.

**Vendor Assessment (Technical)**

No direct remote access to application, users must first use Remote Desktop or some other 3rd party utility to first access a machine at the practice

**Support brief casing**

- Makes a copy of database on laptop that user can then take off-site, changes made on laptop are merged to main server when user returns to site.
- Requires exclusive use of database for download to laptop

**Functional Review**

Original text sent to vendor  
Can also be done my Logmein and similar web based VPNs. Hosted solution has been executed by 2Onions.

**Vendor clarification**

Medtech also provides a cloud based version.

**Final report**

Can also be done my Logmein and similar web based VPNs. Hosted solution has been executed by 2Onions. Medtech also provides a cloud based version

**Technical Review**

Nothing more to add

**Describe third party access to PMS data (if any).**

**Vendor Assessment (Functional)**

There is a Medtech notification to the sector regarding “recognised 3rd party products” identified as: BPAC, Enigma, Konnect (for insurance reports), HealthStat, HealthLink, CMP Medica (MiMS).

These appear to have a proprietary interface with MT32. Refer to the following URL for further information: [www.medtechglobal.com/global/services/integration-program.html](http://www.medtechglobal.com/global/services/integration-program.html)

- As per the notification MedTech’s product performance and reliability will not be warranted by MedTech if any 3rd party products are integrated with Medtech that are not approved by MedTech.
- Third party data access appears to be via direct query of the database. Other providers, such as Doctor Info, install software locally on the server, which appears to directly query the database. We have no knowledge of any query API.
- It is unclear what security provisions are possible, or implemented, to control access at database level.

**Vendor Assessment**

N/A
4.2 Privacy and confidentiality

Describe how your PMS protects patients' privacy and confidentiality of health records; Specifically elaborate on programme level security on management and use of patient records. This should protect confidentiality and integrity of data as well as ensure that users who alter health records cannot falsely deny they made those changes (non-repudiation).

Vendor Assessment (Functional)  
There is an audit log of changes. It is possible to observe who made changes and what changes were made.

Individual users can mark individual consultation notes as “confidential”. If this is done, access is restricted to a list of users defined by that user. There is no “break the glass” capability in this regard, and no mechanism to deal with statutory duty to report.

Individual users can be configured to have access, or be blocked from, particular screens or functions. This is system-centric, not patient-centric, in that it does not appear to be possible to restrict access to individual data items other than through the “confidential” checkbox.

No other means of restricting access were identified.

Vendor Assessment (Technical)  
- Basic username and password authentication at application level
- No specific password policy
- Database access is not user specific and via application specific connection
- Ability to mark records are ‘confidential’ thereby restricting access to the user who created the record (or trusted others)
- Access to different modules set during user creation

Vendor clarification

Medtech is a commercial off the shelf software product.

Users are never required to ever work at the database level or modify the database.
There are multiple layers to security. Physical security of the database is the responsibility of the customer. Our guidelines recommend having a comprehensive security policy to protect the server room, actual services hosting the database, the operating system access to the server etc.

Medtech guidelines recommend use of strong passwords. Actually password policy at each practice is the responsibility of the customer.

**Final report**

- Basic username and password authentication at application level; Medtech guidelines recommend use of strong passwords.
- Password policy at each practice is the responsibility of the customer
- Ability to mark records are ‘confidential’ thereby restricting access to the user who created the record (or trusted others)
- Access to different modules set during user creation

<table>
<thead>
<tr>
<th>Functional Review</th>
<th>Agreed</th>
</tr>
</thead>
</table>
| **Technical Review** | If database access is via an administrator account then there is essentially no data access control, because ad hoc report queries can be used to subvert any security settings.  
**Vendor clarification**  
*Medtech is a commercial off the shelf software product.*  
*Users are never required to ever work at the database level or modify the database.*  
*There are multiple layers to security. Physical security of the database is the responsibility of the customer. Our guidelines recommend having a comprehensive security policy to protect the server room, actual servers hosting the database, the operating system access to the server etc.*  
*Medtech guidelines recommend use of strong passwords. Actually password policy at each practice is the responsibility of the customer* |

**Vendor Assessment (Functional)**

Scanned documents are imported into the patient’s “inbox” (document/result repository), then electronically filed.

Images and PDF files can be imported into MedTech by way of storing them on a local file system folder, and recording a link to that location within MedTech (that is, the files in question are not imported into the database).

**Vendor Assessment (Technical)**

Two types of ‘attachments ‘ as below:

- Scans which go into a BLOB database and can be encrypted
- Files (e.g. digital camera images) which are stored in a folder/file location with a pointer in MedTech32 to that location, typically a folder designated on the server BUT could be anywhere (e.g. local workstation)

**Functional Review**

If scanned documents are OCR’d and cut and pasted into an inbox document they can then be “attached” to outgoing documents. However MedTech has no capability to otherwise use OCR for its proprietary scanning process and even this is an “added cost module”.

The process for attaching documents is kludgy and lacks even simply drag and drop capability.
How does your PMS protect privacy when generating reports and data sets (e.g. clinical data sets for population health research and reporting to Ministry etc.)? Describe how identifiable personal information is anonymised (if supported).

**Vendor Assessment (Functional)**

Reports are generated using “Query Builder”. In this interface, users select a variety of fields from system-defined objects, and the results are ANDed together to form a query.

No access control is apparent other than controlling which users have access to this facility. It should be noted that access to this facility gives a user access to full patient information, including personal details and financials.

It is unknown what access controls (if any) are implemented at database level.

There is no apparent mechanism for anonymising clinical data other than excluding identifiable personal information (other than the file ID) from the query.

**Vendor Assessment (Technical)**

N/A

**Functional Review**

Agreed.

**Technical Review**

If database access is via an administrator account then there is essentially no data access control, because ad hoc report queries can be used to subvert any security settings.

---

### 4.3 Auditing

Describe your auditing mechanism during creation, amendment and access to health records and how you maintain an audit trail.

Describe who has access to the audit results and the security around this.

**Vendor Assessment (Functional)**

Changes to clinical data are recorded. Changes can be inspected by all users having access to the clinical records.

There does not appear to be an access log.

**Vendor Assessment (Technical)**

Audit Tab on most screens tracks when record first added and when last updated

Audit tab available to all users

Not all details of changes are recorded (usually just first added/ last updated) though changes to Clinical note entries ARE recorded at a before/after level.

Doesn’t track “views” of the records

Audit specific fields present in key tables in the MedTech32 database which holds sensitive information.

**Functional Review**

Nothing more to add

**Technical Review**

No access log.
### 4.4 Patient / whanau access

Describe how your system enables patients and their caregivers access to their own records (aka Personal Health Records)

<table>
<thead>
<tr>
<th>Vendor Assessment (Functional)</th>
<th>Original text sent to vendor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A Personal Health Record, ManageMyHealth exists but we do not have access and were unable to assess it. No other patient access to records is provided.</td>
</tr>
<tr>
<td>Vendor clarification</td>
<td>ManageMyHealth Uploads are completed automatically on change/addition to any piece of data for a registered ManageMyHealth user ensuring real-time accuracy of data for the patient. Uploads are not scheduled for specific times or only once a day.</td>
</tr>
<tr>
<td>Final report</td>
<td>A Personal Health Record, ManageMyHealth, is available as an add on. ManageMyHealth uploads are completed automatically on change/addition to any piece of data for a registered ManageMyHealth user ensuring real-time accuracy of data for the patient. Uploads are not scheduled for specific times or only once a day.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vendor Assessment (Technical)</th>
<th>N/A</th>
</tr>
</thead>
</table>

**Functional Review**

It works but requires a daily upload to the Manage My Health server as opposed to an “as needed” retrieval as per other systems e.g. Healthlink

**Technical Review**

Nothing more to add

Describe differences (if any) in security mechanisms (especially that relates to privacy and confidentiality) between integrated products / components (e.g. patient portal, mobile apps and client PMS)

| Vendor Assessment (Functional) | Unable to assess. No mobile apps or client PMS capabilities were identified, and we did not have access to the ManageMyHealth portal. |
| Vendor Assessment (Technical) | Could not be assessed |

**Functional Review**

Nothing more to add

**Technical Review**

Nothing more to add

### 4.5 Care team access

Describe how your PMS provides access in a multi-site, multi-professional integrated / shared care setting.

| Vendor Assessment (Functional) | There was no indication that MedTech is capable of multi-site, multi-professional integrated/shared utilisation other than by way of multiple client computers logged into a common MedTech server on a network. |
| Vendor clarification | Medtech provides for comprehensive through the Integrated Care Module. |

| Vendor Assessment (Technical) | N/A |
Correct. This has been implemented on the West Coast and East Tamaki health and works well.

Describe what access, security and audit controls are in place over this including what is definable at a system policy level.

Vendor Assessment (Functional) N/A
Vendor Assessment (Technical) N/A

4.6 Location of data

Are you taking copies of patient’s identifiable information and storing it in a separate location other than at the practice? If so what security and audit controls do you have over this and where is the information being stored?

Vendor Assessment (Functional) Third party companies may do backups off-site. The example of this that we are aware of involves accredited MedTech engineers. Technicians login remotely as server administrator, then do a backup in the database and download and store that off-site. The company providing this service has their own server. Security around storage and access is unknown.
Vendor Assessment (Technical) Practices data typically stored on site except for standard off-site backups as recommended by industry best practice.
Off-site storage typically tape, external HDD, USB memory drive
Increasingly practices use on-line backup solution (e.g. Nexus)
[ManageMyHealth contains patient identifiable information in a hosted environment]

4.7 Overall Star Rating: Information security, access and privacy

| Functional | 1½ |
| Technical | 1½ |

5 USABILITY (ALERTS MANAGEMENT ONLY)
Usability is among the most critical success factors in acceptance of software systems by clinicians. While there is a multitude of guidelines and references for good user interface design there is no definitive standard.
It is our assumption that if a system is difficult to use, (e.g. can’t find features, or misunderstand what the feature is used for) this practically indicates that functionality will either not be used or will be misused.

In the near future it is desirable to achieve consistent GUI and data entry/visualisation functionality including, but not limited to, the following aspects:

- Patient selection and identification
- Diagnostic test orders / prescribing
- Log In and log out
- Record navigation
- Patient documentation
- Error messages and handling
- Medication management (e.g. prescribing, medication lists etc.)
- Clinical coding (tools and automatic / assisted encoding functionality to help reduce clinician workload)

We have identified alerts management in PMS as the top priority usability issue as it is a well known fact that if they are too frequent, the user stops reading them and moves immediately past them. This has serious safety and quality implications.

5.1 Alerts management

Describe how your PMS provides patient alerts and manages them effectively.

How are clinical related alerts presented in terms of severity? How are different alerts differentiated (i.e. the ability to easily separate out clinical, environmental or practice related alerts)?

How does the PMS support role-based management of alerts of all types, whether they be user-created, other-user created or generated by third parties?

Is the behaviour of alerts able to be defined at a practice, role or user level? If so, describe what level of user-defined customisation of alert types is available?

| Vendor Assessment (Functional) | Alerts pop up when a file is opened, and click-through is required to access the file. There is no apparent mechanism for representing alert severity, no apparent mechanism to separate out clinical, environmental or practice related alerts. No apparent role-based alert control mechanism and no ability to customise alert behaviour. |
| Vendor Assessment (Technical) | N/A |
| Functional Review | Agreed. Visual presentation is limited, alert fatigue is high. Unintuitive. The user/MedTech interface is very old fashioned and out of date |
| Technical Review | Nothing more to add |

5.2 Overall Star Rating: Usability

| Functional | ★☆ |
| Technical | ★☆ |
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PROVIDER DETAILS

MyPractice response to RFI for PMS Requirements

1. **RFI response form**

   Provider details

<table>
<thead>
<tr>
<th>Name of organisation</th>
<th>My Practice Limited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of contact person</td>
<td>Dr Ashwin Patel</td>
</tr>
<tr>
<td>Position of contact person</td>
<td>Chief Executive Officer</td>
</tr>
<tr>
<td>Postal address</td>
<td>52 Gladstone Road, Parnell, Auckland</td>
</tr>
<tr>
<td>Mobile number</td>
<td>021 209 9093</td>
</tr>
<tr>
<td>Facsimile number</td>
<td>09 303 1807</td>
</tr>
<tr>
<td>Email address</td>
<td><a href="mailto:ashwin.patel@mypractice.co.nz">ashwin.patel@mypractice.co.nz</a></td>
</tr>
</tbody>
</table>

We have examined the request for information documents (RFI) for the evaluation of our Practice Management System.

We have read and understood the terms and conditions set out in Section 2 of this document.

We attach our RFI response in accordance with your request for RFI.

We attach all information required by the RFI.

Signed by: [Signature]

Dated: 11/8/2011

On behalf of: My Practice Ltd
(the submitting organisation)
1 **STRUCTURED DATA**

PMS are required to support structured data for medication lists, problems, allergies, etc. To better support information sharing / interoperability there is a need for use of common terminology (where there are standards that state this). As such, use of NPOCS codes (NZ adaptation of LOINC) for lab orders and results and New Zealand Medicines Terminology (NZMT) through New Zealand Universal List of Medicines (NZULM) service and in near future consequent New Zealand Medicines Formulary are proposed to be included as PMS requirements. In general, the expectation is that where a messaging standard mandates use of a particular coding system the PMS will need to support it (e.g. LOINC).

Where no code system is mandated (such as is currently the case with diagnosis codes) use of such coding systems in the PMS is proposed to not require semantic equivalence or interoperability, but rather that the code, the coding system and meaning of the code be available, consistent with but not limited to the approach being taken for GP2GP. Vendors are expected to engage with the Health IT Cluster and the Sector Architects Group and align with the more recent works in the sector (such as the new Health Identity Project and the draft interoperability reference architecture).

Interoperability should be at a structured data item level, rather than at a text block level (even though text may explain the data or coding). As standards are agreed these need to be adopted or adapted. Vendors are encouraged to outline how their system is architected to support the adoption of such future requirements.

1.1 **Non-clinical (demographic and administrative / financial information)**

Describe the level of structuring of data in your PMS for patient demographics, administration and financial information.

<table>
<thead>
<tr>
<th>Vendor self-assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>MyPractice has actively participated in the development and implementation of the GP2GP project and can confirm full compliance with exchange of all data elements. All demographic information is captured as structured data using the lowest practical level of detail (typically level 3). Health sector standard value domains are enforced when available (Titles, Marital Status, Gender, Language, Countries, Ethnicity as initially sourced from NZ Data Dictionary 1995).</td>
</tr>
</tbody>
</table>

Occupations are recorded using the ACC code set to facilitate e-lodgement, but further details can be captured as part of the social history.
Users cannot add/alter the Standards based options.

Attention has been applied in capturing data at the most appropriate level of detail for administrative or clinical usage. e.g. Ethnicity is captured using the most granular level of the NZ code set. This enables patients to have their specific ethnicity recorded (which is preferred by patients).

Grouping is left to the code set hierarchy, rather than at the discretion of the patient or staff, (no one needs to guess whether a Cambodian patient should be recorded as South East Asian or as Other Asian)

Addresses are broken down to a level where automated geo-locating and deprivation indexes can be assigned (via an always up to date web service)

MyPractice has been identified as an early adopter of the Health Identity Project and will be implementing the new NZ Post Web service for addresses.

Unlimited addresses and contact numbers can be recorded with usage and preference annotation.
Date of entry in NZ / Country of Birth is captured.

Links to NHI lookup and the MOH Eligibility rules algorithm are provided next to the relevant fields.

Enrolment dates and supporting information are captured.

Full relationship mapping is supported including patient’s Next of Kin, In Case of Emergency, Care givers, Case Managers, Specialists, LMC/Midwifes, Previous and next General Practitioners. The Next of Kin is used directly for NIR notification.

Family Groups are maintained to facilitate booking appointments and seamlessly moving between family members during consultations.
Selected family members can have addresses/contact details updated together.

Multiple funding schemes (CSC, High Users) are recorded along with supporting criteria as appropriate (Care-plus). Capitation is uploaded electronically every quarter. Historical schemes are kept.

Audits of data element changes are kept, including Previous/New Values, date time and users.

Error Providers (as circled) provide prompts for completeness of important data elements but do not restrict recording of whatever data is available.

Users are subsequently alerted to missing data (e.g. NHI, Ethnicity, enrolment at appropriate times).
Account holder information is captured including other patients or organisations. Settings can be set for statements and administration fees.

Source of referral or attendance is recorded for subsequent analysis to guide marketing.

Patient preferences capture consents, Opt off registers (such as Test-Safe), Defaults for Close control, repeat script / review frequency.

Freeform text notes are captured for administrative staff. Individualised alerts (non clinical) and clinical (Post-it notes) can be set.

Practices are able to set up and maintain their own fields (in structured categories). These fields are available for reporting / searches. Example of usage includes Schools including Class and Teacher, Iwi affiliations, Religion, employment including Role and position, employer.

This extensible module negates a need to capture unstructured demographic data even when the practice’s needs are peculiar.

Further work has begun on integration with the Health Identity Project and providers of Health Services information that will allow seamless access to Provider information that is always up to date.

The Health Identity Project will enable two-way updates for patient information including demographic, contact details and medical warnings.
This information is also synchronised with Managed Care initiatives such as CCMS (HSA Global) which also extends to core clinical information.

Development has commenced for facilities to enable a patient to update their own information, including touch screen applications deployed in waiting rooms and on-line access via patient portals.

MyPractice integrates with existing patient portals (e.g. HSA Global, Medifile) and plans to integrate with others, such as Orion’s Patient Portal and Manage My Health.

Full accounts receivable information is captured and used to create flexible reports to manage debts, monitor services provided and track income.

MyPractice captures and stores atomic information on invoice items, batched invoices, payments and payment allocations. The data model fully supports standard practices for both cash basis and accrual methods of accounting.

Invoices are assigned to providers, business entities, patients and responsible payors to support self payment, other patient or organisation account holders and third party payors.

Payments can then be allocated to the service provider and the business entities in any combination. Manual and electronic submissions of claims are fully supported.

Electronic reconciliation of payments is also available. GST exclusive amounts and GST rates are recorded.

<table>
<thead>
<tr>
<th>Functional review</th>
<th>Active participant in GP2GP noted. Full integration with Health identity index a real bonus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical review</td>
<td>Good</td>
</tr>
<tr>
<td>Panel query</td>
<td>Has the transfer between systems being fully tested. What are the financial arrangements for ongoing maintenance of the system?</td>
</tr>
<tr>
<td>Vendor clarification</td>
<td>GP2GP underwent comprehensive testing between all four vendors. This was carried out by an independent party commissioned by Patient’s First. MyPractice successfully completed these tests. On-going maintenance will be financed from within the user subscriptions.</td>
</tr>
</tbody>
</table>

1.2 Clinical (core clinical dataset)

Describe how your PMS represents and stores a core set of patient-centric clinical data with a structure and minimum level of detail required for information exchange, e.g. at a minimum that supports a level of detail that can produce the GP2GP data set.

| Vendor self-assessment | We have used an information architecture for representing the comprehensive and longitudinal health record meeting clinical and ethico-legal requirements while supporting the interoperability of clinical information systems. This has been deployed across NZ since 1994. Clinical data is captured complete with its context at appropriate levels of structure for its intended usage task. Our information model is derived largely from the Good European Health Record and subsequent work of CEN TC/251. These projects developed comprehensive multi-media information architecture for using and sharing electronic healthcare records, meeting clinical, technical, educational and ethico-legal requirements. |

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We have contributed to and learnt from the Australian Good Electronic Health Record project including an implementation of the GEHR kernel (this work currently continues under international Open Source Foundation, openEHR).

Use has been made of HL7’s Clinical Document Architecture, ASTM’s CCR and CCD for messaging where appropriate (GP2GP toolkit).

Most of our clinical data is stored at Level 3 (most granular) and fully populated GP2GP at detailed level.

The record is structured in a way that preserves the meaning of the information when it was originally written, so that it can be understood if read by another person elsewhere. Clinical involvement in the design and implementation has been critical to its success.

A lot of care has been taken to faithful preserve meaning and remain faithful to the clinical care process.

The source is attributed, dated and context captured.

Entries represented in MyPractice include observations about what the patient reports and what the practitioners find. This includes facts and conflicting, uncertain, or negative statements. Practitioners record what they think, problems, plans, justifications, rational, analyses, groupings of problems and differential diagnoses. Actions including orders and results for investigations, referrals and treatments. Correspondence, opinions and contributions from other parties.

Clinical information is represented as mixtures of narrative, structured, coded and multimedia entries.
There is a need for the structure of information in the record to be appropriate to the needs of practitioners. Internally appropriate data is structured using the archetype methodology to represent the domain specific characteristics.

Certain elements require narrative text over a structured entry to retain expressiveness. This supplements a core structured and coded record.

User acceptance, efficiency gains and some outcomes benefits can be demonstrated through its use.

Systems have all been developed through a progressive evolution of functionality and scale, usually through close working partnerships between the development teams and clinical champions, over a period of decades.

Successes have been demonstrated by achieving complete direct clinical data entry at the point of care. The real value of good record keeping /structure can be demonstrated in how this information can be presented in support of the clinical process e.g. filtered abstractions are used to support the reasoning of the practitioner.

Progress Notes

<table>
<thead>
<tr>
<th>Date</th>
<th>25/02/2004 10:15 a.m.</th>
<th>22/06/2004 5:20 p.m.</th>
<th>B10/2003 8:00 a.m.</th>
<th>13/02/2003 3:20 p.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author</td>
<td>Demo</td>
<td>Demo</td>
<td>Demo</td>
<td>Demo</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>Diabetes mellitus Preventive 65.</td>
<td>Diabetes C10...</td>
<td>Diabetes mellitus regular review C10...</td>
<td>Diabetes - controlled</td>
</tr>
<tr>
<td>Presenting Complaint</td>
<td>- Immunization</td>
<td>- Diabetes mellitus regular review C10...</td>
<td>- Diabetes mellitus regular review C10...</td>
<td>- Diabetes - controlled</td>
</tr>
<tr>
<td>History</td>
<td>BMI 50.5. Seen by Specialist - early cessation</td>
<td>BSL 5.8. On 10u insulin at night + morning sugar 7.5 (was sugars of 3 or 4 before lunch but no more recently spent 1/2 in Hawaii. Alcohol status 14 standard units/week)</td>
<td>Morning glucose - 7.5 (pre-lunch - 5.5 (all ok ex of hypoglycaemia). Pre-dinner - 6.7)</td>
<td></td>
</tr>
<tr>
<td>Exam</td>
<td>BP= 130/80.</td>
<td>BP= 145/95.</td>
<td>BP= 140/90.</td>
<td>BP= 150/100.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action</td>
<td>LAB - HbA1c.</td>
<td>RX - Glucose Ints 3 times daily, 100mg.</td>
<td>RX - Metformin Hydrochloride Tab 850mg twice daily, 150 tablets</td>
<td>RX - Diacepan 80mg, 1 daily, 50 tablets</td>
</tr>
<tr>
<td></td>
<td>RX - Metformin Hydrochloride Tab 850mg twice daily, 150 tablets</td>
<td>RX - Glucose Ints 3 times daily, 100mg.</td>
<td>RX - Metformin Hydrochloride Tab 850mg twice daily, 150 tablets</td>
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</tr>
<tr>
<td></td>
<td>RX - Metformin Hydrochloride Tab 850mg twice daily, 150 tablets</td>
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<td>RX - Metformin Hydrochloride Tab 850mg twice daily, 150 tablets</td>
<td>RX - Glucose Ints 3 times daily, 100mg.</td>
</tr>
</tbody>
</table>

Medication History

- Metformin Hydrochloride Tab 850mg twice daily
- Glucose Ints 3 times daily
- Diacepan 80mg, 1 daily, 50 tablets
- Metformin Hydrochloride Tab 850mg twice daily
- Metformin Hydrochloride Tab 850mg twice daily

Demox Tab 100 mg, 1 capsule

- Lincomycin (10 mg, once daily)
- Amoxicillin (500 mg, once daily)
- Metformin Hydrochloride Tab 500mg once daily
- Metformin Hydrochloride Tab 850mg twice daily
- Metformin Hydrochloride Tab 850mg twice daily

Medication Timeline

- Demox Tab 100 mg, 1 capsule
Laboratory and measured values (Vitals).

<table>
<thead>
<tr>
<th>Functional review</th>
<th>Down to level 3 GP2GP and very good mapping of measurements and results because of structured data.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical review</td>
<td>Says the reference model is based on GEHR and subsequent work of CEN TC/251. The reference model (GEHR), whilst a distinct improvement on systems lacking a reference model is nonetheless somewhat dated, but it sounds promising that subsequent work has been leveraged, presumably CEN EN 13606. Also “makes use of” CDA, CCR and CCD. Clinical data appears highly structured.</td>
</tr>
</tbody>
</table>
| Describe how this core set can be extended when additions or modifications are needed; particularly: | - The ease with which these changes could be applied  
- How to ensure backward data compatibility and preservation of semantics  
- How related parts of PMS, especially APIs and reporting components will be affected. |
| Vendor self-assessment | Additional data elements within an existing code set are added with full compliance to data integrity (codes are not re-used, or removed but are deprecated, codes are stored with reference to their code sets).  
It is possible to have multiple code sets co-exist within a domain (Diagnosis with Read Codes and Diagnoses with SNOMED codes, rather than force a remapping of previous codes that would risk a change in intended meaning).  
Tools are also provided to re-map code sets where appropriate under the direct control of users e.g. Smoking status, imported drugs and allergies |

![Image of Code Remapper](image1.png)
Users can add their own demographic data elements.

Tools are provided to map data elements when provided by third parties such as Laboratories and electronic decision Support providers.

Data structures are designed for extensibility.

New elements and structures can be introduced without change to the database through the implementation of use types and format types that describe the metadata of additional archetypes.

A reference database is distributed and updated by MyPractice. This central distribution ensures consistency and accuracy.

An example of recent change is with HbA1c change to mmol/mol.

This is handled at the time of access / reporting and not by changing existing data.

Changes to API are done with due consideration to backward compatibility and asynchronous deployment. New methods are introduced if changes to interfaces or returned data format are required.

<table>
<thead>
<tr>
<th>Functional review</th>
<th>Can see how can add new codes for tasks or own code if can’t find in read. But unsure how could add new measurement e.g. a questionnaire score.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical review</td>
<td>Good vocabulary implementation, with awareness of the risks of mapping. Addresses both code set and dataset maintenance.</td>
</tr>
<tr>
<td>Panel query</td>
<td>How would a user add a new measurement, e.g. for a patient questionnaire score for a depression index?</td>
</tr>
<tr>
<td>Vendor clarification</td>
<td></td>
</tr>
</tbody>
</table>
  - If new concepts / coded data elements are used in our user-defined forms, the associated data is stored with the supplied code. It is then available for retrieval in that form and any other form based on the supplied code. Coded data is also available for document templates and queries.  
  - We recommend new concepts are reported / submitted back to us, so that they can be implemented consistently between practices / nationally.  
  - A national Concepts list has been developed to facilitate this process, with reference to SNOMED-CT for conditions, LOINC for Laboratory and ULM for medications. This will enable cross-system consistent use of elements.   |
**Vendor self-assessment**

The ISO/IEC 11179 Specification and Standardisation of Data Elements proposed a standard approach for the construction of a metadata dictionary. This is a framework standard rather than a populated dictionary of healthcare elements.

The conceptual model for managing classification schemes provided by ISO 11179 was applied in developing the Concept list used to describe data elements between systems in projects such as the e-referrals (also extensively used the HIS0 online forms standard).

This concept list is also used internally by MyPractice to identify data elements.

Parts of ISO/IEC 11179 provided guidance on how to develop unambiguous data definitions, names with embedded meaning and the data item’s definition and value domain. This concept list has been provided to the Sector architects interoperability group and will be considered by HIS0 in due course.

**Functional review**

Not able to evaluate.

**Technical review**

ISO/IEC 11179 has been used in the internal architecture of MyPractice.

Describe the use of New Zealand Pathology Observation Code Sets (NZPOCS) standard by your PMS during ordering and reporting of laboratory tests.

**Vendor self-assessment**

MyPractice has adopted the NZPOCS standard for ordering and reporting of laboratory tests. This code set is based on LOINC (Logical Observation Identifiers Names and Codes) with extensions to cover result and order sets specific to New Zealand.

Orders are internally coded with the NZPOCS. Incoming codes include the NZPOCS but also consist of a variety of propriety codes originating from the laboratories. Internal mapping is performed on incoming results to facilitate searches and aggregate reporting including graphical displays.

On line laboratory orders are under development. NZPOCS codes will be used in these projects.

**Functional review**

Yes they are used
1.3 **Health record organisation**

Elaborate on PMS health record structure and application functionality which would support:
- Traditional long case format clinical history (past history, family history, social history etc)
- Goal (health programme) based records
- Problem-based records (longitudinal / episodic based-records versus single visit based records)

**Vendor self-assessment**

The Problem Oriented Medical Record

Failure to trace the evolution of each problem for a patient can result in unnecessary delays or failure in instigating the correct clinical management.

The key organisational structure within patient records is the problem list (Profile). Advantages of maintaining this list include permitting medical problems to be dealt with scientifically, improving continuity of care and allowing audit.

To enable satisfactory functioning of this model the problem list must be kept visible to the user so that each problem could be followed through until it was resolved. Progress notes should be linked to a problem and be easily retrievable.

MyPractice has successfully adopted the POMR and further enhanced its functionality without placing unacceptable burden on the user’s limited time.

Problems can be classified (Coded)

Problems can be enhanced with structured details

Diagnosis and actions can be re-used in follow up consultations

Clinical pathways and smart forms help populate SOAP notes
Specific prompts help capture relevant information about each problem or important lifestyle category.

Pregnancy, Obstetric and menstrual history is available for female patients
- Care plans (with SMART Goals)
- Freeform
- Templates e.g. antenatal, diabetes
- Management Plans (e.g. Chronic Disease Management, Shared Care)
- Episodes of care

SOAP Notes
- Weed introduced the Problem Orientated Medical Record (POMR) in 1971.
- This proposed a format for clinical records consisting of a problem list and, separately for each problem, a plan (diagnostic, therapeutic and educational) and a daily SOAP (Subjective, Objective, Assessment and Plan) progress note.
- MyPractice fully supports and extends this model
- Progress notes include the patient’s perspective (presenting complaint)
- Multiple problems are handled, each with their own SOAP sections
- Complete note entry in any order and easily move back and forth between problems
- Investigations, referrals, prescriptions are attached to the problem
- Add diagrams and attachments specific to any problem
Add a second problem (and as many more as required) with its own history, examination findings and actions.

MyPractice has enabled a simple process to acquire a retrospective picture of events within one problem entered sequentially in date order.

‘Side views’ (consult history) are accessible from the problem list, current consultation or ad-hoc allowing just relevant consultations regarding a specified problem to be displayed in such a way to clearly see the progression of that problem over time. One can clearly follow and assess how the history, examination and actions have changed over the course of an illness.
<table>
<thead>
<tr>
<th>Functional review</th>
<th>Can do both of these things well</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical review</td>
<td>Good structured clinical documentation.</td>
</tr>
</tbody>
</table>

### 1.4 Structured and coded data

State the chosen health information structure and coding systems in the PMS (this should include the ability to include time-series data).

It is expected, at a minimum, the following types of clinical information be captured in structured and coded form where and when possible:

- Reason for encounter (also secondary reasons if present)
- Problem or diagnosis
- Vitals
- Allergies and adverse reactions
- Substance use
- Treatment and procedures
- Ordering and results
- Medications (past and current)
- Injury details (ACC)
- Past history
- Family history
- Basic maternity history
- Immunisations

**Vendor self-assessment**

First generation Read v2 has been the standard for diagnosis coding in primary care. The limitations of representing terms in a single hierarchy have been overcome by using search methods in line with clinician behaviour. Multiple terms can be concurrently used and stepping up or down a single hierarchy is not needed.

Velocity searching further enhances the search of these codes.

Both the preferred term and Read code are stored. The Term may be further annotated / modified without changing the code for display purposes.
Second generation systems that allow poly-hierarchy, and are combinatorial systems suitable for multiple purposes have been introduced. E.g. LOINC and internally SNOMED-CT for results and measurements.

SNOMED-CT, LOINC and NZULM coded concepts are used for our API interface.

Further deployment of SNOMED-CT for diagnosis coding is planned and awaiting acceptance from receiving parties such as ACC.

Complex expressions comprising a combination of terms (e.g. including qualifiers) will be introduced.

Over time we are expecting access to a live terminology service, at run-time, in order to ensure currency of the coded platforms without the need for periodic updates and cross sector consistency.

Terms for Diagnosis, Current problems, Past History, Family history, Maternity, treatment and procedures are coded as above.

Orders and results are coded with NZPOCs (LOINC).

ACC code sets are used for accident details except the diagnosis (Read).

Immunisations use code sets provided by the NIR.

Medications are currently coded using the NZULM codes. This has been adopted early along with electronic prescriptions. This allows positive matching with pharmacy systems. We anticipate that all other parties will follow shortly including Pharmac, and the NZMF.

Medication allergies and adverse reactions are currently coded in a derivative of the ATC codes but will shortly adopt the NZULM as suitable hierarchy / classifications are established.

Well-structured clinical records improve the completeness of the information documented within a clinical encounter. In order to support evidence (guidelines) based management, consistent shared care and to allow clinical audit to take place across a range of clinical settings, forms and templates have been adopted.

These facilitate rapid and structured data entry catering for the majority of possible responses. This includes the use of anatomical diagrams, tick-boxes, pick-lists and preferred terms.
Graphical displays and time line views make use of time-series data for all vital measurements, results and medication history (multiple elements can be tracked).

**Functional review**
This is in place and meets the standard

**Technical review**
Good implementation of coding.
With Read 2, correctly stores both the code and the selected term.

**How can the PMS enable assigning multiple codes / terms (possibly from different terminologies) on the same data item?**

**Vendor self-assessment**
Data items are coded by users with a single code. This same coded term however can be presented to different parties with different terms and codes as required through mappings e.g. Ethnicity is captured using the lowest level Ethnicity groups. It is presented to CBF registers as the level 2 codes and to other exports using Level 1.
Lab results often will have multiple codes assigned to them. Proprietary codes are often received. An internal code is added to each result then mapped to any other code set as required e.g. NZPOCs (LOINC) codes. The original code received is also stored to maintain integrity.

Drugs often have several codes assigned to them. Brand Codes, Pharmaceutical classifications (ATC, Pharmac Chemical ID), NZULM and distribution codes (Pharmacode). This is achieved with multiple data fields for each medication and cross referencing.

<table>
<thead>
<tr>
<th>Functional review</th>
<th>Says can met this, and has to receive labs and drugs with multiple codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical review</td>
<td>Single codes for each data item. However, aware of the need for post-coordination, and states this is coming.</td>
</tr>
</tbody>
</table>

Describe how the structured and coded data enable decision support functions such as:
- Presenting appropriate management guidelines during assessment based on clinical context
- Generating medical warnings based on context and record status and actions taken
- Recalls such as for screening, immunisation and disease surveillance

Vendor self-assessment

Structured and coded data allows intelligent systems such as MyPractice to understand and act on provided data. MyPractice compares patient specific observation values with population norms and highlights potential risk factors.

Examples of internal decision support include simple logical algorithms such as an alert to a user that a patient’s screening task or recall is overdue.

Screening tasks are auto generated based on age/sex and registration status. Any completed tasks generate an automated record. Practices set up screening protocols based on factors such as age, sex, ethnicity. Calculations derived from one or more clinical observation parameters such as a cardiovascular disease risk score.
Demographic, disease coding and Laboratory codes and internal mapping is used to gather appropriate factors for the Framingham equation.

Extra factors are prompted and saved for subsequent use.

Algorithms that compare new entries with existing record entries and with reference databases, such as drug prescribing systems; these function as alerting systems;

The code enables alerts for drugs containing allergens at multiple levels. e.g. synermox will trigger an alert for a patient allergic to penicillin.

Coded problems entered in to the profile are used for contraindication checks.

The enactment of an electronic guideline and decision support function is of greatest clinical value when it is linked to the circumstances and needs of an individual patient.

Rule-based systems incorporating probabilistic algorithms to determine the most likely clinical decision or pathway from a set of predetermined options.

Triggers include text typed by the user. This results in suggestions on the side.

Further resources are available on request ranging from Handouts, differential diagnosis and translation services.
If the suggestion is accepted, an interactive guideline is presented. Advice on recommended actions is re-calculated continuously as further data is provided. This means data entry can be in any order and even incomplete data will produce valuable evidence based guidance.

**Functional review**

Does this to high standard with more than just alerts and prompts, smart suggestions pop up based on the text being written. Then smart links to selection of resources like web pages or internal forms or files.

**Technical review**

Highlights potential risk factors by comparing data items with population norms. Algorithms can trigger alerts based on patient data. Rules-based systems with probabilistic algorithms select most likely clinical pathway from a set of options.
Explain how the structured and coded data supports aggregation of identifiable patient records into clinical datasets for population health and research purposes.

**Vendor self-assessment**

Clinical audit aims to promote a culture of working to standards and of encouraging clinicians regularly to review the quality of care they provide. This promotes a positive attitude towards critical self-appraisal in the context of an open, supportive and learning environment.

Data collection has been integrated into a normal workflow to minimise effort required to create records that can act as an invaluable resource with which to perform audit and for population analysis.

Built in audits and reports exist for many areas such as Task management and Recalls (Smear and mammogram audits), data completeness (for Capitation), Population demographics and clinical behaviour.

Predesigned reports including those using SQL reporting services are very easy to run. Exports are available to Excel and PDF formats.

For increased flexibility, our Query Builder provides ad-hoc access to all data (Demographic, administrative, clinical and service related) with simple and complex logic structures.
Data can be saved in an Excel format, used to create alerts, send mail merged letters, emails or text messages.

Structured and coded data is aggregated and extracted for Clinical Performance Indicators, IMS, Health Stats, Dr Info that enable comparison between practices and PHOs.

<table>
<thead>
<tr>
<th>Functional review</th>
<th>Meets this standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical review</td>
<td>Well implemented.</td>
</tr>
</tbody>
</table>

### 1.5 Medication management

Explain how your PMS keeps an up-to-date list of medications available for prescribing.

It is expected that NZMT is to be used as the single source for medications (through NZULM).

**Vendor self-assessment**

A database update is provided 1-2 monthly by Pharmac which is combined with the latest release of the NZULM codes. This is distributed to practices along with our automated online updates. This includes information on Funding, Special Authority status / forms, and discontinuations.

Drug vs. allergy, Drug vs. drug interactions, drug dosage by age, contraindications, pregnancy, breastfeeding alerts are distributed.

In the near future we expect the Pharmac tables to be provided with the ULM codes embedded.
We eagerly await the NZMF which will contain updated information via a Web service. This will be fully integrated to allow information on Drug dosages, drug–drug interactions, indications, contraindications, Pregnancy and lactation compatibility, sports suitability. The NZULM codes will provide the link between Pharmac, MedSafe, and the NZMF.

<table>
<thead>
<tr>
<th>Functional review</th>
<th>Yes meets standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical review</td>
<td>Automated 1-2 monthly updates of latest NZULM and Pharmac databases.</td>
</tr>
</tbody>
</table>

**How does your PMS provide list of current medications, past medications and adverse reactions in structured and coded form?**

**Vendor self-assessment**

Medications are stored in a consistent structure, whether they are single prescriptions, regular medications or being reviewed in the prescription history.

Medications are coded with specific codes that represent the specific brand or generic item, as well as their pharmaceutical classification.

Additional information is now captured on dispensed items (Date, actual drug dispensed, quantity, pharmacist and contact details) as it is returned via e-prescriptions.

Lists of regular drugs, prescribed drugs and allergy lists can be accessed by the query builder, internal API, HISO Forms, e-Referral, SureMed insurance forms and web forms such as Maternity Forms for shared care.

Extract formats include JSON (JavaScript Object Notation) Format which is a lightweight data-interchange format, XML and Excel spreadsheets. Recently extracts to CCR /CDA has been enabled via the GP2GP toolkit.

The internal drug coding system is being progressively replaced with NZULM.
<table>
<thead>
<tr>
<th>Functional review</th>
<th>Yes meets the standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical review</td>
<td>Well structured, integrates with ePrescribing.</td>
</tr>
</tbody>
</table>

How does your PMS provide links to commonly used drug references; such as MIMS etc?

**Vendor self-assessment**

Full integration is provided to the electronic Pharmaceutical Schedule as provided by Pharmac. Special Authority criteria/forms are integrated.

We have integrated links to EMC (Electronic Medicines Compendium), MedSafe, Pharmac and the Electronic Special Authority sites.

We have integrated links to EMC (Electronic Medicines Compendium), MedSafe, Pharmac and the Electronic Special Authority sites.

MIMS is accessible for licensed users. One click access opens the MIMS application or navigates to the online version.
The NZMF will be fully integrated into MyPractice providing free extensive clinically oriented information that will be NZ specific and contain current best practice advice on prescribing not limited to datasheets.

- Independent, authoritative and comprehensive drug information
- Accurate, up to date
- Promote safe, effective medicines
- Cost effective utilisation, improved access

<table>
<thead>
<tr>
<th>Functional review</th>
<th>They exist within the product but simply are links to the external resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical review</td>
<td>Provides links to a number of drug information resources, and the electronic Pharmaceutical Schedule. MIMS is accessed as a separate, stand-alone application.</td>
</tr>
</tbody>
</table>

Describe how you keep medicines lists up-to-date.

**Vendor self-assessment**

We receive a file containing the NZ Pharmaceutical schedule from Pharmac every 1-2 months, NZULM codes are assigned to all drugs, this is then distributed to sites through an online update.

Plans are already in place to access medicine information via a web service as soon as it is made available with the NZMF. Practices will be enabled to update their systems in real time or with daily periodic updates. Information will include pricing, funding and availability.

<table>
<thead>
<tr>
<th>Functional review</th>
<th>Automated update is in place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical review</td>
<td>Automated 1-2 monthly updates of latest NZULM and Pharmac databases.</td>
</tr>
</tbody>
</table>

### 1.6 Overall Star Rating: Structured Data

| Functional | ★★★★ ★★★★ |
| Technical  | ★★★★ ★★★★ |

### 2 PUBLISHED, STANDARDS BASED APIs

To support additional and external specialist applications (such as decision support, user defined special purpose assessments or integration with other systems) the PMS should support a published API that such applications can use to extract data from and write data back to the PMS.

Ease of data extraction and analysis from some PMS are expressed as being an associated priority issue, but to some extent both are by limitations in terms of available structured data.

The most likely and pragmatic approach is a phased one whereby vendors are required to expose a defined set of (patient and clinical) information in a structured and published way.

Over time, this moves to a standards based API defined as a sector standard to which vendors need to comply.

The main commercial consideration that needs to accompany this requirement is that this is a requirement for being a recognised “certified” product in the market – and should be part of the core product and corresponding standard license and maintenance pricing rather than an additional module.
The way in which patients may wish commercial PHR services to interact with the systems in the practice is still evolving, as is the willingness or otherwise of practices to share or use information in that way. At issue for patients is the extent to which selection of a PHR promoted by a practice or selected by themselves has the potential to lock them into that PHR or to PMS used by the practice (and hence to practices using that PMS).

GP2GP is a standard aimed at making it easier for patients to shift practices. We would expect commercial PHRs to be encompassed by a future PMS API standard / guideline and future plans to interface with Regional CDRs and Shared Care Records.

### 2.1 APIs and details

Which APIs are exposed by your PMS? Describe the different types of interfaces, level of detail of data and services offered by these APIs.

<table>
<thead>
<tr>
<th>Vendor self-assessment</th>
<th>APIs exposure functionality to</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Read, write data including</td>
</tr>
<tr>
<td></td>
<td>Patient identification and demographics</td>
</tr>
<tr>
<td></td>
<td>Provider and Practice details</td>
</tr>
<tr>
<td></td>
<td>Clinical and service information</td>
</tr>
<tr>
<td></td>
<td>Consultation notes</td>
</tr>
<tr>
<td></td>
<td>Problem list</td>
</tr>
<tr>
<td></td>
<td>Smoking / alcohol status</td>
</tr>
<tr>
<td></td>
<td>Measurements and vitals</td>
</tr>
<tr>
<td></td>
<td>Laboratory results</td>
</tr>
<tr>
<td></td>
<td>Perform Actions</td>
</tr>
<tr>
<td></td>
<td>Create Recall and screening tasks</td>
</tr>
<tr>
<td></td>
<td>Create invoices</td>
</tr>
<tr>
<td></td>
<td>Prescriptions</td>
</tr>
<tr>
<td></td>
<td>Order Tests</td>
</tr>
<tr>
<td></td>
<td>Referrals/documents</td>
</tr>
<tr>
<td></td>
<td>Create RSD formatted messages for Healthlink</td>
</tr>
</tbody>
</table>

A link is provided for integration partners where documentation and samples are provided. [http://www.mypractice.co.nz/Support/ForDevelopers/WebformSample/tabid/172/Default.aspx](http://www.mypractice.co.nz/Support/ForDevelopers/WebformSample/tabid/172/Default.aspx). A sample screenshot:
### Functional review
Not able to evaluate.

### Technical review
Appears to have comprehensive APIs.

### How are these interfaces presented (e.g. Web services, REST, direct invocation etc.)?

**Vendor self-assessment**

- Windows.External and SOAP APIs
- Rest based JSON services
- Enigma (Predict) API
- Best Practice API
- TIM (Counties Manukau’s Template Interface Manager)
- HISO e-Forms API
- e-Chat /Touch screen web service API
- HSA Gobal CCMS (Managed care)
- Geostan API
- SureMed API (document exchange)
- Electronic Special Authority
- PriMed (Mental Health)
- Vensa (EZtext) text messaging
- Kiwifax
- Under development
- Health Identity Project
- NZMF
- E-post

### Functional review
Not able to evaluate.

### Technical review
Combination of Web services and direct APIs. Implements a range of third-party APIs.
2.2 Behaviour of APIs

Describe the behaviour of APIs; e.g. one way read-only or two-way which can update information on PMS. Elaborate on input, processing, output and states.

How can the 3rd party applications work with the PMS in terms of single click icon for launching the 3rd application, and exposure relevant patient data via API in given context?

<table>
<thead>
<tr>
<th>Vendor self-assessment</th>
<th>APIs provide bidirectional access as above. 3rd party products can be invoked</th>
</tr>
</thead>
</table>

**Panel query**

Please elaborate on bidirectional access and 3rd party application invocation.

**Vendor clarification**

Almost all demographic and clinical data elements are available to these interfaces. This constitutes selection from about 1500 different elements. Our SDK for developers contains this information with instructions on its usage.

**Present typical use cases and describe how these APIs are used by other systems.**

| Vendor self-assessment |  
|------------------------|---|
|  
| Predict/Diabetes/CVD management web form from Enigma are launched by clicking on the Predict or appropriate service links  
| The form is opened within the context of the current patient and provider  
| Data is pre-populated on to the form via the API.  
| The user adds/updates information.  
| Data including the CVD Risk assessment is written back in to the clinical notes. This measurement is used for review and available for CPI reporting.  
| Recalls are completed/ created, Problem list are updated.  |
ProCare web forms are used to obtain rule based voucher numbers, access diagnostic services and make claims using eligibility and clinical data. Invoices are generated within MyPractice to track debts and reconcile payments.

Best practice web forms allow access to interactive decision support on a multitude of topics/clinical scenarios. Documents, lab orders and scripts are initiated via the API.

Functional review

Seem to be but would want technical assessment of “sufficient”

Technical review

The typical use cases appear well supported.

2.3 Access and licensing

Describe how other systems can access your APIs. What, if any, restrictions do you place on the use of any of the interfaces described?

<table>
<thead>
<tr>
<th>Vendor self-assessment</th>
<th>Functional review</th>
<th>Technical review</th>
</tr>
</thead>
<tbody>
<tr>
<td>All functionality and support is provided to licensed parties</td>
<td>Licensing restrictions only</td>
<td>Full access to licensed parties.</td>
</tr>
</tbody>
</table>

What is the licensing model and price for each of the interfaces you outline where these are not bundled with the standard PMS license charge?

<table>
<thead>
<tr>
<th>Vendor self-assessment</th>
<th>Functional review</th>
<th>Technical review</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typically costs are usually per Practice per month; however this is negotiated based on the amount of usage and volume. Licensing covers ongoing support to developers and to end users Maintenance include minor enhancements, bug fixes and adaptation to changing environments (e.g. new version of Windows) Pricing is available on application. Prices have not been a barrier to utilisation of the services by Practices.</td>
<td>Pricing is not given. It has been stated as not being a barrier, but no price given</td>
<td>Monthly license fee not stated, so unable to assess impact. States it has not been a barrier.</td>
</tr>
</tbody>
</table>

2.4 Standards / specifications

Which interface standards does the PMS support and how are they implemented (e.g. HSSP, HISO Online Forms etc.)?
Integrated health care has been managed up until recently through defined sets of electronic messages, transmitted for example using EDIFACT or HL7 initially supporting purchaser-provider claims but now such messages have been developed to support the clinical shared care process itself e.g. such as the Diabetes annual reviews and Maternity care.

- HL7 version 2 defined only the formats of messages, but said nothing about the data structures behind them. It was purely text-based messaging. However, “compliant” implementations vary quite widely. HL7 v2.x messages comprise segments and delimiters. The position of a field defines its meaning.

- 2.4 has been extended to carry binary content such as PDF formatted discharge letters from Hospitals to GPs.

- XML has recently been widely adopted as a representation of information for communication purposes. e.g. Diabetes Get Checked Version 2 is a proprietary XML message.


- CCD – Continuity of Care Document is a joint standard generated by ASTM and HL7 to combine the benefits of the ASTM CCR standard and the HL7 CDA standards. It is a method to create simpler documents now with a migration path to the more complex CDA protocol later.


- This standard also provides for the exchange of clinical documents, with some XML, in a more flexible schema. The goal in creating the standard was to tag specific elements in a health record so that data could be communicated in a vendor-neutral fashion.

- CDA and CCR standards have been used in the GP2GP project and are planned for the next iteration of e-prescribing.

- MyPractice provides means for requesting program services through APIs thus granting controlled access to our application.

- An application-programming interface (API) is a set of programming instructions and standards for accessing local and Web-based software applications.
- MyPractice releases its API and documentation describing the syntax required so that other software developers can design products that can access and update our data and utilise functions such as task management and invoicing. This type of integration is seamless, since the user never notices when software functions are handed from one application to another.

- Along with eXtensible Markup Language (XML), the following technological standards, protocols and programming languages are what make our Web services work:
  - SOAP (Simple Object Access Protocol): SOAP is responsible for encoding XML messages so that they can be received and understood by any operating system over any type of network protocol.
  - UDDI (Universal Description, Discovery and Integration): Described as a “yellow pages for the Internet,” UDDI is an XML-based directory that allows businesses to list themselves, find each other and collaborate using Web services.
  - WSDL (Web Services Description Language): WSDL is the SOAP of the UDDI. Basically, WSDL is the XML-based language that we use to describe our services in the UDDI.
  - APIs have been developed for individual integration partners such as Enigma, Procare, Counties Manukau TIM and BPAC.
  - The HISO on-line forms API standard offers a strong focus on integration, portability and interoperability while still offering a high degree of extensibility.
  - This standard has been implemented and extended in the e-referral project which will be deployed this year.
  - The standard interface method calls has been retrofitted to our interface for extensibility without compromising present functionality.
  - MyPractice is committed to the National standards and we will actively encourage all integration partners to migrate to the common interface, as we believe all current functionality can be delivered through this standard or an extension of this standard.
  - We will not encourage further development of alternative proprietary solutions.
  - We believe this will reduce the cost of interfacing to MyPractice and the inherent ongoing maintenance/support burden for all parties.

### Functional review

Long list of potential standards, but needs more technical look at what is inside.

### Technical review

Interface implementations are based on SOAP, UDDI, WSDL, and HISO Forms.

Committed to standards rather than proprietary solutions.

Good awareness of the overall standards landscape.

### 2.5 Overall Star Rating: Published, standards based APIs

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Functional</strong></td>
<td><strong>Technical</strong></td>
</tr>
<tr>
<td>N/A</td>
<td>★★★★☆</td>
</tr>
</tbody>
</table>

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3 INTEROPERABILITY PRIORITIES

A significant number of sector initiatives and projects which require interoperability have been recently initiated. Some, such as GP2GP, have already produced important artefacts and experience. There is continuing work to enable sharing of health information with the focus on achieving semantic interoperability. It was recognised that execution under the BSMC business cases would lead to increased clinical network information sharing that may make it desirable to quickly move to a standard for record sharing rather than to have different solutions developed in different regions.

3.1 Contribution to interoperability environment

Describe how you position your company and PMS within the New Zealand health IT interoperability environment.

Explain which national / regional projects you are part of and level of contribution.

| Vendor self-assessment | MyPractice is engaged with the Health IT Cluster and are inaugural members of the both Vendors Architects Group and Interoperability Reference Architecture Working group. We participate in many expert advisory groups, technical working parties and health standards based organisations both locally, nationally and internationally (representing views from General Practice, Health informatics, Developers and IT Vendors).
MyPractice and its principal, Dr Ashwin Patel, have actively participated in standards development and implementation since 1994 and have shown and demonstrated a full commitment. We have been an early adopter in many integration projects where value to our customers or associated parties has been identified. Participation in development or adoption of standards has been an important and strategic priority for us.
Examples of contribution include:
- NZ Health Standards Committee member (from 1994)
- Standards NZ subcommittee member
- Information Committee for RNZCGP
- Author of NZ Data Dictionary (1995)
- Pharmaceutical Index of NZ – Author
- National Provider Index, developed concept 1996 (Now called HPI)
- Multiple Health IT / integrated care pilots and projects between Next Generation and South-Med e.g. Provider database, Diabetes Management, implementation of Gastroenteritis Guideline, CVD assessment
- IPA IT group (Pre IPAC)
- Reviewer for Australian GEHR
- Electronic discharges (Counties Manukau, Northland)
- NIR advisory committee
- WONCA working parties, speaker at international conferences
- International Expert on Disease Coding Jury for Australia
- Attended international HL7 standards meetings (Seattle)
- Member on multiple expert groups and committees for Pathology/Radiology/RSD messaging standards, primary care datasets, e-forms standard
- SNO-MED integration |
- Development of PMS Data elements Concept list
- Member Sector Architects interoperability working party
- Member Sector Architects Vendors Group
- Full integration with HSA CCMS Managed Care pilot Project
- e-prescribing pilot project
- GP2GP design and implementation
- Early adopter in the Health Identity Project
- e-continuum of care review and integration planning

<table>
<thead>
<tr>
<th>Function review</th>
<th>Response shows a long history of commitment to the General Practice computing space</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical review</td>
<td>Solid engagement with sector activities, including active involvement in standards development and a full commitment to standards.</td>
</tr>
</tbody>
</table>

### 3.2 Standards

Which national and international standards for interoperability are currently supported by your PMS (e.g. for patient / provider identification, messaging, record organisation etc.) and how?

What are your plans for implementing relevant standards?

Of the initiatives you outline in your response to question IO1a, what standards are being applied to each of these?

<table>
<thead>
<tr>
<th>Vendor self-assessment</th>
<th>MyPractice remains fully committed to standards based approach and are actively implementing all appropriate standards.</th>
</tr>
</thead>
</table>
| **Current**             | - Edifact and HL7 messaging (Claims)  
                          - Pathology and Radiology Messaging Standard HISO 10008  
                          - New Zealand Pathology Observation Code Sets (NZPOCS)  
                          - Referrals, Status and Discharges (RSD) Messaging Standard 10011.2 v2.1  
                          - Health Practitioner Index (HPI) (data 10005 and code set 10006 standards)  
                          - SOAP  
                          - Project for the Integration of Mental Health Data (PRIMHD)  
                          - Diabetes Get Checked version 1 and 2  
                          - CBF Extracts, imports.  
                          - CPI extracts (PPP)  
                          - Online Forms Architecture Technical Specification  
                          - Continuum of Care - eReferrals (10011 RSD)  
                          - Primary Care Data Dictionary/Concepts, ISO/IEC 11179  
                          - 10000 Ethnicity  
                          - Electronic Pharmaceutical Messaging Standard  
                          - NZULM  
                          - GP2GP (CDA/CCR)  
                          - Health Identity (NHI/HPI) |
| **Planned**             | - e-discharge/Transfer of care  
                          - SNOMED  
                          - Core and Common Data Set  
                          - Reference Architecture  
                          - 10037 Connected Health  
                          - 10029 Health Information Security Framework |
3.3 **Overall Star Rating: Interoperability**

<table>
<thead>
<tr>
<th></th>
<th>Functional</th>
<th>Technical</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>★★☆☆</td>
<td>★☆★☆☆☆☆</td>
</tr>
</tbody>
</table>

4 **INFORMATION SECURITY, ACCESS AND PRIVACY**

A defined (and refined) set of privacy and security guidelines should be provided to the vendors and refined over time to ensure security and privacy requirements can be met – that align with legislation. There is also a need to define the data governance and privacy principals as they relate to personal health records and shared care records/plans. The proliferation of cloud computing drives a need for a set of principles around data governance across the sector.

Whilst this issue goes beyond primary care, as systems become connected up, broader debate on access and privacy are required. Historic rules have been adjusted by allowing “opt out” of Test Safe, and this seems to be becoming a default option.

As PHRs become used, and patient / whānau access to records increases, a more complex consent / deny access model is potentially needed.

For now, the capabilities of the PMS around (role based) security, information privacy, access and audit of records need to be clearly understood. Where there are add-on products or extensions to the PMS (e.g. Portals), any difference between core PMS functionality and the add-on products should be clear; this includes the way in which data is stored and accessed for such add-on products.

4.1 **Access control**

Define how you identify users; e.g. make sure users are really the intended persons (authentication)

How the PMS can integrate with LDAP (e.g. Active Directory) authentication frameworks and enable single sign-on?

<table>
<thead>
<tr>
<th>Vendor self-assessment</th>
<th>Users are authenticated by sign on with a user name and password. Passwords are obfuscated.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strong Password policies can be enforced at the windows log on if required. A strong password policy can be applied to MyPractice log on, but in consultation with our users, is not currently enforced</td>
</tr>
</tbody>
</table>
Lightweight Directory Access Protocol (LDAP) has not been integrated into MyPractice. Currently access to multiple services outside of MyPractice with the same password has not been required.

As further internet based services that require authentication become available or desirable, we will reconsider LDAP.

**Functional review**

Supports LDAP, need technical review

**Technical review**

Username/password authentication. States password is “obfuscated”, hopefully this means hashed/encrypted. No LDAP integration yet but is open to doing this if/when it becomes required.

**Explain how you allow access to patient records by authorised users. How do you support role based access?**

**Vendor self-assessment**

Multiple roles can be set up for each system.

Authorised users manage roles required for their businesses.

Each role can be assigned privileges such as access to protected functions.

Users can be assigned to one or many roles within a system.

When access to incoming mail or task management is user based, easy access is given to other users to cover absence or urgency.
Users can also apply settings to automatically include mail for absent practitioners.

Access to subsets of patients within a system can be controlled through role based functions that revolve around exclusivity.

Roles can also controls management of exclusivity at a patient level. (can selectively share records when required)

**Functional review**
Meets all these requirements

**Technical review**
Implements appropriate role-based security configuration. Doesn’t mention “break the glass” capability.

**Panel query**
How is a “break the glass” capability implemented?

**Vendor clarification**
Not required, as there are no areas restricted to specific users once the role is granted. (If you have clinical access, you have access to all clinical notes). Break glass would have been appropriate if members of the same role were given restricted access.

**How does your PMS allow remote access to authorised users?**

**Vendor self-assessment**
Multiple mechanisms exist to allow remote access to authenticated users. These include from windows based methods to access the desktop e.g. HealthLink’s SECURIT VPN remote access, RDP connections, Team Viewer and Log me in.

MyPractice can be installed remotely with a secure Virtual Private Network connection to the data server. Access via Citrix or other terminal services are used to access hosted servers. There is no restriction on user types (doctors, nurses, practice managers etc.) other than that imposed by the Practice. Some Practices allow researchers and external management access remotely.

**Functional review**
Response points out that this is usually done via remote access to the desktop.
### Technical review

Multiple modes of remote access are available (VPN, RDP, “Team Viewer”, “log me in”). A hosted solution is provided.

### Describe third party access to PMS data (if any).

**Vendor self-assessment**

Authorised third parties access data (read and write) through our API interfaces. This allows us to retain referential integrity and security. Examples include Enigma, PHOs, Best Practice.

Read only access is also granted through SQL queries written by us on behalf of authorised population analysis providers. Examples are Dr Info and HealthStats. Data is transmitted in a secure encrypted format only with the direct permission / knowledge of Practices.

### Functional review

Some providers use read only to gain access to queries for large pool of queries otherwise everything is via the APIs.

### Technical review

Third party data access is through a MyPractice API which implements a security access layer, which can include proprietary queries written by MyPractice staff. Direct database access is not permitted.

### Describe your patient consent mechanism and how it is embedded into the workflow

**Vendor self-assessment**

A record is kept when consent is captured by practitioners for a variety of reasons. Patients have their preferences recorded for transfer of records:

**Participation in TestSafe**

<table>
<thead>
<tr>
<th>Account</th>
<th>Consent</th>
<th>Date Consent to Transfer of Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>12/05/2008</td>
</tr>
</tbody>
</table>

**National Immunisation Register**

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>3M HibHepB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>01/03/2011</td>
</tr>
<tr>
<td>Status</td>
<td>Given</td>
</tr>
<tr>
<td>Indication</td>
<td>3 months</td>
</tr>
<tr>
<td>Sequence</td>
<td>2</td>
</tr>
<tr>
<td>Batch</td>
<td>Batch Exp</td>
</tr>
<tr>
<td>Diluent</td>
<td>Diluent Exp</td>
</tr>
<tr>
<td>Route</td>
<td>IM - intramuscular</td>
</tr>
<tr>
<td>Adverse Effect</td>
<td>Reported</td>
</tr>
<tr>
<td>Status</td>
<td>Message Status</td>
</tr>
<tr>
<td>Co-administered</td>
<td>Opted Off Test Safe</td>
</tr>
<tr>
<td>Not Eligible</td>
<td>False</td>
</tr>
</tbody>
</table>
Specific topics discussed in the consent process can also be captured.

Templates for written consents can be printed, and then scanned back into the patient’s record.

| Functional review | Many mechanisms shown and covers wide range of public health initiatives. |
### Technical review

Consent for a variety of purposes is explicitly represented and stored (e.g. notes transfer, participation in TestSafe, NIR, Diabetes Get Checked).

The consent process includes recording what topics were discussed, and written templates can be associated with a consent.

### 4.2 Privacy and confidentiality

Describe how your PMS protects patients' privacy and confidentiality of health records; specifically elaborate on programme level security on management and use of patient records. This should protect confidentiality and integrity of data as well as ensure that users who alter health records cannot falsely deny they made those changes (non-repudiation).

#### Vendor self-assessment

Patients can elect whether records are shared with only their own team, or any practitioners within the Practice.

There are options to individual profile items are Private or Hidden.

This will disable automatic transcribing into letters/referrals. Hidden items are not visible to onlookers (e.g. patients, spouses / care givers that accompany the patient during a consultation). Records can be edited, however a full audit trail is maintained.

A change log is maintained for demographic and administration data.

Clinical edit control can be restricted to the original author or allow other practitioners to correct records (Practice settings).
The original record is never deleted (text is hidden or displayed with a strikethrough format). Changes made subsequently are in displayed in italics. All entries (original and alterations) have user details and date / time stamps.

Options exist to move incorrectly entered records (or lab results). A full audit trail / history is again maintained.

<table>
<thead>
<tr>
<th>Name</th>
<th>Results</th>
<th>Measurements</th>
<th>Scripts</th>
<th>Lab</th>
<th>Radiol</th>
<th>Cardiol</th>
<th>Endo</th>
<th>Audio</th>
<th>Letters</th>
<th>Forms</th>
<th>Trim</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maxime</td>
<td>Filter</td>
<td>Notes</td>
<td>Summary</td>
<td>Letters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20/02/2002 03:15 p.m.</td>
<td>Viral warts now ABL</td>
<td>Exami</td>
<td>2 small lesions left mole, 2 lesions</td>
<td>Action</td>
<td>Cryotherapy to lesion of skin,</td>
<td>History</td>
<td>Left lesion smaller than right, left lesion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19/02/2002 03:00 a.m.</td>
<td>scrotal pain, recurrent torsion hemato</td>
<td>Exam</td>
<td>History</td>
<td>Left scrotal pain 2 hours, increased</td>
<td>Action</td>
<td>Ref - Michael Rice, UROLOGIST</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19/11/2002 02:59 p.m.</td>
<td>skin check</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

**Functional review**

Mets the above requirements, except for the requirement to have a PIN number on private data.

**Technical review**

Granular control over provider access to individual patient records within the practice. Includes hidden items that are concealed from patients, relatives etc.

Full audit trail of all changes to records. Old versions are retained. Doesn’t mention “break the glass” capability. Doesn’t mention how access control is applied to reporting.

**Panel query**

How is access control applied to reporting queries?

**Vendor clarification**

Access to Reports can be restricted by the user’s Role, E.g. Selected Financial reports can be limited to Practice Managers only.

These reports will only appear in the selection list if the logged on user is assigned to the appropriate role.

**Vendor self-assessment**

All of the attachment files are coded in binary and stored in the database (not stored on loose files in the hard drive.) Attachments can be added during a consultation (e.g. created diagrams or imported files)
Incoming mail may include attachments such as PDF files. Letters are scanned in and saved as JPEG, TIFF or PDF files. All these files are presented to practitioners for sign-off before finally being saved in clinical records.

Attachments are also tagged with their usage type. Scanned documents may be incoming correspondence, or they may be attachments to a consultation (the usage type and physical format types are independent).

Attachments are part of the clinical record and subject to the same access privileges. There is no separate access to these files without access to clinical records.

**Functional review**
The same security measures are in place and the attachment files like PDF and jpeg are stored in the database.

**Technical review**
All attachments are stored within the database. Attachments can be added to consultation notes or otherwise signed off and stored in the record. Access to attachments is managed in the same way as access to the clinical notes.

How does your PMS protect privacy when generating reports and data sets (e.g. clinical data sets for population health research and reporting to Ministry etc.)? Describe how identifiable personal information is anonymised (if supported).

**Vendor self-assessment**
Extracts for external parties are created without patient identifiers e.g. Clinical Performance Indicators. The fields included for ad-hoc queries and those included in exports are under the control of the user. Patient identifiers can be excluded.
4.3 Auditing

Describe your auditing mechanism during creation, amendment and access to health records and how you maintain an audit trail.

Describe who has access to the audit results and the security around this.

| Vendor self-assessment | All entries (new or changes) into the database are logged with the entry date-time and logged on user. This includes patient identification and demographics as well as clinical data. See above for examples. Access to read a record is granted only to authenticated users with appropriate privileges. Every screen accessed to view only is not logged. Addition of this level of auditing is possible, but no request has ever been made for it. Security and auditing needs to be appropriate to the level of risk and not impose unacceptable overheads (data storage, speed, additional complexity to the code). Security measures for on-line or other exposed deployments would need to be considered in line with risk and potential privacy issues. |
| Functional review | Does not do all of this. Logs entries but not views of screens, no inbuilt alert reporting for compliance monitoring. |
| Technical review | Comprehensive auditing for data changes. Not auditing read-only access as never asked for, but system is capable of it. Is aware of tradeoff of security vs usability. |

4.4 Patient / whanau access

Describe how your system enables patients and their caregivers access to their own records (aka Personal Health Records)

| Vendor self-assessment | Computers offer tremendous opportunities to place patients in control of their own health care. The electronic medical record should be anchored in general practice but owned by the patient. We recognise the central role of patients as informed partners in decisions about their own healthcare and in service priority setting. Patients can acquire considerable expertise in managing their own health if they are given useful and appropriate material with which to educate themselves. |
Full Records can be printed out or provided as a PDF file for patients on request. Their records can be forwarded electronically to any other practitioner via RSD or GP2GP.

My Practice also provides a touch-screen application for deployment in waiting areas. This allows patients to check in on arrival and confirm currency of contact details. The system also allows completion of questionnaires (e.g. e-chat).

Clinical pathways and shared care plans are accessible for patients in Managed care programs such as CCMS. Other aspects of their records are also currently viewable through various patient portals. These include Medi-file and the HSA patient portal. We have begun integration with the Orion patient portal and are considering Manage My Health.

Our own service will allow patients and their caregivers (including after-hour call centres) to book appointments on-line. This is currently being trialled. Other services such as online access to results, clinical summaries, repeat medications and secure mail are under development.

### Functional review
Not inbuilt but work is underway to link into existing portals. They have under development an online booking service.

### Technical review
Currently trialling a patient portal with limited capabilities; e.g. booking appointments. On line access to clinical data is “under development”.

Suggests support for patient access to clinical pathways, but no details provided. Doing work on integration with other patient portals eg. Orion, MedTech.

### Panel query
**When is the expected delivery date for the integration with an existing patient portal?**

- Fully integrated with Portals from Medifile and HSA Global.
- Integration with Orion’s patient portal and the National Shared Maternal portal are planned for 1st quarter 2012.
- Integration with Manage My Health will be within 3 months of a user’s request for this functionality.

Describe differences (if any) in security mechanisms (especially that relates to privacy and confidentiality) between integrated products / components (e.g. patient portal, mobile apps and client PMS)

### Vendor self-assessment
RSD and GP2GP files are transmitted encrypted over a secure network. Each patient portal has its own security mechanisms. We will only interface to those that meet the appropriate national standards. Our own portal services will meet those requirements of The Connected Health Architectural Framework, Network to Network Interface (NNI) and User to Network Interface (UNI) specifications.

### Functional review
Needs technical review

### Technical review
Too early in their development process to assess this. States intended compliance with Connected Health Architecture Framework, Network to Network Interface and User to Network Interface specifications.

### 4.5 Care team access
Describe how your PMS provides access in a multi-site, multi-professional integrated / shared care setting.
**Vendor self-assessment**

MyPractice believes that the PMS needs to represent responsibilities and intentions within the shared care process in order to support effective clinical workflow.

We recognise the differing culture of nurses and doctors in the way information is used, even if the information itself is held in common.

MyPractice is tightly integrated with HSA Global’s Collaborative Care Management Solution (CCMS). CCMS includes a clinical case management solution that provides secure access to up-to-date patient information directly at the point of care to team members inside and beyond general practice. It is used by healthcare provider organizations to manage long term conditions and chronic disease. CCMS supports the clinical and administrative processes to manage registration, admission, assessment, care planning, scheduling, clinical documentation, discharge and transfer.

Multiple Programs are supported. Patients are enrolled on to a program. Patients can belong to multiple programs.

Data is now synchronised seamlessly between MyPractice and CCMS whilst the patient remains on the program. Updates are sent with each encounter.

Up to date information including care plans and shared tasks are available to General Practitioners, Practice nurses, visiting Diabetes Nurses, Podiatrist and Case Managers.

This solution is currently being piloted by The National Shared Care Plan programme which has been developed in partnership with the National Health IT Board and the Auckland Regional District Health Boards.

**Functional review**

Tight integration with the national shared care program via HSA global Collaborative care management solution is good evidence of a strong commitment to this model.

**Technical review**

Doesn't address multi-site shared-care using MyPractice. Instead, describes using HSA’s CCMS solution for this.

Describe what access, security and audit controls are in place over this including what is definable at a system policy level.

**Vendor self-assessment**

Each program is configured with information to be shared.

This is visible and under the control of participating Practices.
Part of the patient enrolment process includes obtaining patient consent to share their information. Exactly what information is sent is also visible at each transaction.

All information is exchanged securely and handled with appropriate regards to privacy requirements.

<table>
<thead>
<tr>
<th>Functional review</th>
<th>Need to assess implications on data stewardship and medico-legal aspects.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical review</td>
<td>Each program is configured with what information can be shared. It is not described how exchange is secured and authentication done.</td>
</tr>
<tr>
<td>Panel query</td>
<td>What happens when patient data is accessed by users outside of the practice?</td>
</tr>
<tr>
<td>Vendor clarification</td>
<td>Exchange of data is over a secured web service. Each site has a unique identifier that must be registered and activated within the host system. Each user has a username/password specific to this service and it is used for authentication prior to access being granted to the shared record. Access outside of the practice requires similar password authentication. An audit log of all accessed data is maintained.</td>
</tr>
</tbody>
</table>

### 4.6 Location of data

Are you taking copies of patient’s identifiable information and storing it in a separate location other than at the practice? If so what security and audit controls do you have over this and where is the information being stored?

| Vendor self-assessment | All Patient and Practice related information is stored within the database. Any type of file format can be imported as part of their record. No loose files / external referenced material are required. This ensures all information is subject to the same level of auditing and security required ensuring medico-legal integrity. Complete Back ups are easily achieved and able to be automated. MyPractice does not take copies of Patient information outside of the Practice. Users of MyPractice may store their data off site (e.g. on line backup); have their data hosted, or available on-line. The providers for these services provide security assurances directly to the Practices concerned. |

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Full support is given to such service providers to ensure they can provide secure mechanisms to our clients.

<table>
<thead>
<tr>
<th>Functional review</th>
<th>Noted but not within power of vendor to control where practice hosts the database.</th>
</tr>
</thead>
</table>
| Technical review  | All clinical data is stored within the database.  
                     | No information is taken outside the practice.  
                     | Points out that if MyPractice is implemented in the cloud, the security arrangements are the responsibility of the hosting provider. |

### 4.7 Overall Star Rating: Information security, access and privacy

<table>
<thead>
<tr>
<th>Functional</th>
<th>★ ★ ★</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical</td>
<td>★ ★ ★ ★</td>
</tr>
</tbody>
</table>

#### 5 USABILITY – ALERTS MANAGEMENT ONLY

Usability is among the most critical success factors in acceptance of software systems by clinicians. While there is a multitude of guidelines and references for good user interface design there is no definitive standard.

It is our assumption that if a system is difficult to use, (e.g. can’t find features, or misunderstand what the feature is used for) this practically indicates that functionality will either not be used or will be misused.

In the near future it is desirable to achieve consistent GUI and data entry/visualisation functionality including, but not limited to, the following aspects:

- Patient selection and identification
- Diagnostic test orders / prescribing
- Log In and log out
- Record navigation
- Patient documentation
- Error messages and handling
- Medication management (e.g. prescribing, medication lists etc.)
- Clinical coding (tools and automatic / assisted encoding functionality to help reduce clinician workload)

We have identified alerts management in PMS as the top priority usability issue as it is a well known fact that if they are too frequent, the user stops reading them and moves immediately past them. This has serious safety and quality implications.

#### 5.1 Alerts management

Describe how your PMS provides patient alerts and manages them effectively.

How are clinical related alerts presented in terms of severity? How different alerts are differentiated (i.e. the ability to easily separate out clinical, environmental or practice related alerts)?

How does the PMS support role-based management of alerts of all types, whether they are user-created, other-user created or generated by third parties?

Is the behaviour of alerts able to be defined at a practice, role or user level? If so, describe what level of user-defined customisation of alert types is available?
MyPractice Evaluation Review of Vendor Self-assessment

**Vendor self-assessment**

MyPractice has taken great care in providing and managing appropriate patient alerts. MyPractice has been designed to match functionality with the tasks healthcare practitioners and their teams perform.

Information has been organised into usable forms, rather than collected as a simple data repository. This has been possible with human-centred design analyses. The different cognitive processes and different constraints and limitations of electronic records and paper-based records have been fully considered to limit usability issues.

Alerts needed to be provided in an intelligent integrated manner which avoid pitfalls such as alert fatigue (reducing the risk that users gets so many alerts that they grow numb to the alerts and stop looking at them).

The process involved identifying characteristics of users such as expertise and skills, functional analysis to identify top-level domain structure and task analysis. Representational analysis to identify the best information display and the best information flow structure for a given task.

Alerts or other forms of decision support are provided throughout the system in appropriate ways, whenever possible at the point in time relevant to the task in hand and without undue interruption to the natural workflow.

Passive alerts appear on the appointment book

Tasks that are due for the logged on users

Workload (Number of patients waiting, due to be seen)

Types of consultations

Length of time patients have been keep waiting in reception

Further information is provided on mouse-over, with bubble tool tips.

The patient search screen reminds users of missing information, lack of contact for prolonged periods (again without interruption to the task in hand).
On selection of the patient, important administrative alerts interrupt the user. This is repeated on patient arrival.

Separate alerts are provided for administrative and clinical reasons.

Post-it notes appear whenever a clinical record is opened.

Missing important information is highlighted during consultations.

Important problems are easy to see as they are highlighted.
Overdue screening tasks remain visible throughout the consultation and are near the finish button for completion if time permits, usually after dealing with the presenting problems.

Writing in notes may trigger rule based suggestions, or provide links to useful resources, without interrupting the flow of thought.

Suggestions can be configured by users including sophisticated rule sets and priorities. Sets of suggestions can be provided by external parties such as PHOs to prompt enrolment in support programs/suggest services.

Clinical pathways alert users to progression along best practice management of problems that span over many consultations/multiple providers. These are tailored for each patient, with patient’s preferences being noted. Additional information on each step is provided to users as a tooltip.
Drug allergy information is offered while prescribing. Further alerts interrupt the flow in case the passive alert is not heeded.

Selected Drug interaction alerts are supported including Drug Interactions that matter in General Practice (rather than all possible interactions).

Checks are also made against the patients problem list.
Age appropriate dosage is supported with simple override functionality (for small or large for age patients).

The type of alerts can be configured at a user or system level.

<table>
<thead>
<tr>
<th>Functional review</th>
<th>Does most of the above, and is very much integrated with user work flow.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical review</td>
<td>Highly usable, an impressive user interface.</td>
</tr>
</tbody>
</table>

### 5.2 Overall Star Rating: Usability

| Functional | ★★★★☆ |
| Technical  | ★★★★☆ |
6 ADDITIONAL INFORMATION

6.1 User manuals and tutorials
These are provided on-line:
- http://mypractice.co.nz/portals/0/Resources/Help/Help.htm

6.2 Architectural overview
Our design is evolving over time as it has been tested against real world requirements. We have recognised that our user requirements are forever changing and that we need to be responsive to this. Using agile modelling we have built our system to facilitate change instead of creating an inflexible architecture.

Our design supports user empowerment by being flexible, configurable and focused on the user experience.
Appropriate levels of user personalisation and options are supported without overloading users with unnecessary options and settings that can lead to confusion.
MyPractice.Net is a rich client application designed to run on a client PCs or cloud based hosts.
Taking into consideration preferred options for deployment topology and our architectural style we selected the Microsoft platform and .NET Framework technologies. This has allowed us to take advantage of the market maturity of our platform and focus on what was uniquely valuable to our users.

The application’s functionality has been partitioned into layers, components and services to achieve separation in concerns. Abstraction and use of dependency injection is used to implement loose coupling between layers. This has allowed reuse of components and post deployment extensibility. Service orientation techniques provide interoperability with other systems.

My Practice Application Architecture

Benefits of our N-tier/3 tier architectural style include:
- Maintainability (allows updates of each tier independently)
- Scalability (deployment of layers allows straightforward scaling out)
- Flexibility (increased)
- Availability
Cross layer concerns include auditing and logging, authentication and authorisation (security) as well as exception handling.

6.3 Modules / Sub-systems, including interface descriptions

There are numerous modules / subcomponents as depicted below:

Please do not hesitate to contact us if any elaboration or further explanations are required on any aspects of our response.

Regards

Dr Ashwin Patel
CEO
My Practice Ltd