The eHealth readiness of Australia’s medical specialists

Department of Health and Ageing
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1. Introduction
The area of eHealth is one of the most critical elements of the recent health reforms. It will serve not only as an enabler of improved information transparency, but also ensure better patient care, improve collegiate ties, enhance patient satisfaction and – ultimately – save lives.

It is also an area of significant investment. The Australian Department of Health and Ageing (Department) is currently progressing key foundational activities supporting the Government's eHealth agenda, including the Healthcare Identifiers Service (HI Service), which commenced operations on 1 July 2010, as well as investing $466.7 million over two years from July 2010 to establish a personally controlled electronic health record (PCEHR) system.

Proposals to develop a PCEHR system are predicated on the eHealth readiness of key populations of health professionals, including medical specialists and allied health professionals, to provide quality healthcare along the continuum of care in the primary and ambulatory care sectors. As we look at overseas examples, one of the areas that is consistently overlooked is the importance of clinical engagement and clarity on medical uses. Obtaining an understanding of the eHealth readiness of key stakeholders in the health system is the first step on the path to ensuring strong clinical engagement.

To further this goal, the Department has commissioned McKinsey & Company to undertake an objective assessment of the allied health sector’s eHealth readiness.

Ultimately, the objective of this report is to inform the broader goal of clinical engagement in eHealth enabled models of care delivery, centred on the patients. In addition, this report aims to profile the baseline penetration of equipment and usage of technologies into this sector (connectivity, software, platforms, technologies), the mindsets and behaviours of medical specialists towards eHealth adoption and usage and the barriers and drivers for medical specialists to participate in future national eHealth initiatives. Each of these is a critical component in ensuring the long-term success of Australia’s eHealth agenda.

This report combines qualitative and quantitative primary research, secondary research including a review of global literature, and existing perspectives from various organisations. We hope it is useful in achieving the above objectives, and are proud to present this report to the Department.

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2. Acknowledgements
This report has been compiled with the assistance of the following clinical experts, practising health professionals and organisations. We thank them for their time and input.

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<th>Title</th>
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3. Executive summary
eHealth technologies and solutions offer significant benefits, from better collaboration between practitioners and continuity of care, through to better quality of care and efficiencies. Realising these benefits, however, requires a high degree of connectivity and coordination between numerous players embedded in a complex ecosystem. Although medical specialists form just a small part of the vast health landscape, they serve as critical hubs for information transfer. Their engagement is therefore necessary for advancing the use of eHealth to achieve system-wide outcomes. However, little research has been done to date on understanding medical specialists’ positions with respect to eHealth.

This report sets out our research on the use of and attitudes towards ‘eHealth’ (the combined use of electronic communication and technology in healthcare) among the full range of licensed medical specialists in eight different segments—anaesthesia, diagnostics (radiology and pathology), internal medicine, emergency medicine, obstetrics and gynaecology (including neonatology), ophthalmology and dermatology, psychiatry and surgery.

Our research has been framed around three ‘anchor’ questions:

1. Are Australian medical specialists ready to adopt and use eHealth technologies and solutions, today and in a way consistent with policy direction in the future?
2. What are the barriers impacting eHealth readiness and adoption and how can we minimise them?
3. What are the eHealth enablers and how can we apply them to drive adoption and effective usage?

We conducted 20 initial qualitative interviews to design a quantitative survey, ran that survey with 600 medical specialists, and interviewed a further 20 specialists in-depth. The quantitative survey was targeted at a random sample of ~10,000 practitioners, designed to incorporate geographic and demographic stratifications, and secured a response rate of ~6%. The sample sizes achieved imply an ~11% error of estimation at the 95% confidence level for sector-level analyses. All questions within the survey were mandatory. While the sample was designed to capture key demographic lenses, for analysis purposes the responses have been weighted such that responses, and the high-level results drawn from them, are representative of the medical specialist population as a whole. This research is intended to provide a starting point for understanding medical specialists’ eHealth readiness and findings should be interpreted as directional in nature.

Australia’s medical specialists have a strong foundation for eHealth adoption and use, but are far from realising its full potential. Specialists generally take a practice-oriented view, rather than a macro-level perspective to eHealth benefits. For this reason, current use is typically self-contained within a practice or hospital rather than integrated across networks. Specialists are generally ready to adopt eHealth technologies that improve their practice’s operational efficiency, but only to the extent that delivery of care within their practice is not disrupted. Specialists have the skills and tools needed to support self-contained eHealth use, but most lack the connectivity, IT support and conviction required to engage in a way that drives more widespread improvements in patient-focused clinical outcomes. For example, many specialists have adopted computerised record keeping systems within their practice, but are unable to share these records in a computerised format with their patients or with other practitioners.

Attitudes vary not only according to the personality and IT-engagement of the individual specialist, but also according to their operating environment, the nature of their work and the business model of their practice. If those in an emergency ward, for example, are expected to update patient records on the IT infrastructure provided, then they will do so. Private practice surgeons who work more independently, and for whom any IT failure or distraction is costly, are often less enthusiastic.
However, even these practitioners may still be willing to adopt certain solutions due to influence from practice managers and support staff, who are often the primary users of practice billing, scheduling and record keeping systems. While comparing specialties helps explain some of the differences between observed eHealth adoption levels, there is still a high degree of heterogeneity with respect to adoption within most specialties.

To help understand these variations, we analysed the eHealth readiness of Australia’s medical specialists along three dimensions: their infrastructural readiness (their operating environment, as well as their IT hardware, software and connections); their aptitudinal readiness (depth of skills and capability to use eHealth solutions); and their attitudinal readiness (willingness to use current and future eHealth solutions). We found consistently strong infrastructural and aptitudinal readiness for basic, self-contained computer applications, but differences emerged when more connected applications were considered, and these were amplified by differences in attitudinal readiness.

Knowing that each specialty segment contained a proportion of eHealth early adopters and enthusiasts, we sought to more clearly understand the underlying drivers for the observed attitudinal differences. This understanding could, in turn, help inform approaches for increasing adoption and use within each specialty. Through this attitudes-based analysis, we identified five separate groups of specialists, distinct ‘clusters’ in their potential eHealth engagement, which occur across the practice groupings of specialists. Each cluster exhibited differences in perceived benefits, perceived barriers and the likely enablers that will drive their use and adoption of eHealth practices and solutions.

This report works through the above analysis. It opens by confirming the medical specialties that we researched and detailing their current and expected future uses of eHealth solutions. The report then sets out the infrastructural, aptitudinal and attitudinal readiness of medical specialists to use eHealth solutions now and in the future. We then introduce our analysis of the five attitudinal ‘clusters’ that exist in each medical specialty and the eHealth benefits and barriers they perceive. Finally, we demonstrate how these cluster insights might be used in developing a strategy for eHealth adoption: the interventions most likely to be effective, and a considered approach to timing and applying those interventions.

**Current and expected eHealth use**

Medical specialists currently use certain self-contained eHealth applications in their practices: Exhibit 1. However, applications that share information within and between practice networks have been less widely adopted. The current uses identified by the National E-Health Strategy (2008) span practice management tools, information sharing and sources, and service delivery tools such as chronic disease support and telehealth. Intended future uses would expand the use of remote care management and wellness, clinical decision support (especially to aid collaborative diagnosis, treatment and care processes), electronic health records, and public health intelligence. Importantly, these future uses would share more information but would require more reliable and more connected eHealth platforms.
Communicate with patients outside of consultations
Share health records with patients
Decision-making support for ordering prescriptions
Transferring prescriptions to the pharmacy
Decision-making support for ordering tests
Enter patient notes after a consultation
Ordering diagnostic imaging
Sending or receiving referrals
View/record patient information during consultations
Show patients information during consultation
Ordering pathology tests
Completing event summaries
Sharing health records with practitioners
Viewing diagnostic imaging results
Viewing pathology results
Billing and patient rebates
Patient booking and scheduling
Access online clinical reference tools

Specialists commonly use computers for reference and education and express less interest in patient-facing and decision support applications

Please indicate whether you use, don’t use but would like, or don’t use and don’t need a computer for each of the following activities

<table>
<thead>
<tr>
<th>Use</th>
<th>Don’t use but would like</th>
<th>Don’t use and don’t need</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access online clinical reference tools</td>
<td>72</td>
<td>22</td>
</tr>
<tr>
<td>Complete education and training courses</td>
<td>70</td>
<td>23</td>
</tr>
<tr>
<td>Viewing pathology results</td>
<td>62</td>
<td>26</td>
</tr>
<tr>
<td>Billing and patient rebates</td>
<td>68</td>
<td>20</td>
</tr>
<tr>
<td>Patient booking and scheduling</td>
<td>60</td>
<td>24</td>
</tr>
<tr>
<td>Viewing diagnostic imaging results</td>
<td>53</td>
<td>29</td>
</tr>
<tr>
<td>Sharing health records with practitioners</td>
<td>24</td>
<td>57</td>
</tr>
<tr>
<td>Completing event summaries</td>
<td>33</td>
<td>43</td>
</tr>
<tr>
<td>Ordering pathology tests</td>
<td>20</td>
<td>55</td>
</tr>
<tr>
<td>Show patients information during consultation</td>
<td>39</td>
<td>35</td>
</tr>
<tr>
<td>View/record patient information during consultations</td>
<td>38</td>
<td>35</td>
</tr>
<tr>
<td>Sending or receiving referrals</td>
<td>20</td>
<td>51</td>
</tr>
<tr>
<td>Ordering diagnostic imaging</td>
<td>17</td>
<td>53</td>
</tr>
<tr>
<td>Enter patient notes after a consultation</td>
<td>30</td>
<td>37</td>
</tr>
<tr>
<td>Decision-making support for ordering tests</td>
<td>9</td>
<td>54</td>
</tr>
<tr>
<td>Transferring prescriptions to the pharmacy</td>
<td>8</td>
<td>52</td>
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<tr>
<td>Decision-making support for ordering prescriptions</td>
<td>10</td>
<td>50</td>
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<tr>
<td>Share health records with practitioners</td>
<td>12</td>
<td>43</td>
</tr>
<tr>
<td>Communicate with patients outside of consultations</td>
<td>17</td>
<td>37</td>
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SOURCE: eHealth readiness survey

Medical specialists use computers regularly for some self-contained practice and research functions, but despite strong interest have yet to more fully embrace eHealth.

- Computers are used for convenient access to information and education (72 percent of survey respondents used computers for reference purposes, and 70 percent for education) and for viewing results electronically (62 percent of specialists use computers to view pathology results, 53 percent to view diagnostic imaging results)

- Diagnostic specialists (radiology and pathology) are the most likely to use computers regularly, with almost all strongly agreeing that they are expected to use computers in their daily work, and that most of their peers do so as well. About 80 percent of emergency ward specialists hold the same beliefs, a figure that drops to below half for the other specialties

- Specialties with strong clinical workflow needs that can be met using existing technology, or who operate in a culture where computer use is expected, are the heaviest adopters. Over 90 percent of emergency specialists use computers to view pathology and diagnostic imaging results, and 74 percent use computers to complete event summaries

- Although computerised health records are gaining traction, relatively few specialists use an electronic record-keeping system as a single repository for all relevant patient information. Only 41 percent of survey respondents used a computerised health record-keeping system, and of these just 37 percent relied solely on computerised records. Most of the specialists using computerised systems use them for administrative purposes and storing patient notes but, for
data security and legal reasons, maintain separate hard-copy storage of communication to and from other providers (e.g. test results, diagnostic imaging and referral letters).

- Of those specialists not currently using information-sharing applications (to record and share information, order electronic tests, and support interactive decisions) approximately 60 percent would like to have these capabilities in the future.

The specialists gave several reasons for not using eHealth applications more, including that the application is not available in their practice setting, particularly among those working in public hospitals, or is not seen as relevant or would not be used often enough to offer true benefits; that the specialists are unaware of the available applications; and that there is no demand or capacity to reciprocate from patients, GPs, other practitioners, or other caregivers.

Table 1 completes a specialty-by-specialty look at current and desired future use of eHealth, and some of the limitations on those uses.

**Table 1: eHealth use and drivers/limitations by specialty**
*(Percent of specialists using or interested in using; excludes scheduling and billing)*

<table>
<thead>
<tr>
<th>Segment</th>
<th>Top 4 current uses (percent of specialists using)</th>
<th>Top 3 desired uses (percent of specialists who don’t use but would like to)</th>
<th>Drivers/limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaesthesia</td>
<td>Education (80%)</td>
<td>Share records with practitioners (75%)</td>
<td>Heavy use of eHealth in surrounding hospital environment</td>
</tr>
<tr>
<td></td>
<td>Clinical reference (76%)</td>
<td>Share health records with patients (63%)</td>
<td>Access to accurate past medical history perceived to be very beneficial</td>
</tr>
<tr>
<td></td>
<td>Viewing pathology (72%)</td>
<td>Show patients info during consultation (63%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Viewing imaging (66%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diagnostics (radiology and pathology)</td>
<td>Clinical reference (86%)</td>
<td>Order pathology (60%)</td>
<td>Practice dynamics provide sufficient scale to justify expenditures</td>
</tr>
<tr>
<td></td>
<td>Education (85%)</td>
<td>Decision support for test ordering (60%)</td>
<td>Digital transfer of images and test results can greatly improve practice efficiency</td>
</tr>
<tr>
<td></td>
<td>Viewing pathology (77%)</td>
<td>Send/receive referrals (58%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Viewing imaging (71%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency and intensive care medicine</td>
<td>Viewing pathology (92%)</td>
<td>Order prescriptions (83%)</td>
<td>Timely access to patient information is critical, especially in cases where patient is unable to provide the information and GP cannot be reached</td>
</tr>
<tr>
<td></td>
<td>Viewing imaging (91%)</td>
<td>Decision support for prescriptions (79%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clinical reference (86%)</td>
<td>Share records with practitioners (72%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Event summaries (74%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Segment</td>
<td>Top 4 current uses (percent of specialists using)</td>
<td>Top 3 desired uses (percent of specialists who don’t use but would like to)</td>
<td>Drivers/limitations</td>
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</table>
| **Internal medicine** | Clinical reference (75%)  
Viewing pathology (69%)  
Education (64%)  
Viewing imaging (56%) | Share records with practitioners (68%)  
Order imaging (62%)  
Decision support for prescriptions (60%) | Computerised records more efficient for specialists managing long-term patients  
Interactive decision support appeals to those using complex diagnostic algorithms, e.g. for the prescription of specialised drugs |
| **Obstetrics and gynaecology** | Clinical reference (74%)  
Education (72%)  
Viewing pathology (53%)  
View/record patient notes during consult (45%) | Order prescriptions (48%)  
Share records with practitioners (48%)  
Decision support for prescriptions (45%) | High risk of medicolegal claims, resulting in strong need for documentation but also concern about privacy breaches  
Interest in reducing paper files, given that files must be retained for 25 years |
| **Other (dermatology and ophthalmology)** | Clinical reference (66%)  
Education (63%)  
Show patients info during consult (49%)  
View/record patient notes during consult (47%) | Complete event summaries (54%)  
Decision support for ordering tests (54%)  
View diagnostic imaging (52%) | These specialists integrate less frequently with other practitioners and therefore benefit less from information exchange  
Dermatologists often interested in using computers to increase practice efficiency |
| **Psychiatry** | Clinical reference (72%)  
Education (71%)  
Complete event summaries (41%)  
View pathology (38%) | Order pathology (58%)  
Decision support for ordering tests (55%)  
Decision support for ordering prescriptions (54%) | Practitioners do not need to use computers for their specialty  
Strong concerns about privacy and confidentiality  
Concern that using computer during consultation interferes with patient relationships |
| **Surgery** | Education (65%)  
Clinical reference (58%)  
Viewing imaging (53%)  
Viewing pathology (52%) | Order pathology (52%)  
Order prescriptions (49%)  
Send/receive referrals (49%) | Surgeons perceive little workflow benefits from eHealth because most of their time is spent interacting directly with patients (however, practice assistants may see benefits)  
Access to digital imaging and complete, accurate health records provides a benefit for some surgeons |
Specialist readiness for eHealth use

There is a strong infrastructural and aptitudinal foundation for eHealth use by specialists. For more advanced, collaborative applications, IT connectivity and practitioner skill levels may be barriers, particularly where specialist software is non-intuitive compared to modern personal and business applications. Attitudinal readiness is highly variable across specialties, and depends significantly on the expectations in place in the specialist’s working environment.

Infrastructural readiness

Consistent with observed eHealth use for self-contained applications, most medical specialists have the necessary basic infrastructural readiness. However, system reliability, connectivity and interoperability concerns are major barriers to the use of connected, information-sharing eHealth applications, especially among early adopters.

Most medical specialists have access to computers in their main practice setting (86 percent in major cities and over 90 percent in inner regional and outer regional locations, with access falling to 79 percent when these practitioners travel to remote areas). A majority (62 percent) have access to a computer less than 3 years old. Internet access is also widespread in the main practice setting in major cities (86 percent), but less commonly available in remote areas (70 percent). Of those with access, 84 percent have broadband connectivity.

Beyond basic computer and internet access, which is largely in place, specialists need access to reliable, easy-to-use systems that enable information sharing across practices. Improving reliability and usability will help reduce a major barrier to adoption among 34 percent of respondents, the concern about system malfunction or downtime. System malfunctions can cause enormous disruptions to practitioners’ care delivery process as an inability to access information can paralyse the practice’s workflow. Specialists also commented that eHealth systems can be difficult to learn and use properly, which is even more problematic if users frequently rotate or change practices.

Aptitudinal readiness

Again, most medical specialists have the skills and interests needed for self-contained eHealth applications (internet navigation, form completion, etc.). Current usage suggests that specialists are as technology literate as doctors as a whole, with widespread computer use. Usage rates decline with age but not steeply, with 76 percent of specialists aged 55–64 using computers in their workplace, and 93 percent of medical specialists aged 65+ spending some personal time online each week. While specialists typically have sufficient levels of competence for basic computer use (e.g. accessing information online and sending emails), those who transitioned to computerised systems acknowledged that they suffered a loss in productivity in part due to the learning process in the first few months of the transition. Some practitioners were unwilling to undergo this learning process for fear that their patients would lose confidence in their skills if they were perceived to be struggling with computer use. One approach taken internationally was to address this challenge by building additional capacity during the transitional period.

Beyond training and support for system installation, specialists also need IT support for troubleshooting when things go wrong – they expect systems to work, and are not always willing or able to spend time resolving IT problems. For this reason, IT support is critical for most specialists, especially when installing and learning to use systems. Specialists in larger practices and hospitals
usually have access to dedicated IT personnel, but specialists in smaller practices often struggle to find competent, affordable support when they need it, or don’t appreciate the need to set up access to such support before it is suddenly required. For example, one interviewed paediatrician stopped paying for an IT maintenance and support service, only to see her IT system disabled by a virus after her antivirus software expired.

The lack of IT support for these specialists restricts their readiness to systems that they perceive as proven to be reliable (e.g. some practitioners will only use Apple® products) or solutions where malfunctions or downtime could be tolerated on a temporary basis.

**Attitudinal readiness**

Medical specialists have varied attitudes towards eHealth, with some being strongly convinced of the benefits, and others remaining pessimistic. Underlying these attitudes are their perceptions of the benefits of eHealth applications, and the barriers that confront them in adopting those applications. These attitudes are strong determinants of adoption rates in each specialty segment. But the segments are not homogeneous: in each there will be specialists who are resistant to eHealth applications, and those that verge on being eHealth evangelists. Identifying the resistors and the catalysts for change will be critical, as will determining the best approach for mobilising eHealth’s strongest advocates to help influence their peers.

To better explore and understand these attitudes and underlying perceptions, our analysis has identified 5 distinct ‘clusters’ of medical specialists. We now turn to that cluster analysis as the clearest way of identifying insights to medical specialist attitudes that are actionable, and upon which can be built a meaningful strategy to support eHealth engagement and adoption.

**Cluster analysis of attitudes and drivers**

We identified five eHealth attitudinal clusters of medical specialists based on perceptions of eHealth benefits, adoption drivers and barriers. We further refined these clusters to improve reachability by adding a demographic dimension, the percentage of income derived from the private sector. The most significant influence in defining the boundaries between clusters has proven to be the barriers perceived by medical specialists. We describe the clusters below, in order of their likelihood to adopt, and influence others to adopt, eHealth solutions. The relevant research findings are then summarised in the table that follows.

**Cluster 1: eHealth entrepreneurs (24 percent of all respondents)**

These specialists have the strongest interest in and use of eHealth solutions, and are willing eHealth participants. Anticipating strong benefits in efficiency, continuity of care and practitioner collaboration, their main concerns are IT compatibility and reliability issues. They are almost twice as likely as other clusters to expect that eHealth will improve patient engagement, relationships and satisfaction.

Internal medicine is overrepresented in this cluster, in part because many of these specialists handle patients with complex care needs over long periods of time, and as a result, have found ways to use eHealth solutions to improve their efficiency. Those in solo or small private practices have often pioneered their own in-house eHealth solutions in an effort to improve workflow. Some practitioners (e.g. rheumatologists) find compelling benefits in computerised decision-making
algorithms and documentation for the prescription of highly specialist drugs, while others find electronic records much more efficient for capturing, storing and retrieving patient information.

Though internal medicine practitioners are the most prominent eHealth entrepreneurs, the cluster is well-represented in nearly all specialty groups, so collectively they may engage with most other medical specialists. The cluster’s experience and enthusiasm may well be available to persuade more hesitant practitioners. Engagement strategies should therefore aim to harness this potential energy. They might be engaged in designing and shaping solutions, in defining value propositions for their peers, and in supporting demonstrations of usability and benefits.

Cluster 2: Network adopters (17 percent of all respondents)
These specialists commonly work in an environment, such as public hospitals, where computer use is expected. In these settings, they anticipate eHealth improvements in collaboration and continuity and quality of care, so that internal IT compatibility and reliability are their main concerns. While enthusiastic about the benefits, they are difficult to influence directly because they have restricted influence over their operating environment and so are less likely to control purchasing and adoption decisions within their practices. Accordingly, use of eHealth applications by others in their network is a much stronger driver for adoption than financial incentives or patient demand.

Anaesthesia, emergency medicine, and diagnostics specialists are over-represented in this cluster, largely because these practitioners typically work in hospital environments surrounded by eHealth use. These specialists also tend to be adept at working with technology and interested in the use of computers to improve their workflow.

Network adopters can play an important role as change advocates within their networks of care because they interact with a wide range of other specialists and other healthcare professionals, as well as with patients. As eHealth supporters, they can be used to disseminate information and influence perspectives more broadly within their operating environments.

Cluster 3: Capable but unconvinced (13 percent of all respondents)
These specialists are reasonably tech-savvy, have financial resources and IT support, and are less influenced by potential barriers such as IT compatibility, cost or privacy concerns. They currently use a range of eHealth applications, but only the ones with clear perceived benefits. Relative to the first two clusters, they are much less interested in adopting the eHealth solutions that they do not currently use. For example, 44 percent of the cluster responded that it didn’t need interactive decision support for ordering tests (compared to 18 percent of eHealth entrepreneurs), even though computerised test ordering rates were similar to eHealth entrepreneurs (22 percent vs. 29 percent respectively for ordering pathology tests, and 23 percent vs. 22 percent for ordering imaging).

Practices for which IT failures or delays would be either costly or critical, such as surgeons and emergency specialists, are over represented in this cluster. These practitioners are generally adept at using technology, but are interested only in solutions that improve efficiency without detriment to clinical care, or that improve clinical care without sacrificing practice efficiency.

The capable but unconvinced specialists are unimpressed by the surveyed adoption drivers, with only peer practitioner use holding some sway with them, and even then not greatly. The case for adoption must include clear evidence that the proposed eHealth solution has been implemented successfully
by other practitioners whom they respect. Overall, they are not yet convinced that eHealth would help them improve clinical care, though they are open to that evidence. However, they would resist solutions that could cause disruption to the care delivery process in their practice. Evidence that the eHealth solution being proposed to them is an integral part of a broader and positive healthcare reform will be important to them. However, that argument will not be decisive unless they are sure the solution will not cost them practice efficiency.

Cluster 4: Apprehensive followers (30 percent of all respondents)
These specialists see some benefits in eHealth applications, but perceived benefits are heavily outweighed by perceived barriers and risks. For example, they are more than four times more likely to be concerned about malfunction risk than Cluster 3 specialists. They have the most serious privacy concerns, are financially constrained for new investments, and have limited access to IT support. This cluster contains a fairly even mix across all specialties, as it is not closely tied with any specialty-specific characteristics or drivers.

Given the number of perceived barriers and weak perception of benefits, adoption strategies will need to be multi-faceted and address more than a barrier or two major barriers. They will also be waiting for others to act first. In earlier stages, apprehensive followers should be engaged in defining eHealth solutions and delivery models, to ensure that solutions address their needs and concerns. Frequently updated, transparent information on adoption level and momentum, within relevant communities of care, will provide some of the pressure and encouragement they need.

Cluster 5: Uninterested (16 percent of all respondents)
These specialists have the lowest IT usage rates and have negative perceptions of all eHealth benefits. They do not operate in an environment in which computer use is expected, and face many barriers to adoption. They strongly disagree that eHealth applications will bring better patient relationships, engagement or outcomes (in fact, they believe the reverse) and are also less responsive to common influence levers (e.g. financial incentives and peer pressure). The cluster is skewed towards older practitioners who, with retirement looming, have less incentive to adopt new technology.

Psychiatrists and surgeons are over represented in this cluster; two of the least likely segments to integrate computers into their daily work, and who are worried respectively about interference with patient rapport, and malfunctions and downtime (including simply the time taken to find records and download diagnostic images). The more computerised segments, such as emergency and diagnostics specialists, are almost nonexistent in this cluster.

Though active adoption cannot be expected, the cluster cannot be ignored. Some of its members will influence their peers and public opinion, so any strategy must provide them with evidence on clinical care outcomes and practice efficiencies. That evidence will be better regarded if it comes from their peers. Practice managers and support staff are also influential for this cluster, as they often determine computer use within the practice while the specialists maintain a healthy distance from IT. While not interested in eHealth for its own sake, they may be persuaded by the need for them to adopt eHealth solutions as part of an overall strategy to achieve health outcomes. However, there will be a point at which the best approach will be to require, rather than request, adoption.

Although specialist segments often have one or two dominant clusters, most segments are represented across four or five and there are strong eHealth supporters in each specialist segment.
This indicates that clinical workflows explain some but not all of the variation in attitudes between specialists (Exhibit 2). How eHealth supporters are leveraged to influence the rest of their segment may differ, particularly where the more resistant clusters (3-5) are in the strong majority.

Exhibit 2

**Most specialist segments have one or two dominant clusters, but maintain representation across all five**

% of respondents

<table>
<thead>
<tr>
<th>Specialty segment composition by cluster</th>
<th>Uninterested</th>
<th>Apprehensive follower</th>
<th>Capable but unconvinced</th>
<th>Network adopter</th>
<th>eHealth entrepreneur</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency</td>
<td>13</td>
<td>16</td>
<td>51</td>
<td>13</td>
<td>18</td>
</tr>
<tr>
<td>Diagnostics</td>
<td>30</td>
<td>13</td>
<td>33</td>
<td>16</td>
<td>22</td>
</tr>
<tr>
<td>Internal Medicine</td>
<td>35</td>
<td>16</td>
<td>13</td>
<td>10</td>
<td>26</td>
</tr>
<tr>
<td>Anaesthesia</td>
<td>16</td>
<td>27</td>
<td>11</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Obstetrics/ gynaecology</td>
<td>21</td>
<td>21</td>
<td>10</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>Ophthalmology/ dermatology</td>
<td>25</td>
<td>25</td>
<td>9</td>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td>Psychiatry</td>
<td>38</td>
<td>38</td>
<td>38</td>
<td>38</td>
<td>33</td>
</tr>
<tr>
<td>Surgery</td>
<td>26</td>
<td>33</td>
<td>33</td>
<td>33</td>
<td>19</td>
</tr>
</tbody>
</table>

SOURCE: eHealth readiness survey
<table>
<thead>
<tr>
<th>Cluster</th>
<th>Current use (examples)</th>
<th>Perceived benefits</th>
<th>Barriers</th>
<th>Adoption drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>eHealth entrepreneurs</td>
<td>Viewing pathology results (86%)</td>
<td>Continuity of care (72%)</td>
<td>External compatibility (30%)</td>
<td>Financial incentives (56%)</td>
</tr>
<tr>
<td></td>
<td>Viewing/recording notes during consultations (53%)</td>
<td>Efficiency (70%)</td>
<td>Internal compatibility (26%)</td>
<td>Professional body endorsement (50%)</td>
</tr>
<tr>
<td></td>
<td>Electronic health record (59%); paperless (31%)</td>
<td>Collaboration (65%)</td>
<td>Malfunction and downtime risk (17%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Continuity of care (71%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quality of care (65%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Patient safety (61%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Collaboration (77%)</td>
<td>Internal compatibility (32%)</td>
<td>Other practitioner use (16%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Continuity of care (71%)</td>
<td>Malfunction and downtime risk (23%)</td>
<td>Support staff use (9%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quality of care (65%)</td>
<td>External compatibility (19%)</td>
<td>Professional bodies (9%)</td>
</tr>
<tr>
<td>Network adopters</td>
<td>Viewing pathology results (89%)</td>
<td>Collaboration (37%)</td>
<td>Internal breaches (13%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Viewing/recording notes during consultations (43%)</td>
<td>Continuity of care (39%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electronic health record (53%); paperless (9%)</td>
<td>Quality of care (65%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Patient safety (61%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Efficiency (41%)</td>
<td>Internal compatibility (15%)</td>
<td>Other practitioner use (12%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Collaboration (31%)</td>
<td>Malfunction and downtime risk (13%)</td>
<td>Otherwise negative</td>
</tr>
<tr>
<td>Capable but unconvinced</td>
<td>Viewing pathology results (71%)</td>
<td>Efficiency (34%)</td>
<td>Malfunctions and downtime risk (58%)</td>
<td>Financial incentives (30%)</td>
</tr>
<tr>
<td></td>
<td>Viewing/recording notes during consultations (39%)</td>
<td>Continuity of care (34%)</td>
<td>Prefer to wait until technology proven (51%)</td>
<td>Professional body endorsement (17%)</td>
</tr>
<tr>
<td></td>
<td>Electronic health record (49%); paperless (15%)</td>
<td>Collaboration (31%)</td>
<td>Privacy breaches (47%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Efficiency (25%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apprehensive followers</td>
<td>Viewing pathology results (46%)</td>
<td>Continuity of care (34%)</td>
<td>Malfunctions and downtime risk (40%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Viewing/recording notes during consultations (31%)</td>
<td>Collaboration (31%)</td>
<td>Prefer to wait until technology proven (36%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electronic health record (33%); paperless (12%)</td>
<td>Efficiency (25%)</td>
<td>Privacy breaches (31%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Minimal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uninterested and IT challenged</td>
<td>Viewing pathology results (20%)</td>
<td>Minimal</td>
<td>Malfunctions and downtime (40%)</td>
<td>Minimal</td>
</tr>
<tr>
<td></td>
<td>Viewing/recording notes during consultations (18%)</td>
<td></td>
<td>Prefer to wait until technology proven (36%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electronic health record (16%); paperless (6%)</td>
<td></td>
<td>Privacy breaches (31%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Minimal</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Practitioner engagement strategies

The purpose of the readiness and cluster analyses is to inform eHealth adoption strategies so that the right interventions can be deployed at the right time for the right group of specialists. These decisions will depend on several factors including the type of eHealth application, the extent of the desired adoption (e.g. ubiquitous, specific specialties, specific geographies), the target adoption rate and profile over time, and the budget for change and adoption actions.

Available interventions

The research indicates that a focus on educating and training individual practitioners will be insufficient because it does not address some fundamental barriers to adoption, such as the suitability or limitations of available eHealth solutions, and how they are delivered across the relevant health network. Actions to influence the use of eHealth applications by medical specialists must work along three complementary axes, being those that:

1. Shape the eHealth products, i.e. the eHealth solutions as a whole, including any IT hardware, software, delivery and support
2. Shape the demand for those products among medical specialists, and
3. Shape the health ecosystems in which those specialists work

Shaping eHealth products

A number of barriers to adoption of eHealth stem from concerns about the eHealth ‘product’ itself, such as the security, privacy, suitability, interoperability, usability, reliability or cost (of installation and operation) of the solutions. Therefore an effective adoption strategy cannot be limited to engaging or shaping the demand. Interventions are needed to lower the product-related barriers (real or perceived), tailoring the product or its delivery to the differentiated needs of the medical specialists.

Shaping eHealth demand

The research identifies wide variations in the intended use of eHealth solutions, and in the attitudinal underpinnings of these variations. The clusters have markedly different perceptions of the benefits, costs and risks of eHealth. The effort to shape the demand for eHealth solutions must be grounded in the needs profiles identified in the research: by specialty and by cluster. Examples of demand-shaping interventions are outlined below, focused on defining and proving tailored value propositions, and stimulating awareness and early adoption.
Shaping health ecosystems

Introducing eHealth solutions that affect care delivery models requires coordinated approaches across the healthcare system. The research has confirmed that medical specialists are influenced by overall system changes and benefits. The eHealth adoption strategy therefore needs to help create the conditions in the ecosystem that influence and support adoption, within and across clusters. This includes a regulatory and incentive environment in which vendors, professional bodies and practitioners can develop and adopt the right solutions.

Across each of these three areas, some interventions will work better with some clusters than others, as we have seen above. Further, some interventions must be launched before others: in any adoption strategy, there will be an establishment period, a time in which momentum is built, and a time for consolidating real change. Our research suggests the following interventions may be appropriate for each cluster through the duration of the change and adoption effort. The nature and timing are discussed in more detail in Section 7 of this report.

Table 3: Interventions and target clusters

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Establishment (0-6 months)</th>
<th>Momentum (6 m to 1 yr)</th>
<th>Change (1-2 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shaping the product</td>
<td>Clusters targeted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Establish basic standards and certification criteria</td>
<td>1, 2, 3</td>
<td>4, 5</td>
<td></td>
</tr>
<tr>
<td>Create incentives for product usability and functionality</td>
<td>3, 4</td>
<td>4, 5</td>
<td></td>
</tr>
<tr>
<td>Provide solutions and support to mitigate risk of malfunctions or downtime</td>
<td>3, 4</td>
<td>3, 4</td>
<td></td>
</tr>
<tr>
<td>Shaping the demand</td>
<td>Clusters targeted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Establish a measurement and evaluation framework</td>
<td>1, 2</td>
<td>1, 2, 3</td>
<td>1, 2, 3, 4, 5</td>
</tr>
<tr>
<td>Disseminate accurate information and education on product use and risks</td>
<td>1, 2</td>
<td>4, 5</td>
<td>4, 5</td>
</tr>
<tr>
<td>Recognise and promote successful use cases</td>
<td>1, 2, 3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Provide assurance on the intended use of practitioner performance data</td>
<td>4</td>
<td>4, 5</td>
<td></td>
</tr>
<tr>
<td>Embed eHealth solution deployment in the context of a broader initiative</td>
<td>1, 3</td>
<td>4, 5</td>
<td></td>
</tr>
<tr>
<td>Shaping the ecosystem</td>
<td>Clusters targeted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultivate eHealth pioneers as change champions</td>
<td>1</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Identify and target critical adoption ‘nodes’ and specialists who frequently interact with others</td>
<td>2</td>
<td>2, 3</td>
<td>4, 5</td>
</tr>
<tr>
<td>Design and offer training workshops targeting support staff</td>
<td>1, 3, 5</td>
<td>3, 5</td>
<td></td>
</tr>
<tr>
<td>Offer incentives for use</td>
<td></td>
<td>1, 4</td>
<td></td>
</tr>
<tr>
<td>Create transparency on adoption levels</td>
<td>4, 5</td>
<td>4, 5</td>
<td></td>
</tr>
<tr>
<td>Require mandatory participation</td>
<td></td>
<td>4, 5</td>
<td></td>
</tr>
</tbody>
</table>
Applying the interventions in a strategy

It is not the purpose of this report to determine final strategies to drive the adoption of particular eHealth solutions. However, it sets out a detailed example of how the findings of the eHealth readiness research may be applied in a comprehensive adoption strategy, with well-targeted interventions selected to meet practitioner and policy expectations and address the many barriers to adoption. In overview, the described strategy would:

1. Describe the objectives and set the aspiration
2. Develop and prioritise use- and business cases
3. Identify the critical medical specialist sectors and their role in the use-case
4. Highlight participant clusters and their role in adoption
5. Prioritise clusters and their intervention drivers
6. Integrate intervention levers to develop a coordinated strategy
7. Measure performance and refine the approach

This strategic approach can be further developed for most eHealth solutions. The body of this report includes an example that illustrates this process in further detail for a national telestroke program.

Research conclusions

On the basis of this research, we would now answer the three anchor questions as follows.

1. **Medical specialists are ready to adopt eHealth technologies that either improve their practice’s operational efficiency or improve clinical care, but are not yet ready to use eHealth in a way that connects and coordinates care within the entire health ecosystem.**

   – Australia’s medical specialists have a strong foundation for eHealth adoption and use, but current levels of electronic information sharing indicate that they are far from realising its full potential. Specialists generally take a practice-oriented view, rather than a macro-level perspective to eHealth adoption and benefits. For this reason, current use is often self-contained within a practice or hospital rather than integrated across networks. Medical specialists have the skills and tools needed to support self-contained eHealth use, but most lack the connectivity, IT support and conviction required to adopt eHealth solutions that drive widespread patient-focused clinical outcomes.

2. **The leading barriers to eHealth adoption are product-driven concerns about system malfunctions, downtime, and poor usability, all of which jeopardise specialists’ ability to deliver quality care efficiently. Improving product reliability and connectivity will help specialists feel comfortable using eHealth solutions to their full potential.**

   – Specialists are extremely sensitive to operational efficiency risks because they directly affect both patient care and their income (for private fee-for-service specialists). Many specialists also face connectivity constraints, have concerns about privacy and security, and perceive financial costs and risks that exceed the perceived benefits.
Reducing technological barriers will require a joint effort between system vendors, clinicians, and other industry stakeholders such as standards organisations. They will need to improve product functionality and usability, minimise the risk and impact of system error, and improve connectivity and interoperability. Concerns about privacy and security can be overcome through dissemination of accurate information and adherence to universal privacy guidelines. Time and cost concerns can be addressed by reducing real and perceived costs (e.g. through IT support or subsidies) and by increasing real and perceived benefits.

3. eHealth use is largely driven by two demand-related factors: a strong perception of benefits, and pressure from others in a specialist’s working environment. Connecting eHealth use with tangible, relevant benefits and building an influential network of eHealth advocates will best promote future use.

Specialists’ primary objective is to deliver high quality care as efficiently and safely as possible. To the extent that they believe eHealth will advance these objectives, they are incentivised to adopt. These beliefs vary widely between different attitudinal clusters of specialists, however. External pressure is also very powerful, both in convincing specialists of the benefits and in providing the resources and support needed to facilitate adoption. Beyond their immediate environments, specialists are influenced to varying degrees by respected peers, advice from professional bodies, and journal publications.

Increased adoption and effective use can be driven by strengthening the connection between eHealth and the benefits that are most relevant to specialists. This can be accomplished by ensuring eHealth solutions are clearly embedded in overall improvement of care delivery models and processes, establishing specific value propositions to specialists in adopting these new care models and supporting eHealth solutions, and measuring and tracking outcomes and presenting this evidence through credible sources that reach both practitioners and hospital decision-makers. Peers and professional bodies are also valuable influence levers and can provide information and pressure on specialists within their networks.

Based on these findings, advancing medical specialists’ eHealth adoption in a way that achieves widespread improvements in health outcomes requires shaping the three axes of ecosystem, product, and demand. Addressing a single axis in isolation is likely insufficient to produce significant change. Shaping the ecosystem is critical for establishing an integrated healthcare network that supports and drives change, shaping the product is necessary to overcome adoption barriers and ensure that solutions maintain or enhance specialists’ care delivery processes, and shaping demand provides the necessary incentives to spur adoption and use.

This report is intended as a starting point to inform the engagement of medical specialists with eHealth solutions for eHealth for patient-centred care, and we acknowledge that additional research may be needed to gain a deeper understanding of the topics covered and to support specific strategies. This report aims to benchmark medical specialists’ infrastructural readiness for eHealth, the benefits they seek, and the barriers and drivers for their participation in future national eHealth initiatives. Each of these is critical for the long-term success of Australia’s eHealth agenda.
4. Definitions
Medical specialists

We defined medical specialists according to the Health Insurance Regulations 1975 (the Regulations), which describe relevant specialist medical organisations and qualifications for the purpose of access to Medicare. Under this definition, to be eligible for recognition as a specialist, a doctor must either:

- Be registered with the Australian Medical Board to practise as a specialist in accordance with the Health Practitioner Regulation National Law Act 2009; or
- Have obtained, as a result of successfully completing training in the specialty, the appropriate qualification for the nominated specialty (as listed in Schedule 4 of the regulations), and be a Fellow of the relevant medical college.

Doctors undertaking specialist training are not recognised as specialists under the Regulations.¹

Some qualifications that are recognised by the Australian Medical Council (AMC)² are not included under the definition of specialists provided above, specifically those that describe primary care such as general practice and rural general practice, and specialties that do not involve direct patient care such as medical administration. Accordingly, those groups were considered out of scope for the purposes of this research.

This report considers 8 primary categories of medical specialists, as follows:

1. Internal medicine
2. Surgery
3. Emergency Medicine
4. Anaesthesia
5. Psychiatry
6. Diagnostics (radiology and pathology)
7. Obstetrics, gynaecology (includes neonatology)
8. Other (e.g. dermatology and ophthalmology)

Further details on sampling rationale and approach are included in Appendix 2: Research methodology.

Geographic classifications

Our classification of location corresponds with prior healthcare sector reviews (e.g. The Australian Medical Specialist Workforce, An Overview of Workforce Planning Issues, Australian Health Workforce Advisory Committee Report 2006.¹), and is based directly on the Australian Standard Geographical Classification as published by the Australian Bureau of Statistics. In response to

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¹ Australian Government Medicare Australia ‘Guidelines for the Recognition of Medical Practitioners as specialists or Consultant Physicians for Medicare purposes under the Health Insurance Act 1973’.

² Australian Medical Council – List of Australian Recognised Medical Specialties.
the limited number of medical specialists in remote areas, the ‘Outer Regional’, ‘Remote’ and ‘Very Remote’ categories have been consolidated into a single category, whilst the ASGC ‘Offshore’ classification is considered irrelevant in this instance and accordingly has been discounted.

**eHealth**

We broadly define eHealth as the combined use of electronic communication and technology in healthcare. This definition encompasses four general categories of technology solutions. While the precise future state of eHealth is difficult to predict given ongoing technology advancements, the current landscape and expected lead applications find broad consensus.

In the wake of the National E-Health Strategy (2008), the health landscape has evolved significantly. Rather than take a static view of eHealth based on the current state, it is necessary to consider future applications, particularly in light of the PCEHR Concept of Operations and DoHA’s understanding of the likely/intended role of medical specialists downstream.

**Telehealth**

For the purposes of this research, telehealth has been used more broadly than the Medicare Benefits Scheme (MBS) definition. We define telehealth as the use of electronic information and telecommunications technologies to support long-distance clinical health care, patient and professional health-related education, public health and health administration. During the primary research, survey respondents and interviewees were asked to consider both clinical elements of the healthcare system such as remote consultations with patients and other practitioners, and non-clinical elements such as remote training.

**Electronic health record**

For the purposes of our survey, we used the term electronic health record to refer to all patient records that are stored in hospital or clinic settings in a computerised format. We included both stand-alone electronic medical records and records with the capability of being shared across different healthcare settings.

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3 MBS telehealth rebates are limited to remote consultations with rural, regional and outer metropolitan patients via video-conference or online.

4 Refer to the NeHTA’s ‘List of acronyms, abbreviations and glossary of terms’ for additional details on the definitions of electronic health records and electronic medical records.
Readiness

We define eHealth readiness across three dimensions:

- **Infrastructural readiness**: to what extent does the practitioner’s external environment and infrastructure support eHealth adoption? For example, does the practitioner have the requisite computer systems and connectivity to use a full spectrum of eHealth solutions?
- **Attitudinal readiness**: do practitioners believe that the benefits from adopting and using eHealth solutions outweigh the costs and risks? How willing are they to engage in new technologies?
- **Aptitudinal readiness**: to what extent does a practitioner have the skills, training and IT support needed to adopt and use eHealth solutions to their full potential?

This three-dimensional approach provides a more robust understanding of the current state of readiness and likely barriers and enablers. It allows an assessment of not only the existing hardware and software used today, but also how it is used and the underlying reasons for usage or lack thereof. It also provides the foundation for understanding the gaps and barriers to eHealth and their root causes (which can range widely from concerns such as over implications for their role, implications of information transparency, or efforts or costs they anticipate relative to benefits or incentives).

Additionally, we consider eHealth readiness within the context of expected use, which often varies considerably based on the nature of a practitioner’s work (e.g. specialty, geographic location, practice setting, and type of patients).
5. Current and future uses of eHealth
At present, specialists are embedding eHealth solutions into their practices to varying degrees, driven by their operating environments and perceptions of relative benefits and barriers, as discussed in Section 6 below. Most private practitioners have adopted solutions that provide their practice with immediate operational benefits, e.g. time savings, reduction of storage space, and rapid access to information. The most commonly used solutions are those that enable users to view information that others have provided (e.g. pathology results). Many specialists also use solutions for information capture and storage, although the relative benefits and costs for these applications vary by specialty type. Solutions that involve information sharing are less common, as these are often the most challenging to implement and provide the fewest direct benefits to specialists.

The following section outlines current eHealth use by specialty segment and is organised as follows:

- Current and desired eHealth use
- Telehealth
- Segment-specific eHealth use
- Future eHealth expectations

**Current and desired eHealth use**

**Practice management**

Practice administration applications such as billing and scheduling are prevalent among most medical specialists (Exhibit 3). These applications provide immediate efficiency and cash flow benefits at a relatively low cost. Decisions to implement and use billing and scheduling applications in private practices are usually made in conjunction with practice managers, who are often the primary users.

**Viewing information created by others**

Specialists frequently use self-contained eHealth applications (i.e. uses that do not require information exchange) for accessing information and content provided by others. For example, 72 percent of survey respondents used computers for accessing health-related information, and 70 percent used computers for completing educational courses. This strong response is not surprising given the relatively low barriers to using these applications and the need for specialists to complete Continuing Professional Development (CPD) courses, which is a requirement for registration in Australia. An increasing number of Medical Colleges are delivering CPD programs online and uptake has been strong due to the convenience and time savings. Similarly, specialists often find that the most efficient way to look up health-related information is through an online search. They also use computers to find and read journal articles in their areas of interest.

Some practitioners (39 percent) use computers to share information with their patients during a consultation. Online resources are particularly well-suited for some specialties (e.g. ophthalmology and surgery) because they provide a convenient and helpful way for specialists to explain procedures to their patients.

Beyond these basic eHealth applications, specialists are also using computers to view pathology results (62 percent) and imaging (53 percent). Specialists typically use a secure web-based interface to view test results, and some are able to download results directly into an electronic medical record system. Especially during the initial use period, specialists are concerned about missing a critical diagnosis and as a result, they often request and file hard copies of test results.
in duplicate. While specialists are generally pleased with the convenience of viewing results online, some have voiced complaints that they are only able to access results from certain laboratories or are limited to viewing imaging that they ordered themselves. Access limitations are specifically frustrating for specialists providing consultations to practitioners in remote areas because of the time delays that result.

**Exhibit 3**

**Specialists commonly use computers for reference and education and express less interest in patient-facing and decision support applications**

<table>
<thead>
<tr>
<th>Use of computers for eHealth applications</th>
<th>Use</th>
<th>Don't use but would like</th>
<th>Don't use and don't need</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access online clinical reference tools</td>
<td>72</td>
<td>22</td>
<td>6</td>
</tr>
<tr>
<td>Complete education and training courses</td>
<td>70</td>
<td>23</td>
<td>6</td>
</tr>
<tr>
<td>Viewing pathology results</td>
<td>62</td>
<td>26</td>
<td>12</td>
</tr>
<tr>
<td>Billing and patient rebates</td>
<td>66</td>
<td>20</td>
<td>13</td>
</tr>
<tr>
<td>Patient booking and scheduling</td>
<td>60</td>
<td>24</td>
<td>15</td>
</tr>
<tr>
<td>Viewing diagnostic imaging results</td>
<td>53</td>
<td>29</td>
<td>18</td>
</tr>
<tr>
<td>Sharing health records with practitioners</td>
<td>44</td>
<td>57</td>
<td>19</td>
</tr>
<tr>
<td>Completing event summaries</td>
<td>32</td>
<td>43</td>
<td>23</td>
</tr>
<tr>
<td>Ordering pathology tests</td>
<td>26</td>
<td>35</td>
<td>27</td>
</tr>
<tr>
<td>Show patients information during consultation</td>
<td>23</td>
<td>35</td>
<td>27</td>
</tr>
<tr>
<td>View/record patient information during consultations</td>
<td>22</td>
<td>35</td>
<td>28</td>
</tr>
<tr>
<td>Sending or receiving referrals</td>
<td>20</td>
<td>51</td>
<td>28</td>
</tr>
<tr>
<td>Ordering diagnostic imaging</td>
<td>17</td>
<td>53</td>
<td>29</td>
</tr>
<tr>
<td>Enter patient notes after a consultation</td>
<td>10</td>
<td>37</td>
<td>31</td>
</tr>
<tr>
<td>Decision-making support for ordering tests</td>
<td>9</td>
<td>54</td>
<td>37</td>
</tr>
<tr>
<td>Transferring prescriptions to the pharmacy</td>
<td>8</td>
<td>52</td>
<td>40</td>
</tr>
<tr>
<td>Decision-making support for ordering prescriptions</td>
<td>10</td>
<td>50</td>
<td>40</td>
</tr>
<tr>
<td>Share health records with patients</td>
<td>12</td>
<td>43</td>
<td>45</td>
</tr>
<tr>
<td>Communicate with patients outside of consultations</td>
<td>17</td>
<td>37</td>
<td>46</td>
</tr>
</tbody>
</table>

**SOURCE:** eHealth readiness survey

Capturing information

Specialists using computers to capture information typically cited internal efficiency gains as the primary driver, often because they access the same records over a long period of time. Although computerised health records are gaining popularity, relatively few specialists use an electronic record-keeping system as a single repository for all relevant patient information. Only 41 percent of survey respondents used a computerised health record-keeping system, and of these just 37 percent relied solely on computerised records (Exhibit 4). Most will use a computerised system for administrative purposes and storing patient notes, but maintain separate hard-copy storage for information received from other providers (e.g. test results, diagnostic imaging, and referral letters).

Many practices are in the process of transitioning to paperless operations, but are finding the process challenging for the following reasons:

- **Duplication due to incompatibility.** System incompatibility results in additional time required to complete certain operations. For example, some electronic medical record (EMR) systems are
unable to integrate with billing/EFTPOS systems, so a paperless process requires duplicate data entry and additional time relative to the paper-based alternative

- **Risk of technical failure**, which can paralyse a practice if systems are forced to go offline or are unusable for a period of time

- **Medicolegal concerns** about losing information or missing critical test results due to a user error or oversight

- **Workflow disruptions**, because for some types of records and information, capturing notes in an online system does not fit well with the current process flow. For this information, the specialist often relies on faster and/or easier traditional approaches (e.g. handwritten notes)

- **Inability to share information with other practitioners**, either due to a lack of interoperability between computerised systems or the limitation that some practitioners can only receive information by fax or post

- **Perception that patients still need hardcopies**, that patients need print-outs of their pathology test requests so they can choose and locate a pathology lab, paper scripts so that they have flexibility in choosing a pharmacy, and physical records to share information with their families and GPs.

Exhibit 4

_Although electronically maintained health records are gaining traction, relatively few specialists have gone completely paperless_

% of respondents

<table>
<thead>
<tr>
<th>Do you currently use an electronic health record? In other words, do you maintain information about your patients’ health status and health care in a computer-readable format?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic or computer-readable health records</td>
</tr>
<tr>
<td>Use</td>
</tr>
<tr>
<td>58</td>
</tr>
<tr>
<td>Entirely computerised records</td>
</tr>
<tr>
<td>Combination of paper-based and computerised records</td>
</tr>
</tbody>
</table>

SOURCE: eHealth readiness survey
Sharing information electronically

Applications requiring more sophisticated connectivity (e.g. test orders and sharing information with other practitioners) are not yet widely used. The perceived benefits from these applications are often outweighed by perceived risks to a practitioner’s ability to deliver care or to the practice’s efficiency. For example, some specialists cited concerns about confidentiality as reasons why they would not be willing to use computers to store and share patient records. Other practitioners mentioned that even though they had the ability to send information (e.g. discharge letters) electronically, it was significantly more time-consuming to use computers than to use a fax machine. In many cases, the benefits for information sharing accrue mostly to the overall health system and not to the individual specialist, limiting overall incentives for use.

Additional reasons specialists provided for not using eHealth solutions are listed below:

- **Solution not available** in current practice location. Some specialists, especially those based in hospitals, are constrained by the systems and software currently available in their operating environment. This was especially common among emergency medicine and intensive care specialists, who were often very interested in tools like interactive decision support or electronic medical records, but did not have access in their hospitals. Additionally, a lack of external connectivity frequently limits the ability to share information electronically outside of the practice or hospital setting.

- **Specific eHealth applications not perceived as relevant** to specialist’s work. For example, some specialists do not hold consultations with patients and therefore would not use computers to take notes or otherwise engage with patients during a consultation.

- **eHealth application not used frequently enough** to provide a significant benefit. Many specialists write prescriptions only on a limited basis and therefore have little interest in ePrescribing. For them, it is much easier to use a script pad than to implement and learn to use a computerised system.

- **Lack of awareness**, especially for more sophisticated applications. Many specialists are still unaware of applications like computerised decision support, and among those who are aware, many do not understand how the applications could provide benefits. Some specialists (e.g. obstetricians) mentioned that to date, they had heard very little if any information on eHealth and how eHealth solutions might be used in their specialty.

- **Lack of demand** from patients, GPs, or other practitioners. For example, some specialists are willing to share information electronically with their patients on request, but find that their patients rarely, if ever, ask for this service.

Interest in future eHealth use

Among eHealth applications that are not commonly used, specialists are especially interested in sharing information with other practitioners (57 percent of specialists surveyed don’t use but would like a computer), ordering tests and prescriptions, and decision support for test orders.

Specialists are least interested in using computers to share health records with patients (45 percent don’t want and don’t need a computer for this) and communicating with patients outside of consultations (46 percent don’t want and don’t need a computer for this). Specialists provided two primary reasons for their lack of interest in sharing records electronically. First, they stated that...
they have no need to change because the current process (providing patients with a printed copy of a discharge letter) meets their patients’ needs. Second, they were concerned that because they believe patients are not trained to interpret and understand medical information, patients may become unnecessarily worried over records or results that they are not interpreting correctly.

Specialists interviewed were also, for the most part, opposed to communicating with patients electronically outside of consultations. The primary concerns were legal risk, especially if a specialist did not respond quickly to an urgent note, and the increased time required to respond to patient emails (which would not be reimbursed).

Consistent with specialists’ relatively low level of interest in sharing records and communicating electronically with patients, they perceive that eHealth offers relatively fewer opportunities to improve patient relationships, satisfaction and engagement (discussed further in Section 6). In many cases, specialists’ patient interactions skew towards being transactional rather than long-term, and as a result, these specialists often focus on excellence in care delivery rather than sustaining relationships.

**Telehealth**

There is significant and growing interest in telehealth\(^5\) among all specialties, although interest for training, supervising and consultations with other practitioners is much stronger than interest in using telehealth to connect directly with patients. Telehealth is currently used by fewer than 10 percent of specialists surveyed, but an additional 41 percent stated that they definitely or probably will start using telehealth within the next 3 years (Exhibit 5). Within specific segments, diagnostics (~24 percent) emergency practitioners (~18 percent) and obstetrics/gynaecologists (~18 percent) are the most likely to have already started using telehealth services. Appendix 3 provides additional details on telehealth use by segment.

Most telehealth is currently for consultations between practitioners and/or for training purposes, and these two applications retain the greatest potential for future use (62 percent of practitioners who definitely or probably will start using telehealth are very interested in using it for training and 55 percent are very interested in using it for consultations with other healthcare practitioners. Far fewer specialists (43 percent) are interested in telehealth for remote monitoring and remote consultations with patients (38 percent). Specialists interviewed were much more interested in providing advice to GPs and other specialists in remote areas than in connecting with patients, and in many cases (e.g. teledermatology) specialists did not believe that the patient even needed to be present for them to provide a diagnosis.

Many telehealth systems have been developed by strongly motivated clinicians, who promote and market them through their own networks with little support from the IT and telecommunications industry. Not all are compatible with the current or proposed structure of the MBS telehealth items, as not all require that the patient be physically present or consulted by videoconference.

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\(^5\) For the purposes of this research, telehealth has been defined more broadly than under the Medicare Benefits Scheme (MBS). Refer to the Definitions section for additional detail.
A key motivating factor for telehealth services is the reduction of patient travel costs and waiting times, particularly the avoidance of referral to a bigger centre. Another is the reduction of long distance and overnight callouts for doctors who are ‘on-call’. Telehealth is also being pursued for life and death situations where rapid treatment is required, or where supervision is otherwise ideal: for example, the telestroke initiative, and the assessment and management of neurosurgical emergencies.

Although telehealth use is currently low, future interest is strong

The following applications were explored during initial clinician and stakeholder interviews. These examples show that, though the potential efficiencies and learnings from these early telehealth initiatives are significant, incentives may need some realignment so that telehealth parties are not penalised for treating patients locally.

- An Australia-wide teledermatology program run by the Australian College of Rural and Remote Medicine. Rural doctors can email patient histories and a set of photographs to a secure website supported by a dermatologist in South Brisbane, who makes a diagnosis and sends educational materials and a treatment plan back to the GP. Significant savings on patient travel and public-sector wait times, though increases GP workload beyond a simple referral.

- A ‘telestroke’ program operating in a rural Victorian town with a large hospital, enabling thrombolytic therapy to commence immediately after a stroke without wasting time transferring the patient to a city hospital. The patient examination is videoed and the diagnostic images sent to a neurologist in Melbourne, who confirms the diagnosis and approves the thrombolytic therapy. The program saved patient transport and improved clinical outcomes, but the hospital’s pharmaceutical budget was stretched as a result of undertaking treatment locally.
• The iCBT cognitive behavioural therapy program run by the Clinical Research Unit for Anxiety and Depression at St Vincent’s Public Hospital. Carefully selected patients are enrolled in an online program as an alternative to medication and psychotherapy. Very little clinician input is required and about 50 percent of selected patients recover using this tool alone, with significant savings to the health system. This program is now being replicated in several states with a view to decreasing the workload of psychologists and GPs who are freed up to focus on more complex cases.

• A telehealth-based system of trainee supervision and assessment to allow a greater proportion of surgical training to be undertaken in rural and remote hospitals. This is currently under development through the Royal Australasian College of Surgeons.

Segment-specific eHealth use

To a large extent, medical specialists’ eHealth use is influenced by factors associated with their specialty segment and surrounding environment. The specialties with high professional needs that can be met using existing technology tend to be the heaviest eHealth adopters (Exhibit 6). For example:

• **Diagnostics** (i.e. radiologists and pathologists) most frequently use computerised information recording and sharing, and their use primarily involves capturing and recording information in an eHealth system and making it available to others. Due to the large volume of information that flows through these groups, they have been heavily incentivised to computerise operations to improve efficiency and reduce the risk of error. As a result, many are able to provide results to the referring provider online, typically through a web-based interface.

• **Emergency medicine** practitioners are the most likely to use computers for viewing results. These specialists are frequently embedded in hospitals that have integrated pathology and imaging departments, making it easy for them to receive test results rapidly on their computer, iPad or iPhone. Many of them also use computers to complete discharge summaries, often through their hospital’s electronic health record system. Although these summaries are completed on a computer, they are frequently printed and faxed or mailed to the patient’s GP.

For other specialists, such as the surgeons and psychiatrists, computers are often ancillary to rather than embedded into their daily workflow. Many of these specialists are more isolated in solo or small private practices and face minimal pressure from other practitioners to change.
Additional details on factors influencing eHealth use by specialty segment are summarised in Table 4. In addition to environmental factors, usage decisions often hinge on whether benefits from eHealth accrue to specialists themselves, versus to someone else in their practice or the health system as a whole, and the degree of perceived risk to their care delivery process. While all specialty segments perceive pros and cons to eHealth use, the extent to which these factors influence behaviours is closely related to individual specialists’ attitudes and perceptions (discussed further in section 6).

Table 4: Factors influencing eHealth use by specialty segment

<table>
<thead>
<tr>
<th>Segment</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaesthesia</td>
<td>Access to accurate past medical history in the health record perceived to be very beneficial (would improve safety)</td>
<td>Fewer directly relevant applications for eHealth use – computers can be a distraction when anaesthetists need to focus on watching their patients</td>
</tr>
<tr>
<td></td>
<td>Heavy use of eHealth in surrounding (hospital) environment</td>
<td>Access to eHealth often limited by the environments in which they operate</td>
</tr>
<tr>
<td></td>
<td>Remote supervising is appealing – supervisors could provide advice more quickly in emergency situations</td>
<td>Solutions must be portable between multiple locations</td>
</tr>
<tr>
<td></td>
<td>‘Apps’ on portable smart devices very helpful for drug dosing calculations</td>
<td></td>
</tr>
<tr>
<td>Diagnostics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal Medicine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ophthalmology/dermatology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychiatry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgery</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SOURCE: eHealth readiness survey

Usage rates for many eHealth applications vary by specialty segment

Average % of applications in category used by respondents

Exhibit 6
<table>
<thead>
<tr>
<th>Segment</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
</table>
| Diagnostics                     | Clear safety and efficiency benefits, e.g. health identifiers to match results for same patient completed at different facilities  
Practice dynamics provide sufficient scale to justify expenditures  
Computers help manage information flow and improve efficiency because practitioners’ requests are legible and complete  
Digital transfer of images and test results can greatly improve practice efficiency | Concerns about making comparisons between test results from different pathology laboratories using different rages if all results are on the same record  
Errors arising from viewing digital images using incorrect equipment e.g. mobile phones |
| Emergency and intensive care medicine | Timely access to patient information is critical, so significant perceived value for electronic health records, especially in cases where patient is unable to provide the information him or herself  
Exposure to a wide variety of cases makes interactive decision support more appealing, especially for younger practitioners  
Paperless systems reduce risk of contamination and improve infection control in hospitals | eHealth access largely dependent on hospital environment. More difficult to influence change due to the decision-making process in hospitals |
| Internal medicine               | Computerised records more efficient for specialists managing long-term patients  
Interactive decision support appealing for those using complex diagnostic algorithms (e.g. for the prescription of highly specialised drugs)  
ePrescribing, ePathology and eImaging save time upfront when ordering scripts/results and also through fewer phone calls due to illegible handwriting | Can be difficult to type and talk to patients at the same time – takes time for practitioners to adjust their workflow  
Moving long volumes of paper-based patient histories and notes to computerised systems is time-consuming  
Challenges with multidisciplinary care due to lack of system compatibility |
| Obstetrics and gynaecology      | Interest in reducing physical paper files because they take up a lot of space, given that obstetric files must be retained for 25 years  
Computerised systems can improve ease and legibility of documentation, which can be helpful in the event of a medicolegal claim | Prescribe a narrow range of drugs – little perceived need for decision support or ePrescribing  
Increased risk of medicolegal claims, which makes them especially concerned about privacy breaches and confidentiality of shared records |
<table>
<thead>
<tr>
<th>Segment</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ophthalmology and dermatology</td>
<td>Telehealth relevant and interesting for subset of dermatologists focusing on rural and regional Australia, because they can use images to help provide diagnoses. Dermatology is a younger specialty and nearly all of the new specialists are highly computerised and comfortable with technology.</td>
<td>These specialists integrate less frequently with other practitioners and therefore benefit less from information exchange.</td>
</tr>
<tr>
<td>Surgery</td>
<td>eHealth can help improve efficiency of practice, although this typically benefits the practice manager or secretary rather than the surgeon. Remote access to imaging is convenient for surgeons, especially those travelling occasionally to rural or remote areas.</td>
<td>eHealth offers little to improve their workflow because most of their time is spent interacting directly with patients. Frequently perform highly specialised, often repetitive work - little perceived opportunity to benefit from interactive decision support. Access to digital imaging can be a challenge (e.g. inability to access images if not the referring physician, slow download times). Solo practice surgeons less likely to perceive sufficient benefit to offset the costs of new systems.</td>
</tr>
<tr>
<td>Psychiatry</td>
<td>Do not need to physically touch patients: opportunity to use telepsychiatry to reach rural and remote patients who would not otherwise have access. When extensive documentation is required, notes can often be completed more quickly on a computer.</td>
<td>Practitioners do not need to use technology or computers for specialty and are therefore less comfortable with technology. Strong concerns about privacy and confidentiality (though some acknowledge this is better protected through electronic files). Culture tends to be more conservative and less cutting-edge in regards to technology adoption. Perception that use of computers during a consultation can disrupt patient communication and rapport.</td>
</tr>
</tbody>
</table>
**Expected future uses of eHealth**

Intended future uses of eHealth would expand the use of telemedicine, expand remote care management with remote health monitoring and feedback on behaviour, and better support clinical decisions, electronic health records, and public health intelligence. Importantly, these future uses would focus more than current applications on sharing information through reliable, connected eHealth platforms. As a result, they will require deeper adoption strategies to gain support and build capabilities at both the practice and health network levels.

The eHealth solutions marked to progress in the National E-Health Strategy (2008) include:

- **Telemedicine**: A subset of telehealth technologies that enable healthcare providers to administer care remotely, e.g. kiosks with videoconferencing and vital sign devices, mobile applications, SMS, store-forward

- **Remote-care wellness and management**: A subset of telehealth technologies that enable healthcare providers and educators to monitor, educate and influence the behaviour of patients remotely, such as
  - Remote health monitoring technologies to collect and manage data (e.g. vital signs, motion, compliance) from passive/active/interactive devices; includes workflow and decision support systems used to drive appropriate health actions based on the collected data
  - Feedback and behaviour modification technologies to effect change in patient behaviour by providing health education and feedback on behaviour relative to personalised health goal

- **Clinical decision support**: Tools used by healthcare providers or patients to aid diagnosis, treatment, or care process decisions. For example, these may document data, display relevant data, lookup/display reference material, flag potential errors, implement (e.g. guided dose algorithms), and track over the care pathway

- **Electronic health records**: Systems for managing longitudinal health record spanning multiple providers across the care continuum, consisting of an electronic medical record (medical history within single provider) and healthcare information exchange (to integrate and make available electronic health records across providers). This could also include computerised physician order entry

- **Health intelligence**: Health intelligence is a group of technologies that enables public health informatics functions and analyses such as disease surveillance, electronic health record based outcomes analyses such as comparative effectiveness of drugs and procedures, and risk stratification analyses that enable activities such as selection of patients for disease management programs.
6. Specialist readiness for eHealth use
Australia’s medical specialists have a strong foundation for eHealth adoption and use, but are far from realising its full potential. Specialists have the skills and tools needed to support self-contained eHealth use, but lack the connectivity, IT support and conviction required to engage in a way that integrates care across networks to drive patient-focused outcomes. Although improved connectivity is critical for advancing the impact of eHealth, it is often only perceived as relevant by specialists embedded in hospitals or other multidisciplinary care settings where coordination is an essential part of the care process.

Most medical specialists are focused on the effective delivery of their intervention and the efficiency of their practice. Improvements in end-to-end patient care across the entire care delivery pathway are often a secondary benefit rather than a primary driver for eHealth adoption. However, perceptions vary widely among specialists. For many, concerns about productivity losses from system downtimes and other factors remain a major barrier. Others believe that eHealth enables them to deliver better quality care more efficiently, and have had firsthand experience in overcoming barriers and realising benefits.

A deeper understanding of these perspectives is needed to leverage the experience and enthusiasm of early adopters to influence system-wide change. Adoption strategies (see Section 7 below) will require reductions in real and perceived operational barriers, matched by compelling practice-based evidence supporting the change.

These attitudes vary not only according to the personality and IT-engagement of the individual specialist, but also according to their operating environment, the nature of their work and the business model of their practice. If those in an emergency ward, for example, are expected to update patient records on the IT infrastructure provided, then they will do so. Private practice surgeons who work more independently, and for whom any IT failure or distraction is costly, are often less enthusiastic. While comparing specialties helps explain some of the differences between observed eHealth adoption levels, there is still a high degree of heterogeneity with respect to adoption within most specialties.

To help understand these variations, we analysed the eHealth readiness of Australia’s medical specialists along three dimensions:

- Their infrastructural readiness (their operating environment, as well as their IT hardware, software and connections)
- Their aptitudinal readiness (depth of skills and capability to use eHealth solutions); and
- Their attitudinal readiness (willingness to use current and future eHealth solutions).

We found consistently strong infrastructural and aptitudinal readiness for basic, self-contained computer applications, but differences emerged when more connected applications were considered, and these were amplified by differences in attitudinal readiness.

The following section provides an assessment of overall readiness across the dimensions of infrastructure, aptitude and attitude, and explores the primary barriers and drivers for adoption. Additional detail at the specialty segment level is provided in Appendix 3.

**Infrastructural readiness**

A specialist’s eHealth infrastructure includes the IT hardware, software and connections in their operating environment. Consistent with observed eHealth use for self-contained applications, most medical specialists have the necessary basic infrastructural readiness. However, system
reliability, connectivity and interoperability concerns are major barriers to the use of connected, information-sharing eHealth applications, especially among early adopters.

Most medical specialists have access to computers in their main practice setting (86 percent in major cities and over 90 percent in inner regional and outer regional locations), although access does decrease slightly when these practitioners travel to remote areas (79 percent) (Exhibit 7). Similarly, internet access is widespread in the main practice setting in major cities (86 percent), but less commonly available in remote areas (70 percent). The reduced availability of computer and internet access in remote regions is only relevant for the 30 percent of specialists travelling to these areas on an occasional basis, as less than 1 percent of specialists are based in a remote area.

The majority of specialists have broadband connectivity (84 percent of respondents with internet access) and access to a computer less than 3 years old (62 percent of respondents with computers). Although the ~30 percent of specialists with older computers might have difficulties with certain software programs, they are usually able to use basic web-based eHealth applications.

### Exhibit 7

**Most medical specialists have access to computers and internet in the practice setting**

<table>
<thead>
<tr>
<th>Computer access in main practice setting</th>
<th>Internet access in main practice setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Major city</td>
<td>Major city</td>
</tr>
<tr>
<td>Inner regional</td>
<td>Inner regional</td>
</tr>
<tr>
<td>Outer regional</td>
<td>Outer regional</td>
</tr>
<tr>
<td>Remote¹</td>
<td>Remote¹</td>
</tr>
<tr>
<td>14</td>
<td>14</td>
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<tr>
<td>96</td>
<td>96</td>
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<td>91</td>
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<td>21</td>
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<td>86</td>
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<td>79</td>
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<tr>
<td>91</td>
<td>91</td>
</tr>
<tr>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

Although access is lower in remote regions, fewer than 1% of specialists practice regularly in these areas

1 Base = all specialists that practice at least occasionally, but are not based in a rural or remote area, n = 106

SOURCE: eHealth readiness survey

Beyond basic computer and internet access, which is largely in place, specialists need access to reliable, easy-to-use systems that enable information sharing across practices. Improving reliability and usability will help reduce the concern about system malfunction or downtime, a major barrier to adoption among 34 percent of specialists (Exhibit 8). System malfunctions can cause enormous disruptions to practitioners’ care delivery process as an inability to access information can paralyse the practice’s workflow. A further complaint uncovered in interviews is that the eHealth systems can
be difficult to learn and use properly, which is even more problematic if users frequently rotate or change practices. eHealth software applications used are based on older programming platforms and operating systems, and so are not as intuitive or flexible to change as specialists experience with modern personal and business software. For example, one specialist mentioned that a new receptionist accidentally pushed the wrong button on the practice’s electronic medical record system and it accidentally deleted several months of appointment bookings.

Exhibit 8
System reliability and connectivity are cited as the leading barriers to adoption
% of respondents that strongly agree

<table>
<thead>
<tr>
<th>Perception of eHealth barriers</th>
<th>% Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concern about malfunction or downtime</td>
<td>34</td>
</tr>
<tr>
<td>Need to maintain compatibility with IT systems</td>
<td>32</td>
</tr>
<tr>
<td>Prefer to wait for technology to be established</td>
<td>24</td>
</tr>
<tr>
<td>Need to connect with external systems</td>
<td>23</td>
</tr>
<tr>
<td>Concern about privacy breach</td>
<td>23</td>
</tr>
<tr>
<td>Don’t have adequate IT support</td>
<td>17</td>
</tr>
<tr>
<td>Concerned about productivity drop</td>
<td>16</td>
</tr>
<tr>
<td>Cannot afford</td>
<td>15</td>
</tr>
<tr>
<td>Concern about visibility of performance data</td>
<td>14</td>
</tr>
<tr>
<td>Not enough people are using</td>
<td>14</td>
</tr>
<tr>
<td>Takes too long to access and use</td>
<td>14</td>
</tr>
<tr>
<td>Too difficult to select and implement</td>
<td>12</td>
</tr>
<tr>
<td>Can’t find solution that meets my needs</td>
<td>12</td>
</tr>
<tr>
<td>Others in practice are resistant</td>
<td>4</td>
</tr>
</tbody>
</table>

SOURCE: eHealth readiness survey

Consistent adherence to interoperability standards will also improve information sharing, as 32 percent of specialists strongly agreed that maintaining internal compatibility is a barrier to eHealth adoption and 23 percent strongly agreed that connecting with external systems is a barrier. Furthermore, some specialists and hospitals are postponing adoption decisions in anticipation of a universal, enforced standard or other similar directive. Connectivity between private specialist rooms and public hospitals is particularly difficult to establish because hospital systems are currently designed and used for internal connectivity only.

The current landscape for electronic medical records is highly fragmented, explaining some of the concerns about software compatibility and hardware connectivity (Exhibit 9). For example, the top 10 vendors account for ~65 percent of all survey respondents, with the single largest vendor (Genie Solutions) accounting for ~23 percent of respondents. Discussions with users listed the following drivers for choosing one electronic medical record system over another:
• **Peer endorsement.** Specialists frequently ask peers who have already adopted for advice to determine the most user-friendly and most suitable options. Peer recommendations are an especially strong driver among private practitioners.

• **Knowledgeable and enthusiastic salespeople** who provide strong demonstrations. Specialists adopting a system for the first time conclude that if a salesperson isn’t able to understand and use a system, then they probably won’t have much success with it either.

• **Solutions that work out-of-the box.** Specialists appreciate being able to use a system immediately, but also want access to more advanced functions if and when they are ready to explore them.

• **Relevance.** Solutions need to be tailored to meet specialists’ needs – specialists do not want to spend additional time working through endless drop-down menus and capturing irrelevant information (e.g. geriatricians do not need to ask their patients if they are pregnant).

• **Flexibility across specialties.** Some private-sector specialists practice in consulting suites alongside specialists from other disciplines (frequently a spouse or colleagues sharing space in the same unit). Since EMR systems can be an expensive investment, specialists often seek a common platform that enables them to distribute costs among multiple co-locating practitioners.

### Exhibit 9

**The market for electronic health records is highly fragmented**

<table>
<thead>
<tr>
<th>Electronic health record vendors</th>
<th>% of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genie Solutions</td>
<td>23</td>
</tr>
<tr>
<td>Health Communication Network</td>
<td>9</td>
</tr>
<tr>
<td>Cerner</td>
<td>9</td>
</tr>
<tr>
<td>Zedmed</td>
<td>6</td>
</tr>
<tr>
<td>Core Medical Solutions</td>
<td>3</td>
</tr>
<tr>
<td>Health Track</td>
<td>3</td>
</tr>
<tr>
<td>TotalCare</td>
<td>3</td>
</tr>
<tr>
<td>iSoft</td>
<td>2</td>
</tr>
<tr>
<td>Advanced Professional Systems</td>
<td>2</td>
</tr>
<tr>
<td>Houston Medical</td>
<td>2</td>
</tr>
<tr>
<td>Diaspark</td>
<td>2</td>
</tr>
<tr>
<td>Other, self-created or unknown</td>
<td>36</td>
</tr>
</tbody>
</table>

1 Base = all respondents using an electronic health record; n = 155

**SOURCE:** eHealth readiness survey
Aptitudinal readiness

Many of the specialists interviewed were enthusiastic technology users, and they often had multiple computers and communication devices in their practice and for their personal use. They were generally comfortable using the technology when it worked, but often not sufficiently IT savvy to troubleshoot or resolve issues on their own. Also, while specialists typically had sufficient levels of competence for basic computer use (e.g. accessing information online and sending emails), those who transitioned to computerised systems acknowledged that they suffered a loss in productivity during the first few months of the transition. This was especially true among older practitioners who had not previously needed to type and therefore were very slow when learning to use a keyboard. Some practitioners were unwilling to undergo the learning process for fear that their patients would lose confidence in their skills if they were perceived to be struggling with computer use.

Regardless of age, nearly all specialists have the basic skills to use the internet in their personal lives (Exhibit 10). For example, 93 percent of medical specialists aged 65+ years of age spent some time online each week.

### Exhibit 10

**Regardless of age, nearly all specialists use the internet in their personal lives**

<table>
<thead>
<tr>
<th>Time spent on the internet for personal reasons</th>
<th>% of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>12</td>
</tr>
<tr>
<td>Less than 3 hours/week</td>
<td>12</td>
</tr>
<tr>
<td>3 - 10 hours/week</td>
<td>11</td>
</tr>
<tr>
<td>&gt;10 hours/week</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age category</th>
<th>None</th>
<th>Less than 3 hours/week</th>
<th>3 - 10 hours/week</th>
<th>&gt;10 hours/week</th>
</tr>
</thead>
<tbody>
<tr>
<td>35-44</td>
<td>36</td>
<td>29</td>
<td>37</td>
<td>7</td>
</tr>
<tr>
<td>45-54</td>
<td>50</td>
<td>59</td>
<td>51</td>
<td>45</td>
</tr>
<tr>
<td>55-64</td>
<td>12</td>
<td>12</td>
<td>11</td>
<td>46</td>
</tr>
<tr>
<td>65+</td>
<td>12</td>
<td>12</td>
<td>11</td>
<td>40</td>
</tr>
</tbody>
</table>

1 Excludes time spent on email, messaging, or for work-related purposes.

SOURCE: eHealth readiness survey
Computer usage levels discussed in Section 5 suggest that specialists are relatively technology literate. 93 percent of specialists surveyed used computers for at least one of the listed applications\(^6\) (Exhibit 11). Although usage rates decline with age, it is not a steep drop-off – 99 percent of medical specialists between 35–44 years of age use computers in the workplace, 97 percent of those aged 45–54, 92 percent of those aged 55–64 and 76 percent of those aged 55–64.

**Exhibit 11**

**Current usage levels suggest that specialists are relatively technology literate**

<table>
<thead>
<tr>
<th>Computer use in the workplace by age category</th>
<th>35-44</th>
<th>45-54</th>
<th>55-64</th>
<th>65+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>99</td>
<td>97</td>
<td>92</td>
<td>76</td>
</tr>
<tr>
<td>No</td>
<td>1</td>
<td>3</td>
<td>8</td>
<td>24</td>
</tr>
</tbody>
</table>

\(^1\) Includes the use of computers outside a practitioner’s own room or office

**SOURCE**: eHealth readiness survey

Specialists often need additional training and support for system installation and for troubleshooting when things go wrong – they expect systems to work, and may not be willing or able to spend time working out why they don’t. For this reason, IT support is critical for most specialists, especially when installing and learning to use systems. Specialists in larger practices and hospitals usually have access to dedicated IT personnel, but specialists in smaller practices often struggle to find competent, affordable support in a timely manner. The lack of IT support for these specialists restricts their readiness to systems that they perceive as proven to be reliable or solutions where malfunctions or downtime could be tolerated on a temporary basis.

**Attitudinal readiness**

Medical specialists have quite varied attitudes towards eHealth; some are strong advocates while others remain pessimistic. Underlying these attitudes are their perceptions of the benefits and risks

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\(^6\) For a complete list of applications, please refer to Question 12 from the survey in Appendix 4.
associated with adoption. These attitudes are strong determinants of adoption rates in each specialty segment. But the segments are not homogeneous: in each there will be specialists who are quite resistant to eHealth applications, and those that verge on being eHealth evangelsists. Identifying potential resistors and catalysts for change will be critical for advancing adoption, as will uncovering ways to deploy eHealth’s strongest advocates in a way that helps influence their more hesitant peers.

The most commonly agreed eHealth benefits include collaboration, continuity of care, and efficiency (Exhibit 12). However, these perceptions are strongly held by less than half of all specialists. Moreover, most of the remaining benefits had just 15–30 percent of specialists in strong agreement. Given this variation in attitude, we undertook additional analysis to understand the underlying drivers and primary reasons for differences between specialists.

**Exhibit 12**

*Collaboration, continuity of care and efficiency are most common benefits; impact on patient relationships and engagement is less clear*

<table>
<thead>
<tr>
<th>Perception of eHealth benefits</th>
<th>% of respondents that strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve collaboration</td>
<td>43</td>
</tr>
<tr>
<td>Improve continuity of care</td>
<td>42</td>
</tr>
<tr>
<td>Improve practice’s efficiency</td>
<td>38</td>
</tr>
<tr>
<td>Improve quality of care</td>
<td>33</td>
</tr>
<tr>
<td>Improve care delivery process</td>
<td>30</td>
</tr>
<tr>
<td>Increase patient safety</td>
<td>28</td>
</tr>
<tr>
<td>Increase access to care</td>
<td>28</td>
</tr>
<tr>
<td>Broaden scope of services</td>
<td>19</td>
</tr>
<tr>
<td>Increase patients’ satisfaction</td>
<td>19</td>
</tr>
<tr>
<td>Reduce exposure to legal risk</td>
<td>18</td>
</tr>
<tr>
<td>Increase patient engagement</td>
<td>16</td>
</tr>
<tr>
<td>Improve patient relationships</td>
<td>15</td>
</tr>
<tr>
<td>Increase number of referrals</td>
<td>9</td>
</tr>
</tbody>
</table>

When evaluating attitudinal readiness across purely demographic dimensions (e.g. age, geographic region, gender), the differences between groups were not overly strong (Exhibit 13). Viewing results by specialty segment offered greater variation, but we still observed strong advocates and resistors within most segments. As discussed in the methodology section, we decided to identify clusters, or distinct groupings of similar specialists, based on specialists’ attitudes towards computers and perceptions of eHealth benefits and barriers. This approach provided rich and robust insights on attitudes and needs, but in the absence of a demographic component, the clusters were difficult to identify and reach. Therefore, we added the percentage of income derived from the private sector to create a hybrid clustering approach, which combined all of the attitudinal dimensions from the original analysis with a demographic attribute. The resulting clustering grouped medical specialists...
to form reachable, interpretable and distinct clusters so that specific engagement strategies could be targeted to relevant practitioners. (Detail on strategy development is provided in Section 7.)

Exhibit 13

When viewed across demographic dimensions the differences between specialists are less strong than when viewed across needs-based clusters

Belief that computers reduce the risk of error in specialty
Percent strongly agree

<table>
<thead>
<tr>
<th>Data cuts by demographics</th>
<th>By age</th>
<th>By specialty segment</th>
</tr>
</thead>
<tbody>
<tr>
<td>35-44</td>
<td>39</td>
<td>Anaesthesia</td>
</tr>
<tr>
<td>45-54</td>
<td>31</td>
<td>Diagnostics</td>
</tr>
<tr>
<td>55-64</td>
<td>28</td>
<td>Emergency</td>
</tr>
<tr>
<td>65+</td>
<td>28</td>
<td>Internal med</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Obstetrics/gyn</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ophthal/derm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Psychiatry</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Surgery</td>
</tr>
</tbody>
</table>

| Variation: 11             |        | Highest variation: 37 |

<table>
<thead>
<tr>
<th>Data cut by 'needs-plus'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cluster 1</td>
</tr>
<tr>
<td>Cluster 2</td>
</tr>
<tr>
<td>Cluster 3</td>
</tr>
<tr>
<td>Cluster 4</td>
</tr>
<tr>
<td>Cluster 5</td>
</tr>
</tbody>
</table>

| Variation = 53 pts       |

SOURCE: eHealth readiness survey

Cluster analysis of attitudes and drivers

Applying the approach described above, we identified five overarching eHealth attitudinal clusters of medical specialists (Exhibit 14). Comparing specialists across clusters, they are distinct in the benefits they see in eHealth applications, the barriers they perceive, and their primary influences.

Clusters exhibit some differences in demographics (Exhibit 15). eHealth entrepreneurs and network adopters skewed younger (20 percent and 23 percent over age 55, respectively) while the uninterested cluster skewed older (64 percent are over age 55). The uninterested cluster is predominantly male. Network adopters are most commonly found in the public hospitals; the remaining clusters skewed more heavily towards private practice, especially the apprehensive followers (69 percent of income from the private sector) and the uninterested (89 percent). Geographic dispersion is relatively consistent, though the eHealth entrepreneurs are the least likely to be in a major city location (21 percent based outside of a major city, versus 13 percent for the uninterested). Internet use for personal reasons is consistent between most clusters except the eHealth entrepreneurs, who are more likely to spend over 10 hours a week online (21 percent versus 12 percent of all specialists). The uninterested are most likely to be native English speakers (89 percent); the network adopters are the least (75 percent).
We identified 5 distinct clusters through a ‘needs-plus’ clustering analysis

<table>
<thead>
<tr>
<th>Input attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>eHealth entrepreneurs</td>
</tr>
<tr>
<td>Network adopters</td>
</tr>
<tr>
<td>Capable but unconvinced</td>
</tr>
<tr>
<td>Apprehensive followers</td>
</tr>
<tr>
<td>Uninterested</td>
</tr>
<tr>
<td>▪ Strongest interest in and use of eHealth solutions</td>
</tr>
<tr>
<td>▪ Driven by efficiency</td>
</tr>
<tr>
<td>▪ Easy to influence</td>
</tr>
<tr>
<td>▪ Few barriers; least concerned about risks</td>
</tr>
<tr>
<td>▪ Tech-savvy early adopters</td>
</tr>
<tr>
<td>▪ Surrounded by computer-using peers</td>
</tr>
<tr>
<td>▪ Overall very optimistic about benefits</td>
</tr>
<tr>
<td>▪ More difficult to influence</td>
</tr>
<tr>
<td>▪ Well-resourced</td>
</tr>
<tr>
<td>▪ Very few barriers, but relatively weak perception of benefits also</td>
</tr>
<tr>
<td>▪ Waiting to see clear value before adopting</td>
</tr>
<tr>
<td>▪ Waiting for everyone else to adopt</td>
</tr>
<tr>
<td>▪ Numerous technical concerns</td>
</tr>
<tr>
<td>▪ Financially constrained</td>
</tr>
<tr>
<td>▪ Limited access to IT support</td>
</tr>
<tr>
<td>▪ Lowest perception of benefits</td>
</tr>
<tr>
<td>▪ Difficult to influence</td>
</tr>
<tr>
<td>▪ Not in a culture of computer use</td>
</tr>
<tr>
<td>▪ Older and thinking about retirement</td>
</tr>
</tbody>
</table>

24% 17% 13% 30% 16%

Exhibit 15

Clear socio-demographic characteristics can be detected for each cluster

<table>
<thead>
<tr>
<th>Socio-demographic characteristics</th>
<th>eHealth Entrepreneurs</th>
<th>Network adopters</th>
<th>Capable but unconvinced</th>
<th>Apprehensive followers</th>
<th>Uninterested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (female, %)</td>
<td>32</td>
<td>26</td>
<td>22</td>
<td>30</td>
<td>11</td>
</tr>
<tr>
<td>Percent over 55</td>
<td>22</td>
<td>25</td>
<td>35</td>
<td>35</td>
<td>67</td>
</tr>
<tr>
<td>Percent private practice</td>
<td>58</td>
<td>23</td>
<td>53</td>
<td>69</td>
<td>89</td>
</tr>
<tr>
<td>Hospital based (%)</td>
<td>44</td>
<td>75</td>
<td>49</td>
<td>26</td>
<td>24</td>
</tr>
<tr>
<td>Location (non-major city, %)</td>
<td>21</td>
<td>17</td>
<td>15</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>Internet use (&gt;10 hrs/wk, %)</td>
<td>19</td>
<td>15</td>
<td>5</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td>Non-native English (%)</td>
<td>19</td>
<td>25</td>
<td>22</td>
<td>16</td>
<td>11</td>
</tr>
<tr>
<td>Overrepresented specialties</td>
<td>Internal Medicine</td>
<td>Anaesthesia</td>
<td>Emergency Diagnostics</td>
<td>None</td>
<td>Psychiatry Surgery</td>
</tr>
</tbody>
</table>
Although specialist segments often have one or two dominant clusters, most segments still contain representation across all five, indicating that the clinical workflow needs do not negate the need for eHealth solutions. However, the clinical needs of each sector and some demographic factors explain the cluster distributions depicted in Exhibit 16. While there will be strong eHealth supporters in each specialist segment, how they are leveraged will differ in each segment’s engagement and adoption strategy, particularly in those segments where the more resistant clusters (3–5) are in the strong majority.

**Exhibit 16**

**Most specialist segments have one or two dominant clusters, but maintain representation across all five**

<table>
<thead>
<tr>
<th>Specialty segment composition by cluster</th>
<th>% of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency</td>
<td>18</td>
</tr>
<tr>
<td>Diagnostics</td>
<td>16</td>
</tr>
<tr>
<td>Internal Medicine</td>
<td>35</td>
</tr>
<tr>
<td>Anaesthesia</td>
<td>16</td>
</tr>
<tr>
<td>Obstetrics/gynaecology</td>
<td>26</td>
</tr>
<tr>
<td>Ophthalmology/dermatology</td>
<td>13</td>
</tr>
<tr>
<td>Psychiatry</td>
<td>10</td>
</tr>
<tr>
<td>Surgery</td>
<td>13</td>
</tr>
</tbody>
</table>

SOURCE: eHealth readiness survey

We describe the clusters below, in order of their likelihood to adopt, and influence others to adopt, eHealth solutions. The relevant research findings are then summarised in Table 5 and Exhibits 17–21.

- **Cluster 1: eHealth entrepreneurs (24 percent of all medical specialists).** These specialists have the strongest interest in and use of eHealth solutions, and are willing eHealth participants. Anticipating strong benefits in efficiency, continuity of care and practitioner collaboration, their main concerns are IT compatibility and reliability issues. They are almost twice as likely as other clusters to expect that eHealth will improve patient engagement, relationships and satisfaction. Though internal medicine practitioners are the most prominent eHealth entrepreneurs, the cluster is well-represented in nearly all specialty groups.

- **Cluster 2: Network adopters (17 percent of all medical specialists).** These specialists commonly work in an environment, such as public hospitals, where computer use is expected. In these settings, they anticipate eHealth improvements in collaboration and continuity and quality
of care, so that internal IT compatibility and reliability are their main concerns. While enthusiastic about the benefits, they are difficult to influence directly because they have restricted influence over their operating environment and so are less likely to control purchasing and adoption decisions within their practices. Accordingly, use of eHealth applications by others in their network is a much stronger driver for adoption than financial incentives or patient demand. Anaesthesia, emergency medicine, and diagnostics specialists are over represented in this cluster.

- **Cluster 3: Capable but unconvinced (13 percent of all medical specialists).** These specialists are reasonably tech-savvy, have financial resources and IT support, and are relatively unconcerned by potential barriers such as IT compatibility, cost or privacy. They currently use a range of eHealth applications, but only the ones with clear benefits. Relative to the first two clusters, they are much less interested in adopting the eHealth solutions that they do not currently use. For example, 44 percent of the cluster responded that it didn’t need interactive decision support for ordering tests versus 18 percent of eHealth entrepreneurs and 23 percent of network adopters, even though computerised test ordering rates were similar across all three clusters. They are unimpressed by the surveyed adoption drivers, with only peer practitioner use holding sway with them, and even then not greatly. Practices for which IT failures or delays would be either costly or critical, such as surgeons and emergency specialists, are over represented in this cluster.

- **Cluster 4: Apprehensive followers (30 percent of all medical specialists).** These specialists see some benefits in eHealth applications, but are less enthusiastic about them than the first two clusters, and so are waiting for others to adopt them first. The perceived benefits are, for these followers, heavily outweighed by perceived barriers. For example, they are more than four times more likely to be concerned about malfunction risk than Cluster 3 specialists. They have the most serious privacy concerns, are financially constrained from new investments, and have limited access to IT support. This cluster contains a fairly even mix across all specialties.

- **Cluster 5: Uninterested (16 percent of all medical specialists).** These specialists have the lowest IT usage rates and have negative perceptions of all eHealth benefits. They do not operate in an environment in which computer use is expected, and face many barriers to adoption. They strongly disagree that eHealth applications will bring better patient relationships, engagement or outcomes (in fact, believe the reverse). The cluster is skewed towards older practitioners, with retirement looming, and solo practitioners. No adoption lever is likely to influence them to adopt eHealth solutions. Psychiatrists and surgeons are over represented in this cluster; emergency and diagnostics specialists are almost nonexistent. Though active adoption cannot be expected, the cluster cannot be ignored, as some of its members will influence their peers and public opinion.
Table 5: Cluster use, perceptions and drivers
(number in brackets reflects percent of segment that use or strongly agree):

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Current use</th>
<th>Perceived benefits</th>
<th>Barriers</th>
<th>Adoption drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>eHealth entrepreneurs</td>
<td>Viewing pathology results (86%)</td>
<td>Continuity of care (72%)</td>
<td>External compatibility (30%)</td>
<td>Financial incentives (56%)</td>
</tr>
<tr>
<td></td>
<td>Watching/recording notes during consultations (53%)</td>
<td>Efficiency (70%)</td>
<td>Internal compatibility (26%)</td>
<td>Professional body endorsement (50%)</td>
</tr>
<tr>
<td></td>
<td>Electronic health record (59%)</td>
<td>Collaboration (65%)</td>
<td>Malfunction and downtime risk (17%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Paperless records (31%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network adopters</td>
<td>Watching pathology results (89%)</td>
<td>Collaboration (77%)</td>
<td>Internal compatibility (32%)</td>
<td>Other practitioner use (16%)</td>
</tr>
<tr>
<td></td>
<td>Watching/recording notes during consultations (43%)</td>
<td>Continuity of care (71%)</td>
<td>Malfunction and downtime risk (23%)</td>
<td>Support staff use (9%)</td>
</tr>
<tr>
<td></td>
<td>Electronic health record (53%)</td>
<td>Quality of care (65%)</td>
<td>External compatibility (19%)</td>
<td>Professional bodies (9%)</td>
</tr>
<tr>
<td></td>
<td>Paperless records (9%)</td>
<td>Patient safety (61%)</td>
<td>Privacy breaches (13%)</td>
<td></td>
</tr>
<tr>
<td>Capable but unconvinced</td>
<td>Watching pathology results (71%)</td>
<td>Efficiency (41%)</td>
<td>Internal compatibility (15%)</td>
<td>Other practitioner use (12%)</td>
</tr>
<tr>
<td></td>
<td>Watching/recording notes during consultations (39%)</td>
<td>Collaboration (37%)</td>
<td>Malfunction and downtime risk (13%)</td>
<td>Otherwise negative</td>
</tr>
<tr>
<td></td>
<td>Electronic health record (49%)</td>
<td></td>
<td>External compatibility (10%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Paperless records (15%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apprehensive followers</td>
<td>Watching pathology results (46%)</td>
<td>Continuity of care (34%)</td>
<td>Malfunctions and downtime risk (38%)</td>
<td>Financial incentives (30%)</td>
</tr>
<tr>
<td></td>
<td>Watching/recording notes during consultations (31%)</td>
<td>Collaboration (31%)</td>
<td>Prefer to wait until technology proven (51%)</td>
<td>Professional body endorsement (17%)</td>
</tr>
<tr>
<td></td>
<td>Electronic health record (33%)</td>
<td>Efficiency (25%)</td>
<td>Privacy breaches (47%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Paperless records (12%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uninterested and IT challenged</td>
<td>Watching pathology results (20%)</td>
<td>Minimal</td>
<td>Malfunctions and downtime (40%)</td>
<td>Minimal</td>
</tr>
<tr>
<td></td>
<td>Watching/recording notes during consultations (18%)</td>
<td></td>
<td>Prefer to wait until technology proven (36%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electronic health record (16%)</td>
<td></td>
<td>Privacy breaches (31%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Paperless records (6%)</td>
<td></td>
<td></td>
<td></td>
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</table>
### Perceptions of eHealth benefits by cluster (1/2)

#### % of respondents

<table>
<thead>
<tr>
<th></th>
<th>Increase efficiency</th>
<th>Improve care delivery process</th>
<th>Improve collaboration</th>
<th>Increase referrals</th>
<th>Increase scope of services</th>
<th>Reduce exposure to risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>eHealth entrepreneurs</td>
<td>170</td>
<td>53</td>
<td>66</td>
<td>10</td>
<td>34</td>
<td>32</td>
</tr>
<tr>
<td>Network adopters</td>
<td>80</td>
<td>54</td>
<td>77</td>
<td>25</td>
<td>32</td>
<td>34</td>
</tr>
<tr>
<td>Capable but unconvinced</td>
<td>41</td>
<td>37</td>
<td>37</td>
<td>25</td>
<td>32</td>
<td>34</td>
</tr>
<tr>
<td>Apprehensive followers</td>
<td>25</td>
<td>22</td>
<td>31</td>
<td>15</td>
<td>31</td>
<td>34</td>
</tr>
<tr>
<td>Uninterested</td>
<td>36</td>
<td>31</td>
<td>37</td>
<td>25</td>
<td>32</td>
<td>34</td>
</tr>
</tbody>
</table>

#### SOURCE: eHealth readiness survey

### Perceptions of eHealth benefits by cluster (2/2)

#### % of respondents

<table>
<thead>
<tr>
<th></th>
<th>Patient safety</th>
<th>Quality of care</th>
<th>Continuity of care</th>
<th>Access to care</th>
<th>Patient satisfaction</th>
<th>Patient relationships</th>
<th>Patient engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>eHealth entrepreneurs</td>
<td>52</td>
<td>63</td>
<td>72</td>
<td>54</td>
<td>43</td>
<td>36</td>
<td>33</td>
</tr>
<tr>
<td>Network adopters</td>
<td>61</td>
<td>65</td>
<td>71</td>
<td>43</td>
<td>33</td>
<td>34</td>
<td>31</td>
</tr>
<tr>
<td>Capable but unconvinced</td>
<td>41</td>
<td>35</td>
<td>23</td>
<td>24</td>
<td>15</td>
<td>27</td>
<td>15</td>
</tr>
<tr>
<td>Apprehensive followers</td>
<td>19</td>
<td>23</td>
<td>34</td>
<td>22</td>
<td>15</td>
<td>27</td>
<td>15</td>
</tr>
<tr>
<td>Uninterested</td>
<td>53</td>
<td>53</td>
<td>40</td>
<td>48</td>
<td>47</td>
<td>61</td>
<td>56</td>
</tr>
</tbody>
</table>

#### SOURCE: eHealth readiness survey
### Exhibit 19

#### Perceptions of eHealth barriers by cluster (1/2)

% of respondents

<table>
<thead>
<tr>
<th></th>
<th>Internal compatibility</th>
<th>External compatibility</th>
<th>Concern about malfunctions or downtime</th>
<th>Prefer to wait until technology established</th>
<th>Not enough people using to provide a benefit</th>
<th>Can’t find solution that meets needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>eHealth entrepreneurs</td>
<td>26</td>
<td>30</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>11</td>
</tr>
<tr>
<td>Network adopters</td>
<td>32</td>
<td>15</td>
<td>17</td>
<td>13</td>
<td>26</td>
<td>23</td>
</tr>
<tr>
<td>Capable but unconvinced</td>
<td>15</td>
<td>19</td>
<td>17</td>
<td>13</td>
<td>27</td>
<td>26</td>
</tr>
<tr>
<td>Apprehensive followers</td>
<td>45</td>
<td>33</td>
<td>58</td>
<td>51</td>
<td>28</td>
<td>35</td>
</tr>
<tr>
<td>Uninterested</td>
<td>26</td>
<td>12</td>
<td>40</td>
<td>36</td>
<td>24</td>
<td>27</td>
</tr>
</tbody>
</table>

SOURCE: eHealth readiness survey

### Exhibit 20

#### Perceptions of eHealth barriers by cluster (2/2)

% of respondents

<table>
<thead>
<tr>
<th></th>
<th>Can’t afford</th>
<th>Drop in productivity during transition</th>
<th>Takes too long to access and use</th>
<th>Too difficult to select and implement</th>
<th>Lack of IT support</th>
<th>Risks associated with...</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly disagree</td>
<td>Strongly agree</td>
<td>Strongly disagree</td>
<td>Strongly agree</td>
<td>Strongly disagree</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>eHealth entrepreneurs</td>
<td>26</td>
<td>30</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>11</td>
</tr>
<tr>
<td>Network adopters</td>
<td>32</td>
<td>15</td>
<td>17</td>
<td>13</td>
<td>26</td>
<td>23</td>
</tr>
<tr>
<td>Capable but unconvinced</td>
<td>15</td>
<td>19</td>
<td>17</td>
<td>13</td>
<td>27</td>
<td>26</td>
</tr>
<tr>
<td>Apprehensive followers</td>
<td>45</td>
<td>33</td>
<td>58</td>
<td>51</td>
<td>28</td>
<td>35</td>
</tr>
<tr>
<td>Uninterested</td>
<td>26</td>
<td>12</td>
<td>40</td>
<td>36</td>
<td>24</td>
<td>27</td>
</tr>
</tbody>
</table>

SOURCE: eHealth readiness survey
### Adoption and usage drivers by cluster

Percentage of respondents

<table>
<thead>
<tr>
<th></th>
<th>Patients</th>
<th>Support staff</th>
<th>Professional bodies</th>
<th>Other practitioners</th>
<th>Financial incentives</th>
<th>Respect and recognition</th>
</tr>
</thead>
<tbody>
<tr>
<td>eHealth entrepreneurs</td>
<td>18</td>
<td>15</td>
<td>50</td>
<td>29</td>
<td>66</td>
<td>13</td>
</tr>
<tr>
<td>Network adopters</td>
<td>29</td>
<td>18</td>
<td>9</td>
<td>16</td>
<td>17</td>
<td>13</td>
</tr>
<tr>
<td>Capable but unconvinced</td>
<td>38</td>
<td>29</td>
<td>12</td>
<td>10</td>
<td>20</td>
<td>13</td>
</tr>
<tr>
<td>Apprehensive follower</td>
<td>26</td>
<td>17</td>
<td>13</td>
<td>18</td>
<td>20</td>
<td>13</td>
</tr>
<tr>
<td>Uninterested</td>
<td>64</td>
<td>47</td>
<td>43</td>
<td>42</td>
<td>62</td>
<td>62</td>
</tr>
</tbody>
</table>

**SOURCE:** eHealth readiness survey

Exhibit 21
7. Strategies for advancing the eHealth Agenda
The purpose of the readiness and cluster analyses from the preceding section is to inform eHealth adoption strategies so that the right interventions can be deployed at the right time for the right group of specialists. These decisions will depend on several factors including the type of eHealth application, the extent of the desired adoption (e.g. ubiquitous, specific specialties, specific geographies), the target adoption rate and profile over time, and the budget for change and adoption actions. The following section is focused on strategy development, outlined as follows:

1. Influencing clusters to adopt eHealth solutions
2. Possible adoption intervention levers that would shape eHealth products, demand and their use in the health ecosystem
3. A mapping of each potential intervention to each cluster, identifying the execution timing that may be most effective for each intervention
4. A proposed methodology for developing an eHealth adoption strategy based on the research findings and possible interventions
5. A longitudinal example to illustrate the application of cluster-based engagement strategies to advance the adoption of electronic health records.

Influencing clusters to adopt eHealth solutions
As we have seen, each cluster has its own distinct perceptions of eHealth benefits, risks and barriers to adoption, and these distinctions are more actionable in a change strategy than any differences between specialties: see section 6 above. Any strategy for eHealth adoption will therefore need to include interventions targeted at clusters in each specialty, reinforcing the benefits they perceive, while addressing the barriers and risks. Before identifying what those actions should be, we should confirm what each cluster will be influenced by, and how each cluster might be leveraged to influence others. The following section provides an overview, summarised in Exhibit 22, of the most effective likely approach to influence each cluster towards adoption.

Cluster 1: eHealth entrepreneurs
As keen early adopters and eHealth advocates, the eHealth entrepreneurs have the ability to act as strong change enablers. It is critical that engagement strategies targeted at these specialists work with and not against their existing investment in eHealth solutions and infrastructure, and that they are encouraged to adopt solutions compatible with the standards being put in place (as there is a risk that as early adopters, they start using solutions that are not compliant with standards). This cluster’s experience and enthusiasm position it especially well as an influencing driver to persuade more hesitant practitioners. Since the cluster is well-represented in most specialty groups, they have the ability to collectively reach a large number of other medical specialists.

Engagement strategies should therefore aim to harness the energy of eHealth entrepreneurs and garner not only their endorsement, but also their leadership and ownership of the eHealth technologies and their application in the context of their practice. They can serve as valuable contributors to designing and shaping solutions and defining relevant value propositions for their peers. Additionally, they can lead or support demonstrations of usability and benefits, and liaise with their relevant professional bodies for further engagement.

Cluster 2: Network adopters
The network adopters are similarly predisposed towards eHealth, but are primarily confined to a small number of specialty segments (emergency, anaesthesia, and diagnostics) and
typically reside within public hospitals. As such, they are often constrained and heavily influenced by the hospital environments in which they operate. Because their hospitals often have the scale and scope to justify eHealth expenditure, the use of eHealth tools (e.g. ePathology, electronic medical records) is often mandated and as a result, many network adopters are avid eHealth users. However, other network adopters voiced concerns that the pace of investment decisions in their hospitals is very slow, which prevents them from increasing their take up of eHealth.

Network adopters can play an important role as change advocates within their networks of care because they interact with a wide range of other specialists and other healthcare professionals, as well as with patients. As eHealth supporters, they are able to disseminate information and influence perspectives more broadly within their operating environments. For example, radiology specialists frequently share imaging with surgeons and could use this connection to help surgeons understand benefits of electronic imaging over traditional films.

One critical factor for increased adoption is connecting the network adopters so that they can share information in a structured format outside of their hospitals. Public hospital systems typically restrict access to information to hospital practitioners and these records are not typically interoperable with systems external to the hospital.

**Cluster 3: Capable but unconvinced**

This cluster is willing to adopt eHealth, but only if convinced that the benefits are there, and that it will not compromise the efficiency of their practice. The case for adoption must be carefully prepared for them, and include propositions for improvements in either their practice or clinical outcomes. The case must include clear evidence that the proposed eHealth solution has been implemented successfully by other practitioners whom they respect. Evidence that the eHealth solution being proposed to them is an integral part of a broader and positive healthcare reform will be important to them. However, that argument will not be decisive unless they are sure they can adopt the solution without losing practice efficiency. They are less concerned about other risks perceived by the apprehensive follower cluster.

The ‘capable but unconvinced’ cluster is fairly evenly distributed across specialty segments, so a specialty-focused approach will be less appropriate. Those operating in hospital environments may be reached through their more enthusiastic network adopter peers. Beyond general communication with private practitioners, the adoption strategy will need to target specialists who are known networkers and influencers. As the specialists may make less direct use of the eHealth solution than their administrative staff, they may also be influenced by initiatives that help their staff adopt the solutions.

The news that these unconvinced specialists are starting to adopt eHealth solutions will be particularly persuasive for apprehensive followers. They may well expect eHealth pioneers in private practice to take up new systems, as well as those in the public sector who have had the decision made for them by the Department or hospital administrations. That slightly more sceptical practitioners have been convinced will mean the eHealth initiative has crossed a threshold to the mainstream.
Cluster 4: Apprehensive followers
This will be a challenging cluster because it is less likely to perceive eHealth benefits, faces several major barriers, and is relatively difficult to influence. Therefore, adoption strategies targeted towards these practitioners will need to take a multi-faceted approach; simply addressing one or two major barriers will not be sufficient to drive adoption.

As their name suggests, there are two arguments for not targeting apprehensive followers too early in the strategy. First, given this group’s lack of IT support, it will be better to present them with proven systems and surround them with a network of competent users. Second, members are much more likely to be persuaded if they feel that a large number of healthcare professionals in the system has already adopted, particularly previously unconvinced specialists. Frequently updated, transparent information on adoption level and momentum within their relevant communities of care will provide some of the pressure and encouragement needed for them to change.

This does not mean, however, that they should be uniformly deferred until later, as a number of this group can be mobilised in early phases if adoption levels and rates are sufficiently high within their specific healthcare network/community, e.g. anaesthetists. In earlier stages, they could be invited to participate in discussions that shape eHealth solutions and delivery models and provide feedback on ways that the solutions could best address their needs and concerns.

Cluster 5: Uninterested
Given their uniformly negative attitudes towards eHealth, this will be the most challenging cluster to change. It should not be ignored, however, as some of its members can be in positions that influence their peers or public opinion.

The cluster is comprised largely of specialists with little perceived use for eHealth in their care delivery process (e.g. surgeons and psychiatrists). They are primarily private-sector based practitioners, often in small, isolated practices with minimal incentive to change. While not interested in eHealth for its own sake, they may be persuaded by the need for them to adopt eHealth solutions as part of an overall strategy to improve overall health outcomes. However, there will be a point at which the best approach will be to require, rather than request, them to adopt.

An active communication plan addressing their perceptions with evidence should be pursued, even if active adoption is not expected early. Additionally, for those who may be open to change, it will be much easier to persuade them once they see their peers using the systems effectively, and once systems have been developed that address their specific needs.

Other avenues of change support for this cluster are the practice managers and support staff. While these personnel may have limited influence on practitioners’ perceptions and behaviours, they frequently determine computer use within the practice because the specialists have such limited involvement in IT.
Cluster overview for medical specialists

<table>
<thead>
<tr>
<th>Observed essence</th>
<th>Underlying drivers</th>
<th>Objectives for engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>eHealth entrepreneurs</td>
<td>Early adopters and strong eHealth believers</td>
<td>Motivated to try new things – if it makes their life better</td>
</tr>
<tr>
<td></td>
<td>Easy to influence</td>
<td>Desire to improve efficiency</td>
</tr>
<tr>
<td>Environmental converts</td>
<td>Early adopters and avid technology users</td>
<td>Demands associated with hospital environment</td>
</tr>
<tr>
<td></td>
<td>Strong perception of benefits, esp. collaboration</td>
<td>Computer-savvy culture</td>
</tr>
<tr>
<td>Capable but unconvinced</td>
<td>Very few barriers, but low perception of benefits</td>
<td>‘Prove it to me’ perspective – only willing to adopt if the benefits are tangible</td>
</tr>
<tr>
<td></td>
<td>Peers are strongest influence lever</td>
<td></td>
</tr>
<tr>
<td>Apprehensive followers</td>
<td>Waiting for everyone else to adopt</td>
<td>Not comfortable trusting new technology</td>
</tr>
<tr>
<td></td>
<td>Numerous concerns: weaker view of benefits</td>
<td>Constrained by limited access to resources/support</td>
</tr>
<tr>
<td>Uninterested</td>
<td>Very negative with few strong influence drivers</td>
<td>Not interested in and less comfort using technology</td>
</tr>
<tr>
<td></td>
<td>Skew older; many are nearing retirement</td>
<td>eHealth perceived as less relevant / not worth the cost</td>
</tr>
</tbody>
</table>

Possible adoption intervention levers

Given the insights into infrastructural, aptitudinal and attitudinal readiness described above, it is clear that interventions that focus solely on, for example, educating and training the individual practitioner would be insufficient. Necessarily, they would fail to address some of the more fundamental barriers to adoption, such as real concerns about the suitability or limitation of the sets of eHealth solutions and how they are delivered, or the network- or environment-based constraints and influencers.

Drawing on the experience of the pharmaceutical industry and its approach to major product launches in the healthcare system, we believe that an effective approach to eHealth adoption by medical specialists and across the health system needs to simultaneously consider interventions along three complementary axes:

- Shaping the eHealth products, i.e. the eHealth solutions as a whole, including any IT hardware, software, delivery and support
- Shaping the demand for those applications among medical specialists, and
- Shaping the health ecosystems in which those specialists work.
This section briefly defines a range of interventions in each of these three areas that would each be necessary, and together would be sufficient, to secure widespread adoption of particular eHealth solutions. In each area, some interventions will work better with some clusters than others. Further, the interventions will need to be staggered through the natural phases of the strategy: its establishment period, a time in which momentum is built, and a time for consolidating real change. This section concludes with an indication of when best to engage each intervention, and with which clusters.

**Shaping eHealth products**

A number of barriers to adoption of eHealth stem from concerns about the eHealth ‘product’ itself, such as the security, privacy, suitability, interoperability, usability, reliability or cost (of installation and operation) of the solutions. Therefore an effective adoption strategy cannot be limited to engaging or shaping the demand. Interventions are needed to lower the product-related barriers (real or perceived), thereby tailoring the product or its delivery to the differentiated needs of the medical specialists.

The surveys and interviews clearly identified a number of real and perceived concerns about the eHealth solutions or ‘products’ themselves, spanning their suitability, interoperability, usability, security, reliability or cost (of installation and operation). Some effort has to be made to ensure that the offered solutions are appealing to their users and effective for health outcomes. Any adoption strategy therefore needs explicit interventions focused on the ‘product’ itself, and not be limited to engaging or shaping the demand. These interventions would aim to tailor products to the differentiated needs of both specialties and clusters, and to reduce the product-related barriers (real or perceived) analysed in Section 5.

- **Establish basic standards and certification criteria based on core use objectives.** These standards should apply to products used by practitioners across the entire health space, not just those used by medical specialists, to lay the groundwork for system-wide connectivity and information exchange
  - **Address compatibility concerns** by spearheading coordination between standards organisations, software vendors, and other relevant bodies to promote adherence to clear interoperability standards
  - **Develop and institute an accreditation program** to certify products that meet these guidelines, and create a certification logo or other clear identifier so specialists can easily find certified systems. In the short-term, work with early adopters to prioritise interoperability needs and identify alternative/intermediate modes of interoperability, e.g. allowing flexibility or an evolution path for less mature systems, users or organisations (however, these need to be carefully considered to avoid interim solutions becoming ‘permanent’ for some users). In the long-term, require use of certified systems to receive Medicare reimbursement
<table>
<thead>
<tr>
<th>Target clusters</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>eHealth entrepreneurs</td>
<td>30% of cluster 1 (eHealth entrepreneurs) strongly agree that external compatibility is a barrier, and 26% for internal compatibility. These are the two largest perceived barriers, stemming from this cluster’s already strong use of eHealth solutions. Leaders from this cluster should be actively engaged in identifying the highest priority interoperability needs and challenges, and identify options to overcome them in the short-term and longer-term.</td>
</tr>
<tr>
<td>Network adopters</td>
<td>32% of cluster strongly agrees that internal compatibility is a barrier, and 19% for external compatibility. Although this cluster tends to be more internally focused at the present time, as a larger number of practitioners outside the hospital setting gain the ability to connect, external connectivity will rise in importance. Network adopters have the strongest interest in access to shared records (82% strongly agree). Resolving their barriers to record sharing will be critical for achieving rapid uptake in accessing and using shared patient health records.</td>
</tr>
<tr>
<td>Capable but unconvinced</td>
<td>Efforts to enhance compatibility and technical stability will also reduce barriers for this cluster, but will not be sufficient to drive widespread change. 15% of cluster strongly agree that internal compatibility is a barrier, and 10% external compatibility. Although these are two of the greatest barriers, they are much less significant for this cluster as compared with perceptions among specialists in general (32% and 23%, respectively).</td>
</tr>
<tr>
<td>Apprehensive followers</td>
<td>45% of apprehensive followers strongly agree that internal compatibility is a barrier, and 33% for external compatibility. These are just two of many perceived barriers for this cluster, so while addressing compatibility is important, it is unlikely to be sufficient for driving significant change.</td>
</tr>
</tbody>
</table>

- **Identify ways to make adoption easy for specialists**, with a focus on minimising workflow disruptions, improving user-friendliness of products, increasing the relevance of products to specialists’ needs, and increasing access to eHealth solutions. Possible mechanisms to achieve these improvements include:
  - **Connect early adopters with vendors** to identify improvements and enhancements. Provide incentives for early adopters to pilot or trial new products since they are much less likely to be discouraged by unexpected issues and can help resolve problems before the systems are shared with their more risk-averse peers.
  - **Publicly recognise strong products** for specific specialty needs and/or offer optional certification for systems that have the appropriate functionality for a specific specialty segment.
  - **Add a ‘cloud’ platform option** for delivery of some solutions, especially for the more isolated small practices.
  - **Aggregate data and feedback from users** to provide specialists with peer reviews that can help inform purchase and usage decisions.
  - **Incorporate usability ratings** into publicly available product reviews to motivate vendors to improve user-friendliness of systems and help practitioners find systems that are considered easy to operate by others in their specialty.
<table>
<thead>
<tr>
<th>Target clusters</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network adopters</td>
<td>The two leading responses to the open ended question, ‘What single factor would persuade you the most to increase your adoption of eHealth solutions’ were ease of use/user friendliness (12%) and increased efficiency (12%)</td>
</tr>
<tr>
<td>Capable but unconvinced</td>
<td>Despite access to resources, sufficient IT support, and the ability to select and implement new systems, some members of this cluster are concerned with the poor usability of existing systems (21% cited improved ease of use/user friendliness as the single factor that would most persuade them to increase adoption)</td>
</tr>
<tr>
<td>Apprehensive followers</td>
<td>13% cited improved ease of use/user friendliness as the single factor that would most persuade them to increase adoption. Practitioners also discussed problems with usability during interviews. One specialist cited a recent example where someone new to her practice accidentally pressed a button that deleted several months’ worth of appointments and billing records.</td>
</tr>
<tr>
<td>Uninterested</td>
<td>27% of cluster strongly agrees that they can’t find a solution that meets their needs; many of the specialists in this cluster are surgeons and psychiatrists, whose needs frequently differ from the typical GP or internal medicine user 6% cited improved ease of use/user friendliness as the single factor that would most persuade them to increase adoption</td>
</tr>
</tbody>
</table>

- **Provide solutions to mitigate risk of malfunctions or downtime** (and improve other non-functional requirements such as latency, etc). A number of measures can be considered, either to improve performance, mitigate the consequences of lapses in performance, or address the perceptions of performance. These could include:

  - **Communicate transparently on system performance metrics** (including uptime and malfunctions) and issue resolution response times
  - **Communicate transparently on user experience** and feedback of systems (via surveys or online/virtual forums)
  - **Factor initial transitory productivity dips in resource plans** when the new solutions are introduced in larger care settings (such as hospitals), (temporarily over-staff or reduce caseload in the days/weeks when the solution is introduced, so that initial productivity dips due to initial learning phase does not translate into patient experience or quality impacts)
  - **Appoint and communicate the availability of an on-call emergency IT support team** to ensure rapid issue resolution and improve accessibility of IT support for private practitioners. This could be delivered as a shared service at a local level (e.g. by a local health network or by a large hospital)
  - **Implement safety precautions** by providing practitioners with information and risk management solutions such as regular back-ups of data
  - **Coordinate with IT vendors to track technical malfunctions** and determine the causes and solutions in a timely manner. Provide certification ‘kitemark’ to vendors meeting support level standards and/or impose penalties on vendors that are unresponsive to technical issues or repeatedly launch software without adequate issue-resolution support
<table>
<thead>
<tr>
<th>Target clusters</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>eHealth entrepreneurs</td>
<td>Increased/improved IT support was cited by 14% of cluster as the single factor that would most persuade them to increase their use of eHealth</td>
</tr>
<tr>
<td>Network adopters</td>
<td>Malfunctions or downtime are also perceived as a large barrier (23%). ‘System proven to be reliable’ was cited as the single most important factor in driving increased for approximately 11% of the cluster</td>
</tr>
<tr>
<td>Apprehensive followers</td>
<td>Malfunctions or downtime are perceived as a large barrier for this cluster (58% strongly agree, the largest across all segments). 51% strongly agree that they prefer to wait until technology-based systems are proven before adopting them. 14% listed increased/improved IT support as the single factor that would most persuade them to increase their use of eHealth.</td>
</tr>
</tbody>
</table>

**Shaping eHealth demand**

The research identifies wide variations in the intended use of eHealth solutions, and in the attitudinal underpinnings of these variations. The clusters have markedly different perceptions of the benefits, costs and risks of eHealth. The effort to shape the demand for eHealth solutions must be grounded in the needs profiles identified in the research: by specialty and by cluster. Examples of demand-shaping interventions are outlined below, focused on defining and proving tailored value propositions, and stimulating awareness and early adoption.

As well as ensuring the eHealth solution will be effective, the strategy will need to respond to current specialist attitudes towards eHealth, and help shape their future ones. Among specialists, there are wide variations in the intended use of particular eHealth solutions, driven by diverse perceptions of their benefits, costs and risks. To make those perceptions more positive, interventions are needed that more clearly communicate measured benefits, both to practice efficiency and to healthcare outcomes. This effort must be guided to meet the specific concerns of individual specialties and clusters. Practitioners, and others whom they trust, will be needed to demonstrate successful eHealth solutions, talking to both their benefits and the ways in which barriers and risks are managed. Some examples of demand-shaping interventions are outlined below, which define, prove and communicate the case for adoption, and stimulate awareness and early adoption.

- **Establish a measurement and evaluation framework** to track desired outputs and outcomes. Communicate evidence that reinforce both patient-related and efficiency-related eHealth benefits, by:
  - **Defining the value propositions** that are most relevant to each cluster and specialty
  - **Identifying short-term usage metrics** that are easy to track and monitor (e.g. number of specialists using ePrescribing) and connecting them with long-term outcomes (e.g. reduction in hospitalisations due to fewer prescription errors) to provide compelling evidence for change
  - **Create credible evidence** via relevant use case implementations (actively shaping these to make sure they ‘meet the bar’, in terms of level of evidence required). Use pilot implementation sites to build an evidence case for change and refine solutions prior to a full-scale rollout
  - **Determining the most effective channels** for communicating evidence to each cluster (e.g. academic publication, professional body, patient representation body, peers)
<table>
<thead>
<tr>
<th>Target clusters</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>eHealth entrepreneurs</td>
<td>72% of eHealth entrepreneurs strongly agree that continuity of care will be a benefit of eHealth. 70% strongly agree with efficiency, and 65% with collaboration. 15% of this cluster cited either ‘a guarantee of better patient outcomes’ or ‘if it were shown to increase practice efficiency’ as the single factor that would most persuade them to increase adoption.</td>
</tr>
<tr>
<td>Network adopters</td>
<td>Promote examples of successful use by other practitioners and change champions and use peers to specifically reinforce messages of collaboration, continuity of care, and quality of care. Single largest driver of adoption is use of technology by other practitioners – 16% of segment strongly agree this will drive behaviour and adoption. 77% strongly agree that collaboration is a benefit of eHealth, 71% of segment with continuity of care, and 65% strongly agree with quality of care.</td>
</tr>
<tr>
<td>Capable but unconvinced</td>
<td>The primary goal for this segment is to shift their perceptions of eHealth. Just 9% (vs. 30% for all specialists) strongly believe that it will increase patient safety and 15% (vs. 35% for all specialists) strongly believe that it will improve quality of care. In the absence of perceived benefits, these specialists see little reason to adopt the new solutions. Nearly 15% of this cluster cited either ‘a guarantee of better patient outcomes’ or ‘if it were shown to increase practice efficiency’ as the single factor that would most persuade them to increase adoption. 43% strongly believes that eHealth will improve efficiency, which was the most commonly perceived benefit.</td>
</tr>
<tr>
<td>Apprehensive followers</td>
<td>11% of this cluster cited ‘if it were shown to increase practice efficiency’ as the single factor that would most persuade them to increase adoption. A further 7% cited ‘a guarantee of better patient outcomes’ as the single factor that would most persuade them to increase adoption.</td>
</tr>
<tr>
<td>Uninterested</td>
<td>8% of this cluster cited ‘if it were shown to increase practice efficiency’ as the single factor that would most persuade them to increase adoption. A further 8% cited ‘a guarantee of better patient outcomes’ as the single factor that would most persuade them to increase adoption.</td>
</tr>
</tbody>
</table>

- **Disseminate accurate information and education on product use and risks**, relevant to the specific needs and concerns of practitioner groups. This will serve two primary objectives. First, it will raise awareness of eHealth among the clusters that have not moved towards adoption. Second, it will help address the existing misconceptions around eHealth risks (breaches of privacy) and help practitioners feel confident that these risks can be mitigated. Some channels for spreading information include:
  - **Medico-legal groups**, which reach a large number of specialists and are well-positioned to offer guidelines, training programs, and possibly premium discounts for practitioners using eHealth in ways that reduce their legal liability risk.
  - **Specialist colleges**, which can offer information on best-practice usage guidelines targeted towards specific specialty segments, incorporate eHealth into specialist training programs, reinforce messages about eHealth benefits and offer continuing professional development courses specifically related to eHealth.
  - **Conferences**, which frequently attract specialists within specific practice and interest areas. Interactive exhibits provide the opportunity to demonstrate product use and offer
specialists free trial versions of certain eHealth products (on a USB stick or as iPhone apps). Additionally, eHealth entrepreneurs can be invited to present and share their experiences and innovative solutions with like-minded peers.

- **Clinical leaders**, who can share information with specialists and provide support on a one-on-one basis. This is one of the most effective channels for persuasion, but the trade-off for greater depth of impact is reduced breadth.

<table>
<thead>
<tr>
<th>Target clusters</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>eHealth entrepreneurs</td>
<td>50% of eHealth entrepreneurs strongly agree that professional bodies will influence their uptake of eHealth solutions. This is by far the highest across all segments – professional bodies have tremendous potential to exert influence with this group.</td>
</tr>
<tr>
<td>Network adopters</td>
<td>16% strongly agree that requests from other practitioners would influence them to increase their uptake of eHealth, which is the strongest driver for this cluster. 47% strongly agree that concerns about breaches of patient privacy are a barrier.</td>
</tr>
<tr>
<td>Apprehensive followers</td>
<td>17% strongly agree that professional bodies will strongly influence them. Since this cluster is less comfortable with eHealth technology, it frequently looks to peers and professional bodies for advice on which systems to adopt.</td>
</tr>
<tr>
<td>Uninterested</td>
<td>33% of segment strongly agree with patient privacy being a barrier. 7% stated that a guarantee of safety/data confidentiality is the single factor that would most persuade them to increase their use of eHealth solutions.</td>
</tr>
</tbody>
</table>

- **Recognise and promote successful use cases.** Unlike GPs, medical specialists often work in niche areas with very specific needs and uses for technology. Customisation is therefore more difficult, but essential nonetheless. By publically sharing innovative approaches, other practitioners may be better able to identify similar ways to use the solutions within their practice. Also, IT vendors will gain a better perspective on the needs and ideal use cases for this specialised customer base. Specific options for disseminating this information include:

  - **Formally recognise innovative and promising uses of eHealth technology** and appoint an innovations team to identify ways to replicate these programs across Australia. Provide eHealth entrepreneurs with public recognition for their efforts and also share their innovative solutions to encourage further adoption.

  - **Create opportunities for members of target clusters to directly experience or observe the benefits of eHealth implementation** (via simulations, continuous education, exposure in a care setting in which they occasionally or regularly practice, exposure to peers in their practice who are already adopters).
Target clusters | Rationale
--- | ---
eHealth entrepreneurs | A relatively small but still significant percentage (21%) of eHealth entrepreneurs strongly agree that they are influenced by respect and recognition, and this type of program will resonate strongly with this subset.
Network adopters | Similar to the eHealth entrepreneurs, the widespread use of eHealth in this cluster positions it well to communicate and share benefits across the medical ecosystem. 24% are already using telehealth (vs. an average of 9% across all specialties) and 53% are using electronic health records (vs. an average of 42%).
Capable but unconvinced | As adoption and usage rates begin to rise, this cluster is more likely to respond to peers as compared with other potential influences. 12% of cluster strongly agrees that requests from other practitioners will drive their use of eHealth.

- **Provide assurance on the intended use of practitioner performance data.** With the increased availability of information, some practitioners are concerned about the implications if data on their performance or medical decisions is made publically available. Some steps to mitigate this concern could include:
  - **Inviting practitioners to discuss and align** on the most important and relevant performance metrics in their specialty or sub-specialty.
  - Providing reassurance that data will not be used for punitive purposes, access will be restricted and confidentiality will be enforced.
  - **Sharing data at the appropriate level of detail**, i.e. providing information on a practitioner’s performance quartile rather than on their specific score.
  - **Using performance data in ways that benefit practitioners**, by providing anonymous benchmarking so that they can compare their performance to peers in a non-threatening way.

Target clusters | Rationale
--- | ---
Apprehensive followers | 26% strongly agree that the risks associated with increased visibility of practitioner performance data are a barrier.
Uninterested | 31% strongly agree that the risks associated with increased visibility of practitioner performance data are a barrier.

- **Embed eHealth solution deployment in the context of a broader change initiative** to improve the care delivery model or process that has directly perceived benefits to the targeted cluster. For example, fund or set up a program to improve the stroke pathway, requiring the inclusion of the relevant required enabling technologies.
### Target clusters | Rationale
---|---
eHealth entrepreneurs | This cluster cares about patient outcomes, and will likely be motivated by an initiative that is seen to advance patient care. Additionally, they are already excited about eHealth and will help lead adoption in their network.
Capable but unconvinced | Connecting eHealth deployment with an initiative viewed as beneficial to this cluster attaches value to the eHealth solution, which may be sufficient to spur adoption.
Apprehensive followers | Apprehensive followers may be more easily sold on the greater initiative, and if the eHealth solution is a small part of the picture than the barriers may be perceived as less when compared with the impact of the initiative as a whole.
Uninterested | Even though they are uninterested in eHealth, if an eHealth application were tied to something of strong interest, they may be willing to adopt the eHealth component to achieve better outcomes.

### Shaping the health ecosystem
Introducing eHealth solutions that affect care delivery models require coordinated approaches across the healthcare system. The research has confirmed that medical specialists are influenced by overall system changes and benefits. The eHealth adoption strategy therefore needs to help create the conditions in the ecosystem which influence and support adoption, within and across clusters. This includes a regulatory and incentive environment in which vendors, professional bodies and practitioners can develop and adopt the right solutions.

Even where effective eHealth solutions are in demand, their adoption must be coordinated across the healthcare system to maintain the integrity of care delivery. The eHealth readiness research has confirmed that quality care delivery across the health ecosystem does influence adoption by individual specialists, so long as it does not compromise their own practice efficiency. The eHealth adoption strategy must therefore include interventions to create ecosystem conditions that support adoption, and to ensure care delivery benefits are secured by those adoptions. Many of these interventions must be guided from the top – governments must establish the regulatory and incentive environment before vendors and professional bodies can respond, with individual practitioners being the final tier.

- **Cultivate eHealth pioneers as change champions** to drive more widespread adoption. eHealth entrepreneurs are generally excited to engage and share their experiences, especially those who have spent significant amounts of time developing and implementing their own proprietary systems, are thus a valuable source of information and insights. However, due to their busy schedules they are also time-constrained and may be difficult (or costly) to engage on a long-term basis. Some options for engaging with them include:
  - **Form an online panel of eHealth entrepreneurs** to maintain a strong connection with this critical group, test and get feedback on potential engagement strategies, capture and document best-practices for use, and help track benefits.
  - **Give formal system deployment roles to senior tech-savvy practitioners** since they are more likely to have both the time and the interest to help progress eHealth adoption, and will also be well-known and respected by their peers.
Target clusters | Rationale
--- | ---
eHealth entrepreneurs | Other practitioners rank as one of the most significant sources of influence among the other clusters. One cluster member provided an example of how she was able to effect change in her hospital. She was so excited about computerised decision-making algorithms related to her specialty that she carried around USB drives with the time-saving tools and handed them out to her peers. Because the tools were relevant, easy to use, and endorsed by an experienced and well-respected peer, they were quickly adopted.

Apprehensive followers | Form a group of influential early adopters from this cluster that interfaces with and therefore has the ability to influence hospital-based specialists across other disciplines. 75% of this cluster is hospital based, and although they are typically localised within three segments, these segments often interface with groups that are more difficult to influence (e.g. surgeons).

**• Identify and target critical adoption ‘nodes’** (care settings where many specialists practice occasionally, to ensure broad exposure of eHealth solution to many specialists), or care settings with high intensity of interaction with specialist practice settings. Additionally, **target specialists who frequently interact with other practitioners** and therefore have multiple influence points, such as the radiologists and pathologists Some specific examples related to pathology include:

- Collaborate with pathologists to identify ways to increase ease of use for referring doctors. For instance, the pathology group at a hospital in South Australia developed an app for all the doctors affiliated with the hospital so that they can receive alerts and test results from the pathology department on their iPhones
- Provide pathologists with information and training that can be used to help overcome specialists’ concerns (explain how electronic notifications will work so that specialists don’t overlook a critical diagnosis and explain the benefits of using computerised systems to provide guidelines for test requests)
- Coordinate with pathologists to overcome potential challenges associated with increased information sharing, interpreting results from different laboratories (using different reference ranges) on the same electronic record.

**• Design and offer training workshops targeting support staff.** Although support staff will not train specialists, they often have a key role in influencing adoption and use in the practice, and they also use the systems themselves (by entering information in a structured format after a specialist dictates their notes). Strong knowledge of the systems also helps them respond quickly if specialists have questions or concerns.
<table>
<thead>
<tr>
<th>Target clusters</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>eHealth entrepreneurs</td>
<td>23% of eHealth entrepreneurs strongly agree that support staff will influence their use of eHealth. Although this is a small percentage relative to other drivers, it still reflects a significant lever for influence. Conversations with practitioners suggest that practice managers play a key role in influencing adoption due to their ability to provide information on potential systems and their role in providing training and support once systems are implemented.</td>
</tr>
<tr>
<td>Capable but unconvinced</td>
<td>9% strongly agrees that requests from support staff will influence them to increase adoption.</td>
</tr>
<tr>
<td>Uninterested</td>
<td>Despite low computer use and interest in eHealth, 73% of this cluster use electronic billing systems. It is likely a practice manager or supporting staff role that is responsible for these systems and who could influence adoption of future eHealth applications.</td>
</tr>
</tbody>
</table>

- **Offer incentives for eHealth use** targeting small private practices that lack the scale to justify large-scale IT investments. Tie financial rewards or reimbursement to evidence that eHealth solutions are being used in a way that advances health outcomes.

<table>
<thead>
<tr>
<th>Target clusters</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>eHealth entrepreneurs</td>
<td>56% of eHealth entrepreneurs strongly agree that financial incentives will influence their uptake of eHealth solutions, the highest of all segments. Since there are many alternative influence levers for eHealth entrepreneurs, however, financial incentives may not be necessary to drive change.</td>
</tr>
<tr>
<td>Apprehensive followers</td>
<td>Financial incentives are important for this segment. 30% strongly agree that financial incentives will influence adoption. 19% cited financial incentives as the single factor that would most influence them to increase adoption. A further 5% cited ‘Appropriate Medicare rebates/remuneration for time’ as the single factor that would most influence them to increase adoption. Practitioners mentioned during interviews that costs are an especially large burden on small practice groups.</td>
</tr>
</tbody>
</table>

- **Create transparency on adoption levels and momentum within healthcare communities** in which specialists participate, and publicise commitments to future adoption timing by practice/specialist.

<table>
<thead>
<tr>
<th>Target clusters</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apprehensive followers</td>
<td>28% of apprehensive followers strongly agrees that there aren’t enough people using eHealth systems for them to provide a benefit. 51% prefers to wait until technology-based systems are proven before adopting them. Anecdotal evidence from interviews with specialists in this cluster suggest that they will adopt something new when they perceive that everyone else is already doing it.</td>
</tr>
<tr>
<td>Uninterested</td>
<td>24% of uninterested cluster strongly agrees that there aren’t enough people using eHealth systems for them to provide a benefit. 36% prefers to wait until technology-based systems are proven before adopting them, and 8% of cluster responded that if they weren’t approaching retirement they would be more likely to change.</td>
</tr>
</tbody>
</table>
• **Enforce system-wide measures to mitigate privacy risk.** Provide practitioners with information, training and support so that they understand how to minimise risk of privacy breaches and maintain security of information in their practices. Audit practices to ensure that these measures are being adhered to. Although this solution is intended to remove barriers for the network adopters and uninterested, interventions will need to be applied universally to ensure that the entire health network is safe and secure.

<table>
<thead>
<tr>
<th>Target clusters</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network adopters</td>
<td>47% strongly agree that concerns about breaches of patient privacy are a barrier to adoption</td>
</tr>
</tbody>
</table>
| Uninterested      | 33% of segment strongly agree that patient privacy is a barrier
                  | 7% stated that a guarantee of safety/data confidentiality is the single factor that would most persuade them to increase their use of eHealth solutions |

• Require **mandatory participation** in eHealth programs.

<table>
<thead>
<tr>
<th>Target clusters</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apprehensive followers</td>
<td>Some members of this cluster may be unwilling to change unless they perceive no other alternatives. For example, one practitioner explained that the only reason she used computerised records was because she didn’t have a choice. When her practice decided to move to an electronic record keeping system, they made it nearly impossible for her to access paper-based files. She soon realised that scribing notes on small pieces of paper wasn’t an effective way to track her patients over time, so she made the change to computerised records</td>
</tr>
<tr>
<td>Uninterested</td>
<td>This cluster is uniformly negative in their perspective of influencing drivers, and 13% responded ‘nothing’ when asked what single factor would most persuade them to adopt and use eHealth solutions</td>
</tr>
</tbody>
</table>

• **Actively coordinate simultaneous adoption within targeted healthcare delivery communities or pathways** in which specialists participate, to actively address concerns/barriers related to lack of peer or network participation. Focus on a specific patient cohort, a condition, or a type of provider-provider relationship and then address the full spectrum of participants in that network to demonstrate the full potential for improved information sharing and coordination of care. This intervention will be effective across all clusters, and achieving a balance between them will help ensure that the more enthusiastic adopters are able to influence and bring along their more hesitant counterparts.
Mapping between strategies and clusters

Our research suggests the following interventions may be appropriate for each cluster of specialists through the duration of the change and adoption effort. Table 6 connects the major engagement strategies discussed above with estimated sequencing by cluster.

Table 6: Proposed intervention strategies and estimated timing by cluster

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Establishment (0-6 months)</th>
<th>Momentum (6m to 1 yr)</th>
<th>Change (1-2 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shaping the product</td>
<td>Clusters targeted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Establish basic standards and certification criteria</td>
<td>1, 2</td>
<td>3, 4, 5</td>
<td></td>
</tr>
<tr>
<td>Make adoption easy and identify ways to minimise workflow disruption</td>
<td>1, 2</td>
<td>3, 4</td>
<td>4, 5</td>
</tr>
<tr>
<td>Provide solutions and support to mitigate risk of malfunctions or downtime</td>
<td>3, 4</td>
<td>3, 4</td>
<td></td>
</tr>
<tr>
<td>Shaping the demand</td>
<td>Clusters targeted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Establish a measurement and evaluation framework</td>
<td>1, 2</td>
<td>1, 2, 3</td>
<td>1, 2, 3, 4, 5</td>
</tr>
<tr>
<td>Disseminate accurate information and education on product use and risks</td>
<td>1, 2</td>
<td>4, 5</td>
<td>4, 5</td>
</tr>
<tr>
<td>Recognise and promote successful use cases</td>
<td>1, 2, 3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Provide assurance on the intended use of practitioner performance data</td>
<td>4</td>
<td>4, 5</td>
<td></td>
</tr>
<tr>
<td>Embed eHealth solution deployment in the context of a broader initiative</td>
<td>1, 3</td>
<td>4, 5</td>
<td></td>
</tr>
<tr>
<td>Shaping the ecosystem</td>
<td>Clusters targeted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultivate eHealth pioneers as change champions</td>
<td>1</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Identify and target critical adoption ‘nodes’ and specialists who frequently interact with others</td>
<td>2</td>
<td>2, 3</td>
<td>4, 5</td>
</tr>
<tr>
<td>Design and offer training workshops targeting support staff</td>
<td>1, 3, 5</td>
<td>3, 5</td>
<td></td>
</tr>
<tr>
<td>Offer incentives for use</td>
<td>1, 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Create transparency on adoption levels</td>
<td>4, 5</td>
<td>4, 5</td>
<td></td>
</tr>
<tr>
<td>Enforce system-wide measures to mitigate privacy risk</td>
<td>1, 2, 3</td>
<td>1, 2, 3, 4, 5</td>
<td>1, 2, 3, 4, 5</td>
</tr>
<tr>
<td>Require mandatory participation</td>
<td>4, 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actively coordinate simultaneous adoption within a pathway</td>
<td>1, 2, 3, 4, 5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Worked example: strategy for a national telestroke program

The following example applies the cluster-based insights and interventions discussed above to a hypothetical scenario: the Government’s delivery of a national telestroke program. It is not intended to promote telestroke as a national priority; instead, it is meant to illustrate the end-to-end adoption strategy development process that could follow from the eHealth readiness research. Telestroke was selected as an example because it has already been successfully implemented in
some sites in Australia and shows potential for both improving patient outcomes and reducing healthcare costs.

1. Describe the objectives and aspiration

First, clarify the objectives and overall aspiration in detail, along with metrics for measuring success. Understand and describe both the starting position and the intended end-state.

- Purpose of program: connect emergency medicine specialists and physicians in rural and regional Australia with stroke specialists to rapidly evaluate and treat stroke patients in their local hospital
- Objectives, aspirations and metrics from the perspective of each stakeholder are listed in Table 7 below.

Table 7: Example objectives, aspirations and metrics for each stakeholder

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Objectives and aspirations</th>
<th>Sample metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients</td>
<td>Better quality of care because advanced lifesaving treatment could be started locally</td>
<td>Neurological impairment and disability</td>
</tr>
<tr>
<td></td>
<td>Better quality of care because advanced lifesaving treatment could be started in time</td>
<td>Potential lost earnings</td>
</tr>
<tr>
<td></td>
<td>Less post-stroke disability</td>
<td>Mortality rates</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Long-term morbidity rates</td>
</tr>
<tr>
<td>Healthcare professionals</td>
<td>Provide the patients with better quality care by bringing virtually services to their patients locally</td>
<td>Proportion of eligible stroke patients treated with tissue plasminogen activator (tPA)</td>
</tr>
<tr>
<td></td>
<td>Improve ability to take care of patients they otherwise could not handle (become able to perform lifesaving treatment)</td>
<td>Mortality rates</td>
</tr>
<tr>
<td></td>
<td>Deliver care at an earlier stage of the disease development</td>
<td></td>
</tr>
<tr>
<td>Remote institution</td>
<td>The local medical staff at remote locations are enabled to take care of the patients locally in an improved manner</td>
<td>Time to treatment</td>
</tr>
<tr>
<td></td>
<td>Deliver quality services locally at remote locations to the patients</td>
<td>Hospital length of stay</td>
</tr>
<tr>
<td></td>
<td>Save lives</td>
<td>Percentage of patients going to rehabilitation and nursing homes</td>
</tr>
<tr>
<td></td>
<td>Reduced costs (since the same equipment could be reused for more specialties)</td>
<td>Mortality rates</td>
</tr>
<tr>
<td>Central institution</td>
<td>Provide the medical staff at remote locations with medical expertise allowing the local staff to give better patients treatment</td>
<td>Proportion of eligible stroke patients treated with tissue plasminogen activator (tPA)</td>
</tr>
<tr>
<td></td>
<td>Chronic care management improvement</td>
<td>Number of remote patients treated</td>
</tr>
<tr>
<td></td>
<td>More efficient use of expert time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>More efficient use of the work force</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Deliver quality services to the remote institutions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A regional neurosurgical service influences patient management and reduces the frequency of patient transfer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Are receiving the ‘right’ patients</td>
<td></td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Objectives and aspirations</td>
<td>Sample metrics</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>Government</td>
<td>Acute care improvement</td>
<td>Cost of hospital stay</td>
</tr>
<tr>
<td></td>
<td>They can have access to services from other states to serve their own inhabitants when there is a lack of professionals in their own state</td>
<td>Cost of outpatient clinic visits</td>
</tr>
<tr>
<td></td>
<td>Proven long-term cost-benefit affectivity for the healthcare system</td>
<td>Cost of drugs for treatment</td>
</tr>
<tr>
<td></td>
<td>Better organised service</td>
<td></td>
</tr>
</tbody>
</table>

2. Develop and prioritise use-cases

*Describe the use-cases envisaged for the program. Prioritise these both on their impact – for example, for patients, healthcare professionals and the healthcare system – and their reach – e.g. how many patients or clinicians will be touched.*

This example has been developed for telestroke, a telemedicine use-case that provides stroke care through the use of video telecommunications. Telestroke facilitates remote cerebrovascular specialty consults from virtually any location within minutes of attempted contact, adding greater expertise to the care of any individual patient.

Teleradiology is a critical component of a telestroke program, and is based on a Picture Archive Communication System (PACS). When standardised in a serviceable way, the system enables exchange of pictures not only inside an institution but also between institutions.

Basic patient demographics, vitals, and radiology are collected at the point of care and delivered securely for evaluation by stroke neurologists. Powerful reporting tools enable customised management plan creation based on diagnosis, including thrombolytic therapy and non-stroke cases.

3. Identify the critical participants and their roles

*Within each use-case, identify the critical participants, the roles they would play, and the interactions with other healthcare practitioners or systems and with patients.*

- **Imaging specialist (radiographer):** performs brain imaging review (CT scan) and local physicians and stroke specialist review on radiology PACS system. Imaging specialists need to liaise with the participating emergency physicians
- **Rural specialists:** assess and confirm diagnosis whilst videoconferencing with metropolitan stroke care specialist and collaborate with stroke specialist to determine best approach for care. A truly national telestroke program would engage with most of the country’s rural and regional emergency medicine specialists and physicians
- **Neurologist/stroke specialist:** confirms the diagnosis with local physicians and determines the best approach for care, and completes an electronic event summary, which is shared with emergency medicine specialists and physicians, patient, and other relevant care providers. The program would require a sufficient number of specialists to provide around-the-clock coverage, and could be implemented progressively. Complete adoption is not required for the program to run successfully. Over time, stroke specialists could potentially be sourced from other regions within Australia especially during the night hours that are more difficult to staff
• **Hospital leadership:** hospital administration, pharmacy and the hospital leadership teams are critical because they need to invest in the following items (if they do not already exist): videoconferencing equipment with remote zoom focus, a connection for videoconferencing through hospital firewalls, high-speed internet, CT or brain image transfer capability, and a computer. There also needs to be consideration of whether the rural hospital should have an additional budget for thrombolytics.

• **Other stakeholders include:** product vendors, payers, health education and health workforce organisations (e.g. to determine roles and adjustments required), DoHA and State and Territory jurisdictions (e.g. to define regulatory framework under which care can be delivered, to determine approved technologies, and to coordinate changes in the end-to-end care pathway).

### 4. Highlight and prioritise clusters within specialties

*Within these specialties, analyse the clusters that will need to be engaged, in terms of a) the role they will be expected to play in adoption; b) the timing of that role; c) their influence in overall adoption success; d) the degree to which their eHealth readiness needs to be shifted; and e) a targeted and compelling business case to support the desired shift.*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Medical specialist clusters involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiographer</td>
<td>N/A (There is no need for the radiologist to be on site at the rural end, and it is sufficient for the neurologist and the physician to review the images prior to administering TPA. The radiologist can subsequently issue the report, but this is not critical for management to commence.)</td>
</tr>
<tr>
<td>Emergency medicine specialists and physicians</td>
<td>eHealth entrepreneur (13%); network adopters (51%), capable but unconvinced (16%) and apprehensive follower (18%)</td>
</tr>
<tr>
<td>Stroke specialist (internal medicine)</td>
<td>eHealth entrepreneur (35%); network adopters (16%) (Targeting ~50% of potential stroke specialists should yield a reasonable number of participants)</td>
</tr>
</tbody>
</table>

• **Short-term:** The eHealth entrepreneurs and network adopters are the logical top priority, and between them they represent over 60 percent of all emergency medicine practitioners and over 50 percent of internal medicine practitioners.

• **Medium- to long-term:** Capable but unconvinced and apprehensive followers can be targeted in concert. Both will need to understand the benefits, which should be fairly straightforward once the program is underway and demonstrating tangible improvements.

### 5. Identify the interventions that will be needed to shift attitudes and promote adoption

*Before defining interventions, review the perceptions, barriers and influences of targeted clusters and specific needs of specialties.*

Before identifying interventions, it is useful to compare the baseline with the desired end state to determine the specific needs for change. This can be done along the same dimensions of product, demand and ecosystem discussed above. This comparison is proposed in Table 8 for the telestroke example.
Table 9: Changes required to achieve program objectives

<table>
<thead>
<tr>
<th>Current state</th>
<th>Desired end state</th>
<th>Change required</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current imaging and videoconferencing technology is suitable for administering program</td>
<td>Reliable, easy-to-use videoconferencing tools supported by image/record sharing capabilities</td>
<td>Address connectivity/interoperability concerns so that hospitals are able to seamlessly exchange information</td>
</tr>
<tr>
<td>Connectivity limitations may prevent some hospitals from sharing imaging and/or discharge letters electronically</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Demand</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demand is low, due to lack of awareness and availability</td>
<td>Strong demand resulting from demonstrated improvements in patient outcomes and reduction in cost</td>
<td>Increase in awareness and interest levels and evidence-based support for the program</td>
</tr>
<tr>
<td><strong>Ecosystem</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Needs development – potential interest in telehealth but few strong drivers to influence change</td>
<td>A self-sustaining network of telestroke best-practice users and advocates</td>
<td>Identification and cultivation of early adopters supplemented by education and training programs Incentives (financial or otherwise) to promote trial and use</td>
</tr>
</tbody>
</table>

Proposed interventions

**Shaping the product**

Establish basic standards and certification criteria to achieve seamless information exchange.

- Ensure that guidelines for imaging and messaging transfer are clear, readily available, and include the basic requirements needed to support this program
- Verify that hospitals and private practitioners are using a certified system before granting them approval to practice and receive reimbursement for telestroke.

Ensure systems are easy to access and use.

- Provide stroke specialists with convenient access to videoconferencing facilities, ideally integrated into their regular work environment so that they can easily alternate between live and remote patient sessions. Efficiency is critical – if the systems take too long to set up, access or use, specialists will turn to other priorities. Also, many internal medicine practitioners are patient-relationship oriented and will likely tire of performing consultations via videoconference only.

**Shaping the demand**

Establish a measurement and evaluation framework.

- Develop a system to measure, track and report the key output metrics defined in step 1 (e.g. time to treatment, proportion of eligible stroke patients treated with TPA) and to link
short-term outputs with long-term outcomes (e.g. decreased mortality rates, increased quality-adjusted life years, cost savings)

– Test the metrics in conjunction with a pilot program launch.

Disseminate accurate information on product use and risks.

– Offer footage from the videoconference sessions (with permission) to other relevant healthcare providers during training sessions so that they understand the benefits of sending patients to a centre that supports telestroke

– Use pilot program practitioners to act as change agents. These practitioners can help communicate benefits to their peers. They can also act as expert resources for any new practitioner who is having difficulty adapting to the new approach

– Engage organisations such as the Australian College of Rural and Remote Medicine (ACRRM) to act as advocates and provide education to enable this change

Recognise and promote successful use cases.

– Cultivate eHealth pioneers as change champions by targeting emergency medicine specialists and physicians who are already using telehealth. Invite a select group of practitioners to participate in pilot programs in order to generate interest and resolve any challenges. The combination of strong interest and solid skills will help the initial user group resolve any initial challenges without becoming daunted or overwhelmed by the technology or jeopardising patient care.

Provide assurance on the intended use of practitioner performance data.

– Collect treatment statistics through the systems in place at each hospital and aggregate this data on a regular basis. Provide participating hospitals and stroke experts with access to de-identified data so that they can refine and improve diagnosis and treatment protocols

– Implement security measures to ensure that practitioner performance data remains private.

Embed eHealth solution deployment in the context of a broader initiative.

– Identify communities with high incidence rates and incorporate telestroke program into a broader stroke initiative that includes telemonitoring and other interventions.

**Shaping the ecosystem**

Cultivate eHealth pioneers as change champions.

– Identify medical specialists who are already using telestroke and invite them to help shape the initiative

– Ask the early adopters to present at medical conferences and share information on their experiences through relevant medical colleges (e.g. the College of Intensive Care Medicine of Australia and New Zealand and the Australasian College of Emergency Medicine).
Design and offer training workshops targeting support staff.

- Ensure that support staff have the training and skills necessary to set up videoconferencing equipment and resolve basic issues through a nationwide training program.

Offer incentives for use.

- Share the value capture with stroke specialists. Over time, the early intervention enabled by this initiative can provide significant savings. Transferring some of these savings to the stroke specialists (e.g. in the form of further investment/budgets for their organisation) will ensure around-the-clock access to the highest quality of care.

Create transparency on adoption levels.

- Track adoption and use over time and publish a quarterly report listing the hospitals that offer telestroke
- Similarly, track and maintain a list of stroke experts who are interested in linking with emergency departments as part of this program.

Enforce system-wide measures to mitigate privacy risk.

- Audit hospitals periodically to ensure adherence to guidelines for secure transfer of records and imaging files.

6. Integrate intervention levers to develop a coordinated strategy

Consider the intervention strategies appropriate to targeting each cluster, along with their relative merit for the intended objective, optimum sequence and timing. Combine and refine the potential interventions to develop a coordinated strategic plan, ensuring they are consistent with the objective, appropriately sequenced (both between clusters and between strategies) and can translate into a clear plan of action.

Based on the required changes and clusters involved, the following sequence of interventions are proposed to achieve program objectives. A further description of how each of these interventions could be applied more specifically to telestroke follows Table 9.
Table 9: Targeting and timing of intervention levers

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Establishment (0-6 months)</th>
<th>Momentum (6 m to 1 yr)</th>
<th>Change (1-2 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Shaping the product</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Establish basic standards and certification criteria</td>
<td>1, 2, 3, 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Make adoption easy and identify ways to minimise workflow disruption</td>
<td>1, 2</td>
<td>3, 4</td>
<td>4, 5</td>
</tr>
<tr>
<td><strong>Shaping the demand</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Establish a measurement and evaluation framework</td>
<td>1, 2</td>
<td>1, 2, 3</td>
<td>1, 2, 3, 4</td>
</tr>
<tr>
<td>Disseminate accurate information on product use and risks</td>
<td>1, 2, 3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Publicly recognise and promote successful use cases</td>
<td>1, 2, 3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Provide assurance on the intended use of practitioner performance data</td>
<td>4</td>
<td>4, 5</td>
<td></td>
</tr>
<tr>
<td>Embed eHealth solution deployment in the context of a broader initiative</td>
<td>1, 3</td>
<td>4, 5</td>
<td></td>
</tr>
<tr>
<td><strong>Shaping the demand</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultivate eHealth pioneers as change champions</td>
<td>1</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Design and offer training workshops targeting support staff</td>
<td>1, 3, 5</td>
<td></td>
<td>3, 5</td>
</tr>
<tr>
<td>Offer incentives for use</td>
<td></td>
<td></td>
<td>1, 4</td>
</tr>
<tr>
<td>Create transparency on adoption levels</td>
<td>4, 5</td>
<td></td>
<td>4, 5</td>
</tr>
<tr>
<td>Enforce system-wide measures to mitigate privacy risk</td>
<td>1, 2, 3</td>
<td>1, 2, 3, 4</td>
<td>1, 2, 3, 4</td>
</tr>
</tbody>
</table>

7. Measure performance and refine

*Establish a regular rhythm of performance measurement and review along the stated metrics. Consider progress on both how well you are doing at getting traction on adoption and use case enablement, but also whether you are achieving the targeted engagement role for each cluster and shifting core eHealth readiness attributes for these clusters (e.g. infrastructure, aptitude, and attitude). Refine the engagement approach as required.*

In addition to tracking and reporting on the metrics listed in step 1 and refining as needed, the telestroke systems can be linked to a computerised database so that data can be collected and analysed regularly to compare all participating hospitals and medical centres. Outcomes data can then be used to improve the quality of the telestroke program and of stroke care in the future.
8. Conclusion
Those charged with the responsibilities of advancing Australia’s national eHealth strategies should take heart from this report. There is nothing in the findings that presents a philosophical or otherwise insurmountable barrier to eHealth adoption by medical specialists. Almost all have the connectivity and know-how to take up an eHealth solution that has proven its worth in the market. For most, it is simply an operational decision: will a proposed solution be a cost-effective improvement to the efficiency with which the specialist contributes to patient care.

On the basis of this research, we would now answer our three anchor questions as follows.

1. **Medical specialists are ready to adopt eHealth technologies that either improve their practice’s operational efficiency or improve clinical care, but are not yet ready to use eHealth in a way that connects and coordinates care within the entire health ecosystem.**

   Australia’s medical specialists have a strong foundation for eHealth adoption and use, but current levels of electronic information sharing indicate that they are far from realising its full potential. Specialists generally take a practice-oriented view, rather than a macro-level perspective to eHealth adoption and benefits. For this reason, current use is often self-contained within a practice or hospital rather than integrated across networks. Medical specialists have the skills and tools needed to support self-contained eHealth use, but most lack the connectivity, IT support and conviction required to adopt eHealth solutions that drive widespread patient-focused clinical outcomes.

2. **The leading barriers to eHealth adoption are product-driven concerns about system malfunctions, downtime, and poor usability, all of which jeopardise specialists’ ability to deliver quality care efficiently. Improving product reliability and connectivity will help specialists feel comfortable using eHealth solutions to their full potential.**

   Specialists are extremely sensitive to operational efficiency risks because they directly affect both patient care and their income (for private fee-for-service specialists). Many specialists also face connectivity constraints, have concerns about privacy and security, and perceive financial costs and risks that exceed the perceived benefits.

   Reducing technological barriers will require a joint effort between system vendors, clinicians, and other industry stakeholders such as standards organisations. They will need to improve product functionality and usability, minimise the risk and impact of system error, and improve connectivity and interoperability. Concerns about privacy and security can be overcome through dissemination of accurate information and adherence to universal privacy guidelines. Time and cost concerns can be addressed by reducing real and perceived costs (e.g. through IT support or subsidies) and by increasing real and perceived benefits.

3. **eHealth use is largely driven by two demand-related factors: a strong perception of benefits, and pressure from others in a specialist’s working environment. Connecting eHealth use with tangible, relevant benefits and building an influential network of eHealth advocates will best promote future use.**

   Specialists’ primary objective is to deliver high quality care as efficiently and safely as possible. To the extent that they believe eHealth will advance these objectives, they are incentivised to adopt. These beliefs vary widely between different attitudinal clusters of specialists, however. External pressure is also very powerful, both in convincing specialists of the benefits and in providing the resources and support needed to facilitate adoption. Beyond their immediate
environments, specialists are influenced to varying degrees by respected peers, advice from professional bodies, and journal publications.

Increased adoption and effective use can be driven by strengthening the connection between eHealth and the benefits that are most relevant to specialists. This can be accomplished by ensuring eHealth solutions are clearly embedded in overall improvement of care delivery models and processes, establishing specific value propositions to specialists in adopting these new care models and supporting eHealth solutions, and measuring and tracking outcomes and presenting this evidence through credible sources that reach both practitioners and hospital decision-makers.

Based on these findings, advancing medical specialists’ eHealth adoption in a way that achieves widespread improvements in health outcomes requires shaping the three axes of ecosystem, product, and demand. Addressing a single axis in isolation is likely insufficient to produce significant change. Shaping the ecosystem is critical for establishing an integrated healthcare network that supports and drives change, shaping the product is necessary to overcome adoption barriers and ensure that solutions maintain or enhance specialists’ care delivery processes, and shaping demand provides the necessary incentives to spur adoption and use.
9. Appendices
## Appendix 1 – Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Refers to</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASCIA</td>
<td>Australasian Society of Clinical Immunology and Allergy</td>
</tr>
<tr>
<td>ASUM</td>
<td>Australasian Society for Ultrasound in Medicine</td>
</tr>
<tr>
<td>ASCTS</td>
<td>Australasian Society of Cardiac and Thoracic Surgeons</td>
</tr>
<tr>
<td>ASCS</td>
<td>Australasian Society of Colorectal Surgeons</td>
</tr>
<tr>
<td>ABS</td>
<td>Australian Bureau of Statistics</td>
</tr>
<tr>
<td>AOA</td>
<td>Australian Orthopaedic Association</td>
</tr>
<tr>
<td>ASMOF</td>
<td>Australian Salaried Medical Officers Federation</td>
</tr>
<tr>
<td>ASGM</td>
<td>Australian Society for Geriatric Medicine</td>
</tr>
<tr>
<td>ASH</td>
<td>Australian Society of Hypnosis</td>
</tr>
<tr>
<td>ASID</td>
<td>Australian Society of Infectious Diseases</td>
</tr>
<tr>
<td>ASM</td>
<td>Australian Society of Microbiology</td>
</tr>
<tr>
<td>ASO</td>
<td>Australian Society of Ophthalmologists</td>
</tr>
<tr>
<td>ASOHNS</td>
<td>Australian Society of Otolaryngology Head and Neck Surgery</td>
</tr>
<tr>
<td>ASPS</td>
<td>Australian Society of Plastic Surgeons</td>
</tr>
<tr>
<td>CSANZ</td>
<td>Cardiac Society of Australia and New Zealand</td>
</tr>
<tr>
<td>CICM</td>
<td>College of Intensive Care Medicine</td>
</tr>
<tr>
<td>CPD</td>
<td>Continuing professional development</td>
</tr>
<tr>
<td>CSSANZ</td>
<td>Colorectal Surgical Society of Australia &amp; New Zealand</td>
</tr>
<tr>
<td>DCCM</td>
<td>Department of Critical Care Medicine</td>
</tr>
<tr>
<td>DOHA</td>
<td>Department of Health and Ageing</td>
</tr>
<tr>
<td>DHAS</td>
<td>Doctors’ Health Advisory Service</td>
</tr>
<tr>
<td>ESA</td>
<td>Endocrine Society of Australia</td>
</tr>
<tr>
<td>FPOA</td>
<td>Faculty of Psychiatry of Old Age</td>
</tr>
<tr>
<td>FSA</td>
<td>Fertility Society of Australia</td>
</tr>
<tr>
<td>GESA</td>
<td>Gastroenterological Society of Australia</td>
</tr>
<tr>
<td>HSANZ</td>
<td>Haematology Society of Australia &amp; New Zealand</td>
</tr>
<tr>
<td>HISA</td>
<td>Health Informatics Society of Australia</td>
</tr>
<tr>
<td>HIMSS</td>
<td>Healthcare Information and Management Systems Society</td>
</tr>
<tr>
<td>MOGA</td>
<td>Medical Oncology Group of Australia</td>
</tr>
<tr>
<td>MBS</td>
<td>Medicare Benefits Schedule</td>
</tr>
<tr>
<td>MEPSA</td>
<td>Molecular and Experimental Pathology Society Australia</td>
</tr>
<tr>
<td>NCOPP</td>
<td>National Coalition of Public Pathology</td>
</tr>
<tr>
<td>NeHTA</td>
<td>National eHealth Transition Authority</td>
</tr>
<tr>
<td>NSA</td>
<td>Neurosurgical Society of Australasia</td>
</tr>
<tr>
<td>OSSANZ</td>
<td>Obesity Surgery Society of Australia &amp; New Zealand</td>
</tr>
<tr>
<td>PACS</td>
<td>Picture Archive Communication System</td>
</tr>
<tr>
<td>PBS</td>
<td>Pharmaceutical Benefits Scheme</td>
</tr>
<tr>
<td>PCA</td>
<td>Palliative Care Australia</td>
</tr>
<tr>
<td>PCPA</td>
<td>Private Cancer Physicians of Australia</td>
</tr>
<tr>
<td>PHIAAC</td>
<td>Private Health Insurance Administration Council</td>
</tr>
<tr>
<td>QH</td>
<td>Queensland Health</td>
</tr>
<tr>
<td>RACP</td>
<td>Royal Australasian College of Physicians</td>
</tr>
<tr>
<td>RACS</td>
<td>Royal Australasian College of Surgeons</td>
</tr>
</tbody>
</table>
Appendix 2: Research Methodology

Summary of overall approach

In forming our perspectives on the eHealth readiness of the Medical Specialist sector, we focused on both quantitative and qualitative primary research sources. This was supplemented by secondary research as appropriate. By way of overview, our approach consisted of a four step process:

- **Step One: Define macro segmentation.**

  To allow for ease of stakeholder identification, we adopted a profession-focused segmentation for the purposes of conducting our primary research. We captured the full range of licensed medical specialists in eight different segments—anaesthesia, diagnostics (radiology and pathology), internal medicine, emergency medicine, obstetrics and gynaecology (including neonatology), psychiatry, surgery, and other (dermatologists and ophthalmologists). All categories of specialists included in the Health Insurance Regulations 1975 were included in the research. Some specialties (e.g. pathologists and radiologists, emergency medicine and intensive care) were analysed as a single segment due to their small size and similar characteristics. Further definition of our rationale for selecting these segments is provided in Exhibit 23.
### Medical specialist sample composition

<table>
<thead>
<tr>
<th>Specialty segments (75 each)</th>
<th>Sample quotas</th>
<th>Additions and combinations</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>▪ Diagnostics</td>
<td>▪ Radiology and pathology combined into single ‘diagnostics’ segment</td>
<td>▪ Total population sizes are very small and readiness characteristics are similar</td>
</tr>
<tr>
<td></td>
<td>− Radiology</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>− Pathology</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>− Internal medicine</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>− Surgery</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>− Psychiatry</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>− Obstetrics, gynaecology and neonatology</td>
<td>▪ Neonatology is included with obstetrics and gynaecology</td>
<td>▪ Segment captures practitioners serving mums and bubs, a priority group for DoHA</td>
</tr>
<tr>
<td></td>
<td>− Emergency</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>− Anaesthesia</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>− Ophthalmology &amp; dermatology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geography (75 minimum)</td>
<td>▪ Major city</td>
<td>▪ Outer regional and remote combined into a single segment; separate question captures part-time rural work</td>
<td>▪ Only ~5% of specialists’ main practice locations is classified as either outer regional or remote</td>
</tr>
<tr>
<td></td>
<td>− Inner regional</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>− Outer regional &amp; remote</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other lenses</td>
<td>▪ Public vs. private mix</td>
<td>▪ Additional emphasis on understanding practitioners who serve elderly patients</td>
<td>▪ These attributes may be correlated with readiness</td>
</tr>
<tr>
<td></td>
<td>− Nature of work: procedural vs. consultative</td>
<td></td>
<td>▪ Elderly patients are a priority group for DoHA</td>
</tr>
<tr>
<td></td>
<td>− Patient age: percent &gt;65&lt;sup&gt;1&lt;/sup&gt;</td>
<td></td>
<td>▪ Soft quotas (e.g., age) are needed to ensure a representative sample</td>
</tr>
<tr>
<td></td>
<td>− Practitioner age and sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>− State/territory</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>1</sup> Quota of 75 has been set for practitioners with more than 50% of their patients over age 65

---

**Step Two: Develop hypotheses and survey.**

An effective survey requires both a clear understanding of hypotheses, as well as a set of questions that address – and can prove - these hypotheses. To inform our ingoing hypotheses, we conducted an extensive scan of international examples of eHealth initiatives and stakeholder challenges encountered. We then built issue trees to ensure we had a complete landscape of potential areas to test, and enable us to then focus on those we felt were of critical importance. Further detail on these issue trees is contained in Exhibits 24–26.
Hypothesis development (1/3)

Initial question #1
Are AHPs and Medical Specialists ready to adopt eHealth solutions, both today and in a way consistent with future policy direction?

Infrastructural and technical readiness
- Hardware
  - Specialist equipment required for healthcare
    - General, servers, physical network, computers
  - eHealth tools in use (e.g., e-prescribing, EHRs, telehealth)
    - Non-eHealth in use (e.g., billing, appointments)
- Software, systems and applications
  - Perception of readiness in the surrounding environment
    - Behavioural norms and expectations
- Social and environmental influences
  - Internal/External locus of control
    - Level of risk aversion
  - Perceived costs/risks/effort (see barriers)
    - Impact on practitioners’ credibility
    - Impact on patient relationships
  - Perceived benefits (see enablers)
    - Quality
    - Access
- Affect/perspective
  - Computers skills
  - Language skills
  - Capacity to acquire and install IT
  - Access to IT support

Attitudinal, skills and capabilities readiness
- Internal/External locus of control
  - Level of risk aversion
  - Perceived costs/risks/effort (see barriers)
    - Impact on practitioners’ credibility
    - Impact on patient relationships
  - Perceived benefits (see enablers)
    - Quality
    - Access

Exhibit 24

Hypothesis development (2/3)

Initial question #2
How do we reduce or eliminate adoption and usage barriers?

Financial impact
- Fixed costs of hardware and software installation
  - Impact of operating costs (licenses, upgrades, support)
- Implementation time
  - Operation and management time
  - Risk of selecting the wrong system
  - Risk of downtime due to system malfunction
  - Internal incompatibility
  - Systems may have limited or no interoperability outside practice
  - Systems may not meet providers’ needs

Practitioner time
- Potential for mistakes/harm through user error
  - Illegal record tampering
  - Reduced ability to remain impartial
  - Quality data used to evaluate practitioners’ competence
  - Breach of patient confidentiality

Impact of technology
- Exposure and legal implications
  - Medical equipment required for healthcare
    - General, servers, physical network, computers
  - eHealth tools in use (e.g., e-prescribing, EHRs, telehealth)
  - Non-eHealth in use (e.g., billing, appointments)
- Social and environmental influences
  - Perception of readiness in the surrounding environment
    - Behavioural norms and expectations
- Affect/perspective
  - Computer skills
  - Language skills
  - Capacity to acquire and install IT
  - Access to IT support

Exhibit 25
Hypothesis development (3/3)

How do we emphasise and strengthen eHealth adoption and usage drivers?

- Enables same processes to be done better/faster
  - Improved provider skills
  - Greater access to knowledge and critical patient info

- Enables new processes
  - Increased automation/better tools
  - Eliminate steps/sub-tasks

- Streamlines existing processes
  - Increased information reduces redundancy
  - Shift non-critical tasks to support staff

How do we link eHealth solutions with ability to improve patient outcomes?

- Patient safety increases due to reduced risk of error
  - Improved customer satisfaction resulting in increased retention
  - eHealth solutions can drive customer acquisition (e.g. more GP referrals)
  - Applications of eHealth can open new revenue channels (e.g. online consultations)

- Continuity of care is improved (especially for chronic diseases)
  - Providers receive incentive payments
  - eHealth adoption is a reimbursement requirement (amount or speed of reimbursement)
  - eHealth adoption can reduce liability insurance premiums

- Collaboration and communication between providers facilitated by information portability
  - Physicians, peers and other health providers
  - Administrative, purchasing and support staff
  - Patients

- Patients have greater level of engagement in managing their health through increased info and touchpoints
  - Professional bodies

Greater access to knowledge and critical patient info

- Streamlines existing processes

- Eliminate steps/sub-tasks

- Increased information reduces redundancy

- Shift non-critical tasks to support staff

How do we link eHealth adoption and usage with increased compensation?

- Internal compensation (direct patient revenue)
  - Enabling new processes

- External compensation

How do we use social influences to accelerate adoption?

- Leverage influential stakeholders

- Provide reputational benefits

Patient safety increases due to reduced risk of error

- Improved customer satisfaction resulting in increased retention

- eHealth solutions can drive customer acquisition (e.g. more GP referrals)

- Applications of eHealth can open new revenue channels (e.g. online consultations)

- Providers receive incentive payments

- eHealth adoption is a reimbursement requirement (amount or speed of reimbursement)

- eHealth adoption can reduce liability insurance premiums

- Physicians, peers and other health providers

- Administrative, purchasing and support staff

- Patients

- Professional bodies

These initial hypotheses were then translated into survey questions, and tested in 15 medical specialist interviews. These interviews served the dual purpose of both refining the initial hypotheses and ensuring the survey questions could be understood by the intended audience.

- **Step Three: Finalise and conduct survey.**

To conduct the survey, we used a combination of approaches to ensure sample biases were avoided, and the results for each profession type would be representative of each segment. Further detail on our statistical approach is found in the Conducting the Medical Specialist Survey section below.

- **Step Four: Analyse results and test conclusions.**

The insights and recommendations were developed from analysis of the raw survey data, and enriched with an additional 20 deep-structured interviews with medical specialists once the survey closed. The analysis and interpretation of the research results were syndicated and refined via engagement of key stakeholders (including DoHA and NeHTA decision makers with a direct interest in the survey results), which allowed us to probe and refine initial conclusions, and define and test potential engagement strategy options given those conclusions. Finally, a literature search of available secondary data was used to support or challenge hypotheses and assumptions arising from the research.

Below is a more detailed description of the statistical methodology used in conducting the survey.
Primary and secondary data sources
To ensure this report serves as an independent assessment of the eHealth readiness of medical specialists, we employed a quantitative and qualitative survey of professionals in the industry as primary data source for this report (as opposed to relying on anecdotal evidence or literature reviews).

The primary data item is an assessment of the overall readiness of Australian medical specialists to adopt and use eHealth technologies and solutions, including the primary drivers of, and barriers to, adoption.

Our primary research approach was informed by the experience of several national peak bodies, special interest groups and other organisations with a professional interest in the content of this report. Where appropriate, the input of these bodies was considered in the formation of this report, with an understanding of the experience each organisation or group brought to bear in providing their input.

Secondary data sources for this research include background data from other institutions, including but not limited to Australian Bureau of Statistics, Australian Health Workforce Advisory Committee, Australian Institute of Health and Welfare, Department of Health and Ageing, Medicare Australia, National eHealth Transition Authority, and the National Health and Hospitals Reform Commission.

Key questions of research
- Are Australian medical practitioners ready to adopt and use eHealth technologies and solutions, today and in a way consistent with policy direction in the future?
- What are the barriers impacting eHealth readiness and adoption and how can we minimise them?
- What are the eHealth enablers and how can we apply them to drive adoption and effective usage?

Conducting the medical specialist survey
To identify relevant medical specialists in our selected segments, we worked closely with market intelligence firms and healthcare industry experts who maintained lists of specialists. We were able to prepare a list of over 19,000+ specialists, which included practitioner’s name, specialty, gender, address and contact details, who were then approached in a randomised format to participate in the survey. Since many specialists practice across multiple postcodes, their appropriate geographic region was determined during the recruitment for the survey.

As noted above, we randomly selected survey participants from the pool of 19,000+ specialists, controlling to ensure our sample set was representative of the overall demographic profile for each segment (Exhibit 27). In total, we approached 10,015 specialists to participate in this survey, of which 956 offered to participate. From this group, 600 were eligible to complete the survey – a yield rate of ~6 percent. Because all questions were mandatory, quantitative survey results are based on 600 responses unless otherwise indicated.
The distribution by age, gender and state in our sample reflects the distribution in the overall population of medical specialists

<table>
<thead>
<tr>
<th>Age</th>
<th>Sample</th>
<th>All medical specialists</th>
</tr>
</thead>
<tbody>
<tr>
<td>65+</td>
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<td>21</td>
</tr>
<tr>
<td>55-64</td>
<td>20</td>
<td>31</td>
</tr>
<tr>
<td>45-54</td>
<td>36</td>
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<td>35-44</td>
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<td>27</td>
</tr>
<tr>
<td>&lt;35</td>
<td>32</td>
<td>21</td>
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<table>
<thead>
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<th>Gender</th>
<th>Sample</th>
<th>All medical specialists</th>
</tr>
</thead>
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<td>74</td>
<td>76</td>
</tr>
<tr>
<td>Female</td>
<td>26</td>
<td>24</td>
</tr>
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</table>

<table>
<thead>
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<th>State</th>
<th>Sample</th>
<th>All medical specialists</th>
</tr>
</thead>
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<td>NT</td>
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<td>1</td>
</tr>
<tr>
<td>ACT</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

SOURCE: AIHW Medical Labour Force Survey, 2008; eHealth readiness survey

Determining the appropriate sample size

As a methodological note, the statistic error (i.e. generalising from the survey results to the whole population of medical specialists) of a representative sample (such as this one) is +/- 4 percent at the 95 percent level of confidence. This means that if 50 percent of medical specialists in the sample agree with a particular proposition, it can be assumed with 95 percent confidence that, had the whole population of medical specialists been interviewed, between 46–54 percent would also have agreed with the proposition at the time of the survey.

When the survey results are broken down into subgroups of medical specialists (surgeons), the error of estimation will be higher for smaller sample sizes, in the order of one divided by the square root of the sample size. Below is a simple table which shows the error of estimation at a 95 percent confidence interval based on specific sample sizes:
Table 10: Error of estimation at 95 percent confidence interval

<table>
<thead>
<tr>
<th>Total population size</th>
<th>100</th>
<th>200</th>
<th>400</th>
<th>800</th>
<th>1000</th>
<th>1500</th>
<th>1500+</th>
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</thead>
<tbody>
<tr>
<td>Sample size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>25</td>
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<td>19.3</td>
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<td>19.6</td>
</tr>
<tr>
<td>50</td>
<td>9.8</td>
<td>12.0</td>
<td>13.0</td>
<td>13.4</td>
<td>13.5</td>
<td>13.6</td>
<td>13.9</td>
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<tr>
<td>75</td>
<td>5.7</td>
<td>9.0</td>
<td>10.2</td>
<td>10.8</td>
<td>10.9</td>
<td>11.0</td>
<td>11.3</td>
</tr>
<tr>
<td>100</td>
<td>0.0</td>
<td>6.9</td>
<td>8.5</td>
<td>9.2</td>
<td>9.3</td>
<td>9.5</td>
<td>9.8</td>
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<td>8.4</td>
<td></td>
<td>8.8</td>
</tr>
<tr>
<td>150</td>
<td>4.0</td>
<td>6.3</td>
<td>7.2</td>
<td>7.4</td>
<td>7.6</td>
<td></td>
<td>8.0</td>
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<tr>
<td>175</td>
<td>2.6</td>
<td>5.6</td>
<td>6.6</td>
<td>6.2</td>
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<td>4.9</td>
<td>6.0</td>
<td>6.2</td>
<td>6.5</td>
<td>6.9</td>
<td></td>
</tr>
<tr>
<td>250</td>
<td>3.8</td>
<td>5.1</td>
<td>5.4</td>
<td>5.7</td>
<td>6.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>300</td>
<td>2.8</td>
<td>4.5</td>
<td>4.7</td>
<td>5.1</td>
<td>5.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>0.0</td>
<td>3.5</td>
<td>3.8</td>
<td>4.2</td>
<td>4.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>2.7</td>
<td>3.1</td>
<td>3.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>600</td>
<td>2.0</td>
<td>2.5</td>
<td>3.1</td>
<td>4.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>700</td>
<td>1.3</td>
<td>2.0</td>
<td></td>
<td></td>
<td>3.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>800</td>
<td>0.0</td>
<td>1.6</td>
<td>2.4</td>
<td>3.5</td>
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<td></td>
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<tr>
<td>900</td>
<td>1.0</td>
<td></td>
<td>2.1</td>
<td>3.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td>0.0</td>
<td>1.8</td>
<td></td>
<td>3.1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As Table 10 above illustrates, the maximum error of estimation when comparing any two Medical Specialist segments using a sample size of 75 for each segment is 11.3 percent. **What this means is that regardless of whether a population of a given segment is 500, 5,000 or 50,000, the maximum error of estimation is 11.3 percent.**

To help illustrate the implication of this approach and to interpret the above chart, two short case examples are helpful.

**Case example 1: Single population confidence**

To determine error for a single population, we read the relevant cell in the above table for both population and sample. For example, if Profession A had a population of 400, a sample size of 75, and a score of 50 percent eHealth ready, the result would show 95 percent confidence that 39.8–60.2 percent (i.e. 50 percent +/- 10.2 percent) of the population is eHealth ready.

**Case example 2: Comparing two populations using confidence**

Assume Profession A had a population size of 400, and Profession B had a population size of 5,000. Assume also that the objective is to determine whether the mean eHealth readiness of each profession is statistically different, with 40 percent of Profession A responding they are eHealth ready and 65 percent of Profession B responding they are eHealth ready. Assume a sample size of 75 across each profession.
Using the above chart and given the assumptions described, we can see that a sample of 75 of the 400 Profession A results in an error of estimation of 10.2 percent. A sample of 75 of the 5,000 Profession B (i.e. 1500+) results in an error of estimation of 11.3 percent – the theoretical maximum error of estimation when surveying 75 professionals from a very large population. So, what we can say is that it can be assumed with 95 percent confidence that, had the whole population of:

- Profession A been interviewed, between 29.8–50.2 percent (i.e. 40 percent +/- 10.2 percent) would be eHealth ready
- Profession B been interviewed, between 53.7–76.3 percent (i.e. 65 percent +/- 11.3 percent) would be eHealth ready.

Given these two ranges do not overlap, we would conclude that there was a statistically significant difference between these two professions.

For this survey, we selected a sample size of 75 responses for each of the eight categories of medical specialists. The selection of 75 responses represents a balance between a desire to minimise the error of estimation, the likely variance between each medical specialist segment, and the financial resources available by the Department for this work. While surveying 1,000 medical specialists in each profession would have reduced the error of estimation from 11.3 percent to 3.1 percent, this would have resulted in a waste of resources given the specificity required for the hypotheses in this project and been impractical given the relative size of some of these segments and anticipated yield rates.

This constraint is meaningful. By way of illustration, there are approximately 1,037 emergency medicine specialists in Australia. Even if responses had been in the order of 200 for this group (~20 percent, which would be a high response rate), we can see from the above table the error of estimation would still have been in the order of 6.2 percent.

Therefore, although the general maxim of ‘bigger is better’ for surveys such as the one in this project is true, we feel confident that 75 medical specialists per segment provides an acceptable level of sampling error to identify outlier segments. This is particularly so given the focus of this effort is to identify directional trends (rather than a precise point estimate).

Avoiding biases

We applied several survey techniques to control for selection biases in this survey. For example, we:

- Collected 75 randomly selected respondents per category to provide a representative sample
- Allowed survey participants to respond to the survey by either completing an online form or undertaking a telephone survey (15 percent of medical specialist responses were completed via telephone)
- Ensured representativeness of the sample by replicating the demographic profile of each medical specialist segment in the sample
- Ensured surveys were 15 minutes in length (online) and approximately 20 minutes in length (telephone) to minimise imposition on respondents.
Caveat: appropriate use of data

Given the nature of the underlying hypotheses, and the desire to identify outliers, the primary research approach was calibrated to an acceptable level of residual error as described above (maximum of 11.3%, depending on the type of analysis being undertaken). The output of the research identified directional differences between clusters and specialties. The nature of this approach means that future research studies cannot be directly compared to the outcome of the primary research in this report without replicating the research methodology.

Data weighting methodology

All responses have been weighted as follows:

- Under weighted if they are over represented in sample as compared to their representation in the overall population of medical specialists
- Over-weighted if they are under represented in sample as compared to population.

The population distribution by specialty segment was estimated based on statistics from the Australian Institute of Health and Welfare (AIHW)\(^7\) and the population distribution by geographic classification was estimated based on the total pool of 19,000+ specialists that was compiled prior to launching the quantitative survey.

For example, anaesthesia in inner regional forms approximately 2 percent of the population but only 1.2 percent of the sample. As such, this segment has been over-weighted by a factor of 1.68 (2/1.2) to accurately represent its presence in the population.

The weighting scheme used for this analysis is provided in Table 11 below and the comparison between unweighted and weighted data is provided in Exhibit 28.

<table>
<thead>
<tr>
<th>Table 11: Weighting for medical specialist data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Cities</td>
</tr>
<tr>
<td>---------------</td>
</tr>
<tr>
<td>Anaesthesia</td>
</tr>
<tr>
<td>Emergency Medicine</td>
</tr>
<tr>
<td>Internal medicine</td>
</tr>
<tr>
<td>Obstetrics and Gynaecology</td>
</tr>
<tr>
<td>Ophthalmology and dermatology</td>
</tr>
<tr>
<td>Pathology</td>
</tr>
<tr>
<td>Psychiatry</td>
</tr>
<tr>
<td>Radiology</td>
</tr>
</tbody>
</table>

Surgery | 16.4% | 2.6% | 1.2% | 20%  
Total   | 83%  | 12%  | 5%   |

Exhibit 28

Topline findings for medical specialists are based on 600 respondents weighted to reflect their actual representation by specialty and geography

Sample composition by specialty

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Unweighted</th>
<th>Weighted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency</td>
<td>13</td>
<td>6</td>
</tr>
<tr>
<td>Pathology(^1)</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Obstetrics/ gynaecology</td>
<td>13</td>
<td>11</td>
</tr>
<tr>
<td>Ophthalmology/dermatology</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>Radiology(^1)</td>
<td>13</td>
<td>20</td>
</tr>
<tr>
<td>Psychiatry</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Anaesthesia</td>
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<td></td>
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<tr>
<td>Surgery</td>
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<td>27</td>
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<tr>
<td>Internal Med</td>
<td>13</td>
<td></td>
</tr>
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</table>

Sample composition by geography

<table>
<thead>
<tr>
<th>Geography</th>
<th>Unweighted</th>
<th>Weighted</th>
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<tbody>
<tr>
<td>Major cities</td>
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<td></td>
</tr>
<tr>
<td>Inner regional</td>
<td>14</td>
<td>12</td>
</tr>
<tr>
<td>Outer regional and remote</td>
<td>13</td>
<td>5</td>
</tr>
</tbody>
</table>

\(^1\) Pathology and radiology are analysed as a single segment called ‘diagnostics’

SOURCE: eHealth readiness survey

Clustering analysis

**Purpose**

We used cluster analysis to group practitioners with similar needs and attitudes. This allowed us to develop tailored interventions based on each cluster’s distinct motivations.

Through this process, we defined clusters that are:

- Reachable – i.e. we can target specific interventions to each group
- Interpretable – i.e. we can understand who they are and what matters most to each
- Distinct – i.e. different from each other on key attitudes and behaviours.
- We can easily define reachable clusters based on demographic criteria. However, by adhering to a strictly demographic approach, we lose the ability to incorporate the needs-based insights required to develop targeted interventions. In contrast, while a needs-only approach provides rich and robust insights on attitudes and behaviours, it falls short on the reachability dimension. Therefore, we applied a hybrid ‘needs-plus’ clustering approach, which combines needs-based and demographic dimensions so that we can identify targeted interventions that can be effectively delivered to the relevant practitioners (Exhibit 29).
Reachability can often be enhanced with little or no damage to needs insight by using a ‘needs-plus’ approach

- ‘Needs-plus’ means supplementing needs with demographic or behavioural variables for building clusters
- May result in a more complex solution – decision on how to balance needs insight and reachability must be weighed carefully

Reachability is important for the delivery of the value proposition, not its design

* Reachability means communications and interventions can reach segment members collectively with little waste

---

We need strong variation in at least some attributes or variables to define groups that are distinct. A ‘needs plus’ clustering approach enables us to identify much greater variation in responses, especially when compared with basic demographic measures such as age, gender and region.

**Process to develop ‘needs-plus’ clusters**

The ‘needs plus’ approach follows a two-step process, described below.

1. **Step 1:** Select variables and create clusters based on needs dimensions:
   - **Identify attitude ‘themes’** – We used a factor analysis across all eHealth attitudinal variables to identify themes across attitudes
   - Identify and retain relevant ‘themes’ – We identified a set of themes (approximately 7–8) that were the most representative of eHealth attitudinal dimensions
   - Select final list of variables – We identified one or two variables that were strongly related to each theme and that also exhibited sufficient variability in the sample
• Conduct 1st stage segmentation – We used hierarchical clustering (Ward’s method\(^8\)) to fold similar respondents into increasingly larger groups – this approach yielded an initial ‘coarse’ solution to assess.

• Select ideal cluster solution – We ran multiple iterations of the hierarchical clustering analysis and identified the cluster solution that offered the most effective target groups.

Step 2: Refine needs-based clustering by adding behavioural and profile variables to create ‘needs plus’ clusters:

• Improve needs-based cluster solution – We used k-means clustering on existing hierarchically derived clusters to improve on our solution by adding percent private as a variable to enhance reachability.

• Profile the final solution – We profiled the final solution on all variables to make a comprehensive, final assessment of its quality, relative to the segmentation objectives.

• Refine and ‘bring to life’ the profiling description – We used deep-structured interviews and stakeholder discussions and workshops to test and refine the profiles and ensure that they were both insightful and actionable (i.e. helpful to define relevant intervention strategies, meaningful and reachable).

**Research limitations**

Given the nature of the underlying hypotheses, and the desire to identify outliers, the primary research approach was calibrated to an acceptable level of residual error as described above (maximum of 11.3 percent, depending on the type of analysis being undertaken). The output of the research identified directional differences between clusters and specialties. The nature of this approach means that future research studies cannot be compared to the outcome of the primary research in this report without replicating the research methodology.

**Compliance and regulation**

The research survey and all related materials were reviewed and approved by the Australian Government Statistical Clearing House. The approval number is 02172-02.

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\(^8\) For more detail, refer to Joe H Ward’s “Hierarchical Grouping to Optimise an Objective Function”, *Journal of the American Statistical Association*, Volume 58, Issue 301 (Mar 1963), 236–244.
Appendix 3 – Sector profiles

**Anaesthesia**

**General overview**

Description of specialty

Anaesthetics is the medical specialty concerned with the pharmacological, physiological, and clinical basis of anaesthesia (intentional reduction of bodily sensation), including resuscitation, intensive respiratory care, and pain management.

Specialist anaesthetists work across the full scope of practice including anaesthesia for surgical and non-surgical procedures (including sedation and all forms of anaesthesia, topical, local, regional and general); perioperative/peri-procedural care and management; assessment and management of patients requiring analgesia, critical/intensive care, and patients in emergency and trauma situations (including resuscitation and life support). In many rural and regional hospitals, intensive care and high dependency functions like ventilating patients for retrieval are still performed by anaesthetists.

<table>
<thead>
<tr>
<th>Number</th>
<th>4673 registered specialist anaesthetists*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender mix</td>
<td>25% female, 75% male</td>
</tr>
</tbody>
</table>


**Anaesthetists and eHealth**

*Examples of relevant eHealth applications*

Some example uses of eHealth that anaesthetists benefit from include:

- Timely access to shared patient records in an electronic format is highly desired by this specialty. Patients are rarely able to give a coherent and accurate medical history prior to surgery due to anxiety and medical problems, and the surgeon’s notes are not always available when they are needed.

- Decision support tools are used particularly by younger and less experienced anaesthetists to rapidly calculate drug doses and infusion rates.

The Medicare rules for anaesthesia rebates are very complex and are subject to change. This means that the legal requirement to provide informed financial consent to privately insured patients about the possibility of out-of-pocket fees and charges can become quite difficult where anaesthetics is involved. Practice management systems are available which make these calculations a lot easier and these are widely used by the major practices.

**Current eHealth ‘Position’**

- Anaesthetists place high value on being early adopters of new computer systems: they would like to be early adopters themselves and a strong driver of eHealth adoption is the perception that they stand to gain respect and recognition for being an early adopter.

- In the qualitative interviews it was clear that anaesthetists involved in multiple short procedures, such as colonoscopies did not have time to type in electronic notes in ‘real time’ as the cases moved through the theatre too fast. Also, anaesthetists must move extraordinarily quickly and become very ‘hands-on’ in a crisis – no eHealth skills or technologies are useful in these circumstances.
• Portability of eHealth solutions is of high value to anaesthetists who frequently practice in multiple locations – there has been high penetration of portable smartphone and tablet technologies and the associated ‘apps’ into this group which they predominantly use for drug and infusion calculations, as well as other medical reference tools.

**Key insights from eHealth readiness survey**

• Anaesthetists are very interested in eHealth, although their current use is often limited by the solutions available in the hospitals where they practice. They are especially interested in sharing health records with other practitioners (75 percent do not use computers but would like to), showing patients health-related information during a consultation (63 percent) and sharing health records with patients (63 percent). Although patient relationships are not always top-of-mind because their patients are not conscious during operations, anaesthetists appreciate the ability to use computers to share information with patients during a pre-operative consultation.

• Anaesthetists have the lowest level of interest in telehealth (19 percent stated definitely will not use within the next three years, versus 9 percent of all specialists). Although anaesthetists perceive relatively few relevant applications for telehealth due to the hands-on nature of their specialty, interviewees expressed interest in remote monitoring and supervision as well as videoconferencing for training and educational purposes. Of those interested in telehealth, 67 percent stated that they would be very interested in using it for training. As an example, one interviewee mentioned that a remote connection with her supervisor would help her obtain his advice more quickly in emergency situations and also save him from making additional trips back to the hospital if she had questions about a patient. Another interviewee’s practice recently constructed a large videoconference facility for participation in seminars and conferences with other anaesthetists, although they had not yet used it due to the limited number of other practices that had videoconferencing ability.

• Relative to other specialists, anaesthetists share similar perspectives towards computers with one exception: they are less likely to agree that computers help reduce the risk of error in their sector. A possible reason for this response, as provided by interviewees, is that computer use during an operation is risky because it distracts the anaesthetist from paying full attention to his or her patient.

• Despite fairly strong interest, anaesthetists generally perceive fewer benefits from eHealth as compared with specialists in general. They are especially less likely to agree on improved quality of care, increased efficiency, increased access to care, and broadened scope of services. Some of the anaesthetists surveyed were fairly neutral in their opinions towards eHealth because they did not perceive many tangible benefits for their specialty, although they were consistently interested in access to shared health records if a history of prior procedures was included.

• Barriers to adoption are relatively weak for most anaesthetists. The two strongest barriers were concerns about malfunction or downtime (33 percent strongly agree) and compatibility with existing IT systems (31 percent strongly agree). This is consistent with their concerns about risks due to technological failure and the need to maintain internal connectivity with other systems in the hospital setting.

• Anaesthetists were somewhat more likely than their peers to agree that respect and recognition would influence them to increase their adoption of eHealth (11% strongly agree, 38 percent
somewhat agree), but professional bodies (15 percent strongly agree, 64 percent somewhat agree) and financial incentives (14 percent strongly agree, 37 percent somewhat agree) still emerged as the two leading drivers for adoption.

**Characteristics and practice attributes**

*Distribution by Age and State*

There is a significant mal-distribution of full-time equivalent (FTE) anaesthetists between urban and rural areas. For anaesthesia services, sustainable practice is linked to the practice of surgeons, obstetricians, and other proceduralists. At present, anaesthetists provide services to the population in remote areas on a visiting team basis.

Analysis commissioned by the Australian and New Zealand College of Anaesthetists (ANZCA9) suggests a widening gap between demand and supply in the future, rising from a very small shortage of four FTE anaesthetists in 2008 to a shortfall of 2287 practitioners in 2028. Nearly half of the expected increase in demand can be attributed to demographic change, including ageing of the population. The balance can be largely attributed to rising incomes in the population at large and raised community expectations. In relation to anaesthesia, the increase in number of endoscopic procedures, invasive cardiovascular procedures and imaging procedures has increased the demand for both anaesthesia and sedation.

*General workforce trends*

A high-level practice profile of survey respondents suggests that:

- Anaesthesia is a low-volume specialty relative to the other medical specialist segments. 22 percent see fewer than 6 patients per day (versus 9 percent across all medical specialists) and 75 percent see 6-15 patients per day (versus 53 percent across all medical specialists)

- Anaesthetists tend to practice in multiple locations. Thirty eight percent of respondents practice in three to four locations, versus 23 percent of all medical specialists. Generally anaesthetists work in private consulting rooms with a number of other anaesthetists, and attend patients in multiple hospitals/day surgery centres

- Anaesthetists are less likely to practice in rural or remote areas. Just 20 percent of respondents surveyed travel to rural or remote areas on at least an occasional basis, versus 31 percent of all medical specialists. Consistent with a ‘visiting teams’ model, over half of the respondents who perform regional or remote work do so monthly or less

- More than half of respondents receive less than half of their income from the private sector, but 35 percent receive more than three quarters of their income from private practice. This mirrors the fact that more and more elective procedures are being performed in the private sector.

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**Overview of respondent practice attributes for anaesthesia**

**Percent of respondents**

<table>
<thead>
<tr>
<th>Daily patient volume</th>
<th>Number of practice locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-25</td>
<td>Four or more</td>
</tr>
<tr>
<td>25+</td>
<td>38</td>
</tr>
<tr>
<td>&lt; 6</td>
<td>One</td>
</tr>
<tr>
<td>6-15</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Three</td>
</tr>
<tr>
<td></td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Two</td>
</tr>
</tbody>
</table>

**Frequency of rural or remote service**

- Daily: 80
- Weekly or fortnightly: 11
- Monthly: 1
- Once a month or less: 11

**Percentage of income from private sector**

| 75+             | 35                          |
| 50-74           | 12                          |
| 25-49           | 16                          |
| <25             | 37                          |

**Source:** eHealth readiness survey

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**Education, registration and accreditation**

The Australian and New Zealand College of Anaesthetists (ANZCA) trains and accredits doctors throughout Australia and New Zealand to be anaesthetists, through initial qualification, registration and continuing professional development.

The Australian and New Zealand College of Anaesthetists
630 St Kilda Road, Melbourne VIC 3004
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F: +61 3 9510 6786
http://www.anzca.edu.au

The specialist qualification for Australia and New Zealand is Fellowship of the Australian and New Zealand College of Anaesthetists (FANZCA). Anaesthetists spend at least five years in specialist anaesthesia training after a minimum of two years of pre-vocational experience after graduating from medical school. This comprises 33 months of clinical anaesthesia, three months of intensive care medicine and 24 months of other disciplines.

**Sources of financial reimbursement/role in the healthcare ecosystem**

As a rule, anaesthetists in private practice tend to be in large group practices, which share infrastructure and an ‘on-call’ roster. Anaesthetists do not practice independently, as their services are performed in conjunction with a procedural team, and the Medicare eligibility for anaesthesia services is determined by the link to a procedure and the specialist who undertakes it.
Under the Medicare Benefits Schedule (MBS) anaesthesia rebates are determined by the Relative Value Guide (RVG) for Anaesthesia. The RVG structure is based on a unit system, which reflects the difficulty of the service, and the time the service took. Under the RVG structure, the Medicare Benefits Schedule (MBS) fee for an anaesthetic service in connection with a procedure comprises up to four unit components, represented by one or more MBS items:

- A basic unit value representing the degree of difficulty of the procedure (Initiation of Management of Anaesthesia)
- A time unit value based on the total time of the anaesthetic
- Modifying unit/s recognising certain added complexities
- Associated Therapeutic and Diagnostic Services. 10

In addition, an attendance item rebate is payable for a consultation prior to the procedure being performed so that the anaesthetist can take the patient’s medical history and undertake a physical examination if necessary to determine fitness for anaesthesia.

**Diagnostics (pathology and radiology)**

Although pathology and radiology are grouped for the purposes of this project, at the request of the Department these have been separated into two categories for this section only. Separate discussions for pathologists and diagnostics follow the combined analysis below.

**Key insights from eHealth readiness survey – diagnostics**

The data and analysis in the following section combines pathologists and radiologists as diagnosticians unless otherwise indicated.

- Given the large volume of information that diagnosticians are expected to share regularly with other practitioners, these specialists face strong incentives to computerise. As a result, diagnosticians are strong eHealth users and are especially likely to use computers to record and exchange health information. For example:
  - Over 90 percent use computers for storing records, and among these, 80 percent store patient health records in a computer-readable format
  - 57 percent use computers to view or record information during consultations (versus 38 percent of all medical specialists)
  - 50 percent use computers to enter patient notes after a consultation (versus 30 percent of all medical specialists)
  - 49 percent share health records with other practitioners (versus 24 percent of all medical specialists)
  - 46 percent use computers to record event summaries (versus 33 percent of all medical specialists)

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10 Medicare Australia Website PDF Relative Value Guide for Anaesthesia 2011.
Of all specialties, diagnosticians are the most likely to be using telehealth (24 percent currently use, versus 9 percent of all medical specialists). The most common uses for telehealth include holding consultations with other practitioners (14 percent of all diagnosticians) and training (11 percent). This is consistent with work practices, as diagnostic specialists frequently consult with practitioners in external locations to discuss test results.

Similarly, of those interested in telehealth, 69 percent are interested in using it for training and 63 percent are interested in consultations with other practitioners. Just 33 percent are interested in using telehealth for consultations with patients.

Diagnosticians work in environments where computer use is prevalent. They are significantly more likely to agree that they are expected to use computers in their sector (96 percent strongly agree) and that most practitioners in their professional network use computers (91 percent strongly agree). They are also more likely to agree that the use of computers reduces errors in their sector (57 percent strongly agree) and express interest in computerised access to a shared patient summary (69% strongly agree).

In addition to environmental influences, diagnosticians are relatively self-motivated to adopt and use new technology: 41 percent strongly agree that they like to be early adopters of new computer systems for their practices (versus 28 percent of all medical specialists).

As expected, given their existing levels of eHealth use, diagnosticians are overwhelmingly positive towards eHealth benefits as compared with medical specialists in general. They have found ways to use eHealth to improve both the efficiency and the quality of care delivery in their speciality. Relative to other specialists, they are especially likely to agree that eHealth will:

- Improve quality of care (61 percent versus 33 percent overall)
- Improve continuity of care (60 percent versus 42 percent overall)
- Improve their practice’s efficiency (56 percent versus 38 percent overall)
- Improve their care delivery process (53 percent versus 30 percent overall)

As avid computer users who frequently exchange information electronically, diagnosticians are especially concerned about maintaining compatibility with existing systems, which was cited as the most significant barrier to adoption (45 percent strongly agree), and with systems used externally (29 percent of diagnosticians strongly agree). Although less concerned about system reliability than medical specialists overall, 21 percent of diagnosticians strongly agreed that concerns about system malfunctions and downtime was a barrier.

As compared with medical specialists in general, diagnosticians are especially likely to be influenced by professional bodies (29 percent strongly agree) and by other practitioners (23 percent strongly agree).

Exhibit 31 depicts practice attributes for both pathologists and radiologists combined. Relative to radiologists, the pathologist respondents:

- Have lower patient volumes. They are more likely to see 5 or fewer patients per day.
- Practise at a fewer locations. They are much more likely to practise at just one location.
- Practise **almost exclusively in the public sector**. Nearly all respondents reported that 75 percent or more of their income derived from the public sector. In comparison, some radiologist respondents reported that 50 percent or more of their income was sourced from the private sector.

**Exhibit 31**

**Overview of respondent practice attributes for diagnostics**

<table>
<thead>
<tr>
<th>Daily patient volume</th>
<th>Number of practice locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>25+</td>
<td>Four or more</td>
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<tr>
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<tr>
<td>&lt; 6</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency of rural or remote service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
</tr>
<tr>
<td>Weekly or fortnightly</td>
</tr>
<tr>
<td>Monthly</td>
</tr>
<tr>
<td>Once a month or less</td>
</tr>
<tr>
<td>Never</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percentage of income from private sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-74</td>
</tr>
<tr>
<td>25-49</td>
</tr>
<tr>
<td>75+</td>
</tr>
<tr>
<td>&lt; 25</td>
</tr>
</tbody>
</table>

SOURCE: eHealth readiness survey

**Diagnostics – pathology**

**General overview**

Description of specialty: Pathologists study the nature and causes of human diseases. Pathology underpins every aspect of medicine, from monitoring of chronic diseases, to genetic research, to the diagnosis of every detected cancer in the world.

Sub-specialties include: Anatomical Pathology, Chemical Pathology, Genetic Pathology, Forensic Pathology, Haematology, Immunopathology and Microbiology.

Number: There are just under 1000 pathologists registered to practice in Australia.*

Gender mix: 36% female, 64% male.

Pathologists and eHealth

Examples of relevant eHealth applications

- Some example uses of eHealth that pathologists could benefit from include:
  - If a new eHealth imaging or ePathology system works properly, it could greatly reduce the unnecessary duplication of imaging and pathology tests which are costly, potentially unsafe, and are an inefficient use of time.
  - The introduction of the health identifiers into pathology systems has the potential to greatly reduce errors incurred during the processing of samples and reduce unnecessary duplication of tests.
  - Pathologists also mentioned that computerised decision support for test ordering helps ensure that practitioners are ordering the most appropriate tests for their patients.

Current eHealth ‘position’

Pathology is a highly technically competent and ‘eHealth’ ready specialty due to the automated nature of pathology work. The recently signed Pathology Funding agreement for 2011 has a number of references to eHealth initiatives to be implemented.

There are laboratory information systems marketed specifically to pathology laboratories in Australia, there is however a desire to improve these in consultation with the vendors as none are completely adequate for their purposes.

Seventy percent of pathology reports are currently delivered electronically using secure messaging, although some laboratories do not have the capacity to do this even now. It is mostly the public laboratories that are lagging behind – fixing this issue has not been a priority for some State and Territory Governments, although Queensland seems to be the leader.

There is considerable variation among medical specialties as to which groups are able to receive pathology reports securely electronically. The best are GPs because their standard practice software like Medical Director enables this.

The laboratory information systems are funded by the pathology businesses and not by the Government, so the college does have some concerns about future costs. It is not just the acquisition of appropriate software, but the training, maintenance and implementation that will be very expensive for the laboratories to maintain.

The college has a position that the PCEHR must not be selective in any way and must include all previous pathology records. To do otherwise is potentially dangerous and will lead to unnecessary duplication of tests. Despite this advice, however, a selective record has been recommended, which they do not support. They believe that access to the record should be controlled to protect privacy, not the content of the record. They do not believe that the potential size of a complete record will be a real issue as large amounts of storage are now available even on memory sticks, and up-to-date search functions are very sophisticated, enabling quick retrieval of relevant information from a document. They claim about 70 percent of the EHR would be pathology results.
The college is also deeply opposed to a system where the patients would have access to the pathology results before the referring doctor as this would lead to a lot of misinterpretation and unnecessary distress, particularly where cancer marker levels, e.g. PSA and CA125 are being measured.

The college is currently undertaking a joint project with NeHTA on the structured reporting of cancer into registries using the transfer of atomic data and not just blocks of text. Due to a lack of capability at the registry level, host registries and host laboratories have been hard to find and the pilot has yet to start. Most cancer registries are currently paper-based and very unsophisticated in the level of detail they collect.

In terms of where the laboratories are up to now and future readiness, the introduction of the unique health identifiers is seen as a huge step forward, which will greatly reduce error rates in the reporting of tissue specimens. Ideally they would like to introduce a system using secure messaging where they can flag when important results sent out are not ‘read’ and implement a protocol to try and contact the referring doctor. They are also keen to implement audit and training mechanisms using eHealth.

**Key insights from eHealth readiness survey – differences for pathologists**

Survey results that differed significantly between pathologists and radiologists are highlighted below. (The margin of error when results are viewed for just radiologists or just pathologists increases to +/- 17 percent at the 95 percent level of confidence.)

- A number of eHealth application are not relevant for pathologists, namely transferring prescriptions (approximately 70 percent responded that they don’t use or need computers for prescribing), ordering diagnostic imaging (~40 percent don’t need), patient booking and scheduling (~40 percent don’t need), and patient consultation-related activities

- Similarly, of those interested in telehealth, just 33 percent are interested in using telehealth for consultations with patients, which was driven by stronger interest from radiologists than from pathologists

- Relative to radiologists, pathologists are especially likely to agree that eHealth will improve their ability to collaborate with other providers. Patient relationships are less relevant for pathologists, given the nature of their work

- Access to IT support was a much stronger barrier for pathologists than for radiologists.

**Characteristics and practice attributes**

**General workforce trends**

Pathologists generally work in approved pathology laboratories which can be funded by the public sector attached to public hospitals, the corporate sector or as small/medium enterprises owned by pathologists. In contrast to diagnostic imaging, pathology is a smaller workforce, which is ageing, and significant workforce shortages in some of the sub-specialties are emerging.

**Education, registration and accreditation**

The Royal Australasian College of Pathologists (RACPA) is the organisation responsible for training pathologists and maintaining standards in Australia.
The Royal Australasian College of Pathologists accepts applications from registered medical practitioners with a minimum of one year’s postgraduate experience, who wish to become specialist pathologists. The trainee must be employed in a training position in a laboratory accredited by the college prior to application.

Pathology training takes a minimum of five years, including examinations. Training can be undertaken in General or Clinical Pathology or in one of the following single disciplines: Anatomical Pathology, Chemical Pathology, Genetic Pathology, Forensic Pathology, Haematology, Immunopathology or Microbiology.

Sources of financial reimbursement/role in the healthcare ecosystem

Diagnostic services provided to patients out-of-hospital and private hospital in-patients in Australia are remunerated on a fee-for-service basis under Medicare as outlined in the Medicare Benefits Schedule (MBS). Pathology outlays are managed through an agreement with the peak bodies, the Pathology Funding Agreement.

The Medicare rebate is paid at 85 percent of the scheduled fee for out-of-hospital services and 75 per cent for in-hospital services. About 86 percent of services are bulk-billed for pathology. In most cases, a request from a medical practitioner is required. The only exception is for a very small number of specified tests which can be requested by Nurse Practitioners and Midwives. There is also a small group of pathology tests which a medical practitioner can perform themselves, which do not require a request.

### Diagnostics - radiology

#### General overview

**Description of specialty**  
A radiologist is a medical specialist who has had specific postgraduate training in performing and interpreting diagnostic imaging tests and interventional procedures or treatments that involve the use of X-ray, ultrasound, and magnetic resonance imaging equipment. Radiologists are trained to assist other doctors and specialists to treat their patients by making a diagnosis and providing treatment using medical imaging.

Radiologists can choose to work in various sub-specialties of radiology such as breast imaging, interventional radiology, musculoskeletal imaging, cardiac imaging, or paediatric (children’s) imaging.

**Number**  
There are approximately 1500 diagnostic radiologists and a further ~260 radiation oncologists registered to practice in Australia.*

**Gender mix**  
22% female, 78% male.

Radiologists communicate the results of diagnostic and interventional imaging through a written report sent to the referring doctor. Radiologists work as part of a clinical team so that they can participate actively in decision making about imaging tests.

There are three types of radiology – diagnostic, interventional and therapeutic (called radiation oncology):

**Diagnostic:**
- Diagnostic imaging uses plain X-ray radiology, computerised tomography (CT), magnetic resonance imaging (MRI), ultrasound and nuclear medicine imaging techniques to obtain images that are interpreted to aid in the diagnosis of disease.

**Interventional**
- Interventional radiologists treat as well as diagnose disease using imaging equipment. Interventional radiologists may sub-specialise further so that they only treat abnormalities of the brain or spinal cord (neurointervention), or of the blood vessels elsewhere in the body (angiointervention). Interventional radiology is a minimally invasive procedure using X-ray, magnetic or ultrasound images to guide the procedures, usually done with tiny instruments and thin plastic tubes called catheters inserted through an artery or vein.

**Radiation oncology**
- Radiation oncology uses radiation to treat diseases such as cancer, using radiation therapy. These specialists are not called radiologists, but radiation oncologists, even though they belong to The Royal Australian and New Zealand College of Radiologists.

**Radiologists and eHealth**

*Examples of relevant eHealth applications*
- Some example uses of eHealth that radiologists could benefit from include:
  - Electronic reporting of results and online access to images is a highly efficient and convenient service for practitioners, especially among those consulting with patients in remote areas.
  - Electronic ordering is not yet widely used, but is anticipated to improve accuracy and efficiency.

**Current eHealth ‘position’**
Radiologists are among the most advanced specialist groups in terms of eHealth. The RANZCR believes that radiologists are more technically advanced and more eHealth ready than the other specialties by a factor of 50–80 percent, as all their workflows are currently digitalised.

Their main challenges are as follows:
- Lack of readiness of referring doctors
- Lack of appropriate infrastructure to send and store large files in appropriate formats
- Ensuring that standards for viewing digital images are consistent and adhered to.
The College has developed its own solutions to the issues raised above, however there is a need for national leadership for things to progress any further. The lack of connectivity is a major issue even within hospitals, as many operating theatres and outpatient areas do not have the proper equipment to view digital images. There is also disagreement between radiologists and other specialists who use imaging about what the standards for viewing digital images should be.

Ultimately there will be a transition period in moving to a purely digital world, as no-one is able to scan all the old images in existence on to a digital record. The type of medical record they want to see will contain images and the radiologists’ reports, a central data repository with centralised but controlled access, in an environment where the privacy issues have been dealt with. The PCEHR currently does not address these issues as it may contain images at the moment, but not the referrals. They think that appropriate incorporation of the diagnostic imaging is infeasible in the time allocated to implement the project – the infrastructure to support this does not exist.

They also have issues with the potential ownership of images. At the moment patients are sometimes given a memory stick and a CD, and sometimes the images are sent to the referring doctor. This raises the question of who is responsible for them in the long term, as a lot of data is currently lost and scans are duplicated unnecessarily, which irradiates the patient and could potentially be harmful.

The equipment on which images are viewed is not consistent. This has been raised as a concern by the medical indemnity providers as a source of errors resulting in medicolegal claims. Sometimes when a CD is put into a public hospital computer it cannot be opened without administrator rights. Some hospitals also do not accept CDs as legitimate patient records when they come with a transferred patient, as they do not contain a doctor’s signature – this should be improved with the introduction of the patient health identifiers.

The College (RANZCR) is also considering the appropriateness of the Medicare rebates for diagnostic imaging, as currently a rebate is not payable until a report is provided, the provision of images alone is insufficient – this may need to be reviewed in the light of the eHealth changes.

**Key insights from eHealth readiness survey – differences for radiologists**

The eHealth readiness discussion in the preceding section included radiologists as part of the ‘diagnostics’ segment. Results that differed significantly between radiologists and pathologists have been highlighted below. The primary differences between these two groups are in the ways that they use computers and eHealth solutions, rather than their perceptions of eHealth benefits, barriers, and adoption drivers. (The margin of error when results are viewed for just radiologists increases to +/- 17 percent at the 95 percent level of confidence.)

- Radiologists are more likely to use computers to share health records with patients, for patient booking and scheduling, for billing and patient rebates, to show patients health-related notes during a consultation, to view and/or record information during consultations, and to enter patient notes after a consultation
- Radiologists are also more likely to rely on computerised records (~45 percent of respondents store patient histories and records entirely on computers)
• Radiologists expressed stronger interest in using computers to transfer prescriptions to the pharmacy and to complete event summaries or specialist reports

• Of those planning to use telehealth within the next three years, radiologists were more interested than pathologists in holding remote consultations with patients. Interest in other telehealth applications was relatively similar between the two groups of specialists

• Radiologists were less likely to agree that eHealth will improve their ability to collaborate with other providers, and also less likely to agree that access to IT support is a barrier.

**Characteristics and practice attributes**

**General workforce trends**

Most radiologists work in a public or private hospital or private radiology practices. Independent practice is rarely possible because of the capital costs of the equipment required. The advent of digital imaging has meant that radiologists are able to report on films from locations that are a great distance from the practice – sometimes even overseas. Diagnostic radiology is a relatively popular specialty due to regular working hours and a reliable income, and workforce issues in rural and remote Australia can usually be addressed by radiologists operating from a distance as previously described.

**Education, registration and accreditation**

The Royal Australian and New Zealand College of Radiologists (RANZCR) is the organisation responsible for training radiologists and radiation oncologists and maintaining imaging standards in Australia.

The Royal Australian and New Zealand College of Radiologists

Level 9, 51 Druitt Street, Sydney NSW 2000

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F: 61 2 9268 9799

www.ranzcr.edu.au

To enter training in diagnostic radiology or radiation oncology, the trainee must have successfully completed a medical degree and the one year internship program.

The current Radiodiagnosis curriculum, introduced from 1 December 2009, is a five-year program conducted in two phases:

• Phase 1 – three years of general radiology training

• Phase 2 – two years of systems-focused (as distinguished from sub-specialty) rotations for advanced radiology training.

The current Radiation Oncology Training Program, introduced from 1 December 2008, is a five-year program conducted in two phases:

• Phase 1 of between 18–24 months duration

• Phase 2 of approximately 36–42 months duration (depending on the trainee's progress through Phase 1).
There are examinations at the end of both phases of training.

Sources of financial reimbursement/role in the healthcare ecosystem

Diagnostic services provided to patients out-of-hospital and private hospital in-patients in Australia are remunerated on a fee-for-service basis under Medicare as outlined in the Medicare Benefits Schedule (MBS).

The Medicare rebate is paid at 85 percent of the scheduled fee for out-of-hospital services and 75 percent for in-hospital services. About 73 percent of services are bulk-billed for imaging. In the case of diagnostic imaging, a referral is not required for all services, as specialists can self-determine in their area of specialty. A wide range of allied health professionals can also refer for specified imaging services.

Emergency medicine and Intensive Care medicine

General overview – Emergency medicine

| Description of specialty | Emergency medicine is a field of practice based on the knowledge and skills required for the prevention, diagnosis and management of acute and urgent aspects of illness and injury affecting patients of all age groups with a full spectrum of episodic undifferentiated physical and behavioural disorders; it further encompasses an understanding of the development of pre-hospital and in-hospital emergency medical systems and the skills necessary for this development.* |
| Number | There are just under 1000 emergency medicine specialists licensed to practise in Australia.** |
| Gender mix | 25% female, 75% male. |


General overview – Intensive care medicine

| Description of specialty | Intensive care medicine concerns the provision of the continuous and closely monitored healthcare that is provided to critically ill patients. Sub-specialties include: Toxicology, Disaster Medicine, Hyperbaric Medicine, Ultrasound, Paediatrics, Retrieval Medicine, and International relief/disaster. |
| Number | There are 429 intensive care medicine specialists. |
| Gender mix | 25% female, 75% male. |

Emergency and intensive care medicine specialists and eHealth

Examples of relevant eHealth applications

Some example uses of eHealth that emergency and intensive care medicine specialists currently and could possibly benefit from include:

- Unlike some other specialities, there is heavy use of decision-support tools in Emergency and ICU medicine, due to the sheer range of acute conditions encountered in this type of practice
- Support for a shared EHR is likely to be very high in this group due to the nature of their work
- ePrescribing programs and clinical algorithms are frequently used
- There are some applications for telehealth that can reduce the potential for unnecessary transfer to hospital.
Current eHealth ‘position’

The biggest issue for this specialist group is the past medical history and some kind of reliable shared record, which documents medications, allergies, and diagnostic tests, as most sick patients presenting to hospitals have a minimum of information with them and cannot give a reliable history. If the hospital has no accessible record then the doctors have nothing to go on, this is when errors are made and tests get duplicated, which occurs far too often. Lack of connectivity and hospital inconsistency in their level of sophistication in record-keeping – some are electronic, some are paper, with many stages in between – is a very big problem in this area.

Emergency medicine specialists are generally very technologically competent in their personal use of IT; however this does not always translate into professional competence to use eHealth tools. This is due to a lack of undergraduate training in IT, and they are time poor in the workplace once they graduate. Although they work set shifts, once they are at work they are very busy and often do not have time to sit down – any new system must have a user interface that is extremely simple and quick to use.

The Australian College of Emergency Medicine (ACEM) is using eLearning to address some of the gaps with eHealth readiness for trainees and fellows. Most of this activity has been funded through a variety of government grants. The elearning options are seen to be important for rural trainees due to the perception that city doctors do better in their exams as a result of better supervision. An e-portfolio is being introduced for trainees to encourage reflective learning and a proactive approach to quality and dealing with errors. Fellows are also offered training in this area.

Some hospitals are using telehealth technologies, mainly in rural areas to limit unnecessary admissions of more remote patients. These can be as simple as photos sent online, or Skype, depending on the hospital and the enthusiasm of individual specialists.

The ACEM also provides very specific visual resources online for international medical graduates seeking specialist recognition as many of these are working in rural hospitals. These are provided in a way that enables them to improve their skills in a ‘no-risk no-fail’ environment. This is also a government-funded program.

Intensive care medicine fellows are very technologically savvy and are pushing the College of Intensive Care Medicine (CICM) towards greater engagement with online tools and eHealth. The College has a Facebook page and social networking approaches to educational activities such as online chats on a particular topic. iPhone apps are also used very widely for educational and work processes. The CICM is looking to provide more education and other facilities like forms and exams online to meet demand from trainees. Digital images are currently used in the exams as this is how hospital residents are now trained to view them. They are soon to start a digital journal library as they no longer have access to the one at the ANZCA.
There are two major issues facing ICU specialists that eHealth can address:

- Provision of assistance to rural and regional Australia in terms of advice, trainee supervision and retrievals. Many smaller hospitals have the ability to ventilate patients but the doctor present is either an international medical graduate or an anaesthetist who is not a fellow of the college due to workforce shortages in the regions. The international medical graduates are mostly from India – there are some very good hospitals in India providing ICU training, however language can be a major barrier. Skype is used a lot when communicating with rural hospitals to provide support, however the College has needed to set minimum standards for how such a consultation should occur to avoid errors. A high quality medical record providing timely access to relevant information is very important in these circumstances. Queensland Health has been the leader when it comes to addressing some of the issues faced by rural hospital practitioners.

- Communication is a key skill, particularly when talking to families about end-of-life decisions. Both colleges provide training in this area. Good access to medical records across hospitals is critical to record advance directives and decisions about resuscitation that may have been made. Skype can also be used in this scenario. Providing education online is important in this area too.

Unfortunately there is enormous variation in the hospital system in terms of what IT facilities are available, ranging from completely paperless facilities, to those with nothing, with ICU specialists needing to bring in their own equipment from home.

**Key insights from eHealth readiness survey**

- Emergency medicine practitioners are above-average eHealth users and are especially likely to use computers to view pathology results (92 percent) and view diagnostic imaging results (91 percent). Their hospital-based location often provides them with easy access to both of these time-saving applications.

- Emergency medicine practitioners are much more likely to use telehealth (18% currently use, versus 9% of all medical specialists). Of those interested in telehealth, the most appealing uses include training (74 percent of those who definitely or probably will use telehealth within the next three years) and consultations with practitioners (67 percent).

- A sizable number of emergency medicine practitioners are already using computers to order tests (41 percent for pathology tests and 36 percent for diagnostic imaging) and interest is strong among those who don’t yet have this capability (55 percent would like to order pathology tests online and 58 percent would like to order diagnostic imaging).

- Similar to the diagnosticians, emergency medicine practitioners are very technologically savvy. Of all specialists, they are the most interested in maintaining up-to-date computer systems (55 percent strongly agree that this is important to them), and 43 percent strongly agree that they like to be early adopters of new computer systems.

- Although just 26 percent currently share health records electronically with other practitioners, 72 percent would be interested in doing so in the future.

- Of all specialists, emergency medicine practitioners are the most interested in accessing shared patient health summaries (84 percent strongly agree versus 51 percent of all specialists). Access
to basic health information is especially critical in this specialty because patients are not always able to communicate the information themselves, and GPs can be very difficult to reach during non-business hours.

- Emergency medicine practitioners are also especially likely to agree that they are expected to use computers in their specialty (81 percent strongly agree) and that most practitioners in their network use computers (79 percent strongly agree).

- Similarly to the diagnosticians, emergency medicine practitioners are very technologically savvy. Of all specialists, they are the most interested in maintaining up-to-date computer systems (55 percent strongly agree that this is important to them), and 43 percent strongly agree that they like to be early adopters of new computer systems.

- Emergency medicine practitioners perceive many benefits from eHealth, especially in improving the quality and provision of care. The leading benefits include:
  - Improved collaboration (60 percent strongly agree)
  - Improved continuity of care (56 percent strongly agree)
  - Increased patient safety (46 percent strongly agree)

- The leading barrier for emergency medicine practitioners is external connectivity (40 percent strongly agree), which prevents them from accessing and sharing information electronically outside of their immediate hospital environments. Internal connectivity is also a strong barrier (37 percent strongly agree), as is the concern about malfunctions or downtime (38 percent strongly agree). Access to IT support is also more of a barrier for emergency medicine practitioners as compared with other specialties (28 percent strongly agree versus 17 percent for medical specialists in general).

- As compared with other medical specialists, emergency medicine practitioners are somewhat more likely to be influenced by professional bodies (27 percent strongly agree) and other practitioners in their network (20 percent strongly agree). These specialists tend to work closely with other practitioners on a regular basis due to their hospital environments, which helps explain the relevance of peers in influencing their decisions.

**Characteristics and practice attributes**

**General workforce trends**

There is a workforce shortage of fully qualified emergency medicine specialists due to increasing demand, although this is predominantly in rural and regional Australia. International medical graduates who do not speak English as a first language often fill these posts. Most are from India, Pakistan or South East Asia, working under Area of Need provisions. At one stage it was thought that there could possibly be an oversupply of intensive care medicine specialists, however this has not proven to be the case. The College of Intensive Care Medicine (CICM) theorises that this is related to the increasing complexity of cases being undertaken in private hospitals and the need for high dependency services in the private sector as a consequence.

A high-level practice profile of survey respondents suggests:
• Most specialists in the emergency and ICU category work in one hospital, occasionally two or more if they choose a part-time private appointment for some shifts per week.

• As these are both specialties where the training and the majority of the work occurs in the public sector, this is where most of these practitioners are located. The introduction of private sector emergency departments and high dependency units has been relatively recent, and it is only in a select few private hospitals that very sick and complex patients are seen in these settings.

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**Exhibit 32**

**Overview of respondent practice attributes for emergency medicine**

<table>
<thead>
<tr>
<th>Daily patient volume</th>
<th>Number of practice locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>25+</td>
<td>Four or more</td>
</tr>
<tr>
<td>16-25</td>
<td>Three</td>
</tr>
<tr>
<td>&lt; 6</td>
<td>Two</td>
</tr>
<tr>
<td>6-15</td>
<td>One</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency of rural or remote service</th>
<th>Percentage of income from private sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>75+</td>
</tr>
<tr>
<td>Weekly or fortnightly</td>
<td>50-74</td>
</tr>
<tr>
<td>Monthly</td>
<td>25-49</td>
</tr>
<tr>
<td>Never</td>
<td>25-49</td>
</tr>
</tbody>
</table>

**SOURCE:** eHealth readiness survey

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**Education, registration and accreditation**

The Australasian College of Emergency Medicine (ACEM) is the organisation responsible for training emergency medicine specialists and maintaining standards in Australia.

The ACEM is relatively new, with emergency medicine being formally recognised as a speciality in Australia in 1993.

The Australasian College of Emergency Medicine  
34 Jeffcott Street, West Melbourne VIC 3003  
T: +61 3 9320 0444  
F: +61 3 9320 0400  
www.acem.org.au
The Australasian College of Intensive Care Medicine (CICM) is the organisation responsible for training intensive care medicine specialists and maintaining standards in Australia.

The CICM was established in 2008 and formally took over the responsibility for training and certification of intensive care specialists from ANZCA. ICM specialists trained prior to 2008 have a joint fellowship either through ANZCA or RACP.

College of Intensive Care Medicine of Australia and New Zealand
Suite 101, 168 Greville Street, Prahan VIC 3181
T: +61 3 9514 2888
F: +61 3 9533 2657
www.cicm.org.au

Training in emergency medicine generally commences in the third postgraduate year, and occurs in a college-accredited emergency department. A fellowship examination must be successfully completed. By way of summary:

- Dual training programs for combined fellowships in ICU or paediatrics are available, and have minimised the amount of required time and number of exams.
- The training requirements of the College of Intensive Care Medicine training program in General Intensive Care includes 12 months General Hospital Experience post graduation plus 36 months of basic training and 36 months of advanced training.
- A six year training program comprising three years of basic training and three years of advanced training, which must include:
  - Thirty six months of intensive care training. Twelve months may be undertaken in Basic Training in units approved for training. Twenty four months of core intensive care training must be undertaken in Advanced Training in an intensive care unit approved for core training. One core year of intensive care training must be continuous.
  - The second core year of intensive care training may be spent discontinuously in two periods of six months each. At least 12 months must be undertaken in a unit or units accredited as C24, and only one rotation to a unit classified as C6 is permitted without prior approval of the Censor. In-Training Assessments for this period of training are required. At least six months of intensive care training must be undertaken as a Senior Registrar. A maximum of 24 months of intensive care training, whether basic or core, can be completed in the same unit.11

Sources of financial reimbursement/role in the healthcare ecosystem
Most emergency medicine fellows and trainees are employed in the public sector as this is where the accredited training positions are – only six private hospitals around Australia have EDs accredited for training purposes, compared with 130 in the public sector. These are for the most part salaried employees. There is however considerable growth in the provision of private

11 Australian College of Intensive Care Medicine website 2011.
emergency department services, for which fee-for-service is charged and rebates are available from the private health funds or Medicare.

ICU Medicine specialists work as salaried employees in public hospitals, and now increasingly in high-dependency units in the private hospital sector.

**Internal medicine – physicians and paediatricians**

**General overview**

<table>
<thead>
<tr>
<th>Description of specialty</th>
<th>General overview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal medicine specialists or physicians work in the branch of medicine that concerns the detailed diagnosis and nonsurgical management of complex medical problems, especially of internal organ systems. The Royal Australian College of Physicians (RACP) admits fellows in the following faculties: Adult Medicine, Palliative Medicine, Rehabilitation Medicine, Public Health Medicine, and Occupational &amp; Environmental Medicine, and Paediatrics which concerns babies, children and adolescents.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number</th>
<th>There are just under 6000 registered practicing physicians and paediatricians.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender mix</td>
<td>25% female, 75% male.</td>
</tr>
</tbody>
</table>


The faculties of adult medicine and paediatrics are able to train in a range of sub-specialties as described in the table below. Physicians in several of the sub-specialties, particularly cardiology and gastroenterology, may be trained as ‘procedural’ specialists as they elect to predominantly undertake invasive diagnostic and therapeutic procedures as part of their work.

**Medical and Paediatric Sub-specialties**

<table>
<thead>
<tr>
<th>Medical and Paediatric Sub-specialties</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiology</td>
<td>Diseases of the heart</td>
</tr>
<tr>
<td>Clinical Genetics</td>
<td>Disorders of the genes</td>
</tr>
<tr>
<td>Clinical Pharmacology</td>
<td>The effects of drugs and management of drug therapy</td>
</tr>
<tr>
<td>Community Child Health</td>
<td>Social and physical environmental factors affecting the growth and development of young people whether well, ill, impaired or disabled, generally in community-based or government child health services</td>
</tr>
<tr>
<td>Paediatric Emergency Medicine</td>
<td>Diagnosis and management of acute/emergency paediatric problems</td>
</tr>
<tr>
<td>Endocrinology</td>
<td>Disorders of internal glands and hormones, including diabetes and thyroid disorders</td>
</tr>
<tr>
<td>Endocrinology &amp; Chemical Pathology</td>
<td>Diagnosis, investigation and management of disorders of chemistry, metabolism and the endocrine system, together with the techniques, management and administration of a chemical pathology laboratory</td>
</tr>
<tr>
<td>Gastroenterology and Hepatology</td>
<td>Diseases of the gut, liver and associated organs</td>
</tr>
<tr>
<td>General Medicine</td>
<td>Diagnosis and management of conditions that may be complex, difficult to diagnose or involve multiple organs and systems of the body</td>
</tr>
<tr>
<td>Geriatric Medicine</td>
<td>Management of illness and maintenance of health in aged people</td>
</tr>
<tr>
<td>General Paediatrics</td>
<td>Diagnosis and management of infants, children and adolescents with undifferentiated and complex conditions</td>
</tr>
</tbody>
</table>

12 Royal Australasian College of Physicians website 2011.
Physicians/Paediatricians and eHealth

Examples of relevant eHealth applications

Some example uses of eHealth that physicians could benefit from include:

- The College has given qualified support to the concept of shared electronic health records in terms of the enhanced safety and quality potentially provided to patients

- The use of better quality information provided in an electronic format to physicians ‘on-call’ to limit unnecessary call-outs has been cited as a major potential benefit

- Regional and rural physicians are very interested in telehealth as a means of improving the speed of urgent treatments and access to specialists. During interviews, these physicians mentioned that they do not necessarily require videoconferencing to implement telehealth initiatives

- The emergence of high-cost highly specialised drugs in haematology, oncology and rheumatology has driven the uptake of eHealth solutions in these sub-specialties to better manage the complex treatment algorithms required by the Pharmaceutical Benefits Scheme (PBS), hospitals and other regulators.

Current eHealth ‘position’

The RACP considers that information and communication technologies have a significant role to play in creating opportunities for new models of care delivery, and that information management is fundamental to healthcare delivery and electronic applications can improve the quality, safety and effectiveness of clinical decisions. There is increasing demand for clinical information to be
exchanged between individual healthcare practitioners, healthcare provider organisations and health departments.\textsuperscript{13}

There is a spectrum of readiness amongst physicians – almost all have smartphones, which are used in a professional context especially to access information, but about 20–30 percent still do not provide the RACP with an email address as they do not like to receive information or accounts this way. The College believes that 60 percent are in the middle and that it is this group that needs to be addressed by targeted government initiatives. They have a strong view that eHealth is coming whether they like it or not, but say that some physicians may fear punishment by the government for not having kept up with the times in this area, and that this may affect compliance with new programs.

Some of the very busy procedural specialists have had difficulty implementing systems which do not have a user-friendly interface and which are time-consuming to install – getting stuck using both paper and electronic information in the practice, which is not particularly efficient.

Physicians have also reported a number of perceived problems with the government’s approach to eHealth, including that the Medicare Benefits Schedule (MBS) is far too rigid a tool as it stands to be used to fund eHealth. They would prefer a flexible system that can operate using multiple modalities and which is portable, which can also attract government funding.

There is some concern that the current concept for the PCEHR is too GP-centric, diminishing the input from other health professionals involved in the patient’s care.

Many of the software programs in use are developed for GPs and do not allow the deep focus on one area of medicine that specialist physicians would like, i.e. they contain too much irrelevant information in drop-down menus for example. Connectivity beyond the practice is also cited as a major barrier to eHealth adoption.

\textbf{Key insights from eHealth readiness survey}

- Internal medicine practitioners’ use of eHealth is relatively consistent with the average use for all medical specialists. They are slightly more likely to use computers to show patients information during consultations (48 percent versus 39 percent of all specialists)

- Internal medicine practitioners are especially interested in using computers to share health records (68 percent would like to use a computer for sharing information with other practitioners and 52 percent would like to use a computer for sharing information with patients). Internal medicine practitioners are especially interested in accessing a shared patient health summary (64 percent strongly agree versus 51 percent of all medical specialists), often because their patients have complex conditions that require integration and information sharing across multiple care providers

- Internal medicine practitioners are also interested in using computers for ordering diagnostic imaging (62 percent) and pathology tests (60 percent). Similarly, they are very interested in interactive decision support for ordering prescriptions (60 percent) and for ordering diagnostic tests (56 percent)

\textsuperscript{13} Royal Australasian College of Physicians website Policy and Advocacy ‘eHealth’ 2011.
• Computerised records are popular among some internal medicine practitioners for time-saving purposes. 56 percent are interested in completing event summaries/specialist reports on computers (versus 43 percent of all medical specialists) and 63 percent store records at least partially on computers (of these, 72 percent use an electronic health record system)

• Only 6 percent of internal medicine practitioners currently use telehealth, but 52 percent stated that they probably or definitely will start using telehealth within the next three years. Of these, 59 percent are very interested in using telehealth for training and for consultations with other providers and 58 percent are very interested in telehealth for patient monitoring, which was the highest level of interest in patient monitoring across all specialty segments

• Perceptions towards eHealth benefits are generally strong for internal medicine specialists. They are especially likely to agree that eHealth will:
  – Improve continuity of care (56 percent)
  – Improve collaboration (55 percent)
  – Improve efficiency (53 percent)
  – Improve quality of care (47 percent)

• Although just 29 percent strongly agree that eHealth will improve patient satisfaction, this is higher than the average across all specialists (19 percent strongly agree). During interviews, practitioners mentioned that computerised records can help them come across as more knowledgeable about their patients’ individual circumstances because they can access information quickly rather than having to ask the same questions each visit

• eHealth barriers are similar for internal medicine practitioners as for specialists in general. They are most concerned about system malfunctions or downtime (30 percent strongly agree). They are also somewhat hesitant to use new technology (30 percent strongly agree that they prefer to wait until technology-based systems are proven and established before adopting)

• Relative to other specialists, internal medicine practitioners are more influenced by financial incentives (37 percent strongly agree). Other influence drivers are relatively consistent for internal medicine.

**Characteristics and practice attributes**

*General workforce trends*

Fellowship of the RACP is generally considered a prestigious qualification, and the College has no difficulty attracting the best graduates. There are, however significant issues with workforce mal-distribution. The first is that certain sub-specialties are far more popular than others, particularly the procedures specialties of interventional cardiology and gastroenterology in which private practice can be extremely lucrative. The second is in rural, regional and Aboriginal health, where the majority of services are still provided on a ‘fly-in, fly-out’ basis funded by State and Territory Governments or even individual practices in some cases. The RACP is taking a number of steps to address this through its Rural Taskforce Expert Advisory Group.
Practice settings may include public and private hospitals and day procedure centres, private clinics usually in partnership with other specialists, community settings, outpatients and, Aboriginal Medical Services.

A high-level practice profile of survey respondents suggests:

- Patient throughput is modest with 70 percent seeing 15 or fewer patients per day
- The majority (>80 percent) practice in more than one location, reflecting that most maintain practice in both public and private sectors
- Only a minority of physicians practice purely in the public hospital sector – and those that do tend to be either at the start of their career, or on an academic career pathway. Most physicians maintain a private practice as well as undertaking sessions as a visiting specialist in the public system where they benefit from exposure to a more challenging case mix and academic prestige.

Exhibit 33

**Overview of respondent practice attributes for internal medicine**
Percent of respondents

<table>
<thead>
<tr>
<th>Daily patient volume</th>
<th>Number of practice locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>25+</td>
<td>Four or more</td>
</tr>
<tr>
<td>16-25</td>
<td>One</td>
</tr>
<tr>
<td>&lt; 6</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>19</td>
</tr>
<tr>
<td>65</td>
<td>31</td>
</tr>
<tr>
<td>6-15</td>
<td>31</td>
</tr>
<tr>
<td>5</td>
<td>31</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency of rural or remote service</th>
<th>Percentage of income from private sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>Never</td>
</tr>
<tr>
<td>Weekly or fortnightly</td>
<td>75+</td>
</tr>
<tr>
<td>Monthly</td>
<td>50-74</td>
</tr>
<tr>
<td>Once a month or less</td>
<td>25-49</td>
</tr>
<tr>
<td></td>
<td>&lt;25</td>
</tr>
</tbody>
</table>

SOURCE: eHealth readiness survey
Education, registration and accreditation

The Royal Australasian College of Physicians (RACP) is the organisation responsible for training physicians and paediatricians and maintaining practice standards in Australia.

The Royal Australasian College of Physicians
145 Macquarie Street, Sydney NSW 2000
T: (+61) (02) 9256 5444
F: (+61) (02) 9252 3310
www.racp.edu.au

To become a physician or paediatrician it is necessary to successfully complete a six year university undergraduate degree in medicine followed by a year-long internship. It is then possible to apply for a basic training position, during which exams are held and at the end of which selection into advanced training occurs. In total at least an additional eight years of training following graduation is required prior to successfully achieving fellowship of the RACP and subsequently registration as a specialist physician.

The RACP has various training pathways, linked to comprehensive training curricula, complemented by an extensive and wide-ranging program of on-the-job training, working with and learning from experienced clinicians.

Sources of financial reimbursement/role in the healthcare ecosystem

In the private sector Medicare reimburses patients for visits to a specialist 85 percent of the Medicare scheduled fee. In addition, the doctor may choose to charge a further gap above the scheduled fee.

Where people receive their treatment in-hospital as a private patient they are eligible for a Medicare rebate equal to 75 percent of the Medicare Schedule fee. If they hold Private Health Insurance (PHI), they may also receive a rebate from their PHI fund.

Patients receiving medical services in the public hospital system are treated free of charge, however they are not eligible for choice of doctor and may be treated by trainees who are supervised by the specialist on call.

A GP referral is required to access physician care in the private sector.

Obstetrics, gynaecology and neonatology

General overview

<table>
<thead>
<tr>
<th>Description of specialty</th>
<th>Obstetrics and gynaecology are the surgical specialties concerned with the female reproductive organs and pregnancy, and as such are combined to form a single medical specialty and postgraduate training program. Specialists in obstetrics and gynaecology may practice as obstetricians, gynaecologists, or both, or in the sub-specialties of maternal-fetal medicine, uro-gynaecology, obstetrical and gynaecological ultrasound, gynaecological oncology and reproductive endocrinology and infertility.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>~1400 registered specialist obstetricians and gynaecologists.*</td>
</tr>
<tr>
<td>Gender mix</td>
<td>31% female, 69% male</td>
</tr>
</tbody>
</table>

Obstetricians/Gynaecologists/Neonatologists and eHealth

Examples of relevant eHealth applications

Some example uses of eHealth that obstetricians and gynaecologists currently or could possibly benefit from include:

- One major eHealth driver is the ability to reduce the volume of physical records in a practitioner’s office or, after retirement, home. This is particularly relevant for obstetricians because those who deliver babies need to retain medical records for up to 25 years (patients have up to seven years after the age of 18 to lodge a malpractice claim).

- A secondary driver is the simplified collection of perinatal statistics because the current processes are typically ad hoc and differ widely between States. The uploading of data into registers also stands to be improved through use of eHealth.

- Online applications which enable patients to track progress with their pregnancy and newborn, and monitor any associated health issues also present an opportunity in this area.

Current eHealth ‘position’

- Despite relatively low agreement that computer use is expected in their specialty, actual use of computers and eHealth technologies among obstetricians and gynaecologists is consistent with the average across all medical specialties. The segment records especially strong computer use for scheduling, billing and patient communication (outside of consultations).

- This segment has a relatively low appetite for accessing shared patient records (due to the more insular nature of the specialty, which has more limited need for sharing patient records as their patients are often generally healthy). In particular, practitioners perceive very little benefit for enhanced continuity or quality of care from eHealth tools.

- The key barriers to greater eHealth use for obstetricians and gynaecologists are concerns about system malfunctions and risks associated with sharing and visibility of practitioner performance data (which appears consistent with practitioners’ concerns about minimising their exposure to indemnity claims). Other concerns include the process to assign identifiers to newborns which the College perceives is not being addressed, the management of ‘family files’ maintained by medical geneticists, and remote access to diagnostic images through the provider’s firewall.

- Due to the sensitive nature of reproductive health, obstetricians and gynaecologists are more concerned than most other specialist groups about privacy issues associated with shared electronic health records in the private sector.

Key insights from eHealth readiness survey

- Computer use for obstetricians and gynaecologists is in line with the average across all specialists with the following exceptions:

  - Practice management applications are more common: 89 percent use computers for billing and patient rebates (versus 66 percent of all medical specialists) and 71 percent use computers for patient booking and scheduling (versus 60 percent of all medical specialists).

  - 28 percent use computers to communicate with patients outside of consultations, versus just 17 percent of all medical specialists.
– Obstetricians and gynaecologists are less interested in interactive decision support for ordering tests (53 percent do not use or need versus 37 percent of all medical specialists)

• 45 percent of obstetricians and gynaecologists do not use any form of computerised records. Of the obstetricians and gynaecologists who do use computers, approximately two-thirds use an electronic health record system

• Obstetricians and gynaecologists are much more likely to use telehealth (18% currently use, versus 9% of all medical specialists). A further 33 percent stated that they definitely or probably will start using telehealth within the next three years. Of these, 64 percent are interested in consultations with other healthcare providers and 58 percent are interested in telehealth for training

• Compared with other specialities, obstetricians and gynaecologists are less likely to agree that most practitioners in their network use computers (38 percent strongly agree versus 55 percent of all medical specialists) and are less interested in shared patient summaries (35 percent strongly agree versus 51 percent of all medical specialists). During interviews, obstetricians and gynaecologists mentioned that they generally obtain all of the information that they need through discussions with their patients and some expressed hesitance to trust records from other practitioners for this purpose

• Obstetricians and gynaecologists are especially concerned about system malfunctions and downtime, which was the most commonly cited barrier (47 percent strongly agree). To a lesser degree, they are also concerned about technology maturity (28 percent prefer for technology to be established before using), patient privacy breaches (28 percent) and external connectivity (28 percent). Other than an above-average concern about system malfunctions, agreement levels on perceived barriers were consistent with agreement among medical specialists in general

• Obstetricians and gynaecologists are most influenced by professional bodies (17 percent), which is consistent with medical specialists overall. They were significantly less responsive to financial incentives (just 11 percent strongly agree) as compared with other specialists.

Characteristics and practice attributes

Distribution by age and state

Although two thirds of practising specialists are male, there is an increasing feminisation of the workforce and the sex ratio of specialists under 40 years old differs markedly from the segment overall. Consistent with other professions, the majority (84 percent in 2003) practice in metropolitan areas. The average age of specialists is 50.3 years.

General workforce trends

Solo private practice is the most common practice type although the feminisation of the workforce is causing practice structures to change as women are forming group practices where they cover each other.

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14 Statistics from the RANZCOG 2010 practice profile, available from the RANZCOG website.
15 2003 RANZCOG workforce survey.
Workforce pressure is common in obstetrics as this is the most demanding area, requiring almost constant on-call periods in private practice. Many obstetricians cease practice and focus on gynaecology once they have family responsibilities or get older, leading to significant shortages of obstetric specialists.

A high-level practice profile of survey respondents suggests:

- Moderate patient volumes. Nearly half of respondents see 6-15 patients per day, and 40 percent see 16-25 patients daily
- Few practice locations. Nearly 60 percent of respondents practice in only one or two locations
- Strong private sector service. Nearly 80 percent of respondents earn more than half of their income from the private sector. Many people take out private health insurance for the purpose of having choice of doctor and hospital when they decide to have children. The sensitive nature of reproductive health is an additional motivating factor for women seeking care in the private sector.

### Exhibit 34

#### Overview of respondent practice attributes for obstetrics and gynaecology

**Percent of respondents**

<table>
<thead>
<tr>
<th>Daily patient volume</th>
<th>Number of practice locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>25+</td>
<td>Four or more</td>
</tr>
<tr>
<td>16-25</td>
<td>Three</td>
</tr>
<tr>
<td>6-15</td>
<td>Two</td>
</tr>
<tr>
<td>&lt; 6</td>
<td>One</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency of rural or remote service</th>
<th>Percentage of income from private sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>&lt;25</td>
</tr>
<tr>
<td>Weekly or fortnightly</td>
<td>25-49</td>
</tr>
<tr>
<td>Monthly Once a month or less</td>
<td>50-74</td>
</tr>
<tr>
<td>Never</td>
<td>75+</td>
</tr>
</tbody>
</table>

**Source:** eHealth readiness survey

### Education, registration and accreditation

The Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG) trains and accredits doctors throughout Australia and New Zealand in the specialties of obstetrics and gynaecology, through initial qualification and continuing professional development. The Royal Australian College of Physicians (RACP) trains and accredits neonatologists and perinatal specialists.
The RANZCOG offers postgraduate training in obstetrics and gynaecology to medical graduates who have completed at least two years of general hospital training, and who are successful in gaining a training position.

- Membership/fellowship training involves six years of postgraduate hospital-based training and assessment
- Sub-specialty certification in one of the five sub-specialty areas offered requires a further three years training
- Diploma training is a six-month program for general practitioners (GPs) wishing to gain additional experience and knowledge in the areas of obstetrics and basic gynaecology
- Overseas trained doctors who have been granted partial recognition of their obstetrics and gynaecology qualifications and experience may have to complete two years of post-Membership training as an OTS trainee.

The Royal Australian College of Physicians’ Physician Readiness for Expert Practice (PREP) program provides comprehensive education and training for neonatal and perinatal medicine. Advanced Training in neonatal/perinatal medicine is for three years following satisfactory completion of three years basic paediatric training and the FRACP examination in paediatrics. RACP guidelines indicate that the Advanced Training program should be closely related to a comprehensive training program in obstetrics.

**Sources of financial reimbursement/role in the healthcare ecosystem**

Obstetricians and gynaecologists operate in both the public and private hospital sectors, as well as academic positions tied to public hospitals. The 2003 RANZCOG workforce survey estimated that 36 percent of its fellows practiced obstetrics in the private sector only, 34 percent in the public sector only and 30 percent in both sectors and projected the proportion practising only in the private sector to decline to 23 percent by 2009. Referral from a GP is required to access Medicare benefits for obstetrics and gynaecology.

In the private sector Medicare reimburses patients for visits to a specialist 85 percent of the Medicare scheduled fee. In addition, the doctor may choose to charge a further gap above the scheduled fee. This is common practice in obstetrics due to shortages of obstetricians, particularly in regional areas. Quarterly statistics for bulk-billing rates for obstetrics in December 2010 put the rate at 37.6 percent of services.
The Extended Medicare Safety Net (EMSN) provides an additional rebate for Australian families and singles who incur out-of-pocket costs for out-of-hospital services. Out-of-hospital services include GP and specialist attendances. Once the relevant annual threshold of out-of-pocket costs has been met, Medicare will pay for 80 percent of any future out-of-pocket costs for out-of-hospital Medicare services for the remainder of the calendar year. However, as announced in the 2009-10 Budget, from 1 January 2010 there is an upper limit on the amount of benefit that can be paid under EMSN for obstetric and some associated services like assisted reproductive technology.

In 2011, the annual EMSN threshold for concession cardholders, including the Pensioner Concession Card, Health Care Card and the Seniors Health Card and people who receive Family Tax Benefits (Part A) is $578.60. For all other singles and families the annual threshold is $1,157.50. These amounts are indexed by Consumer Price Index on 1 January each year.

Where people receive their treatment in-hospital as a private patient they are eligible for a Medicare rebate equal to 75 percent of the Medicare Schedule fee. If they hold Private Health Insurance (PHI), they may also receive a rebate from their PHI fund.

Patients receiving obstetric and gynaecology services in the public hospital system are treated free of charge, however they are not eligible for choice of doctor and may be treated by trainees who are supervised by the specialist on call.

**Medical indemnity claims**

Typically, obstetricians face more claims than other specialties, and the settled value of these claims is higher. In 2007–08 obstetrics was the most common clinical service context for all claims (18 percent). As at June 2008, the clinicians practicing the specialty ‘obstetrics only’ accounted for 26 percent of current claims with reserve of $500,000 or more, compared with just 14 percent of total current claims and more than 3 percent of obstetrics claims closed between 2003–04 and 2007–08 settled for more than $500,000.17

**Ophthalmology and dermatology**

**General overview - Ophthalmology**

<table>
<thead>
<tr>
<th>Description of specialty</th>
<th>Ophthalmology is the branch of medicine that deals with the anatomy, functions, pathology, and treatment of the eye.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ophthalmologists practice under the following sub-specialties: cornea and external disease, glaucoma, neuro-ophthalmology, ophthalmic pathology, ocular inflammation, oculo-plastics, orbital surgery, paediatric ophthalmology, vitreoretinal disease, and developing world ophthalmology.</td>
</tr>
<tr>
<td>Number</td>
<td>Approximately 800 registered practicing ophthalmologists.*</td>
</tr>
<tr>
<td>Gender mix</td>
<td>18% female, 82% male.</td>
</tr>
</tbody>
</table>


General overview - Dermatology

Description of specialty
Dermatologists are qualified medical specialists who, through additional training, have obtained postgraduate qualifications to specialise in the diagnosis, treatment and prevention of skin, nail and hair diseases and skin cancers. Dermatologists practice under the following sub-specialties: pigmentation disorders, systemic diseases, skin cancer and skin tumours, papulas and vascular disorders, inflammatory dermatoses, disorders of keratinization, psoriasis, lymphocytic and blood element disorders.

Number
Just under 400 registered practising dermatologists.*

Gender mix
18% female, 82% male.


Ophthalmologists/Dermatologists and eHealth
Examples of relevant eHealth applications
Some example uses of eHealth that ophthalmologists and dermatologists currently or possibly could benefit from include:

• Telehealth applications are growing in acceptance in dermatology due to the urbanised nature of the specialty and the need to prevent unnecessary travel for rural patients – there are a large number of dermatology conditions that can be completely managed using telehealth to communicate with the GP, so long as photos and biopsies are taken correctly at the rural end of the transaction. It is unclear how these processes should best be remunerated under Medicare, and it does not necessarily result in less work for the GP, who now must assume responsibility for the patient rather than simply writing a referral.

• The introduction of health identifiers could potentially greatly reduce errors in the processing of biopsy specimens.

• Ophthalmologists are interested in the introduction of systems that ease reporting requirements and data entry into registries and that reduce red tape.

Current eHealth ‘position’

• The ACD generally reports a high level of eHealth readiness in its fellows due to the nature of the specialty easily enabling transfer of records (which consist largely of photos and associated disease categories) into an electronic format. Some of the more senior practitioners are still resistant to computer use, but even this group uses practice management software and the associated tools.

• An Australia-wide teledermatology program is run by the Australian College of Rural and Remote Medicine where rural doctors can email patient histories and a set of photographs to a secure website supported by a dermatologist in South Brisbane who make a diagnosis and send educational materials and a treatment plans back to the GP. Significant savings on patient travel and public-sector wait times, but increases GP workload beyond a simple referral.

• In ophthalmology, many fellows are quite technologically savvy although this does tend to be the younger ones with the older ones still resistant. Almost 100 percent use smartphones in their practice and for personal use.
Most ophthalmology practices are computerised in terms of practice management, but uptake of clinical records management has been very patchy due to lack of suitable systems for specialist use – almost all are in private practice, still many on their own. There are some evangelists who have gone completely paperless but the majority have yet to follow suit.

The RACO provides online exams and training, and trainees are required to keep their surgical logbooks online. Numerous online surveys have been undertaken with ophthalmologists previously and the responses have been reasonably good.

There are varied views amongst the RACO Fellows re eHealth – government initiatives tend to be met with suspicion and a fear of change. There are also fears about privacy and confidentiality in the community to contend with.

Any new system for ophthalmologists will need to start simple and have an easy-to-use interface. An emphasis in quality and safety as occurs in the public hospital system will make adoption easier for them.

**Key insights from eHealth readiness survey**

- Ophthalmologists and dermatologists are generally average eHealth users, with the following exceptions:
  - They are more likely to use computerised practice management (78 percent use computers for booking and scheduling and 83 percent use computers for billing and patient rebates)
  - They are above-average users of electronic ordering for pathology tests (30 percent currently use computer to order pathology tests)
  - They are more likely to use computers during consultations. 49 percent use computers to show patients information during a consultation and 47 percent use computers to view or record patient information during consultations
  - They are less likely to view pathology results online (46 percent versus 62 percent of all medical specialists), view diagnostic imaging results online (16 percent versus 53 percent of all specialists), and to complete event summaries/specialist’s letters on computers (20 percent versus 33 percent of all medical specialists)

- Relative to other specialists, ophthalmologists and dermatologists are less likely to agree that most practitioners in their network use computers (43 percent strongly agree) and that they are expected to use computers in their specialty (31 percent strongly agree). Just 14 percent like to be early adopters of new computer systems, versus 28 percent of all medical specialists. Ophthalmologists and dermatologists are also less interested in access to a shared patient summary (27 percent strongly agree versus 51 percent of all medical specialists). These specialists typically operate in a more standalone manner as compared with other specialists and perceive less value in accessing past histories for their patients because they are less likely to uncover relevant information.
• Perceptions of eHealth benefits for ophthalmologists and dermatologists range from average to below average as compared with all medical specialists. They are especially less likely to agree that eHealth improves continuity of care (27 percent strongly agree), improves quality of care (20 percent strongly agree), improves the care delivery process (20 percent strongly agree), and increases patient safety (18 percent strongly agree).

• Compared with other specialists, ophthalmologists and dermatologists are especially concerned about system malfunctions or downtime (47 percent strongly agree this is a barrier to adoption). They are also more likely to agree that it is too difficult to select and implement a new system (26 percent strongly agree, versus 12 percent of all medical specialists). Perceptions of the remaining barriers are relatively consistent with the average across all specialists.

• As compared with other specialists, ophthalmologists and dermatologists are more motivated by financial incentives (34 percent strongly agree and 31 percent somewhat agree that financial incentives will have an influence on their adoption of eHealth solutions). After financial incentives, professional bodies were second most popular adoption driver (13 percent strongly agree, 58 percent somewhat agree).

**Characteristics and practice attributes**

*General workforce trends*

Both ophthalmology and dermatology are specialties dominated by private practice and where undertaking multiple minor procedures is the norm. As such they can be highly lucrative and create far fewer lifestyle pressures than some other medical specialties. This means that entry into these professions can be very competitive leading to perceptions of a shortage in training positions. Like other specialties, they are highly concentrated in urban areas, although in ophthalmology, ‘fly-in, fly-out’ services to indigenous communities are commonly provided by State Governments and the charitable sector.

A high-level practice profile of survey respondents suggests:

• These are procedural specialties characterised by high patient throughput (>60 percent see more than 25 patients/day), with most activity occurring in the private sector – approximately 90 percent derive more than 75 percent of their income from private practice

• These specialties involve highly repetitive examinations and minor procedures, with fewer patients requiring overnight admissions to hospital.
**Exhibit 35**

**Overview of respondent practice attributes for ophthalmology and dermatology**

Percent of respondents

**Daily patient volume**

- < 6: 10%
- 6-15: 25%
- 16-25: 29%
- 25+: 16%

**Number of practice locations**

- Four or more: 27%
- Three: 34%
- Two: 24%
- One: 16%

**Frequency of rural or remote service**

- Never: 15%
- Once a month or less: 9%
- Monthly: 2%
- Weekly or fortnightly: 12%
- Daily: 15%

**Percentage of income from private sector**

- < 25: 89%
- 25-49: 3%
- 50-74: 0%
- 75+: 8%

**SOURCE:** eHealth readiness survey

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**Education, registration and accreditation – dermatology**

The Australasian College of Dermatologists (ACD) is the medical college responsible for training dermatologists and maintaining standards in Australia.

The Australasian College of Dermatologists
PO Box 3785, Rhodes NSW 2138
T: +61 (02) 8765 0242
F: 61 (02) 9736 2194
www.dermcoll.asn.au

The training pathway is outlined as follows:18

- **Post-university Medical Experience**
  After the completion of university medical studies, at least two years (PGY 1 and PGY 2 accredited positions) acceptable training in a teaching hospital or equivalent recognised by the ACD must be completed

- **Australasian College of Dermatologists Training Program**
  The Australasian College of Dermatologists is the only organisation accredited to train and

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18 Australasian College of Dermatologists website 2011.
assess dermatologists in Australia. Entry to the program is highly competitive – the current class has only 12 members and there is usually a wait for training positions. Once accepted to the program, trainees must complete four to five years of defined clinical and educational experience in accredited training programs and pass a series of assessments.

**Education, registration and accreditation – ophthalmology**

The Royal Australian and New Zealand College of Ophthalmologists (RANZCO) is the medical college responsible for training ophthalmologists and maintaining standards in Australia.

The Royal Australian and New Zealand College of Ophthalmologists
94-98 Chalmers Street, Surry Hills 2010
T: 61 2 9690 1001
F: 61 2 9690 1321
www.ranzco.edu

The training pathway is outlined as follows – selection is very competitive:19

**Selection**

- Complete medical degree and intern year
- Obtain an appointment to a first year accredited hospital post.

**Basic Training**

- Pass the induction assessment on commencement (within three months)
- Pass all Ophthalmic Science (OS) assessments, and the Ophthalmic Basic Competencies and Knowledge (OBCK), and satisfy all term requirements, within the first 18 months, to be eligible to apply for advanced training.

**Advanced Training**

- Obtain an appointment to an advanced training post from Year three
- Meet all requirements to be eligible to sit basic and advanced pathology from Year three
- Sit and pass basic and advanced pathology, usually in Year three
- Demonstrate fitness to sit the RANZCO Advanced Clinical Exam (RACE) in Year four
- Sit and pass the RACE
- Pass all rotation requirements for Year four.

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19 Royal Australian and New Zealand College of Ophthalmologists website 2011.
Final Year

- Meet the pre-requisites and all requirements for the final year, by obtaining prior approval from the Censor-in-Chief of the final year program and supervisor, and approval also of final year reports from both the trainee and the supervisor.

**Sources of financial reimbursement/role in the healthcare ecosystem**

Both dermatology and ophthalmology are specialties heavily weighted towards private practice. Those who do work in the public sector usually have academic positions and are providing highly specialised services for one or two sessions per week. Most of these specialists join group practices early in their career, which then fragment as they go out on their own. Rebates for private sector consultations and procedures are provided under the Medicare Benefits Schedule at normally 85 percent of the Schedule fee for outpatients, and at 75 percent of the Schedule fee for inpatients as previously outlined. Procedures in these specialties tend to be small, rapid throughput and repetitive, such as biopsies in dermatology, and cataract eye surgery.

**Psychiatry**

**General overview**

<table>
<thead>
<tr>
<th>Description of specialty</th>
<th>Psychiatry is the branch of medicine that deals with the diagnosis, treatment, and prevention of mental and emotional disorders, and abnormal behaviour. Psychiatrists can further specialise in areas such as child and adolescent psychiatry, forensic psychiatry (legal and criminal matters), psychoanalysis, psychotherapy, psychiatry of old age, addiction psychiatry and psychiatry of learning disability. Psychiatrists also act as consultants in drug and alcohol programs and to community services. Within hospitals they are commonly involved in liaison with other areas of medicine and surgery, for example as consultants to pain clinics.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>There are ~2460 registered psychiatrists in Australia.*</td>
</tr>
<tr>
<td>Gender mix</td>
<td>33% female, 67% male.</td>
</tr>
</tbody>
</table>


**Psychiatrists and eHealth**

**Examples of relevant eHealth applications**

Some example uses of eHealth that psychiatrists currently and could possibly benefit from include:

- Psychiatrists are likely to be particularly interested in eHealth solutions that allow them to enhance their long-term patient relationships
- There are some niche applications of eHealth in psychiatry that have attracted enthusiasts and which have developed a strong evidence-base around cost-effectiveness and improved access to mental health services. The iCBT program developed by the Clinical Research Unit for Anxiety and Depression at St Vincent’s Public Hospital is one such program that allows carefully selected patients to undertake cognitive behavioural therapy online with minimal clinician involvement, as an alternative to medication and face-to-face counselling.
Current eHealth ‘position’

• Psychiatrists tend to favour eHealth for event summaries at a greater rate than other specialties, in part due to the potential for time savings when creating and distributing large amounts of patient information.

• Some psychiatrists are particularly interested in telepsychiatry as a way of providing increased access to patients in rural and remote areas. They noted that their patients responded surprisingly well to consultations via videoconference.

• In general, the specialty perceives little value from eHealth, although practitioners see some benefit in increased patient engagement from eHealth, which is particularly important given the typically long-term nature of psychiatrists’ relationships with their patients.

• There are no strong drivers for greater adoption of eHealth among psychiatrists, as they feel no pressure to do so from patients, their professional network or professional associations.

Key insights from eHealth readiness survey

• Psychiatrists are below-average eHealth users as compared with medical specialists in general. Relative to other specialists, they are especially less likely to use computers for the following applications:

  – Viewing diagnostic imaging (20 percent) and pathology results (38 percent) and ordering diagnostic imaging (5 percent) and pathology tests (11 percent). 37 percent of psychiatrists reported that they don’t use and don’t need computers to order diagnostic imaging, largely because they rarely if ever order imaging in their specialty.

  – Sending or receiving referrals (11 percent use computers).

  – Viewing or recording information during consultations (24 percent currently use computers, 45 percent stated that they don’t use and don’t need computers).

• Psychiatrists are approximately average in their use of telehealth (12 percent currently use versus 9 percent of all specialists). Among the 42 percent that will definitely or probably use telehealth within the next three years, 70 percent are interested in training, 59 percent are interested in remote consultations with other providers, and 44 percent are interested in remote consultations with patients.

• During interviews, psychiatrists expressed strong concerns that using computers during consultations would interfere with patient relationships. They commented that patients often complained about GPs using computers during consultations, which they did not like. The psychiatrists that maintained computerised records typically completed computerised entries of their notes after each consultation.

• Psychiatrists were one of the least interested segments in using computers to share information with their patients (60% stated that they don’t use and don’t need a computer to share information with patients). Some psychiatrists mentioned that they provide their patients with information to share with their families, but this is usually in the form of a pamphlet or website suggestion rather than specific health details.
• Psychiatrists are also less likely to express interest in sharing health records with other practitioners (41 percent don’t use and don’t need a computer). Their health records tend to be shared among fewer practitioners due to the nature of their work and the level of confidentiality required.

• Psychiatrists are beginning to transition to computerised notes, but only 4 percent reported that they are paperless. A further 53 percent use a combination of paper-based and computerised records.

• Not surprisingly, psychiatrists are much less likely to agree that most practitioners in their network use computers (33 percent strongly agree) and that computer use is expected in their specialty (32 percent strongly agree). They are also less likely to agree that computer use reduces error in their specialty (22 percent strongly agree) and less likely to consider themselves early adopters of new computer systems (just 17 percent strongly agree). During interviews, psychiatrists commented that the specialty tends to be more conservative and less interested in adopting the newest technology, in part because computers and technology are not a required part of the job.

• Psychiatrists have fairly average perceptions of eHealth benefits, with one exception. They are less likely to agree that eHealth will improve quality of care (23 percent strongly agree versus 33 percent of all specialists). The greatest perceived benefit is improved collaboration (40 percent strongly agree).

• Perceptions of adoption barriers are much higher for psychiatrists as compared with other specialists. Relative to specialists overall, psychiatrists are especially concerned about system malfunctions or downtime (47 percent strongly agree this is a barrier), privacy breaches (41 percent strongly agree), and drops in productivity during the transition to a new system (29 percent strongly agree). They are also waiting for the technology to mature (34 percent strongly agree that they prefer to wait until systems are proven before adopting) and that not enough people are using the systems for them to provide a benefit (27 percent strongly agree).

• Agreement on adoption drivers is relatively weak, but the two strongest influences for psychiatrists are financial incentives (19 percent strongly agree and 32 percent somewhat agree) and professional bodies (17 percent strongly agree and 42 percent somewhat agree).

Characteristics and practice attributes

General workforce trends

There are several factors likely to put pressure on psychiatry workforce levels in the near term:

• The workforce is ageing. The majority of psychiatrists (56 percent) are aged between 35–54 years but a significant proportion (40 percent) is older than 55 years. The impact of ageing of the workforce may be more immediate for psychiatry than other specialties (70 percent of psychiatrists are older than 45, compared to 62 percent for all medical specialties).

• Psychiatrists are working fewer hours. Average weekly hours are falling from 45.0 in 1995 to 40.9 in 2004 and 38.3 in 2008, will put further pressure on workforce requirements.

• Although two thirds of practising specialists are male, there is an increasing feminisation of the workforce (in 2004, females made up 56 percent of psychiatrists in training) and women tend, on average, to work fewer hours.20

20 Trend across all medical specialties.
• There are currently difficulties in filling psychiatry training positions, and the College is working with Federal, State and Territory Governments on making psychiatry training a more attractive option for junior doctors.

Private practice is the most common setting for psychiatrists: 41 percent of psychiatrists work exclusively in private settings, 23 percent exclusively in public settings and 36 percent in both sectors.\(^{21}\) Although the ratio of psychiatrists to population in Australia is higher than the World Health Organisation recommendation, they are unevenly distributed and (like most medical specialists) concentrated in capital cities.\(^{22}\)

A high-level practice profile of survey respondents suggests:

• High patient volumes. Nearly three-quarters of respondents see 6-15 patients daily
• Few practice locations. Nearly 70 percent of respondents practice in one or two locations, which is consistent with consultations in rooms
• Consistent source of income. Respondents appear to practice overwhelmingly in either the public or private sector (earning at least 75 percent of their income from a single sector), rather than mixing their settings. This may reflect the very different patient mix encountered in each sector.

Exhibit 36

**Overview of respondent practice attributes for psychiatry**

<table>
<thead>
<tr>
<th>Percent of respondents</th>
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<tbody>
<tr>
<td><strong>Daily patient volume</strong></td>
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<tr>
<td>16-25</td>
</tr>
<tr>
<td><strong>Number of practice locations</strong></td>
</tr>
<tr>
<td>Four or more</td>
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<tr>
<td><strong>Frequency of rural or remote service</strong></td>
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<tr>
<td>Daily</td>
</tr>
<tr>
<td><strong>Percentage of income from private sector</strong></td>
</tr>
<tr>
<td>75+</td>
</tr>
</tbody>
</table>

SOURCE: eHealth readiness survey


\(^{22}\) Ibid.
**Education, registration and accreditation**

The Royal Australian and New Zealand College of Psychiatrists (RANZCP) trains and accredits doctors throughout Australia and New Zealand to be psychiatrists, through initial qualification, registration and continuing professional development.

The Royal Australian and New Zealand College of Psychiatrists
254 - 260 Albert Street, East Melbourne VIC 3002
T: +61 3 9640 0646
F: +61 3 9642 5652
http://www.ranzcp.org

The College’s program for post graduate training in psychiatry takes a minimum of five years and is based around rotations in adult general psychiatry, child/adolescent psychiatry, and consultant liaison, together with training experiences in rural psychiatry and indigenous mental health, psychiatry of old age, addiction, ECT and psychotherapy.

**Sources of financial reimbursement/role in the healthcare ecosystem**

The great majority of psychiatric services are performed as outpatient services, as changes in practice and improvements in medication mean that increasingly only the most severely ill patients require admission to hospital, for example patients with psychosis, suicidal patients and those with life-threatening eating disorders.

In the private sector Medicare rebates for psychiatry consultations are payable once a referral has been made to a consultant psychiatrist from the General Practitioner or another specialist. In most cases an initial assessment involves a diagnosis and a care (treatment and management) plan being constructed which contains the outcomes of the assessment, the patient’s diagnosis or diagnoses, opinion on risk assessment, treatment options and decisions, appropriate care pathways and appropriate medication recommendations where necessary. Copies of the treatment and management plan must be provided to the referring practitioner and, where appropriate, relevant allied health providers. Medicare benefits for psychiatric consultations are generally reduced after 50 attendances in a calendar year.

For certain very severe conditions specified in the Medicare Benefits Schedule (MBS), like serious eating disorders, the psychiatrist may use Medicare items, which permit much more frequent visits to a consultant psychiatrist than a standard mental healthcare plan; however these items are monitored very closely by Medicare to ensure appropriate use. Referral from a GP is required to access Medicare benefits for psychiatry services.

As with other Medicare attendance items in the private sector, psychiatry consultations attract a rebate of 85 percent of the scheduled fee which varies according to the duration and complexity of the assessment. Very few psychiatrists bulk-bill due to increased demand, workforce shortages and psychiatrists generally working fewer hours. Bulk-billing rates were about 29 percent in 2009.23

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23 Department of Health and Ageing website – Medicare statistics.
Medicare rebates for telepsychiatry consultations were introduced in 2002. Since the introduction of telepsychiatry item numbers, uptake has been very low. Barriers identified by the RANZCP include: lack of funding for GP or clinician time to facilitate patient consultations in rural areas; lack of patient awareness; lack of facilities; and insufficient incentives and information for psychiatrists. In qualitative interviews, individual psychiatrists suggested that barriers to uptake have been; a culture in psychiatry that over emphasises the necessity of the patient being physically present, low cultural acceptance in some remote communities – particularly amongst Aboriginal and Torres Strait Islander patients and psychiatry patient loads currently being too high to permit the additional burden of telemedicine services.

**Surgery**

**General overview**

<table>
<thead>
<tr>
<th>Description of specialty</th>
<th>Surgery is the branch of medicine that deals with the diagnosis and treatment of injury, deformity, and disease by manual and instrumental means. The Royal Australian College of Surgeons admits Fellows in the following sub-specialties: Cardiothoracic Surgery, General Surgery, Neurosurgery, Orthopaedic Surgery, Otolaryngology Head and Neck Surgery, Paediatric Surgery, Plastic and Reconstructive Surgery, Urology and Vascular Surgery.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>There are approximately 3800 registered surgeons in Australia.*</td>
</tr>
<tr>
<td>Gender mix</td>
<td>10% female, 90% male.</td>
</tr>
</tbody>
</table>


**Surgeons and eHealth**

**Examples of relevant eHealth applications**

Some example uses of eHealth that surgeons currently and could possibly benefit from include:

- Greater supervision and training for practitioners in rural and remote Australia through telehealth

- The drive towards universal digital imaging is strong in surgery, and joint standards for the use and viewing of digital images have been developed by the RACS in conjunction with the Royal Australian and New Zealand College of Radiologists. Simplification of diagnostic imaging by eliminating the transfer of hard copies and designing appropriate transfer arrangements. Standardisation of systems between corporate diagnostic imaging services has been raised as an important requirement by surgeons frustrated at having to use different systems for different providers in private practice

- Improvements in quality and safety, and the ability to audit practice, particularly if it is advocated by medical defence organisations or the College

- The use of shared patient records for multidisciplinary care of complex patients is cited as a particular need for those surgeons who are managing severely injured patients (trauma and burns), patients with complex congenital problems or cancer. Shared records kept in the public

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sector cannot be transferred to the private sector which is a source of frustration for surgeons in these areas. These clinicians rely heavily on input from nursing and allied health

- Standardisation and simplification of referrals.

**Current eHealth ‘position’**

- Surgeons are relatively low users of eHealth and do not believe that computers are important in their specialty, that their use is expected or that most practitioners in their network use computers. However, surgeons do employ eHealth tools relatively often for billing and patient communication (outside of consultation and sharing information)

- Surgeons perceive little value from eHealth, and especially believe that it is unlikely to improve quality, safety or continuity of patient care. Surgeons perceive that eHealth will not improve collaboration and typically would not like to access shared patient records

- They face few strong drivers for adoption, but are facing some patient pressure to use eHealth tools.

**Key insights from eHealth readiness survey**

- Relative to other specialists, surgeons are especially likely to use computers for billing (82 percent use computers versus 66 percent of all specialists). Surgeons are less likely to use computers for accessing clinical reference tools (58 percent) and viewing pathology results (52 percent)

- Surgeons are relatively uninterested in telehealth (65% stated that they either probably would not use or definitely would not use telehealth within the next three years, as compared with 49% of all medical specialists). During interviews, surgeons were especially concerned about how telehealth might be employed as they underscored the importance of telehealth as a tool to enhance rather than replace care. As a tactile, hands-on specialty, the surgeons interviewed were especially interested in maintaining face-to-face connections with patients and practitioners. However, they did acknowledge the value of videoconferencing for education and training purposes

- Surgeons are the least interested of all specialists in using computers to share health records with their patients (62 percent do not use and do not need a computer to share health records with patients). They are also less interested in accessing a shared health summary for their patients (31 percent strongly agree versus 51 percent of all specialists). Additionally, surgeons are also much less interested in using interactive decision support for prescribing (55 percent do not use and do not need) and for test ordering (49 percent do not use and do not need)

- Surgeons are moving towards computerised health records. 22 percent use computerised records only and a further 54 percent use a combination of paper-based and computerised records

- Surgeons are much less likely to perceive benefits from eHealth. Relative to other specialists, they are much less likely to agree that eHealth will improve collaboration (27 percent strongly agree), efficiency (26 percent strongly agree), continuity of care (25 percent strongly agree), quality of care (17 percent strongly agree), and patient safety (just 12 percent strongly agree and 18 percent strongly disagree). During interviews, some surgeons mentioned that using
computers during consultations slowed them down because of the additional time it took for them to find patient information and to download images

- Despite their below-average perceptions of eHealth benefits, surgeons’ perceptions of barriers are relatively consistent with perceptions among specialists in general. The leading barriers for surgeons are maintaining compatibility with existing IT systems (33 percent strongly agree), concern about patient privacy breaches (28 percent strongly agree) and concerns about system malfunctions or downtime (28 percent strongly agree)

- Adoption drivers for surgeons are relatively weak. The strongest are financial incentives (18 percent strongly agree and 41 percent somewhat agree) and professional bodies (13 percent strongly agree and 56 percent somewhat agree).

**Characteristics and practice attributes**

**General workforce trends**

The general trend towards private hospital services is particularly strong for surgery. Currently more than 80 percent of elective surgery in Australia takes place in the private sector. The financial rewards for practising in the private sector are considerably greater than in the public hospital system, however most surgeons continue with part-time public hospital appointments which offer academic and social prestige, a more interesting and complex patient mix and the opportunity for teaching and research. Further growth in demand for surgeons to work in the private sector is likely to be at the expense of the hours that surgeons work in the public sector.

A high-level practice profile of survey respondents suggests:

- High patient volumes: over 40 percent of the sample see 16–25 patients per day, and over 20 percent see more than 25 patients daily
- Multiple practice locations: over half of the sample practices in three or more locations
- Relatively high regional or remote service usually on a ‘fly-in, fly-out’ basis which is sponsored by State and Territory Governments: nearly one quarter of the sample performs regional or remote service at least fortnightly (12 percent daily)
- Substantial private sector practice: 85 percent of respondents receive more than half of their income from private practice and more than 60 percent earn more the 75 percent from private practice.

---

### Exhibit 37

**Overview of respondent practice attributes for surgery**

**Percent of respondents**

<table>
<thead>
<tr>
<th>Daily patient volume</th>
<th>Number of practice locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>25+</td>
<td>Four or more</td>
</tr>
<tr>
<td>21</td>
<td>19</td>
</tr>
<tr>
<td>6-15</td>
<td>One</td>
</tr>
<tr>
<td>36</td>
<td>Two</td>
</tr>
<tr>
<td>16-25</td>
<td>Three</td>
</tr>
<tr>
<td>Minimum</td>
<td>20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency of rural or remote service</th>
<th>Percentage of income from private sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>63</td>
</tr>
<tr>
<td>Weekly or fortnightly</td>
<td>12</td>
</tr>
<tr>
<td>Monthly</td>
<td>12</td>
</tr>
<tr>
<td>Once a month or less</td>
<td>12</td>
</tr>
<tr>
<td>Never</td>
<td>62</td>
</tr>
</tbody>
</table>

**Education, registration and accreditation**

The Royal Australasian College of Surgeons (RACS) is the organisation responsible for training surgeons and maintaining surgical standards in Australia.

The Royal Australasian College of Surgeons  
250-290 Spring Street, Melbourne VIC 3002  
T: + 61 3 9249 1200  
F: + 61 3 9249 1219  
http://www.surgeons.org

The specialist qualification for Australia and New Zealand is Fellowship of the Royal Australian College of Surgeons (FRACS). Doctors with a minimum of two years postgraduate experience may apply for entry into the Surgical Education and Training Program. Each of the nine surgical divisions (Cardiothoracic Surgery, General Surgery, Neurosurgery, Orthopaedic Surgery, Otolaryngology Head and Neck Surgery, Paediatric Surgery, Plastic and Reconstructive Surgery, Urology and Vascular Surgery) has a board for training in that specialty. Upon successful completion of the Surgical Education and Training (SET) program for each specialty, trainees receive their Fellowship. They may then work independently as surgeons within the specialty in which they qualified. All medical practitioners are required to continually update their skills and ensure their knowledge is current through continuing professional development and practice audit.
Sources of financial reimbursement/role in the healthcare ecosystem

In the private sector Medicare reimburses patients for visits to a specialist 85 percent of the Medicare scheduled fee. In addition, the doctor may choose to charge a further gap above the scheduled fee.

Where people receive their treatment in-hospital as a private patient they are eligible for a Medicare rebate equal to 75 percent of the Medicare Schedule fee. If they hold Private Health Insurance (PHI), they may also receive a rebate from their PHI fund.

Patients receiving surgical services in the public hospital system are treated free of charge, however they are not eligible for choice of doctor and may be treated by trainees who are supervised by the specialist on call.

A GP referral is required to access a surgeon in the private sector.

Appendix 4 – Survey

1. Screening questions

<table>
<thead>
<tr>
<th>S1</th>
<th>We have your specialty (or one of your specialties) listed as [INSERT SPECIALTY], is this correct?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>[CONTINUE]</td>
</tr>
<tr>
<td>No, it is something else [SPECIFY]</td>
<td>[CONTINUE IF SPECIALTY IS ON LIST]</td>
</tr>
<tr>
<td>Other response</td>
<td>[TERMINATE]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>S2</th>
<th>[IF S1 = Internal Medicine] [OTHERWISE SKIP TO S3] Would you describe your role as primarily procedural or consultative?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedural</td>
<td></td>
</tr>
<tr>
<td>Consultative</td>
<td></td>
</tr>
</tbody>
</table>

2. Location questions

<table>
<thead>
<tr>
<th>L1</th>
<th>[ASK ALL] At how many different practice locations in Australia do you normally see patients? [READ OUT ALTERNATIVES] [SINGLE RESPONSE]</th>
</tr>
</thead>
<tbody>
<tr>
<td>One location</td>
<td></td>
</tr>
<tr>
<td>Two locations</td>
<td></td>
</tr>
<tr>
<td>Three locations</td>
<td></td>
</tr>
<tr>
<td>Four or more locations</td>
<td></td>
</tr>
</tbody>
</table>
### L2
**[ASK ALL]** At how many different practice locations in Australia do you normally see patients? **[READ OUT ALTERNATIVES] [SINGLE RESPONSE]**

a) A salaried position in the public sector __%  
b) A salaried position in the private sector __%  
c) Fee-for-service income in the private sector __%  

---  
100%  

### L3
**[IF L2(a) <75%] [OTHERWISE SKIP TO L4]**  
Please answer all remaining questions in relation to the main practice location used for your private sector work.  
**What is the primary setting of your main practice in the private sector?** **[READ OUT ALTERNATIVES] [SINGLE RESPONSE]**

<table>
<thead>
<tr>
<th>Setting</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private hospital</td>
<td>1</td>
</tr>
<tr>
<td>Private rooms or clinic</td>
<td>2</td>
</tr>
<tr>
<td>Laboratory or radiology facility</td>
<td>3</td>
</tr>
<tr>
<td>Community health centre</td>
<td>4</td>
</tr>
<tr>
<td>Patient home or premises</td>
<td>6</td>
</tr>
<tr>
<td>Other [SPECIFY]</td>
<td>7</td>
</tr>
</tbody>
</table>

### L4
**[IF L2(a) > OR = 75%] [OTHERWISE SKIP TO L5]**  
Please answer all remaining questions in relation to your main practice location.  
**What is the primary setting of your main practice?** **[READ OUT ALTERNATIVES] [SINGLE RESPONSE]**

<table>
<thead>
<tr>
<th>Setting</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public hospital</td>
<td>1</td>
</tr>
<tr>
<td>Private hospital</td>
<td>2</td>
</tr>
<tr>
<td>Private rooms or clinic</td>
<td>3</td>
</tr>
<tr>
<td>Laboratory or radiology facility</td>
<td>4</td>
</tr>
<tr>
<td>Community health centre</td>
<td>5</td>
</tr>
<tr>
<td>Patient home or premises</td>
<td>6</td>
</tr>
<tr>
<td>Other [SPECIFY]</td>
<td>7</td>
</tr>
</tbody>
</table>

### L5
**[ASK ALL]** How many days per week do you see patients at your main practice location? **[READ OUT ALTERNATIVES] [SINGLE RESPONSE]**

<table>
<thead>
<tr>
<th>Days per Week</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5 or more days per week</td>
<td>5</td>
</tr>
</tbody>
</table>
L6  How many patients do you see in an average day, at your main practice location? [READ OUT ALTERNATIVES] [SINGLE RESPONSE]

<table>
<thead>
<tr>
<th>Number of Patients</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 or fewer</td>
<td>1</td>
</tr>
<tr>
<td>6–15</td>
<td>2</td>
</tr>
<tr>
<td>16–25</td>
<td>3</td>
</tr>
<tr>
<td>More than 25 patients per day</td>
<td>4</td>
</tr>
</tbody>
</table>

L7  How frequently do you practice in a rural or remote area in Australia? [READ OUT ALTERNATIVES] [SINGLE RESPONSE]

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>1</td>
</tr>
<tr>
<td>Weekly or fortnightly</td>
<td>2</td>
</tr>
<tr>
<td>Monthly</td>
<td>3</td>
</tr>
<tr>
<td>Less than once a month</td>
<td>4</td>
</tr>
<tr>
<td>Never</td>
<td>5</td>
</tr>
</tbody>
</table>

L8  [IF L7 = 2 OR 3 OR 4] [OTHERWISE SKIP TO Q1] When you practice in a rural or remote area, do you typically have computer access in the practice setting?

<table>
<thead>
<tr>
<th>Access</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
</tr>
</tbody>
</table>

L9  [IF L8 = 1] [OTHERWISE SKIP TO Q1] When you practice in a rural or remote area, do you typically have internet access in the practice setting?

<table>
<thead>
<tr>
<th>Access</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
</tr>
</tbody>
</table>

3. **Main Survey Questions**

Q1  [ASK ALL] Which of the following do you have access to in your main practice, that is, accessible to you in your own room or office, not just in a secretary’s office or receptionist area? [READ OUT EACH IN TURN]

<table>
<thead>
<tr>
<th>Access</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) A desktop computer</td>
<td>1</td>
</tr>
<tr>
<td>b) A laptop or notebook or tablet</td>
<td>1</td>
</tr>
<tr>
<td>c) A dictation device</td>
<td>1</td>
</tr>
<tr>
<td>d) Videoconference facilities</td>
<td>1</td>
</tr>
<tr>
<td>e) Internet access</td>
<td>1</td>
</tr>
<tr>
<td>f) A mobile phone</td>
<td>1</td>
</tr>
<tr>
<td>Q2</td>
<td>[IF Q1(a) = 1 OR Q1 (b)=1] [OTHERWISE SKIP TO Q3] Is the primary computer in your own room or office less than 3 years old?</td>
</tr>
<tr>
<td>----</td>
<td>----------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Yes 1</td>
</tr>
<tr>
<td></td>
<td>No 2</td>
</tr>
<tr>
<td></td>
<td>Don't know 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q3</th>
<th>[IF Q1(c) = 1] [OTHERWISE SKIP TO Q4] Is your dictation device a digital or analogue recorder?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Digital 1</td>
</tr>
<tr>
<td></td>
<td>Analogue 2</td>
</tr>
<tr>
<td></td>
<td>Don't know 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q4</th>
<th>[IF Q1(e) = 1] [OTHERWISE SKIP TO Q5] Is your internet access broadband?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Broadband 1</td>
</tr>
<tr>
<td></td>
<td>Not broadband 2</td>
</tr>
<tr>
<td></td>
<td>Don't know 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q5</th>
<th>[IF Q1(f) = 1] [OTHERWISE SKIP TO Q6] Is your mobile phone a smartphone, which means you can use it for web browsing?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes 1</td>
</tr>
<tr>
<td></td>
<td>No 2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q6</th>
<th>[ASK ALL] Are patient histories and records at your main practice location stored (a) entirely as paper files, or (b) entirely on computers, or (c) as a combination of paper-based and computerised files?</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>Entirely as paper files 1</td>
</tr>
<tr>
<td>b)</td>
<td>Entirely on computers 2</td>
</tr>
<tr>
<td>c)</td>
<td>A combination of paper-based and computerised files 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q7</th>
<th>[IF Q6 = 2 OR 3] [OTHERWISE SKIP TO Q9] In your main practice location, do you currently use an electronic health record? In other words, do you maintain information about your patients’ health status and health care in a computer-readable format?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes 1</td>
</tr>
<tr>
<td></td>
<td>No 2</td>
</tr>
</tbody>
</table>

| Q8 | [IF Q7 = 1] [OTHERWISE SKIP TO Q9] What is the name of the electronic health record system that you currently use for patient records? [SINGLE RESPONSE] |
Q9 [IF Q6 = b OR c] [OTHERWISE SKIP TO Q11] Does your main practice use any of the following security techniques? [READ OUT EACH IN TURN]

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>b)</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>c)</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>d)</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

[Q10 was omitted from survey]

Q11 [ASK ALL] Please write down the following scale: (1) strongly disagree, (2) somewhat disagree, (3) somewhat agree, and (4) strongly agree. Using that scale, please indicate your disagreement or agreement with the following statements. [READ OUT EACH IN TURN] [ROTATE START POINT]

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>b)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>c)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>d)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>e)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>f)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
Q12 Please write down the following scale: (1) I use a computerised system, (2) I don’t use but would like a computerised system, and (3) I don’t use and don’t need a computerised system. Please indicate which of those three options best applies to each of the following activities. [READ OUT EACH IN TURN] [SINGLE RESPONSE FOR EACH INFORMATION TYPE]

<table>
<thead>
<tr>
<th></th>
<th>Use a computerised system</th>
<th>Don’t use but would like</th>
<th>Don’t use and don’t need</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) For sending referrals to or receiving referrals from other practitioners</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>b) For transferring prescriptions to the pharmacy</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>c) To provide interactive decision-making support for prescription ordering or medication management</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>d) For ordering pathology tests</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>e) For viewing pathology results</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>f) To provide interactive decision-making support for ordering diagnostic tests</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>g) For ordering diagnostic imaging</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>h) For viewing diagnostic imaging results</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>i) For completing event summaries such as a hospital discharge summary or specialist report</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>j) For sharing health records with my patients</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>k) For sharing health records with other practitioners</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>l) For patient booking and scheduling</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>m) For billing and patient rebates</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>n) To view and/or record patient information during consultations</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>o) To show patients health-related information during a consultation</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>p) To enter patient notes after a consultation</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>q) To communicate with patients before or after consultations about health-related issues</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>r) To access online clinical reference tools</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>s) To complete continuing education and training courses</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
Q13 You may be aware that starting on the first of July 2011, Medicare rebates will be available for a range of telehealth consultations. Telehealth includes both clinical elements of the health care system such as remote consultations with patients, and non-clinical elements such as remote training.

Are you already using any telehealth services?

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q14 [IF Q13 = 1] [OTHERWISE SKIP TO Q15] Please indicate whether you use each of the following telehealth services: [READ OUT EACH IN TURN]

<table>
<thead>
<tr>
<th>Service</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Monitoring patients remotely</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>b) Holding consultations with patients</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>c) Holding consultations with other healthcare practitioners</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>d) Training</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>e) Supervising</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Q15 [IF Q13 = 2] [OTHERWISE SKIP TO Q17] Within the next three years, what is the likelihood that you will start using any telehealth services? Will you...

<table>
<thead>
<tr>
<th>Response</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definitely start using telehealth services</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probably start using telehealth services</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probably not start using</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Definitely not start using</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q16 [IF Q15 = 1 OR 2] [OTHERWISE SKIP TO Q17] Within the next three years, would you be very interested, somewhat interested, or not interested in using telehealth services for each of the following applications? [READ OUT ALTERNATIVES] [SINGLE RESPONSE]

<table>
<thead>
<tr>
<th>Application</th>
<th>Very interested</th>
<th>Somewhat interested</th>
<th>Not interested</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Monitoring patients remotely</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>b) Holding consultations with patients</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>c) Holding consultations with other healthcare practitioners</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>d) Training</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>e) Supervising</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
The next few questions are about eHealth, which is the combined use of electronic communication and technology in healthcare. Some examples of eHealth solutions include sharable electronic medical records, e-discharge summaries, e-prescribing, e-pathology and e-referrals.

Using the same scale that you recorded earlier, please indicate if you (1) strongly disagree, (2) somewhat disagree, (3) somewhat agree, or (4) strongly agree that eHealth will improve:

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
<th>Don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Improve my practice’s efficiency</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>b) Improve my ability to collaborate with other care providers</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>c) Increase patient safety at my practice</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>d) Increase my patients’ engagement in managing their health</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>e) Improve continuity of care for my patients</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>f) Increase my patients’ satisfaction level</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>g) Increase the number of referrals to my practice</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>h) Broaden the scope of services offered by my practice</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>i) Reduce my exposure to legal risk</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>j) Improve relationships with my patients</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>k) Improve my care delivery process</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>l) Increase access to care in my specialty</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>m) Improve the quality of care in my specialty</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Q18  Again using the same scale, please indicate if you (1) strongly disagree, (2) somewhat disagree, (3) somewhat agree, or (4) strongly agree that the following factors will have or have already had an influence on your adoption of eHealth solutions. [READ OUT EACH IN TURN]

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>Other practitioners in my network ask me to adopt eHealth solutions</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>b)</td>
<td>I face pressure from my patients</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>c)</td>
<td>My support staff ask me to adopt eHealth solutions</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>d)</td>
<td>Professional bodies advise me to use eHealth solutions</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>e)</td>
<td>I am offered financial incentives to adopt eHealth solutions</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>f)</td>
<td>I will gain respect and recognition from the medical community for being an early adopter of eHealth solutions</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
Q19  Again using the same scale, please indicate if you (1) strongly disagree, (2) somewhat disagree, (3) somewhat agree, or (4) strongly agree that each of the following factors is or was a barrier to you adopting and using eHealth solutions. [READ OUT EACH IN TURN] [ROTATE START POINT]

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) My practice can’t afford the initial and continued technology investment</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>b) I am concerned about a drop in productivity during the transition</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>c) It takes too long to access and use the technologies</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>d) I can’t find a solution that meets my practice’s needs</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>e) My practice needs to maintain compatibility with our existing IT systems</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>f) My practice needs to connect our IT systems with those used externally</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>g) I am concerned about system malfunctions or downtime</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>h) I am concerned about breaches of patient privacy</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>i) I am concerned about the risks associated with increased sharing and visibility of practitioner performance data</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>j) It is too difficult to select and implement a new system</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>k) I don’t have access to adequate IT support</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>l) Others in my practice are resistant</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>m) There aren’t enough people using these systems for them to provide a real benefit to me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>n) I prefer to wait until technology-based systems are proven and well-established before adopting them</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Q20  What single factor would persuade you the most to increase your adoption of eHealth solutions? [FREE RESPONSE]
<table>
<thead>
<tr>
<th>Q21</th>
<th>Are you a member of any Australian professional body or association?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q22</th>
<th>[IF Q21 = 1] [OTHERWISE SKIP TO Q23] Which Australian body or association are you most closely aligned with?</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Q23</th>
<th>[ASK ALL – ANSWER NOT COMPULSORY IF RESPONDENT REFUSES] In which year were you born?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q24</th>
<th>In approximately what year did you first practice medicine in your current speciality, after completing your residency or fellowship?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9 or,</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q25</th>
<th>Outside of work, how many hours do you spend on the internet each week for personal reasons? Do not include time you spend on e-mail or instant messaging or work-related internet activities [READ OUT ALL STATEMENTS, RECORD SINGLE RESPONSE]</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>1</td>
</tr>
<tr>
<td>Less than 3 hours per week</td>
<td>2</td>
</tr>
<tr>
<td>3 to 10 hours per week</td>
<td>3</td>
</tr>
<tr>
<td>More than 10 hours per week</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q26</th>
<th>And finally, is English your first language?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
</tr>
</tbody>
</table>