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## AN INVESTIGATION INTO STORE AND FORWARD TELEHEALTH ADOPTION IN AUSTRALIA

Anton Cush BAppSc, MBA, MeH

University of Queensland, Australia

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### Abstract

**The challenge for health care payers is to stem expenditure growth and gain proportionate value where the costs escalate. A visionary approach which transcends political agenda is required to ensure that worthwhile, strategic objectives for cost, quality and access are pursued. Health care is poised for a change in course, with e-health and telehealth driving the next breakthroughs in health care systems across the world.**

**Methods: Qualitative research methodology was utilised as an appropriate approach as this fulfils the needs of exploration where little knowledge is available and an understanding of economic, political and social factors is needed. A carefully selected group of subjects who could provide the insights needed to make recommendations to enable store and forward (SAF) telehealth in Australia were chosen. Semi-structured interviews were conducted using scheduled, recorded teleconferences initiated from a standard landline service.**

**Results: Discussions took place relating to any barriers holding SAF telehealth as a health service delivery model back and ultimately what can be done to promote a sustainable and productive service emerging as part of a new health care service. The summary of these findings is broken into individual sections and they are presented in the paper.**

**Conclusions: SAF telehealth consultations could occur in a number of ways and its continued expansion is governed by reimbursement policy and ongoing technology innovation. With the use of smart technologies and governance, costs can be reduced while improving quality of care and access to services for many patients.**

**Keywords:** telemedicine; store and forward; telehealth; referral and consultation; health information systems.

### Introduction

Health care systems across the world are facing sustainability issues created by increasing demand for health services, the aging population and the rise of chronic diseases as well as resource constraints.<sup>1</sup>

Australia's 2012 annual health expenditure was approximately AUD\$130 billion or 7% of gross domestic product and treasury projections predict this will grow to AUD\$450 billion or 13% of gross domestic product by 2050.<sup>2</sup> The challenge will be to reduce this increase in expenditure and gain proportionate value where costs escalate. We should be aiming to buy the health care that improves patient outcomes, not health care that has the most activity.<sup>3</sup>

Higher levels of quality in care cannot be achieved by adding more stress to our current health system.<sup>4</sup> McKeon elicits a number of recommendations for Australia to deliver more value from future health spend with a focus on increasing health research and development funding to three percent of government health expenditure.<sup>2</sup> This renewed ambition should be intrinsically linked to Australia's health reforms and consist of a litany of collaborative touch points between a number of institutions.<sup>2</sup> Australia's health care industry is fractious with many stakeholders and historically has had a reluctance to invest in information and communications technologies to deliver health services to patients. However, supporting research and development is not enough and technology on its own is not the solution. An approach which transcends political agenda is required to ensure worthwhile, strategic objectives are pursued.<sup>5</sup> Health care is poised for a change in course, with e-health and telehealth driving the next breakthroughs in health care systems across the world.<sup>6,7</sup>

Telehealth is a service where medical consultations are delivered using information and communications technology.<sup>8</sup> These consultations can occur synchronously or asynchronously. Synchronous or live inter-

active telehealth typically uses telephone or video consultation technology and is defined as a referred consultation between a patient and specialist using these systems. Asynchronous or store and forward (SAF) telehealth is where medical information is captured to be assessed at a later time by a physician trained in the corresponding field.<sup>9</sup> Audio, video, images or data are captured (stored) at one location and sent electronically (forwarded) to another location.<sup>10</sup>

Store and forward telehealth is underutilised in Australia and there is very little information available in the literature on its commercial use, outside the public health system. The aim of this study was to contribute to the understanding of what policy and legislation is required to support SAF telehealth in Australia. To this end, the views of Australia's e-health thought leaders were sought to build a picture of the potential for and barriers to widespread adoption and commercialisation of SAF telehealth in Australia.

## Methods

Qualitative research methodology was selected as an appropriate approach as this fulfils the needs of exploration where little knowledge is available and an understanding of economic, political and social factors is needed. Purposive sampling was enlisted as there is a finite group of subjects who could provide the insights needed to make recommendations to enable SAF telehealth in Australia. These subjects were drawn from the professional networks of the Commonwealth Scientific and Industrial Research Organisation, Australian e-Health Research Centre and the Centre for Online Health. The 14 thought leaders finally selected were a mix of high level e-health executives, practising clinicians, university professors and e-health program managers.

Ethical approval was granted by the University of Queensland's Medical Research Ethics Committee and semi-structured interviews were conducted using scheduled, recorded teleconferences initiated from a standard landline service.

These interviews consisted of six questions designed to reveal perceptions of the prevalence of SAF telehealth. Further, discussions took place relating to any barriers holding this health service delivery model back and ultimately what can be done to promote a sustainable and productive service emerging as part of a new health care service. The interview instrument was piloted with three volunteers and one of the can-

didates, then refined and finalised for use before the larger group was interviewed.

The interviews ranged in duration from 12 minutes through to 35 minutes giving the subjects ample opportunity to speak freely and share insights, while the interviewer loosely followed the scheduled questions. This created a natural conversation in many cases and each session uniquely contributed to the pool of findings. The recorded teleconferences were downloaded from the web-based recording service and replayed for transcription and analysis.

## Results

The transcriptions of the responses are the six questions on the barriers and potential for the widespread adoption of SAF telehealth shown in Appendix 1. The findings are summarised as follows.

### SAF consultation frequency

*“Store and forward is definitely increasing but is based around trials. It should be part of a health system’s normal process”*

SAF telehealth is on the rise, particularly in some of the image-based specialties such as dermatology, orthopaedics and cardiology. As people become more familiar with the technology and process, it may be adopted more widely and at a higher rate. There is currently no promotional campaign supporting SAF telehealth with clinicians finding out about it via word of mouth.

### SAF integration in clinical practice

*“Store and forward varies from no integration through to attempts to get integration”*

Currently in Australia, the use of SAF telehealth in practice suffers from low levels of integration. Some clinicians use it opportunistically and send an image off to a colleague for a second opinion but it is not formalised and much of this type of activity occurs in the clinician's spare time. Dermatology and cardiology are integrated to some degree but there still remains a lack of protocol and standards. Without standards, the quality of these transactions is variable and difficult to improve upon.

## Technologies to enable SAF

*“E-mail is used but there are no protocols”*

E-mail has proven to be the mainstay for SAF telehealth consultations with some limited use of web portals and mobile devices to capture and send images. The e-mail approach, while resourceful, could potentially breach patient privacy and confidentiality as standard e-mails are not secure and are easily shared, perhaps with people who are not authorised to access them. In some cases, patient names are omitted from the e-mail to protect against this potential privacy breach but this is not a scalable solution. It is well noted that there is a need for a secure environment tailored to the needs of telehealth and these applications are currently in development within the government and vendor communities.

## Barriers for SAF

*“It is currently a service between hospitals in the public system. In the private sector, the government incentive is only for video consultations”*

A multitude of potential barriers exist for SAF telehealth. There is a lack of policy, legislation, software and marketing to support it. SAF telehealth is almost operating in whitespace with no rules, funding, process or governance. It seems unlikely that these conditions can prevail indefinitely. Many of the pieces could potentially fall into place once there is a way to formally fund the consultations. Specialists who were interested in diversifying into telehealth would need to prepare for computerisation of their patient data as usage of electronic records for this group has been cited as low as 10%.

## Sustainable SAF

*“If it adds work, then it won’t be used...end-to-end service models are required as it has to be no more administratively difficult than the current model”*

A comprehensive business model, including funding, would be needed to attract software vendors to develop applications to run the telehealth system. The environment would need to be streamlined and simple to use, as doctors will not have the tolerance for ongoing management of system configuration to allow con-

sultations to take place. Further, the creation of a new environment would also address the interoperability challenges that currently exist. Currently, patient cases are sent around the medical community without standards, which makes dealing with high volumes problematic, potentially resulting in sub-optimal outcomes for patients. There are large numbers of new users required to reach the critical mass needed for a SAF telehealth system to be viable. A robust training and marketing campaign would be one way to overcome this issue.

The supporting software suite is a key component for the sustainability of SAF telehealth. Additionally, to enable these tools to work efficiently, associated systems like the National Authentication Service for Health need to be integrated. The creation of an end-to-end service model that is easier to administer than the current process is another factor that will promote the sustainability of SAF telehealth.

A suitable reimbursement model which considers the time involved from the GP and specialist is the cornerstone to the development of this new mode of health service delivery for private practice. It is conceivable that the public health system could move forward without the reimbursement issue being addressed but will still need the software and backend infrastructure in place. However, this builds an inconsistency across the health spectrum which erodes any chance of equitable access to services for the population. The ongoing funding of pilot and demonstration programs, while delivering some benefit to patients, restricts the progress of SAF telehealth as a sustainable health service delivery vehicle, due to the funding inevitably coming to an end, in many cases ending the program as well. Patients, particularly those in rural and remote areas will embrace SAF telehealth and will be excited to just have the option to not travel long distances to a metropolitan area for a short consultation. The challenge is to get payers, providers and patients inspired and aligned towards the same goal.

## Responsibility to commercialise SAF

*“A commercial private group putting forward a business case with a mix of private and public sector patients in a for profit arrangement may be the answer”*

Ultimately, to commercialise SAF telehealth so that it operates in a predictable way, with policy, legislation,

governance and technology, there will need to be a convergence of many stakeholders, viz, government (both state and federal), the medical and allied health industry, providers, insurance companies, the vendor community and patients. Relying on any one of these groups alone to drive the initiative is unlikely to be successful. In order to meet the practitioner's needs, an agile approach needs to be taken and this is unlikely to be initiated without funding commitment from government in the form of a reimbursement model. From that point, the other stakeholders will be well equipped to create and execute a plan to ultimately deliver a sustainable service that improves cost, quality and access.

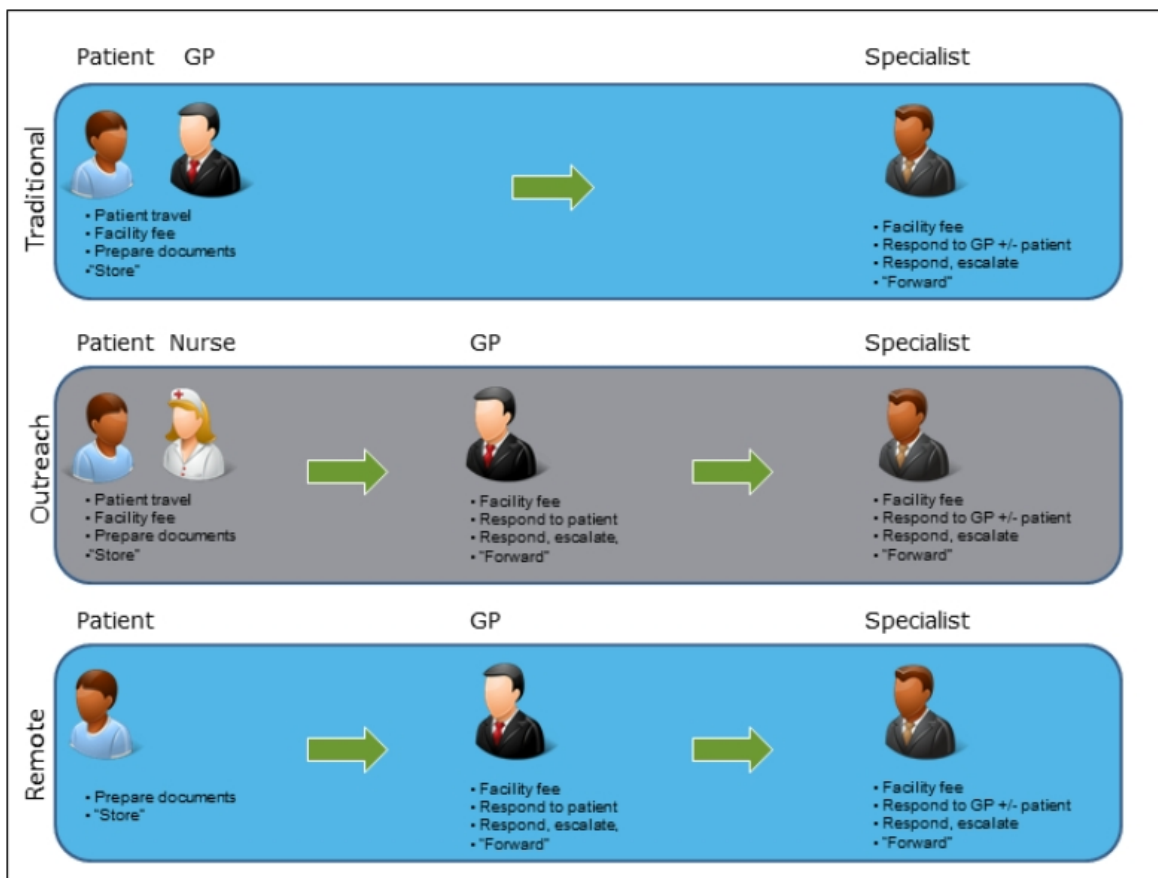
### Discussion

The Australian healthcare system requires patients to visit a GP to obtain a specialist referral to ensure the patient receives the most appropriate treatment. To this end, SAF telehealth consultations could occur in a

number of ways. Three potential pathways, namely, traditional, outreach and remote are shown in Figure 1.

The proposal for this study is depicted as Traditional. In this setting, the patient travels to their GP, where a consultation occurs and notes are added to the patient's electronic health record. If the GP decides to escalate any concerns, a referral to a specialist at another location is initiated. The specialist receives the referral and generates an extract of the patient's electronic health record which is dynamically combined with the referral to present the case. The case is consulted on by the specialist, the response is added to the patient's electronic health record and the GP is alerted to this fact. The GP then adjusts the care plan for the patient which may include a follow up visit between the GP and patient, prescription of pharmaceuticals or simple correspondence. This approach augments the capacity of every participating GP practice to have the appearance of delivering secondary care for discrete patient conditions.

As competence builds with the Traditional approach,



**Figure 1.** Theoretical store and forward telehealth models for the Australian health system.

Australia's health system may move on to adopt Outreach, which further expands the reach of both GPs and specialist services. In this model, the patient visits an outreach clinic and the nurse consults with the patient, records the details in the patient's electronic health record and escalates care when needed to the GP via referral. If the GP is confident the patient can be treated in primary care, then care will be delivered back through the nurse via the electronic health record. If secondary care is needed, then the GP will escalate the case as for the Traditional model.

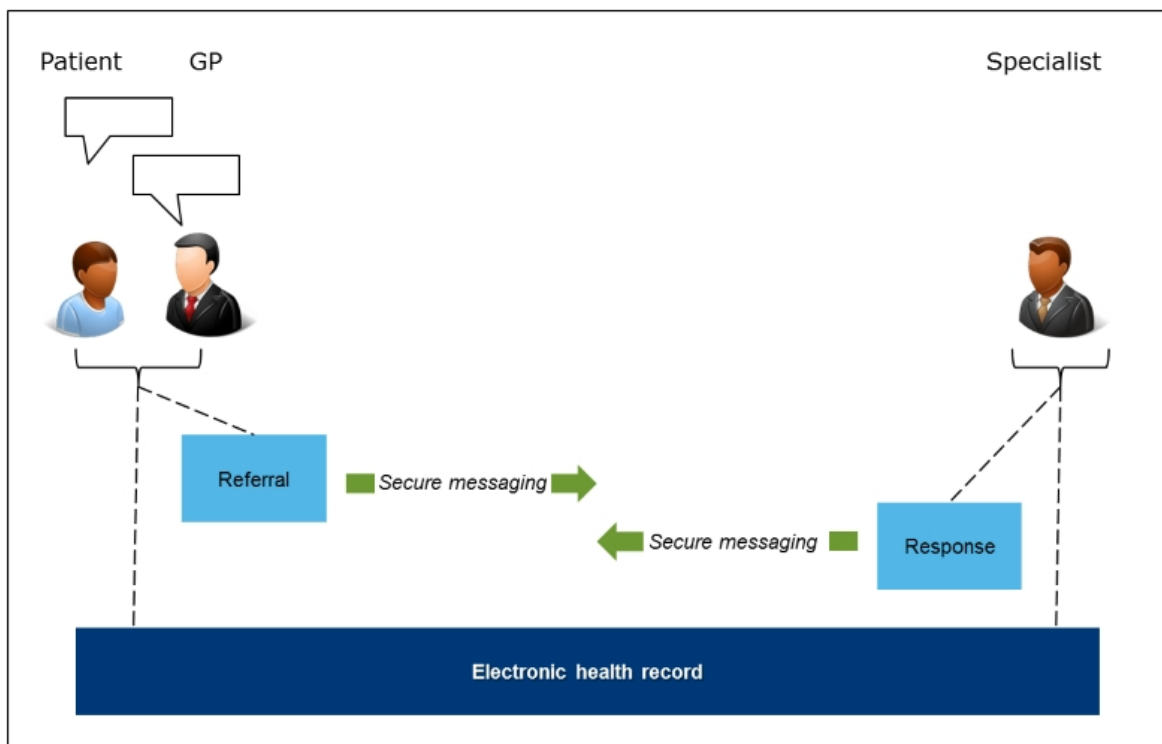
Finally, as confidence continues to develop and technological infrastructure allows, patients may make entries to their electronic health record via their home care system and request a GP consult under the Remote model. At this point, the GP will make decisions on whether, for example, an in-person visit or nurse visit is required or the case is in need of secondary care.

The proposed traditional model is shown in (Figure 2).

Australia has ambitions for a nationwide electronic health record for patients and the following approach

builds on this infrastructure. Upon consultation between the GP and patient, the GP enriches the patient's electronic health record with updated information and decides to raise a referral for a specific complaint with a specialist. A referral is added to the electronic health record and a notification is sent to the specialist through a secure messaging vendor. The business rules of the secure messaging system allow the GP to find an appropriate specialist and ensures the specialist is available to conduct the teleconsultation within an agreed timeframe. Once the specialist receives the notification, an extract from the patient's electronic health record is assessed by the specialist and a range of treatment options are added to the electronic health record. A notification is sent to the GP where a selection of options are available to inform the patient of the modified treatment plan. Patients will also be granted the right to communicate in real time with the telehealth specialist physician, upon request.

A consortium including clinicians, economists, legal advisors, technology vendors, insurance companies and patient advocates would be well-positioned to lobby the appropriate government departments to-



**Figure 2.** The proposed Traditional store and forward telehealth system that allows selected specialist services through a GP.

wards the development of provisions required to help SAF telehealth enter mainstream medical practice. The charter of this group may be to initially extend the reach of image-based specialties to rural and remote patients through the existing GP network. Subsequent phases of the telehealth roadmap may include expansion into other specialties and the convergence of home and health.

Industry, guided by practitioners and e-health experts, is in a strong position to provide a seamless, end-to-end solution which facilitates the clinical, administrative and reporting workflow to make this telehealth aspiration a world class solution. From the electronic health record to scheduling and billing, the new system will be easier to use than the incumbent process and will demonstrate greater transparency on the use of secondary care by rural and remote patients in Australia.

SAF telehealth is here to stay and its continued expansion is governed by reimbursement policy and ongoing technology innovation.<sup>11</sup> Its utilisation depends on our ability to fully exploit the potential it offers to serve our health system's needs. The following insight was shared by one of the interview subjects:

*"Health is an information intensive business. There is data flowing in many places, from clinical interactions, devices both inside and outside the hospital as well as all the diagnostic modalities. Australia's health system needs to learn how to leverage this for both patient and economic benefit..... the future will see expert-on-demand and equity of access regardless of who you are or where you live. Teleconsultation is going to play a big part in that."*

SAF telehealth has been used in a wide range of clinical applications across the world and in some regions, for example, North America, it is gaining traction as a commercial reality. For patients, this means more complete care in closer proximity to where they live and for payers, it offers potential financial gains attributed to reduced transportation, hospitalisation and readmission costs.<sup>12</sup> With the approach proposed in this study, Australia's rural and remotely located GPs will benefit from reduced professional isolation with new opportunities for learning as well as greater involvement in the integration of specialist consultations into their patient's care plans. Metropolitan

based specialists will have the freedom to choose if they would like to diversify their practice into SAF telehealth to extend their reach as far as Australia's GP outposts permit.

If SAF telehealth can deliver equal or better outcomes at a reduced cost to the provider, private payers may choose to reduce the subsequent payment to the provider or identify discrete clinical applications for its use. This potential reaction from the private sector may create a disincentive for the widespread adoption of SAF telehealth. Conversely, these conditions build a positive environment for public health systems to control the adoption of SAF telehealth as costs external to the provider are reduced and these savings may be redirected into incentive schemes to promote SAF programs. Bundled payments may also help institutionalise SAF telehealth by offering a global payment for a specific service, such as cardiac surgery or childbirth.<sup>13</sup> Here, providers are intrinsically incentivised to deliver services with the lowest use of resources possible. The literature is limited in providing rounded commercial evidence on SAF telehealth, perhaps due to the nature of many research projects focused on user acceptance and clinical process.

The future role of public and private health funds will transition from being a payer to more of a manager of treatment and SAF telehealth provides these groups with a detailed audit trail to monitor health outcomes performance.<sup>14</sup> Swiss health providers observe that the savings realised by the use of a telehealth triage system, that better allocates health resources, are greater than the overall cost of running the service.<sup>15</sup> If financial impact is the only measure considered, telehealth is cost-effective and has been demonstrated to curb but not stop the increase in health spend.<sup>15</sup> Additionally, insurers benefit from higher levels of information regarding provider visits. The patient experience is also dramatically improved as their travel burden and waiting times are reduced, and outcomes are improved due to earlier commencement of treatment.<sup>15</sup> These elements, when combined, deliver a foundation for sustainable health services delivery.

In order to tie all of these pieces together, the infrastructure is needed to enable SAF telehealth to proliferate and this includes the right drivers, policy and legislation, implementation and sustainability concepts. The underlying need for an appropriately featured electronic health record and information and communications technology network allows the sys-

tem to physically function and this was cited by the thought leaders interviewed and as a significant issue to tackle.

## Conclusion

These interviews provided an up-to-date insight into the reality of what is required to launch a commercial SAF telehealth offering and offered the sum total of many years of experience as a basis for these views. The majority of the interview subjects agreed that health policy reform, providing reimbursement for SAF telehealth, is the starting point and without this, only limited changes will occur regarding health cost, quality and access in this regard. Government is now tasked with developing an environment to support SAF telehealth, to capitalise on its infrastructure investments and provide a meaningful return for its citizens. This will signal to industry to invest in the development of streamlined clinical solutions that reduce administrative procedures.

Traditionally, health care has been a trade-off between cost, quality and access. With the use of smart technologies and governance, costs can be reduced, while improving quality of care and access to services for our rural and remote patients. This patient-centric approach of SAF telehealth will mature over time and offer insights into how similar methodologies can be applied across the health spectrum.

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## Corresponding Author:

Anton Cush  
 28 Dunsmore Street,  
 Kelvin Grove, QLD, 4059  
 Australia  
 E-mail: [antoncush@gmail.com](mailto:antoncush@gmail.com)

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## Appendix 1

### 1. Are encounters via store and forward increasing or decreasing?

- a) It is increasing but not as fast as it should;
- b) It is increasing but not in a formal way with appropriate governance framework;
- c) Definitely increasing but based around trials. It should be part of a health system's normal process;
- d) Increasing particularly for dermatology and orthopaedics;
- e) Increasing as a lot of medicine can be done via store and forward;
- f) Increasing in aged care especially within dermatology;
- g) Increasing but there is a lot more potential especially when using multimedia attachments such as moving and still pictures;
- h) Increasing but it is growing slowly because it is only promoted through word of mouth;
- i) It is increasing as people are getting more comfortable with the technology; and
- j) Store and forward has stagnated. It is only being used in public health at this point as there is no reimbursement. If it is happening, it is unstructured such as emails for a second opinion between clinicians.

Four subjects did not provide usable responses to this question.

### 2. How integrated is store and forward in practice? Is it part of a pilot project or business as usual?

- a) It is varied from no integration through to attempts to get integration. Some people are opportunistic perhaps getting an image off to a colleague for examination through to some formality and on to advanced formality collecting patient data and history;
- b) More or less part of pilot projects;
- c) Business as usual;
- d) Integrated;
- e) Dermatology seems to be integrated and cardiology is integrated in some cases;
- f) Integrated but undefined.;
- g) Embedded into every day practice;
- h) There are very few people who are using store and forward on a regular basis;
- i) Integrated but informally being practiced;

- j) It is a mix. There are many examples of pilot projects and business as usual; and
- k) Mostly as a pilot project but without standardisation or protocols. Clinicians seem to do it in their spare time.

Three subjects did not provide usable responses to this question.

### 3. What technologies are people using to enable store and forward?

- a) There are some applications that provide secure messaging but not specifically designed to share images. There are a lot of people who want to do it but don't know how to go about it;
- b) Patient administration systems as a starting point, then email;
- c) Images such as JPGs attached to email using Microsoft Outlook;
- d) A web portal and iPhone as well as specialised cameras;
- e) Emails and portals;
- f) List Servs and email. People are attaching an image to an email and getting an opinion about it;
- g) Email and photos with iPhones and iPads;
- h) An email service, however, there is a clinical information and technology services group building a specifically tailored web application for store and forward;
- i) Secure messaging platforms are being developed which provide access to notes; and
- j) Email but there are no protocols.

Four subjects did not provide usable responses to this question.

### 4. What barriers exist to using store and forward?

- a) Only approximately 10% of specialists have computerised records, maybe because of the wide range of needs secondary care has, developing a solution is a very challenging proposition. A lack of a comprehensive health record. Each hospital has records but they are siloed and not interoperable, therefore health institutions can't share information. No reimbursement;
- b) Even once the technology is sorted, uptake won't be as rapid as it may take time to prepare

the case and send it off. The receiving end is lacking reimbursement and funding model. At the moment, people do it out of the kindness of their hearts. PCEHR could long term play a role in case preparation;

- c) Lack of familiarity amongst physicians;
- d) Partly funding as most people are doing it altruistically;
- e) Business models are not there yet;
- f) There is a clinical technology piece missing;
- g) Not all health institutions work with secure messaging systems, this would need to change;
- h) Getting enough users to build the momentum to drive the creation of software and protocols. Further, insurance companies need to pay for the clinician's time. Telehealth as a standalone operation does not have a good ROI;
- i) It is currently a service between hospitals in the public system. In the private sector, the government incentive is only for video consultations;
- j) Doctors don't have the time to get into the details on managing devices, and how to adjust the security settings to allow a transaction to take place. The whole process needs to be simpler;
- k) There is no system in place, so the information coming in is difficult to handle; and
- l) A system to carry out the service is needed. Provided everyone fits into the current legislation and medical framework, store and forward between GPs and specialists should be simple as the patient is only indirectly involved. You would also need to sort out funding and accountability.

Two subjects did not provide usable responses to this question.

##### **5. What can be done to make store and forward sustainable?**

- a) Medical records should allow us to do things faster. If a clinician has to create a document to send to someone else, then there will be resistance. If they extract and receive, they will adopt it. If you have to go through change and adoption then the governance model is inadequate or the product is wrong. If it adds work then it won't be used. NASH needs to work as authentication problems will limit access. End-to-end service models are required as it has to

be no more difficult administratively than the current model. Reimbursement is part of it but it doesn't guarantee anything;

- b) Appropriate funding streams and a standardised suite of applications are required. The ability to tap into an electronic health record and other patient repositories to remove duplication for case preparation. To be able to do this process quickly is important;
- c) The wants from the vendors that want to sell the systems and technology. The needs from right through the continuum of care to be able to seamlessly share records and provide care. All stakeholders cooperating to create an affordable solution;
- d) Recognition of the time involved is needed. Payment of the specialist's time. The technology is not holding anything back;
- e) Funding to recognise it as necessary to rural and remote practice. High speed broadband to ensure reliable service;
- f) Reimbursement models so clinicians get paid for their time as well as education about the relevant technology;
- g) Time cost covered for a consult. There should be time based increments set for store and forward with a business model based on MBS system. Also, there would need to be better collaboration between the hospital network and primary care;
- h) Reimbursement so the GPs and specialists get paid for their time and effort. Also considering a facility fee would be recommended;
- i) We should get away from pilots as there is limited funding and no sustainability. The evidence is out there, it works. We need a whole system business case and demonstrate ROI. We need a platform, protocol, MBS reimbursement, clinical workflow;
- j) A dedicated web application is needed because email will only go so far. It is sustainable in the longer term and will become one of the main delivery models in some specialities. Clear cut legislation is needed for the private sector as well as the provision of a Medicare number;
- k) Provision of a service that makes it really easy. One that is not too many clicks away from their patient management application. They need to transition seamlessly from one software application to another;

- l) An integrated suite which provides easy access to store and forward, live interactive telehealth as well as the patient record is needed to make life easier for clinicians. A reimbursement provision is also needed for private practice. However, the public health system only needs a unified system to move forward. Reimbursement will not be as much of a concern here; and
- m) Funding. Making a good workflow that allows clinicians to find each other easily. People in rural and remote areas will be excited just to have the option to not travel to a major centre and the demand will be strong. You need to ensure that people understand that this is not a short cut but a valid, proven mode of clinical service delivery.
- j) Groups of specialists will need to take the initiative for marketing programs to get the word out;
- k) A third party. Doctors don't have the time to get this going. Perhaps a service started by government, then handed over to someone else to run as a sustainable service;
- l) Public health system is well placed to make the first step to roll out and sustainability; and
- m) Either driven state by state or a national approach to provide a unified approach to legislation and funding. We also need to bring the vendor community along to provide the software required.

One subject did not provide a usable response to this question.

One subject did not provide a usable response to this question.

**6. Who is responsible to commercialise store and forward and make it more widely available?**

- a) Relying on a government model will not meet customers' needs. Private sector will commercialise because it can better respond to customers;
- b) Private sector would become involved if there was financial gain but the drive will come from public or NPO as potential to deliver better services;
- c) The government needs to be aware of the benefits and should act accordingly. The state level policy makers would have the main role to play;
- d) Government intervention is necessary because it is unlikely that the economics will work for patients or clinicians otherwise;
- e) Medical and allied health industry. The providers themselves need to take the leading role to taking it forward;
- f) Advocacy from the colleges, the AMA, they will need to build a consortium;
- g) MBS with the input from the colleges. Government would need to commit to funding;
- h) Government is unlikely to commercialise. A commercial private group putting forward a business case with a mix of private and public sector patients in a "for profit" arrangement;
- i) State health departments and Medicare Locals. It will take a sponsor to develop the case and take it to government;