Problems to be solved

Problem #1 – ‘Clinic in a box’ - A package of user-deployed remote digital assessment tools to augment telehealth consultations and improve clinical decision making.

Problem Owner – Brooke Kyle

What is the problem?

The problem can best be described in two cases:

Pete from Coolgardie

64 year old male with paroxysmal atrial fibrillation. He lives alone at home, and his kids live interstate.

Generally Pete gets on with life, but recently he’s getting palpitations, chest discomfort and occasionally light-headedness. Recently having it more often and is starting a new medication, worried it might make his heart too slow. Pete to drive 30 minutes to his nearest hospital in Kalgoorlie to be investigated.

Cheryl from Hilarys

57F, cares for her husband who’s going through chemotherapy, with often frequent trips for his care alone. Her daughter is supportive but is busy working as a nurse and caring for her own young children. Cheryl has been breathless for a few years, and it’s been getting worse since her husband became unwell. With recent events she's been too busy to get it checked out. Unfortunately, Cheryl’s husband is admitted to hospital after becoming unwell, and Cheryl follows him a few days later with a life-threatening respiratory failure. This is the first time she’s been diagnosed with COPD – and her hospital admission could have been prevented if she was able to get the care she needed.

These are common cases; sadly, we often see them on the ward after they deteriorate, rather than pre-emptively to prevent such an event.

Why do you want to solve this problem? What benefits would it provide?

Australia is a huge landmass, with people living near and very, very far – with some people as remote as Derby WA. Distance has always been a barrier to receiving adequate healthcare, but with the pandemic this got harder. Lockdowns, travel restrictions and fear all contributed to the problem. In addition to this, we are seeing more patients than ever, and the demands on healthcare is growing (Graph 1). The swap to Telehealth has resulted in a loss of simple assessments which would historically be routine in face-to-face appointments such as observations (oxygen saturations, blood pressure, heart rate and temperature). Even with Telehealth, patients need to take time off to attend appointments for relatively simple investigations such as lung function testing, FeNO, ECG, carbon monoxide levels

These investigations are irreplaceable and necessary to make diagnosis, or guide treatment. Without them, the diagnosis and hence treatment is delayed which can lead to preventable hospital presentations. Having simple investigations at home can improve diagnostic accuracy and reduce the time to diagnosis and treatment. Clinic in a Box can ensure that a person’s location, or even a pandemic, will never interfere with good clinical care.

We have combatted the rise in demand, and the COVID-19 restrictions, by using the telehealth resources already available to us. For example, in Respiratory at SCGH, in 2020 Telehealth accounted for 15% of our outpatient appointments, predominantly for those in regional and remote areas. In February this year, telehealth makes 66% of our clinic appointments, and the number is approaching 100% in April/May. The Sir Charles Gairdner respiratory clinic alone has 15,000 clinic appointments per year. Patients are becoming more complex to treat as well. The number of severe asthmatics started on monoclonal antibodies is increasing drastically, with only 38 patients in 2018, compared to 98 patients this year.

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What do you envision as the ideal solution to this problem?

With improving wireless health technology, such as wearable devices and smaller portable equipment means we can diagnose and monitor people from afar. Telstra’s largest 5G Network has improved coverage, connectivity and quality of internet access to people across the country.

Algorithms can order, track and deliver packages with incredible speed and accuracy, to an increasingly distant population. All of this is at our fingertips – so how do we use it?

Clinic in a Box is the perfect collaboration between telehealth and diagnostics.

A Software algorithm will be designed to detect a person’s outpatient date, and order a suitable Clinic in a Box for the clinic specialty. The order will be dispatched to the warehouse for a Box to be delivered 1-2 weeks prior to the appointment, and a message will be sent to both the clinic and patient informing them of the Box arrival.

Contents within the Box will vary depending on the clinic specialty (see attached *‘Clinic in a Box’* for details), with each box containing a tablet/iPad. On arrival of the Box, the patient will open the Web-based confidential and secure portal, which will be accessed via an icon on the home screen. The patient can type in their details to access their portal. Within the portal, stepwise instructions on how to do each investigation will appear sequentially in whichever language the patient selects on log in. The equipment in the box will automatically connect wirelessly to the portal, and as each investigation is done, the data will automatically upload to the portal in real time, which can be accessed by the clinician instantly. On completion of the investigations, the patient packs all equipment back into the box, discarding any single-use items, and returns via post to the warehouse for sterilization. Each part of the transit is tracked, with communication to the warehouse and clinic on the journey each way. Patients can use the tablet/iPad for the telehealth appointment if their own network connectivity is poor, or access to technology unavailable. This will ensure the entire investigation, assessment and management is seamless, and patients can have gold standard care, no matter where they are. *See “Flow Chart” attached for the entire Clinic in a Box Journey.*

This solution ensures no delays to diagnostics or treatment. In the cases above, this solution could be life-changing. In Pete’s case: Clinic in a Box with AliveCor Kardia portable ECG allows a 6 lead ECG reading at any time. This portable device can detect arrhythmias and automatically upload data to be accessed at any time by the clinician. It only takes 2 fingers, and 30 seconds to complete. For Pete, this could diagnose his heart condition, allowing us to start urgent treatment instantly.

In Cheryl’s case: A portable spirometer at home with a telehealth appointment could have given her the diagnosis. Her inhaler therapy could have started the same day, and her risk of hospitalisation and threat to her safety could be drastically reduced.

Healthcare is changing. Coupling Clinic in a Box with Telehealth can make it better.

Useful resources:

Examples of portable devices included in the Clinic in a Box:

- AliveCor Kardia portable ECG device: Alive Technologies
- Bird SpiroHome portable Spirometer: Spirohome Personal Spirometer (birdhealthcare.com)

Sir Charles Gairdner / North Metropolitan Health Service Rural and regional catchment areas (See Telehealth Strategy 2018-2022 – attached)

Outpatient Hospital Activity: AIHW Hospital activity - Australian Institute of Health and Welfare (aihw.gov.au)

Problem #2 – Room allocation in outpatient departments- not enough rooms for multiple specialties to provide F2F appts for all patient groups on every weekday

Problem Owner – Zena Robinson

What is the problem?

There is no digital system to manage room allocation in an outpatient setting. This means that outpatient rooms are either in too greater demand or that outpatient rooms are underutilised. At present, many tertiary hospitals in WA are using spreadsheets for their room allocation. WebPAS used for appointment bookings, does not allow for understanding of room utilisation in an outpatient setting.

Why do you want to solve this problem? What benefits would it provide?

Currently, as outpatient clinic demand increases, the need for high quality of care in clinical operations remains critical. Improved room allocation in an outpatient setting would:

- Improve patient experience, with less waiting time and optimal patient flow
- Allow for transparency of room allocation for all subspecialities sharing the same workspace
- Better utilisation of available space when clinics are reduced due to planned or unplanned leave
- Reduce time spent on room allocation by management- no more auditing of allocated rooms
- Would allow for Adhoc clinics to open up if room allocation is known in advance

What do you envision as the ideal solution to this problem?

Digital solution- A software program that is able to identify room allocation and room utilisation to maximise use of outpatient services. This software program needs to be simple and must be able to pull clinic codes from WebPAS.

Outpatient redesign - use a different approach, Doctor-to-Patient policy, whereby the doctor travels between multiple consultation rooms, in which patients prepare for their consultation. For example, a patient is seen by a midwife/nurse for education, a sonographer for a scan, the “floating” doctor for a management plan and then a phlebotomist for bloods before exiting the clinic.

Problem #3 – Ambulance ramping

Problem Owner – Lizzie Cann

What is the problem?

When an emergency department is at capacity, patients are unable to be transferred from the ambulance to the emergency department in timely manner, commonly referred to as ambulance ramping. Not only does this result in patients not receiving timely care, it also prevents paramedics from responding to subsequent ambulance callouts while they wait with the patient. In the last two years there has been increased reports of ambulance ramping outside hospitals, people needing to be driven to the ED as there are no available ambulances, and people dying waiting for an ambulance. **(ref: https://www.ama.com.au/sites/default/files/2022-05/ambulance-ramping-report-card.pdf)**

Why do you want to solve this problem? What benefits would it provide?

It is often on the front page of the newspaper in every State and creates a large safety risk for patients and increases the pressure and stress within Emergency departments which are already stretched. Benefits – timely care provided to patients in the appropriate timeframe in the appropriate setting.

What do you envision as the ideal solution to this problem?

Virtual ED's to divert patients away from ED. More care provided in the home. Direct admits when AI based algorithms determine it is highly likely a patient will need to be admitted (e.g. 95 year old is likely to require admission, so why have them wait in ED) AI based algorithms to assist in determining what early diagnostics are required, to allow for more timely decision making when an ED bed is available current AMA campaign - clear the hospital logjam: **https://www.ama.com.au/clear-the-hospital-logjam**

Some good suggestions here: **https://www.theage.com.au/national/victoria/hospital-bed-blocks-ambulance-ramping-here-s-six-suggestions-to-fix-them-20220412-p5acsu.html**

Useful resources:

Ambulance ramping report card from AMA: https://www.ama.com.au/sites/default/files/2022-05/ambulance-ramping-report-card.pdf

Article: the ethics of ambulance ramping: https://onlinelibrary.wiley.com/doi/pdf/10.1111/1742-6723.12625

News articles:

https://www.abc.net.au/news/2022-01-03/wa-records-worst-ambulance-ramping-figures-in-history/100735606

https://www.abc.net.au/news/2022-05-09/ambulance-ramping-sparks-unprecedented-warning-for-wa/101051460

Ailing WA health system gets $252 million budget boost amid pressure on emergency departments - ABC News

Problem #4 - With a skills shortage in the Aged/Disability Care can we facilitate bringing carer/nursing skills to providers or jobs to nurses/carers that are no longer permanently employed?

Problem Owner – JP du Plessis

What is the problem?

Australia is facing a shortage of at least 110,000 direct aged-care workers within the next decade unless urgent action is taken to boost the workforce.

The aged-care system is understaffed, leading to care that is below world standards, as highlighted by the aged-care royal commission.

It is estimated that Australia will need at least 17,000 more direct aged-care workers each year in the next decade to meet basic standards of care.

Direct-care workers include personal-care assistants, nurses, and allied-health staff.

Care staff are leaving the industry due to:

- The rigid scheduling of shifts to fill a 24/7 demand is robbing staff of a work-life balance and driving a burnout rate
- Inflexible scheduling/rostering increasing working hours
- Understaffing and low pay
- An ageing population that is increasing the demand on staff
- The pandemic, has tested the resolve of almost all nurses, with a recent report finding that 42 per cent of nurses are less willing to work than before.

Why do you want to solve this problem? What benefits would it provide?

To help address the workforce shortages in the aged and disability care sectors so that the care recipients get the care that they deserve.

These problems won't all be solved with technology, but technology could help to:

Nurses/Carers

- Encourage nurses and carers to re-join the care economy which will enable them to pursue their passion and utilise their skills
- Enable flexible working arrangements to achieve better work life balance and therefore foster longevity in the sector

Providers/Employers

- Connect employers with appropriately qualified jobseekers and vice versa which will help reduce the time to fill job vacancies.
- Reduce the administrative burden - faster onboarding so successful applicants can start providing care sooner.
- Easily identify staff availability for more flexible and streamlined rostering based on employer and staff preferences.

Problem #4 - With a skills shortage in the Aged/Disability Care can we facilitate bringing carer/nursing skills to providers or jobs to nurses/carers that are no longer permanently employed?

What would an ideal solution look like?

A solution that could address one or multiple of the following:

A platform that will help to augment the current workforce with:

- retired care staff
- care staff that have left the industry due to burnout and inflexible work arrangements
- international care staff looking to migrate to Australia

Allowing care staff to be matched with providers based on their compatibility (skills, experience, flexible working conditions, and staffing needs) and be able to provide services to multiple providers.

For providers to be able to entice care staff by offering (advertising) positions stipulating flexible work arrangements and options based on their needs.

To reduce the end-to-end administrative burden of onboarding and sign up i.e.

- Video interview - capability to reach staff across the nation and internationally
- Blockchain credentialing - Gathering credentials for applying to work is a hassle. Gathering licensures, references, and other documents can be time-consuming. Blockchain credentialing will allow care staff to keep all their records together in a safe, secure online locale that they can share easily with their employer.
    - if a carer's credentials have already been reviewed and approved by a prior organisation, providers can simply use those credentials and save themselves lots of time and expenses.

Useful resources:

This is a global problem – here are a few articles talking to the issue.

- https://www.ceda.com.au/NewsAndResources/MediaReleases/Health-Ageing/Australia%E2%80%99s-dire-shortage-of-aged-care-workers-req
- https://www.ceda.com.au/ResearchAndPolicies/Research/Health-Ageing/Duty-of-care-Meeting-the-aged-care-workforce-chall
- https://www.sbs.com.au/news/article/hundreds-of-burnt-out-aged-care-and-disability-care-workers-are-quitting-union-warns/8sr5lwvfp
- https://online.vu.edu.au/blog/understanding-nursing-shortage-australia
- https://www.theguardian.com/australia-news/2022/mar/03/one-in-five-aged-care-staff-plan-to-quit-in-next-year-citing-hopelessness-survey-suggests
- https://agedcare.royalcommission.gov.au/system/files/2020-06/RCD.9999.0256.0017.pdf

Problem #5 – AI to triage referrals

Problem Owner – Catherine Rivers

What is the problem?

The large amount of time required to read all referrals sent to hospital Outpatients departments and provide accurate timely care.

Referral triage is subject to each clinician's own interpretation, for example one clinician may triage as an urgent case an another considers the referral non urgent.

Triaging is time consuming and intensive.

Clinicians can find it difficult to find the time away from clinical areas to spend dedicated uninterrupted time to read and triage referrals. This can cause a risk of delayed care for the patient.

Referrals are often sent with missing details and require follow up with GP, causing a delay in care for the patient and improved process for both referring healthcare's and the hospital is needed.

Clerical staff interpreting triage and finding appointments on the waitlist is also time consuming and at can be delayed if experienced clerical staff are on unexpected leave.

Why do you want to solve this problem? What benefits would it provide?

- Patients would be appointed appropriately to the correct outpatient departments that best suit for them. The appointments scheduled and care given in a timely manner.
- Communication between referring GP and hospitals could be improved with a fast response to the GP or other healthcare providers.
- The time and cost saving to health would be huge.
- More time for clinical staff to see patient
- Have referrals lost, delayed or incorrect triage would be eliminated.
- Once the referral was triaged by the AI the system would link straight into the bookings system saving clerical time.

What do you envision as the ideal solution to this problem?

Artificial intelligence is used widely to read long documents in legal and financial settings, applying this technology to triage referrals to specific area of specialty in health would allow an accurate safe and time saving solution . There are examples of this technology being used in some specialities of health across the world. I would like to implement this to Obstetrics and antenatal care. Technology such as AI could assist by analysing large volumes of data and interpret the information typically done by the clinicians. Triage would be more accurate and much quicker than is possible with human interaction.

An example of AI for referral triage:

https://www.optometry.unsw.edu.au/artificial-intelligence-improve-optometrists-diagnoses-and-referrals

Problem #6 – Integrated Medical Retrieval Information Management System

Problem Owner – Rakesh Rawat, Nick White, Brian Dorricott, Martin Milewicz

What is the problem?

This is a real-life problem involving medical retrievals in the remote and regional communities. During the whole retrieval process, information exchange takes place at many places, right from planning to handover to retrieval to admission in a hospital. Currently, there is not one single source of information management solution for retrieval services that is available to any health services and Royal Flying Doctor Services (RFDS) within Australia. When an emergency medical retrieval is done, a call centre usually consisting of medical consultants and nurses access the patient's condition in a telehealth type of setting by coordinating with the remote medical service provider and accessing the patients triage condition. Depending on the need and condition of a patient, a decision to retrieval is made. From one call centre recording system, information is added to an initial clinical assessment system. Next, transportation arrangement is made by collecting information from other sources like services provided by Careflight or RFDS. Once, a patient is retrieved, information is again entered in the core primary and secondary systems and other clinical systems. One of the biggest problems is information redundancy and time wasted by medical service providers to juggle between multiple systems, enter similar information in a multitude of systems. The other major issue is unavailability of network and internet services in many of these remote communities. Medical service providers are forced to enter this information in paper-based forms or normal word processing applications and later re-enter this in their core or secondary systems.

Why do you want to solve this problem? What benefits would it provide?

The complexity of information management, having to remember multiple logins and passwords, enter similar information in a variety of different systems, where these systems do not exchange information, thus reducing reporting capabilities is one big problem. Rather than focusing on providing critical care to a transported patient, half of the time of a medical service provider is spent in managing information. In an emergency retrieval situation, with limited resources and medical capabilities, every minute is crucial, and the medical service provider needs this time to focus on delivering best available treatment to a transported patient. Rather than being a hindrance to service delivery, an information management system should assist the medical service provider.

What do you envision as the ideal solution to this problem?

A single system that can be integrated in an existing eMR or a core system of a health services, capacity to retrieve information from other systems like Careflight or RFDS for better planning, saving costs and resources and improving services. Key features or capabilities of such a system are:

- Information sharing.
- Single source of truth for data management and reporting, especially clinical and retrieval related information. Thus, reduces data redundancy and data entry at various locations and in different settings during the complete retrieval process.
- Capacity to generate pdfs for distribution at various handover locations.
- Dashboards and alerts displaying current workload and distribution of workload.
- Capacity to work in an offline mode (no network or internet access).

Problem #7 – Chronic Disease Care Plans

Problem Owner – Kresna Bell

What is the problem and why do you want to solve it?

In Australia, more than 50% of people are living with a chronic disease, and 20% with 2 or more. Patients with a chronic disease are commonly put on a 'care plan' by their usual GP. The purpose of a care plan is to help health professionals manage the patient's chronic disease(s), via regular monitoring and intervention. A care plan usually consists of a treatment plan, a set of actions to be performed on a regular basis and personal goals for the patient.

The set of actions is usually large (10+), and may include pathology tests, routine exams by a specialist, medications and discussions with the patient. These actions have varying frequencies, eg, they may be every 3 months or once a year. Ensuring patients return to the clinic to have these actions done is already challenging, and when the patient has multimorbidity with overlapping actions, this becomes significantly harder for the clinic to manage.

A (very) simplified example, a patient with diabetes type 2 requires the following:

- Blood pressure: Every 12 months
- HbA1C test: Every 3 months
- Dental exam: Every 6 months

A patient with chronic kidney disease (stage 3) requires the following:

- Blood pressure: Every 3 months
- ACR test: Every 3 months
- Dental exam: every 12 months

Various strategies are engaged to ensure the patient presents for these activities, for example, the clinician will record a 'recall' for the activity, so the patient is actively followed up to book an appointment, and the activity to be done is prominent on the patient's record. However, if the patient has multiple chronic diseases, this action list can get hard to manage, and an unfortunate occurrence is the patient may be called into the clinic on Monday for their diabetes blood pressure check, and because they also have chronic kidney disease, they may be called to come back into the clinic on Thursday because their blood pressure check is due for this care plan too. This both wastes the nurses time, and frustrates the patient.

What do you envision as the ideal solution to this problem?

A solution is required to help manage and record the outcome of the actions required for care plans. Upcoming actions need to be easy to interpret, and when an action is completed, this should be clearly visible. If the patient has multiple chronic diseases, the duplicate actions occurring in the same month should be aggregated. Eg, when the blood pressure check for the diabetes care plan is completed, this should carry across to the blood pressure check on the chronic kidney disease care plan if it is within one month of being due. These care plan actions are usually managed by a team of clinicians, including a GP, nursing staff and sometimes allied health/specialists.

Problem #8 – As organisations want to engage with their own clients/patients with appropriate content to inform, educate and coach their clients/patients, then if Telstra Health could provide a content store that can be accessed and applied to our various product range and then shared via the preferred communication channel of our customers with their clients/patients.

Problem Owner – Will Grant

What is the problem?

Health Service Providers utilise a wide range of information to share with their patients at various stages of when care is delivered. The information may relate to either their condition or the treatment they are receiving, but also information relating to the technology that they may be using to receive the care. Health Service Providers source this from both internally created and external data sources.

Why do you want to solve this problem? What benefits would it provide?

To enable our Health Service Providers to be able to source the most relevant information that that may be applicable to the condition or treatment that the patient is receiving, or perhaps information applicable to the technology they are using.

It would enable the healthcare provider to have content that could be used to inform, educate and even coach patients and by having this information made available by a Telstra Health tool could support Telstra Health position as being the leading e-health software provider in Australia.

The key component of this is that Telstra Health would not be responsible for curating the content where it has a clinical context. Where its our products and the information relates to our technology, that should be provided by Telstra Health. The content that has a clinical context could be sourced and uploaded by customers themselves, non-for-profits such as 'Heart Foundation' or 'Diabetes Australia' or other organisations that can curate the clinical content. The benefit to Telstra Health may be a reduction in support tickets if our technology information is easily accessible in one location for all products. As our products come together a central knowledge base will be extremely valuable.

What do you envision as the ideal solution to this problem?

A solution may be an online store like iStock photos to download information. It could be a module attached to each NextGen product that can deliver curated content.