Why do we need a Comprehensive Evaluation Framework for Telehealth?

- There is no universally accepted standard for evaluating a telehealth service, therefore all evaluations undertaken are done in different ways.
- Current evaluation methodologies have varying weaknesses in what aspects are properly evaluated and what aspects are missed entirely.
- Many evaluation strategies focus on either clinical-benefit or cost-benefit, rarely both. Evaluations with emphasis on both often lack performance in one of those areas.

Literature Review – Telehealth Projects in Australia

- Looked specifically at projects from the year 2000 onwards. With the objective of cataloging which projects show evidence of quality evaluation.
- Searches returned over 8,000 results many of which were not specific to telehealth evaluation within Australia.
- The papers that remained were culled down to 35 of interest.
- 12 of the papers were deemed acceptable in terms of the evaluation techniques adopted.
- The learnings from this literature review made it clear that a more comprehensive evaluation methodology is necessary in the area of telehealth.
Successes and Failures in Telehealth 2014

Literature Review – Evaluation Landscape
- The purpose of the literature review was to review existing telehealth and eHealth evaluation strategies, methodologies, frameworks and approaches.
- Common themes and issues in evaluation were identified.
- The value of a new evaluation methodology for telehealth services was realised.

Overview
- Literature review on Telehealth projects.
- Literature review on evaluation methodologies in Telehealth and eHealth.
- A Comprehensive framework was developed as a result.
- Elements of four existing foundational frameworks were combined.
- Two case studies were undertaken utilising the framework.
- The case studies served to validate its applicability in telehealth service evaluations.

Foundational Frameworks
- Technology Acceptance Model (TAM)
- A generic information and communications technology (ICT) evaluation framework (CHEATS)
- A Unified Approach for the Evaluation of Telehealth Implementations in Australia (IBES)
- Telemedicine Maturity Model (TMMM)

Notable Evaluation Frameworks
- “Technology Acceptance Model”—version 1 introduced in 1986, TAM 2 in 2000 and TAM 3 was proposed in 2008

- CHEATS—a generic information communication technology (ICT) evaluation framework (2002)
  - Clinical, Human and organisational, Educational, Administrative, Technical, Social.

  - [Patient Control], [Clinician Quality of Care] [Organisation sustainability], [Technology capability/capacity]
Notable Evaluation Frameworks

- **TMMM - Telemedicine Maturity Model (2013)**

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<thead>
<tr>
<th>Framework</th>
<th>Strengths</th>
<th>Criticisms</th>
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<tbody>
<tr>
<td>TAM</td>
<td>TAM is a strong user evaluation approach to acceptance of a technology or service.</td>
<td>TAM has no clinical, organisational acknowledgement, criticised for perceived ease-of-use being a relatively poor indicator for acceptance.</td>
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<tr>
<td>CHEATS</td>
<td>CHEATS is an ICT approach to telehealth service evaluation that also covers clinical, organisational and human factors.</td>
<td>CHEATS is very vague in some parts, overlap or misplacement of aspects addressed.</td>
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<tr>
<td>IBES</td>
<td>IBES is strong in terms of sustainability, scalability in terms of finances. Technology aspects are addressed as are clinical measures specific to the Australian health context.</td>
<td>IBES only minor human factors.</td>
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<tr>
<td>TMMM</td>
<td>TMMM is an excellent process-oriented evaluation approach on multiple levels of maturity of a telehealth service.</td>
<td>TMMM is a strong approach to sustainability, scalability in terms of finances. Technology aspects are addressed as are clinical measures specific to the Australian health context.</td>
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Developing the Comprehensive Framework

The following common themes from the literature were taken into consideration during the development phase:

- Technology is core in telehealth.
- Administrative work is essential for smooth operations.
- Clinical aspects are also essential.
- Human related aspects are often overlooked in telehealth service evaluations.
- Support and admin personnel should also be included in evaluations.

A Three-Dimensional Hybrid Approach to Evaluation

The Comprehensive Evaluation Framework consists of the following three dimensions that attempt to summarise the current evaluation landscape:

- **Factors Addressed:** aspects of a telehealth service that are to be evaluated.
- **Frameworks:** a collection of four previously mentioned foundational frameworks to use as the method for an evaluation.
- **Participants:** the people involved in a telehealth service to be evaluated.

Example Participants

- **Support Personnel:** medical technicians, clerical staff, hospital services staff, IT staff, IT staff.
- **Patient:** individual patients with single episode of care / ongoing repeated care; patients with supporters or family members; cohorts of similar patients;
- **Clinician:** GP, Specialist, Community Health Worker, Doctor, Nurse
- **Management Personnel:** Administration, Business Owners, Technology Providers, Regulation Bodies, Third-Party Financers, Health-care Organisations
Case Study A – The University of Melbourne

- Case Study A consisted of an interview with a doctor using a telehealth service based around video conferencing with migrants and any high risk seekers.
- Followed by an open discussion with a professor from The University of Melbourne.

Case Study B – Federation University Australia

- Case Study B consisted of an interview with a nurse using video conferencing software to undertake consults with a patient at her end and an oncologist at the other end.
- An open discussion was conducted with a professor from Federation University Australia.

Results – Case Study A

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<tr>
<th>Role</th>
<th>Interview</th>
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<tr>
<td>Doctor</td>
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<tr>
<td>Professor</td>
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**Doctor:**

- "It prevents travel and people in rural areas get seen more regularly, i.e., every 3 months instead of 6 months."
- "The picture can be poor due to bandwidth but sound is not an issue. One exception is when using an interpreter in a telehealth consultation as feedback from the interpreter is via phone."  
- "The quality is a little less but I think discomfort is minimal."

**Professor:**

- "It’s quite good because it’s quite detailed. We’re not just spurting in generalisations or hypothesising, we’re talking about the actual physical hands on experience of doing it. Which I think is the main value to informative adds."

Results – Case Study B

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<tr>
<th>Role</th>
<th>Interview</th>
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<tbody>
<tr>
<td>Nurse</td>
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<tr>
<td>Professor</td>
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**Nurse:**

- "Patients feel a bit of discomfort about talking to a TV. Younger patients are more accepting of talking to a screen."
- "I had a couple of training sessions. I’m still learning, it’s a new system for many people."
- "Advantages are being at a distance we have more access to the oncologist."
- "Consultations generally tend to be 30 minutes, short."

**Professor:**

- "The tele-presence gives a sense of being there, being in the same room as the patient, saying if they can still communicate professionally and not be impeded on by the technology."
- "I would say the questions are pretty relevant after reflecting on it."
Analysis

Case Study A
- Telehealth is an effective method of dealing with migrant and asylum seeker patients. Issues highlighted from the interviews are that of bandwidth, picture quality, and occasional microphone feedback when an interpreter is present.

Case Study B
- It has been found that the telehealth service used by the nurse and oncologist does allow for more patients to be seen by the specialist and reduces travel costs and travel. Subsequently less patients would be able to see the specialist if they (or the specialist) have to travel for a consultation.

Conclusions & Recommendations

- The case studies demonstrate how the Comprehensive Evaluation Framework transcends the foundational frameworks.
- Questions generated for the interviews are likely not possible with just one framework alone.
- If questions were from just one foundational framework then it probably would not have covered the entire scope of the project as effectively.
- Further work would be valuable in applying more comprehensive evaluations in order to test the scope of the comprehensive framework across more of the factors addressed under participant group dimensions.

Future Work

- As new frameworks or evaluation strategies are developed they too could benefit from being added to the comprehensive framework in order to see how well it stacks up against existing frameworks and evaluation methodologies.

My Future Plans in Research

- Interested in pursuing a doctorate with the University of Western Sydney’s THRIL group in the area of Evidence-Based Practice in the Telehealth service context.
- The honours project is good foundation work for moving into such an area that is similar to evaluation although less subjective and more scientific based.

Thank you!

References
- Han, Y. (2013). My Interests in THRIL. University of Western Sydney's Telehealth Research Innovation and Learning (THRIL) group.