INQUIRY INTO TELEHEALTH SERVICES IN QUEENSLAND

HEALTH AND COMMUNITY SERVICES COMMITTEE

Submission prepared by
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28th March 2014

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Research Director
Health and Community Services Committee
Parliament House
George Street
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To the Research Director, Health and Community Services Committee,

Re.: Inquiry into Telehealth Services in Queensland

Thank you to the Health and Community Services Committee for inviting submissions regarding the Inquiry into Telehealth Services in Queensland. I make this submission as an individual researcher and not on behalf of, nor representing the interests of, any other individual or organisation. In this cover letter, I a) outline my relevant professional background, and b) overview this submission's focus on the Committee's Terms of Reference (TOR), before providing details of the submission.

Relevant Professional Background

My name is Teegan Green and I am a confirmed PhD Candidate in management and marketing at the University of Queensland UQ Business School, Faculty of Business, Economics, & Law. I am examining public sector hospital provision of telemedicine healthcare services across Queensland. I contribute to this inquiry my scholarly background regarding telemedicine from a business perspective in marketing (which considers patients as customers consistent with a patient-centric focus on public healthcare), and management (which advocates the views of service providers i.e., specialists, general practitioners, public hospitals and other vested stakeholders). I also draw on knowledge from my honours thesis where I developed existing metrics using financial mathematics to put a price on customer lifetime value (CLV) to evaluate a firm's initial return on an investment.

Submission Focus

I submit two key points for consideration by the committee. I propose:

1. Expanding the definition of telehealth (still in accordance with the Department of Health's 2012-2013 definition), to include:
    a. a hierarchy of service delivery models encompassed by telehealth
    (TOR 1.C: 'models of service delivery')
2. Updating the Terms of Reference to include:
    a. a marketing/management approach to telehealth
    (TOR 1.E: 'patient/clinician/health staff perceptions/experiences of telehealth)
    b. the use of CLV as a metric to evaluate patient-centric financial returns to the state government from the initial telehealth capital investment.
    (TOR 2: 'consider the value for money of the delivery of telehealth services')

Thank you to the Committee for the time taken in reviewing this submission. I would welcome the opportunity to elaborate on this submission if required, or to contribute to the Inquiry in other ways.

Yours sincerely,

[redacted]
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KEY POINT 1: TELEHEALTH DEFINITION

1. For Consideration: Telehealth Definition

For the purposes of the Inquiry, the Committee's TOR defines telehealth in accordance with the Department of Health's 2012-13 definition[1], reproduced verbatim as follows:

I. *Telehealth is the "…delivery of health-related services and information via telecommunication technologies, including:*
   i. *live, audio and/or video interactive links for clinical consultations and educational purposes*
   ii. *store-and-forward telehealth, including digital images, video, audio and clinical (stored) on a client computer, then transmitted securely (forwarded) to a clinic at another location where they are studied by relevant specialists*
   iii. *teleradiology for remote reporting and clinical advice for diagnostic images*
   iv. *telehealth services and equipment to monitor people in their home"*

2. Recommendation: Expand the Telehealth Definition to include TOR 1.C

I recommend that the Committee expand on the above definition of telehealth to include a) a hierarchy of service provision that reflects b) the different models of virtual service delivery which telehealth encompasses. Adopting this approach would address TOR 1.C: '*models of service delivery*' by a) including it in the overarching telehealth definition and b) embedding a review of models of service delivery into the Inquiry. The definition of telehealth in Section I(i-iv) above identifies several different virtual healthcare services provided within telehealth. I use the Department of Health's telehealth definition to propose a telehealth hierarchy of *'models of service delivery'* (referencing TOR 1.C). The hierarchy situates telehealth as encompassing several different models of service delivery: a) telemedicine, b) telecare and c) tele-education, as shown in Figure 1.

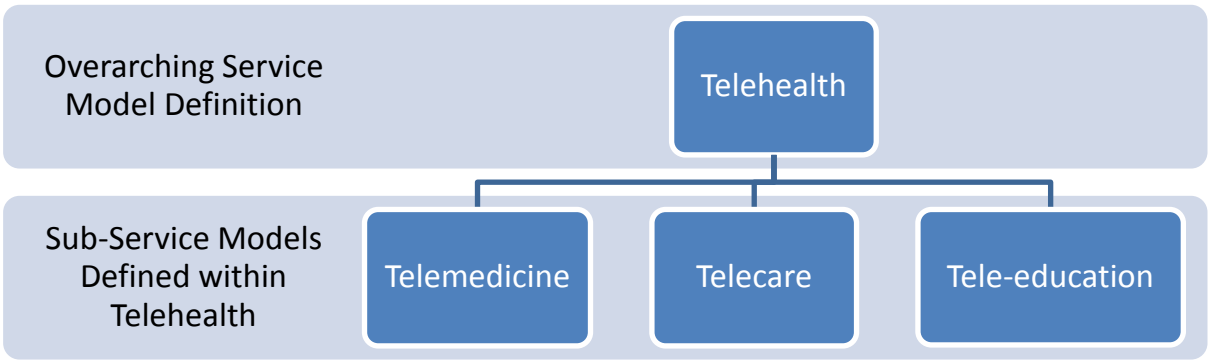

Figure 1: Defining a Hierarchy of Service Delivery Models within Telehealth

[1] http://www.parliament.qld.gov.au/documents/tableOffice/TabledPapers/2013/5413T3564.pdf

a) Telehealth Sub-Service Delivery Model 1: Telemedicine

I propose that sections (i), (ii) and (iii) from the Committee's TOR be collapsed into one sub-service of telehealth, termed telemedicine. Telemedicine defines the virtual service delivery interactions via technology between teledoctors and patients, as well as between specialists and general practitioners. Using excerpts from the Department of Health's 2012-13 definition reported in sections (i), (ii), and (iii) on p. 1 of this submission, telemedicine includes "…live, audio and/or video interactive links for clinical consultations" (section (i)) via teleconferencing and/or "…store-and-forward including digital images, video, audio (stored) on a client computer, then transmitted securely (forwarded) to a clinic at another location where they are studied by relevant specialists" (section (ii)) and "…teleradiology for remote reporting and clinical advice for diagnostic images" (section (iii)).

b) Telehealth Sub-Service Delivery Model 2: Telecare

I propose that section (iv) from the Committee's TOR remain a separate sub-service within the definition of telehealth, but that this sub-service be termed telecare. Telecare defines virtual service delivery models offered to patients for off-site care, such as services used to monitor patients in the home. Using the Department of Health's 2012-13 definition reported in section (iv) on p. 1 of this submission, telecare includes "…telehealth services and equipment to monitor people in their home".

c) Telehealth Sub-Service Delivery Model 3: Tele-education

I propose that the reference to the 'educational purposes' of telehealth in section (i) be revised to acknowledge the educational purposes for which store-and-forward (section ii) and teleradiology (section iii) may also be used, in a sub-service termed tele-education. That is, telehealth education does not just occur via teleconferencing (as noted in section (i)), but also can occur via store-and-forward and for teleradiology purposes. Tele-education can therefore be considered as another sub-service model encompassed by the overarching definition of telehealth. Using excerpts from the Department of Health's 2012-13 definition reported in sections (i), (ii), and (iii), educational purposes are therefore not just restricted to section (i) which occurs via "live, audio, and/or video interactive links" but also occur via "store-and-forward telehealth, including digital images, video, audio and clinical images (stored) on a client computer, then transmitted securely (forwarded)" (section (ii)), and via "teleradiology for remote reporting and clinical advice for diagnostic images" (section (iii)).

3. Recommendation Benefits: Structured Review of Models of Service Delivery

The key benefit is that adopting a hierarchy of virtual healthcare sub-service models (telemedicine, telecare and tele-education) provided *within* the definition of 'telehealth' is more clearly defined; allowing for a structured review of models of service delivery (addressing TOR 1.C: '*models of service delivery'*) by including this in the Committee's definition of telehealth (based on the Department of Health 2012-13 definition).

KEY POINT 2: TERMS OF REFERENCE

1. For Consideration: TOR 1.E

For the purposes of the Inquiry, the Committee's TOR is reproduced verbatim as follows:

"In conducting its inquiry the committee will:

1. *Examine the implementation of the Telehealth service by the Department of Health and Hospital and Health Services in trials, pilot and other sites, including:*
    - *A. Expenditure and budget*
    - *B. Governance arrangements*
    - *C. Models of service delivery*
    - *D. Technology and communication systems capacity and capability*
    - *E. Patients, clinicians and health staff perceptions and experiences of Telehealth*
    - *F. The outcomes of trials and pilot projects*
    - *G. Quality of patient care*
    - *H. Access to health services, particularly in rural and remote locations*
2. *Consider the value for money of the delivery of Telehealth services*
3. *Examine the factors that support successful implementation of Telehealth services and identify any barriers to successful implementation*
4. *Consider strategies to address any barriers to successful implementation of Telehealth services in Queensland"*

2. Recommendation: Update TOR 1.E to include a marketing/management approach

TOR 1.E states that the Committee will review '*patients, clinicians and health staff perceptions and experiences of Telehealth'*. I recommend that the Committee update TOR 1.E to include a marketing/management approach. A marketing approach focusses on patients (i.e., customers), whilst a management approach focusses on service providers (i.e., hospitals, specialists, health staff etc.). In order to measure perceptions and experiences, an operational (i.e., working) definition of Telehealth must exist. I now suggest one way to achieve this with reference to the Department of Health's 2012-13 *Blueprint for Better Healthcare in Queensland*[2].

a) Marketing Approach

Since the first principle theme from the Department of Health's 2012-13 *Blueprint for Better Healthcare in Queensland*[2] is termed 'health services focussed on patients and people', a marketing-based approach to measuring *'patient perceptions and experiences of Telehealth'*, as per TOR 1.E, is useful. The first principle theme from the *Blueprint for Better Healthcare in Queensland* is:

[2] http://www.parliament.qld.gov.au/documents/tableOffice/TabledPapers/2013/5413T3564.pdf

> *"Our healthcare system provides the best services, at the best time and in the best place, and patients and people are at the centre of all we do. We are committed to making the healthcare system less complicated and more accessible for all Queenslanders including those in rural and remote communities."* (p. 10).

As such, one suggestion for measuring patient's perceptions and experiences of Telehealth, quantitatively, is to use Likert scale questions (on a scale of 1=strongly disagree to 7=strongly agree), based on keywords from the first principle of the *Blueprint for Better Healthcare in Queensland.* Table 1 provides an example survey excerpt based on this idea.

Table 1: TOR 1.E Assess Patient Perceptions of Telehealth (Blueprint for Better Healthcare in Queensland: Principle 1)

Our Queensland public healthcare Telehealth system:	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
provides the best services	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
provides services at the best time	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
provides services in the best place	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
is patient-focussed	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
is uncomplicated	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
is accessible for rural communities	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
is accessible for remote communities	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐

b) Management Approach

Since the second principle theme from the Department of Health's 2012-13 *Blueprint for Better Healthcare in Queensland*[2] is termed 'empowering the community and our workforce', a management-based approach to measuring '*clinicians and health staff perceptions and experiences of Telehealth*', as per TOR 1.E, is useful. The second principal theme from the *Blueprint for Better Healthcare in Queensland* is:

> *"We are committed to empowering local communities and healthcare professionals to make decisions about local healthcare needs. By improving collaboration with non-government providers, we will maximise the value of our health investment. Through greater transparency in the reporting of hospital performance, we promote public confidence in the health system. A more flexible workforce supports local healthcare decision-making, improved patient access and quality service delivery"*

Similarly, one suggestion for measuring clinician's and health staff perceptions and experiences of Telehealth quantitatively, is to use Likert scale questions (on a scale of

1=strongly disagree and 7=strongly agree), based on keywords from the second principle of the *Blueprint for Better Healthcare in Queensland.* Table 2 provides an example survey excerpt based on this idea.

Table 2: TOR 1.E Assess Clinician Perceptions of Telehealth (Blueprint for Better Healthcare in Queensland: Principle 2)

Our Queensland public healthcare Telehealth system:	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
empowers local communities	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
empowers healthcare professionals	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
supports local healthcare decision-making	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
has improved patient access	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
has quality service delivery	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐

3. Recommendation Benefits: Measure TOR 1.E based on an operational definition

The key benefit is that Tables 1 and 2 suggest one way to measure TOR 1.E, by drawing on the first and second principal themes for an operational definition of telehealth from the Department of Health's 2012-13 *Blueprint for Better Healthcare in Queensland.* Table 1 and 2 address the Committee's TOR 1.E by addressing how a) patient perceptions and experiences of Telehealth (applying a marketing-based approach) and b) clinician and health staff perceptions and experiences of Telehealth (applying a management-based approach) can be measured quantitatively.

It should be noted that an assessment of the validity and reliability of these scales would be necessary (since they are based on keywords from the first and second principles from the *Blueprint for Better Healthcare in Queensland,* and not adopted/adapted from peer-reviewed scholarly literature). Other mixed method research approaches including site visits and qualitative research (observations, interviews, focus groups) would also be useful as an alternative or complement to the quantitative measures suggested.

1. For Consideration: TOR 2

I refer to the TOR reproduced verbatim on p. 4 of this submission, TOR 2: '*consider the value for money of the delivery of Telehealth services'.*

2. Recommendation: Consider using CLV as a metric to measure value

TOR 2 indicates the Committee will consider the value for money of Telehealth services. Consistent with a patient-centric approach to healthcare, I propose that the Committee adopts a patient-centric metric to evaluate the value for money of the delivery of Telehealth services. One useful customer-based metric is customer lifetime value (CLV). Customer lifetime value is a metric used in the marketing literature[3] to evaluate the customer-based return on an initial capital investment made by an organisation. CLV uses a net present value function from financial mathematics to calculate the individual net present worth of each customer to a firm, discounted back to present day dollar value, and summed across the entire anticipated lifetime duration of a customer with a firm.

A version of the formula is provided for reference to demonstrate calculation of CLV:

Equation 1. Customer Lifetime Value

$$CLV_1 = \left[\sum_{t=0}^{T} \frac{[(p_t - c_t) \times r_t]}{(1+i)^t}\right]$$

Therefore, CLV (i.e., the net present value of an individual customer to a firm), is:

Table 3: Measure TOR 2 - Customer Lifetime Value

Variable	Represents
Σ	The **sum** of
p_t	The **price** paid for the service, minus
c_t	The **cost** of providing the service, multiplied by
r_t	The **retention rate** of the customer (i.e., the probability the customer will stay with the service), divided by
i	1 plus the **interest rate** required for the cost of investment, to the power of
t	The number of compounding periods

To compute total customer (i.e., patient) equity, the individual CLV net present value estimates for each patient are added to yield an aggregate, present day lump sum. This lump sum can then be directly compared, in today's dollar value, to the present-day dollar value of the total telehealth capital investment. If customer (i.e., patient) equity outweighs the cost of the capital investment required to deliver Telehealth services, then value for

[3]Roland T. Rust, Katherine N. Lemon & Valarie A. Zeithaml. (*2004*). Return on Marketing: Using Customer Equity to Focus Marketing Strategy. *Journal of Marketing*: January, 68(1), pp. 109-127.

money can be considered to have been achieved based on a patient-centric approach to evaluation, in keeping with TOR 2.

An additional utility offered by the CLV metric is that two aggregate customer equity lump sums could be calculated: a) an estimation of customer (i.e., patient equity) pre-Telehealth services integration and b) an estimation of customer (i.e., patient equity) post-Telehealth services integration. This approach would allow a direct comparison, in today's dollar value, of the savings gained by introducing Telehealth services to the state public healthcare system, evaluated from a patient-centric financial approach.

3. **Recommendation Benefits: Evaluate Telehealth value for money using a patient-metric**

The key benefit of using CLV to estimate the individual net worth of patients of the public state healthcare system is that individual net present value estimates can be added together to derive aggregate 'customer (i.e., patient) equity', which can then be compared to the present day state government capital investment in Telehealth. This could allow a patient-centric comparison of the total net-worth of patients in the public healthcare system to the net capital investment by the state in Telehealth.

Adopting patient-centric metrics to evaluate TOR 2: '*value for money of the delivery of Telehealth services'* addresses elements of the third principle theme from the Department of Health's 2012-13 *Blueprint for Better Healthcare in Queensland*, which states:

> *"A focus on outcomes rather than inputs will provide a more accurate measure of performance. Exposing public sector health services to contestability will drive innovation and new measures for financial accountability will improve performance and reduce waste"* (Excerpt from Principal Theme 3, p. 10).

Adopting a CLV patient-based metric by which to evaluate the value for money of Telehealth represents one way by which new measures for financial accountability [i.e., CLV] could improve the performance and the evaluation of a patient-centric public healthcare system, with patient-centric financial metrics.

[END OF SUBMISSION]