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Data review of an ongoing telehealth programme in a tertiary paediatric hospital

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Summary

The Royal Children's Hospital (RCH) in Melbourne has been providing teleconsultations since 2011 using web-based video-conferencing. We reviewed telehealth activity over the first 30 months of the programme. The average consultation rate was 14 per month in 2012, 39 in 2013 and 49 per month in the first half of 2014. One-third of all activity (265 out of 852 consultations) was provided by only two departments: neurology and respiratory medicine. By June 2014, 92% of departments ($n = 34$) had provided one or more video-consultations. Most telehealth activity was provided by just a few clinicians. A review of actual and billed activity between July 2013 and April 2014 showed that 36% of booked telehealth appointments ($n = 144$ of 395) were not billed to Medicare; financial and other processes have since been streamlined. A snapshot of telehealth activity over a two-month period was used to estimate the revenue from telehealth. Approximately 65 billed telehealth appointments per month would be required to fund a 0.6 FTE coordinator's post. Overall, the findings have been valuable in planning the future expansion of telehealth at the RCH.

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Introduction

The Royal Children's Hospital (RCH) in Melbourne has been providing web-based video-consultations since 2011. The main reasons for offering teleconsultations were to increase convenience for families, reduce the number of doctors travelling to provide outreach clinics, provide additional services without making demands on available physical space, and take advantage of the Medicare incentive for telehealth. Medicare is the Australian government universal health scheme available to all Australians.¹ Telehealth incentives were introduced in 2011 to help improve access to specialist health services through the use of telehealth by rural and regional Australians.²

The RCH set initial targets for telehealth in its hospital strategic plan, as follows: (1) to increase the telehealth activity by 10% annually and (2) to engage all departments in telehealth activity by 2018. Convenience to families and consumer, and clinician acceptance, were demonstrated in the first year of the programme.^{3,4}

RCH telehealth is targeted towards rural, regional or interstate families. The need for good administrative support for telehealth is well documented^{5–8} and in mid 2014, 18 months after the start of the telehealth programme, there appeared to be differences between the numbers of telehealth appointments being booked and the numbers being billed. We reviewed the data in order to identify gaps in telehealth administrative processes.

Methods

When teleconsultations began at the RCH, a 'telehealth' appointment type was created and used in the hospital booking and patient administration system. This allowed telehealth appointments to be identified and enabled accurate counting of activity. The following information was reviewed:

1. the origins of the telehealth referrals, i.e. rural, regional and interstate;
2. how many rural, regional and interstate review appointments took place in each speciality;
3. how many of these review appointments were conducted by telehealth.

In addition, we calculated the income required to meet the cost of a telehealth coordinator who would provide telehealth support to clinicians.

To help identify potential gaps in telehealth administrative processes a comparison was made between booked

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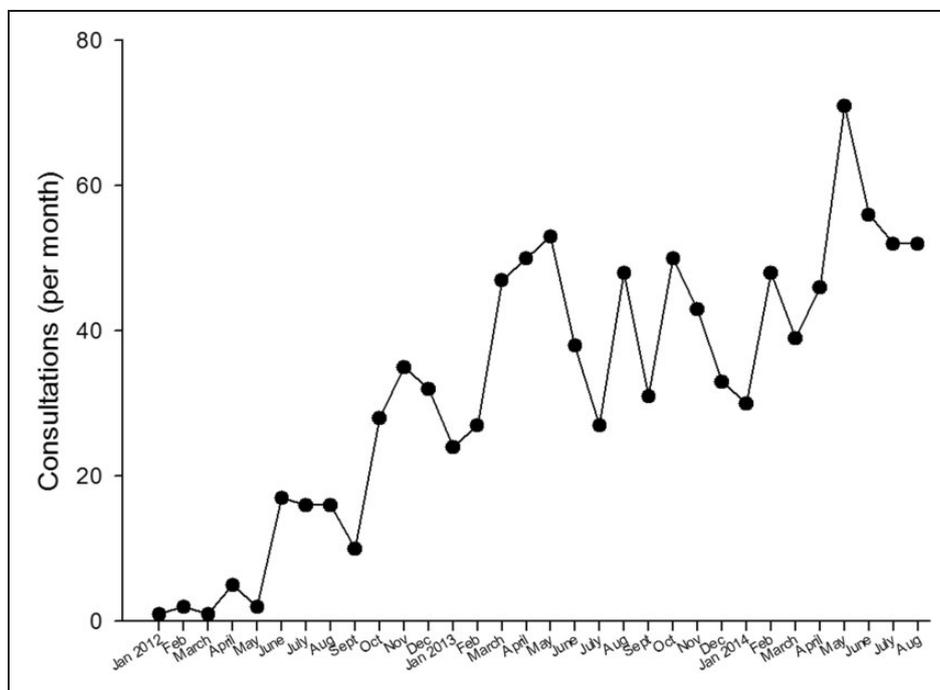


Figure 1. RCH telehealth activity 2012–2014.

and billed telehealth appointments. Unbilled appointments were also audited to identify where any process breakdown took place. Ethics permission for the study was not required.

Results

Telehealth activity

The average consultation rate was 14 per month in 2012. This increased to 39 in 2013, and to 49 per month in the first half of 2014 (Figure 1). The growth in activity greatly exceeded the 10% per annum target (Table 1).

Telehealth providers

Departments and hospital services were grouped in a way that could be reported easily and was meaningful to clinicians. The first two departments to provide telehealth consultations in 2011 were neurology and allergy. The initial impetus for offering telehealth at the RCH was GP recommendation, specifically for allergy referrals. This was followed by the neurology department, who were keen to offer this mode of access to their patients. By March 2013, 54% of departments ($n = 20$) had provided one or more video-consultations, reaching 92% ($n = 34$) by June 2014.

One-third of all activity (265 out of 852 consultations) was provided by only two departments: neurology and respiratory medicine. Over half (57%) of departments (21 out of 37) had provided 10 or fewer teleconsultations over the study period (Table 2). Within four of the five most active departments (neurology, respiratory medicine,

nephrology and gynaecology) between 1 and 3 doctors provided most telehealth activity.

The telehealth appointments were reviewed by the name of the clinician. Between January 2011 and August 2014, teleconsultations were booked under 142 different clinicians. Of these, 22% of clinicians ($n = 31$) provided 10 or more consultations, constituting 76% of all telehealth activity. 78% of clinicians provided less than 10 consultations, 58% provided 3 or less and 32% provided only one consultation.

Actual and billed activity

The review showed that there were several steps to be completed before the hospital Finance Department could bill Medicare for a telehealth consultation. These included: the appointment being booked as telehealth and then recorded as 'attended' on the appointment management system; 'consent to bill Medicare' being obtained with the corresponding Item numbers; evidence that the clinician had an agreement with the hospital to provide Medicare-billable consultations and, eligibility to bill Medicare, including patient and clinician eligibility.

Between July 2013 and April 2014, 36% of booked telehealth appointments ($n = 144$ of 395) were not billed to Medicare. Billing had not been generated for 23% of doctors (20 out of 86 individual providers).

An audit of non-billed consultations and discussions with Finance staff, clinicians and administrators identified a range of reasons for the difference between booked and billed consultations. The most common reason for non-billed activity was related to the way a doctor was set up

Table 1. Potential telehealth activity (calculated as 10% of all interstate and rural reviews) and actual telehealth activity (FY 2013/14).

Department or service	No of interstate and rural reviews	Potential telehealth activity	Actual telehealth activity	Actual telehealth activity (% of interstate and rural reviews)
Orthopaedics	3620	362	1	0
Cardiology	3003	300	0	0
Oncology	2342	234	26	1
Neurology	1910	191	69	4
Plastics	1875	188	2	0
General Medicine	1496	150	9	1
Endocrinology and Diabetes	1412	141	0	0
Allergy and Immunology	1118	112	1	1
Respiratory medicine	1105	111	59	5
Ophthalmology	1023	102	0	0
Gastroenterology	792	79	8	1
Burns	741	74	0	0
Nephrology	645	65	33	5
Urology	603	60	12	2
Neurosurgery	495	50	9	2
Centre for Community Child Health	489	49	49	10
ENT	483	48	1	0
Developmental Medicine	410	41	10	2
Rheumatology	371	37	3	1
Haematology	322	32	16	5
Adolescent Medicine	267	27	6	2
Dermatology	234	23	1	0
Imaging and Radiology	222	22	1	0
PaNS and General Surgery	175	18	2	1
Liver	144	14	1	1
Gynaecology	138	14	23	17
Neonates	129	13	0	0
Infectious Diseases	83	8	1	1
Weight Management	65	7	1	2
Integrated Mental Health	53	5	2	4
Transition	53	5	0	0
Pre-admission (anaesthesia)	41	4	5	12
Clinical Nutrition	40	4	2	5
Rehabilitation	16	2	0	0
Immunisation	6	1	10	167
Genetics	1	0	2	200
<i>Total</i>	<i>25,922</i>	<i>2592</i>	<i>365</i>	<i>13</i>

with RCH Finance to bill Medicare: in most cases the doctor had missing or unverified Private Practice Agreement paperwork, or was not set up properly in the Finance system to bill or receive payments from Medicare. Other doctors provided public clinics only (not billable to Medicare) or were not eligible to bill Medicare, for example trainee physicians (Fellows and Registrars) or allied health staff.

Problems were uncovered at all steps of the telehealth administrative process. Some consultations did not

actually take place, sometimes because the patient had not been adequately prepared or there were technical failures.

A common block to billing was lack of 'Consent to bill Medicare'. When appointments take place in the home and parents have an email address, the RCH uses an electronic signature system (eSign, Yozons) to obtain consent, but this requires the manual completion of an electronic form and recording the parent's email address, information which is not collected when registering new patients.

Table 2. Departments providing telehealth consultations (January 2012 – June 2014).

	Number of consultations
Neurology	144
Respiratory Medicine	121
Centre for Community Child Health	86
Nephrology	81
Gynaecology	71
Oncology	55
Pain services	50
Developmental Medicine	33
Immunisation	29
Haematology	28
General Medicine	28
Rehabilitation	24
Gastroenterology	20
Urology	20
Neurosurgery	11
Mental Health / Psychiatry	10
Liver	9
Plastics	9
Adolescent Medicine	8
Pre-admission (anaesthesia)	8
Clinical Nutrition	7
Genetics and Metabolics	5
Rheumatology	5
Allied Health	4
PaNS (Surgery)	4
Allergy and Immunology	2
Dermatology	2
Orthopaedics	2
ENT	1
Infectious Diseases	1
Neonates	1
Weight Management	1
Burns	0
Cardiology	0
Endocrinology and Diabetes	0
Ophthalmology	0
Transition (to adult services)	0

Income necessary to fund a telehealth coordinator

Four of the five busiest telehealth-providing services had good department-based administrative support, but this was not available to all departments. As a result, some process gaps resulted in failed appointments and lost revenue through unbilled activity. Services often claimed that a lack of coordinating support limited them in providing more telehealth, in particular when a local clinician was involved.

A snapshot of activity over two busy months was used to estimate the revenue from a typical range of consultation types. This was extrapolated across a year to determine the activity required to cover the cost of a telehealth coordinator. It was estimated that an average of 65 billed telehealth appointments per month would be needed to fund a coordinator, using the additional telehealth incentive payments only, or 22 appointments per month using the entire Medicare revenue (Table 3).

Potential telehealth activity

The RCH offers teleconsultations mainly to rural, regional or interstate families and usually for review appointments. The number of rural, regional or interstate review appointments was collected for each department. After reviewing the data we estimated that 10% of review appointments could be conducted via telehealth, recognising that this could vary between services and patient groups. In the last financial year (2013–2014) there were 25,922 recorded rural, regional or interstate review consultations (Table 1). If 10% of these were to be provided by telehealth, that would be 2592 per year or an average 216 per month.

In the last financial year (2013–2014) the Centre for Community Child Health provided 49 of their 489 rural, regional or interstate review appointments by telehealth, i.e. they achieved the 10% target. Gynaecology provided 17% (23 of 138) of their appointments by telehealth, pre-admission anaesthesia 12% (5 of 41), respiratory medicine 5% (59 of 1105) and neurology 4% (69 of 1910 rural, regional or interstate appointments). Most immunisation appointments were first rather than review appointments, which distorted their data.

Origin of referrals

The departments with the most rural, regional or interstate consultations were orthopaedics, cardiology, oncology, neurology and plastics (Table 1). Most referrals from rural and regional Victoria were to general paediatrics, orthopaedics, cardiology and neurology, as well as to allergy and cardiac services (Table 4).

Discussion

Reviewing the RCH telehealth data provided much useful information. The implementation of a single, countable organisation-wide telehealth appointment type on the patient management system was fundamental to the collection of valid data. Data collection and analysis depends on the quality of the original data entry and, from the outset, administrative staff used the telehealth appointment type appropriately and reliably. Having a range of different telehealth appointment types for each clinic or department would make data analysis much more difficult.

Table 3. Estimated activity needed to cover coordinator costs, based on a 2-month snapshot of telehealth activity: 116 billable appointments in April and May 2014.

3a. Item numbers			
Item number			No
116, physician simple review			63
132, physician complex review			31
105, surgical follow up			14
6011, neurosurgery			4
292, psychiatry			2
2806, anaesthesia			1
17620, pain			1
<i>Total</i>			<i>116</i>
3b. Medicare payments for 116 billable appointments			
Total Medicare payments for consultations	\$18,639	Average payment per consultation	\$161
Total Medicare incentive payments for telehealth	\$6213	Average payment per consultation	\$54
3c. Cost of a part-time telehealth coordinator			
Cost per annum of 0.6 FTE coordinator (based on a full-time cost of \$70,000)			\$42,000
Number of telehealth appointments needed per year using Medicare incentive payments for telehealth to cover coordinator costs			784
Number of appointments needed per month			65

Better telehealth targets could be developed by reviewing the number of face-to-face review appointments for rural, regional or interstate families. The RCH provided 25,922 rural, regional or interstate review appointments in the last financial year. If 10% of these could be provided by telehealth, the hospital could offer more than 200 telehealth appointments per month.

A study in Norway, where telemedicine has been available for many years (102 telemedicine programmes listed in 1998), audited activity at a national and service level over three years from 2009–2011. The most active provider of telemedicine conducted 0.62% of their out-patients visits by telehealth, dropping to an average 0.35% in subsequent years. Across the country, the most active speciality – neurosurgery – provided 5.5% of out-patient contacts by telemedicine.⁹ This is worth noting when considering realistic targets. True comparison is difficult though without a better understanding of the population demographics and telehealth model. For example, if Norway offers telehealth to everyone, what proportion would be considered rural or regional? Even though the Norwegian study⁹ suggests that a 10% target may be unrealistic, some RCH departments have already achieved this.

Understanding current telehealth provision has identified replicable patterns. Most departments have now provided at least one teleconsultation and every month 20 or more different clinicians provide teleconsultations. In August 2014, 36 different clinicians provided one or

more teleconsultations. However most activity is conducted by a small number of clinicians.

All clinicians providing regular telehealth have done so, despite not always having adequate administrative support and sometimes having technical failures. Replicating this high activity among a few more clinicians is likely to result in a more sustained telehealth service at the hospital.

Comparing booked with billed telehealth uncovered blocks in the telehealth processes. These problems occurred at all steps in the telehealth administrative processes. Since the audit, an organisation-wide appointment management system has been introduced. This has centralised the appointment booking process that previously consisted of multiple paper-based forms, so that a single centralised electronic system is now used by all staff. This has already greatly streamlined telehealth processes for requesting and managing telehealth appointments.

Some consultations did not take place because no one had contacted the family beforehand to ensure they were able to connect to the video call. The RCH is currently reviewing other video call technologies that remove the need for test runs or training of callers.

Guidelines have been developed to ensure that medical consultants are set up to bill Medicare where appropriate. Telehealth billing is now managed by a Specialist Clinics billing team, keeping telehealth billing more in line with “usual business”. Obtaining ‘consent to bill Medicare’ is now centralised with the Specialist Clinics billing team,

Table 4. Referral patterns by Medicare Local region.

Region	Most common referral	Second most common referral
Macedon Ranges and North Western Melbourne*	General paediatrics	Orthopaedics - Allergy (equal)
South Eastern Melbourne*	General paediatrics	Orthopaedics
Goulburn Valley	Orthopaedics	General paediatrics
Loddon Mallee Murray	Orthopaedics	General paediatrics
Barwon*	Allergy	Cardiac services
Gippsland	Orthopaedics	Neurology - General paediatrics (equal)
Frankston Mornington Peninsula*	Orthopaedics	General paediatrics
Grampians	Orthopaedics	Neurology
Hume	Orthopaedics	Neurology
Great South Coast	Orthopaedics	Neurology
Lower Murray	General paediatrics – Neurology (equal)	Orthopaedics

*includes a mixture of RA1 (Major Cities) and RA2 (Inner Regional).¹⁷ RA1 is not eligible for Medicare billing for telehealth.¹⁸

whereas previously multiple departmental administrative staff managed it.

Comparing booked with billed telehealth highlighted limitations of Medicare's 'consent to bill' requirements. RCH staff reported difficulty in obtaining faxed consent to bill Medicare when patients attended their local doctor for telehealth. Medicare requires faxed or emailed consent from patients to bill Medicare on their behalf, including the consultation Item number.¹⁰ As the Item number is not known until after the consultation takes place, it can be difficult to send this consent form to the patient and have it signed before they leave the doctor's clinic. The electronic signature system involves an email message sent direct to the patient or parents, and although this is better than standard email, it still represents a manual process requiring staff to fill in the form and relies on parents completing the form online.

Comparing booked with billed telehealth highlighted funding limitations of Medicare-billable telehealth. The audit of booked and billed appointments also highlighted the need for sustainable telehealth funding models. Allied health staff, registrars or fellows provided many of the telehealth appointments. Where face-to-face clinics are often run by a team including a consultant, registrars, fellows, nurses and allied health staff, Medicare-billable telehealth only funds the consultant. Therefore to ensure Medicare funding, telehealth can only be provided by the most expensive, and not necessarily most appropriate, member of the team: the medical consultant.

A snapshot of billable telehealth activity helped to estimate the activity required to fund a telehealth coordinator. The lack of an identifiable telehealth contact person in the Specialist Clinics has limited the uptake of telehealth and it was proposed that a 3-day per week telehealth coordinator should be employed. A snapshot of telehealth activity over two busy months was used to estimate the revenue from telehealth. Approximately 65 billed

telehealth appointments per month would be required to fund a 0.6 FTE post.

Understanding face-to-face activity and referral patterns is useful to plan telehealth provision. An understanding of the source of referrals can assist with prioritising telehealth implementation. Although there were high volumes of rural, regional or interstate patients seen in orthopaedics, plastics and cardiology, there has been limited uptake of telehealth in these specialties. The reasons include challenges with funding models or clinician buy-in to telehealth or identification of suitable patient cohorts. The literature supports the role of telehealth in all these specialties.^{11–16}

Telehealth models are likely to vary between services. For example, regular orthopaedic fracture reviews could be run at local GP clinics; oncology long-term follow-up involving the child's own GP or paediatrician would enable the local doctor to become an integral part of the long-term post-treatment monitoring and routine epilepsy review appointments in neurology could be offered to patients in their home.

Combining data from the Centre for Community Child Health and general medicine makes general paediatrics the third highest provider of telehealth. The RCH must be careful to ensure that telehealth does not replace locally available paediatric services and that existing referral patterns are maintained.

Conclusion

Previous studies have demonstrated the convenience to families of paediatric telehealth, and consumer and clinician acceptance.^{3,4} Collecting useful, measurable data informs improvement and helps ensure management support for telehealth. The present review has identified the services with the most rural, regional or interstate patients, and what referrals are coming from where. This helps to focus the rollout of telehealth on the needs

of patients, to reduce demand on hospital physical space and to offer convenience to families.

The data review showed that most telehealth activity has been provided by just a few clinicians. Understanding this has been useful as we try and improve activity with other clinicians. The data analysis has highlighted process gaps that can be rectified to increase activity and maximise revenue. It has also enabled more realistic and useful targets to be established. Overall, the findings have been valuable in planning the future expansion of telehealth at the RCH.

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