

Telementoring for hepatitis C treatment in correctional facilities

Journal of Telemedicine and Telecare
2018, Vol. 24(10) 690–696
© The Author(s) 2018
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/1357633X18795361
journals.sagepub.com/home/jtt



Maike Neuhaus¹ , Danette Langbecker¹ , Liam J Caffery¹,
Monica Taylor¹, Lisa Garner¹, Gayle Williams²,
Anthony C Smith¹ and Graeme A Macdonald³

Abstract

Introduction: Prevalence of hepatitis C virus (HCV) is substantially higher among prisoners than the general population. In Australia until recently, only a small proportion of prisoners with HCV received antiviral therapy. The direct-acting antivirals (DAAs) for HCV are highly effective, with a low burden of side effects. Since 2016, DAAs are available to all Australians with HCV. However, currently in Australia, they can only be prescribed by or in consultation with experienced prescribers. This study evaluated a telementoring service to upskill doctors and nurse practitioners working in correctional facilities.

Methods: The telementoring service was implemented in five correctional facilities. Qualitative interviews were used to examine the perceived clinical effectiveness and organisational impacts of the service. Content analysis of the interviews was used to identify key themes.

Results: In the first ten months of the service, there were 16 telementoring sessions with 173 patients discussed. Sixteen staff participated in qualitative interviews. From these, three key themes were identified: access to antiviral therapy; organisational impacts (cost, increased staff knowledge and confidence, staff time, and workload); and, adaptations of the care model and future opportunities.

Conclusion: Telementoring is an effective method to facilitate eligible prescriber status to medical doctors and upskill other clinicians in correctional facilities to increase capacity to treat HCV.

Keywords

Prisoners, health services, antiviral agents, telehealth, telemedicine

Date received: 15 July 2018; Date accepted: 26 July 2018

Introduction

Correctional facility inmates are a high-risk group for hepatitis C virus (HCV) infection.¹ The prevalence of HCV in Australian prisons is about 40 times higher than the general population,² with approximately 35% of prisoners being infected.³ While this issue is similar in other countries, HCV prevalence among Australian prisoners is among the highest.^{4–6} Until recently, only a minority of HCV-positive prisoners in Australia have received antiviral therapy.²

Until March 2016, HCV antiviral therapy was based on pegylated interferon injections combined with oral Ribavirin. Side effects of this combination, particularly neuropsychiatric complications, made large-scale use in correctional facilities problematic.⁷ Since March 2016, the Australian government has funded direct-acting antiviral therapies for HCV (DAAs) for all Australians living with HCV. These agents are highly effective oral therapies with few side effects. However,

there is the potential for significant drug-drug interactions. DAA combinations that include a protease inhibitor can lead to worsening of decompensated liver disease. Additionally, DAAs are relatively expensive. For all these reasons, there are restrictions on who can prescribe these agents.⁸ In Australia, only specialists in HCV, or less-experienced doctors in consultation

¹Centre for Online Health, The University of Queensland, Australia

²Prison Health Services, West Moreton Hospital and Health Service, Australia

³Department of Gastroenterology and Hepatology; PA-Southside Clinical School, The University of Queensland; Translational Research Institute, Princess Alexandra Hospital, Australia

Corresponding author:

Maike Neuhaus, Centre for Online Health, The University of Queensland, Ground Floor, Building 33, Princess Alexandra Hospital, Woolloongabba, Queensland 4102, Australia.

Email: m.neuhaus@uq.edu.au

with such a specialist, can prescribe DAAs.⁹ At present, there is a paucity of experienced prescribers within the prison system.

To address this issue, the Princess Alexandra Hospital Secure Unit in Brisbane, Australia, recently established a telementoring service for HCV antiviral therapy in conjunction with clinicians in five prisons. Telementoring is a concept introduced by Project ECHO[®] in 2004.¹⁰ It increases access to specialty-level knowledge (rather than providing direct care to patients) through connecting specialists with primary care providers using video-conference. It has been applied in numerous target populations and specialties, including human immunodeficiency virus, HCV, and pain and addictions.¹¹ The secure unit of the hospital involved in this telementoring study provides inpatient and outpatient care of prisoners, including a long-standing face-to-face service for management of HCV. The telementoring service was a new program aimed at increasing capacity to treat prisoners with HCV by upskilling doctors and nurse practitioners about DAA therapy; and, for the prison doctors to become experienced prescribers.

This study explored the clinical effectiveness and other impacts from the perspective of service staff involved in the HCV telementoring service.

Methods

Telementoring service model

The telementoring service uses videoconferencing between a hepatology specialist team and clinicians from correctional facilities to assess patients, prescribe medications under specialist supervision, and review progress across a course of treatment. It is provided using a hub-and-spoke model, with a hepatologist (GAM), senior nurse, project officer and administrative staff at the Princess Alexandra Hospital Secure Unit (hub) and prisoner health service staff at five Queensland correctional facilities (spokes). Four of these were from one local health service area, with another being privately operated. The service commenced 23 January 2017. The service model is shown in Figure 1.

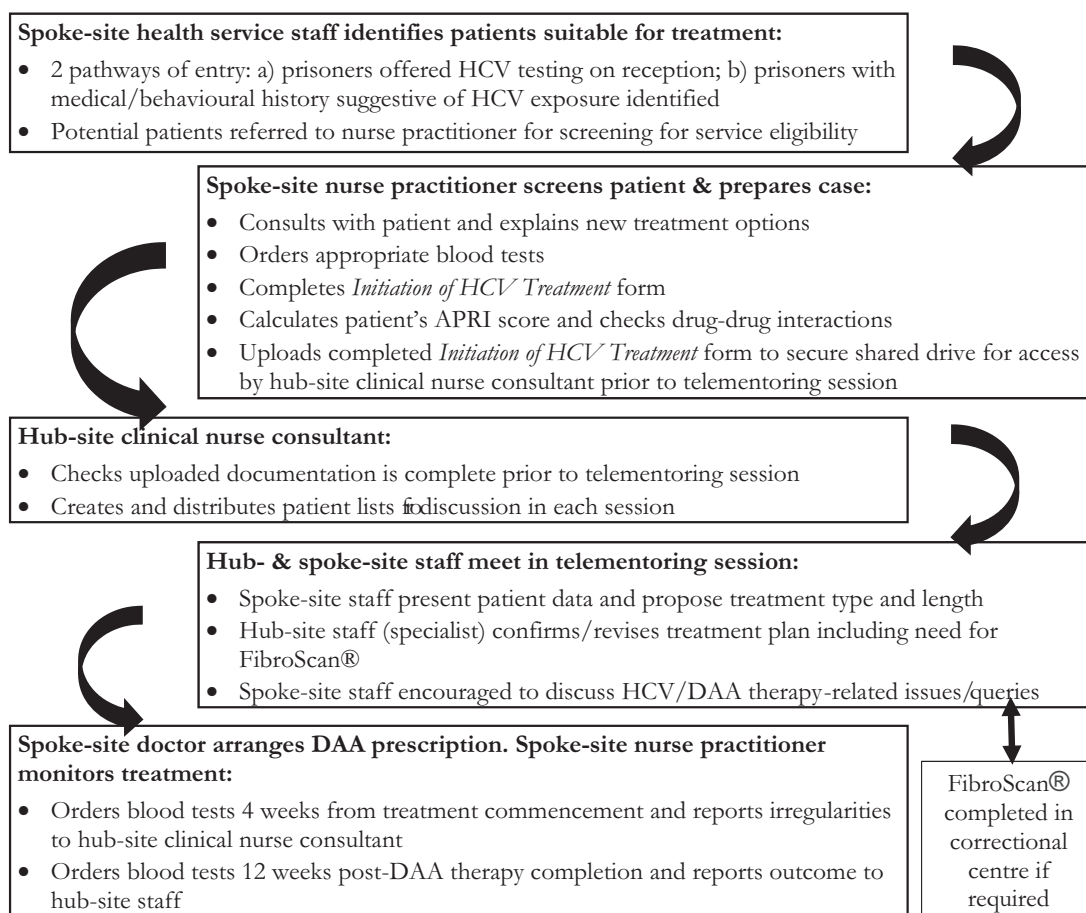


Figure 1. HCV Telementoring service model of care.

APRI: aminotransferase platelet ratio index; DAA: direct-acting antiviral; HCV: hepatitis C virus.

Data collection

Service activity data were from patients who were presented during a telemonitoring session during the first 10 months of service. Data were collected by the hepatology team in conjunction with spoke-site staff. Analyses of service activity data related to clinical effectiveness will be reported separately. All staff involved in the service were invited to participate in semi-structured qualitative interviews, conducted by a researcher not involved with service provision (MT). Interviews included questions about the impacts of the service on staff knowledge and confidence to treat HCV; organisational impacts such as changed workloads, service activity, and costs; and successes and barriers of the new model of care (Table 1). Interviews were conducted by phone or in person and were audio-recorded, transcribed and entered into NVivo software to facilitate analysis.

Data analysis

Quantitative data were analysed descriptively. Qualitative data underwent inductive content analysis by three researchers (MN, DL, MT) in an iterative fashion. This involved reading transcripts and familiarisation with the data. One researcher inductively coded all transcripts and a second coded half the transcripts. Discussion and comparison of codes enabled the

development of an agreed set of codes that was then applied to the data. Comparison and grouping of codes with reference to the transcripts and in discussion with a third researcher enabled creation of key themes representing the perspectives of participants. Findings are reported using the Consolidated Criteria for Reporting Qualitative Research framework.¹²

Ethical approval

Ethical approval was granted by Metro South Health Human Research Ethics Committee (HREC/17/QPAH/244), with ratification by The University of Queensland Human Research Ethics Committee (clearance number 2017000753).

Results

During the first 10 months of the telementoring service, 127 patients (19% female, average age 35.7 years) were discussed in 16 telementoring sessions across five facilities. A total of 108 patients commenced DAAs with 75% confirmed as completing treatment. (It was possible that more prisoners completed treatment; however, they were either released or transferred with their script, so the outcome of their treatment is not known.) (See Table 2).

Table 1. Semi-structured interview guide.

-
1. What is your role with Queensland Health or Corrections?
 2. What does your involvement with the Hepatitis C Telehealth Service in QLD correctional facilities look like on a day-to-day basis?
Prompt: first involvement
 3. What were your initial thoughts or impressions on the idea of the telehealth service before becoming involved?
Prompts: excited, sceptic, good ideal/bad idea
 4. How does this model compare to the standard treatment prisoners previously received?
Prompts: Access, continuity of care, timing
 5. How has the model changed from when it first started to now?
Prompts: communication, frequency of calls, number of cases discussed, paperwork, time, patients
 - Why were those changes made?
 - What impact have those changes had?
 - Looking back, is there anything you wished you had known at the start that would lead you to have done things differently?
 6. How has this model affected your confidence in treating hepatitis C?
 7. How has this model affected your workload and process?
Prompts: paperwork, time commitments
 8. How has the model affected prisoners?
Prompts: health, access
 9. How has service activity changed over time?
Prompts: number of patients
 10. How are costs affected?
Prompts: transport, staff time, clinical costs
 11. What barriers or problems have you encountered with providing service in this manner?
Prompts: All patients eligible? Need to see specialist in person?
 - Have there been any negative things to come out of this program?
 12. What are the successes or most positive things to come out of this program?
Prompts: Staff knowledge/confidence improved? Patients give any feedback?
 13. Any other comments you would like to make on the service?
-

Table 2. Hepatitis C virus telementoring service case activity over the first 10 months.

Correctional facility	Cases discussed	Cases commenced treatment	Confirmed cases completed treatment	Unknown outcome - (released on treatment with remaining dispensed medication)	Unknown outcome - (transferred on treatment with remaining dispensed medication)
Facility A	33	29	23	5	1
Facility B	15	11	7	4	0
Facility C	27	24	20	4	0
Facility D	24	18	11	7	0
Facility E	28	26	20	5	1
TOTAL	127	108	81	25	2

Twenty staff involved with the service were invited to participate in the qualitative interviews, with 16 consenting (11 from spoke sites; 10 female; age range 32–60 years). Participants were from a variety of staff levels and positions, including medical, nursing, allied health and administrative sectors. Interviews averaged 15 minutes (range, 7–33 minutes).

Key themes identified from interviews included access to treatment, organisational impacts, and adaptations to the service model and future opportunities. Illustrative quotes are shown in Table 3.

Access to treatment

Most participants reported that prisoners had poor access to HCV treatment prior to the telementoring service, with some reporting no treatment activity at their sites. Several respondents reported that patients without comorbidities (i.e. low-acuity patients) were rarely seen. Participants also reported a lack of formal coordination for HCV treatment. Prisoners were typically seen on an ad-hoc basis which was dependent on referral by a prison doctor to the tertiary centre. This also meant prisoners who received antiviral therapy were not necessarily comprehensively assessed prior to specialist review, which contributed to delays before commencing therapy.

Substantial increases in treatment access for prisoners at the facilities were reported. Reasons highlighted for the increase were the availability of DAAs and upskilled staff to identify patients suitable for treatment (e.g. patients expected to be simple to treat and incarcerated for duration of treatment, with no evidence of cirrhosis, few comorbidities, and no potential drug-drug interactions). Most participants highlighted the positive impact the increased access had on treated prisoners. They reported that such prisoners were grateful to receive therapy quickly and without the burden of travel to tertiary facilities. Some participants also identified positive impacts of improved access to treatment on the broader community, such as reduced

HCV transmission risk on prisoners' release into the community.

Participants mentioned a number of ongoing challenges with the new model of care. This included unintended treatment breaks when patients were released or moved to another prison. Another challenge was the large number of patients eligible for DAA treatment, with prison health services having to implement processes to prioritise prisoners to manage high patient loads.

Organisational impacts. Most participants reported that the service activity rapidly increased after implementation of the telementoring service, and continues to increase. Organisational impacts of the service included coordination requirements, improved staff knowledge and confidence, and workload and cost implications.

Many participants highlighted the importance of careful coordination of the service. Such coordination was seen as critical because of the high number of preparatory tasks required to optimise the telementoring sessions; and, to facilitate uninterrupted treatment when a prisoner moved to another facility. Many participants mentioned improvements in efficiency of coordination had occurred over time.

Increases in staff knowledge and confidence regarding HCV antiviral therapy were attributed to the training provided during implementation and from participation in the service. Across the involved prisons, one medical officer (GW) achieved status as an experienced prescriber as a result of her participation. Four nurse practitioners were involved and became experienced in identifying and evaluating patients for DAA therapy.

Most participants reported a slight increase in workload to complete paperwork, order tests, and coordinate with stakeholders. While this workload increased over time because of the increasing number of patients being treated, participants also indicated that they have become more efficient in processing the related tasks.

Perceived cost implications of the service were mixed. Some participants mentioned that correctional

Table 3. Summary of themes, categories and illustrative quotations.**Theme: Access to treatment***Increased access to treatment compared to previous*

So we never, we weren't treating anyone, we had not treated a single prisoner, as far as I'm aware, that wasn't acute kind of thing, in our prisons prior to us doing this. Yet we'd had medication for 12 months available to us. [HEPCTH8]

Impact of increased access on prisoners

Sometimes they use it as a bit of a stepping stone for another life. Because if they don't have Hep C then that's the start of being healthy. [HEPCTH16]

Impact of increased access on the broader community

... because there is such a high percentage of patients in prison with hepatitis C it then has an effect on the general community because we're not spreading it as much when they do get out of prison. [HEPCTH6]

Remaining challenges to access

The movement between the jails and from the jail back into the community, that's one of our biggest barriers. [HEPCTH17]

Theme: Organisational impacts*Coordination*

Well the way with the hepatitis C prescriptions is that there's quite a delay in getting it in from central pharmacy. So we have to rearrange our schedule and make sure that we place the order well before Monday in order to get the delivery supply the Friday of the same week. ... We try to work in a schedule so that we get the prescriptions and check through them for validity and ordering them before the deadline. [HEPCTH10]

Staff knowledge and confidence

So I think that's a benefit of this because it's the same people really understanding what we're doing and making it more efficient and safer. ... The nurse practitioners were really getting involved. [HEPCTH6]

Staff time and workload

I would say it's required additional paperwork but the paperwork isn't that huge. It's only like a three page document it's really just a tick and flick most of it. And as far as the bloodwork we would be doing the bloodwork anyway so I guess that's not really been an addition. So I guess it's just the paperwork and actually then physically seeing the patients to let them know what's happening and advise them of issues of treatment. And then I guess the time that it takes to actually do the video conference each fortnight. [HEPCTH7]

Cost implications

... we see maximum security prisoners. Hence the cost of bringing them into the secure unit for a face-to-face consult would be massive because of the amount of security that needs to be put in place. And also holding that patient in a confined area for quite a few hours. [HEPCTH1]

So yeah so the... sort of cost of meds, like at the [facility] pharmacy in the past, my whole stockholding was like about \$30–40,000, stockholding. My drug bill now is going to the millions. [HEPCTH13]

Adaptations to the model and future opportunities*Changes made to the HCV telementoring model*

... basically we've been left to treat them, once they've been started on treatment we have been left as nurse practitioners, which is good, to treat them on an everyday basis. And we don't need to kind of check in with the gastro about them anymore unless we feel that we need to. [HEPCTH8]

Future opportunities

So we've gone ahead now on the back of this and gone to the pain service and said you know this really, really works for us with hepatology can you engage with us in a similar way where we'll do the assessment of patients and present their cases to you and consult with you remotely about them so that you can give us some advice on how to manage them. [HEPCTH17]

HCV: hepatitis C virus; Hep C; hepatitis C.

facilities saved money by avoiding prisoner transport for in-person hospital screening, testing, treatment and monitoring. However, the correctional facilities experienced significant changes in cash flow with implementation of the service. These changes occurred because of the high cost of DAAs, combined with the increased number of patients on HCV treatment at the correctional facility. While the federal government reimburses the cost of these prescriptions, the reimbursement is distributed into the general revenue for the corresponding hospital and health service and not necessarily directly back to the prison health service.

This means that the telementoring service could result in substantial over-budget spending by the prisons' pharmacies.

Adaptations and future opportunities

The third key theme related to adaptations to the telementoring service over time as well as opportunities to expand the service model.

Several adaptations to the model were noted. Some participants mentioned that initially, prescriptions were written by the tertiary facility specialist. Over time,

the prison primary care teams largely took over the prescribing process. Furthermore, owing to the large demand for the service, a cap was placed on the number of patients each prison was allowed to present per telementoring session. Other adaptations included consistent record-keeping across spoke sites; stocking small amounts of DAA medication for the treatment of patients who moved from another prison without their DAAs; an increased frequency of telementoring sessions from once per month to fortnightly; and, discussion of new patients only, with patient reviews solely being discussed on a needs-basis.

Many participants perceived future opportunities for the telementoring model to improve and evolve. This included establishment of a dedicated nursing and/or administrative position to complete the involved paperwork and case preparation; increased scope to treat simple cases without specialist input; and, expansion of the telementoring service to other specialties, such as persistent pain and inflammatory bowel disease.

Discussion

Telementoring is an effective method to upskill staff in identifying and preparing patients for HCV treatment, and can facilitate staff to become experienced prescribers of DAAs. Results from this study indicate that telementoring can increase capacity to treat HCV in correctional facilities. This is comparable to reports by HCV telementoring services in other countries,¹³ as well as telementoring services in other specialties.¹¹ Furthermore, results from this study indicate that an HCV therapy telementoring service is likely to reduce the per capita cost of treating HCV in this setting.¹⁴

While this service achieved its aims, a few challenges and improvement opportunities were identified. The challenge around unintended treatment breaks when patients are released or transferred to another prison can be overcome by prescribing DAAs using Regulation 24.¹⁵ This enables the entire course of therapy to be provided at the time of initial dispensing and transferred with the prisoner to other prisons or on his or her release. However, this increases the issue of pharmacy cash flow and may further limit the number of scripts filled per day.

Another improvement opportunity relates to DAA prescribing restrictions. Across the five correctional facilities, only one doctor (in addition to the specialist) was involved and upskilled to prescribe. While the number of nurse practitioners involved in the service was significantly higher, they are, under current Australian regulations, allowed to prescribe DAAs only in the community.⁸ The scope of the service could be extended by allowing nurse practitioners to

also prescribe DAAs in Australian correctional facilities. However, as identified by participants of this study, additional staff roles may be required to assist with the associated increased workload.

A few limitations of this study should be noted. Some staff interviews were very short in duration, potentially compromising in-depth discussion. Furthermore, this study examined staff perceptions rather than formally measured changes in staff knowledge or economic impacts of the service. However, this telementoring service has strong potential for extension to other prisons, or other settings where there is a high prevalence of HCV (e.g. remote Indigenous communities), and to other clinical services (e.g. diabetes, persistent pain services, renal impairment or cardiovascular risk factors).

Acknowledgements

We would like to acknowledge participating correctional facilities as well as the staff who volunteered their time to participate in qualitative interviews. We would also like to acknowledge the dedicated service staff, including Marie Finley, Penny Wright and Jo Rowan, without whom this service would not exist.

We thank Metro South Health and West Moreton Hospital and Health Service for their contribution towards this work.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by funding to establish the Princess Alexandra Hospital Telehealth Centre that was provided by the Commonwealth and State Governments – through the Digital Regions initiative.

ORCID iD

Maike Neuhaus  <http://orcid.org/0000-0002-4960-2614>

Danette Langbecker  <http://orcid.org/0000-0002-6964-2912>

References

1. Dolan K, Teutsch S, Scheuer N, et al. Incidence and risk for acute hepatitis C infection during imprisonment in Australia. *Eur J Epidemiol* 2010; 25: 143–148.
2. Butler T, Lim D and Callander D. National prison entrants' bloodborne virus and risk behaviour survey 2004, 2007 and 2010. Darlinghurst, NSW: The Kirby Institute (University of New South Wales) and National Drug Research Institute (Curtin University), 2011.
3. van der Poorten D, Kenny DT and George J. Prevalence of and risk factors for hepatitis C in Aboriginal and

- non-Aboriginal adolescent offenders. *Med J Aust* 2008; 188: 610–614.
4. Alvarez KJ, Befus M, Herzig CT, et al. Prevalence and correlates of hepatitis C virus infection among inmates at two New York State correctional facilities. *J Infect Public Health* 2014; 7: 517–521.
 5. Dolan K, Wirtz AL, Moazen B, et al. Global burden of HIV, viral hepatitis, and tuberculosis in prisoners and detainees. *Lancet* 2016; 388: 1089–1102.
 6. Zampino R, Coppola N, Sagnelli C, et al. Hepatitis C virus infection and prisoners: Epidemiology, outcome and treatment. *World J Hepatol* 2015; 7: 2323–2330.
 7. Imperial JC. Chronic hepatitis C in the state prison system: Insights into the problems and possible solutions. *Exp Rev Gastroenterol Hepatol* 2010; 4: 355–364.
 8. Australian Government Department of Human Services. *Highly specialised drugs*. Canberra: Australian Government, 2018.
 9. Australian Government Department of Health. *Hepatitis C medicines – fact sheet for community based prescribers*. Canberra: Australian Government, 2018.
 10. Arora S, Geppert CMA, Kalishman S, et al. Academic health center management of chronic diseases through knowledge networks: Project ECHO. *Acad Med* 2007; 82: 154–160.
 11. Zhou C, Crawford A, Serhal E, et al. The Impact of Project ECHO on participant and patient outcomes: A systematic review. *Acad Med* 2016; 91: 1439–1461.
 12. Tong A, Sainsbury P and Craig J. Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. *Int J Qual Health Care* 2007; 19: 349–357.
 13. Tahan V, Almashhrawi A, Mutrux R, et al. Show Me ECHO-Hepatitis C: A telemedicine mentoring program for patients with hepatitis C in underserved and rural areas in Missouri as a model in developing countries. *Turk J Gastroenterol* 2015; 26: 447–449.
 14. Taylor M, Caffery LJ, Scuffham PA, et al. Economic modelling of telehealth substitution of face-to-face specialist outpatient consultations for Queensland correctional facilities. *Aust Health Rev*. Epub ahead of print 28 November 2017. DOI: 10.1071/AH17135.
 15. Australian Government Australian Institute of Health and Welfare. *Pharmaceutical Benefits Scheme (PBS) prescription – Regulation 24 applicable indicator*. Canberra: Australian Government, 2018.