EXPERIENCE REPORT

Learning Health Systems

Telementoring of primary care providers delivering hepatitis C treatment in New York City: Results from Project INSPIRE

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Abstract

Introduction: The recent availability of highly effective, easily administered, and relatively nontoxic treatments for hepatitis C virus (HCV) infection provides an opportunity for clinicians to treat HCV in nonspecialist settings with appropriate support. Project INSPIRE provides care coordination to HCV patients and a web-based training program (telementoring) on disease management and treatment by HCV specialists to primary care providers inexperienced in HCV treatment. Weekly telementoring sessions use a didactic and case-based approach to instruct non-HCV providers on how to identify and assess HCV treatment candidates and prescribe appropriate treatment.

Methods: We used mixed methods to assess the telementoring service, including provider surveys and semistructured interviews. Quantitative data were analyzed using descriptive statistics, and qualitative data were analyzed to identify dominant themes.

Results: Provider survey responses indicated an increased ability to identify and evaluate HCV treatment candidates and increased confidence in sharing knowledge with peers and patients. Interviews revealed a high degree of satisfaction with the telementoring service and Project INSPIRE overall. The telementoring service was viewed as having enhanced providers' knowledge, confidence, and ability to treat their own HCV-infected patients rather than having to refer them to an HCV specialist with resulting benefits for continuity of care. Providers reported comradery and collegiality with other INSPIRE providers and satisfaction with professional growth from attaining new knowledge and skills via the telementoring service.

Conclusions: Using readily available web conferencing technology, telementoring can facilitate knowledge transfer between specialists and primary care providers, facilitating continuity of care for patients and increased provider satisfaction.

KEYWORDS

care coordination, HCV treatment, provider satisfaction, telementoring

1 | INTRODUCTION

Hepatitis C virus (HCV) is a global concern, affecting roughly 184 million people worldwide, and it is the most common blood-borne infection in the United States.[1-4] Left untreated, HCV often leads to chronic liver disease including cirrhosis, liver cancer, and extrahepatic complications.[5-7] Until recently, multidrug HCV treatment regimens lasted 24 to 48 weeks, had low cure rates, and were often accompanied by moderate to severe side effects, which made adherence and completion of treatment a challenge for many patients.[8-11] Some of the side effects could be alleviated by adjusting the dosage of medication, but this required specialist knowledge of HCV and the medications.

The treatment of HCV was transformed with the introduction of highly effective direct-acting antivirals in 2013.[12,13] Current HCV treatments include several 8- or 12-week once-daily single-pill oral regimen options with limited side effects. These treatments do not require frequent clinical monitoring and are highly effective in curing HCV infection. The ease of administration and few side effects facilitate adherence and increase the likelihood of treatment completion and achieving a cure (sustained viral response); reported rates of sustained viral response in clinical trials and some observational cohorts exceed 90%.[14-17]

With the availability of these new medications, the demand for HCV treatment has grown. However, the number of clinicians experienced in and willing to treat HCV infection is insufficient to meet the demand, and more providers are needed to meet the needs of HCV patients seeking care and treatment.[9,18,19] Further limiting access to care is a requirement by a majority of state Medicaid programs in the United States that require an HCV specialist either prescribe or consult on the prescription of HCV medications.[20] Increased HCV screening resulting from the Centers for Disease Control and Prevention's 2012 guidance recommending an HCV screening test for all persons born between 1945 and 1965 and the resulting increase in case identification adds to the need for clinicians who can provide HCV care and treatment.[21,22]

Project INSPIRE, funded by an Health Care Innovation Award from the Centers for Medicare & Medicaid Services (CMS) to identify, diagnose, and treat people with HCV, and led by the New York City Department of Health and Mental Hygiene, provides care coordination to people with HCV by identifying them and assisting them through the steps of the cascade of HCV diagnosis and treatment.[23,24] Another component of Project INSPIRE is to train primary care providers (PCPs) who are non-HCV specialists to treat and care for their HCV-infected patients through a telementoring program delivered via a weekly webinar series, which is the focus of this report. The telementoring service is provided by the 2 clinical partners in New York City who are participating in INSPIRE: Montefiore Medical Center and Mount Sinai Medical Center. Hepatitis C virus specialists and nonspecialist PCPs participate together in the telementoring service.

The term telemedicine is widely used to describe the remote provision of health care using some form of video telecommunication and is typically used for remote monitoring of patients.[25-27] Telemedicine is typically used to diagnose and monitor patients in rural settings and in prisons and typically refers to an encounter between provider and patient.[28-30] In contrast, "telementoring" refers to a provider-to-provider relationship and has more often been applied to surgical specialists who provide assistance to surgeons in remote locations including battlefields and underserved, rural areas.[31-34] Telementoring is essentially real-time technical assistance and guidance between a provider with specialized information and a remote provider who is the recipient of the information.[35] Reported benefits of surgical telementoring include the ability to share the latest surgical techniques with remote providers which in turn allows patients to benefit from the receipt of more advanced care locally.[32,33] Telementoring has evolved beyond the realm of surgery to address a variety of health concerns ranging from acute conditions, such as certain surgical procedures and emergency care, to chronic conditions such as asthma and diabetes. Physicians at the University of New Mexico created Project ECHO (Extension for Community Healthcare Outcomes) to train PCPs around the state in HCV care and treatment via videoconferencing.[36-38] Outcomes from Project ECHO include increased professional satisfaction and greater confidence among the participating providers in caring for their HCV patients, who often have complex care needs, such as medical, mental, and behavioral health care.[36]

Project ECHO began with telementoring on HCV because of the high HCV prevalence in New Mexico, a rural state that at that time had only 2 clinics providing HCV treatment.[36] The original goal of Project ECHO was to bring the quality of care delivered at an academic medical center to rural patients throughout New Mexico who were receiving care at a local clinic. Remote training of rural providers through a telementoring program was an integral component of Project ECHO and key in transforming the health care system in that state, enabling more people to be assessed and treated for their HCV infection. In Project INSPIRE, a telementoring service similar to the ECHO model was applied to an urban setting where PCPs participating in the telementoring service learn about HCV disease and treatment from HCV specialists affiliated with their institutions who are also participating in Project INSPIRE with the goal of transforming the workforce and enabling PCPs to treat their HCV-infected patients. The service has several features of a Learning Health Care System (LHCS), including learning from patient experiences, continuous ongoing study, a routine socio-technical infrastructure, and stakeholders who view the service as part of their culture.[39]

The objective of this analysis was to describe the perceived benefits of the Project INSPIRE telementoring service from the providers' perspective and to describe how satisfaction varied between HCV specialists, PCPs, and mental health providers, at each of the 2 clinical partners. We present the results of surveys conducted to assess changes in providers' self-assessed knowledge, ability, and confidence in caring for HCV patients as well as their satisfaction with the program. We also present results from qualitative interviews with providers that give context for the survey responses and to highlight differences by provider type.

2 | METHODS

Each medical center participating in Project INSPIRE developed its own telementoring service, both of which focused on training and mentoring PCPs and other non-HCV specialists on how to care for their HCV-

infected patients including how to assess for and provide HCV treatment. Participating providers at each institution attend weekly telementoring sessions, available online at one medical center and available both online and in person at the other. Presentations, which typically use a case-based format, are given by HCV specialists, hepatologists, infectious diseases specialists, PCPs, psychologists, social workers, and Project INSPIRE care coordinators. Interactive discussions between participants and the weekly speaker are possible through the chat and audio functions of the webinar platform. Providers are also able to present cases for discussion during the webinars and receive real-time feedback on care and treatment options from the participating HCV specialists and other clinicians. The webinar topics include medical aspects of liver disease focusing on HCV infection and treatment; psychosocial aspects of substance use and models of providing care along the HCV care continuum; and policy issues related to patient treatment access. Some of the specific topics covered include the following: patient assessment prior to treatment; when to refer for liver transplant; HCV/HIV coinfection; prior authorization for HCV treatment; and HCV treatment among people who use drugs.

Project INSPIRE providers who attended the telementoring sessions were asked to complete surveys at baseline and at months 6 and 12. The survey questions were based on questions used in Project ECHO[36] and were administered on paper or electronically via email. Project INSPIRE providers were also invited to participate in semistructured interviews between December 2015 and February 2016 to assess their satisfaction with Project INSPIRE in general and with the telementoring service. The interviews were conducted by authors who are trained in qualitative research methods employed by Weill Cornell Medical College. Survey data were analyzed using t tests and the McNemar test to assess changes from baseline to follow-up. Qualitative interview data were analyzed using NVivo v. 10 (QSR International, Burlington, MA) to identify dominant themes. The surveys and interview guides were approved by the Institutional Review Board of Weill Cornell Medical College. Dr Alain Litwin has received grant support from and is an Advisory Board member for Merck and Gilead Sciences. Dr Jeffrey Weiss has received grant support from Gilead Sciences.

3 | RESULTS

3.1 | Survey results

Of the 18 providers participating in the project, 72% (n = 13) completed all 3 of the telementoring surveys: one survey at baseline with follow-up surveys at the 6- and 12-month intervals. Of the 5 who did not complete all of the surveys, 4 were HCV specialists and one was a PCP who left to work elsewhere in the first year of the project. A description and count of providers from each site who were included in our quantitative and qualitative analyses are given in Table 1. There were no substantial differences between sites in either the quantitative or the qualitative result.

Providers were asked to rate their perceived ability to perform certain HCV care–related tasks at baseline and again at 12 months. Of all the changes related to the program, the greatest improvement was in perceived "ability to serve as a consultant within my clinic for HCV questions and concerns," with an average score of 6.08 (scored 1-7) at 12 months, compared with 4.56 at baseline (P < .05). The second greatest increases were seen in perceived ability to educate and motivate patients with HCV infection and ability to educate clinic staff about patients with HCV, with the former going from 5.29 at baseline to 6.31 at 12 months (P < .05) and the latter going from an average of 5.22 to 6.23 (P < .05 for both). A statistically significant change was also observed in providers' perceived ability to identify suitable candidates for HCV treatment, going from 5.28 to 6.31 (Table 2). The ability of providers to assess and manage substance use disorder problems among their HCV patients and to manage psychiatric comorbidities in their HCV patients did not significantly change from baseline to 12-month follow-up.

Providers were also queried on their satisfaction with participating in Project INSPIRE after 6 months. All providers (100%) said they would recommend the program to a colleague even though one-third (33%) felt that the project increased their workload. A majority (83%) of the providers felt that the project had decreased the number of traditional consultations while 6% disagreed and 11% did not know. All of the providers (100%) agreed that the project improved the quality of patient care and 94% reported greater job satisfaction (Table 3). There were no statistically significant differences in the responses when the questions were repeated after 12 months compared with the 6-month responses.

3.2 | Qualitative interview results

Fourteen of the 18 (78%) participating providers agreed to be interviewed, 7 from each of the 2 medical centers. All of the HCV specialists who were interviewed were from one institution; providers from the other institution were primarily PCPs, including 2 infectious diseases specialists who provided HIV primary care. During the semistructured interviews, providers were specifically asked to describe their satisfaction with the telementoring sessions. One question also asked them to describe the greatest benefit of participating in Project INSPIRE. Three dominant themes emerged from their responses, 2 of which were directly related to the benefits of the

TABLE 1 Providers by site and data collection method

	Provider Type	HCV MD	Non-HCV MD	NP	RN	PhD	LCSW
Quantitative surveys, n = 18	Site 1	1	7	1	0	0	0
	Site 2	2	1	1	2	2	1
Qualitative surveys, n = 14	Site 1	1	5	1	0	0	0
	Site 2	2	1	1	1	1	1

Abbreviation: HCV, hepatitis C virus.

TABLE 2 Changes in perceived ability: baseline and 12-mo assessments

	Ability to Identify Patients who Should Be Screened for HCV		Ability to Identify Suitable Candidates for Treatment for HCV		Ability to Assess Severity of Liver Disease in Patients With HCV		Ability to Educate Clinic Staff About Patients With HCV		Ability to Educate and Motivate Patients With HCV		Ability to Assess and Manage Psychiatric Comorbidities in Patients With HCV		Ability to Assess and Manage Substance Abuse Comorbidities in Patients With HCV		Ability to Serve as a Consultant Within My Clinic for HCV Questions and Issues	
	Baseline	12 mo	Baseline	12 mo	Baseline	12 mo	Baseline	12 mo	Baseline	12 mo	Baseline	12 mo	Baseline	12 mo	Baseline	12 mo
Mean	5.67	6.38	5.28	6.31	4.94	5.92	5.22	6.23	5.29	6.31	4.50	5.54	4.78	5.38	4.56	6.08
SD	1.3	1.0	1.3	0.9	1.2	1.2	1.4	0.9	1.2	0.9	1.6	1.2	1.6	1.2	1.8	1.1
P value*	.100		.020		.033		.028		.013		.056		.249		.010	

Abbreviation: HCV, hepatitis C virus.

Response key: 1 = no skill; 2 = vague knowledge; 3 = slight knowledge; 4 = average among peers; 5 = competent; 6 = very competent; 7 = expert.

*Paired t tests were used to test for statistically significant changes among providers who completed both baseline and follow-up surveys.

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telementoring (the third described the benefit of having a care coordinator available to work with patients):

1. Personal and professional growth as a result of participating in the project
2. The ability to treat their own patients and potentially cure them of the infection

The first theme was primarily endorsed by PCPs who gained knowledge about caring and treating their HCV-infected patients and on the latest HCV treatments. Along with the gains in knowledge, providers also reported a greater sense of community with their INSPIRE colleagues as a result of the telementoring sessions as well as ongoing knowledge transfer outside of the sessions. Providers who regularly attended the telementoring sessions and who were not HCV specialists described the value of being able to present some of their cases during the telementoring sessions and then receiving real-time feedback from others. This was described as particularly helpful in learning how to treat HIV/HCV-coinfected and more complex patients. One provider who has many coinfected patients described the benefit of receiving feedback on these patients during the telementoring sessions in this way:

> To have that sort of real-time feedback, the chance for more of an interaction, a conversation about it, is very helpful.

Half of the HCV specialists attended the webinar series regularly, but even those who attended less frequently reported satisfaction with the program in general and said that whether they were presenting or simply attending, it was a good opportunity to reinforce their knowledge.

Of the 6 providers who reported their professional growth as the biggest benefit, 3 also stated that they felt like they were part of a larger team and that the collegiality that developed had a positive impact on their job satisfaction and professional growth, including increased confidence in their ability. One provider who became the "go-to" person for HCV-related information at her clinic described how the telementoring service had allowed her to grow as a clinician and to become a source of information for patients and other clinicians at her clinic. Another clinician described how the telementoring service brought the HCV providers together and how that created a sense of comradery among the participating providers.

> The team-building—the experience of being part of a larger team; I think that's very empowering and makes me more comfortable working with more challenging patients.

The next most commonly stated benefit of taking part in Project INSPIRE by PCPs was the ability to treat their own patients rather than referring them to a specialist for care. These providers said this also benefitted their patients who might be reluctant to see a specialist because of perceived stigma. One provider described how this change in her practice affected her personally.

> The amount I've learned about treating folks with Hep C and how gratifying it is ... just being able to see people

TABLE 3 Provider satisfaction: 6- and 12-mo results

	Would Recommend INSPIRE to Colleague		Improved Quality of Patient Care		Increased Job Satisfaction		Useful in Treating Other Patients		No Increase in Personal Workload		More Integrated in Clinic System		Better Access to Specialty Care		Decreased Traditional Consults	
	6 mo	12 mo	6 mo	12 mo	6 mo	12 mo	6 mo	12 mo	6 mo	12 mo	6 mo	12 mo	6 mo	12 mo	6 mo	12 mo
Agree	100%	100%	100%	100%	94%	84%	100%	100%	56%	62%	94%	10%	94%	10%	83%	92%
Disagree	0%	0%	0%	0%	0%	8%	0%	0%	33%	38%	0%	0%	6%	0%	6%	0%
Do not know/not applicable	0%	0%	0%	0%	6%	8%	0%	0%	11%	0%	6%	0%	0%	0%	11%	8%

Abbreviations: HCV, hepatitis C virus; PCP, primary care provider.

For 6-month data, n = 18 (10 PCPs; 4 HCV specialists; 4 HIV specialists); 12-month data, n = 13 (9 PCPs; 4 HIV specialists).

who have been sick for a long time get better—it's really gratifying in a number of ways. Emotionally and intellectually, it's been a wonderful experience.

Another reason providers felt that the project had positively impacted their patients was the convenience of being treated in the same clinic where they went to for primary care and not having to get to a different clinic to see another provider. One provider described how some patients are reluctant to keep appointments with other providers and her ability to treat them at their regular clinic has allowed them to get treated.

I try not to refer people out of the clinic, and part of that is because the more referrals you have to do out of the clinic, the less likely something's going to actually happen, because then people have to make their way to another appointment and they have to see another provider and establish care with another provider. If you're able to keep it where they feel comfortable and supported … then they're more likely to make it through treatment.

Some of the providers of HCV/HIV-coinfected patients also discussed the satisfaction of being able to tell patients that they were now cured of disease. One PCP described how he will never be able to cure someone of their diabetes, but he can cure their HCV and relieve them of that burden.

I explain to them (that) this is adding many years to your life … that (it's) not a problem you have to think about anymore as long as you don't get re-infected. And people see it in my eyes, and I see it in their eyes that this is like a big deal. It feels good to be able to tell somebody you are cured of a disease.

When asked about the impact participating in Project INSPIRE had on their workload, providers were evenly split in saying that their workload had either increased (n = 5) or decreased (n = 5), with the remaining 4 reporting no discernable change in workload. Several providers stated that even though they were seeing more patients with HCV due to their participation in the study, the assistance provided by the care coordinators allowed them to spend more time with their patients, resulting in greater job satisfaction. The providers who reported an increased workload typically described having to attend more meetings as the most negative aspect of the project. Providers who reported an increased number of patients as a result of INSPIRE typically indicated that the increase was viewed positively.

4 | DISCUSSION

Project INSPIRE provided the opportunity for 2 academic medical centers in NYC to enhance access to HCV care and treatment. One of the goals of this project was for each institution to expand the number of providers capable of assessing and treating HCV-infected patients. This goal was accomplished in part by a telementoring service that is consistent with many of the features of an LHCS.[39] External funding, such as the CMS grant awarded to Project INSPIRE, has been cited as motivation for a medical center to transition toward an LHCS.[40] Additional support for providers was also provided by the CMS grant through the employment of care coordinators who were tasked with educating and supporting HCV-infected patients who were enrolled in Project INSPIRE. Identifying new sources of funding at the expiration of the grant such as through health insurance reimbursement is a sustainability challenge that is currently being actively addressed by the Project INSPIRE team.

Providers who participated in Project INSPIRE and completed baseline and follow-up surveys about the telementoring service reported increased confidence at follow-up in their ability to identify patients who are suitable candidates for HCV treatment. Follow-up surveys also showed that providers had gained confidence in their ability to educate and motivate their patients on the need to be screened for HCV and evaluated for treatment. This extended to confidence in being a source of HCV-related information for other providers and staff at their clinic. Hepatitis C virus specialists described benefitting from the service by being able to share their expertise with other providers and by reaffirming their knowledge of the material. The weekly telementoring service, an important component of Project INSPIRE, was highly valued by the providers we interviewed. Primary care providers described how participating in the telementoring service was a positive experience and that it enhanced their overall job satisfaction. Several PCPs described how the service provided them with the opportunity to grow professionally by learning about HCV care and treatment from specialists at their organization. Primary care providers also reported increased self-confidence as a result of the knowledge attained and the ability to begin treating their own patients rather than having to refer them out.

The ability to treat their own patients was important to the PCPs because it enhanced the continuity of care for their patients by removing a potential barrier of having patients see a different provider at another location. For providers with HCV/HIV-coinfected patients, the PCPs also described the satisfaction of being able to cure a patient of one disease and how gratifying that was for both them and the patients. Clinicians also valued the opportunity that telementoring provided them to engage with other INSPIRE providers that enhanced their sense of collegiality as well as their professional confidence. Having a regularly set time for the sessions and providing a broad base of knowledge, such as advances in care and treatment, along with sessions on other relevant topics, would encourage attendance among providers.

A lesson learned is that the technology required to conduct a web-based program such as this one is inexpensive and should not be considered a barrier to implementation. Webcams are now widely available, and low-cost web conferencing services are available. Most of the costs are labor costs for the time of the attendees and presenters.

While we did identify some statistically significant differences, we would recommend caution in interpreting these results due to the relatively small sample sizes at baseline and follow-up and the lack of a standard to identify the clinical significance of these differences. Some of the responses to questions related to program satisfaction may also have been influenced by additional components of the program, such as the care coordination and HCV education provided to patients, which may have previously been performed by the providers. Another limitation is that the HCV specialists participating in Project INSPIRE were less likely to have completed the telementoring surveys or provider satisfaction interviews. Therefore, these results are more influenced by the opinions and attitudes of the participating PCPs who were also more likely to benefit from the telementoring service. The web-based telementoring service provided in this study was well received by providers and enhanced their professional satisfaction. Primary care providers particularly appreciated the opportunity for professional growth and the didactic discussions with their peers and HCV specialists. Participation in the telementoring service gave PCPs the knowledge and confidence to treat their HCV-infected patients, improving continuity of care for those patients.

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