Pre-Coronavirus Disease 2019 Telehealth Practices Among Pediatric Infectious Diseases Specialists in the United States

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Key Points:

A pre-COVID-19 survey of pediatric infectious disease specialists about their use of telehealth found low utilization but high interest. The top modalities used, the interest of the providers, and the barriers to implementation are described.

ABSTRACT

Background: Telehealth (TH) practices among pediatric infectious disease specialists prior to the coronavirus disease 2019 (COVID-19) pandemic are largely unknown.

Methods: In 2019, the Pediatric Infectious Diseases Society (PIDS) Telehealth Working Group surveyed PIDS members to collect data on the use of TH modalities, adoption barriers, interest, extent of curbside consultations (CC), and reimbursement.

Results: Of 1,213 PIDS members, 161 (13.3%) completed the survey, and the responses of 154 (12.7%) from the US were included in our report. Medical school (63.6%) and hospital (44.8%) were the commonest work settings with 16.9% practicing in both of them. The most common TH modalities used were synchronous provider-patient virtual visits (20.8%) and synchronous provider-provider consultations (13.6%). TH services included outpatient consultations (48.1%), vaccine recommendations (43.5%), inpatient consultations (39.6%) and travel advice (39.6%). Barriers perceived by respondents included reimbursement (55.8%), lack of experience with TH (55.2%), lack of institutional support (52.6%), lack of administrative support (50%), and cost of implementation (48.7%). Most respondents (144, 93.5%) were interested in implementing a wide range of TH modalities. CCs accounted for 1-20 hours/week among 148 respondents.

Conclusions: Most of the PIDS survey respondents reported low utilization of TH and several perceived barriers to TH adoption before the COVID-19 pandemic. Nonetheless, they expressed a strong interest in adopting different TH modalities. They also reported spending considerable time on non-reimbursed CCs from within and outside their institutions. Results

of this survey provide baseline information that will allow comparisons with post-COVID-19 changes in the adoption of TH in PID.

Key Words

Telehealth, telemedicine, infectious disease, pediatrics

Introduction

Telehealth (TH) encompasses a broad array of virtual care domains and modalities. The American Telemedicine Association (ATA) definitions are utilized by many.[1,2] Telehealth refers often to virtual communication between a patient and a clinician, but usually includes telemedicine which entails communications between providers. Physicians in many specialties use TH to provide services to colleagues and patients. The American Medical Association's 2016 Physician Practice Survey reported that 15.4% of US physicians had adopted virtual care modalities including audio-visual e-visits (a term often indicating virtual visits) for patients and inter-professional interactions, and 11.2% of the physicians reported working in settings that used provider-to-provider communications such as subspecialty consultations.[3] It should be noted that " telemedicine" was defined in that report as "the use of technology as a substitute for an in-person encounter with a health care professional" to avoid Medicare's definition at the time which limited telehealth to two-way, audiovisual, real-time interactions. The Health Resources Services Administration (HRSA) currently defines TH as the use of electronic information and telecommunications technologies to support long-distance clinical health care, patient and professional health-related education, public health and health administration.[4] HRSA notes that TH is different from telemedicine because TH refers to a broader scope of remote healthcare services than telemedicine, and the latter refers specifically to remote clinical services.

A 2018 survey regarding trends in the TH industry reported that 22% of 800 US physicians in various specialties used TH, a four-fold increase from 5% in 2015.[5] Specialists accounted for 37.5% of survey participants. The top adoption reasons noted in the survey included

increasing patient access, work-life balance, attracting and retaining new patients, improving outcomes, and interest in new technology.

Despite the increased use and reporting on TH practices across the US, limited data exist on TH in pediatrics. Data collected by the Supporting Pediatric Research on Outcomes and Utilization of Telehealth (SPROUT) network from 52 pediatric TH programs (one respondent per program) found 18 pediatric infectious diseases TH (telePID) programs (12 established and six pilot projects).[6] Combined adult/pediatric infectious diseases programs accounted for 55.7% of this group; the number of pediatric-only teleID projects was unknown (Christina Olson, MD, University of Colorado; personal communication). The top established pediatric subspecialty TH programs were psychiatry, cardiology, neurology, neonatology, and critical care. Pediatric infectious disease (PID) did not rank among the top 10 TH-utilizing specialties in that survey.

Given the limited data about practices and attitudes of individual clinicians in our field, the Pediatric Infectious Diseases Society (PIDS) Telehealth Working Group (TWG) sought to understand the TH landscape along with perceptions of barriers to adoption among its members. The results of its first TH survey form the basis of this report.

Methodology

Telehealth Survey

The PIDS TWG was established in 2018 to understand and facilitate the implementation of TH in PID. The group's first task was to understand current TH practices. The PIDS TWG outlined areas within TH that were considered important in understanding existing practices and would be relevant to the adoption of TH in PID. We focused on the specialist in the

care-team subdomain of domain 3 (the experience of TH by its users) of the National Quality Forum framework for measuring the use of TH.[7] The other domains are access to care, financial impact/cost and effectiveness. The survey included the following areas: (1) current TH practices in the US, (2) perceived barriers to implementing telehealth, and (3) practical topics relevant to using telehealth (e.g. reimbursement, liability, etc.).

The group developed a 33-question online survey, containing categorical, quantitative and qualitative questions, to collect individual-level data on TH practices by PIDS members practicing within the US. The survey was adapted and expanded from a 10-question TH survey*[1]that was developed by the Infectious Disease Society of America, and included questions about work setting, use of and time dedicated to TH, satisfaction with TH versus in-person visits, services provided via TH, modalities used, interest in adopting TH and in sharing data with the IDSA, and barriers to TH implementation. Results of that survey have not been published at the time of submitting this report.

We included questions about the respondents' geographic location, specialty/subspecialty training and practice, practice setting and size, the use of synchronous and asynchronous modalities, and TH applications. We queried respondents about the services provided via TH, the modalities used, adoption barriers, reimbursement, whether extramural credentialing (i.e. credentials at outside organizations other than the primary one) was required, professional practice liability, methods and estimated number of curbside consultations (CCs) per week, and the estimated time spent providing CCs per week. The survey did not collect data about remote monitoring, tele-education of patients or

* https://www.idsociety.org/idsa-newsletter/may-9-2018/how-is-tech-used-in-id-clinical-practice-work-group-launches-member-survey/

providers, perceived or actual benefits or outcomes, or specific information about telehealth vendors.

The survey was reviewed and revised by the TWG, and was pilot tested by the chair (D.O.). The PIDS Medical Affairs and Executive Committees reviewed the final version. A link to the survey, administered using SurveyMonkey®, was emailed to all PIDS members and was open for three weeks in March-April 2019.

Definitions

We used TH terms for the purpose of this report primarily as defined by the American Telemedicine Association; it should be noted that its definitions, which resided originally on one webpage, were split among two sources as of September 2020.[1,2] *Asynchronous* telecommunication is store-and-forward transmission of medical images and/or data typically in separate time frames; *synchronous* telecommunication is live simultaneous transmission. Both methods may be used among providers, or between providers and patients. *Telehealth* and *telemedicine* have been used interchangeably in the literature; the latter is considered a type of TH.[4] We use TH to refer to interactions outside the inter-clinical-site scenario such as provider-patient asynchronous or asynchronous virtual or e-visits. *Virtual visits* refer to asynchronous or synchronous communications between patients and providers, and is often used, as is "e-visits," in the industry's vernacular to mean synchronous audiovisual telecommunication between them. Telemedicine in the discussion section refers to communications between clinical sites, e.g. consultations, regardless of the transmission type. We use the terms *teleID* and *telePID* to refer to TH usage by ID and PID specialists, respectively. When we cite terms from references, we use them per the original sources. Curbside consultations (CCs) were defined as any informal advice, suggestion, or

opinion provided to a health care worker (HCW) concerning infectious diseases for which a formal consultation was not performed by the FAHC infectious diseases service, and as such is non-reimbursed service.[8]

Analysis

We used descriptive statistics to characterize each question with a focus on practice settings, types of services rendered by the respondents, and reimbursement. We did not perform comparative statistics. Respondents were excluded from the analysis if their responses indicated locations outside the US or not practicing PID. When questions were skipped, the number of respondents who answered the question were reported accordingly.

Results

Respondents

One hundred sixty-one PIDS members (13.3% of 1,213) completed the survey; seven (4.3%) were excluded because they practiced outside the US (four), were retired at the time of the survey for an unknown period of time (two) or did not practice in the specialty (one). The remaining 154 respondents were all PID physicians, including two who also see adults and two fellows in training. The respondents were located in 34 states with 1-15 respondents per state. The states with the most respondents were California (15), New York (14), Pennsylvania (12), Illinois (10), and Tennessee (9). Most respondents reported practicing in one state only, while 31 (21.1%) reported practicing in 1-6 states.

Work Setting

The two main work/employment settings were medical schools (n=98, 63.6%) and hospitals (69, 44.8%). The remaining settings (solo/group private practice, schools of public health, departments of health and "other") had <8 respondents each. Dual practice settings were reported by 26 (16.9%) at medical school and hospital, two at medical school and school of public health, and one at a multispecialty group and medical school. The median number of providers in a practice reported by 146 respondents was seven (range 1-25). Eight responses indicating ≥75 (range 75-325) individuals per practice were excluded because they suggested entire departments or multispecialty groups instead of the PID division or group.

Telehealth Usage

Forty respondents (25.9%) indicated the use of one or more TH modalities. Synchronous provider-patient consultation was reported as the most common modality (n=32, 20.8%) followed by synchronous provider-provider consultations (21, 13.6%). Figure 1 summarizes the reported usage of one or more telehealth modalities. Overall, synchronous interactions were more common (n=53, 34.4%) than asynchronous communication (31, 20.1%). The most common types of services provided via TH included outpatient consultation (n=74, 48.1%), vaccine recommendations (67, 43.5%), inpatient consultations and travel recommendations (61, 39.6% each). Figure 2 shows all responses reported by the survey participants including "other" and "I don't know".

Barriers

There were 86 (55.8%) respondents who cited “no reimbursement” and/or “insufficient reimbursement” as barriers to TH adoption. Other barriers included lack of experience with the technology (n=85, 55.2%), lack of institutional support (81, 52.6%), lack of administrative support (77, 50%), cost of implementation (75, 48.7%), and insufficient provider time (72, 46.8%) (Figure 3). Individually, “no reimbursement” and “insufficient reimbursement” accounted for 59 (38.3%) and 56 (36.4%) of responses, respectively, and different 29 respondents of each group cited the other reimbursement concern, too. Other barriers were less frequently reported.

The majority of respondents did not know if there was a requirement for extramural credentialing (n=88, 57.1%) or liability coverage (68, 47%) for TH. Notably, many did not answer these two questions resulting in a significantly lower number of responses. It is worth noting that 56 (36.4%) respondents cited fear of medical liability as a barrier to using TH.

Reimbursement

Only 44 (28.6%) of the 154 respondents reported any type of reimbursement for TH, and 16 of them (36.4%) did not know the TH payment source or reimbursement arrangements. Payer types included Medicaid/Medicare (29.5%), private payers (27.3%), internal institutional payments (18.2%), and inter-hospital contracts (11.4%). The remaining 13.6% were split among fee-for-service arrangements with public health or other organizations (6.8%), Tricare (2.3%), grant funding (2.3%) and third-party virtual TH vendors (2.3%).

Curbsides

Curbside consultation (CCs) entailed a significant portion of PID providers' time. There were 148 respondents who estimated the time spent on CCs as 1-20 hours/week, and 134 (90.5%) of them reported up to 10 hours per week. Estimates of the hours per week were 1-2 hours/week for 39 (26.3%), 3-5 hours/week for 70 (47.3%), and 6-10 hours/week for 25 (16.9%). The amount of CC time of 3-5 hours/week represents 7.5% to 12.5% of a 40-hour work week. About half of 151 respondents (n=88, 52.9%) estimated 0-10% conversion of CCs to referrals; 35 (23.2%) and 31 (20.5%) of respondents reported rates of 11-20% and 21-40%, respectively; five (3.3%) reported up to 60% conversion rate.

Interest in Telehealth Adoption

There was high interest among PID respondents to implement one or more TH modalities in their practices (n=144, 93.5%), particularly those entailing provider-to-provider interactions, including synchronous (108, 70.1%) and asynchronous (88, 57.1%) consultations (Figure 4). They were also interested in patient-provider synchronous (n=81, 52.6%) and asynchronous (68, 44.1%) e-visits. Interest in adopting TH was indicated by TH users and nonusers, e.g. 49 (74.2%) of 66 nonusers reported such interest. The adoption of additional modalities varied among users due to the different ones already in use.

Discussion

This report is the first, to our knowledge, to describe the use of, barriers to implementation and attitudes towards TH among individual PID specialists, and it provides a useful baseline of PID TH practices in the pre-COVID-19 era. Overall, the PIDS survey respondents reported low usage but high interest in TH. Synchronous consultation with patient examination and

synchronous/asynchronous provider-to-provider consultations were the most commonly used modalities. Respondents identified significant barriers to implementing TH services at their institutions, which reflected the need for support in navigating technical, payer, legal and credentialing issues. The top three barriers to implementing TH were reimbursement, lack of experience, and lack of support. Yet interest in implementing various TH modalities, especially synchronous provider-to-provider consultations was high prior to the COVID-19 pandemic.

Our survey found that CCs accounted for a significant amount of PID specialist time. Non-reimbursable CCs accounted for 17% of the clinical-work reimbursable value of an adult ID service obtained in a prospective one-year study conducted in 2005.[8] The estimated one-year revenues if this work was compensated were $93,979 using 2005 CMS reimbursement for a six-specialist group, but it was not reported if all the clinicians or some of them provided the CCs. An analysis of 197 asynchronous PID "e-consult" CCs estimated their value to be equivalent to 70 level 4 outpatient consultations, but only 10.5% were converted to in-person evaluations.[9] About half of the respondents to our survey reported only 0%-10% conversion, underscoring the importance of reimbursement as an adoption barrier before the pandemic.

Our findings are similar to results of a large multi-specialty survey conducted before the pandemic. The survey focused primarily on video visits, a core service of the survey sponsor, and reported an increase in their usage from 5% in 2015 to 22% in 2019. That survey showed low utilization and high interest in TH among pediatric providers (7% and 79%) and infectious disease specialists (17% and 83%).[5] It is unclear if the latter group included PID specialists or not. The top adoption barriers among all respondents were uncertainty of

reimbursement (77%), doubt about clinical appropriateness (72%), lack of physician buy-in (60%) and poor leadership support (44%).

There are limited data about outcomes in teleID, and particularly in telePID. Some studies of TH in managing infectious diseases report on practices of primary care clinicians, not ID sub-specialists. One study of outpatient claims for children and adults with six common infections found that virtual visits had lower rates of laboratory testing and imaging, a similar rate of follow-up visits versus most other care settings, but higher rates of antibiotic prescribing and broad spectrum antibiotic usage.[10] Previously, the increased rates of antibiotic usage during e-visits were observed in some studies,[11] while in not in others.[12] Some methodologic differences may explain these discrepancies.

TH studies published between January 2015 and March 2019 also assessed the impact on clinical outcomes from various infections. These studies demonstrated more appropriate antibiotic prescribing and significant reductions in isolating multi-drug resistant bacteria following a telemedicine antimicrobial stewardship program; similar outcomes to on-site consultation in appropriate management, mortality and readmission for *S. aureus* bacteremia; effective use of HIV pre-exposure prophylaxis; and equivalent response to hepatitis C virus therapy.[13] Synchronous multispecialty telemedicine and/or teleconference including ID was associated with sustained virologic response similar to in-clinic management for hepatitis C regardless of genotype.[14] A systematic review of teleID studies, involving mostly adult patients, found that clinical outcomes seemed comparable to in-person consultations with high patient satisfaction, although the studies were deemed to be of poor quality.[15] TeleID has demonstrated high patient satisfaction for general ID, hepatitis C and HIV.[13] A recent systematic review found several benefits from using telehealth, such

as ease of use, trends for improved outcomes and communication, increased access to care and fewer missed appointments.[16]

Our findings must be viewed in the context of the COVID-19 pandemic, which impacted the US 10 months after completion of the survey. The pandemic has transformed the use of TH in the US and elsewhere with higher TH utilization by patients and clinicians. Primary care providers were already eager to take advantage of telePID before the pandemic.[17] Several changes in the TH environment took place during the pandemic, including actions by federal and state governments, which removed restrictions on the use of non-HIPAA compliant applications and practicing across state lines.[18] Other significant changes were removing patients' financial burden to access TH for COVID-19-related care and reimbursement parity between office and virtual visits. Health insurance payers rapidly implemented changes and sometimes waived cost sharing for all TH purposes. Other factors contributed to the rapid uptake of TH including better institutional support for TH, and patient and provider concerns about exposure to the virus in clinical settings. Hong et al[19] found a strong correlation between public interest in TH in the US, rapidly rising in the first two weeks of March 2020, and the increase in COVID-19 cases.

Data from other countries highlight their TH usage, too. Vilendrer et al[20] described rapid deployment of telemedicine at a children's hospital but did not report utilization trends. An Italian team described a new telePID program that was activated in response to the pandemic relying on synchronous consultation with limited examination.[21] In a two-month period, 55 of 61 (90.2%) children avoided visits to the emergency room. TH played a valuable role in reducing potential exposure to pathogens and improving contact tracing and monitoring of large numbers of individuals during epidemics,[22] and telemedicine

reduced the use of personal protective equipment during care for newborns.[23] A report from China described asynchronous and synchronous provider-patient COVID-19 consultations which included ID and other specialists.[24] The level of TH adoption in PID in the US during the pandemic is unknown, but would almost certainly be higher than before it.

Our survey had several strengths and limitations. It was the first to assess TH practices among PID specialists from a geographically diverse sample in the US. It was limited by the small sample size due to the low response rate, and the preponderance of respondents from university and hospital settings. It is unclear if inexperience with TH caused the survey's low response rate, though the latter is typical for most online surveys.

In summary, our survey of PID providers documented low usage and high interest in telehealth before the COVID-19 pandemic. It identified barriers to implementing telePID that existed before the pandemic and found that PID providers dedicated a significant amount of time to non-reimbursable curbside consultations. The survey provides baseline data of telePID practices which surely underwent a dramatic change in 2020. The PIDS Telehealth Working Group will conduct another survey to assess the extent of new telePID adoption since the pandemic has started.

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Figure 1: Telehealth modalities used by pediatric infectious disease specialists. Percent of respondents (n= 154). Participants selected one or more responses.

Figure 2: Services provided by pediatric infectious disease specialists via telehealth. Percent of respondents (n= 154). Participants selected one or more responses.

Figure 3: Barriers to adopting telehealth by pediatric infectious disease specialists. Percent of respondents (n= 154). Participants selected one or more responses.

Figure 4: Interest of pediatric infectious disease specialists in telehealth modalities. Percent of respondents (n= 154). Participants selected one or more responses.

Figure 1

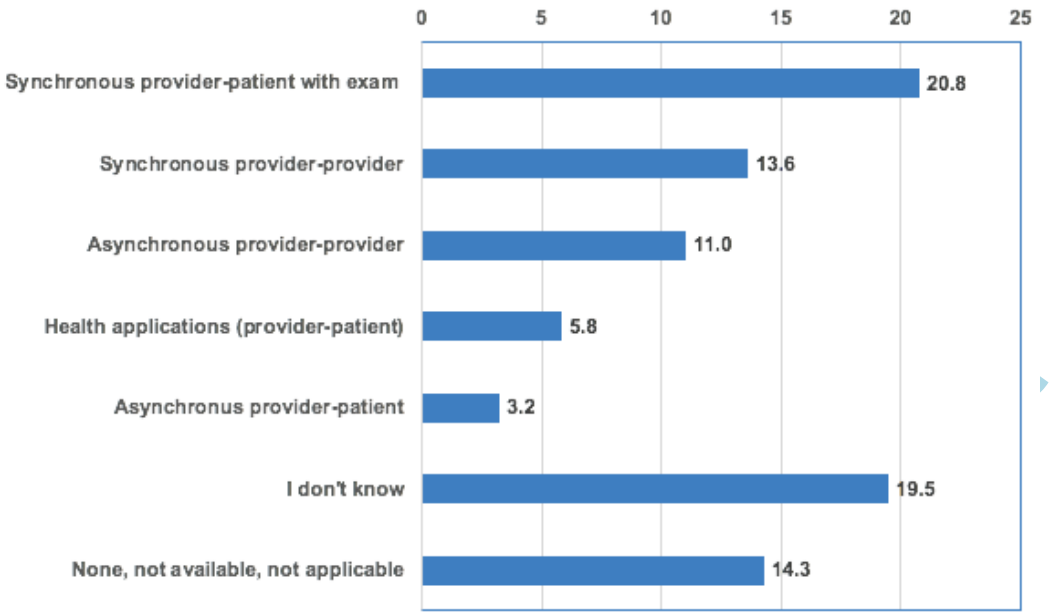

Figure 2

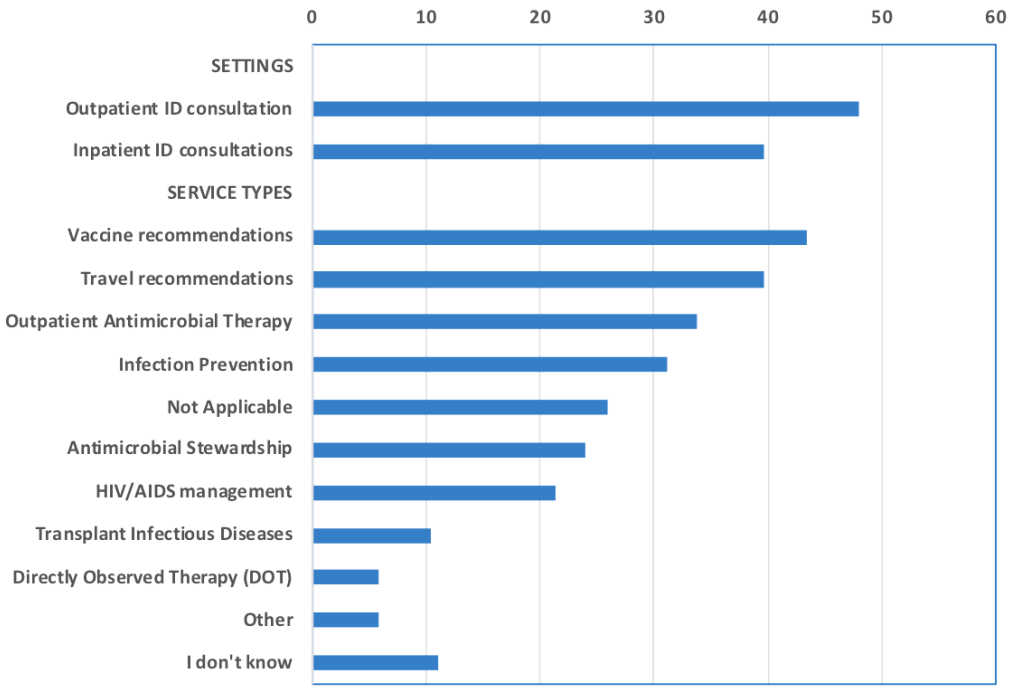

Figure 3

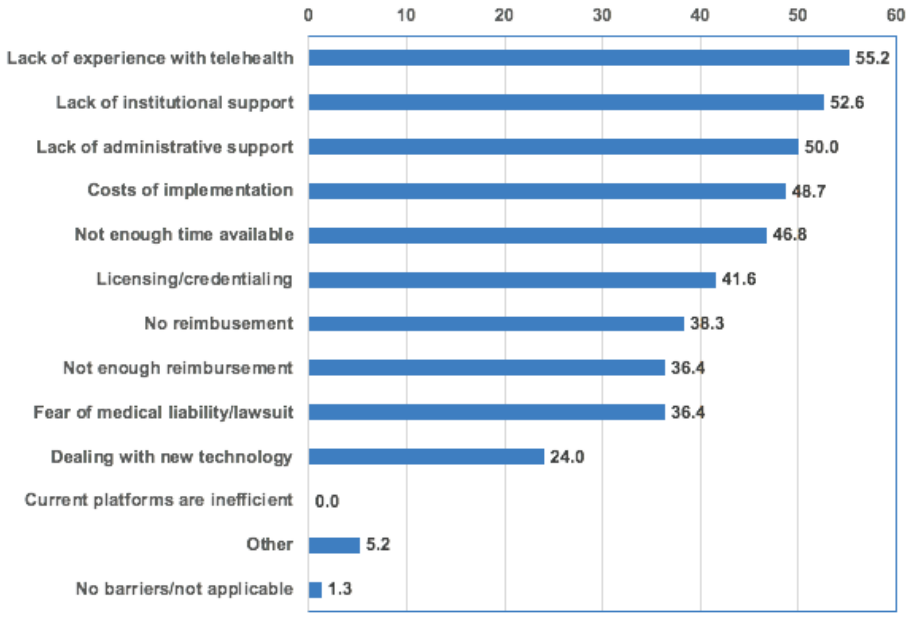

Figure 4