Journal of the Endocrine Society, 2023, **7**, 1–5
https://doi.org/10.1210/jendso/bvad073
Advance access publication 17 June 2023
Brief Report

Comparison of Endocrinologists' Physical Examination Documentation for In-person vs Video Telehealth Diabetes Visits

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Abstract

Objective: Outpatient diabetes mellitus (DM) care over video telehealth (TH) requires modifications to how endocrinologists complete physical examinations (PEs). But there is little guidance on what PE components to include, which may incur wide variation in practice. We compared endocrinologists' documentation of DM PE components for in-person (IP) vs TH visits.

Methods: Retrospective chart review of 200 notes for new patients with DM from 10 endocrinologists (10 IP and 10 TH visits each) in the Veterans Health Administration between April 1, 2020, and April 1, 2022. Notes were scored from 0 to 10 based on documentation of 10 standard PE components. We compared mean PE scores for IP vs TH across all clinicians using mixed effects models. Independent samples *t*-tests were used to compare both mean PE scores within clinician and mean scores for each PE component across clinicians for IP vs TH. We described virtual care-specific and foot assessment techniques.

Results: The overall mean (SE) PE score was higher for IP vs TH (8.3 [0.5] vs 2.2 [0.5]; $P < .001$). Every endocrinologist had higher PE scores for IP vs TH. Every PE component was more commonly documented for IP vs TH. Virtual care-specific techniques and foot assessment were rare.

Conclusions: Our study quantifies the degree to which Pes for TH were attenuated among a sample of endocrinologists, raising a flag that process improvements and research are needed for virtual Pes. Organizational support and training could help increase PE completion via TH. Research should examine reliability and accuracy of virtual PE, its value to clinical decision-making, and its impact on clinical outcomes.

Key Words: physical examination, medical documentation, telehealth, virtual care, endocrinology

Abbreviations: DM, diabetes mellitus; HEENT, head/eyes/ears/nose/throat; IP, in-person; M, mean; PE, physical examination; TH, telehealth; VA, Veterans Health Administration.

Outpatient endocrine care provided by video telehealth (TH) increased exponentially since the coronavirus pandemic. Across medical subspecialties, endocrinology has had among the highest shares of visits conducted by video during the pandemic [1]. Even after the conclusion of the pandemic, TH will likely persist for endocrine care because it has its own benefits and advantages compared with in-person (IP) visits [2-8], and some payers have already committed to reimbursing for TH visits in the long term [9]. Thus, it is important to understand how endocrinologists practice differently when conducting TH visits, and where there may be opportunities for improvement to ensure that TH provides high-quality clinical care.

TH precludes the ability to conduct a hands-on physical examination (PE), raising the question of how clinicians have adapted their practices under this constraint. Historically, the hands-on PE is a major component of the medical visit. Professional groups recommend that the PE for IP visits be tailored to a patient's age, sex, and medical history [10, 11]. Several resources have been published that guide the clinician in conducting these aspects of a PE virtually [12-16]. For example, general appearance and alertness can be assessed at the outset of a telehealth visit. Inspection can also be done virtually to assess for skin abnormalities, neck masses, respirations, abdominal fullness, and gait. Patients can be instructed in maneuvers that aid assessment of other components of the PE including eye movements, peripheral pulses, and peripheral edema. Virtual evaluations can be augmented by using devices such as a home weighing scale, a smart watch that can track heart rate and has a built-in electrocardiogram, automated blood pressure cuff, thermometer, and a pulse oximeter. Virtual examination also allows the opportunity to assess patient's physical surroundings, home environment, and interaction with caregivers [12] to provide important context to patients' health and functioning.

Received: 7 April 2023. **Editorial Decision:** 24 May 2023. **Corrected and Typeset:** 27 June 2023

Specific to endocrinology is the question of how to modify the PE for diabetes mellitus (DM). In DM, PE helps to identify patients with or at risk for developing comorbidities or DM-related complications [17, 18]. A comprehensive PE for DM may include vital signs with or without orthostatic blood pressure, general appearance, and ophthalmoscopic, thyroid, cardiovascular, pulmonary, abdominal, musculoskeletal, neurologic, skin, and foot examinations. Some components, such as a fundoscopic examination or cardiac auscultation, are not currently routinely possible for an endocrine TH visit, but many other components can be completed in their typical or a modified form using inspection, patient self-examination or maneuvers, and data from devices. Comprehensive foot examinations, which should be performed annually [19], can be completed virtually with some modifications, requiring proper positioning of the camera, appropriate patient clothing that can expose the foot area, and patient participation to perform maneuvers and self-examination [13, 20, 21].

Although there is guidance about *how* to conduct components of a virtual PE for DM, there is little guidance from endocrine sources as to what *ought* to be included. Recently, the Endocrine Society released a policy perspective to help guide endocrinologists in the use of TH for outpatient care, but little guidance was provided on the virtual PE [22]. Further, there is a dearth of evidence to support the contribution of different examination components to clinical decision-making and outcomes for DM, such that given the extra effort required to conduct some pieces of the examination virtually, some endocrinologists may be omitting certain pieces of the examination for telehealth patients. As a result, there is likely wide variation in how endocrinologists approach PE for DM telehealth visits. In this study, we compare endocrinologists' documentation of PE components for IP and TH visits.

Methods

Study Setting and Data Source

We reviewed 200 clinic notes from adult endocrinologists in the Veterans Health Administration (VA), the largest integrated health system in the United States. We identified VA endocrinologists with at least 10 IP and 10 TH visits for new patients referred for DM management between April 1, 2020, and April 1, 2022, using data from the VA's Corporate Data Warehouse. Patients with type 1 DM and type 2 DM were included in the study. Clinic notes were excluded if the visit was VA clinical video TH clinic, which is a service using specialty equipment with the help of clinic staff. We randomly selected 10 of these endocrinologists, and for each of these clinicians we included the most recent 10 IP and 10 TH new DM patient visits in the study.

Data Collection

For each visit, K.A. (an endocrinology fellow) and V.V. (an endocrinologist) reviewed the clinic note and recorded whether there was any documentation (0 = no, 1 = yes) for the following 10 PE components: vital signs, general appearance, head/eyes/ears/nose/throat (HEENT), cardiovascular, pulmonary, abdomen, extremities, feet, skin, and neurological assessment. The entire clinic note was reviewed to ensure we captured PE assessments documented outside of the typical "objective" section of the note. If the clinician documented that the patient recently had a foot examination (within a year) or has an upcoming foot examination with a different provider, the foot examination documentation was considered fulfilled.

Each visit could receive a maximum possible score of 10, representing documentation of every PE component. Per clinician, each PE component could receive a maximum possible score of 10 for each visit modality, which would mean that the clinician documented that PE component for all 10 clinic visits. For TH only, we recorded use and type of techniques specific to virtual care: any use of recommended techniques for virtual PE such as patient self-examination or any use of patient-generated health data (ie, weighing scale, smart watch, automated blood pressure cuff, thermometer, or pulse oximeter), and whether assessment of patients' physical surroundings was documented. We did not include glucose data as part of patient-generated health data because this is generally not considered part of the PE. For the TH foot examination, we recorded the text that clinicians used to address this component when it was present.

Data Analysis

We compared the scores for in-person to TH visits using mixed effects models to control for the nesting within clinicians. Specifically, the clinician was treated as a random factor in analyses. We then compared the mean PE scores for IP vs TH visits within each clinician, using independent samples *t*-tests. We also compared the mean scores for each PE component, across all clinicians, for IP and TH visits, using independent samples *t*-tests. For all analyses, a *P*-value of $<.05$ was used as the significance level. We also calculated the frequencies of use for virtual-care specific techniques.

Results

Clinicians documented significantly more components of the physical examination for in-person visits (mean [M] = 8.3, SE = 0.5) than for TH visits (M = 2.2, SE = 0.5), $F(1, 9) = 160.1$, $P < .001$). In addition, each individual clinician had statistically significantly higher PE scores for IP vs TH visits. The difference between the number of PE components documented for IP vs TH varied across clinicians. For example, clinician 2 had a mean PE documentation score of 9.6 for IP vs 5.5 for TH visits, whereas clinician 6 had a mean PE documentation score of 9.0 for IP vs 0.1 for TH visits (Fig. 1).

Every PE component was more commonly documented during IP visits compared with TH visits (Table 1). The biggest differences in documentation of individual PE components for IP vs TH were for vital signs (M = 9.6, SE = 0.2 vs M = 0.0, SE = 0.0, $P < .0001$) and cardiovascular examination (M = 9.8, SD = 0.1 vs M = 0.0, SE = 0.0, $P < .0001$). Among IP visits, the most commonly documented components included vital signs, general appearance, HEENT, cardiovascular, and pulmonary examinations. The least frequently documented PE component was the foot examination (Table 1). For TH visits, the most commonly documented PE components were general appearance, HEENT, pulmonary, and neurologic examinations. Some TH visits fulfilled the foot examination component because of 5 clinicians documenting a recent hands-on foot examination or plans for examination by a different clinician, though no clinician recorded a virtual foot examination conducted during the visit. No TH visits included documentation of vital signs or the cardiovascular examination.

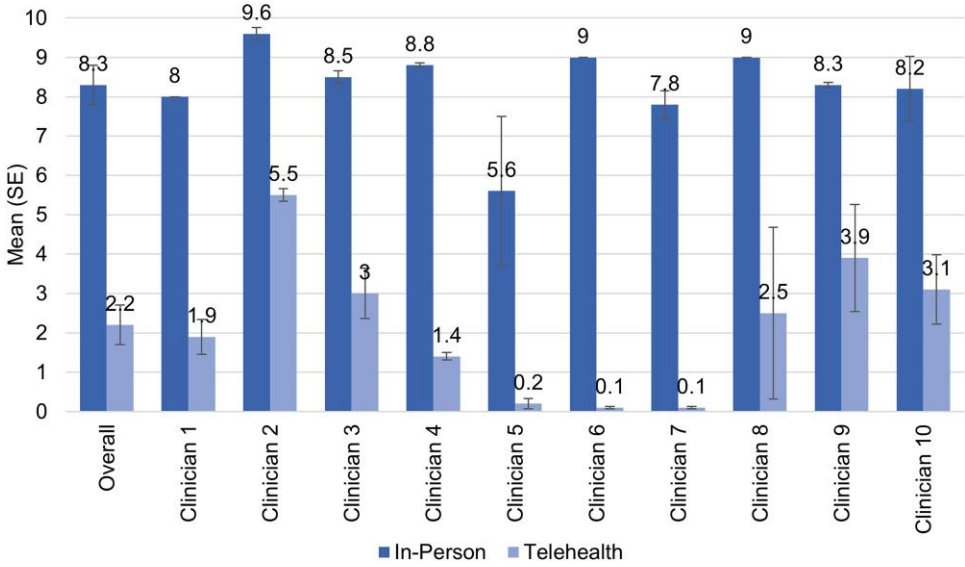

Figure 1. Comparison of physical examination documentation scores for in-person vs telehealth visits for new patients with diabetes.

Table 1. Comparison of mean scores for documentation of physical examination components for IP vs TH visits for new patients with diabetes, combined across clinicians, with examples of TH documentation

	IP visits mean (SE)	TH visits mean (SE)	*P* value	Examples of documentation for TH visit
Vital signs	9.6 (0.2)	0 (0)	<.0001	None
General appearance	9.9 (0.1)	6.5 (5.9)	.01	"Appears obese, well-groomed, sitting in bed, not in distress" "Normal appearance, not in distress"
HEENT	9.6 (0.3)	3.3 (3.6)	<.0001	"No facial plethora, no visible goiter, no moon facies" "No obvious thyromegaly" "No acanthosis nigricans"
Cardiovascular	9.8 (0.1)	0 (0)	<.0001	None
Pulmonary	9.8 (0.1)	3.9 (5.4)	<.0001	"Non-labored breathing on room air" "Breathing comfortably" "Speaking in full sentences"
Abdomen	9.1 (0.9)	0.2 (0.1)	<.0001	"Non-distended"
Extremities	8 (4.3)	1.5 (1.4)	<.0001	"No obvious deformities, moving freely" "No edema by patient palpation"
Foot	4.3 (6.5)	1.4 (0.9)[a]	.04	None
Skin	5.8 (5.9)	1.6 (3.7)	.01	"No visible rashes"
Neurologic	6.8 (6.2)	3.3 (4.2)	.03	"Alert, oriented, conversant, no tremors, no facial asymmetry" "Alert and oriented ×3"

Abbreviations: HEENT, head/eyes/ears/nose/throat; IP, in-person; TH, telehealth.
[a]Score was due to documenting recent foot examination or noting an upcoming foot examination with different provider.

The use of virtual care-specific techniques was minimal. Only 1 clinician used patient self-examination, having 3 patients perform self-examination for peripheral edema. No TH visits incorporated patient-generated health data or assessment of the surroundings.

Discussion

The emergence of TH has revolutionized health care delivery by enabling patients to receive care from remote locations, which has in turn changed the clinician's ability to carry out a central part of the visit—the physical examination. In this study, we conducted a chart review of 200 visits across 10 clinicians to compare physical examination documentation between in-person and telehealth visits for new patients with diabetes. We found much less documentation of PE components for TH compared with IP visits overall, which was a consistent finding across all 10 clinicians. Every PE component was less commonly documented for TH visits. No TH visits included documentation of a cardiovascular system assessment or foot inspection, and only 1 clinician used patient-self examination as part of the assessment. No clinicians used patient-generated data (outside of blood glucose data) to complete the virtual examination. Although 1 of the apparent advantages of TH visits over IP visits is the ability to see the patient's surroundings and environment, no clinician

documented it. Our study quantifies the degree to which the PE for TH is attenuated in practice among a sample of endocrinologists, raising a flag that both process improvements and research are needed for virtual physical examinations.

These findings are not simply the consequence of inability to perform a physical examination by virtual means. Multiple studies have shown that almost all PE components can be conducted virtually [12-16]. Some virtual PE assessments are relatively easy to perform, which likely explains why the general appearance component was the most-frequently documented PE component during TH visits in our study. Other virtual PE components, such as cardiovascular assessment using patient-generated health data or foot assessment by inspection, require more clinician instructions, patient involvement, and/or use of technology. We found these assessments were much less frequent, suggesting ease of completing certain PE components may be a major determinant of whether they are completed.

Interestingly, we found that foot examination was infrequently performed during both IP and TH visits. Some clinicians fulfilled the TH foot examination component because they reviewed the chart and documented evidence of a recent or planned IP examination. This approach, not observed for other PE components, may be due to the foot examination being 1 part of the diabetes physical examination that is both guideline-recommended [19] and (unlike vital signs) unlikely to be recorded at a medical visit for a different condition, such that endocrinologists are particularly conscientious about its completion. We anticipated a higher rate of foot assessment than observed for both TH and IP visits because these were all new patients, but our findings are consistent with the low completion of routine DM foot examination reported in previous studies [23-26].

The findings of this study raise the question of why there are fewer components of the PE being conducted for TH. Reasons likely include a lack of adequate clinician time or training to complete a virtual PE, patients' physical or cognitive inability to participate in certain virtual exam components, lack of technology on the clinician or patient side to leverage patient-generated health data, and insufficient time and staff support to troubleshoot any of these challenges to the virtual PE during a visit. In the absence of evidence-based guidelines to recommend the value of different virtual PE components for DM, it is also possible that clinicians may be unmotivated to address the multiple barriers above to complete the virtual PE to the degree they can easily do during IP visits. Additional organizational support in the form of providing necessary technology for virtual PEs, ensuring sufficient technology and staff support, and providing patient training in self-examination and/or clinician training in virtual examination may be needed to boost virtual PE completion. Once these evidence-based guidelines for virtual PE for DM are formulated, other fields of medicine can use it as a model to help train providers and standardize telemedicine practice in general.

There are concerns that TH visits can be unsafe and dangerous because of the inability of the provider to do a comprehensive PE [27], and in a recent qualitative study, endocrinologists expressed worry about missing important clinical findings including incidental ones when doing virtual physical examination [28]. Research is needed to address these concerns and should examine the reliability and accuracy of individual components of the virtual PE and the effect of the virtual PE (or absence of it) on clinical decision-making and outcomes. To then promote best practices, results should be incorporated into clear, evidence-based guidance for the DM virtual examination and health system should ensure structures and processes are in place to support it.

This study has limitations. One is its small sample size. We studied the notes of 10 clinicians. However, this is the first study of its kind of which we are aware inside or outside of endocrinology. It highlights major differences in practice *within clinicians* for IP vs TH visits, which gives a more direct view on the effect of TH than simple averaging across all visits and clinicians. Our findings serve as an alert and an impetus to conduct larger studies of the virtual PE and its outcomes. A second limitation is the possibility that lower documentation of the virtual PE reflects underdocumentation rather than actual practice. Underdocumentation may be a problem particular to integrated health systems such as the VA, where reimbursement criteria are less a driver of clinician documentation. However, underdocumentation in this case would not fully explain why we observed comparatively less documentation for TH vs IP within individual clinicians in the same health system. A third limitation is that the clinicians included in the study are all from the VA. Clinicians in other settings would be subject to different requirements for reimbursement, and may also have different organizational expectations, structures, processes, and practices related to virtual care, which may impact how they approach the virtual PE. Studies in other health systems are needed, including assessments of whether any documented PE components reflect clinically meaningful assessments that could inform risk stratification and decision-making, or simply clinician choices driven by which components are most easily completed over TH.

Conclusions

Endocrinologists seeing new patients with DM documented a greatly attenuated PE for TH compared with IP for new DM visits. TH visits often left out PE components generally considered informative in diabetes management, including the cardiovascular and foot examination. Virtual care-specific techniques such as patient self-examination and use of patient generated health data, which could help enhance or complete the PE, were underused across the board. Because use of TH is likely to persist as a means to enhance access chronic disease care for many patients, organizations may need to develop structures and processes to support clinicians' completion of the virtual PE. At the same time, future research should focus on enhancing the accuracy and reliability of virtual PE and assessing its value in terms of clinical decision-making and clinical outcomes. Eventually, evidence-based guidance should be developed for virtual PE for DM for use in training clinicians and to help promote clinically meaningful and efficient approaches and to standardize its practice. These steps will help improve the overall quality of DM care delivered through TH and ensure that patients receive the same level of care regardless of the mode of their medical visit.

Funding

This work was supported in part by resources from the VA Bedford Healthcare System.

Disclosures

The authors have nothing to disclose.

Data Availability

Original data generated and analyzed during this study are included in this published article or in the data repositories listed in References.

Disclaimer

The views expressed in this article are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs or the United States government.

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