USE OF MEDICARE-COVERED TELEREHABILITATION FOR PHYSICAL AND OCCUPATIONAL THERAPY AND SPEECH-LANGUAGE PATHOLOGY SERVICES DURING THE COVID-19 PUBLIC HEALTH EMERGENCY

KEY POINTS

- Between 2019 and 2020, the first year of the COVID-19 public health emergency (PHE), the number of Medicare beneficiaries receiving fee-for-service (FFS) telerehabilitation physical therapy (PT) and occupational therapy (OT) services from therapist practices soared by more than 1,700-fold, from 113 to 198,582. At the same time, the number of beneficiaries receiving in-person PT and OT services from therapist practices declined by more than 23%, from 19 million to 14.6 million, in the initial months of the PHE but slowly recovered as the PHE continued.

- The number receiving telerehabilitation speech-language pathology (SLP) services from therapist practices increased from 411 in 2019 to 39,842 in 2020, an increase of nearly a hundred-fold. The number receiving in-person SLP services from therapist practices declined from 363,664 in 2019 to 259,425 in 2020 (a decline of nearly 29%).

- The number of Medicare beneficiaries receiving FFS telerehabilitation PT and OT services from nursing homes during that same period grew from 25 in 2019 to 13,958 in 2020, a nearly 560-fold (nursing homes were not providing telerehabilitation SLP services prior to the PHE), whereas the number receiving in-person PT and OT services from nursing homes declined from 842,793 in 2019 to 722,149 in 2020, or by 14% after the start of the PHE while in-person SLP services dropped by a little less than 10%, from 357,095 in 2019 to 322,432 in 2020.

- Despite notable increases in the number of beneficiaries receiving telerehabilitation PT, OT, and SLP services from both therapy practices and nursing homes, these gains did not fully offset the reduction in in-person use.

- Use of telerehabilitation by nursing homes was facilitated by having staff that can provide in-person support to patients during telerehabilitation and comfort with technology by both the patient and the therapist.

- Some of the challenges to adopting telerehabilitation included lack of infrastructure, such as broadband services and equipment, fear of technology issues interfering with a telerehabilitation session, lack of in-person support and evidence of efficacy for some patient populations, and safety concerns.

- Interviewees recommended a hybrid approach to therapy that includes a mix of in-person and telerehabilitation sessions at the discretion of the clinician as the most effective approach to patient care beyond the PHE.

BACKGROUND

Efforts to conserve health care resources and reduce infection due to the COVID-19 public health emergency (PHE) led to the deferral of nonemergency care and dramatic reductions in in-person clinical care.[1] Reduced access to in-person care together with PHE waivers allowing flexibilities in the use of telehealth paved the way for increased uptake of telemedicine. Prior to the PHE, Medicare coverage of telehealth was restricted to a

limited set of services, including office visits, consultations, and psychotherapy, delivered through interactive audio and video telecommunications.[2] Services were also restricted to beneficiaries in rural areas using telehealth at an originating site such as a doctor's office or clinic.

In response to the PHE, the Centers for Medicare & Medicaid Services (CMS) used Section 1135 waivers to expand the types of health care professionals that could bill Medicare for telehealth to include all providers eligible to bill Medicare for their services.[3] This waiver allowed providers, including physical therapists, occupational therapists, and speech-language pathologists, expanded abilities to bill Medicare for telehealth services. In addition, CMS granted states flexibilities under Appendix K of Section 1915(c) to make temporary changes to their Medicaid programs allowing for the coverage of expanded telehealth services for enrollees of Section 1915(c) waiver programs.

Before the PHE, telehealth use for physical therapy (PT), occupational therapy (OT), and speech-language pathology (SLP), collectively referred to as telerehabilitation, was very limited and would often complement in-person care instead of replacing it.[1] Services for PT, OT, and SLP were typically provided in person at a rehabilitation facility or in nursing homes to residents as needed through employed therapists or contract staff. However, during the PHE, telerehabilitation replaced in-person rehabilitation for many patients, especially for nonemergency services, dramatically changing the adoption trajectory of telerehabilitation.

Over 28 million (about 43% of all) Medicare beneficiaries used telehealth during the first year of the pandemic, an 88-fold increase in telehealth use from the prior year.[4] These users included almost half (49%) of Medicare Advantage beneficiaries and nearly four in ten (38%) beneficiaries enrolled in Medicare fee-for-service (FFS). Although there is research exploring the use of telehealth during the PHE, including variation in use across specialties, we still know very little about trends in telerehabilitation for PT, OT, and SLP.

As Congress considers making some flexibilities permanent, there is a need for evidence on the feasibility, acceptability, and effectiveness of telerehabilitation services in varied settings among Medicare beneficiaries. Research shows that telerehabilitation, and telehealth more broadly, can be an effective tool for empowering both health care providers and patients to make the best decisions about the approach to care that considers the unique circumstances of the patient, including their age, diagnosis, geographic location, and preferences.[2,5,6] Telerehabilitation has the potential to improve access to care among Medicare beneficiaries, including beneficiaries in rural areas, beneficiaries of color, and people with several comorbidities or who are disabled.[2] Studies have shown that certain care (for example, PT) delivered through telerehabilitation is as effective as in-person care and more effective than no care.[5-8] However, the pre-PHE literature on the effectiveness of telerehabilitation focuses on services for mental health conditions and PT, and for patients younger than 65.[5-8] Finally, there has been limited research on the extent to which providers used telerehabilitation during a patient's course of treatment in nursing homes and the PHE experience provides an opportunity to address this research gap.

The goal of this study was to examine the extent to which therapist practices and nursing homes[i] adopted telehealth services for PT, OT, and SLP, explore the major challenges and facilitators in adopting telerehabilitation services, and examine whether these services were effective in addressing patient care and staffing needs during the PHE. We use Medicare administrative data to examine trends in the number of Medicare beneficiaries receiving telerehabilitation services in relation to in-person therapy before and during

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[i] In this brief, we use the term *nursing home* to refer to services provided by any facility certified by Medicare to provide nursing home services. This term aims to capture skilled nursing facilities (SNFs) that provide short-term, post-acute services as well as facilities that also provide long-term and custodial care.

the initial years of the PHE. To better understand implementation of telerehabilitation during the PHE, including facilitators and challenges, we conducted in-depth interviews with several telerehabilitation experts.

METHODS

Quantitative Data and Analysis

For the quantitative analysis, we used Medicare FFS Part B claims for in-person or telerehabilitation services for 2019, 2020, and the first six months of 2021. We compared the number of Medicare beneficiaries provided telerehabilitation versus in-person therapy by therapist practices and nursing homes.

Data

We used Medicare FFS claims data to identify telerehabilitation and in-person service use among Medicare beneficiaries. Specifically, we used: (1) the CMS Common Working File (CWF) and the Medicare Part B total beneficiary claim history and entitlement file; and (2) the Medicare Provider Enrollment, Chain, and Ownership System (PECOS) which is a national database of Medicare provider, physician, and supplier enrollment information.

The claims data used did not include Part A claims submitted by SNFs because these claims do not include details about the types of services provided. For services furnished under Medicare Part A, all costs, including therapy, are paid for on a per diem prospective payment basis and therapy costs cannot be separated out. The services provided by nursing homes captured in this study are those paid for outside a nursing home's per diem payments. Medicare beneficiaries can reside in a nursing home and still receive Part B Medicare-covered rehabilitation services when their Part A benefits have been exhausted.[ii] This study also does not capture out-of-pocket payments for therapy services, or those paid for by Medicaid under a nursing home rate. Essentially, the data reflect these Part B services provided in the community or in nursing homes.

Service Use Definition

We identified use of PT, OT, or SLP in 2019, 2020, and 2021 in Medicare Part B outpatient and professional FFS claims using the Healthcare Common Procedure Coding System (HCPCS) codes. These national codes facilitate processing and payment of health insurance claims by Medicare and other insurers (see ***Appendix Table A1*** for HCPCS code definition for each therapy type). Because for some claims it was not possible to distinguish between PT and OT claims, we grouped the two categories of services together. Therapy services were categorized under two mutually exclusive categories (***Table 1***).

Table 1. Therapy Types and Abbreviations	
Therapy Type Defined by HCPCS	**Therapy Type Abbreviation**
Speech, language, and pathology therapy	SLP
Occupational or physical therapy	OT or PT
HCPCS = Healthcare Common Procedure Coding System.	

A claim was flagged as telerehabilitation if any of five HCPC modifier codes had the value '95,' which corresponds to telehealth services, otherwise the service was classified as delivered in person.

[ii] Other reasons someone might receive Part B therapy services from a nursing home include not having a qualifying three-day hospital stay or the person does not meet the level of care requirement for Part A SNF benefits.

The Tax Identification Number reported on the Part B claims were used to identify the therapist practices providing PT, OT, and SLP services. The provider identifiers reported on the claims and PECOS data were used to identify unique nursing home providers (***Appendix Table A2***).

Analysis

We used Part B FFS claims to calculate the number of therapist practices and nursing homes providing PT, OT, and SLP services, the number of such services provided, and the number of unique beneficiaries receiving these services. Because the results were similar across the three measures, we only present the number of unique beneficiaries receiving PT, OT, and SLP services.

Qualitative Data Collection and Analysis

For the qualitative analysis, we conducted nine in-depth semi-structured interviews with experts representing rehabilitation service providers, advocacy groups, state government, and academic researchers with varied experiences with telerehabilitation services during the PHE (see ***Appendix Table A3***). We identified and recruited a convenience sample of experts through internal and external referrals and online searches and conducted individual 60-minute interviews with nine participants via videoconference. We asked participants about their experiences with adopting telerehabilitation for PT, OT, and SLP in nursing homes and the community, including facilitators of and challenges to adoption, patients' and clinicians' general perception of the clinical effectiveness of telerehabilitation, and considerations for future adoption. The full interview guide is available in ***Appendix A4***. All interviews took place from June 2022 through August 2022. The findings presented in this brief capture prevailing themes from these interviews.

RESULTS

We present annual and monthly trends in the number of Medicare beneficiaries receiving telerehabilitation and in-person PT, OT, and SLP services by both therapist practices and nursing homes before and after the PHE began. The brief also uses the findings from in-depth interviews with telerehabilitation experts to better inform this quantitative analysis.

Although the number of beneficiaries receiving in-person therapy before and after the start of the PHE far surpassed those receiving telerehabilitation services, the data suggest substantial gains in the number receiving telerehabilitation services and drops in the number receiving in-person rehabilitation services after the PHE began. In 2019, therapist practices provided telerehabilitation PT and OT services to 113 Medicare beneficiaries and this number grew to 198,582 beneficiaries in 2020 (***Table 2***), an increase of more than 1,700-fold.[iii] Similarly, the number of beneficiaries receiving telerehabilitation SLP services from therapist practices grew from 411 in 2019 to 39,842 in 2020, an increase of nearly a hundred-fold. At the same time, the number of beneficiaries receiving in-person rehabilitation PT and OT services from therapist practices declined from nearly 19 million in 2019 to about 14.6 million in 2020 (a decline of more than 23%) while the number receiving in-person SLP services declined from 363,664 in 2019 to 259,425 in 2020 (a decline of nearly 29%).

The same patterns were seen for nursing homes. The growth in the number of beneficiaries receiving telerehabilitation services was dramatic; however, the declines in in-person services were more modest. The number of beneficiaries receiving telerehabilitation PT and OT from nursing homes grew from 25 in 2019 to 13,958 in 2020 (an increase of nearly 56,000%) while the number receiving in-person PT and OT services fell from 842,793 in 2019 to 722,149 in 2020 (a decline of approximately 14%). Before the PHE, nursing homes

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[iii] The data for 2021 are incomplete and may contribute to the changes between 2020 and 2021. Therefore, the 2021 data are not discussed and should be considered preliminary.

were not providing FFS Part B telerehabilitation SLP services to Medicare beneficiaries, but this changed after the PHE began and in 2020 nursing homes provided this service to 678 beneficiaries. During the PHE, the number of Medicare beneficiaries receiving in-person SLP services on an annual basis from nursing homes declined from 357,095 in 2019 to 322,432 in 2020 (a decline of about 10%).

Despite notable increases in the number of beneficiaries receiving telerehabilitation PT, OT, and SLP services from both therapy practices and nursing homes, these gains did not fully offset the reduction in in-person use.

Table 2. PT, OT, and SLP Provided by Therapist Practices and Nursing Homes			
Metric	2019	2020	2021 (January-June only)
Telerehabilitation PT and OT Services			
Total number of unique beneficiaries served by therapist practices	113	198,582	64,303
Total number of unique beneficiaries served by nursing homes	25	13,958	11,944
In-Person PT and OT Services			
Total number of unique beneficiaries served by therapist practices	18,990,459	14,557,685	8,501,199
Total number of unique beneficiaries served by nursing homes	842,793	722,149	453,987
Telerehabilitation SLP Services			
Total number of unique beneficiaries served by therapist practices	411	39,842	23,981
Total number of unique beneficiaries served by nursing homes	---	678	682
In-Person SLP Services			
Total number of unique beneficiaries served by therapist practices	363,664	259,425	147,422
Total number of unique beneficiaries served by nursing homes	357,095	322,432	177,782
Source: The Medicare Common Working File (CWF) for 2019, 2020, and 2021.			
Note: The CWF includes Medicare Part A and Part B claims, but the analysis only used Part B claims. The data for 2019 and 2020 represent the full 12 months while the 2021 data represent only the first 6 months of the year.			

The annual data mask how providers and beneficiaries adjusted to the PHE. Monthly data indicate that while the number of Medicare beneficiaries receiving telerehabilitation PT and OT services from therapist practices reached its apex in May 2020, this number then declined but remained higher than pre-PHE levels (*Figure 1* and see *Appendix B* for month-by-month percentage point changes). The volume of in-person PT and OT services declined sharply in March 2020 and April 2020 and then slowly recovered reaching pre-PHE levels in early 2021. The patterns were very similar for SLP services provided by therapist practices, except the number of beneficiaries receiving telerehabilitation SLP services did not drop off after the initial increase at the start of the PHE (*Figure 2* and see *Appendix B* for month-by-month percentage point changes).

Figure 1. Number of Medicare Beneficiaries Receiving FFS Part B PT and OT Services, by Delivery Mode (in person or telehealth) and by Type of Provider (therapist practices or nursing homes)
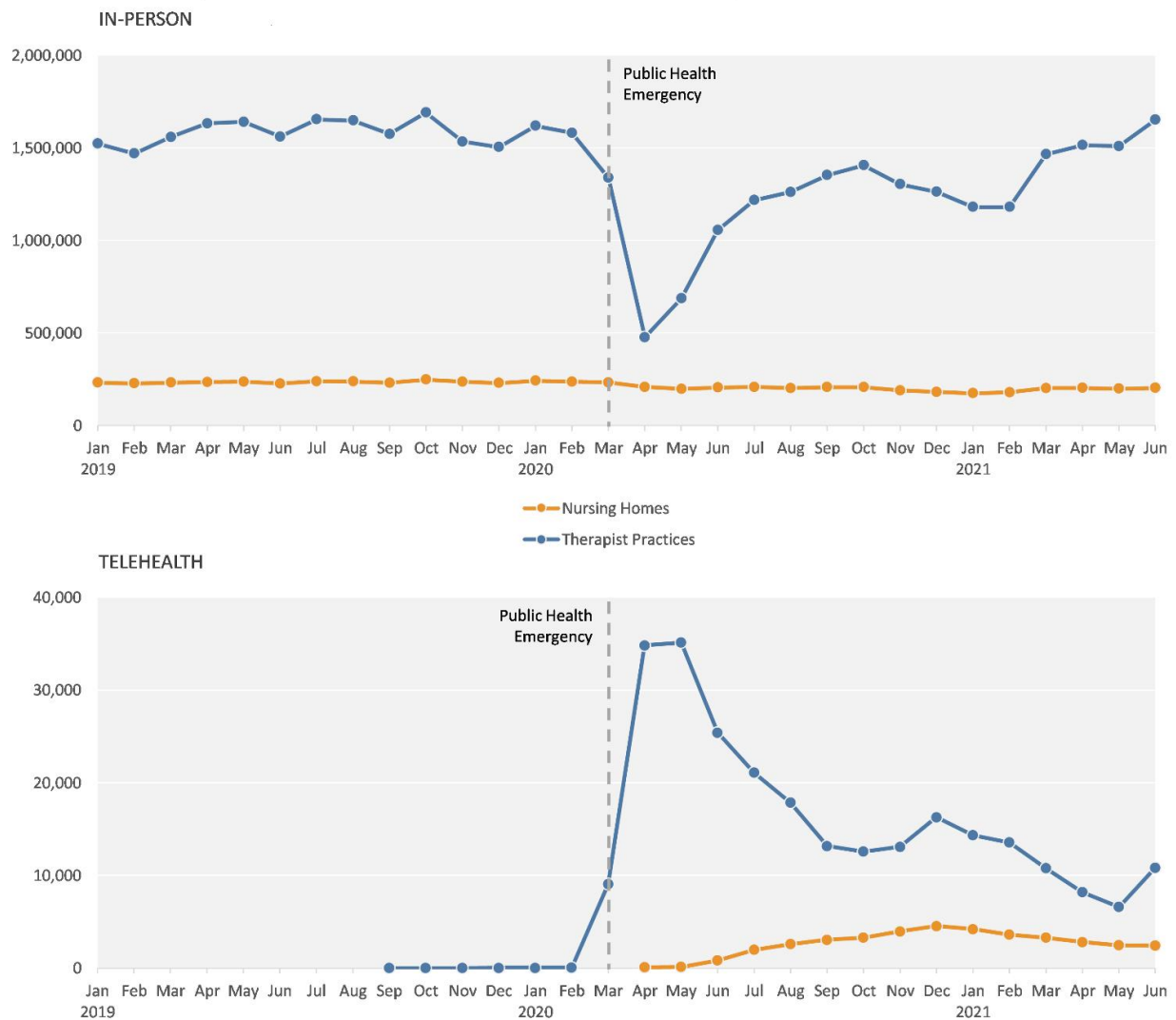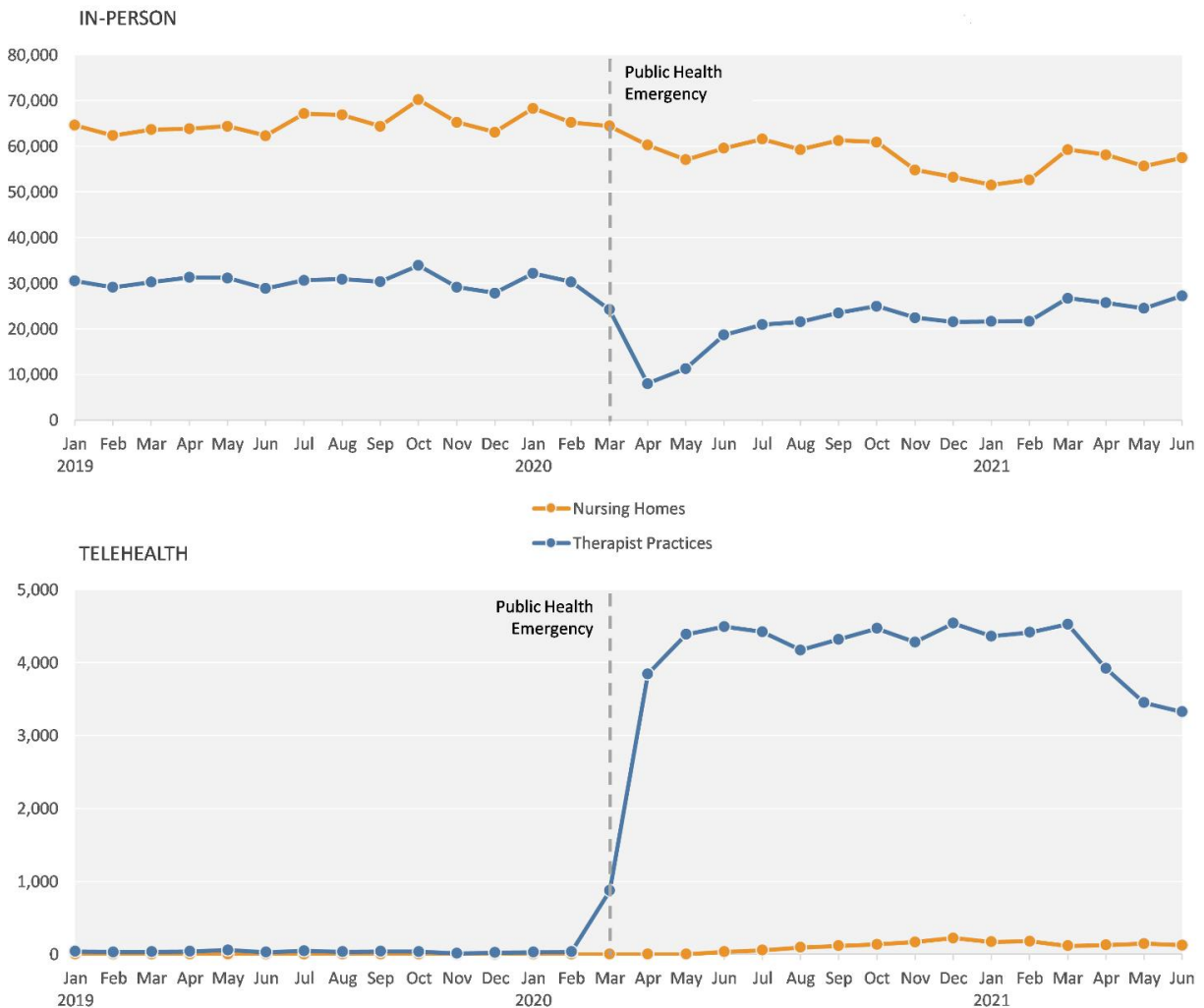

Source: The Medicare Common Working File (CWF) for 2019, 2020, and 2021.

Note: The CWF includes Medicare Part A and Part B claims, but the analysis only used Part B claims.

FFS = fee-for-service; OT = occupational therapy; PT = physical therapy.

The pattern was different among nursing homes. The number of Medicare beneficiaries receiving telerehabilitation PT and OT services began to increase in April 2020 but did not hit its apex until December 2020 (February 2021 for telerehabilitation SLP services). In-person PT, OT, and SLP services remained relatively constant and did not change dramatically after the PHE started but started to decline slowly after March 2020.

Figure 2. Number of Medicare Beneficiaries Receiving FFS Part B SLP Services, by Delivery Mode (in person or telehealth) and by Type of Provider (therapist practices or nursing homes)

Source: The Medicare Common Working File (CWF) for 2019, 2020, and 2021.

Note: The CWF includes Medicare Part A and Part B claims, but the analysis only used Part B claims.

FFS = fee-for-service; SLP = speech, language, pathology.

Facilitators and Barriers to the Adoption of Telerehabilitation

Factors Facilitating Implementation and Adoption of Telerehabilitation

To provide some context to the observed trends in telerehabilitation use during the PHE, experts who participated in in-depth interviews discussed their experiences with implementing telerehabilitation services during the pandemic, including adoption facilitators. Participants discussed the COVID-19 pandemic and PHE waivers as the primary catalyst for offering telerehabilitation in nursing homes and the community. In nursing home settings, at the onset of the PHE, visitor restrictions and safety considerations precluded therapists from providing in-person therapy. In many situations, especially among older or medically vulnerable patients, telerehabilitation became the only modality for continuing rehabilitative treatment. The flexibilities afforded under PHE waivers for furnishing telehealth services also stimulated uptake of telerehabilitation in these settings.

Participants cited state and federal flexibilities under the PHE that permitted reimbursement for telerehabilitation at in-person therapy levels as having a significant impact on a therapist's ability to offer telerehabilitation. Larger clinical organizations could provide some telerehabilitation services without equal reimbursement before the PHE, but an interviewee from a smaller rehabilitation organization stated the lack of reimbursement parity for telerehabilitation made it impossible for her organization to offer this service to her patients before the PHE waivers.

> *"... [Telerehabilitation] is not a good business model because, you know, all those years, we never got reimbursed for any of it. It was just added cost. But what we did find was that patient satisfaction, patient outcomes, clinician satisfaction, everything just went up and so it was an excellent solution minus the cost side of it, but it was the right thing to do."*
> – Physical therapist and chief strategy officer on telerehabilitation before the PHE

Participants also noted the importance of having in-person support while the licensed therapist conducted the session remotely. The in-person facilitator for the patient was usually a licensed clinician such as a PT or OT assistant; but sometimes a caregiver (family member or friend of the patient) or nursing support staff in a nursing home (such as a certified nursing assistant) acted as the facilitator during a telerehabilitation session. According to interviewees, the in-person facilitator often provided technology, clinical, and physical support for the patient. Interviewees emphasized that patients often needed someone present and attentive to their physical needs for safety concerns and physical assistance during the therapy session, as well as to help with the technology components (for example, navigating the telehealth platform, logging into the virtual session, or adjusting the camera position). Therapists might prefer prior clinical training for the in-person facilitator when treating patients with severe cognitive impairments or certain physical disabilities (for example, patients living with different types of dementia, hearing or visual impairment, or vestibular issues), but the facilitator did not necessarily need to be clinically trained for successful telerehabilitation sessions for patients with less clinical need. According to one interviewee, a unique advantage of engaging informal caregivers as the in-person facilitator is that the caregiver can learn firsthand about the rehabilitative process from the therapist and can continue supporting the patient through rehabilitative exercises after the conclusion of treatment with the therapist.

> *"It's very rare, especially in our space [skilled nursing facilities], where you get a patient who is independent with their technology. And so, you know, I would say 95% of the time they need support and assistance on the ground with a facilitator."*
> – Speech-language pathologist and vice president of rehabilitation

Challenges to the Adoption and Implementation of Telerehabilitation

Interviewees indicated that in nursing homes, concerns among patients, therapists, and facility staff about efficacy, privacy, and patients' safety discouraged initial adoption of telerehabilitation. Some nursing home staff and therapists expressed concerns about potential Health Insurance Portability and Accountability Act violations due to perceived information technology vulnerabilities.

> *"So a lot of our nursing homes are not well equipped--some still are not. Because when the pandemic started, the only place they had WiFi access was on the first floor or near the offices. And so, for our larger buildings or ones that are made up of concrete walls where the signal doesn't go through well, and once the pandemic started, you couldn't get IT people in there to run new wires."*
> – State long-term care ombudsman

Interviewees also cited technology as a challenge to implementing telerehabilitation, especially in nursing homes. According to interviewees, many nursing homes initially lacked the information technology infrastructure to support telerehabilitation services, including staffing,

broadband or internet bandwidth, and devices that can support a telerehabilitation platform. Interviewees indicated technology infrastructure also varied significantly in quality and availability across facilities. Further, patients, therapists, and facility staff expressed concerns about the reliability of a remote connection during a telerehabilitation session. These concerns, and the fear of unanticipated technology issues interfering with the session, could have discouraged some patients or therapists from adopting telerehabilitation.

> *"So the service was being reimbursed traditionally, as a 1 on 1 therapy session. And oftentimes you were using more staff than the 1 staff person, so definitely we were looking at greater cost in order to deliver the service."*
> – President and CEO of advocacy organization for older adults

Some participants indicated telerehabilitation could potentially be more expensive to provide than traditional in-person therapy, especially in nursing homes. Given the higher acuity of residents receiving rehabilitative treatment in nursing homes, along with the higher prevalence of cognitive and physical disabilities, telerehabilitation sessions in these settings typically used an in-person facilitator, usually a physical or occupational therapist assistant. Telerehabilitation sessions also required telehealth-appropriate devices and advanced coordination with nursing home staff to ensure someone was available to help the resident connect to the session and set up the technology. Interviewees indicated the need for additional staff time, technology, training, and advanced coordination for telerehabilitation sessions compared to in-person sessions could increase the resources required to deliver therapy in this setting.

Perception of Whether Telerehabilitation Services can be Effectively Administered

The clinicians interviewed indicated that based on their observations, when used appropriately by therapists and nursing homes, telerehabilitation resulted in similar patient outcomes as in-person therapy. However,

> *"So [the therapist is] not limiting what [they] do with the patient because of telehealth--[they're] picking and choosing what's most important to utilize and facilitate through telehealth with support in the facility in other ways, so that the plan of care continues to progress... Anything that [the therapist has] any question at all, that might be unsafe, especially as it relates to swallowing [in SLP], [they're] not going to do. [They're] really going to focus on more education training versus manually manipulating..."*
> – Speech-language pathologist and vice president of rehabilitation

telerehabilitation was not appropriate for all situations. Participants indicated the efficacy of telerehabilitation sessions depended most on the skills of the individual therapist and less on the delivery mechanism (telehealth versus in person) or discipline (PT, OT, or SLP). Telerehabilitation was most successful when therapists used their clinical judgment to decide whether the patient was appropriate for telerehabilitation and whether the type of treatment was appropriate for a telerehabilitation encounter. Interviewees indicated telerehabilitation could be less effective for patients with cognitive impairment or low health literacy (verbal communication is even more important for telerehabilitation given the lack of touch), during subspecialty visits requiring a physical exam, and

when the patient has little in-person support. Clinicians viewed telerehabilitation as more effective in some circumstances, as patients had more time and energy to complete therapy-related tasks (due to lack of travel) and for patients receiving care from multiple therapists.

Future Considerations to Improve Telerehabilitation Services

Telerehabilitation Workforce and Timing of Services

To build the telerehabilitation workforce, interviewees recommended treating telerehabilitation like a specialty. Some interviewees advocated for therapists to receive extensive training and support for telerehabilitation on topics such as the use of technology, remote bedside manner, safety, and remote clinical

instruction of the patient. Because telerehabilitation sessions required additional technological preparation by the patient (and caregiver, if needed) and therapist, interviewees also recommended scheduling and coordination (such as appropriate camera placement) before the first telerehabilitation visit to ensure a safe and effective session. Whether the patient is residing at home or in a nursing home, the patient's space needs to be conducive to a telerehabilitation visit and the ability to accommodate an in-person facilitator when needed. Generally, interviewees agreed telerehabilitation sessions should be scheduled after an initial in-person therapy assessment to facilitate preparation and coordinate with in-person support as needed.

Federal and State Policy Considerations

Participants advocated for continued reimbursement parity for telerehabilitation. Some interviewees suggested further evaluation of reimbursement for telerehabilitation services to determine whether the current in-person therapy rate is adequate and sufficient to cover all costs of providing remote therapy. When the patient is receiving telerehabilitation services in their home, they may need assistance from a caregiver, but nursing homes may have to pull staff off a floor to help escort a patient to the location in the nursing home where they will receive the telerehabilitation service and to provide assistance to the patient during the session when needed. One interviewee suggested that nursing homes is where innovation is needed, but it takes money to innovate.

> *"I worry about people that are saying, 'Hey, I'm just going to do everything via telehealth.' It's like, you know, there is a lot you can do [over] telehealth, but we found that we still need in-person visits."*
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> – Physical therapist and chief strategy officer

When asked about regulatory considerations, participants advocated for permitting licensed therapists to determine how best to use telerehabilitation (for example, which patients and types of treatment are most appropriate for telerehabilitation, and when in-person support is needed). More broadly, interviewees wanted some temporary PHE waivers to become permanent, including adding therapists to a list of telehealth providers and allowing therapists to practice across state lines.

Sustaining Telerehabilitation Services

Participants advocated for a telerehabilitation hybrid model moving forward. Interviewees recommended a combination of in-person and telerehabilitation sessions over the course of a patient's treatment, regardless of whether the patient is residing at home or in a nursing home. The combination of services would be based on the capabilities and needs of the patient, nature of the therapy to be provided, and a facility's ability to support telerehabilitation services when the patient resides in a nursing home. Allowing for this type of choice would be the most effective and sustainable approach to incorporating telerehabilitation into practice.

DISCUSSION

The COVID-19 pandemic and CMS' expanded coverage of telehealth services clearly drove a notable increase in the number of Medicare beneficiaries receiving telerehabilitation services from both therapist practices and nursing homes.[9] This occurred even though during the same time period, the number of FFS Medicare beneficiaries was declining (between 2021 and 2022, enrollment in FFS Medicare declined by 3.76%) Our analysis shows that the number of Medicare beneficiaries using telerehabilitation grew exponentially after the PHE began. Although the number of beneficiaries using in-person therapy and total number of visits remained much larger than telerehabilitation, we saw small declines in the number receiving in-person PT, OT, and SLP services starting in 2020, the year the PHE began. When broken down by month, we observed a large jump in the number of Medicare beneficiaries receiving telerehabilitation PT and OT services from both therapist practices and nursing homes in the initial months of the PHE when the pandemic-related shutdowns first started. Although beneficiary use eventually declined during the study period, the number receiving

telerehabilitation PT and OT services remained higher than pre-pandemic levels. Therapist practices and nursing homes differed in how their provision of SLP services changed after the PHE began. The number of Medicare beneficiaries receiving telerehabilitation SLP services from therapist practices increased dramatically when the PHE began but did not decline in the same way as seen for PT and OT services as the PHE persisted. The number served in-person by therapist practices dropped at the start of the PHE but then recovered in the same way that in-person PT and OT services provided by therapist practices did, although the total number of in-person SLP services served remained below pre-PHE levels by the end of the study period, in June of 2021. The number of Medicare beneficiaries receiving telerehabilitation SLP services from nursing homes increased in a more modest way and remained above pre-PHE levels by June 2021. On the other hand, the number of beneficiaries receiving in-person SLP services from nursing homes did not change when the PHE began, but slowly declined over time, coinciding with the general decline in the number of nursing home residents that occurred as the PHE continued.[10] Although there were significant increases in the total number of unique beneficiaries receiving telerehabilitation PT, OT, and SLP from both therapist practices and nursing homes, none of those increases were large enough to offset the declines observed in in-person services. By June of 2021, at the end of the study period, in-person PT, OT, and SLP services provided by both therapist practices and nursing homes still remained notably higher than telerehabilitation services in each year during the study period.

Several factors facilitated the adoption of telerehabilitation services. Study participants identified the provision of in-person support to patients during telerehabilitation sessions by a caregiver, facility staff if the patient resides in a nursing home, or therapy assistant as essential for successful delivery of telerehabilitation services in most situations. Both in nursing homes and the community, participants also highlighted the role of comfort with technology by both the patient and the therapist in facilitating successful implementation of telerehabilitation services. Interviewees identified lack of infrastructure such as broadband services and equipment, fear of technology issues interfering during a telerehabilitation session, lack of in-person support and evidence of efficacy for some patient populations, and safety concerns as challenges.

More work is needed to identify how resources (including staffing levels, rurality, and technology adoption) impact the adoption of telerehabilitation by therapist practices and nursing homes. Given the resources it would have taken to successfully implement telerehabilitation on such short notice, and that the technologies and trained personnel needed to be available at the start of the PHE, it could be the case that more resourced practices and facilities with potentially more enhanced infrastructure for delivering telerehabilitation would see the highest increases in telerehabilitation uptake. On the other hand, several study participants noted that practices and facilities that serve rural communities may have seen more of a need or been more familiar with telehealth and have already developed infrastructure given that pre-pandemic policies allowed the use of telehealth only in rural areas.

The increased and sustained use of telerehabilitation despite challenges identified by participants could point in part to ongoing investment in telerehabilitation infrastructure. The increased use of telerehabilitation demonstrates a potential change in care delivery related to telehealth that might continue with appropriate reimbursement. This research and others[1,11] have also shown that patients and providers accepted and were generally satisfied with telerehabilitation services during the PHE. Recognizing the increased access to telehealth services, and effectiveness of and shift in telehealth use, interviewees recommended continued coverage for telerehabilitation services after the PHE and flexibility for providers to determine when it is best to employ these services. As interviewees noted, the cost of telerehabilitation needs to be further evaluated, considering all services provided, to determine potential savings and whether current reimbursement at in-person therapy rates is adequate.

This is one of the first studies to examine telerehabilitation services among patients receiving care in nursing homes and the community during the COVID-19 pandemic. The end of the COVID-19 PHE in March 2023

resulted in the termination of several PHE-related policies, but telehealth flexibilities were extended through December 31, 2024, until more evidence could be gathered for CMS to consider which telehealth services to make permanent under Medicare. The Medicare Payment Advisory Commission, which has been assessing telehealth visits overall and not specifically for rehabilitation visits, has reported that beneficiaries and clinicians surveyed and interviewed in 2022 were satisfied with telehealth visits overall.[12] Beneficiaries in focus groups noted that their telehealth visits were mainly with clinicians with whom they had an established relationship. Although some beneficiaries and clinicians appreciated the flexibility and convenience of telehealth visits, others believed that in-person visits provided better care. Using data from an annual survey of Medicare beneficiaries, the Commission reported that 40% of those receiving telehealth services were interested in continuing this form of care. Despite this overall satisfaction with telehealth services, more research is needed to build on findings from both the Commission's work and this study on telerehabilitation services to inform the appropriateness and effectiveness of the use of telehealth technologies for the provision of PT, OT, and SLP services to Medicare beneficiaries residing at home or in nursing homes, and to determine the adequate payment for these services.

LIMITATIONS

This study should be interpreted in light of several limitations. First, the quantitative analysis shows trends in the use of telerehabilitation and in-person therapy over time but does not apply statistical methods to determine the causal effects of the PHE on these trends. Nor does this study control for changes in enrollment during the COVID-19 pandemic, though declining enrollment in Medicare FFS may suggest that increases in the use of telerehabilitation as a percentage of the enrolled population could have perhaps been larger than suggested above. The COVID-19 pandemic and PHE waivers were such significant events with direct links to the use of telerehabilitation that it seems reasonable to attribute the changes observed to the PHE. Second, the data analysis was limited to Part B FFS claims, which means not all service use was captured including services provided through the beneficiary's Part A benefit and services provided through a Medicare Advantage Plan. This limitation means the number of beneficiaries receiving any type of PT, OT, or SLP services is undercounted in this study, but it is not clear whether the absolute differences between the number receiving telerehabilitation versus in-person services under Part B would be systematically different than differences in Part A services, or would differ systematically between Medicare FFS and Medicare Advantage beneficiaries. Third, the small sample size and sampling strategy for the qualitative analysis that engaged participants with knowledge of telerehabilitation use in relevant settings during the PHE, rather than a broader, more representative sample, limits generalizability. Fourth, this study does not capture patients' or caregivers' perspectives that might differ from those of providers and other experts and are important to inform future policy efforts. Future research should assess beneficiaries' and caregivers' experiences using telerehabilitation in the community and in nursing homes, including barriers encountered, facilitators, and patients' satisfaction with telerehabilitation services. Additional analysis is also needed to examine the clinical outcomes for patients receiving telerehabilitation as well as the differences in costs for telerehabilitation versus in-person therapy.

APPENDIX A. ADDITIONAL METHODOLOGICAL INFORMATION

Appendix Table A1. Telehealth Therapy Type Definition		
Therapy Type Defined by HCPCS	**Therapy Type Abbreviated**	**HCPCS Codes**
Speech, language, and pathology therapy	SLP	"92507", "92508", "92610", "92611", "92612", "92613", "92614", "92615", "92616", "92617", "92520", "92521", "92522", "92523", "92524", "92525", "92526", "92606", "92607", "92608", "92609", "96105", "96110", "96111", "96112", "96113", "96116", "96121", "96125", "96126"
Occupational therapy	OT only	"97161", "97162", "97163", "97164"
Physical therapy	PT only	"97165", "97166", "97167", "97168"
Occupational and Physical therapy	PT or OT	"90912", "90913", "95831", "95932", "95851", "96000", "96001", "96002", "96003", "96004", "92548", "92549", "G0237", "G0238", "G0239", "G0515", "97010", "97150", "97350", "97799"

Note: For the PT or OT HCPCS codes, we check the revenue center code. If revenue code is "042x", the therapy type should be defined as PT. If "043x", the therapy type should be defined as OT. Else we have to keep them as "PT or OT" because we cannot further break them down.

HCPCS = Healthcare Common Procedure Coding System.

Appendix Table A2. Nursing Home Definition	
Provider Type	**Provider Substr Conditions**
Nursing facility	substr(provider, 3, 1) in ("5") or substr(provider, 3, 2) in ("60","61","62","63","64","69")

Appendix Table A3. Description of Experts Who Participated in Semi-Structured Interviews		
Participant	Role and Expertise	Organization Type
1	Nursing home and telehealth expert; telehealth access and health equity	Advocacy organization for older adults and people with disability
2	Researcher and clinical care provider to patients in nursing homes or post-acute care following a hospitalization	Academic medical center and community nursing homes
3	Former physical therapist and current chief clinical officer	National health care organization providing rehabilitation and wellness services in nursing homes and continuing care retirement communities
4	Speech-language pathologist and senior representative from a national speech-language association	A national professional, scientific, and credentialing association for various clinical disciplines
5	Former speech-language pathologist and current president and chief executive officer	A national advocacy organization representing all aspects of aging services
6	Physical therapist, private practice owner, and board member of a national professional organization	A small practice offering in-home and community-based physical and occupational therapy
7	State long-term care ombudsperson	State government
8	Former speech-language pathologist and current vice president of rehabilitation	A national health care organization with multiple business lines operating in skilled nursing facilities
9	Physical therapist and chief strategy officer	A national rehabilitation services provider operating in nursing homes and home health agencies

Appendix A4. ASPE Nursing Home Telehealth Interview Guide

Note: The interview guide was tailored for each interview to focus on the participant's unique experiences and role within telerehabilitation.

0. BACKGROUND

  0.0..1. To what extent did your organization adopt or try to adopt PT, OT, or SLP telehealth therapy services during the pandemic?
    0.0..1.1. What factors impacted your decision to adopt or not? Were there certain populations or types of services that were targeted for telehealth (i.e., PT related to mobility versus PT related to pain)? *Interviewer note: this may include safety (considered dangerous for frail people) or payment-related factors (expected that in SNFs therapists would have to come in in-person since payment would still be bundled and not paid separately)?*
    0.0..1.2. If adopted one or two telehealth therapy services: Why did you decide to adopt [this/these] services? What factors prevented you from adopting other telehealth therapy services?
    0.0..1.3. If adopted: When did you make the decision to adopt [PT, OT, or SLP telehealth therapy]? Did the decision to adopt vary across services offered, and if so, why (e.g., PT but not SLP; for specific patients or for specific types of conditions)?
  0.0..2. Where did these services take place--for example, a nursing home, patient home, or a combination of locations? If services were administered in multiple locations, please distinguish how much telehealth therapy was adopted in SNF versus NF.

1.   ADOPTION OF PT, OT, OR SLP ADMINISTERED VIA TELEHEALTH

Our next set of questions were about what encouraged or prevented the adoption of telehealth for PT, OT, or SLP in nursing homes and for people receiving services in their homes. For each question, we asked the participant to consider whether adoption factors differ based on the type of service (such as PT versus OT versus SLP) or service location (such as a nursing facility versus SNF versus in the home).

    1.0.   What factors encouraged your adoption of [PT, OT, or SLP] telehealth services? If relevant: what factors do you think encouraged adoption of these services in general?
        1.0..1.   <u>Policy factors</u> (e.g., PHE waivers), <u>organizational or clinical factors</u> (e.g., cost-savings, efficiencies), <u>individual or patient level factors</u> (e.g., patient satisfaction, adherence, flexibility).
        1.0..2.   To what extent did these adoption factors differ depending on the setting (i.e., in a nursing facility versus in the home) or population served (i.e., older adults versus younger adults)?
        1.0..3.   To what extent did these adoption factors differ depending on the telehealth therapy services provided (i.e., PT and OT versus SLP)?

    1.1.   What factors prevented your adoption of [PT, OT, or SLP] telehealth services? If relevant: what factors do you think prevented adoption of these services in general?
        1.1..1.   <u>Policy</u> and <u>payment</u> factors (e.g., reimbursement, contracting with therapy providers).
        1.1..2.   How did challenges specific to the provision of [PT, OT, or SLP] prevent adoption, if at all (e.g., PT/OT activities are too demanding and possibly dangerous for older and frailer populations who may need to be physically guided through therapy sessions, SLP challenges in effectively evaluating treatment given acoustic recordings, PT/OT difficulties communicating appropriate form or providing feedback, communication technology/bandwidth challenges)?
        1.1..3.   To what extent did these challenges differ depending on the setting (i.e., in a nursing facility versus in the home) or population served (i.e., older adults versus younger adults).

2.   IMPLEMENTATION OF PT, OT, OR SLP ADMINISTERED VIA TELEHEALTH

Our next set of questions were about the main advantages and challenges in adopting telehealth for PT, OT, or SLP in nursing homes and for people receiving services in their homes. For each question, er asked the participant to consider whether adoption factors differ based on type of service (such as PT versus OT versus SLP) or service location (such as a nursing facility versus SNF versus in the home).

    2.0.   What factors facilitated your implementation of [PT, OT, or SLP] telehealth services? If needed: what factors do you think facilitated implementation of these services in general? *Interviewer note: you may not need to ask 2.0..1 depending on interviewee response to this general question and based on the time*.
        2.0..1.   <u>Technical factors</u> (e.g., right-sized technology; tech fluency among staff and patients; existing technological infrastructure), <u>behavioral factors</u> (e.g., clinical champions, leadership endorsement, patient desire), <u>health care system</u> factors (e.g., changes to coverage restrictions for Medicare during the PHE), <u>financial factors</u> (e.g., reimbursement on-par with in-person care).
        2.0..2.   To what extent did these facilitators differ depending on the setting (i.e., in a nursing facility versus in the home) or population served (i.e., older adults versus younger adults).
        2.0..3.   To what extent did these factors differ depending on the telehealth therapy services provided (i.e., PT and OT versus SLP)?

2.1. What factors made it challenging to implement [PT, OT, or SLP] telehealth services? If needed: what factors do you think made it challenging to implement these services in general?

    2.1..1. <u>Technical barriers</u> (e.g., staff or patients lacking technical knowledge or having limited training in these services, data security and privacy issues; interoperability issues), <u>behavioral barriers</u> (e.g., disruptions to workflows, skepticism about approaches, therapist reluctance due to safety concerns, patient awareness of and trust in telehealth), <u>health care system barriers</u> (e.g., inadequate or uncertainty around reimbursement for care), <u>financial barriers</u> (e.g., high initial setup costs--investment in equipment, infrastructure, technical skills, training, lack of monetary incentives).

    2.1..2. To what extent did these challenges differ depending on the setting (i.e., in a nursing facility versus in the home) or population served (i.e., older adults versus younger adults).

    2.1..3. To what extent did these factors differ depending on the telehealth therapy services provided (i.e., PT and OT versus SLP)?

2.2. What suggestions do you have for mitigating the challenges or barriers you experienced when implementing telehealth therapy? Do these suggestions differ depending on the population served or telehealth therapy service?

    2.2..1. If you had a magic wand and could change any one thing to improve provision of PT, OT, or SLP administered via telehealth, what would it be and why?

3. PERCEPTION OF EFFICACY OF SERVICES

This next section asked about your general perception of whether PT, OT, or SLP telehealth services helped residents receiving these services in both nursing homes and in their homes.

3.0. What is your general perception of whether PT, OT, or SLP services can be effectively administered via telehealth for people in nursing homes and receiving these services in their home?

    3.0..1. Does the efficacy of these services differ based on whether people are in nursing homes or in a community-based setting, and if so, why?

    3.0..2. Does the efficacy differ depending on the service provided (PT, OT, or SLP), and if so, why?

    3.0..3. Next we will ask about your perception of efficacy and acceptability of these telehealth therapies.

        3.0..3.1. What is your sense of the <u>perception among staff and patients</u> about the effectiveness of these services via telehealth? Is telehealth effective in some circumstances and not others? What are these circumstances and why do you think that is the case? What can be done to address these limitations?

        3.0..3.2. What is your <u>perception of patient and caregiver satisfaction</u> with these services administered via telehealth? Do you think this satisfaction differs depending on service received (PT, OT, or SLP)? Do you think this satisfaction differs depending on where the service was receiving (in a nursing facility or in the home)? What factors do you think contribute to higher or lower patient and/or caregiver satisfaction for these services?

        3.0..3.3. What is your <u>perception of whether patients achieve similar health outcomes using telehealth</u> compared to in-person therapy (e.g., taking longer to reach certain goals/milestones in therapy administered over telehealth to what might be expected in-person)? Why do you believe this? Is your organization tracking outcomes (such as patient-reported, biometric, or usability) that informs your thinking of health outcomes under telehealth?

        3.0..3.4. What is your <u>perception of the burden on nursing home staff to provide these services</u> (i.e., whether CNAs had to add to their list of required activities to set

up and oversee the provision of teletherapy and did it therefore take away from patient care because someone in the facility had to coordinate technology)? Do you think the burden differs depending on the type of service being provided (PT, OT, or SLP)?

    3.0..4. How do the unique needs and goals of this population influence the appropriateness and effectiveness of providing therapy via telehealth?

        3.0..4.1. Considering these unique needs, what is your perception of whether teletherapy will replace in-person therapy? Why do you think that?

        3.0..4.2. Do you think that PT, OT, or SLP therapies delivered via telehealth are considered equivalent to in-person care? Why do you think this?

        3.0..5. Considering potential disparities in use of these services, what is your sense of whether certain nursing facilities were more likely to adopt telehealth provision of PT, OT, or SLP therapies (e.g., higher resourced, better quality/higher star rated NHs, different mix of resident populations (Medicare vs. Medicaid))?

4.   FUTURE CONSIDERATIONS TO IMPROVE CARE DELIVERY

This last section asked about what should be considered in the future to improve PT, OT, or SLP services being administered under telehealth.

    4.0. What are your lessons learned from adopting or trying to adopt [PT, OT, or SLP services] being administered under telehealth to people in nursing homes and in the community?

        4.0..1. Do these lessons learned differ depending on the service adopted, for example PT/OT versus SLP? To what extent do you think they justify separate considerations for telehealth?

        4.0..2. Do these lessons learned differ depending on where services were provided (in a nursing home or in the patient home)?

        4.0..3. What federal/state policies should be considered to improve adoption of these services (e.g., Medicare benefit for permanent adoption)? Do these policies differ depending on the service provided or the location where services are administered?

        4.0..4. What implementation factors or strategies should be considered to improve adoption of these services (e.g., technical assistance needs for providers or staff; addressing patient care and staffing needs; addressing health disparities)? Do these factors or strategies differ depending on the service provided or the location where services are administered?

        4.0..5. What are your thoughts on sustaining these services after the public health emergency ends? Does sustainability look different depending on service provided or the location where services are administered?

5.   WRAP-UP

    5.0. What else comes to mind that regarding PT, OT, or SLP services administered via telehealth to the nursing home population that we have not yet discussed?

APPENDIX B. PERCENTAGE POINT CHANGES IN NUMBER OF MEDICARE BENEFICIARIES RECEIVING FFS PART B PT, OT, AND SLP SERVICES

Appendix Table B.1. Month-Over-Month Percentage Point Changes in Number of Medicare Beneficiaries Receiving FFS Part B PT and OT Services, by Delivery Mode (in-person or telehealth) and by Provider Type (therapist practices or nursing homes)				
Month and Year	**In-person PT/OT from Therapist Practices**	**In-person PT/OT from Nursing Homes**	**Telerehabilitation PT/OT from Therapist Practices**	**Telerehabilitation PT/OT from Nursing Homes**
Jan 2019	na	na	*	*
Feb 2019	-3.5%	-1.8%	*	*
Mar 2019	6.1%	1.7%	*	*
Apr 2019	4.7%	1.4%	*	*
May 2019	0.5%	0.8%	*	0
Jun 2019	-4.9%	-4.0%	*	*
Jul 2019	6.0%	5.2%	*	*
Aug 2019	-0.4%	-0.5%	*	*
Sep 2019	-4.4%	-2.9%	na	*
Oct 2019	7.3%	7.6%	23.1%	*
Nov 2019	-9.3%	-4.6%	-6.3%	*
Dec 2019	-2.0%	-3.0%	60.0%	*
Jan 2020	7.6%	5.3%	45.8%	*
Feb 2020	-2.3%	-2.3%	42.9%	*
Mar 2020	-15.3%	-1.6%	18016.0%	*
Apr 2020	-64.4%	-10.5%	284.5%	na
May 2020	44.1%	-4.8%	0.9%	44.9%
Jun 2020	53.8%	3.4%	-27.7%	541.1%
Jul 2020	15.4%	1.8%	-17.0%	139.9%
Aug 2020	3.6%	-2.9%	-15.3%	30.9%
Sep 2020	7.2%	2.4%	-26.3%	18.3%
Oct 2020	4.0%	0.2%	-4.4%	7.2%
Nov 2020	-7.3%	-8.3%	3.9%	20.1%
Dec 2020	-3.2%	-4.7%	24.5%	14.7%
Jan 2021	-6.5%	-3.5%	-12.0%	-7.2%
Feb 2021	0.0%	2.9%	-5.4%	-13.9%
Mar 2021	24.2%	12.1%	-20.5%	-9.1%
Apr 2021	3.3%	0.8%	-24.0%	-14.4%
May 2021	-0.3%	-2.1%	-19.4%	-12.3%
Jun 2021	9.4%	1.8%	64.2%	-2.3%

Source: The Medicare Common Working File (CWF) for 2019, 2020, and 2021.

Note: The CWF includes Medicare Part A and Part B claims, but the analysis only used Part B claims.
A * indicates a small cell that has been suppressed to maintain confidentiality.

FFS = fee-for-service; na = not applicable; OT = occupational therapy; PT = physical therapy.

Month and Year	In-person SLP from Therapist Practices	In-person SLP from Nursing Homes	Telerehabilitation SLP from Therapist Practices	Telerehabilitation SLP from Nursing Homes
Jan 2019	na	na	na	na
Feb 2019	-4.6%	-3.4%	-21.1%	0
Mar 2019	3.9%	2.1%	10.0%	0
Apr 2019	3.4%	0.3%	18.2%	0
May 2019	-0.4%	0.9%	46.2%	0
Jun 2019	-7.5%	-3.3%	-52.6%	0
Jul 2019	6.2%	7.7%	70.4%	0
Aug 2019	0.9%	-0.3%	-28.3%	*
Sep 2019	-1.8%	-3.7%	15.2%	0
Oct 2019	11.7%	8.9%	-7.9%	0
Nov 2019	-13.9%	-7.0%	-62.9%	*
Dec 2019	-4.6%	-3.3%	69.2%	0
Jan 2020	15.5%	8.3%	31.8%	0
Feb 2020	-5.9%	-4.5%	17.2%	*
Mar 2020	-19.9%	-1.2%	2461.8%	*
Apr 2020	-67.0%	-6.5%	341.3%	*
May 2020	41.6%	-5.3%	14.1%	*
Jun 2020	64.9%	4.4%	2.4%	na
Jul 2020	12.3%	3.4%	-1.5%	63.6%
Aug 2020	2.8%	-3.8%	-5.7%	72.2%
Sep 2020	9.2%	3.4%	3.6%	24.7%
Oct 2020	6.3%	-0.6%	3.5%	16.4%
Nov 2020	-10.1%	-10.0%	-4.3%	23.7%
Dec 2020	-4.2%	-2.9%	6.1%	32.3%
Jan 2021	0.5%	-3.2%	-3.9%	-23.5%
Feb 2021	0.1%	2.2%	1.2%	5.3%
Mar 2021	23.3%	12.6%	2.5%	-35.4%
Apr 2021	-3.7%	-1.9%	-13.3%	8.7%
May 2021	-4.7%	-4.3%	-12.0%	16.0%
Jun 2021	11.2%	3.3%	-3.6%	-14.5%

Appendix Table B.2. Month-Over-Month Percentage Point Changes in Number of Medicare Beneficiaries Receiving FFS Part B SLP Services, by Delivery Mode (in-person or telehealth) and by Provider Type (therapist practices or nursing homes)

Source: The Medicare Common Working File (CWF) for 2019, 2020, and 2021.

Note: The CWF includes Medicare Part A and Part B claims, but the analysis only used Part B claims.
A * indicates a small cell that has been suppressed to maintain confidentiality.

FFS = fee-for-service; na = not applicable; SLP = speech, language, pathology.

REFERENCES

1.	Tenforde AS, Borgstrom H, Polich G, Steere H, Davis IS, Cotton K, O'Donnell M, Silver JK. (2020). Outpatient physical, occupational, and speech therapy synchronous telemedicine: A survey study of patient satisfaction with virtual visits during the COVID-19 pandemic. *Am J Phys Med Rehabil*, 99: 977-81.

2.	Centers for Medicare & Medicaid Services (CMS). (2018). *Information on Medicare Telehealth*.

3.	Centers for Medicare & Medicaid Services (CMS). (2021). *COVID-19 Emergency Declaration Blanket Waivers for Health Care Providers*.

4.	U.S. Department of Health and Human Services. (2022). *Telehealth Was Critical for Providing Services to Medicare Beneficiaries During the First Year of the COVID-19 Pandemic*. Washington, DC: U.S. Department of Health and Human Services.

5.	Hung Kn G, Fong KN. (2019). Effects of telerehabilitation in occupational therapy practice: A systematic review. *Hong Kong J Occup Ther*, 32: 3-21.

6.	Prvu Bettger J, Resnik LJ. (2020). Telerehabilitation in the age of COVID-19: An opportunity for learning health system research. *Phys Ther*, 100: 1913-6.

7.	Cottrell MA, Galea OA, O'Leary SP, Hill AJ, Russell TG. (2017). Real-time telerehabilitation for the treatment of musculoskeletal conditions is effective and comparable to standard practice: A systematic review and meta-analysis. *Clin Rehabil*, 31: 625-38.

8.	Taylor OD, Armfield NR, Dodrill P, Smith AC. (2014). A review of the efficacy and effectiveness of using telehealth for paediatric speech and language assessment. *J Telemed Telecare*, 20: 405-12.

9.	Verma S. (2020). Early impact of CMS expansion of Medicare telehealth during COVID-19. *Health Affairs* Blog.

10.	Kaiser Family Foundation. Total Number of Residents in Certified Nursing Facilities, 2019-2023. https://www.kff.org/other/state-indicator/number-of-nursing-facility-residents/?activeTab=graph&currentTimeframe=0&startTimeframe=8&selectedDistributions=number-of-nursing-facility-residents&selectedRows=%7B%22wrapups%22:%7B%22united-states%22:%7B%7D%7D%7D&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D.

11.	Kumar R, Osborne C, Rinaldi R, Smith JAD, Juengst SB, Barshikar S. (2021). Rehabilitation providers' experiences with rapid telerehabilitation implementation during the COVID-19 pandemic in the United States. *J Phys Med Rehabil*, 3: 51-60.

12.	Medicare Payment Advisory Commission. (2023). Report to Congress: Medicare Payment Policy. Washington, DC: Medicare Payment Advisory Commission. https://www.medpac.gov/document/march-2023-report-to-the-congress-medicare-payment-policy/.

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