Washington DC WIC Agency (DC WIC): Advancing Telehealth Technology and Innovation in DC WIC (ATTAIN DC WIC)
Final Report

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The Telehealth Intervention Strategies for Supplemental Nutrition Program for Women, Infants, and Children (THIS-WIC) team would like to thank the District of Columbia WIC agency and local agency staff who participated in this project and the WIC clients who participated in the evaluation of this work. We would like to thank the collaborators at American University who were involved the research and evaluation for this work. We would like to thank the THIS-WIC Leadership Team and Advisory Board who have provided support, guidance, and feedback throughout the project. Finally, we would like to thank all the doctoral students and graduate and undergraduate research assistants whose efforts made this work possible.

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List of Abbreviations and Terms

ATTAIN DC WIC	Advancing Telehealth Technology and Innovation in DC WIC
CFIR	Consolidated Framework for Implementation Research
DC	District of Columbia
IRB	Institutional Review Board
MIS	Management Information System
PA	Priority Area
SD	Standard Deviation
TA	Technical Assistance
THIS-WIC	USDA/Tufts Telehealth Intervention Strategies for WIC
USDA	United States Department of Agriculture
WIC	Supplemental Nutrition Program for Women, Infants, and Children

Terms and Definitions

Clinics	WIC clinics are locations where WIC clients receive services.
Early phase	First quarter of implementation.
eWIC	eWIC is an electronic system for issuing benefits to WIC participants. WIC food benefits are automatically added to the eWIC card, which functions like a debit card.
Late phase	Final quarter of implementation.
Local agency	WIC administrative entity that oversees clinics where WIC clients receive services.
Telehealth	As defined by the U.S. Department of Health and Human Services, telehealth is the use of electronic communication and telecommunications technology to support long-distance clinical healthcare, patient and professional health-related education, public health, and health administration.
Usual care	Standard mode of delivery for WIC appointment. For THIS-WIC, during the COVID-19 pandemic under Federal waivers, usual care in WIC clinics was either telephone-based or in-clinic appointments.
WIC benefit redemption	Calculated as the percentage of food benefits issued that are redeemed in whole or part.
WIC client	All individuals who receive WIC services at participating clinics involved in the THIS-WIC evaluation and represent the entire agency-level caseload, not just those in the THIS-WIC evaluation. In working with the states engaged in this work, the THIS-WIC team recognizes that States differ in how they refer to individuals who receive WIC services. Some States prefer to use the term “WIC client,” whereas others prefer “WIC participant.” Because of this and potential confusion with the term “participation” in the context of an evaluation, we use the term “client.” We acknowledge that the Food and Nutrition Service’s preferred term is “WIC participant.”
WIC Client Survey respondent	Individuals who consented to participate in the study and responded to the THIS-WIC Client Survey. These individuals represent a subsample of all individuals who received WIC services at participating agencies (WIC clients).
WIC client telehealth user	Individuals who used the telehealth solution (as documented in MIS); these individuals may or may not be survey respondents.
WIC retention	Retention in WIC was defined as those WIC clients who had available data on WIC benefit redemption in MIS after 180 days from survey completion date.
WIC staff key informant interview respondent	Individuals who consented to participate in the study and took part in a WIC staff key informant interview. These individuals were staff who delivered nutrition education/breastfeeding support using telehealth at participating agencies and agreed to take part in the survey or interview.
WIC Staff Survey respondent	Individuals who consented to participate in the study and responded to the THIS-WIC Staff Survey. These individuals were staff who delivered nutrition education/breastfeeding support using telehealth at participating agencies and agreed to take part in the survey.

Executive Summary

Background

Telehealth has emerged as an integral approach to offering healthcare services because it may offer enhanced access to services, convenience in scheduling and receiving services, and cost savings. However, factors such as comfort level with digital technology, availability of internet, privacy and security concerns, and accessibility may be barriers to telehealth integration within the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). The Consolidated Appropriations Act of 2019 (Public Law 1166) authorized the allocation of $5,000,000 for competitive telehealth grants to (1) supplement the nutrition education and breastfeeding support offered to individuals in the WIC program, and (2) decrease barriers to access WIC services. The U.S. Department of Agriculture, Food and Nutrition Service awarded a Cooperative Agreement to Tufts University and collaborators in Telehealth Intervention Strategies for WIC (THIS-WIC) to support the implementation and evaluation of telehealth services in WIC. THIS-WIC awarded grants and evaluated telehealth solutions across seven WIC State agencies: District of Columbia, Georgia, Michigan, North Carolina, South Carolina, Vermont, and Wisconsin WIC. This report describes the implementation of telehealth services in the District of Columbia (DC) using Zoom, Microsoft Teams, and doxy.me. It also details staff and client experience with telehealth and client outcomes in the District of Columbia (DC).

Project Overview

DC WIC delivered nutrition education, breastfeeding support, and other WIC services via telehealth using several platforms and modalities, including Zoom, Microsoft Teams, doxy.me, and phone-based appointments. The THIS-WIC evaluation in DC assessed the implementation of telehealth services using these various modalities and compared staff-, agency-, and client-* level outcomes across all local agencies (n = 4) using a nonrandomized design over 17 months from February 2022 (Q1/2022) to July 2023 (Q3/2023). Implementation evaluation findings are based on data collected from DC's Management Information System (MIS), a State-level implementation tracking tool, the THIS-WIC Staff Survey, cost tracking data, staff implementation tracking surveys, and key informant interviews. Outcome evaluation findings are based on data collected from MIS, the THIS-WIC Client Survey, and client interviews.

* WIC clients refers to all individuals who receive WIC services at the intervention and comparison agencies involved in the THIS-WIC evaluation and represent the entire local agency-level caseload, not just those in the THIS-WIC evaluation. In working with the states engaged in this work, the THIS-WIC team recognizes that states differ in how they refer to individuals who receive WIC services. Some states prefer to use the term "WIC client," whereas other states, including Georgia, prefer "WIC participant." Because of this and potential confusion with the term "participant" in the context of an evaluation, this report uses the term "client."

Findings

Implementation of Telehealth in DC

In DC, WIC staff had a favorable attitude toward the use of telehealth and recognized benefits of telehealth for clients, particularly those who faced barriers—such as transportation, childcare, or work conflicts—to coming into a clinic. WIC staff noted that telehealth appointments provided important flexibility to clients who otherwise might not be able to come in. Because DC offered telehealth services prior to the THIS-WIC project, most staff indicated prior experience using Zoom and Teams; however, fewer than half had used doxy.me prior to THIS-WIC. In the early phase, about one-third of WIC staff preferred phone appointments. Staff indicated that they had received extensive training, felt prepared to use telehealth, and noted that additional training was available for those who requested it. Staff expressed high satisfaction with telehealth and indicated a preference for WIC appointments via Zoom and Teams over in-person appointments (see **Table ES-2**). Staff were ambivalent about using doxy.me instead of in-person appointments. Some staff expressed a preference for in-person appointments because of the ability to conduct health assessments, see the client, interact with the children, and tailor resources based on the client's interests. About one-fourth of WIC staff also reported barriers to using telehealth with video and to discussing the opportunity to use video with clients; they noted that clients had trouble understanding the process of getting a text link to the telehealth platform and experienced connectivity issues or were no-shows.

Table ES-2. Staff Preferences for Using Zoom, Teams, and doxy.me to Provide WIC Services in DC

Statement[a]	Early[b]	Late[b]	p-value[c]
Zoom	N=9	N=7	
I prefer WIC appointments with Zoom over WIC appointments that are in-person	4.33 (1.32)	4.71 (0.49)	0.483
Teams	N=6	N=4	
I prefer WIC appointments with Teams over WIC appointments that are in-person	4.17 (1.33)	4.00 (0.82)	0.830
doxy.me	N=10	N=5	
I prefer WIC appointments with doxy.me over WIC appointments that are in-person	3.80 (1.48)	4.00 (1.00)	0.791

Source: THIS-WIC Staff Survey

[a] Responses were assessed on a 5-point Likert scale, where 1=Strongly disagree and 5=Strongly agree.

[b] Ordinal data are summarized as predicted mean (SD).

[c] p-values were based on mixed-effects regression for ordinal data (controlling for respondent's ID as random intercept for repeated measurements).

Cost of Telehealth in DC

Overall, the startup cost to offer telehealth services was $296,835, of which 58 percent was indirect costs including facilities and administrative costs. Other startup costs included labor (18%), equipment (17%), and contracted services (8%). Mean ongoing service delivery cost per

appointment declined by $11 from 2019 (before THIS-WIC evaluation) to the 12th month of the project. Based on the monthly caseload, it would take DC about 7.5 months to recoup the startup costs.

Client Experience with Telehealth in DC

WIC clients find telehealth appointments to be a highly acceptable approach for receiving WIC services and express a preference to continue the same way in the future (**Table ES-1**). Client experience with WIC appointments; intent to change how they eat and feed their families; breastfeeding behaviors; and retention in WIC were comparable among respondents receiving WIC services in-person or via telehealth. Mean scores indicating agreement that nutrition education lessons would help them make healthy choices were significantly lower for respondents who completed telehealth appointments than for those who completed in-person appointments (3.9 vs. 4.1). Reasons for these differences were not explored.

Table ES-1. Client Preference to Receive WIC Services via Telehealth for Future Appointments

Statement	N	Strongly disagree %	Disagree %	Neither agree nor disagree %	Agree %	Strongly agree %
I would like to receive services the same way at my next WIC appointment	134	3.7	0.0	13.4	29.1	53.7

Source: THIS-WIC Client Survey

Recommendations

WIC staff provided the following recommendations:

- Simultaneous rollout of projects affects staff capacity to use telehealth, particularly when the intent is not aligned. For example, offering telehealth during eWIC rollout put additional burden on staff to manage both in-person and telehealth appointments.
- The mode of WIC service delivery should be driven by the purpose and goals of the appointment: in-person appointments are necessary for health assessments and may be preferable for sensitive discussions, but flexibility of telehealth is important for WIC clients who face barriers coming into a clinic.
- Availability and comfort with technology drives client use of telehealth. Identifying and implementing strategies to support caregivers in becoming familiar and comfortable with using telehealth services may boost usage.
- For telehealth appointments, video should be used whenever possible to build rapport between the WIC provider and client and help ensure that information being shared is understood by the client.

1. Background

Telehealth technology allows healthcare providers to communicate with patients virtually through a two-way, synchronous channel. It has emerged as an integral approach to offering healthcare services and could soon become a standard of care. For the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), telehealth may facilitate access to services in rural areas or in areas with staffing shortages; improve efficiency without higher net costs; and reduce travel and wait time, making it convenient to schedule and receive timely care services. However, factors such as comfort level with digital technology, availability of internet, privacy and security concerns, and accessibility dictate the quality of client experience and may be barriers to telehealth integration within WIC. Understanding variations in telehealth use and adoption by staff and clients is necessary to inform telehealth use policies and practice.

The Consolidated Appropriations Act, 2019 (Public Law 116-6) authorized the allocation of $5,000,000 for competitive telehealth grants to supplement the nutrition counseling and breastfeeding support offered to individuals in the WIC program, and to decrease barriers to access WIC services.[1] The U.S. Department of Agriculture (USDA) Food and Nutrition Service awarded a Cooperative Agreement to Tufts University and collaborators in Telehealth Intervention Strategies for WIC (THIS-WIC) to support the implementation and evaluation of telehealth services in WIC. Through a competitive Request for Application process, State agencies submitted proposals to implement projects focused on one of two Priority Areas (PAs):

- PA I: Implement an existing telehealth solution to ensure timely access to nutritional or breastfeeding support for WIC clients by qualified professionals.
- PA II: Develop and implement an online (mobile-friendly) resource or tool to provide nutrition or breastfeeding support to WIC clients that is within the scope of the nutrition counseling offered in the WIC clinic by qualified professionals, including Registered Dietitians, Certified Lactation Consultants, and International Board-Certified Lactation Consultants.

THIS-WIC awarded grants and evaluated telehealth solutions across seven WIC State agencies:

- PA I: District of Columbia, Georgia, Michigan, Wisconsin
- PA II: North Carolina, South Carolina, Vermont

In addition, THIS-WIC provided technical assistance (TA) to each of the State agencies throughout the study to support the adoption of telehealth and the evaluation of their telehealth intervention. The evaluation details how each State implemented telehealth solutions, staff and client experience, and the overall impact on enrollment and retention of clients in WIC. The COVID-19 pandemic sharply increased public and agency attention on remote access to services and elevated the relevance of telehealth solutions.

The project was funded and designed before the pandemic, but some aspects of the research design were modified to take account of USDA COVID-19 waivers. Specifically, prior to COVID-19, THIS-WIC evaluation entailed evaluating the impact of delivery of WIC nutrition sessions via

telehealth compared to usual care, i.e., the standard mode of delivery for WIC appointments. During COVID-19, with physical presence waivers in place, most appointments in participating agencies were virtual and telephone-based. In April 2022, DC launched eWIC and required in-person appointments, providing an opportunity to examine client-level outcomes by appointment mode (in-person vs. telehealth).

This report describes the findings of the evaluation of an existing telehealth solution used throughout DC: **Advancing Telehealth Technology and Innovation in DC WIC [ATTAIN DC WIC])** between February 2022 and July 2023 in the District of Columbia (DC). In addition, ATTAIN DC WIC included objectives to explore methods to integrate WIC services into home-visiting program services currently offered at local agencies (see **Appendix DC.5** for details). The ATTAIN DC WIC project was a collaboration between DC WIC and American University.

1.1 Need for and Integration of Telehealth Services in Washington, DC

DC WIC services were administered across four local agencies. Most WIC clients served at these agencies are of African American/black or Hispanic origin, and children account for about half of the total caseload, followed by infants (27%) and pregnant/breastfeeding women (26%).[2] Annual DC WIC participant surveys consistently identified transportation, childcare, and wait times as common barriers for attending in-person appointments. For example, when asked what barriers they face to attend in-person appointments, 65 percent of clients at Mary's Center reported the cost of childcare, 65 percent reported cost and access to transportation, and 45 percent reported appointment wait times. DC WIC mothers frequently reported relying on friends and family to bring them to appointments.

To address these concerns, between 2018 and 2019, DC integrated use of Microsoft Teams (a collaboration and engagement product) into workflow for staff for clinic-to-clinic voice and video calls and messaging for staff and offered phone appointments on a limited basis. DC used telehealth for nutrition education to increase WIC participant retention, satisfaction, and health outcomes. However, use of telehealth across the local agencies varies, resulting in unequal opportunities for clients to access nutrition education via telehealth. In FY2019, when WIC clients across all local agencies were asked how reported barriers could be reduced, 34 percent requested additional weekend and evening hours at local agency clinics (likely because of the need to balance work schedules with clinic appointments). Thirty-one percent of respondents recommended use of online education to improve service delivery.

The COVID-19 pandemic accelerated DC WIC's use of telehealth platforms for service delivery, and this was expanded in 2020 when DC integrated additional telehealth capability via Zoom (a videoconferencing and engagement product), and doxy.me (a telemedicine platform). To understand WIC client experiences with telehealth services, DC WIC conducted a survey of English- and Spanish-speaking WIC clients in Spring 2020. About 80 percent of the respondents reported interest in having their appointment over video. Of those who reported that they were not interested in or unsure about video appointments, 47 percent noted feeling uncomfortable being on camera; 30 percent reported poor connectivity issues, low bandwidth,

and poor video or image quality. To overcome this barrier, all three telehealth platforms used by local agencies had an “audio only” option. When WIC clients were asked to identify characteristics of phone appointments that they did not like, 40 percent of Spanish-speaking clients and 7 percent of English-speaking clients noted that they preferred to see the WIC staff member.

WIC local agencies selected these platforms based on functionality needed for telehealth appointments and relative ease of use for WIC clients. For instance, doxy.me, a secure Health Insurance Portability and Accountability Act–compliant platform was selected because clients could be invited via text message without needing to download an app, and it offered a customizable website and waiting room. These solutions also allowed staff to contact WIC clients directly in case of missed appointments and invite them in real time to join the video call.

These platforms were used for group nutrition education, breastfeeding education, individual assessment, and certification. Mary’s Center’s Care Coordination Home Visiting program also used doxy.me, Zoom, and Teams to provide case management and care coordination to families, ensuring access to comprehensive medical, social, behavioral, educational, and support services. In this way, telehealth nutrition education directly addressed challenges experienced by DC WIC participants who could not otherwise attend appointments at local agencies where Competent Professional Authorities were located because of childcare, transportation, wait time issues, or potential conflicts with their work schedules.

1.2 Expansion of Telehealth Services in DC Through THIS-WIC

Through THIS-WIC, DC expanded and enhanced telehealth technologies to improve access to nutrition education among clients, especially those residing in low public transportation areas and those with limited access to childcare services. DC provided telehealth services via several modalities: individual calls by phone, group nutrition education and breastfeeding classes via Zoom, self-paced secondary nutrition education online (pilot), and in-person. In addition, doxy.me was used for secure document sharing, and Teams was used for clinic-to-clinic communication for video calls to link clients to WIC staff at another clinic in cases where clinics were short-staffed.

In April 2022, DC WIC began the eWIC rollout, requiring clients to come to a clinic to receive their eWIC card; all DC WIC agencies therefore scheduled in-person appointments for certifications and medical updates.

2. Project Methods

ATTAIN DC WIC was evaluated using a nonrandomized, longitudinal, exploratory sequential mixed-methods design over 17 months (February 2022–July 2023). The evaluation sought to understand the impact of existing telehealth nutrition education on client-level outcomes. This evaluation compared client outcomes by appointment mode (i.e., those completed in-person at the clinic or via telehealth [phone, Zoom, Teams, or doxy.me]).

Three WIC local agencies (11 clinics) participated in this evaluation. When possible, ATTAIN DC WIC included community engagement practices to address equity and inclusion of WIC program clients and local and DC State agency staff. Overall, THIS-WIC used the five-stage model for comprehensive research on telehealth developed by Fatehi and colleagues[3] to guide the overall design of the telehealth research study; DC's project was in the fifth stage (operational use). See **Appendix DC.1** for details about the model.

2.1 Research Questions

The THIS-WIC evaluation examined several research questions to understand the implementation of telehealth nutrition education (**Table 2-1**). These research questions also informed whether telehealth could overcome known barriers to WIC participation and retention by enhancing existing care practices. THIS-WIC hypothesized that key outcomes such as client satisfaction would improve with telehealth solution usage compared to usual care. In the wake of COVID-19, THIS-WIC worked closely with the DC WIC agency to understand changes during implementation and to develop implementation tracking tools to document and understand delivery of services throughout the evaluation period.

2.2 WIC Agencies Participating in Telehealth Solution Implementation and Evaluation

DC WIC identified four local agencies to participate in the evaluation of ATTAIN DC WIC; one agency closed before the project launch, and three agencies began using telehealth during the COVID-19 pandemic. **Appendix DC.1** lists the agencies involved in the evaluation.

2.3 Data Sources for ATTAIN DC WIC Evaluation

This study leveraged new and existing quantitative and qualitative data to assess processes and outcomes. The data sources included (1) Management Information System (MIS) data, (2) telehealth metadata, (3) Client Survey data, (4) Staff Survey data, (5) staff key informant interview data, (6) implementation data, and (7) cost data. **Appendix DC.1** lists the lead for developing and collecting these data.

2.3.1 Management Information System Data

DC WIC administrative data were provided at two levels: microlevel (individual-level MIS data from WIC clients/clients who completed the THIS-WIC survey) and macrolevel (aggregate MIS data from all clients at participating local agencies). During the study period, DC WIC

implemented a new MIS (HANDS) to replace its legacy system (CARES). Following the transition, not all data available in CARES were available in HANDS or in the same format; data available in HANDS were used in the evaluation. See **Appendix DC.2** for the list of MIS data provided by DC.

Table 2-1. Staff-, Agency-, and Client-Level Research Questions in DC

Staff and Agency Levels	
▪ What was the staff **attitude** toward telehealth? ▪ What was the staff level of **readiness** to implement telehealth? ▪ What was the staff level of **satisfaction** with telehealth? ▪ What was the staff level of telehealth **adoption?** ▪ What was the staff **acceptability** of telehealth?	▪ What was the perceived **feasibility** of using telehealth to provide WIC services? ▪ Did staff perceive telehealth services to make WIC services more accessible for WIC clients? ▪ Did offering telehealth services affect staff **travel** (frequency and time) to clinics? ▪ What was the **startup cost** of telehealth in WIC? ▪ What was the **ongoing cost** of offering WIC services via telehealth?
Client Level	
▪ What was the level of telehealth solution **adoption** among clients? ▪ What was the level of **satisfaction** with WIC services among those receiving in-person versus telehealth services? ▪ What was the perceived **acceptability (accessibility and feasibility)** of WIC services among those receiving in-person versus telehealth services? ▪ What were the perceived **barriers** to attending WIC appointments among those receiving in-person versus telehealth services? ▪ What was the **intent to change dietary behaviors** among those receiving in-person versus telehealth services?	▪ What was the **daily fruit and vegetable intake** among those receiving in-person versus telehealth services? ▪ How did **rates of breastfeeding initiation and duration** differ among those receiving in-person versus telehealth services? ▪ What were the **food benefit redemption** among those receiving in-person versus telehealth services? ▪ What were the **client retention rate** among those receiving in-person versus telehealth services?

2.3.2 Telehealth Metadata

Because of the nature of DC WIC telehealth contracts and administrative rights, which are not established or negotiated by the State agency but rather the organization (i.e., hospital, Federally Qualified Health Center) that provides services including WIC, no telehealth metadata were provided by DC WIC. However, DC MIS captured telehealth solution utilization (e.g., telehealth modality used at appointment).

2.3.3 Client and Staff Surveys

2.3.3.1 Client Survey

The Client Survey was developed by THIS-WIC to assess accessibility, barriers, satisfaction, and attitudes toward using telehealth. The survey was developed using existing valid/reliable tools[4-18]; DC reviewed the survey to ensure that it captured key aspects of their telehealth solutions, had a low respondent burden and easy-to-follow format, and had a literacy level appropriate for WIC clients. The survey was tested with WIC clients (n = 11) in a local agency not participating in the THIS-WIC evaluation, and the average survey completion time was less than 10 minutes. The findings from the pilot testing were used to clarify wording and improve navigability. The final survey included 37 questions; clients who declined telehealth services were asked an additional question to understand their reasons for declining telehealth services. The survey was translated into universal Spanish. The expected respondent burden was 10 minutes. See **Appendix DC.3** for the English- and Spanish-language versions of the Client Survey.

2.3.3.2 THIS-WIC Staff Survey

THIS-WIC developed the Staff Survey to assess staff satisfaction with telehealth for providing nutrition education or breastfeeding support, accessibility and acceptability of the solution, and staff attitudes toward and readiness for telehealth use. The survey items are drawn from reliable/valid instruments[9, 16, 19-25] and focus on key outcomes listed in **Table 2-1**, along with additional demographic questions and covariates (e.g., years of experience working at WIC). As with the Client Survey, a research survey methodologist reviewed the Staff Survey to ensure comprehension and readability. The final staff English-language survey included 28 questions, with branching logic to display certain questions based on response choice selection. The average completion time was 15 minutes. See **Appendix DC.3** for the Staff Survey.

2.3.4 Key Informant Interviews

2.3.4.1 Staff Interviews

Staff and directors at all local agencies were invited to participate in semi-structured interviews to share their experiences using telehealth. In collaboration with THIS-WIC, the ATTAIN DC WIC team, including members of the DC WIC agency and researchers at American University, developed a key informant interview guide to assess staff experiences with developing and implementing telehealth to provide nutrition education and their perceptions of benefits and challenges of using telehealth tools. The interview guide included questions about utilization of telehealth tools, barriers and challenges encountered, successes with telehealth use, and health equity issues emerging from these experiences. See **Appendix DC.3** for the staff and director interview guides.

2.3.4.2 Client Interviews and Community Listening Sessions

WIC clients at all local agencies were invited to take part in semi-structured interviews. Current DC WIC participants, DC residents eligible for WIC but who were not participants, and

nonparticipants who had participated in WIC in the past were invited to community listening sessions. The ATTAIN DC WIC team, including members of the DC WIC agency and researchers at American University, developed a key informant interview guide and the community listening session guide to assess WIC client experiences using telehealth during their WIC appointments. The interview guide included questions about client use of telehealth tools and about their experiences and perceptions of how using telehealth shaped their nutrition outcomes. See **Appendix DC.3** for the client interview guide.

2.3.5 Implementation Data

Telehealth implementation data were obtained from two sources: a 46-item Implementation Tracking Tool completed by the WIC State agency project team in the early, mid, and late phase of implementation; and a staff implementation survey fielded twice during the study period.

2.3.5.1 Implementation Tracking Tool

The THIS-WIC project management team developed the Implementation Tracking Tool with a menu of 46 implementation strategies (e.g., identify and prepare champions) from the Expert Recommendations for Implementing Change study.[26] In collaboration with THIS-WIC, DC developed implementation tracking plans for use at participating agencies. THIS-WIC projects were not expected to implement all 46 strategies but to select those best aligned with their overall goals. See **Appendix DC.4** for the Implementation Tracking Tool.

2.3.5.2 Staff Implementation Survey

The DC WIC agency developed a five-item survey to track telehealth use by staff at participating agencies. Surveys were fielded at two time points to local agency staff and directors via SurveyMonkey and included questions about perceptions of length of appointments, promotion of telehealth appointments, and barriers to using telehealth. See **Appendix DC.3** for the survey.

2.3.6 Telehealth Solution Ongoing Implementation Cost Data

THIS-WIC collected both startup and ongoing cost data from the participating local agencies. Examples of startup costs included purchase of telehealth intervention platform accounts, purchase of new equipment, and staff training. Ongoing costs are those required to deliver nutrition education and breastfeeding services. Ongoing costs for the period after telehealth began included annual costs related to maintenance of the telehealth solution (ongoing training, licensure, administrative time, etc.). See **Appendix DC.3** for the startup and ongoing cost tracking tools.

2.4 Data Collection for Telehealth Solution Evaluation

The DC Public Health Institutional Review Board (IRB) served as the IRB of record for all aspects of the ATTAIN DC WIC evaluation. Tufts University's IRB established a reliance agreement for the evaluation.

Prior to the start of data collection, THIS-WIC principal investigators and study personnel completed human subject protection training, in line with the requirements of the IRB overseeing

the protocol. In addition, THIS-WIC designed and provided virtual training delivered via Zoom to state and local agency personnel relevant to their involvement in the project. The training covered both implementation and evaluation aspects of the work, including details on the study and an overview of human subjects' research protection. This training was recorded to be available for later reference and if new staff came on board after the start of implementation.

2.4.1 Management Information System Data

At the study's onset, DC provided microlevel MIS data weekly to orient study staff with the data fields and review data quality and integrity. After processes were established, DC provided these microlevel data monthly for the rest of the study. DC also provided macrolevel MIS data for all agencies on a quarterly schedule.

2.4.2 Client and Staff Surveys

2.4.2.1 Client Survey

Clients at all three local agencies were invited to complete the Client Survey. Following completion of a telehealth nutrition education appointment, WIC staff notified eligible clients that they would receive a survey link as a text message via Teletask, or they offered a QR code that the client could scan with their own smartphone's QR code reader. Clients who completed the survey were entered into a monthly drawing to win a $25 Amazon gift card. DC used SurveyMonkey (San Mateo), a secure web-based survey platform, to program and administer the survey.

2.4.2.2 Staff Survey

DC WIC sent an invitational email with a link to the Staff Survey to eligible local agency staff and directors. WIC staff received a recruitment email with the survey link embedded in the email. The link directed the staff respondent to the survey hosted on the SurveyMonkey site. The Staff Survey was fielded at two time points (Q3/2022 and Q1–Q2/2023). Incentives were not provided to WIC staff for completion of surveys, in compliance with federal and/or state policies.

2.4.3 Key Informant Interviews

2.4.3.1 Staff Key Informant Interviews

Staff interviews were conducted via Zoom by the ATTAIN DC WIC team using a semi-structured interview guide. Early phase interviews were conducted between July and September 2022 (first quarter of project implementation); late phase interviews were conducted in April and May 2023 and during the late phase of the implementation periods (last quarter of project implementation period). All interviews were scheduled for 30 minutes and digitally recorded. Incentives were not provided to WIC staff for completion of interviews, in compliance with federal and/or state policies.

2.4.3.2 Client Key Informant Interviews and Community Listening Sessions

All client key informant interviews and community listening sessions were conducted by the ATTAIN DC WIC team. The client key informant interviews were conducted virtually via Zoom, and the community listening sessions were conducted at a community center or school; one was conducted virtually via Zoom. Client interviews and community listening sessions were conducted in English and Spanish. Interviews were conducted at two time points (Q2-Q3/2022 and Q1-Q2/2023) during the evaluation. The interviews were scheduled for 30 minutes and digitally recorded. Interview participants received a $20 Amazon gift card. Listening sessions were conducted from March to May 2023.

2.4.4 Telehealth Solution Implementation Data

Implementation data were collected using two methods: responses to the Implementation Tracking Tool for startup (pre-implementation), mid, and late phase or endpoint of implementation (**Appendix DC.3**); and staff implementation surveys fielded by the DC WIC agency twice during the implementation period (**Appendix DC.3**).

2.4.5 Telehealth Solution Implementation Cost Data

For startup costs, THIS-WIC extracted data from original project budgets provided by each subgrantee at the time of award. This included information on all staff working on startup activities (both paid for from the grant and in-kind contributions), equipment used in startup activities (both paid for from the grant and in-kind contributions), and contracted services supporting startup activities. THIS-WIC conducted follow-up interviews with DC WIC agency staff to obtain missing data and clarify cost-related questions, and updated the cost tracking tools to ensure all costs were captured prior to analysis. This information included program implementation and evaluation for staff members and other resources; it also identified in-kind staff and resources not listed in budgets and details on the services provided in contracts.

For ongoing costs of delivering services, DC's WIC agency completed a Microsoft Excel–based cost collection tool reporting on the resources used to provide services in a month and the number of clients served. The tool captured all staff, infrastructure and equipment, supplies, contracted services, overhead, and travel used for providing services at participating agencies. The resource data were combined with the reported number of monthly appointments and enrollments to generate the cost per appointment and enrollment. THIS-WIC collected costs for a typical month prior to telehealth implementation for fiscal year 2019 (initial) and an average of the first 6 months (midpoint) and last 6 months (endpoint) of implementation.

2.5 Sample Description for THIS-WIC Evaluation

Primary data were collected via survey from WIC clients and staff. Key informant interviews were also conducted with WIC clients and staff.

2.5.1 Client Survey Sample Size, Response Rate, Characteristics, and Representativeness

All active WIC clients who received nutrition education or counseling were eligible to take part in the evaluation. Respondents had to be 18 years of age or older and fall into one or more of the following categories: pregnant, non-breastfeeding postpartum, breastfeeding, or the parent/guardian of a participating infant or child in the WIC program.

Following their WIC appointment, 9,710 clients were invited, and 10.0 percent (n = 972) consented to complete the survey. Of those who consented, 97.7 percent (n = 950) completed the survey and 80.1 percent (n = 761) were successfully linked with the MIS identifier. The aggregate MIS data and Client Survey data were used to generate balance tables and assess the representativeness of the survey respondents. This analysis entailed comparing the survey respondents' sociodemographic characteristics, duration of WIC participation, and high-risk status with those of clients completing their appointments in-person or via telehealth.

Overall, 51 percent of Client Survey respondents self-identified as non-Hispanic Black/African American and 41 percent as Hispanic. Less than 5 percent of respondents identified as non-Hispanic White or Asian. Nearly half of the respondents (47%) were 26 to 35 years old and almost a third (32%) were between 36 and 45 years old. Nearly two-thirds of respondents (64%) had some high school education or graduated from high school, and 25 percent had completed at least some college (1 to 5 years). Sixty-five percent of respondents reported speaking English at home while 35 percent reported speaking Spanish at home. The median household size was four members, and the median annual household income was $10,800. All respondents lived in an urban area. See **Appendix DC.1** for sample size calculations, response rate, sociodemographic characteristics, and representativeness of Client Survey responses.

2.5.2 Staff Survey Sample Size and Representativeness

All staff involved in the delivery of nutrition education were invited to participate in the Staff Survey. The number of staff who completed the early and late phase survey was 28 and 11, respectively. Because WIC agencies experienced turnover and hired new staff, the same survey was administered in the early and late phase.

2.5.3 Client Key Informant Interview and Community Listening Session Sample

All active clients at all DC local agencies were invited to participate in the client key informant interviews. A total of 36 clients (24 English-speaking and 12 Spanish-speaking) participated in the early phase interviews, and a total of 12 clients (9 English-speaking and 3 Spanish-speaking) participated in the late phase interviews. Similarly, 24 clients participated in the in-person community listening sessions (12 per session), and 11 participated in the virtual listening session.

2.5.4 Staff Key Informant Interview Sample

Local agency staff at participating agencies were invited to participate in the semi-structured interviews. A total of 24 staff members participated in the early phase interviews and 9 participated in the late phase interviews; 5 participated in both early and late phase interviews.

2.6 Analytic Approach

2.6.1 Aggregate MIS Analysis

For DC, WIC administrative data included WIC client characteristics, certification information, nutrition and risk assessment, nutrition education, and WIC food benefit redemption. DC also linked the Client Survey identifier with the client-level MIS data. Aggregate MIS data were also used to examine agency-level trends in breastfeeding initiation among those who completed their appointments in-person or via telehealth. Descriptive analyses were used to analyze the data and present the findings. All analyses were conducted in SAS 9.4. Cross-tabulations and chi-square statistics were used to examine the differences between in-person and telehealth appointments. See **Appendix DC.1** for details.

2.6.2 Client and Staff Surveys

2.6.2.1 Client Survey

The client outcomes evaluation examined the experiences of WIC clients who received WIC services and completed the Client Survey in one of the WIC clinics associated with the three local agencies in the study between February 2022 and July 2023. The original study design did not include a comparison group because the project was designed as an enhancement and expansion of existing telehealth solutions within DC WIC's local agencies to decrease barriers to access, ensure timely access to client-centered nutrition education, and enhance continuity of care.

As DC transitioned to eWIC, clients were required to come to the clinic for in-person appointments. This is reflected in the data from the Client Survey: 84 percent of the respondents completed their most recent appointment at a WIC clinic and 16 percent did so via telehealth. Although not planned, this provided the opportunity to compare the client outcomes by appointment mode (in-person or via telehealth). Among the 950 respondents who completed the Client Survey, 799 completed their appointment in-person and 151 did so via telehealth.

Client Survey and linked MIS data were analyzed using descriptive statistics, cross-tabulations, and regression. Descriptive statistics included respondent and household demographics, availability of and comfort with technology, attitudes toward telehealth services, intent to change dietary behaviors, and respondent behaviors (fruit and vegetable consumption and breastfeeding). Descriptive statistics for continuous variables present medians and interquartile ranges (25th percentile–75th percentile) because the data on household income and household size were assumed to be skewed.

Cross-tabulations for categorical variables present proportions among those who provided data (i.e., missing values were excluded from the analysis) by appointment type (in-person vs. telehealth). Significance tests compare respondent demographics and household characteristics, availability of and comfort with technology, attitudes toward telehealth services, and behaviors by appointment type. For categorical variables, chi-square tests for independence are presented.

Median tests were used to examine the distribution of sample scores around the median instead of comparing the actual median values and assess whether the two samples were from the same population. Analyses to assess client outcomes (satisfaction index, barriers, and behavior change intentions) employed unadjusted linear regression models comparing differences in means by appointment type. For the client satisfaction index, demographic/household variables that demonstrated statistically significant differences by appointment type were entered into multivariable linear regression; however, a model could not be estimated because of small cell counts. See **Appendix DC.1** for details.

2.6.2.2 Staff Survey

Descriptive analyses were undertaken to examine the Staff Survey data. For categorical and ordinal outcomes, chi-square tests were performed to examine differences in responses from early to late phase surveys. For ordinal/continuous outcomes, independent t-tests were performed to examine mean differences. Of the 39 total responses, 28 were submitted in the early phase and 11 in the late phase. Because of the low count of repeated responses, the data were analyzed cross-sectionally and treated independently. All analyses were conducted in Stata 18 (StataCorp LLC, College Station, TX, USA).

2.6.3 Client and Staff Key Informant Interviews and Community Listening Sessions

All staff interviews were conducted in English; client interviews and community listening sessions were conducted in English and Spanish, audio recorded, and transcribed verbatim. Analyses were conducted by the ATTAIN DC WIC team. Transcripts were read by project team members and an initial set of broad thematic codes were developed. Transcripts were then read again by project team members to refine the initial code list. Coders applied codes to one initial transcript; that initial transcript was used to calculate congruency across multiple coders, and discrepancies were discussed and resolved. All other transcripts were coded and summarized using NVivo software (version 13). The THIS-WIC team aligned the themes from the staff interviews with the Consolidated Framework for Implementation Research (CFIR) constructs.

2.6.4 Telehealth Implementation

Analysis of the Implementation Tracking Tool data involved tabulating the startup, midpoint, and endpoint status for each menu strategy to assess change. The startup measures were considered the implementation plan, and the change from startup to midpoint and endpoint measures were considered indicative of readiness. In addition to understanding the readiness for implementation, these data were used to provide context for the staff- and client-level

outcomes. See **Appendix DC.1** for details. Descriptive analyses were used to examine staff implementation survey data. All analyses were conducted in Microsoft Excel.

2.6.5 Telehealth Solution Startup and Ongoing Cost Analysis

Cost analysis was conducted to understand the (1) startup cost, (2) ongoing service delivery cost, and (3) ongoing cost per enrollment and appointment. Because of understaffing, one agency transferred all its clients to a different provider and was therefore excluded from the ongoing service delivery cost analysis. All costs were adjusted to 2023 dollars using the Consumer Price Index. All analyses were completed in Microsoft Excel (version #2308) and Stata 18. See **Appendix DC.1** for details.

3. Results: Telehealth Implementation in DC

Between Q2/2022 and Q3/2023 (February 2022 through July 2023), three local agencies participated in the THIS-WIC evaluation. This chapter presents implementation outcomes (process and cost). Data sources for findings included in this chapter include the Staff Survey, MIS data, staff key informant interviews, telehealth metadata, implementation data, and startup and ongoing cost data. Chapter 4 presents the client experience with telehealth and the primary and secondary outcomes.

3.1 Telehealth Appointments Completed by WIC Staff

As seen in **Table 3-1**, staff participating in the THIS-WIC survey used telehealth to provide a wide range of services. All Staff Survey respondents in the early phase (n = 28) and late phase (n = 11) offered nutrition education via telehealth; none of them used it to provide breastfeeding support (data not shown).

Table 3-1. Service Type Offered to WIC Clients by Appointment Mode in DC

Type of Appointment	Overall	In-person appointments	Telehealth appointments[a]
	N=25,315	N=19,481	N=5,834
	%		
Initial certification	14.68	19.07	—
Certification	22.28	27.14	6.02
Mid-certification	20.29	23.08	10.97
Nutrition education	27.86	23.05	43.91
Group discussion	0.40	0.27	0.82
Medium risk	0.77	0.54	1.53
High risk	13.73	6.83	36.75

Source: DC MIS caseload data, Q2/2022 to Q3/2023

[a] Telehealth appointments were completed using phone, Zoom, Teams, or doxy.me.

Table 3-2 presents the MIS data on appointment modality, indicating that approximately 77 percent of appointments were conducted in-person, and the remaining 23 percent were conducted via telehealth. As seen, in any given quarter, staff conducted more in-person than telehealth appointments. The quarterly variability in the percentage of appointments completed in-person or via telehealth may be because of the transition to eWIC. DC WIC transitioned to eWIC between Q3/2022 and Q4/2023, and clients were expected to come in-person for certification and mid-certification appointments to complete. As seen, the number of telehealth appointments peaked following the eWIC implementation in Q1/2023 and Q2/2023.

Table 3-2. Appointment Mode for all Services Offered to WIC Clients in DC

Appointment mode	Q2/2022	Q3/2022	Q4/2022	Q1/2023	Q2/2023	Q3/2023	Overall
	N=903	N=4,233	N=4,083	N=6,091	N=7,387	N=2,618	N=25,315
	%						
Telehealth[a]	10.52	10.44	15.23	36.18	26.38	19.98	23.05
In-person	89.48	89.56	84.79	63.82	73.62	80.02	76.95

Source: DC MIS
[a] Telehealth appointments were completed using phone, Zoom, Microsoft Teams, or doxy.me.

3.2 Attitudes Toward Telehealth

WIC staff participating in key informant interviews varied in their attitudes toward telehealth. In both early and late phase, staff acknowledged the benefits of telehealth for their clients, particularly for those who had transportation challenges and work conflicts (*CFIR constructs*[*]*: innovation relative advantage, inner setting, outer setting, characteristics of individuals, implementation process*). Some staff noted that offering telehealth services had increased client retention and increased new client enrollment. In the early phase, staff expressed preference for in-person appointments but in the late phase interviews, staff stated that their use of telehealth was driven by client preferences and comfort with technology.

> *"...sometimes they miss their appointment because of transportation, because of work. They don't want to miss their work, they don't want to miss their class. Because of all that, [it's] helpful to let them to continue on the program doing virtual." [Staff participant 2]*
>
> *"I do. And I mean moms are happy, really, really appreciative for that opportunity because, again, a lot of them: 'I just can't get there today.' They don't have access to transportation. They have to take two buses and a metro to get here. So, it just really allows us actually to reach more people." [Staff participant 4]*
>
> *"I prefer the in-person 'cause you'll see everything, you can give them and talk to them. You can see their reaction as well." [Staff participant 2]*
>
> *"All depends, because a person who might not be good in technology might prefer in-person. A person who is really good in technology will prefer a video call. I think it all depends on the audience." [Staff participant 17b]*
>
> *"I think that [the agency] really supports it and we have found the usefulness and advantages in using telehealth. So, I think that overall, for our [agency], it has been successful. We have seen how valuable it is in retaining WIC participants, and I think that many participants find that it's bringing us, I guess, into 2023 by utilizing this and not just sticking with the old way of doing things now that we see that it is a really helpful tool..." [Staff participant 16]*

[*] As described in Chapter 2, qualitative data were analyzed by the ATTAIN DC WIC team and themes were aligned to the CFIR Framework by the THIS-WIC team. To align project findings with the broader implementation science literature, we noted alignment with CFIR constructs when appropriate.

> *"I think it's a lot deeper than just telehealth or not telehealth. I think it's really just about access to information." [Staff participant 18b]*

In both early and late phase, staff perceived telehealth services as useful in promoting health equity among WIC clients. Staff also considered telehealth to be an integral part of WIC's health equity strategies (**Table 3-3**).

Table 3-3. Staff Attitudes Toward Usefulness of Telehealth in Early and Late Phase in DC

Statement[a]	Early Phase[b] N=28 Mean (SD)	Late Phase[b] N=11 Mean (SD)	p-value[c]
Telehealth is useful in promoting health equity among my WIC participants	4.57 (1.00)	4.45 (1.29)	0.764
Telehealth should be a part of all WIC organizations' health equity strategies	4.61 (1.10)	4.55 (1.21)	0.879

Source: THIS-WIC Staff Survey
[a] Responses were assessed on a 5-point Likert scale, where 1=Strongly disagree and 5=Strongly agree.
[b] Ordinal data are summarized as mean (SD).
[c] p-values were based on t-test for ordinal data.
* $p<0.05$

3.3 Readiness to Implement Telehealth Solution

Data on perceived readiness to implement the telehealth solution were obtained from three sources: (1) an Implementation Tracking Tool completed by staff in the early, midpoint, and endpoint of telehealth implementation; (2) the Staff Survey completed in the early and late phase; and (3) key informant interviews with WIC administrators and staff in the early and late phase.

3.3.1 Telehealth Implementation Strategies

At startup, DC selected 14 strategies planned for implementation and had already implemented 21 other strategies. By midpoint, DC had implemented 34 strategies, and by endpoint they had implemented 36 strategies. By endpoint they had developed and organized quality monitoring systems and obtained and used WIC client and family feedback. By endpoint, DC had also provided local TA, promoted adaptability, and tailored strategies. DC also developed academic partnerships, used an implementation advisor, and recruited, designated, and trained leadership to implement telehealth. Finally, by endpoint, DC had developed systems to remind WIC staff and clients to use telehealth. See **Appendix DC.4** for details.

3.3.2 Staff Training, Frequency of Telehealth Use, and Mode Preference

As seen in **Table 3-4**, in the early and late phase, most respondents indicated having prior experience with using Zoom and Teams; fewer than half had prior experience with using doxy.me. This prior experience reflects the ongoing nature of DC's use of telehealth. In the early phase, phone was the preferred appointment mode for about one-third of the respondents; for the remaining respondents, preferences were evenly distributed for in-person, Zoom, Teams, and doxy.me.

Staff reports on training duration varied considerably for all three solutions: Zoom, Teams, and doxy.me. In the early phase, more staff used Teams daily (67%) than Zoom (22%) or doxy.me (10%). These patterns persisted in the late phase, with more staff using Teams than Zoom; none of the staff used doxy.me daily. In the early phase, staff varied in their preference of appointment mode, with about 33 percent preferring phone.

Table 3-4. Telehealth Training Duration and Frequency of Use in Early and Late Phase in DC

Variables	Early Phase	Late Phase	p-value[a]
	%		
Prior Zoom Use Experience	N=9	N=7	0.572
Yes	88.9	85.7	
Prior Teams Experience	N=6	N=4	0.747
Yes	83.3	75.0	
Prior doxy.me Experience	N=10	N=5	0.439
Yes	40.0	20.0	
Solution 1: Zoom	N=9	N=7	
Hours of training			0.220
0 hours	44.4	42.9	
0 to <2 hours	33.3	0.0	
2 to <4 hours	0.0	28.6	
4 to <6 hours	11.1	0.0	
6 to <8 hours	11.1	14.3	
8 or more hours	0.0	14.3	
Frequency of Zoom Use (Nutrition)	0.0	N=7	0.223
Daily	22.2	42.9	
Weekly	44.4	57.1	
Monthly	33.3	0.0	
Every other month	0.0	0.0	
Solution 2: Teams	N=6	N=4	
Hours of Training			0.691
0 hours	16.7	25.0	
0 to <2 hours	16.7	0.0	
2 to <4 hours	33.3	25.0	

4 to <6 hours	16.7	25.0	
6 to <8 hours	16.7	0.0	
8 or more hours	0.0	25.0	

(continued)

Table 3-4. Telehealth Training Duration and Frequency of Use in Early and Late Phase in DC (continued)

Variables	Early Phase	Late Phase	p-value[a]
	%		
Frequency of Teams Use (Nutrition)			0.435
Daily	66.7	50.0	
Weekly	16.7	50.0	
Monthly	16.7	0.0	
Every other month	0.0	0.0	
Solution 3: doxy.me	N=10	N=5	
Hours of training			0.080
0 hours	0.0	40.0	
0 to <2 hours	50.0	0.0	
2 to <4 hours	40.0	40.0	
4 to <6 hours	10.0	20.0	
6 to <8 hours	0.0	0.0	
8 or more hours	0.0	0.0	
Frequency of doxy.me Use (Nutrition)			0.466
Daily	10	0.0	
Weekly	70	100	
Monthly	20	0.0	
Every other month	0.0	0.0	
Overall Mode Preference (Nutrition Counseling)	N=6	N=1	0.572
doxy.me	16.7	0.0	
Teams	16.7	0.0	
Zoom	16.7	100.0	
In-person	16.7	0.0	
Phone	33.3	0.0	

Source: THIS-WIC Staff Survey

[a] p-values are based on chi-square tests.

Key informant interviews also provided insights into the initial and ongoing training offered to staff (*CFIR construct: inner setting*). In the early and late phase, staff noted that they received extensive training. In the early phase, some noted that they did not have any context for the training while others felt that they did not have any difficulties in transitioning from in-person to telehealth services. In the late phase, staff felt prepared and acknowledged that additional training was available to those who request it. A few staff members indicated a client and staff preference to continue telehealth appointments; clients were required to come in, however, for anthropometric assessments.

"Teams, we never had that before...They gave us training. They told us how to do it. Yeah, they do help us and we did it together." [Staff participant 2]

"Yes. A lot of [training...] But if I do want to do more breastfeeding training, they actually do assist. Before I started this position, I had to take breastfeeding classes prior to…working for WIC." [Staff participant 28]

"I don't have any difficulty when we transitioned from in-person to virtual." [Staff participant 3]

"[B]efore they used to do telehealth, so most people want to continue telehealth, but now we are telling that we are open so [everyone] has to come. We have to measure weight and height. So now they are back to normal. So, they're used to it so they are coming." [Staff participant 3b]

3.4 Satisfaction With Telehealth Solution

As seen in **Table 3-5**, staff satisfaction with appointments conducted via Zoom, Teams, or doxy.me ranged from 4.20 to 4.86, with no significant differences in the early and late phase. Despite the high level of satisfaction with each of these platforms, in the early and late phase, staff consistently preferred in-person appointments over those using Zoom, Teams, or doxy.me.

Table 3-5. Satisfaction With Telehealth Solution in Early and Late Phase among Staff Survey Respondents in DC

Statement[a]	Early Phase[b]	Late Phase[b]	p-value[c]
	Mean (SD)		
Zoom	N=9	N=7	
Overall, I am satisfied with Zoom	4.67 (0.50)	4.86 (0.38)	0.417
I prefer WIC appointments with Zoom over WIC appointments that are in-person	4.33 (1.32)	4.71 (0.49)	0.483
Teams	N=6	N=4	
Overall, I am satisfied with Teams	4.83 (0.41)	4.25 (0.96)	0.214
I prefer WIC appointments with Teams over WIC appointments that are in-person	4.17 (1.33)	4.00 (0.82)	0.830
Doxy,me	N=10	N=5	
Overall, I am satisfied with doxy.me	4.20 (0.79)	3.60 (1.67)	0.353
I prefer WIC appointments with doxy.me over WIC appointments that are in-person	3.80 (1.48)	4.00 (1.00)	0.791

Source: THIS-WIC Staff Survey

[a] Responses were assessed on a 5-point Likert scale, where 1=Strongly disagree and 5=Strongly agree.

[b] Ordinal data are summarized as mean (SD).

[c] p-values were based on t-test for ordinal data.

In both early and late phase interviews, staff shared factors that affected their level of satisfaction with offering telehealth services (*CFIR constructs: inner setting, characteristics of individuals*). For example, staff noted limitations of telehealth, such as inability to conduct health assessments or get a sense of client receptivity to nutrition education sessions. Staff also noted

that they could share more resources (e.g., printed nutrition education materials, printed shopping education materials, and incentives for children such as diapers, plates, cups) with clients during in-person visits and interact with the child. A few staff members did not perceive any difference in client interactions and noted clients still "asked the same questions and I tend to get the same answers whether I'm on the phone or in person."

> *"The positive would be definitely that we are getting up-to-date information about them because [in] our telehealth appointments we wouldn't able to get the height and weight, the accurate height and weight, and the hemoglobin information from the participant." [Staff participant 14]*
>
> *"In-person, sometimes you can feel that person physically […] understanding what you're explaining to them. But virtually or by phone, we're not sure if they [do]...[V]ideo is more clear than when on a phone call, mostly, but in-person is the best in that way." [Staff participant 17b]*
>
> *"In-person nutrition education, you can show them whatever you have [in] the document. You see the child is active or not. You can ask to the child, if it is next to you, what kind of fruit do you like? [W]hat kind of activity? [Staff participant 2]*
>
> *"[T]hey prefer sometimes to do telehealth – not all – sometimes 50 percent. So they say, like, 'Oh my next appointment.' So, once we certified them in-person and the next appointment is telehealth, they will be happy, like, I say: 'Okay: next appointment is virtual.'" [Staff participant 3b]*

3.5 Adoption of Telehealth Solution

Adoption of telehealth services at participating agencies was assessed using data gathered from the staff and local agency directors through staff implementation surveys administered by the DC WIC office in Q4/2022 and Q2/2023. As seen in **Table 3-6**, slightly more than 50 percent of the staff used telehealth with video to a great extent or very great extent in the early and late phase. Most respondents agreed or strongly agreed that their approach to providing WIC services was consistent with their teammates. About two-thirds of staff noted that they did not face any barriers when offering telehealth appointments with video or when talking with clients about using telehealth with video. Commonly experienced barriers when using telehealth with video included freezing video, difficulty sending links, poor connection, IT/connectivity issues on the client side, and lack of experience with technology among clients (C*FIR constructs: innovation relative advantage, implementation process*). Staff discussed difficulty communicating with clients about the use of telehealth via video, concerns about being visible on the video, language barriers, and lack of quiet space for clients as factors that limited adoption of telehealth.

Consistent with MIS data on appointment modality (**Section 3.1**), local agency directors reported considerable variability in telehealth usage across staff and over time. They also noted that clients either had trouble understanding the process to get a text link to the telehealth platform, did not show up for appointments despite reminders, experienced connectivity issues, or were reluctant to be on video. Finally, directors noted that staff were largely conducting in-

person or phone appointments because it was easier and less time-consuming to call clients on the phone rather than through the telehealth platform.

During the key informant interviews conducted in the early phase, staff noted that the transition to a different MIS system did not transfer all client-level data, and that clients were required to come in with documents, which made it difficult to offer telehealth appointments during this transition. Staff varied in their comfort with offering telehealth services but acknowledged that appointments were scheduled based on client preference.

> *"We went from what they called [NAME] to [NAME]...All the data did not transition into it so we needed the people to come in and bring documents" [Staff participant 1]*
>
> *"Depends on the client's choice because sometimes we have the availability to have the cell phone, a cell phone that we use in the clinic. Sometimes participants are not able to use Zoom and not able to use doxy.me, but they feel confident using WhatsApp. We can do a WhatsApp video as well with them." [Staff participant 17b]*
>
> *"It's up to me [which platform to use]. We have all those options, and we select which one is more comfortable for the participant." [Staff participant 19b]*

Table 3-6. Adoption and Use of Telehealth Solution by Staff in DC

Question	Q4/2022	Q2/2023
	%	
I use telehealth with video as much as possible	N=32	N=15
To a very great extent	34.38	26.67
To a great extent	21.88	13.33
To a moderate extent	18.75	20.00
To a slight extent	6.25	13.33
Not at all	18.75	26.67
I provide WIC services through telehealth with video in a similar way as my teammates (length, content, quality)	N=32	N=15
Strongly agree	40.63	26.67
Agree	40.63	33.33
Neither agree nor disagree	12.50	20.00
Disagree	6.25	6.67
Strongly disagree	3.13	13.33
Are there any barriers you face when using telehealth with video?	N=32	N=15
Yes	21.88	20.00
No	75.00	80.00
No response	3.13	0.00
Are there any barriers you face when talking with clients about the opportunity to use telehealth with video?	N=32	N=15
Yes	25.00	26.67
No	75.00	73.33

Source: DC Staff Implementation Survey.

3.6 Acceptability of Telehealth Solution

As seen in **Table 3-7**, staff agreed or strongly agreed that all three platforms were an acceptable way to provide WIC services and were useful for them as WIC staff. Staff acceptability did not change significantly from early to late phase.

Findings from the key informant interviews indicate that staff preferred teleworking because it allowed them to "do their job better" and not worry about "Oh, that kid is coughing, that baby is sneezing, were they screened properly?" Staff also noted that teleworking allowed them to schedule appointments on their non-clinic. Staff considered telehealth to be an important part of providing services and recognized the need to provide clients a choice (of phone or telehealth) and letting them decide what works best for them (C*FIR constructs: innovation advantage and characteristics of individuals*). Some staff noted that the appointments were "more comfortable" when the clients turned on their camera and could be seen. Staff noted that some discussions were best done in-person: for example, "talking about mental health especially with our postpartum moms...especially if there's an interpreter involved." Others noted that using the language line to access interpretation services was better during telehealth appointments than in-person appointments, because all parties were on the call rather than some in person and some on the phone. Another staff member appreciated the opportunity to conduct telehealth appointments while addressing scheduling-related texts from another client, which may not be feasible during in-person appointments. Finally, staff expressed challenges with conducting appointments, particularly because of technology challenges on the WIC client side (i.e., connectivity, dropped calls).

> *"It's more comfortable. Like that way you can see the participants, you can interact with them about what they really like because I think some of them, by the camera, even when it's by phone or call, they don't feel like a hundred percent comfortable sometimes." [Staff participant 13]*
>
> *"We had the language line...I feel that's going to be more awkward when they're in-person to have to use the language line than to have all three of us at an equal basis." [Staff participant 1]*
>
> *"I love it... I can be on a call with a mom and a mom can text me so I can assist two, three moms at the same time. Compared to when I'm in-person with a mom, all of my attention is to that mom, if that makes sense. I'm able to take notes with the mom I'm talking to, and I can glimpse at what I'm being texted, and I can start looking into what the mom needs or how I can assist the mom. Even if I text back, saying, 'Hey, mom, is this a good time for me to call you back?' – at least they know I'm giving them the attention they're looking for." [Staff participant 28]*

Table 3-7. Acceptability of Zoom, Teams, and doxy.me in Early and Late Phase among Staff Survey Respondents in DC

Statement[a]	Early Phase[b] Mean (SD)	Late Phase[b] Mean (SD)	p-value[c]
Zoom	N=9	N=7	
Zoom is an acceptable way to provide WIC services.	4.67 (0.71)	4.86 (0.38)	0.531
Zoom is useful for me as WIC staff.	4.78 (0.44)	4.86 (0.38)	0.710
Teams	N=6	N=4	
Teams is an acceptable way to provide WIC services.	4.67 (0.52)	4.50 (1.00)	0.735
Teams is useful for me as WIC staff.	4.83 (0.41)	4.75 (0.50)	0.779
doxy.me	N=10	N=5	
doxy.me is an acceptable way to provide WIC services.	4.70 (0.48)	4.20 (0.84)	0.161
doxy.me is useful for me as WIC staff.	4.70 (0.48)	4.60 (0.55)	0.723

Source: THIS-WIC Staff Survey

[a] Responses were assessed on a 5-point Likert scale, where 1=Strongly disagree and 5=Strongly agree.

[b] Ordinal data are summarized as mean ± SD.

[c] p-values were based on t-test for ordinal data.

3.7 Feasibility of Telehealth Solution

As seen in **Table 3-8**, staff found the Zoom, Teams, and doxy.me platforms easy to use and flexible to interact with. Staff also felt comfortable using all three platforms to communicate with WIC clients and found that the platforms made their work easier to do. The platforms also made it easier for staff to interact with more clients.

Emergent themes from key informant interviews further provide evidence of the facilitators and barriers to using Online Nutrition Education (*CFIR constructs: innovation characteristics, inner setting, and implementation process*). Although some staff noted that telehealth appointments took the same amount of time as in-person appointments, others noted that it varied based on content being discussed or technical challenges faced by their clients. As noted earlier, staff preferred in-person appointments so they could conduct health assessments and have a better sense of client engagement with the materials being presented. Some staff indicated a preference for Teams because they could call the client directly and see them. Staff members also described client frustrations when telehealth appointments were not offered at WIC and hoped that "virtual appointments" could be offered in the future.

> *"So the disadvantages right now in my case would be to get the lab result or something like that." [Staff participant 22]*
>
> *"Over the phone, we are not sure if the mom is focusing on what you are talking [about] with them or if you are explaining something, if you can actually see in their face […] if they understood what are you talking about." [Staff participant 17b]*

"I'd say so. I feel like that's the direction that we have to head. A lot of our participants are having telehealth visits with their doctor and so they get frustrated that we sometimes can't do the same thing for them." [Staff participant 27]

"Moving forward, I definitely would like to see more virtual appointments and more ways to make the virtual appointments easier, and then possibly finding a way to be able to do their labs virtually somehow." [Staff participant 19b]

Table 3-8. Feasibility of Using Telehealth in Early and Late Phase among Staff Survey Respondents in DC

Statement[a]	Early Phase[b] Mean (SD)	Late Phase[b] Mean (SD)	p-value[c]
Zoom	N=9	N=7	
Learning to use Zoom was easy for me.	4.78 (0.44)	4.71(0.49)	0.789
I find Zoom to be easy to use.	4.78 (0.44)	4.71 (0.49)	0.789
I feel comfortable communicating with WIC clients using Zoom.	5.00 (0.00)	4.71 (0.49)	0.098
Zoom makes my daily work easier to do.	4.33 (0.87)	4.86 (0.38)	0.160
Zoom allows me to interact with more participants.	4.89 (0.33)	4.86 (0.38)	0.861
Teams	N=6	N=4	
Learning to use Teams was easy for me.	4.50 (0.84)	4.75 (0.50)	0.610
I find Teams to be easy to use.	4.67 (0.52)	4.75 (0.50)	0.807
I feel comfortable communicating with WIC clients using Teams.	4.83 (0.41)	4.25 (0.96)	0.214
Teams makes my daily work easier to do.	4.83 (0.41)	4.75 (0.50)	0.779
Teams allows me to interact with more participants.	4.67 (0.52)	4.75 (0.50)	0.807
doxy.me	N=10	N=5	
Learning to use doxy.me was easy for me.	4.60 (0.52)	4.00 (0.71)	0.082
I find doxy.me to be easy to use.	4.60 (0.52)	4.00 (1.00)	0.142
I feel comfortable communicating with WIC clients using doxy.me.	4.50 (0.71)	3.60 (1.67)	0.159
doxy.me makes my daily work easier to do.	4.30 (0.95)	3.80 (1.30)	0.409
doxy.me allows me to interact with more participants.	4.70 (0.67)	4.40 (0.89)	0.478

Source: THIS-WIC Staff Survey

[a] Responses were assessed on a 5-point Likert scale, where 1=Strongly disagree and 5=Strongly agree.

[b] Ordinal data are summarized as mean ± SD.

[c] p-values were based on t-test for ordinal data.

3.8 Improved Accessibility of WIC Services for Clients

As seen in **Table 3-9**, staff providing WIC services through Zoom, Teams, and doxy.me perceived that it positively impacted accessibility to WIC services for clients. Staff reported that use of these platforms increased their ability to reach both participants who face challenges in accessing WIC clinics because of traffic or distance and those who typically miss their appointments. Staff also expressed a high level of interest in continuing to use Zoom and Teams and, to a lesser extent, doxy.me, to provide WIC services.

During key informant interviews, staff noted that continuing to offer telehealth services is in alignment with the delivery of other healthcare services (C*FIR constructs: innovation characteristics, outer setting, inner setting, characteristics of individuals, and implementation process*). Staff were acutely aware of their clients' financial conditions, lifestyle, and routine and acknowledged the role of telehealth services in increased client participation and retention. Staff noted that their clients were able to step out of their office or talk with them from the comfort of their home, or while taking care of chores, which helped with client participation and retention. WIC staff also emphasized the convenience of accessing and sharing nutrition education materials without concern that they might have run out of paper copies. In the early phase, one respondent indicated that, although clients are interested in scheduling telehealth appointments, they may experience challenges with access to the telehealth platform, resulting in converting the telehealth appointment to a phone appointment. Staff also noted increased participation in nutrition education classes offered via Zoom. Anecdotal information from DC WIC agency staff indicate that nutrition education classes are usually vary in duration (10 to 60 minutes) and attendance (2 to 40 participants). Finally, staff acknowledged that offering telehealth services ensured that those who are sick can receive WIC services without putting staff and other clients at risk.

> *"For the clients, especially the people who doesn't want to come, and of course they save their time and money." [Staff participant 2]*
>
> *"It can be a lot of work for the clients to come into the clinic depending on their transportation, depending on their job schedules and kids and school..." [Staff participant 6]*
>
> *"And it can cause some type of barriers to some participants when they cannot get off of their job or the children cannot get out of school during the hours that the clinic is open, so that can be hard on families." [Staff participant 6b]*
>
> *"They come here with children and sometimes the children are crying, and they can't pay attention to what I tell them because they're with the children and they say, 'Be careful.' The children are running or something." [Staff participant 15]*
>
> *'Then we do our nutrition education via Zoom, and we do group teachings. I'm one of the people that teaches the English class. We just go over a topic each month and teach them about something nutrition-wise. We get a lot of participation that way. Some moms are doing it at work while they're on their break. Some moms are literally just at home with their baby trying to listen to us, and it makes things a lot easier for them." [Staff participant 19b]*
>
> *"I think the one thing about the in-person appointments, it can put you at risk for contracting COVID, the flu, things like that. And sometimes the persons will still come in, even if they're sick, or they disregard some of the symptoms that they will have if they're not feeling too well..." [Staff participant 16b]*

Table 3-9. Staff Perceptions of Improved Accessibility to WIC Services for Clients Because of Telehealth in Early and Late Phase in DC

Question[a]	Early Phase[b]	Late Phase[b]	p-value[c]
	Mean (SD)		
With telehealth, I am able to provide services for WIC participants who ...	N=28	N=11	
have difficulty accessing a clinic because of traffic or distance.	4.68 (0.68)	4.64 (1.21)	0.903
would usually miss their appointments.	4.64 (0.87)	4.45 (1.29)	0.601
Zoom	N=9	N=7	
I would like to continue using Zoom to provide WIC services.	4.89 (0.33)	4.86 (0.38)	0.861
Teams	N=6	N=4	
I would like to continue using Teams to provide WIC services.	4.83 (0.41)	4.25 (0.96)	0.214
doxy.me	N=10	N=5	
I would like to continue using doxy.me to provide WIC services.	4.50 (0.71)	3.80 (1.30)	0.194

Source: THIS-WIC Staff Survey

[a] Responses were assessed on a 5-point Likert scale, where 1=Strongly disagree and 5=Strongly agree.

[b] Ordinal data are summarized as mean ± SD.

[c] p-values were based on t-test for ordinal data.

3.9 Frequency of Travel and Travel Time

The Staff Survey asked respondents about the length of work at WIC. Staff who worked for 2 years or more were asked if their job included traveling to one or multiple WIC clinics prior to the COVID-19 pandemic. The analysis of frequency of travel was limited to those who responded to this question. In the early phase, 14 of 15 (94%) and in the late phase, 4 of 5 (80%) traveled to one or more WIC clinics prior to the COVID-19 pandemic. As seen in **Table 3-10**, neither the frequency of travel nor the travel time to other clinics differed significantly from the early phase to the late phase of telehealth implementation.

3.10 Startup Cost to Implement Telehealth Solution

The startup period for implementing the telehealth solution in DC was from March 1, 2020, to December 31, 2020. As seen in **Table 3-11**, over this 10-month period, DC incurred $296,835 in costs to set up the telehealth solution. This translated to an average monthly cost of $29,684. During the startup phase, the single largest expense was indirect costs, accounting for 58 percent of total spending. Indirect costs included facilities and administrative costs (such as overhead, indirect expenses such as rent, employee fringe benefits, utilities). Other startup phase expenses included labor (18% of total), equipment (17%), and contracted services (8%). Contracted services included the costs of the telehealth intervention platforms and accounts and transcription services. Specifically, the costs of doxy.me accounts were $500 per person per month, the costs of the Teams account were $1,600 per account, and the costs of the Zoom account were $350 per account.

Table 3-10. Frequency of Travel and Travel Time to Other WIC Clinics among Staff Survey Respondents in the Early and Late Phase of Telehealth Implementation in DC

Question	Early Phase[a]	Late Phase[a]	p-value[b]
	%		
On average, how many minutes of your workday did you spend traveling to these other WIC clinic sites?	N=13	N=4	0.344
15 minutes or less	15.4	50.0	
16–30 minutes	30.8	25.0	
31–60 minutes	58.3	25.0	
61 minutes or more	0.0	0.0	
On average, how frequently did your job require you to travel to these other WIC clinic sites?	N=14	N=4	0.849
More than 1 per week	50.0	50.0	
1 per week	14.3	25.0	
More than 1 per month	14.3	0.0	
1 per month	21.4	25.0	

Source: THIS-WIC Staff Survey

[a] Categorical data are summarized as column percentages.

[b] p-values were based on t chi-square test for categorical data.

Table 3-11. Telehealth Solution Startup Costs (March 1, 2020, to December 31, 2020) for Intervention Agencies Implementing the Telehealth Solution in DC

Resource Category	Cost, $	Percentage of Total
Labor	52,757	18.0
Equipment	49,631	17.0
Indirect	170,886	58.0
Contracted services	23,561	8.0
Total (10 months)	296,835	100.0
Average per month (10 months)	29,684	—

Source: Cost-tracking data, DC

3.11 Ongoing Cost to Implement Telehealth Solution

As seen in **Table 3-12**, during the pre-implementation period, the average cost per enrollment was $31 for the three intervention agencies. After implementation of the telehealth solution, the average cost per enrollment in those agencies decreased to $26 at 6 months post-implementation, and then to $20 at 12 months post-implementation. The mean and median estimates at each timepoint were similar, indicating minimal skewness of the data. The minimum and maximum values show the spread of the estimates, indicating that there was variation in the average ongoing service delivery cost across agencies.

Table 3-12. Per Enrollment Cost at Participating Agencies in DC for Intervention Agencies Implementing the Telehealth Solution[a]

Value	Pre-implementation (FY2019)	6 Months Post-implementation (December 2022)	12 Months Post-implementation (June 2023)
Mean	$31	$26	$20
Median	$33	$25	$19
Min	$23	$23	$18
Max	$39	$30	$23

Source: Cost-tracking data, DC
[a] Intervention agencies only (n=3); no comparison agencies in DC.

As seen in **Table 3-13**, average per appointment costs in the pre-implementation period were $80. After the introduction of the telehealth solution, per appointment costs at 6 months post-implementation rose to $90, but then decreased at 12 months post-implementation to $69. The difference in the mean and median were minimal, suggesting minimal skewness in the data. Consistent with per enrollment costs, the minimum and maximum values show a variation across the agencies.

Table 3-13. Per Appointment Cost for Intervention Agencies Implementing the Telehealth Solution in DC[a]

Value	Pre-implementation (FY2019)	6 Months Post-implementation (December 2022)	12 Months Post-implementation (June 2023)
Mean	$80	$90	$69
Median	$82	$87	$66
Min	$56	$82	$61
Max	$100	$100	$79

Source: Cost-tracking data, DC
[a] Intervention agencies only (n=3); no comparison agencies in DC.

The findings on the cost of DC's ongoing service delivery support the hypothesis that telehealth implementation can elicit potential cost savings. Both per enrollment and per appointment costs declined over time, although per appointment costs reductions were not observed until 12 months post-implementation. Per appointment costs decreased by $10.74 from pre-implementation to 12 months post-implementation ($79.64–$68.90), representing a potential cost savings per appointment associated with telehealth implementation.

The return on investment analysis assessed the cost savings per appointment compared to the investment of startup. The total startup cost of the telehealth solution in DC was $296,835. As shown in **Table 3-14**, at cost savings of $10.74 per appointment, a total of 27,643 appointments would be needed to recoup their startup cost investment ($296,835/$10.74). In the 12th month post-implementation (June 2023), the three participating WIC agencies reported 3,669 appointments. It would, therefore, take about 7.5 months (27,643/3,669) to recoup investment of the telehealth startup costs in those three agencies.

Table 3-14. Return on Investment Using Cost per Appointment for Intervention Agencies Implementing the Telehealth Solution in DC

Description	Estimate
Total startup cost	$296,835
Intervention cost per appointment	
Pre-implementation (FY2019)	$79.64
12 months post-implementation (October–March 2023)	$68.90
Difference	$10.74
Appointments needed to recoup startup cost	27,643
Total monthly appointments at all participating agencies	3,669
Months needed to recoup startup cost	7.5

Source: Cost-tracking data, DC

3.12 Summary of Findings

In DC, three local agencies participated in the THIS-WIC evaluation. Ten clinics implemented the telehealth solution across the three local agencies. WIC staff conducted about 75 percent of the appointments in-person and 25 percent via telephone, Zoom, Teams, or doxy.me. Key findings include the following:

1. **Staff attitudes**: WIC staff had a favorable attitude toward the use of telehealth and acknowledged the benefits of telehealth for clients experiencing scheduling challenges because of transportation, childcare, and work conflicts. In the early phase, staff expressed a preference for in-person appointments but noted that their use of telehealth is driven by client preferences and comfort with technology. Some staff expressed a preference for in-person appointments because they allowed them to complete health assessments for clients.
2. **Staff readiness**: Because DC offered telehealth services prior to the THIS-WIC project, most staff reported prior experience with the use of telehealth, particularly with Zoom and Teams and, to a lesser extent, with doxy.me. Staff varied in their report on the duration of training offered by DC WIC for these platforms, likely because of the differences in their stage of telehealth use; staff with prior experience may be reporting refresher training duration, and newer staff may be reporting initial training duration. Although some staff did not feel prepared to provide telehealth services in the early phase, they felt prepared by the late phase and acknowledged that additional training was available to those who requested it.
3. **Staff satisfaction**: Overall, staff satisfaction with offering services through the telehealth platform was high. Staff also indicated preference for WIC appointments to be conducted via Zoom and Teams over in-person appointments. Although staff were satisfied with doxy.me, they were ambivalent about using it during in-person appointments. During key informant interviews, some staff expressed preference for in-person appointments because of the ability to conduct health assessments, encounter the client face-to-face, and assess client receptivity to education materials. However, they emphasized that, while they did not prefer telehealth, it provided flexibility to clients who may not otherwise be able to come in-person.

4. **Staff adoption**: Over half of the staff used telehealth with video to a great extent, and about two-thirds noted that they did not face any barriers when offering or conducting telehealth appointments. Staff noted client-level challenges, such as difficulties communicating about the use of telehealth, concerns about being visible on the video, language barriers, and lack of quiet space for clients as factors that hindered adoption. WIC agency directors also noted considerable variability in staff use of telehealth and attributed these to technology barriers experienced by clients. WIC agency directors indicated that staff scheduled and conducted more phone appointments than Zoom, Teams, or doxy.me appointments because they were easier and less time-consuming.
5. **Staff acceptability**: Most staff preferred telehealth appointments because they offered a sense of protection from clients who may be unwell (e.g., coughing children) and allowed them to maintain a workload that did not include both scheduled and walk-in clients. Staff who were successful in connecting with their clients via telehealth (video) noted that seeing the client on the screen made the appointments more comfortable. However, staff noted that the purpose of the appointment should drive the mode. In-person appointments may be preferred for sensitive discussions, and telehealth appointments may be preferred for other, more general discussions.
6. **Perceived feasibility**: In general, staff noted that it was easy to learn how to use the telehealth platform and that it was easy to use and interact with. Staff noted that telehealth appointments usually took the same amount of time as in-person appointments, but some staff noted that technology issues faced by clients either resulted in extended or rescheduled appointments.
7. **Improved accessibility of WIC services for WIC clients**: Staff reported that they were able to provide services to both clients having difficulty accessing a clinic because of traffic or distance and those who would usually miss appointments. Staff had a high level of understanding of their clients' financial condition, lifestyle and routine, and health condition and acknowledged the role of telehealth in increased client participation and retention. Staff noted that they would like to continue using telehealth to provide services.
8. **Travel to other WIC clinics to provide services**. In general, most staff traveled to clinics in the early and late phase of telehealth implementation. Most staff traveled more than once a week to other clinics and spent between 31 and 60 minutes traveling.
9. **The startup cost** to offer telehealth services was $296,835, of which about 58 percent was spent on indirect costs, followed by 18 percent on labor and 17 percent on equipment. Based on the monthly caseload data, it would take DC about 7.5 months to recoup its investment in telehealth startup costs.
10. **The mean ongoing cost per enrollment and per appointment** were lower in the 12th month post-implementation than at the pre-implementation period.

4. Results: Client Experiences With Telehealth

4.1 Acceptability of Telehealth

Interviews with clients and discussions in community listening sessions provide evidence that clients want to have an option to select telehealth or in-person appointments. For example, clients indicated that telehealth allows them to schedule an appointment during their breaks so they do not have to leave their work or home or take paid time off. Some clients noted that it reduced the "anxiety and stress" of scheduling appointments. They spoke of the efficiencies in receiving information quickly because they could connect with the educator and get text responses without waiting until the scheduled in-person appointment, and they touted the benefits of not needing to reschedule appointments for health reasons. Clients also clarified that their choice of telehealth versus in-person appointment would depend on the purpose: telehealth appointments are beneficial for quick check-ins and recertification; in-person is better for health assessments and in-depth nutrition education. Clients noted that being in-person is different because the educator can "show you maybe books or things that they have in the office to give you some type of idea of what it's supposed to look like on a daily basis than over a phone." Some clients also expressed a preference for phone appointments, whereas others preferred video appointments because it allowed them to see the educator.

> *"A combination of both [in-person and remote] would be good." [Client participant 36]*
>
> *"I would prefer remotely one because I could schedule appointments during my break." [Client participant 23]*
>
> *"... when it comes down to appointments, I want to come in-person than over the phone..." [Client participant 1]*
>
> *"It depends, but I mean if I don't have to leave then I would prefer Zoom. But I do understand some things that is best to have in-person, like when they gave us the new cards and explaining how we're using [them]...Everything is on the card so it does make sense for sometimes it to be in-person. So I guess I'm on the fence with that one." [Client participant 38]*
>
> *"I think it's been a little easier to get all the information, because normally, before, I would have to wait until my appointments to get some of the information…During the COVID, they would even send it by mail or provide text messages with different nutrition information." [Client participant 26]*
>
> *"It's faster, more convenient, I don't have to be around people, it's monkeypox now…Then if my daughter has a cold, she can still do the visit – even online." [Client participant 30]*
>
> *"It don't matter. I'd rather do videos because I don't like through the phone. I want to see who I'm talking to. Who the person I'm talking to, so I can remember who I talked to on this phone [if] something ever happened." [Client participant 36]*

WIC clients responded to a series of questions about their experience with their appointment. As seen in **Table 4-1**, most Client Survey respondents agreed or strongly agreed that they could

hear the WIC nutrition educator clearly (93%) and easily talk to the WIC nutrition educator (90%); however, only about half (55%) agreed or strongly agreed that they could clearly see the nutrition educator.

Table 4-1. Client Survey Respondents' Attitudes Toward Telehealth Services[a] in DC

Statement	N	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
		%				
I could easily talk to the WIC nutrition educator during my appointment	136	3.7	1.5	4.4	30.1	60.3
I could see the WIC nutrition educator clearly	117	4.3	6.8	34.2	18.8	35.9
I could hear the WIC nutrition educator clearly	136	2.9	0.7	2.9	28.7	64.7
It was easy to figure out how to use and receive WIC services	135	4.4	3.0	5.2	31.9	55.6
The telehealth platform was simple to use for my WIC appointment	132	4.6	0.8	9.8	31.1	53.8
I had trouble accessing the telehealth platform	133	33.1	25.6	19.5	6.0	15.8
My most recent WIC appointment was shorter than usual when receiving care	133	6.8	17.3	38.3	21.1	16.5
The way I received WIC services at my most recent appointment was easier than going to a WIC clinic	134	3.0	0.0	13.4	26.1	57.5
I would like to receive services the same way as my most recent appointment for my next WIC appointment	134	3.7	0.0	13.4	29.1	53.7

Source: THIS-WIC Client Survey

[a] Telehealth appointments were completed using phone, Zoom, Teams, or doxy.me.

Most respondents agreed or strongly agreed that it was easy to figure out how to use and receive WIC services through telehealth (88%). Most respondents (about 83%) agreed or strongly agreed that the way they received WIC services was easier than going to a WIC clinic and they would like to receive services the same way at their next WIC appointment. About 38 percent of respondents agreed or strongly agreed that their WIC appointment was shorter than usual when receiving care; however, 24 percent disagreed or strongly disagreed with this statement.

Nearly 60 percent of respondents disagreed or strongly disagreed that they had trouble accessing the telehealth platform; however, about 22 percent agreed or strongly agreed with this statement. Most (85%) agreed that the telehealth platform was simple to use for their WIC

appointment. Nearly all respondents (94%) said the content of the telehealth platform was in a language they could read (results not shown in table).

4.2 Adoption and Utilization of Telehealth

Interviews with clients provide insights into the adoption and utilization of telehealth platforms in DC. Although clients varied in their preference for telehealth versus in-person appointments, they highlighted staff preference for phone appointments. Clients also noted that staff availability for in-person appointments was limited and that they were able to schedule a telehealth appointment in a timely manner. This mirrored feedback from staff interviews about telehealth supporting access to staff from other clinics. Although some clients noted that they had "never had a video appointment, everything has always been on the phone," others noted that they scheduled video calls because they could not see the educator over the phone. A few clients also noted that although they had a Zoom appointment scheduled, the educator ended up conducting the appointment over the phone.

> *"I'm comfortable using the Zoom or, at my job, we use Teams as well. Actually, any platform, as long as it's easy to access it." [Client participant 23]*
>
> *"Zoom, phone call, and FaceTime also – but I don't really do Teams." [Client participant 29]*
>
> *"Over the phone. I think it was supposed to have been through Zoom or through FaceTime or whatever, but she did it over the phone and just called me." [Client participant 21*
>
> *"Through phone and also Zoom." [Client participant 16]*
>
> *"I've never had a video one. Everything has always been over the phone." [Client participant 37]*

4.3 Barriers to Accessing WIC Services

4.3.1 Availability of Technology at Home

As seen in **Table 4-2**, most survey respondents (96%) had access to a smartphone or computer at home. Over 80 percent had a smartphone, and some had a computer, tablet, or Chromebook at home. Availability of a smartphone at home varied by appointment type; 91.7 percent of respondents who completed a telehealth appointment had a smartphone, compared to 82.4 percent of respondents who completed an in-person appointment.

Respondents connected to the internet primarily using home connect (59.9%), followed by cellular connect (34.1%). Significant differences were noted in use of home connect by appointment mode. Among those who used home connect, about 8 percent encountered problems often and about 29 percent encountered problems sometimes when it came to connecting to the internet. Among those not using home connect, the most common reason for not doing so was internet cost (44.0%).

4.3.2 Comfort With Technology and Frequency of Videochat Use

Overall, just over half (52%) of the survey respondents were very confident with the use of technology with over a fourth (28%) being somewhat confident; about 6 percent indicated they were somewhat or very uncertain when it came to the use of technology (**Table 4-3**). Confidence with use of technology varied significantly by appointment type; about two-thirds of the respondents who completed telehealth appointments were confident about use of technology compared to half of the respondents who completed in-person appointments. About 30 percent of respondents used videochat daily to communicate with and stay connected with friends and family and about 25 percent used it about twice per week. Only about 5 percent never used videochat to stay connected with friends and family.

Table 4-2. Availability of Technology at Home among Client Survey Respondents in DC

Availability of Technology	Overall	Telehealth Appointment[a]	In-person Appointment	p-value[b]
	%			
Which of the following do you have at home?[c]	N=784	N=120	N=664	
A desktop or laptop computer	43.0	50.0	41.7	0.0916
A tablet computer	26.5	33.3	25.3	0.0666
Chromebook	8.2	12.5	7.4	0.0594
Smartphone	83.8	91.7	82.4	0.0110*
Other	1.8	0.8	2.0	0.3920
No devices in the home	3.7	1.7	4.1	0.1999
How do you most often connect to the internet?	N=779	N=120	N=659	0.0130*
Home connect	59.9	69.2	58.3	
Public connect	2.7	5.0	2.3	
Cellular connect	34.1	25.0	35.8	
Do not connect	3.2	0.8	3.6	
Among Those Who Use Home Connect				
How often do you have problems with the speed, reliability, or quality of Internet connection at home in a way that makes it hard to do things you need to do online?	N=473	N=84	N=389	0.0714
Often	8.2	2.4	9.5	
Sometimes	28.5	22.6	29.8	
Rarely	29.8	32.1	29.3	
Never	29.4	36.9	27.8	
Don't know	4.0	6.0	3.6	
Among Those Who Do Not Use Home Connect				
What is the most important reason why you do not connect to the internet at home?	N=275	N=35	N=240	0.5886
Not available	7.3	8.6	7.1	
Internet cost	44.0	37.1	45.0	
Device cost	11.3	14.3	10.8	
I connect somewhere else	13.8	11.4	14.2	
I don't want to	14.2	11.4	14.6	
Privacy/security	9.5	17.1	8.3	

Source: THIS-WIC Client Survey

[a] Telehealth appointments were completed using phone, Zoom, Teams, or doxy.me.

[b] p-values are based on chi-square test. For those who indicated they have other devices at home, have no devices at home, internet access and reason for not using home connect, 25 percent or more of the cells have expected counts less than 5 so chi-square may not be a valid test.

[c] Percentages do not add up to 100 because respondents could select all that applied.

* $p<0.05$

Table 4-3. Comfort With Technology and Frequency of Videochat Use Among Client Survey Respondents in DC

Comfort With Technology	Overall	Telehealth Appointment[a]	In-person Appointment	p-value[b]
	%			
When it comes to the use of technology, which of the following best describes you?	N=753	N=116	N=637	0.0095*
Very confident	52.3	63.8	50.2	
Somewhat confident	28.2	19.8	29.7	
Neither confident nor uncertain	7.8	1.7	8.9	
Somewhat uncertain	4.9	6.9	4.6	
Very uncertain	1.3	0.9	1.4	
Don't know	5.4	6.9	5.2	
How often do you use video chat to communicate and stay connected with family and friends?	N=758	N=116	N=642	0.5408
Daily	29.9	30.2	29.9	
2 times per week	25.2	25.0	25.2	
1 time per week	9.4	10.3	9.2	
2 times per month	12.7	15.5	12.1	
1 time per month	6.6	3.4	7.2	
Less than 1 time per month	7.9	10.3	7.5	
Never	5.1	2.6	5.6	
Don't know	3.2	2.6	3.3	

Source: THIS-WIC Client Survey

[a] Telehealth appointments were completed using phone, Zoom, Teams, or doxy.me.

[b] p-values are based on chi-square tests.

* $p<0.05$

4.3.3 Barriers to Accessing WIC Services

Client Survey respondents reported barriers to accessing WIC services for their most recent WIC appointment. Barriers included administrative factors (such as receiving a specific appointment time or experiencing long wait times); individual factors (transportation, childcare, and getting off work); and staff interactions (such as language barrier, racial/ethnic barrier, and internet connectivity). As seen in **Table 4-4**, mean scores for all measures ranged from 2.3 to 2.6, indicating low frequency of experiencing barriers. For all eight measures examined, no differences were observed in frequency of barriers among respondents by appointment mode.

Table 4-4. Barriers to Accessing WIC Services Among Client Survey Respondents in DC

Barriers[a]	Telehealth Appointment[b] (N=151)	In-person Appointment (N=799)	Δ (95% CI)	p-value[c]
	Mean (SE)			
Not given a specific appointment time	2.5 (0.18)	2.5 (0.16)	0.05, (-0.15, 0.25)	0.604
Wait too long	2.6 (0.12)	2.6 (0.10)	0.01, (-0.15, 0.16)	0.930
Transportation issues	2.6 (0.08)	2.5 (0.05)	0.04, (-0.12, 0.19)	0.647
Childcare issues	2.5 (0.11)	2.5 (0.08)	-0.09, (-0.25, 0.08)	0.302
Difficulty getting off work	2.3 (0.08)	2.4 (0.03)	-0.14, (-0.31, 0.03)	0.108
WIC staff language barrier	2.6 (0.16)	2.6 (0.15)	0.00, (-0.17, 0.17)	0.984
WIC staff racial/ethnic barrier	2.4 (0.13)	2.4 (0.10)	-0.08, (-0.27, 0.11)	0.420
No or poor internet connection	2.5 (0.12)	2.4 (0.10)	0.08, (-0.11, 0.27)	0.398

Source: THIS-WIC Client Survey

[a] On a scale of no/never to frequently, please mark (X) if you experienced any of the following barriers to attending your WIC appointment with response options: 0=frequently, 1=occasionally, 2=a little, and 3=never.

[b] Telehealth appointments were completed using phone, Zoom, Teams, or doxy.me.

[c] Linear regression models (unadjusted) used to compare differences in means by appointment mode.

During interviews, some clients noted that they had scheduled telehealth appointments via Zoom and phone, but the staff did not initiate the appointment at the scheduled time. A few clients felt that Zoom appointments were impersonal, and phone appointments were not convenient for them because they did not want anyone to overhear the discussion.

> *"I will also say that, even with the Zoom and phone calls, I would set an appointment and move my work calendar to accommodate that appointment – and then they'd never call or join the Zoom when they said they would. And, so, there's this disrespect for people's time and the idea that they think people receiving WIC are just sitting around waiting for the nutritionist to call them and that is not the case. And so then they'll call back three hours later and you're like: 'No, I can't talk to you now. I'm in the middle of something else.' For me, it happens to be a work call. For other families, it might be something else[...]It's a good benefit, but it's a challenge to access it." [Client participant 40]*
>
> *"And the negatives from it is just not having that personal, live feeling of talking to someone, and seeing them face-to-face, and discussing concerns that you may [...] have." [Client participant 35]*
>
> *"Because sometimes you don't want to talk about it on the phone; you don't want anybody to hear what you are saying." [Client participant 6]*

4.4 Satisfaction with WIC Services

The unadjusted mean client satisfaction index did not differ by appointment mode (mean 87.8 vs. 88.4), reflecting similar satisfaction with WIC services delivered via telehealth and in-person

(Table 4-5). An adjusted model was attempted but could not be estimated because of small cell counts for model covariates.

Table 4-5. Satisfaction With WIC Appointment Among Client Survey Respondents in DC

Client Satisfaction	Telehealth Appointment[a] (N=151)	In-person Appointment (N=799)	Δ (95% CI)	p-value[c]
	Mean (SE)			
Client Satisfaction Index[b]	87.8 (2.21)	88.4 (1.82)	-0.62, (-3.62, 2.39)	0.687

Source: THIS-WIC Client Survey

[a] Telehealth appointments were completed using phone, Zoom, Teams, or doxy.me.

[b] Client satisfaction index (range: 20−100) is based on 8 items (inter-item correlation, alpha = 0.93).

[c] Linear regression models (unadjusted) used to compare differences in means by appointment mode.

During interviews, clients indicated that they felt supported by WIC educators because they were always welcoming, helpful, and clear in their communications. Clients also discussed the fact that staff called them back when they had additional questions or needed clarification. They noted that telehealth allowed them to continue receiving services without having to take paid time off or worry about transportation, parking, etc.

> *"…[I]f it was something that I wasn't too comfortable with or sure with, I could always come. They always welcomed me to come in, and they could just give me documentation or whatever it would be that I needed. They were very supportive." [Client participant 35]*
>
> *"I would say they're super-helpful, and they're very supportive, and very nice people."[Client participant 30b]*
>
> *"Because if I have a problem, I can always call them and they'll call. That's the other thing. They're always there to call me back if I have questions that I forgot about." [Client participant 11]*
>
> *"I've been, like I said, with that nutritionist since I was pregnant, I'm really comfortable with her. We talk about the children's milestones and then she even shows interest in the other children that were also on my plan before. Because she knows me, transitioned off, and she still shows interest in them and it's pretty nice and personal." [Client participant 43]*
>
> *"For me, the greater advantage is that soon – I have two kids; one is 3 and one is 15 months. They are very little. Sometimes going out only for a WIC appointment, moving myself from the house to the WIC, is a whole lot of work. Sometimes there is no parking in Unity, so one has to find a parking which is not even in [Clinic]." [Client participant 107]*

4.5 Retention in WIC

As seen in Table 4-6, about two-thirds of survey respondents continued WIC participation 6 months after their survey completion. From the point of initial certification to completion of the

Client Survey, WIC retention rates were similar for clients completing their appointments in-person or via telehealth.

Table 4-6. Client Survey Respondents' Retention in DC WIC[a]

	Overall	Telehealth Appointment[b]	In-person Appointment
	N=851	N=125	N=726
Retention in WIC[c]	%		
Yes	68.98	69.60	68.87

Source: DC MIS linked to THIS-WIC Client Survey data

[a] Analysis was restricted to Client Survey respondents with matched MIS data.

[b] Telehealth appointments were completed using phone, Zoom, Teams, or doxy.me.

[c] Retention was calculated using the date of initial certification and the date of survey completion. If the interval between the date first certified and survey date was >180 days (6 months) the respondent was considered "retained."

4.6 Intent to Change Dietary Behaviors

Respondents' intentions to change how they eat and how they feed their families following their most recent WIC appointment did not differ by appointment mode. As seen in **Table 4-7**, mean scores for the three intentions measures ranged from 3.6 to 4.1, indicating that respondents were neutral or agreed with statements listed below. The mean score indicating agreement that the lessons would help them make healthy choices was significantly lower for those who completed telehealth appointments than those who completed in-person appointments (mean 3.9 vs. 4.1). The difference, although statistically significantly, was minor, a 0.2 difference in mean score. As noted in staff interviews, staff were able to share more resources during in-person appointments than during telehealth appointments.

Table 4-7. Intent to Change Dietary Behaviors Following the WIC Nutrition Education Lesson Among Client Survey Respondents in DC

Question[a]	Telehealth Appointment[b] (n=151)	In-person Appointment (n=799)	Δ (95% CI)	p-value[c]
	Mean (SE)			
After my WIC nutrition education lesson, I wanted to change how I eat.	3.6 (0.09)	3.7 (0.04)	-0.12 (-0.32, 0.08)	0.234
After my WIC nutrition education lesson, I wanted to change how I feed my family.	3.6 (0.09)	3.7 (0.04)	-0.12 (-0.32, 0.08)	0.224
My WIC nutrition education lesson taught me things that will help me choose nutritious foods for me or my family.	3.9 (0.09)	4.1 (0.06)	-0.25 (-0.44, -0.07)	0.008*

Source: THIS-WIC Client Survey

[a] Response options to dietary behavior change items included: 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree.

[b] Telehealth appointments were completed using phone, Zoom, Teams, or doxy.me.

[c] Linear regression models (unadjusted) used to compare differences in means by appointment mode.

*p<0.05

4.7 Daily Fruit and Vegetable Intake

Following their appointments, survey respondents self-reported their daily fruit and vegetable intake, with response options ranging from 0 to 4 or more cups. As seen in **Table 4-8**, about 49 percent of respondents reported consuming one to three cups of fruits per day and about 46 percent reported consuming one to three cups of vegetables per day. The distribution of daily fruit intake was statistically different by appointment mode.

Table 4-8. Daily Fruit and Vegetable Intake Among Client Survey Respondents in DC

Variable	Overall	Telehealth Appointment[a]	In-person Appointment	p-value[b]
	%			
Fruits per day	N=878	N=138	N=740	0.0241*
None	2.4	5.1	1.9	
1/2 cup or less	10.5	9.4	10.7	
1/2 to 1 cup	17.9	20.3	17.4	
1-2 cups	28.1	19.6	29.7	
2-3 cups	21.1	28.3	19.7	
3-4 cups	10.5	8.7	10.8	
4 or more cups	9.6	8.7	9.7	
Vegetables per day	N=875	N=137	N=738	0.9891
None	2.3	2.2	2.3	
1/2 cup or less	12.2	11.7	12.3	
1/2 to 1 cup	20.8	21.2	20.7	
1-2 cups	24.7	25.5	24.5	
2-3 cups	21.7	21.9	21.7	
3-4 cups	10.6	8.8	11.0	
4 or more cups	7.7	8.8	7.5	

Source: THIS-WIC Client Survey
[a] Telehealth appointments were completed using phone, Zoom, Teams, or doxy.me.
[b] p-values are based on chi-square tests.
* $p<0.05$

4.8 Breastfeeding Practices (Initiation and Exclusive Breastfeeding)—Survey

Data captured in the DC MIS system for Client Survey respondents were used to assess the association between breastfeeding behavior and WIC service delivery. This analysis was restricted to WIC households with at least one infant (n = 206). As seen in **Table 4-9**, breastfeeding behaviors did not differ significantly by appointment mode.

4.9 Trends in Breastfeeding Initiation—Aggregate

As seen in **Table 4-10**, breastfeeding initiation rates remained fairly constant and were comparable across appointment modalities.

Table 4-9. Breastfeeding Practices of Client Survey Respondents in DC

Breastfeeding Practices[a]	Overall	Telehealth Appointment[b]	In-person Appointment	p-value[c]
	%			
Ever breastfed	N=172	N=32	N=140	0.5407
Yes	73.8	78.1	72.9	
No	26.2	21.9	27.1	
Exclusively breastfed	N=206	N=44	N=162	0.1661
Yes	12.1	18.2	10.5	
No	87.9	81.8	89.5	

Source: DC MIS

[a] Breastfeeding behavior is reported for households with at least one infant (0–12 months) during the study period.

[b] Telehealth appointments were completed using phone, Zoom, Teams, or doxy.me.

[c] p-values are based on chi-square tests, 25 percent or more of the cells have expected counts less than 5 so chi-square may not be a valid test.

Table 4-10. Breastfeeding Initiation Using Aggregate Data in DC

Appointment Mode	Q2/2022	Q3/2022	Q4/2022	Q1/2023	Q2/2023	Q3/2023	Overall
	N=361	N=1,860	N=1,762	N=2,877	N=3,683	N=1,342	N=11,885
	%						
In-person	72.09	64.73	73.00	71.04	72.22	75.09	72.03
Telehealth[a]	73.38	74.38	72.12	70.06	72.12	70.92	71.62
Overall	73.41	73.33	72.36	70.42	72.25	71.76	71.92

Source: DC MIS

[a] Telehealth appointments were completed using phone, Zoom, Microsoft Teams, or doxy.me.

4.10 Patterns of WIC Benefit Redemption

WIC benefit redemption patterns were examined for the month following the completion of WIC appointment/Client Survey using MIS data. As seen in **Table 4-11**, less than 10 percent of respondents redeemed full WIC benefits and almost half did not redeem any of their benefits in the month following their WIC appointment.

Table 4-11. WIC Benefit Redemption Following Client Survey Completion in DC

Benefit Redemption	Overall	Telehealth Appointment[a]	In-person Appointment	p-value[b]
	N=851	N=125	N=736	
	%			
Full	8.81	13.60	7.99	0.018*
None	48.41	53.60	47.52	
Partial	42.77	32.80	44.49	

Source: DC MIS linked to THIS-WIC Client Survey

[a] Telehealth appointments were completed using phone, Zoom, Microsoft Teams, or doxy.me.
[b] p-values are based on chi-square tests.
* $p<0.05$

4.11 Summary of Findings: Clients

DC WIC launched eWIC during the study period, requiring clients to come in for an in-person appointment, to receive their eWIC card. The Client Survey was administered to all clients regardless of their mode of survey completion. This chapter describes client experience with telehealth services received via phone, Zoom, Teams, or doxy.me and compares outcomes clients who received WIC services in-person versus telehealth. Key findings include the following:

1. **Acceptability of telehealth services:** Client Survey respondents who received WIC services through a telehealth appointment found it acceptable (agree or strongly agree) to do so. Most respondents indicated that the way they received WIC services was easier than going to a WIC clinic and expressed a preference to continue receiving services the same way at their next appointment. Respondents who used the video functionality found it easy to talk with and see their WIC nutrition educator. Client interviews indicated that although appointments were scheduled via video, most were conducted by phone. Clients also noted a preference for telehealth appointments because they found it easier to schedule an appointment in a timely manner via telehealth than in-person, likely due to limited availability of in-person appointments.
2. **Barriers to accessing WIC services**: In general, most survey respondents had a computer, smartphone, and internet connection at home. About two-thirds of the respondents who completed a telehealth appointment were very confident or somewhat confident about using technology compared to half of the respondents who completed an in-person appointment. Overall, only 3 percent had never used videoconferencing to communicate with family and friends (2.6% for telehealth and 5.6% for in-person appointments). Respondents had favorable experiences with their appointments. There were no differences in the mean barrier scores by appointment mode. Client interviews indicated a preference for in-person appointments because they did not want anyone to overhear their discussion with the nutrition educator.
3. **Satisfaction with WIC appointment**: Consistent with low frequency of barriers, Client Survey respondents had a high level of satisfaction with their WIC appointment. Satisfaction with WIC appointments did not differ significantly by mode.

4. **Retention in WIC**: Six months after completing their survey, about 70 percent of survey respondents were retained in WIC. There were no significant differences in retention in WIC by appointment mode.
5. **Intent to change dietary behaviors**: The scores for intent to change dietary behaviors (i.e., how they ate and how they feed their family) did not differ significantly by appointment mode. Mean scores for "usefulness of lessons to make healthy choices" were significantly higher for those who completed their appointment in-person appointment than for those who completed their appointment via telehealth.
6. **Daily fruit and vegetable intake**: About 20 percent of Client Survey respondents ate ½ cup to 1 cup of fruits and about 28 percent ate 1 to 2 cups of fruits, with similar patterns for vegetable intake. Following respondents' WIC appointment, distribution of fruit intake (but not vegetable intake) was significantly different by appointment mode.
7. **Breastfeeding practices**: Unadjusted analysis of breastfeeding practices indicate that there were no significant differences in breastfeeding behaviors—ever breastfed or exclusively breastfed by appointment modality.
8. **WIC benefit redemption:** Unadjusted analysis of WIC benefit redemption indicates that half of the respondents redeemed their WIC benefits in the month following their WIC appointment. These redemption patterns are comparable in the intervention and comparison agencies.

5. Conclusions and Lessons Learned

Telehealth has emerged as an integral approach to offering healthcare services because it may offer enhanced access to services, convenience in scheduling and receiving services, and cost savings by eliminating the need for transportation. However, factors such as comfort level with digital technology, availability of internet, privacy and security concerns, and accessibility may be barriers to telehealth integration within WIC. The goal of the THIS-WIC project was to develop a robust evidence base regarding telehealth solutions in WIC and understand whether and how telehealth influences impact, intermediate, process, and cost outcomes.

As planned, the project's intent was to deliver WIC nutrition education to WIC clients at participating agencies through telehealth (phone, Zoom, Teams, or doxy.me) appointments. Telehealth was implemented in DC throughout the COVID-19 pandemic, and the DC agency also contended with several changes to WIC service delivery, including eWIC rollout, requiring in-person appointments.

5.1 Implementation of Telehealth Services in DC

Between February 2022 (Q1/2022) and July 2023 (Q2/2023), three agencies (11 clinics) offered both in-person and telehealth services to clients. Nutrition education appointments accounted for about 23 percent of in-person appointments and 43 percent of telehealth appointments.

WIC staff generally perceived a high need to offer virtual services to their clients, particularly those who experienced transportation, work schedule, and childcare challenges. Although staff acknowledged that their use of telehealth is driven by client preferences and comfort with technology, they also expressed a preference for in-person appointments because they allowed them to complete health assessments and address sensitive client concerns.

DC WIC agencies had offered telehealth services prior to the THIS-WIC project, and most staff had prior experience with the use of telehealth. Although some staff did not feel prepared to provide telehealth services in the early phase, they felt prepared by the late phase and acknowledged that additional training was available to those who requested it.

At the start of the project, telehealth appointments accounted for about 10 percent of total appointments. Following the eWIC rollout, telehealth appointments accounted for about 30 percent or more of total appointments. In the early phase, about 17 percent of the staff preferred in-person appointments and the remaining preferred telehealth (phone, Zoom, Teams, or doxy.me) to offer nutrition counseling. Staff satisfaction with offering services through the telehealth platform was high. Staff described several factors that affected their level of satisfaction with offering telehealth services including inability to conduct health assessments, getting a sense of client receptivity to nutrition education sessions; sharing resources with clients, and interacting with the child. Some staff preferred telehealth appointments because they only had to attend to a limited number of scheduled appointments on their non-clinic days.

DC WIC staff implementation survey findings indicate declining use of video from the early to late phase (18.75% vs. 26.67%), with about 20 percent indicating that they faced barriers when

using telehealth with video and about 25 percent noting that they faced barriers when talking with clients about the opportunity to use telehealth with video. Staff noted that clients had trouble understanding the process to get a text link to the telehealth platform, did not show up for appointments despite reminders, experienced connectivity issues, and were reluctant to be on video. Agency directors also acknowledged the challenges of video appointments and noted that staff primarily conducted in-person or phone appointments. Staff noted that appointments were more comfortable when clients turned on their camera and could be seen. Some staff also noted an increase in client participation in nutrition education classes offered via Zoom.

Prior to the COVID-19 pandemic, most staff (94% in the early phase and 80% in the late phase) traveled to other WIC clinics, with about half traveling more than once per week. The startup cost to offer telehealth services was $296,835, of which about 58 percent was spent on indirect costs such as overhead, rent, and employee fringe benefits. Based on monthly caseload data, it would take DC about 7.5 months to recoup the investment in telehealth. In the 12th month of telehealth intervention, mean cost per enrollment declined to $20 (compared to $31 in FY 2019), and the mean cost per appointment declined to $69 (compared to $80 in FY 2019).

5.2 Client Experience and Outcomes

In general, most Client Survey respondents had a computer and smartphone at home. Comfort with technology varied among respondents who completed their appointments in-person or via telehealth; 63.8 percent of respondents completing telehealth appointments and 50.2 percent of respondents completing in-person appointments indicated that they were very confident about use of technology. Survey respondents from the intervention agencies indicate a high level of acceptability to receive WIC services via telehealth. Respondents also expressed a preference to continue receiving WIC services the same way for their next appointment. Respondents found telehealth services easy to access and simple to use; those who used the video capability also found it easy to talk with and see the WIC nutrition educator. Satisfaction scores were high and did not differ significantly by appointment modality.

Following their WIC appointment, respondents completing in-person appointments compared with telehealth appointments had comparable distribution for vegetable intake. Overall rates of breastfeeding initiation were also comparable by appointment mode. Because breastfeeding practices were assessed immediately following their telehealth appointment, and these practices are not likely to change based on a single appointment, factors contributing to these differences were not examined.

5.3 Lessons Learned

Telehealth is a viable approach to deliver WIC services to clients. Staff note that clients should be provided flexibility in how they would like to receive WIC services. Some staff expressed a preference for conducting in-person appointments because it allowed them to conduct health assessments, discuss sensitive topics with the client and be responsive with counseling, and see the child. Others expressed a preference for telehealth appointments because they were

better able to manage their workload and focus on scheduled appointments (instead of walk-ins).

Despite the technological challenges faced by staff and clients, staff prefer telehealth appointments and note that telehealth services can help increase client participation because it reduces or eliminates the barriers to attending in-person appointments. Staff who use the video functionality appreciate the rapport building and connections with clients, which ultimately lead to better engagement. Similarly, clients who complete an appointment via telehealth prefer to receive services the same way for future appointments.

5.4 Implications

Telehealth is a relatively new approach to providing services to WIC clients, and findings from this evaluation demonstrate the potential of increasing reach, promoting participation, and reducing attrition. The higher level of satisfaction with WIC services among Client Survey respondents demonstrates the feasibility of delivering virtual services successfully. Additional studies and evaluations are needed to demonstrate its efficacy, particularly as WIC resumes offering in-person services (i.e., usual care). Understanding and deploying strategies to increase awareness, comfort, and use of telehealth synchronously may increase the percentage of kept appointments. The findings from this evaluation suggest that flexibility in providing telehealth services is essential. Training staff on the process and promotion of telehealth platform resources may lead to increased use of telehealth.

The findings on the cost of ongoing service delivery should be interpreted with caution. First, to assess changes in service delivery costs associated with telehealth implementation, the pre-implementation period was set to FY2019 (i.e., before the start of the COVID-19 pandemic). This resulted in a 2.5-year gap between the study pre-implementation and post-implementation periods. Changes in staffing and reporting systems during this period may have affected the quality of the data reported for the pre-implementation period. Other factors and changes in service delivery (beyond implementation of the telehealth solution) may have also affected the costs incurred during the post-implementation period.

Additionally, agency-level costs can vary for reasons beyond telehealth or traditional delivery models, such as client socioeconomic composition, geographical differences, or provider turnover. For example, agencies that experience higher provider turnover may have higher costs because additional resources are spent on recruiting, hiring, training, and onboarding new staff. Studies with a larger sample size can statistically control for these confounding factors, but in this study with a limited sample size the team was not able to do so. Therefore, in addition to the limitations noted above, the changes in costs may be caused by other factors unrelated to the mode of delivery, such as changes in staffing, the level of services or administrative tasks that agencies are required to provide, and WIC participation.

5.5 Strengths and Limitations

This evaluation has several strengths and limitations. The strengths include a natural comparison group, mixed methods design, emphasis on effectiveness and implementation

outcomes, and high rate of staff and client participation in the evaluation, including client key informant interviews that provided additional context to use of telehealth in DC.

Although agencies were not randomized to intervention and comparison groups, the eWIC rollout created a natural experiment with staff providing in-person and telehealth appointments to clients. In the context of understanding client satisfaction and experience, the percentage of invited clients who consented to take part in the evaluation and completed the Client Survey exceeded the target response rate. DC noted that staff reminded participants they would get a link to the survey after their appointments; DC WIC clients are used to receiving WIC communication text messaging and are responsive.

This evaluation has several limitations. The COVID-19 pandemic reshaped usual care service delivery; telehealth appointments during lockdown were conducted primarily via phone. Simultaneous projects including eWIC rollout required clients to attend in-person appointments, thereby reducing the ability to conduct telehealth appointments.

It is important to highlight that client outcomes by appointment mode should not be interpreted as evidence of absence of improvements; it is possible that implementing the intervention in the absence of the COVID-19 pandemic may have produced different results. Additional studies are needed to evaluate the effectiveness of telehealth services compared to in-person appointments and client perspectives on facilitators and barriers to attending telehealth appointments.

Additional limitations include insufficient power to detect a 2-point difference for the client analysis and that calculating response rates was not possible due to lack of data on the number of staff invited to complete surveys and interviews. Finally, WIC client retention following completion of telehealth appointment could not be examined, as retention data (calculated based on the interval from initial certification to survey completion) were retrospective.

5.6 Sustainability

DC WIC considers WIC telehealth a viable option for providing WIC services to clients. Following the THIS-WIC project, DC is focused on modernizing the WIC program and is exploring available options to maintain a level of equitable service for clients. DC WIC has started to update program policies to reflect the shift to more telehealth services, including to whom telehealth services can be provided and when. DC WIC recently rolled out a new self-paced online nutrition education platform. This platform allows the participants to choose the nutrition education topic and to complete their lesson at a time and place most convenient to them. Future program modernization efforts include integration of the MIS with the participant portal to allow participants to securely submit/upload eligibility documents and implementing a virtual customer support hub to allow staff to communicate with participants in real time via phone, text, and email.

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