Interactive Computer-Assisted Recovery Enabler (ICARE): Treatment Support Tool for Substance-Using Offenders

Final Technical Report

Acknowledgments

Disclaimer

Contents

iv

Figures

Tables

List of Acronyms

ADAM	Arrestee Drug Abuse Monitoring Program
BE	behavioral economics
CM	care manager
DCS	Division of Community Supervision
HIPAA	Health Insurance Portability and Accountability Act
ICARE	Interactive Computer-Assisted Recovery Enabler
IRB	institutional review board
JRI	Justice Reinvestment Initiative
NC DAC	North Carolina Department of Adult Corrections
PO	probation officer
RAU	reminders as usual
RCT	randomized controlled trial
SMS	short message service
SUD	substance use disorder
TASC	Treatment Accountability for Safer Communities

Abstract

Individuals who are involved in the criminal legal system often experience disproportionately poorer behavioral and physical health outcomes, including the need for access to mental health care and treatment for substance use disorder. One primary way in which these individuals receive treatment is through care management, often facilitated as a condition of their court sanctions or community supervision. The current study explores how engagement with these services may be improved and what role technology plays in informing access to care.

Automated notifications of upcoming obligations have been widely studied as a form of effective support for people in need of improved treatment adherence. Among individuals involved in the criminal legal system, these "nudges" may be of particular importance given the often expansive nature of the various obligations and needs of those who are navigating a community supervision term. Although research has investigated the effectiveness of these nudges, the current study is the first to evaluate the impact of an automated appointment notification system on behavioral health nonclinical care management adherence among individuals under community supervision.

The current study occurred from November 2019 to March 2024 and consisted of two phases: (1) a formative phase that included focus groups with care managers (CMs) and clients to design an automated notification tool, and (2) a randomized controlled trial (RCT) to evaluate the impact of these notifications on care management intake, check-in appointments and attendance, and probation outcomes. Using a sample of 1,004 individuals referred from the North Carolina Department of Adult Corrections, the current study used an RCT that assigned individuals to either receive Interactive Computer-Assisted Recovery Enabler (ICARE) reminders plus reminders as usual or reminders as usual from their CM and probation officer. The enrollment period for the RCT was 9 months, starting in November 2022 and ending in July

2023. The intervention continued for an additional 8 months after the enrollment period ended, concluding in March 2024. Results show that receiving ICARE notifications significantly improved intake attendance among individuals on probation but did not impact check-in attendance, successful care management termination, or likelihood of experiencing a probation violation. This report outlines these methodological and analytic processes and poses key considerations and recommendations for improving care management access based on this study's findings.

Executive Summary

Study Background

Substance use among individuals involved in the criminal legal system is a pervasive problem. Data from the Arrestee Drug Abuse Monitoring Program (ADAM) show that 63%–83% of arrestees in the 10 ADAM sites tested positive for illicit drugs in 2013 (Office of National Drug Control Policy, 2014). A more recent Bureau of Justice Statistics report confirms that 64% of state and federal prison residents in 2016 reported using at least one drug in the 30 days prior to arrest (Maruschak et al., 2021). Without treatment, individuals who use drugs may continue their criminal behavior after release from prison (see, e.g., Clark, 2024). However, there is evidence that substance use treatment reduces recidivism. A systematic review examined the role of treatment and punishment in the reduction of crime recidivism and drug use (Tomaz et al., 2023). The researchers found that treatment is an effective response of the criminal legal system in helping to reduce criminal recidivism and/or drug use. Some research has found that nonresidential substance use treatment reduces the likelihood of recidivism among probation populations (Hollis et al., 2019; Lattimore et al., 2005). Aos and colleagues (2006) suggest that community-based drug treatment reduces recidivism by about 9%. Thus, there is great interest in directing offenders toward community-based treatment services by a service such as Treatment Accountability for Safer Communities (TASC).

It can be difficult to retain people who have substance use disorders (SUDs) in long-term studies (Nemes et al., 2002; Scott, 2004; Waite et al., 2023). However, relatively new research demonstrates that mobile phone technology is increasingly being integrated into offender rehabilitation efforts to improve client outcomes (Michalek et al., 2015). By enhancing the channels of communication between the care manager (CM) or service provider and clients, this technology is increasing service receipt and retention. Lack of treatment compliance, a major issue in the criminal legal system, is attributed to system-level barriers to program receipt (Clark

et al., 2024; Taxman et al., 2007) and lack of client motivation and readiness to change (Walters et al., 2014).

A growing body of research suggests that the short message service (SMS) function (or texting), which delivers messages directly to mobile phones, is an effective tool in changing health behaviors (Armanasco et al., 2017). In addition, texting can affect the most vulnerable individuals because mobile phone usage is high among adolescents, younger adults, people with lower socioeconomic status, young adults with lower educational attainment, and people who rent or move frequently (Faulkner & Culwin, 2005; Franklin et al., 2003; Koivusilta et al., 2007). Mobile phone technology has also been used directly for substance use treatment (Dahne & Lejuez, 2015; Litvin et al., 2013; Muench et al., 2013; Tofighi et al., 2015); HIV/AIDS testing, assessment, and prevention (Dowshen et al., 2013; Reback et al., 2021); and mental health treatment (Ben-Zeev, 2019).

Although the literature is limited on the use of mobile phone technologies to assist in the treatment process for explicitly justice-involved populations, some studies have examined the feasibility and acceptability of smartphone interventions to promote continued treatment for people directly impacted by the criminal justice system. Langdon and colleagues (2022) gathered perspectives from justice-involved individuals to examine the feasibility and acceptability of a combined in-person and text message-delivered intervention designed to support community reentry and continuation of medications for opioid use disorder. Individuals engaged in this approach while in a correctional facility were receptive to a digital health intervention to support their recovery upon release (Langdon et al., 2022). Similarly, a study was aimed at collecting data from key stakeholders to inform the development of a text messaging intervention targeting court-involved, nonincarcerated youth's behavioral health treatment engagement (Tolou-Shams et al., 2019). The researchers found texting among juvenile justice personnel and the youth and caregivers in their caseload is common but not systematic.

Barriers to texting youth about behavioral health treatment appointments include stigma and privacy, and messages should be short, simple, relatable, positive, and personalized.

This study addressed a critical gap in the literature by designing, implementing, and assessing the use of an appointment notification system to improve and support behavioral health nonclinical care management and probation compliance among individuals under community supervision who are referred by their probation officer (PO). As a statewide nonclinical care management and community-based treatment referral source for justice-involved individuals, Coastal Horizons, the TASC agency for eastern North Carolina, was searching for innovative tools to increase the capacity of CMs to efficiently manage caseloads that, in some cases, exceed 80 clients. The goal was to enhance their ability to support clients by (1) increasing their engagement and retention in care management and treatment, (2) reducing the degree of their substance use and improving mental health, (3) complying with their terms of supervision, and (4) reducing their criminal behavior. TASC clients who are determined to need additional services at intake, and are therefore enrolled in TASC care management, are mandated to comply for a minimum of 30 to 90 days (translating into an intake and at least one follow-up appointment), but they can continue to receive TASC services past that time depending on their needs. TASC's need to improve its program performance by developing low-cost tools was heightened by North Carolina's passage of House Bill 642 (H.B. 642) to adopt the Justice Reinvestment Act of 2011. The Justice Reinvestment Act (2011) is based on a package of recommendations prepared by the Council of State Governments under the Justice Reinvestment Initiative (JRI) co-funded by the Bureau of Justice Assistance and The Pew Center on the States. The JRI encouraged the provision of substance use and mental health treatment to high-risk, high-need individuals under supervision in the community in lieu of prison as a means to reduce recidivism and control costs (Council of State Governments Justice Center, 2014, 2022). Implementing the JRI recommendations resulted in larger and more

challenging caseloads for TASC CMs. One chronic issue facing TASC is high rates of no-shows to appointments, particularly intake (or initial) appointments. Failing to attend TASC appointments means that individuals miss opportunities to engage in care management and receive necessary treatment referrals that, in turn, could place them in jeopardy for probation failure due to noncompliance. The purpose of the Interactive Computer-Assisted Recovery Enabler (ICARE) tool was to automatically transmit appointment reminders to TASC clients, starting from the point of probation referral to the program, with the goal of increasing their care management appointment attendance, increasing their care management completion, and improving their probation compliance.

Major Goals and Objectives

Under this 2018 grant from the National Institute of Justice, RTI International designed, implemented, and assessed the use of an appointment notification system to improve and support behavioral health nonclinical care management and probation compliance among individuals under community supervision who are referred to TASC by their PO in North Carolina. Functionally, the ICARE tool delivered reminders for TASC appointments, including information on the appointment date and time, office physical address and phone number, and prompts to reschedule appointments. Reminder notifications were transmitted to ICARE group members via SMS 1 week and 1 day before each appointment. In the initial appointment reminder notification, clients were given the option to unsubscribe (or opt-out) from receiving messages from ICARE and resubscribe at a future date. If they unsubscribed, they no longer received ICARE appointment reminder messages.

The project included two studies: a formative study to design the ICARE tool and an impact study that used a randomized controlled trial (RCT) to investigate the use of the designed ICARE tool and its impact on participant outcomes.

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ES-4

Qualitative information sources for the formative study included in-person focus groups with TASC CMs and interviews with clients to gather input on their preferences for ICARE's design and use. Sources for the impact study of ICARE included short telephone interviews with treatment group members to gather feedback on their experiences and satisfaction with and their perceived usefulness of the ICARE reminder texts. Quantitative data included TASC care management data for all individuals who are enrolled in the RCT; administrative data obtained from the North Carolina Department of Adult Corrections on demographics, correctional histories, and post-study enrollment violations; and client-level data collected through the ICARE tool on clients' intentions to attend TASC appointments.

The study's three objectives were as follows:

1. To develop the ICARE mobile phone automatic notification system to support clients referred to TASC by enhancing care management

2. To assess the impact of ICARE on TASC compliance as well as user satisfaction with ICARE

3. To assess the impact of ICARE on probation outcomes, particularly the likelihood of technical violations

The project task structure was built around those goals, and progress will be reported in the following ways:

Task 1. Pre-human subjects activities

1.1 Obtain human subjects committee/institutional review board (IRB) approvals

1.2 Finalize the work plan with tasks

Task 2. Develop ICARE (Goal 1)

2.1 Develop the content and design of ICARE

2.2 Develop the ICARE system

Task 3. Assess the impact of ICARE (Goal 2)

3.1 Conduct the RCT

3.2 Summarize study results

Task 4. Dissemination and reporting

4.1 Develop briefs

4.2 Present study findings at conferences and meetings

4.3 Publish manuscripts in peer-reviewed journals

4.4 Produce final research report to the National Institute of Justice (NIJ)

Task 5. Project management and preliminary activities

5.1 Confirm overall project plan (internally and with partners)

5.2 Provide ongoing overall project management, including NIJ deliverables and team meetings

5.3 Provide ongoing overall budget management, including financial reporting

5.4 Archive data at the National Archive of Criminal Justice Data

Research Questions

The impact study's research questions addressed the following:

1. Do TASC clients who receive a TASC intake appointment reminder via ICARE show better intake appointment attendance than clients who receive TASC reminders as usual?

2. Among TASC clients assessed to have service needs at intake, did those who received TASC appointment reminders via ICARE show better TASC appointment attendance than clients who received TASC reminders as usual?

3. Among TASC clients assessed to have service needs at intake, did those who received TASC appointment reminders via ICARE show better TASC care management termination outcomes than clients who received TASC reminders as usual?

4. Among TASC clients assessed to have service needs at intake, did those who received TASC appointment reminders via ICARE show better probation outcomes than clients who received "TASC as usual" appointment reminders?

5. What were TASC clients' TASC appointment setting and attendance experiences? That is, how were TASC intake appointments set? Did clients receive appointment reminders? If so, what kind of TASC appointment reminders did treatment group members receive, either through ICARE or TASC usual practices? If clients received reminders, did the reminders help them keep their appointments? What other ways could clients be supported to help them keep their TASC appointments?

Research Design, Methods, and Analytical and Data Analysis Techniques

Study Overview

In partnership with Coastal Horizons, the TASC provider for 53 counties in eastern North Carolina, and Uptrust[1] (a public benefits software company that develops automated notifications to enhance communications for people who are systems involved), RTI designed, implemented, and assessed the use of an automated appointment notification tool that transmitted messages to individuals under community supervision who were referred to nonclinical care management. The study included formative and impact studies that took place from November 2019 to March 2024.

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[1] In 2023, Uptrust was acquired by FieldWare (https://www.govtech.com/biz/fieldware-buys-uptrust-in-justice-system-tech-deal)

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ES-7

The formative study involved user-centered design activities including focus groups and interviews (see Appendix A for guides) with TASC clients and CMs from four counties in North Carolina during November 2019 and January 2020. The purpose of the focus groups and interviews was to obtain information about users' preferences for ICARE notification content and features. The feedback from the formative work contributed to the design of the ICARE tool and assessment phase approach. These formative activities were determined by RTI's IRB to be not research involving human subjects because although they did involve informed consent and systematic data collection, their findings were not intended to be generalizable beyond the design of the ICARE tool.

The impact study involved implementation and assessment using an RCT of the use of ICARE in TASC offices in 47 North Carolina counties.[2] Using new client referral information that TASC receives from the Division of Community Supervision (DCS) at the North Carolina Department of Adult Corrections (NC DAC), our partner Uptrust established a database of referrals and randomly assigned 1,018 adults[3] who were referred by probation to TASC to two study groups: 504 participants in the control group only received reminders as usual (RAU) about their TASC appointments by POs or TASC CMs as typical operational practices, and 514 participants in the treatment group received TASC appointment reminders plus RAU. According to focus groups with CMs during the formative phase, these reminders typically occur in person, over the phone, via mailed letter, or through an individual's assigned PO, but participant responses also suggest that there are not consistent standards for CM-client communications regarding their frequency. Uptrust was responsible for scheduling and transmitting the appointment reminders as well as maintaining data on whether messages were delivered. However, there were six referred clients

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[2] The RCT considered all 53 counties where Coastal Horizons operated a TASC office; however, offices in six counties did not have any eligible, newly referred clients during the study period.

[3] All participants of the ICARE study were aged 18 years and older.

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ES-8

who did not have mobile phones and could not be contacted via ICARE who were ineligible for the intervention. The impact study activities underwent a full committee human subjects review and were approved by RTI's IRB.

Impact Study Enrollment

During 9 months of enrollment (November 2022 to July 2023), all TASC referrals of people on probation in 47 North Carolina counties where our partner Coastal Horizons operates a TASC office were included in the impact study. Individuals were not recruited individually for participation in the impact study as the ICARE notification messages served as an extension of current probation and TASC care management practice to remind individuals of their requirement to comply with the condition to report to TASC. Current notification practices vary depending on the PO and may include as few as one reminder during a PO visit that TASC attendance is a condition of supervision or additional reminders by the PO via text, phone, or email. The extent of reminding clients is at the discretion of each PO. Upon connection with TASC, CMs may also remind clients about TASC appointments via text, phone, or email at their discretion.

Among the individuals who were enrolled in the ICARE RCT, RTI worked in coordination with Uptrust to conduct recruitment activities with individuals to participate in further research to understand and document their satisfaction with the tool. A subsample of 13 ICARE group participants were recruited by Uptrust through the ICARE notification system to participate in a brief telephone interview. Using a list of names, study IDs, study status (ICARE, RAU), telephone numbers, and a county identifier for the TASC office, Uptrust recruited clients on a rolling basis to be contacted for the telephone interviews. During the telephone interview, RTI gathered feedback on ICARE user experiences and satisfaction with the ICARE appointment reminder texts. The ICARE tool transmitted a recruitment text message (see Appendix D) to enrolled clients that directed those interested in participating to a web page, which described the

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ES-9

ICARE study, the $20 gift card, and the confidential and voluntary nature of the study (see Appendix E). Clients who agreed to participate in the telephone interview provided their first name and phone number to receive a recruitment phone call.

The specific selection protocol was as follows: In the third week of month 1 of enrollment, RTI prompted Uptrust to send a recruitment message for the telephone interviews to up to 10 randomly selected ICARE participants. If we did not receive responses from and hold interviews with up to 10 clients during that week, then we asked Uptrust to send a recruitment message to additional ICARE participants who had not previously received a recruitment message in week 4 to reach up to 10 interviews. RTI selected clients to receive a recruitment message based on their status as being enrolled in the study and being assigned to receive ICARE and the shared the sampled study IDs with Uptrust for recruitment. We attempted to recruit clients from 47 counties for telephone interviews during the first 5 months of study enrollment. Each week, Uptrust sent recruitment messages to up to 5 newly enrolled clients from each of the 47 counties until we reached a total of 80 clients, or fewer if we determined that we were not learning new information from additional telephone interviews. Twice during this period we recontacted prior nonresponding ICARE participants to attempt to recruit them. For those who agreed to participate, an appointment was made for a telephone interview with an RTI study team member. Despite attempts to recruit 80 ICARE members, a total of 13 (4.2%) of the 312 individuals recruited completed telephone interviews; they represented 8 (17.0%) of the 47 counties participating in this study. Given the extremely low response rate and representation across participating counties, caution should be exercised in generalizing the results.

Intervention

From November 2022 to July 2023, TASC clients who were newly referred by probation (i.e., were referred by a PO for an initial intake appointment and assessment at TASC) were enrolled in the ICARE study and randomized to the treatment (ICARE) or control group by Uptrust. The

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ES-10

treatment consisted of two automated notifications via SMS—1 week before and 1 day before— their scheduled intake and each check-in appointments. Individuals assigned to the control group received RAU at the discretion of their TASC CM and PO but did not receive notifications through the ICARE tool. Members of the ICARE treatment group also received RAU at the discretion of their TASC CM and their PO.

From July 2023 to March 2024, no new participants were enrolled in the study but those previously enrolled and assigned to the treatment condition continued to receive reminder messages. Information was collected on intake and check-in appointment attendance, as well as on any responses to the text messages (i.e., opt-out, confirm/deny attendance intentions) to evaluate the impact of message reminders via our data management partner Uptrust.

Impact Assessment

The impact study used administrative data provided by Coastal Horizons and NC DAC to assess the impact of ICARE on TASC appointment attendance and probation compliance. Key outcomes that were compared for treatment and control group members included the following:

- Intake appointment attendance
- Check-in appointment attendance
- Probation compliance (e.g., violations)

To analyze differences between treatment and control subjects, derived variables were created for key outcomes for individuals following enrollment in the study. These outcomes included intake appointment attendance, any check-in appointment attendance, any technical violations, and any commitment to a NC DAC correctional facility. Analysis of differences in background characteristics and criminal histories between the treatment and control groups as well as outcomes included t-tests and chi-square tests. A t-test is a mathematical way to determine

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ES-11

whether the difference between two sample means is likely a real difference or just random chance. A chi-square test is similar to a t-test but compares categories.

Findings

The goal of the current study was to determine the effects of the ICARE appointment notification tool on care management (1) intake attendance, (2) check-in appointment attendance, (3) termination outcomes, and (4) probation violations. A survey of recipients was also used to explore clients' general satisfaction with the tools. Analyses suggest that ICARE has as direct and significant effect ($p < .01$) on improvements to intake appointment attendance, with ICARE recipients being approximately 23% more likely to attend their intake appointments than those clients who received the usual TASC CM and PO reminders alone. No significant impacts were found on check-in attendance, care management termination, or probation violations. However, surveyed recipients ($n = 12$) were extremely satisfied with the tool and felt it was useful in helping them coordinate their care management engagement.

Expected Applicability of the Research

The ICARE tool aimed to enhance care management by providing clients with more information about their appointments and serve as a force multiplier for CMs to keep clients engaged. This study was the first empirical assessment of the effectiveness of an automated appointment reminder system developed for probation-mandated care management and was implemented to advance the correction field's understanding of the benefit of informational nudges to support successful uptake of behavioral health care management. Automated appointment reminders such as ICARE have been employed in several criminal legal system settings and further expansion in these systems have occurred with respect to other legal obligations such as court appointments and probation visits. This study was designed to provide recommendations for practitioners and policymakers who are interested in such tools, with a focus on design and

development considerations and potential impact. Our study assessed the real-world usability of an increasingly popular, automated care management notification intervention. Results from the formative study were intended to help design the ICARE content and message frequency. Results from the impact study were intended to provide some preliminary evidence regarding whether automated appointment reminders in this context might improve behavioral health care management and probation compliance and reduce recidivism, which in this study is defined as a probation violation.

1. Introduction

Behavioral and physical health problems disproportionately affect criminal justice populations and, if left untreated, can weigh heavily on an individual's overall well-being and public safety (Chandler et al., 2009; Vaughn et al., 2012; Vaughn et al., 2014). Care management may improve access to treatment and medical care, as well as longer-term outcomes such as treatment retention, substance use, and recidivism (Avery et al., 2019; Grella et al., 2022; Scott et al., 2017). However, care management intake appointment no-shows are common and may occur due to the several and often competing demands of family, employment, and probation obligations that justice-involved individuals experience. Attention to behavioral health care management appointment no-shows is important because lack of treatment engagement may lead to negative consequences for clients, including continued substance use, persistent mental health problems, probation violations, and revocation.

Mobile phone technology has been shown to improve treatment participation and health outcomes among individuals with chronic illnesses such as diabetes and HIV (Breland et al., 2013; Muessig et al., 2015) and offers an innovative approach to support treatment engagement and retention among criminal justice populations. One approach that has been adapted in the courtroom and probation settings is using automated appointment reminders, in the form of phone calls and text messages, to "nudge" people to attend their court and probation appointments (Zottola et al., 2023). Automated appointment reminders serve as a force multiplier to existing outreach efforts to remind prospective and current clients about care management given their abundance of other obligations.

The current study explores how appointment notification systems may be designed, implemented, and assessed in serving behavioral health nonclinical care management among individuals on community supervision. As a statewide treatment referral source, Coastal

Horizons, which operates TASC centers in eastern North Carolina, is always searching for new and innovate ways to increase the capacity of care managers (CMs) in managing their caseloads, improving client adherence with treatment and community supervision, and reducing substance use and recidivism among this population. In 2011, this effort was furthered by the passage of the Justice Reinvestment Act in North Carolina (H.B. 642), which encourages the use of community supervision and treatment for high-risk individuals in lieu of prison (Council of State Governments Justice Center, 2022). The bill, while a step forward in treatment and rehabilitation efforts across the state, dramatically increased the caseloads of CMs and raised the need for better engagement with clients to prevent no-shows or high failure-to-appear rates. The Interactive Computer-Assisted Recovery Enabler (ICARE) tool delivers automated appointment reminders to clients to ease the burdens of CMs and improve the attendance, and subsequent access to treatment, of individuals on community supervision.

This report presents the findings from a formative study in which RTI and its partners developed the ICARE tool and the impact study that assessed the effectiveness of its use with a randomized controlled trial (RCT). Following a brief description of the context for ICARE and this study, the report provides the relevant theoretical guidance and literature (Chapter 2), the methodology used to evaluate the effectiveness of ICARE (Chapter 3), the findings of both the formative study and impact study's RCT (Chapter 4), and a discussion of the implications and conclusions (Chapter 5).

1.1 Treatment Accountability for Safer Communities (TASC)

In North Carolina, people who are sentenced to a term of community supervision are often referred by the Department of Adult Corrections (DAC) probation officer (PO) to a Treatment Alternatives for Safer Communities (TASC) agency as a condition of their probation. The first TASC programs, formerly called Treatment Alternatives to Street Crime, were implemented in 1972 as a federal initiative to address the pervasive problem of substance use among justice-

involved individuals as well as reduce recidivism. North Carolina's TASC program was first developed in 1978 and has been available statewide since 2001. TASC agencies' responsibilities include providing care management, assessment of substance use treatment needs, and referral to treatment as needed.

1.2 Coastal Horizons Center, Inc. (Coastal Horizons)

Coastal Horizons, Inc. is a nonprofit behavioral health organization that operates TASC in 53 counties in the eastern half of North Carolina.[4] Coastal Horizons provides nonclinical care management to people under community supervision upon referral by their PO. Similar to other TASC programs around the United States, Coastal Horizons provides these care management services with the goal of improving treatment access, engagement, and retention for justice-involved individuals with a substance use disorder (SUD) and those with mental health treatment needs; reducing substance use; improving mental health; and reducing technical violations and involvement in criminal activity. In 2023, over 16,300 referrals were made to Coastal Horizons-operated TASC programs in North Carolina (D. Willetts, personal communication, November 19, 2024). As part of typical business practices, TASC CMs may notify clients about their care management appointments ahead of time via phone call.

Upon being referred to TASC, a person is scheduled to attend an intake appointment where a Coastal Horizon CM completes an assessment - including review of a risk assessment, medical and psychiatric histories, the Addiction Severity Index, and Texas Christian University Drug Screen. The university is an evidence-based screener for SUD (see Texas Christian University Institute of Behavioral Research [2020] for more information). Its findings determine whether services are needed and an individual will be admitted to TASC for nonclinical care management. Care management may include referrals to a variety of services such as peer

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[4] Insight is the provider that operates TASC in the western half of North Carolina.

support, housing and transportation services, harm reduction and other addiction programs, outpatient services, and self-care and wellness programming, among other services.

The biggest challenge with TASC care management is getting people to attend their initial intake appointment. In 2023, the no-show rate at TASC centers across North Carolina was approximately 43% (D. Willetts, personal communication, November 19, 2024). The no-show rate in TASC centers operated by Coastal Horizons in the same year was slightly lower at 37.55%.

1.3   Current Study

The current study builds upon the existing practices within Coastal Horizons and TASC, more generally, to determine if the use of automated appointment notifications impact appointment attendance, check-in adherence, and probation compliance. In collaboration with Coastal Horizons and with a contract to FieldWare Software Solutions (which acquired the company previously known, and still referred to, as "Uptrust"), RTI designed the ICARE appointment notification tool to remind people under community supervision about their TASC appointments. These messages included information on the TASC office street address and phone number and prompts to reschedule appointments if the individual did not plan to attend the scheduled meeting. Upon finalization of the ICARE message content and intervention design, the ICARE tool was implemented to assess impact. For the impact study, individuals referred to TASC were randomized to either receive the ICARE text message reminders plus reminders as usual (RAU) or receive only RAU phone call, email, or mail reminders from TASC staff and probation officers, which are not standardized. In addition to this experimental design, qualitative interviews were conducted with a small number of study participants to determine if they were satisfied with the notifications and how the notifications or other RAU practices impacted their attendance.

1.4   Research Questions

The primary research questions were as follows:

1. Do TASC clients who receive a TASC intake appointment reminder via ICARE show better intake appointment attendance than clients who receive RAU appointment reminders?

2. Among TASC clients assessed to have service needs at intake, did those who received TASC appointment reminders via ICARE show better TASC check-in appointment attendance than clients who received RAU appointment reminders?

3. Among TASC clients assessed to have service needs at intake, did those who received TASC appointment reminders via ICARE show better TASC care management termination outcomes than clients who received RAU appointment reminders?

4. Among TASC clients assessed to have service needs at intake, did those who received TASC appointment reminders via ICARE show better probation outcomes than clients who received RAU appointment reminders?

5. What were TASC clients' TASC appointment setting and attendance experiences? That is, how were TASC intake appointments set? Did clients receive appointment reminders? If so, what kind of TASC appointment reminders did treatment group members receive, either through ICARE or TASC usual practices? If clients received reminders, did the reminders help them keep their appointments? What other ways could clients be supported to help them keep their TASC appointments?)?

This research has some potential implications: (1) inform practitioners about whether automatic notification tools can be leveraged to improve behavioral health care management compliance and treatment engagement among individuals under community supervision; and (2) determine whether appointment reminders reduce no-shows among this population, reduce burden on

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1-5

CMs and POs, and allow clients to take ownership of their own treatment. Successful demonstration of this system has implications for its use within other care management-driven programs for justice-involved individuals like problem-solving courts (e.g., drug courts, mental health courts, veterans courts) and probation terms for both adults and youths.

1.5 Changes in Approach from Original Design and Reason for Change

Importantly, this project experienced a few delays during its period of performance that created opportunities to revise our technical approach. In 2020, we experienced delays with enrollment into the ICARE RCT due to the impact of COVID-19 on the North Carolina Department of Adult Corrections' (NC DAC's) ability to refer clients to TASC. Specifically, NC DAC stopped referring people to TASC for several months after the onset of the pandemic. Even after NC DAC began referring people to TASC, enrollment rates were much lower than expected. As a result, we revised the approach in the impact study from enrolling TASC clients from 8 counties (4 urban and 4 rural) to enrolling participants in all 53 counties in North Carolina where Coastal Horizons operates a TASC program. This modification ultimately allowed RTI to enroll more people in the RCT than initially anticipated after TASC enrollment slowed.

Additionally, RTI experienced a challenge with acquiring appointment data from TASC's care management system due to the information being Health Insurance Portability and Accountability Act (HIPAA) protected. Even though we only proposed to collect correctional ID number, client telephone number, and date and time of appointment, this information is still protected by HIPAA because it would be shared by TASC, which is a covered entity. As a result, the procedures for processing HIPAA-protected appointment data through RTI's information technology systems were arduous and required the information to be stored on HIPAA-compliant servers and the encrypted share network prior to transmitting the information to our partner Uptrust. Further complicating this transfer of information for enrollment purposes is the

fact that the information transfer would have had to occur each day as a TASC client's appointment information could potentially change more than once within a week. As a result of this challenge, we modified our approach by having Uptrust, rather than RTI, enroll people in the RCT. For this information transmission to occur, RTI and Uptrust executed a Business Associate Agreement with TASC, and our partner Uptrust completed system enhancements to become HIPAA compliant in order to receive TASC data. Following the start of enrollment, Uptrust enrolled participants in the RCT and shared with RTI information about the number of people enrolled and the number of transmitted messages each week for quality assurance purposes.

2. Relevant Theoretical Guidance and Literature Review

2.1 Theoretical Perspective on Choice Architecture

Theoretical explanations for why automated reminders should affect appointment attendance originate within the discipline of behavioral economics (BE), which has long applied psychological and economic theories to understand why and how individuals make the choices they do. The concept of "choice architecture" includes various behavioral tools that influence decision-making (Thaler et al., 2010). Thaler and Sunstein (2009, p. 6) defined a nudge as "any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives." Although the effectiveness of nudges has been criticized and recent research has argued that nudges are ineffective as tools for behavioral change (Maier et al., 2022), continued research is necessary. Reminders that offer a nudge may be sufficient to impact appointment attendance because they are automatic, simple, and noninvasive.

BE has also contributed to the field's understanding of the role of cognition in how people respond to automated appointment notifications, theorizing that the brain has two operating systems, system 1 and system 2 (Kahneman, 2011). System 1 entails fast thinking that is automatic and effortless, while system 2 involves effort and a controlled mental process. Every day human decision-making is mostly due to system 1, which lightens the load for system 2 decision-making. The coexisting operating systems lead individuals to take shortcuts, also known as heuristics, to solve problems and ease their mental loads (Kahneman, 2011). Fast information is deemed more significant to the individual; however, decisions based on shortcuts can lead to cognitive biases, such as susceptibility and lack of self-control (Kahneman, 2011). More recent research examined the dual process aspects of BE concerning crime theory and

policy (Pogarsky & Herman, 2019). The content of a nudge, in the form of information transmission, is important because it can influence a decision based on an individual's perception. Information nudges in crime policy are often used "to elevate an individual's perception of the risk of being caught for a crime, and deter them" (p. 3). For example, using official communication in the form of flyers to tell people to lock their car doors can deter individuals from breaking into vehicles (Roach et al., 2017). Informational nudges are associated with system 1 and are viewed as less intrusive, which allows for the possibility of prosocial nudges, especially reminders.

Individuals involved in the criminal legal system sometimes require nudges, in the form of appointment reminders, because they have several—sometimes competing—obligations. In addition to typical life demands and responsibilities that non-justice-involved individuals navigate, such as maintaining employment, parenting, and caring for their physical health, they experience legally mandated obligations to comply with in their daily lives, including attending probation meetings, treatment and programming, and court dates (Corbett, 2015; Lowder et al., 2022). A further complication to meeting these obligations is that many of these individuals do not have access to basic needs that inform probation success, such as transportation or stable housing (Garland et al., 2011; Luther et al., 2011; Herbert et al., 2015; Norman et al., 2022). An appointment reminder provided in some advance of a mandated meeting gives people an opportunity to make arrangements that would allow them to attend. Given that people are typically in possession of and constantly connected to their mobile phones, an appointment reminder transmitted via short message service (SMS) is a direct conduit for that message to reach someone.

2.2   Use and Effectiveness of Automated Appointment Reminders

Building on lessons learned from notable theoretical developments in behavioral science, empirical studies of automated notifications used in the criminal legal system have investigated

the use of postal or written reminders (Bornstein et al., 2013; Rosenbaum et al., 2011) and phone call reminders (Bent-Koerick et al., 2022; Ferri, 2022; Howat et al., 2016; Schnacke et al., 2012) for improving court attendance; however, this scholarship has ultimately demonstrated mixed support for the effectiveness of these tools. A meta-analysis of 12 studies involving reminders of court dates found that reminders significantly reduce the odds of failure to appear in court (Zottola et al., 2023). Research on automated SMS (or text) message reminders have shown these systems to be effective in reducing missed appointments in court and health care settings (Fishbane et al., 2020; Hastings et al., 2021; Lin et al., 2016; Ulloa-Pérez et al., 2022). Some studies in this area have used experimental designs to investigate the effectiveness of various cadences in reducing missed appointments (Fishbane et al., 2020; Hastings et al., 2021; Ulloa-Pérez et al., 2022). For example, Hastings and colleagues (2021) used an RCT to randomly allocate and measure the effect of various text message reminder conditions on scheduled probation appointment attendance. People on probation received four conditions of text messages including: (1) no text messages, (2) a text message two days before the appointment, (3) a text message a day before the appointment, and (4) a text message one day and four days before the appointment. The authors found that participants who received no reminder texts had significantly more canceled appointments compared to participants who received a reminder one day in advance. Participants who received no reminder texts also had significantly more no-shows compared to participants who received two texts. Overall, the results of this evaluation suggest text message reminders increase attendance and reduce canceled and no-show appointments.

Other studies using an RCT have randomly assigned participants to either receive automated text message reminders or RAU or no reminders (Chivers & Barnes, 2018; Cumberbatch & Barnes, 2018; Fishbane et al., 2020; Hastings et al., 2021). Chivers and Barnes (2018) used an RCT approach that randomly assigned defendants to the control group, where they received a

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2-3

standard postal reminder about their first scheduled Magistrate's Court hearing. Defendants assigned to the treatment group received a standard reminder and a text message the day before their court appearance. The authors found no difference in court attendance or failure-to-appear warrants issued between the two groups (Chivers & Barnes, 2018). However, they conducted a follow-up study for 300 cases to test the data quality of telephone numbers, drawn from both the treatment and control groups, and found that 58% of their sample did not have valid telephone numbers (Chivers & Barnes, 2018). The authors did analyze a subset subsample of 300 cases with telephone numbers that had greater reliability and found that attendance in the treatment group (75.9%) was greater than in the control group (66.7%), but it was not statistically significant.

Similarly, Cumberbatch and Barnes (2018) used an RCT approach to examine text message reminders of court dates for victims and witnesses of crimes. Participants randomized to the control group received no reminder, while participants in the treatment group received a text message reminder 2–3 days before the court trial date. The results indicate that 16% of the treatment group did not receive reminder messages and 2% had failure-to-send messages, which resulted in 330 messages being successfully delivered. The authors found no statistically significant differences between the control and treatment group on attendance rates (Cumberbatch & Barnes, 2018).

Studies have also experimented with content of text messages (Chivers & Barnes, 2018; Fishbane et al., 2020). Fishbane and colleagues (2020) changed the cadence and the content of their text message reminders for participants who were summoned to court for low-level offenses, such as open containers, disorderly conduct, and park trespassing. The text messages were categorized into three groups: consequences group, plan-making group, and a combination group, which received a mix of messages received by the consequences and plan-making group. Text messages sent to the consequences group described possible ramifications

if the participant did not show up to the court date, while the plan-making group did not mention any consequences of nonattendance but gave a location and prompted participants to make a plan to attend. Plan-making included recommendations such as mark a date on a calendar, set an alarm on a phone, and write out a plan. Fishbane and colleagues (2020) found that the participants in the treatment group who received consequences and combination messages had fewer failures to appear compared with the control group. However, the authors posit that there seemed to be a positive selection for those who provided a phone number because "the failure-to-appear rate of people who provided a phone number and were randomized to the control group is 37.9%, relative to 40.8% for defendants who did not provide a phone number" (Fishbane et al., 2020, p. 3).

2.3   Intake Appointments and Retention

No-shows to care management appointments are important because lack of treatment engagement may lead to negative consequences for clients, including continued substance use, persistent mental health problems, probation violation, and revocation. Successful reintegration into the community from an incarceration term relies on several factors, including employment, stable housing, and continued treatment. Once an individual is on probation, they have a surplus of other family, employment, and probation obligations. Researchers have found that patient characteristics, enabling factors, need factors, and environmental factors predict treatment retention (Cachay et al., 2018; Ulett et al., 2009).

Little is known about the impact of missed initial visits on retention in the care management of patients. However, research with individuals being released from correctional settings has shown the importance of a "warm handoff" from the facility to the community, which could include aligning the newly released individuals with referrals, housing, and continued treatment (Avery et al., 2019; Grella et al., 2022; Scott et al., 2017).

3.   Methodology of the Current Study

The purpose of the current study is to examine whether an automated notification system improves behavioral health care management appointment uptake and retention among a sample of people who have been referred by their PO to TASC.

3.1   Study Design

The study was designed with two distinct phases: a formative study and an impact study. The goal of the formative study was to apply a user-centered approach to obtain information about user's preferences for ICARE message content and functions. Focus groups were held with TASC staff and interviews were held with clients to collect primary data to inform the design of the automated notification tool so that it would be most effective for the users. From these efforts, RTI also gathered feedback on the TASC care management process, potential barriers to mobile phone usage and text message receipt, and other barriers to successful implementation. The interview and focus group guides used during the formative study can be found in Appendix A. The focus groups took place in rural and metropolitan counties in North Carolina where Coastal Horizons oversees TASC to allow for diverse feedback. Three focus groups with TASC staff and 15 one-on-one interviews with TASC clients took place in November 2019 and January 2020. From this work, tailored ICARE message content and protocols were designed and implemented at Coastal Horizons. **Figure 3-1** shows the text message reminder variations that were designed based on these focus groups and interviews.

To implement and assess the effects of the ICARE tool, RTI conducted an impact study that incorporated an RCT. A cohort of individuals on probation who were referred to TASC was enrolled into the RCT between November 2022 and July 2023. Individuals were randomly assigned to a study condition immediately upon referral to a TASC site from NC DAC. Individuals assigned to the control group received RAU contacts (often phone calls/voicemails)

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3-1

from their TASC CM and PO. Those who were randomized to the treatment received two automated text messages—1 week before and 1 day before—their scheduled intake and check-in appointments, in addition to RAU contacts. These reminders came directly from Uptrust/Lauris and did not require engagement from the CM or PO to be sent. ICARE did not provide reminders about other behavioral health services by the client's CM nor other probationary requirements. From August 2023 through March 2024, no new participants were enrolled in the study but those previously enrolled and assigned to the treatment condition continued to receive reminder messages. RTI's partner Uptrust collected information on intake and check-in appointment dates and times, as well as on any responses to the text messages (i.e., unsubscribes, confirm/deny attendance intentions), and RTI received information on attendance to these appointment from Coastal Horizons to evaluate the impact of automatic TASC appointment notification (RTI conducted research protocol integrity checks by receiving weekly enrollment extracts from Uptrust that included the number of people assigned to the treatment and control groups county, the number of delivered and undelivered messages, and the number of opt-outs and opt-ins over the past week.) This information allowed us to assess fluctuations in these metrics during the enrollment and intervention periods.

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3-2

Figure 3-1. ICARE Text Message Specifications
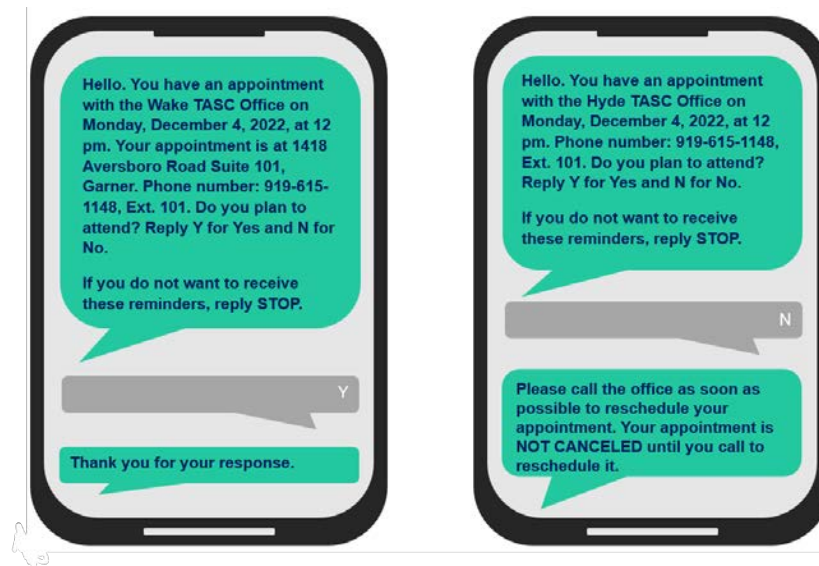
3.2   Recruitment

3.2.1   Formative Study Recruitment

The formative study included primary data collection with TASC staff and clients in Wake, Durham, Cumberland, and Johnston Counties. Recruitment for staff focus groups was coordinated by the Director of the North Carolina TASC Training Institute, who met with officers and CMs to explain the project and provide flyers that included additional information to be distributed to CMs. Three focus groups took place with 13 participants across 3 counties (Wake, Durham, and Cumberland). This included 10 CMs, an officer manager, a field specialist, and a regional TASC coordinator.

To recruit clients for the focus groups, RTI created flyers with information about the study, which were then distributed by TASC CMs. The flyers instructed interested individuals to call RTI staff to sign up for a focus group, but this method of recruitment was ultimately unsuccessful. RTI then asked CMs to assist in recruitment by instructing interested clients to sign up for the focus group at the TASC office front desk. However, only Durham County was able to gather enough participants (n = 4) to conduct a focus group using this strategy. As a result, RTI adjusted

recruitment efforts to conduct one-on-one client interviews in the remaining counties. An additional 10 clients were recruited and interviewed in Johnston (n = 5) and Wake (n = 5) Counties. As compensation for their time and participation, clients who participated in the focus groups or interviews received a $20 Amazon gift card.

3.2.2   RCT Enrollment

During the impact study, RCT participants were enrolled from a population of individuals under community supervision by the NC DAC Division of Community Supervision (DCS). POs completed assessments of all persons under their supervision and determined whether they needed behavioral health care management. If management was needed, the PO electronically transmitted a referral to Coastal Horizon's record management system, Lauris Online (Lauris). Each day, RTI's partner Uptrust accessed Lauris to acquire key information needed to generate automated appointment reminders. If a client's available information included their name, unique DAC identification number, phone number, intake appointment date and time, and county of residence, the individual was eligible for enrollment and Uptrust randomly assigned them to either the control (RAU) or treatment (RAU + ICARE) condition.

Originally, 1,032 justice-involved individuals were referred to TASC during the enrollment period. Of this sample, 522 were assigned to ICARE and 510 were assigned to RAU.

Figure 3-2 presents a consort diagram that shows how RTI arrived at the analytic cohort and where 28 people were excluded due to the absence of data from one of our partners. First, four people (2 ICARE and 2 RAU members) were excluded because they had no appointment data from Coastal Horizons. A total of six ICARE members could not be included in the analytic sample because they did not have a phone number at enrollment. One person in the control group did not have any record with NC DAC, so we could not analyze their correctional outcomes. Based on the data we received from DAC, two RAU group members did not have an

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3-4

overlapping probationary period with our study period. Additionally, 15 people did not have any record of TASC appointment or care management outcome data. Of those 15, seven people did not have data for an intake appointment (4 ICARE and 3 RAU group members), two people (1 ICARE and 1 RAU group member) did not have a record for an intake appointment outcome despite having records for check-in appointment outcomes, and six people (2 ICARE and 4 RAU group members) did not have data on check-in appointments despite having a record for an intake appointment.

The final analysis cohort included a total of 1,004 participants, with 507 people in the treatment group and 497 people in the control group. Within the ICARE group, 128 individuals were identified as untreated, meaning that at some point during the study period they either stopped receiving the text message reminders or we could not confirm receipt of the messages. This may have occurred when phones were shut off, when individuals opt out of receiving the treatment, or because individuals' phone carriers did not supply information on whether the texts were received or not and we received no response that indicated receipt. Analyses used an intent-to-treat model to account for these differences in message receipt.

Figure 3-2. Consort Diagram of Reasons for Exclusion from Analytic Sample

Enrollment Cohort
• Treatment (n = 522)
• Control (n = 510)

Analysis Cohort
• Treatment (n = 507)
• Control (n = 497)

Ineligible/Excluded from Analysis (Treatment = 15; Control = 13)
- No data from Coastal Horizons (TASC)
  - Treatment = 2
  - Control = 2
- Treatment group w/o phone number
  - Treatment = 6
- No data from DAC
  - Control = 1
- No overlapping supervision period
  - Control = 2
- No intake appointment
  - Treatment = 4
  - Control = 3
- No intake outcomes
  - Treatment = 1
  - Control = 1
- No check-in appointments
  - Treatment = 2
  - Control = 4

Collectively, the ICARE group received a total of 5,024 reminder messages, with 3,702 being delivered and 660 being undelivered for intake and check-in appointments. A total of 17 participants unsubscribed from receiving notifications from ICARE. The intervention period was November 2022 to March 2024. Participants received notifications for each TASC appointment until successful or unsuccessful termination or until the end of study period, whichever came first. Successful termination is a designation determined by the CM if the client (1) completes all care management requirements or (2) finishes their probation term and is no longer required to access TASC services. People are unsuccessfully terminated because they did not complete TASC for the following reasons: (1) TASC noncompliance or no-shows, (2) probation noncompliance, (3) they moved out of Coastal Horizon's service area, or (4) they died.

3.2.3   Formative Study

During the formative study, focus groups and brief one-on-one interviews were conducted with TASC CMs and clients using a convenience sample during site visits to TASC facilities. The purpose of focus groups and interviews with TASC CMs and clients was to learn about access to and use of cell phones and receive opinions and suggestions on potential tool content and features. One cognitive interviewer from RTI conducted focus groups with 13 TASC staff members, one focus group with four TASC clients, and 10 one-on-one interviews with TASC clients during November 2019 and January 2020. Interview and focus groups guides were developed through an iterative process in which probing was guided through what was learned in previous sessions. Questions for CMs largely centered on understanding the TASC care management process, including the frequency of appointments, duration of cases, no-shows, and communication with clients. Interviews with clients also discussed their access to various communication methods, their preferred supports and reminders for care management, and the most beneficial way in which a text message reminder system could be designed.

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3-6

The focus groups were conducted in person and lasted approximately 1 hour each. One-on-one interviews were conducted in person and lasted approximately 25 minutes each. Prior to each interview and focus group, the interviewer provided the candidate(s) with some background information about the project, explained that participation was voluntary, and noted that anything said during the interview or focus group would be kept confidential. Participants who were interested in continuing to the focus group or interview then provided their written informed consent. Next, the interviewer presented candidates with an audio recording waiver that was required by TASC. Prior to asking any questions, the interviewer asked each participant to fill out a brief paper survey with questions about cell phone access and use and demographic information (see Appendix B).

The interviewer followed a focus group guide or interview protocol (depending on the data collection method) and added unscripted probes when appropriate. The original focus group guide consisted of questions concerning different potential functions of the ICARE tool, including meeting reminders, care management or treatment appointment attendance, care management or treatment satisfaction, motivational enhancement and wellness messages, logs, and education and social support information. When the data collection method was modified from focus groups to interviews, the focus group guide was adapted to address an individual as opposed to a group. Questions and examples were also used to obtain participant feedback on reasons for not attending an appointment and willingness to respond to brief survey questions pertaining to readiness for change as one potential feature of the ICARE tool. To help guide the discussion, focus group participants and interviewees were provided a handout that displayed each type of example message in a text message layout (see Appendix C). In addition, participants in both focus groups and interviews were asked about their format (e.g., text, email) and timing (e.g., morning, afternoon) preferences of ICARE messages and potential barriers to

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3-7

participating in an ICARE pilot study. Participating CMs were also asked about their communication with TASC clients and about their perceptions of TASC client needs.

3.2.4 Impact Study

Upon NC DAC referral to a TASC center operated by Coastal Horizons during the study period, individuals eligible for the RCT were assigned a study ID and were randomized to a treatment condition by Uptrust, which also oversaw the message delivery system. Each week, Uptrust transmitted to RTI new enrollment information as well as any data regarding text message reminder delivery and participant responses to the text message (i.e., unsubscribes, attendance responses). Coastal Horizons provided RTI with regular reports on appointment attendance and care management completion for all participants. RTI received participants' demographic and correctional data, including previous legal involvement and any post-enrollment violations from the NC DAC at the conclusion of the impact study (March 2024).

Once RTI received all data from Uptrust, Coastal Horizons, and NC DAC at the conclusion of the study period, all data files were cleaned and merged to allow for analyses at the individual participant level. All data analysis was conducted using R software. A more comprehensive review of the data included in this analysis is provided in the Measures section.

3.2.5 Data Sources

Focus Groups/Interview Notes—From staff and client focus groups and one-on-one interviews conducted during the formative study, transcripts and interviewer notes were analyzed to determine participants' perceptions of the ICARE tool, care management, and feedback on specific messaging and potential barriers to successful implementation.

Brief Survey with TASC Clients who Participate in Focus Groups/Interviews—RTI administered a brief survey to clients who participated in the focus groups and interviews to understand their demographics and mobile phone usage.

ICARE (Uptrust)—This data file provided by Uptrust includes outcome information on all individuals randomized to receive ICARE automated appointment reminders or RAU. The file includes study ID, treatment condition (ICARE, RAU), and, for those assigned to ICARE, text messages sent and status (e.g., delivered or undelivered) and clients' responses (Y/N/STOP/START) to the text messages regarding whether they planned to attend the scheduled meeting.

Coastal Horizons Administrative Records Collected and Stored in Lauris—These data include information regarding care management received by clients, such as client Offender Public Information Search correctional ID numbers, client telephone numbers, appointment locations, referral and completion status, and dates for scheduled and attended appointments and case closure.

North Carolina Department of Adult Corrections (NC DAC)—The data acquired from NC DAC includes participant demographics, criminal history, and current probation data. The data include background characteristics such as age at enrollment, sex, and race and ethnicity. Criminal history data includes information on start and end dates for prior commitments to an NC DAC facility and for prior supervision episodes. Probation data include start and end date and type/level of every supervision term on file. For instant terms of community supervision (i.e., the term of supervision while enrolled in ICARE), information is also available on the offense type resulting in the current probation term, conditions of supervision, supervision type, and any recorded violations.

3.3   Quantitative Measures

Several measures were collected across both phases of the ICARE study to determine the effectiveness of appointment reminders on care management and appointment attendance. Measures include individual participants' demographics and criminal history, involvement and

outcomes in TASC care management, and probation violation outcomes. **Table 3-1** describes the quantitative variables collected and used during analysis.

Table 3-1. List of Variables

Variable	Description
Independent Variable	
ICARE	Randomization into the treatment (Y) or control (N) condition
Covariates	
Age	Age in years at the time of study enrollment
Sex	Biological sex at birth (Male; Female)
Race	Agency-identified race (American Indian/Alaskan Native, Asian, Black, White, Other, or Unknown)
Ethnicity	Agency-identified ethnicity (Hispanic/Latino, Not Hispanic/Latino, Other, or Unknown)
Current offense	Most serious offense on client's current probation term
Criminal history	Number of prior probation terms or prior incarceration terms
Outcome/Dependent Variables	
Intake appointment attendance	Whether participant attended TASC intake appointment (Y/N)
Check-in appointment attendance	Whether participant missed any TASC check-in appointments (Y/N)
Successful termination	Whether patient successfully completed TASC care management requirements and had their case subsequently closed (Y/N)
Any Violations	Whether participant had any new violation during their supervision (Y/N)

3.4 Analytic Approach

3.4.1 Formative Study

Data from focus groups and interviewers were analyzed using a noncoding thematic analysis. The lead interviewer and one notetaker reviewed the responses and summarized the perspectives and shared experiences of participants around these a priori areas of interest, such as details of the care management process, communication access and formats (i.e., call, email, etc.), and preferred methods of support. These focus groups and interviews served to

provide information necessary for designing the ICARE appointment notification tool and as such, semantic analysis was used to gather exact needs and suggestions of participants, rather than seek out hidden or underlying meaning. The findings from this analysis can be found in Section 4.1.

3.4.2   Impact Study

The impact study outlines five primary research questions. The first four questions are answered through a series of descriptive and bivariate quantitative analyses. The fifth research question used qualitative data collected through interviews to provide additional context and satisfaction with ICARE for TASC appointment compliance and broader care management efforts.

In addition to answering each of the following research questions, the current study included other analyses. One analysis is of TASC appointment attendance pathways by control versus treatment group condition. The second analysis examines sample descriptive statistics and compares the characteristics of individuals assigned to receive ICARE (treatment group) and those who receive RAU alone (control group). The demographic variables included in this comparison (see 3.4 Quantitative Measures) are factors known to be associated with outcome variables of interest. We also conducted a supplemental analysis of the impact of ICARE by county type, comparing urban and rural counties as defined by U.S. Census Bureau to determine if the effectiveness of ICARE differs by location. All statistical analyses were conducted in R.

Research Question #1—Do TASC clients who received a TASC intake appointment reminder via ICARE show better intake appointment attendance than clients who receive TASC RAU?

The first research question is answered using bivariate analyses. To examine differences in intake appointment attendance between treatment and control group members, chi-square tests were conducted. Interpretation of this test includes both an evaluation of statistical significance and the magnitude of the effect size in order to understand both statistical and practical significance.

Research Question #2—Among TASC clients assessed to have service needs at intake, do those who receive TASC appointment reminders via ICARE show better TASC appointment attendance than clients who receive TASC RAU?

The analytic process for the second research question is similar to the first in that it uses bivariate analyses. A chi-square test of differences is used to examine differences in check-in appointment attendance between the treatment (ICARE) and control (TASC RAU) groups.

Research Question #3—Among TASC clients assessed to have service needs at intake, do those who receive TASC appointment reminders via ICARE show better TASC care management termination outcomes than clients who receive TASC RAU?

Once again, bivariate analyses are used to determine whether ICARE informed successful terminations from TASC care management. A chi-square test was used to determine whether there are any statistically significant differences between the treatment and control conditions on successful care management termination.

Research Question #4—Among TASC clients assessed to have service needs at intake, do those who received TASC appointment reminders via ICARE show better probation outcomes than clients who receive TASC RAU?

The fourth research question also requires bivariate analyses to be answered. A chi-square test was used to assess differences in experiencing any post-enrollment probation violations

between the treatment and control conditions. This test determined whether any between-group differences are statistically significant.

Research Question #5—What were TASC clients' appointment setting and attendance experiences and satisfaction with ICARE?

The fifth research question used qualitative data collected from telephone interviews with 13 ICARE participants. Once notes from all interviews were compiled, RTI reviewed participant responses based on their relationship to the research questions as follows:

1. How were TASC intake appointments set?

2. Did clients receive appointment reminders?

3. What kind of TASC appointment reminders did treatment group members receive, either through ICARE or TASC usual practices?

4. If clients received reminders, did the reminders help them keep their appointments?

5. What other ways could clients be supported to help them keep their TASC appointments?

From these interview notes, researchers interpreted responses and themes were identified to determine how participants perceived their engagement and satisfaction with the ICARE reminder system.

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3-13

4. Findings

4.1 Formative Study Findings

4.1.1 Study Sample Characteristics

Of the 15 TASC clients who participated in a focus group or interview, age was slightly skewed toward younger age groups, with more than half of clients identifying as 25 years old and younger. All but two participating clients were male. Close to an equal number of clients identified as White and as Black or African American, though racial composition varied across TASC locations. Only one client identified as Hispanic or Latino. The highest level of formal education reported by participating clients was "Some college," with over half of clients having a high school education or less. A summary description of client participants is presented in **Table 4-1**. We did not obtain any information on TASC staff who participated in the focus groups.

4.1.2 Care Management Findings

Frequency of Appointments

When conducting focus groups with TASC CMs, we asked questions regarding the process of administering care management to better understand how TASC operates. The purpose of TASC care management is to track progress and ensure that clients are attending appointments with treatment providers. Based on focus group input and conversations with Coastal Horizons, we determined that after an initial intake appointment, a client is typically required to meet with their CM once a month, on average. The frequency of TASC meetings is determined by CMs, who consider the needs of the client. If a client is failing drug screens or treatment programs, CMs may recommend meeting with clients more often (e.g., every 2 weeks). TASC CMs typically manage caseloads of between 100 and 200 clients.

Table 4-1.   Client Recruitment Summary by Location and Demographics

Participant	County	Type	Age	Sex	Race	Hispanic	Education
P1	Durham	Focus group	50–59	Male	White	No	High school
P2	Durham	Focus group	40–49	Male	White	No	High school
P3	Durham	Focus group	21–25	Male	Prefer not to answer	No	Less than high school
P4	Durham	Focus group	50–59	Male	Black or African American	No	Some college
P5	Cumberland	Interview	18–20	Male	Black or African American	No	Some college
P6	Wake	Interview	21–25	Male	White	No	High school
P7	Wake	Interview	18–20	Male	Other	Yes	Some college
P8	Wake	Interview	21–25	Female	Black or African American	No	High school
P9	Wake	Interview	18–20	Male	Black or African American	No	High school
P10	Wake	Interview	18–20	Male	Black or African American	No	High school
P11	Johnston	Interview	30–39	Male	White	No	Some college
P12	Johnston	Interview	30–39	Female	White	No	Some college
P13	Johnston	Interview	40–49	Male	Black or African American	No	Prefer not to answer
P14	Johnston	Interview	21–25	Male	White	No	Some college
P15	Johnston	Interview	30–39	Male	White	No	High school

Duration of a Case

RTI also learned about the average length of TASC care management. TASC clients who are determined to need additional services at intake, and are therefore enrolled in TASC care management, are mandated to comply for a minimum of 30 days to 90 days (translating into an intake and at least one follow-up appointment), but they can continue to receive TASC services past that time depending on their needs. Individuals who do not attend their intake appointment and do not comply with TASC conditions may have their case closed without access to services or face a violation or revocation. CMs reported that most TASC clients receive services for between 3 and 9 months. At the lower end of the spectrum are those who have no past substance use history, have achieved sustained remission, and are actively engaging in

services. Falling on the higher end of the spectrum are those with greater needs—CMs explained that in some instances TASC clients may need to be placed in inpatient treatment and this can prolong their receipt of TASC services. One CM shared, "I've had them up to 8 months. It just depends on if they're dragging their feet with their treatment—they could be there for a while." At a different office, one CM said:

> We keep all clients for 90 days. If they were referred for mental health reasons, we monitor them and make sure they are going to their psychiatrist and other medical appointments. If they are referred for substance abuse, we make sure they are going to their classes. Sometimes we get clients that don't comply, so we have to keep them longer because they are not going to their treatment even if they're clean and if they are done with their SAIOP [Substance Abuse Intensive Outpatient Program], we can't release them.

Combined, these responses suggest that the average duration of TASC care management is 1–3 months with those not progressing in their care management and treatment plan, or those with particularly high behavioral health needs, potentially being enrolled for several months longer.

Absences ("No-shows")

The rate of absences or "no-shows" for intake and regular appointments varied across TASC offices. CMs in one office reported that as many as 60% of clients miss appointments, whereas CMs in another office reported that no-shows were uncommon. Practices for handling no-show appointments differed significantly across TASC sites and even among CMs at the same site. As multiple CMs explained, there are no hard rules. In some cases, CMs reported that they honored a grace period after a scheduled appointment during which time a client could reschedule their appointment without repercussions.

Other CMs took a stricter approach, preparing a missed appointment letter that is sent to the client's PO 15 minutes into the missed appointment and directing the client to contact their PO

to reschedule their appointment. Whether or not a client who misses an appointment is considered in violation of their probation is up to the discretion of their PO. As described by one CM, "We would reach out to their PO if they haven't come in. Then we call them and send them a missed mailing. If they still don't show, we mark in their file that they are unsuccessfully terminated, which is a violation of their probation."

This inconsistent information provided by various TASC CMs further underscores the need for a reliable and consistent text appointment reminding tool. As it appears, the "rules" and consequences for attending TASC appointments vary greatly depending on TASC site and individual CM.

Communication

One of the primary goals of the focus groups was to discover how CMs were currently communicating with clients and whether texting would be a good method of communicating with clients. Communications between TASC CMs and clients currently occur in person, over the telephone, via mailed letter, occasionally through emails, and often through POs. CMs shared that if they cannot get in touch with a client, they usually contact the PO to find out if they have new contact information for the client or information about their whereabouts (i.e., Are they currently detained or in a rehabilitation center?) In some instances, POs may text with their clients, but POs are provided with work cell phones, which CMs do not have. The POs will sometimes use text messaging to remind clients when they have an appointment, but this is done on an individual basis, not by an automated system. All of the CMs were interested in being able to text clients via a computer or mobile app that is not connected to their personal cell phone. They all indicated that they did not have company cell phones to use for texting and did not want to use personal devices for safety reasons. In the event of appointment changes, clients may choose to contact their CMs or their TASC office assistant. Either scenario would result in an update of their appointment information in Lauris. They highlighted some

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4-4

advantages of texting over making phone calls. For example, even if clients are unable to speak on their phones because they are out of minutes, they can receive text messages through Wi-Fi. One CM brought up the use of apps such as WhatsApp, which uses a mobile phone's number to text over Wi-Fi. They were unaware of cases where someone was unable to receive text messages unless their phone was completely turned off.

CMs observed and clients confirmed that almost all TASC clients have access to a cell phone. In some rare cases, clients will provide a landline phone number. CMs observed that landlines are more common among elderly, disabled, or young clients who live with family (e.g., high school students). Most often, landlines are used when a client is living in group housing. In these locations, clients may not be allowed to have a mobile phone and their only communication takes place via one landline for the entire house. Transitional housing varies in prevalence. In one county, CMs reported they have one PO who just handles those in transitional housing, while another county did not think they had many, if any, clients in transitional housing.

4.1.3   Client Findings

RTI administered a brief survey to 15 clients that included questions about personal cell phone ownership and habits of use. Graphs of the results are shown in **Figure 4-1**. Almost all participating TASC clients reported owning their own cell phone. Two-thirds of clients reported using Android phones. Notably, all respondents indicated that the phone they use is a smartphone and that their phone plan includes unlimited texting. Payment plans were equally distributed among contract or prepaid plans.

As shown in **Figure 4-2**, most participating TASC clients (80%) reported that they had gotten a new phone at least once in the last year, but only half reported that their phone number had

changed at least once in the last year and of those, the majority reported that their phone

number changed just once in that year.

Figure 4-1.   Mobile Phone Ownership and Usage among Formative Study Client Participants (n = 15)
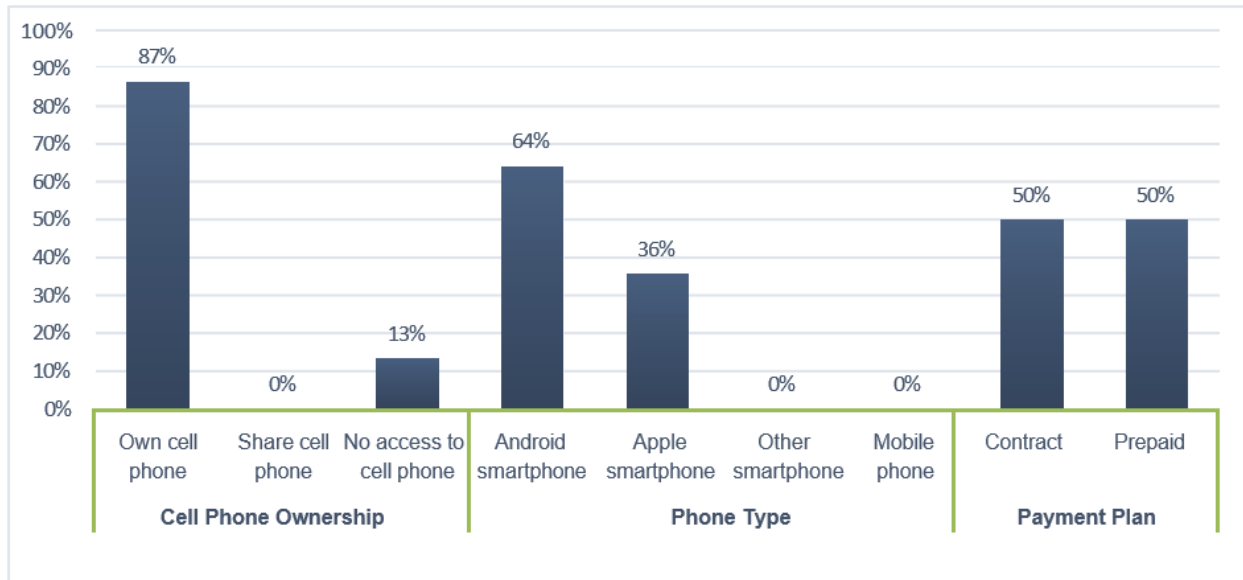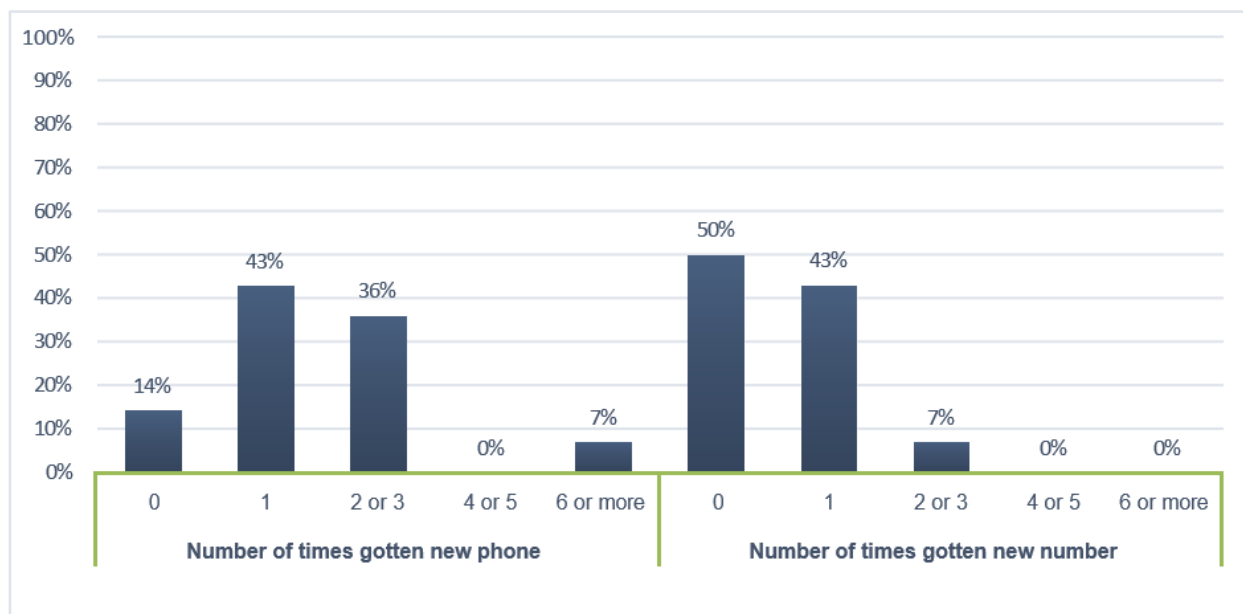

Figure 4-2.   New Mobile Phone or Number among Formative Study Client Participants (n = 15)

Though the CMs indicated the TASC office address should be included in the appointment reminder, not all of the clients agreed. Also, contrary to what the CMs said, most clients seemed ambivalent to including the name of their CM in the text message and would prefer receiving a shorter message rather than one that included a name. When asked if they would understand what it meant to receive a text about an appointment with their "TASC care manager," all clients said they would know what that meant and who that was. A few clients noted that sometimes their CM changes or they have an appointment with a different CM than they usually meet with. Some clients liked the idea of having an address included, but as one client who did not want the address included stated, "They should know where it is by now." Another client mentioned being able to have the address automatically open directions in their "maps" app when they selected it on their phone.

Another feature some clients wanted was including the date and time of their appointment in a way that would make it easier for them to add it to the calendar on their phone. "I put everything on my calendar. Absolutely everything I have to remember goes on my calendar, so a text would make it a little bit easer not having to remember to put the reminder. I think it would be very helpful," remarked one client. Another shared, "I'll go to my calendar and make sure I did stipulate that appointment and it's there because that reminder's going to make me check my calendar to make sure I put it there."

Many clients said they would respond to the text appointment reminder message if it asked if they planned to attend the appointment. Some said they would only respond if they were not planning to attend but would probably not respond if they were going to attend. Others noted that—depending on the time of day—they may respond, just not immediately (e.g., if they received the text while they were at work). Other clients described adding appointment information into calendar or reminder applications on their cell phones that would trigger reminder alerts in advance of the appointment and noted that while they may not respond to a

reminder text, receiving one would prompt them to double-check that the appointment had been entered in this way. Even without the use of a calendar, some clients stated that the appointment reminder would help them regardless of whether they were willing to respond to it.

One point of clarification regarding their response to the appointment reminder message was that answering "No" did not automatically cancel their TASC appointment. It was suggested that if the client responds "No," the automated response should make it clear that they need to call their TASC CM as soon as possible and that their appointment will not be canceled until they do so. Multiple clients suggested using "Y" and "N" instead of "1" and "2" as response options "because it would be easier." One client shared that the letters would be easier because then they would not have to switch their keypad over to the number keys to respond.

4.1.4   Technical Aspects of ICARE

Because the main impetus of the ICARE project is determining whether transmitting automatic appointment reminders to clients for their TASC care management appointments improved their outcomes, they should ideally be tailored to the needs of the end user. As a result, we asked CMs and clients what these appointment reminders should look like, when they should be sent, and whether they would be helpful.

First and foremost, CMs and clients agreed, often enthusiastically, that text appointment reminders were a good idea. To avoid confusion, CMs suggested that reminders should specify that the appointment is with TASC, because many clients see other providers. They added that the reminder messages should also include the name of the client's CM and the address of the TASC office, but some clients felt differently. When provided examples of an appointment reminder text message, clients often shared that they would prefer simpler and shorter reminder messages.

Notably, CMs in one TASC office expressed concern about the possibility that automatic notifications would cause confusion among their clients. They explained that because their office is co-located in the same building as that of NC DAC DCS offices, and because clients typically have appointments with their CM and POs on the same day (usually back-to-back), clients often do not distinguish between probation and TASC appointments. Moreover, when a client's PO reschedules their probation appointment, this does not change their TASC appointment and this information is not always conveyed to TASC, complicating efforts to reschedule TASC appointments. Because scheduling practices and the degree of coordination between TASC staff and POs differ significantly across TASC offices, special considerations may be needed for some sites.

4.2   Impact Phase Findings (RCT)

4.2.1   Study Sample Characteristics

First, we conducted univariate and bivariate (chi-square and t-test) analyses to document the study sample characteristics and investigate any baseline differences in characteristics between the ICARE and RAU group members (see **Table 4-2**).

4.2.2   Differences in Characteristics and Criminal History Between ICARE and Control

Descriptive statistics indicate that both groups (treatment and control) were very similar in their demographic makeup (see **Table 4-2**). Across conditions, most participants were Black or African American (49%), male (75%–78%), and not Hispanic or Latino (~94%). The mean age of participants was 35–36 years old and the majority across both groups had previously experienced a period of criminal legal supervision. For their current supervision period that brought them to TASC, most participants (32%–37%) were convicted of a drug offense as their most serious charge. About 25% of participants across groups had committed a property offense and about 20% were convicted of a violent crime.

Table 4-2. Sample Demographic, Current Offense, and Criminal History

	Treatment (n = 507)				Control (n = 497)				p value
	Mean	SD	Min	Max	Mean	SD	Min	Max	
Age at Enrollment	36.06	10.78	18	71	35.12	11.22	18	69	0.176
Race									0.518
American Indian/Alaskan Native	2.2%	–	–	–	2.8%	–	–	–	
Asian	0.6%	–	–	–	0.0%	–	–	–	
Black	49.4%	–	–	–	49.3%	–	–	–	
White	44.1%	–	–	–	43.7%	–	–	–	
Other/Unknown	3.7%	–	–	–	4.2%	–	–	–	
Ethnicity									0.521
Hispanic	5.0%	–	–	–	4.9%	–	–	–	
Not Hispanic/ Latino	94.4%	–	–	–	94.1%	–	–	–	
Other/Unknown	0.6%	–	–	–	1.0%	–	–	–	
Sex									0.397
Male	78.3%	–	–	–	75.9%	–	–	–	
Female	21.7%	–	–	–	24.1%	–	–	–	
Any Prior Legal System Involvement									
Incarceration	46.9%	–	–		44.3%	–	–	–	0.431
Supervision	65.5%	–	–		64.4%	–	–	–	0.766
Most Serious Offense* for Current Supervision Period									0.554
Violent Offense	20.3%	–	–		22.3%	–	–	–	
Property Offense	24.7%	–	–		25.8%	–	–	–	
Drug Offense	37.3%	–	–		32.4%	–	–	–	
Public Order Offense	6.7%	–	–		6.6%	–	–	–	
Other Offense	11.0%	–	–		12.9%	–	–	–	

*Offenses categorized using the National Crime Reporting Program categories.

Table 4-2 also shows the results of chi-square tests and means difference t-tests in background characteristics and criminal histories between prerandomized ICARE and RAU group members. Importantly, the results indicate that there were no significant differences in background characteristics between the ICARE and RAU study subjects. Additionally, there were no

significant differences in their rates of prior incarceration or supervision terms. When reviewing the distribution of the offense that led to participants' current term of supervision (and the supervision term that aligns with their enrollment into the study), we see no difference in each offense type between the two groups. The lack of a statistical difference between groups reflects successful randomization.

We also conducted bivariate analyses to determine if the effect of receiving ICARE on outcomes differed by the type of county in which participants received TASC services. In this analysis, we categorized all 47 counties included in the study as either urban or rural based on their U.S. Census Bureau designation. Table 4-3 shows differences in intake appointment attendance, check-in appointment attendance, successful termination, and subsequent probation violations between ICARE and control group members and by rural or urban county designation. The results indicate that assignment to ICARE significantly (p=.001) improves intake appointment attendance in only rural counties. There are no other significant differences in outcomes by urbanicity or rurality between the ICARE and control groups.

Table 4-3. ICARE on Appointment Attendance, Successful Termination, and Technical Violations by County Type

Outcome	Urban Counties			Rural Counties		
	Treatment Group N (%)	Control Group N (%)	p value	Treatment Group N (%)	Control Group N (%)	p value
Attended Intake Appointment—Yes	153 (48.11%)	138 (42.72%)	.197	116 (61.38%)	76 (43.68%)	.001
Check-In Appointments Not Missed	1480 (92.21%)	1308 (91.6%)	.580	924 (90.5%)	681 (90.56%)	1.000
Successful Termination	102 (38.06%)	95 (36.82%)	.839	57 (35.62%)	41 (29.71%)	.337
Any Violation—Yes	221 (69.5%)	240 (74.3%)	.206	138 (73.02%)	136 (78.16%)	.310

4.2.3   TASC Pathways by Treatment Group Status

Table 4-4 presents frequencies and percentages that document pathways through TASC care management for RCT study participants. These findings provide more insight into the permutations of intake and check-in appointment attendance and care management termination outcomes. Several participants experienced successful outcomes after attending their check-in appointment. Of treatment group members who attended their intake appointment and who were successfully terminated, 98 (80.3%) had 0 missed appointments, 20 (16.4%) had 1 missed appointment, and 4 (3.3%) had 2 missed appointments. Likewise, of control group members who attended their intake appointment and who were successful in their care management, 69 (77.5%) had 0 missed appointments, 15 (16.9%) had 1 missed appointment, 3 (3.4%) had 2 missed appointments, and 2 (2.2%) had 3 missed appointments.[5][6]

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[5] The criteria for successful TASC termination are that a person has substantially completed their service plan, has had 90 days of sobriety, and was stable during that time. People are unsuccessfully terminated because they did not complete TASC for the following reasons: (1) TASC noncompliance or no-shows, (2) probation noncompliance, (3) they moved out of Coastal Horizon's service area, or (4) they died.

[6] The data from Coastal Horizons' record management system, Lauris, used in this analysis have some limitations, which should be considered when interpreting these results: (1) The field marking the date for the next check-in appointment is regularly overwritten; (2) Coastal only provided data on dates for missed check-in appointments and no information on other potential appointment outcomes; and (3) information was manually entered into Lauris, which increases the chances for data entry error.

Table 4-4.   TASC Pathways by Treatment Group Status

Termination and Count of Missed Appointments	Treatment		Control		Total	
	N	%	N	%	N	%
Missed Intake	238	46.9	283	56.9	521	51.9
Attended Intake	269	53.1	214	43.1	483	48.1
Successful	122	45.4	89	41.6	211	43.7
0 Missed Appointments	98	80.3	69	77.5	167	79.1
1 Missed Appointment	20	16.4	15	16.9	35	16.6
2 Missed Appointments	4	3.3	3	3.4	7	3.3
3+ Missed Appointments	0	0.0	2	2.2	2	0.9
Unsuccessful	81	30.1	74	34.6	155	32.1
0 Missed Appointments	30	37.0	38	51.4	68	43.9
1 Missed Appointment	40	49.4	29	39.2	69	44.5
2 Missed Appointments	9	11.1	5	6.8	14	9.0
3+ Missed Appointments	2	2.5	2	2.7	4	2.6
No Longer Attend	40	14.9	32	15.0	72	14.9
0 Missed Appointments	25	62.5	22	68.8	47	65.3
1 Missed Appointment	14	35.0	9	28.1	23	31.9
2 Missed Appointments	1	2.5	1	3.1	2	2.8
3+ Missed Appointments	0	0.0	0	0.0	0	0.0
Still in Treatment at Study End	26	9.7	19	8.9	45	9.3
0 Missed Appointments	14	53.8	12	63.2	26	57.8
1 Missed Appointment	9	34.6	4	21.1	13	28.9
2 Missed Appointments	2	7.7	3	15.8	5	11.1
3+ Missed Appointments	1	3.8	0	0.0	1	2.2

Other RCT participants who attended their intake appointment were not as successful in completing TASC (i.e., attending following-up appointments and complying with services). Of treatment group members who attended their intake appointment and who were unsuccessful, 30 (37.0%) had 0 missed appointments, 40 (49.4%) had 1 missed appointment, 9 (11.1%) had 2 missed appointments, 1 (1.2%) had 3 missed appointments, and 1 (1.2%) had 4 missed appointments. Of control group members who attended their intake appointment and who were unsuccessful, 38 (51.2%) had 0 missed appointments, 29 (39.2%) had 1 missed appointment, 5

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4-13

(6.8%) had 2 missed appointments, 1 (1.4%) had 3 missed appointments, and 1 (1.4%) had 4 missed appointments.

A third group of participants attended their intake appointment but were designated at that time as no longer required to attend TASC check-in appointments.[7] Of treatment group members who attended their intake appointment and who no longer attended TASC, 25 (62.5%) had 0 missed appointments, 14 (35.0%) had 1 missed appointment, and 1 (2.5%) had 2 missed appointments. Of control group members who attended their intake appointment and who no longer attended TASC, 22 (68.8%) had 0 missed appointments, 9 (28.1%) had 1 missed appointment, and 1 (3.1%) had 2 missed appointments.

A fourth group of participants attended their intake appointment but were still actively engaged in care management. Of treatment group members who attended their intake appointment and were still in TASC at the end of the study, 14 (53.9%) had 0 missed appointments, 9 (34.6%) had 1 missed appointment, 2 (7.7%) had 2 missed appointments, and 1 (3.9%) had 3 missed appointments. Of control group members who attended their intake appointment and were still in TASC at the end of the study, 12 (63.2%) had 0 missed appointments, 4 (21.1%) had 1 missed appointment, and 3 (15.8%) had 2 missed appointments.

4.2.4   RCT Results

Intake Appointment Attendance. The study's first research question sought to understand the direct effect of ICARE automated appointment reminders on intake appointment attendance. In other words, were individuals in the treatment group—those who received automated

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[7] TASC care managers clarified that when individuals' case files were labeled as 'No longer attend', this often meant that they were likely put into more extensive in-patient treatment and therefore no longer received outpatient TASC services.

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4-14

appointment reminders plus RAU—more likely to attend their intake assessment appointment than their control group counterparts who received RAU?

A chi-square test of differences was used to answer this question and compared the attendance rates between the two groups to determine if that difference is statistically significant. The results, presented in **Table 4-5**, indicate that 269 (53.06%) individuals in the treatment condition and 214 (43.06%) individuals in the control condition attended their first intake appointment. The chi-square statistic and its related p value ($\chi2 = 9.655$; $p = .00189$) indicate that this difference is statistically significant at the $p < .01$ level. The difference is not only significant but also substantive, showing a 23% improvement in intake appointment attendance compared with that of the RAU alone condition.

Table 4-5. ICARE on Appointment Attendance, Successful Termination, and Technical Violations

Outcome	Treatment Group N (%)	Control Group N (%)	χ2	Df*	p value
Attended Intake Appointment—Yes	269 (53.06%)	241 (43.06%)	9.655	1	.0019
Did Not Miss Check-in Appointments	2,402 (91.55%)	1989 (91.24%)	0.107	1	.7436
Successful Termination	159 (37.15%)	136 (34.34%)	0.588	1	.4432
Any Violation—Yes	359 (70.8%)	376 (75.7%)	2.762	1	.0965

*Df = degrees of freedom

This finding suggests that individuals who received ICARE automated appointment reminders were more likely to successfully attend their first intake appointment compared with those who received RAU from their CM or PO alone.

Check-In Appointment Attendance. The study's second research question sought to understand the direct effect of ICARE automated appointment reminders on check-in appointment attendance. In other words, were individuals in the ICARE group more likely to not miss any of their check-in appointments than their control group counterparts who did not? The

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4-15

data from Coastal Horizons' record management system, Lauris, had a single representation of the 'next' check-in appointment that was regularly overwritten, so it is possible that we do not have record of all the check-in appointments scheduled for the study participants. The current analysis combines these counts for all appointments we had record of to determine if ICARE reduced the likelihood of clients missing any check-ins.

A chi-square test of differences was used to answer this question and compared the attendance rates between the two groups and to determine if that difference is statistically significant. The results, presented in Table 5, indicate that individuals in the treatment condition did not miss 2,404 check-in appointments (91.55% of all scheduled check-ins) and individuals in the control condition did not miss 1,989 check-ins, or 91.24% of all scheduled check-ins). The chi-square statistic and its related p value ($\chi^2 = 0.107$; $p = .743$) indicate that this difference is not statistically significant.

These findings suggest that ICARE did not significantly improve check-in appointment attendance for participants. However, both groups have relatively high attendance rates for their check-in appointments, which both leaves little room for improvement and suggests that intake attendance is important for sustained care management engagement.

Successful Termination of TASC Care Management. The third research question sought to determine whether individuals who received ICARE were more likely to have a successful termination status at TASC. As previously mentioned, successful termination is a designation determined by the CM if the client (1) completes all care management requirements or (2) finishes their probation term and is no longer required to access TASC services. Individuals may otherwise be designated as Unsuccessful, No Longer in Attendance, or Unknown. For the purposes of answering this research question, analyses examined differences among ICARE and RAU alone group members designated as experiencing a "successful" termination.

Analysis included a chi-square test to compare the frequency and percentage of individuals in both groups who successfully terminated from their care management services and determine if any difference is statistically significant. The results, presented in **Table 4-5**, indicate that 159 individuals in the treatment group (37%) and 136 individuals in the control group (34%) were deemed to have a successful TASC termination. The chi-square statistic and its related p value ($\chi2 = 0.588$; $p = .443$) indicate that this difference is not statistically significant.

These findings suggest that there is no significant direct effect of ICARE on whether a client is successfully terminated from TASC care management assuming they attend their intake appointment (and therefore were included in these subsequent analyses). This result is not surprising given that ICARE appointment notifications only remind clients about their care management intake and check-in appointments, not the actual treatment or services that they are referred to by their TASC CM.

Probation Violations. The fourth and final quantitative research question evaluated the effect, if any, on clients receiving ICARE automated appointment reminders on probation violations after enrollment. Data on several different forms of probation violation was made available by the NC DAC, including:

- Absconding
- Drugs/Alcohol violations
- Failure to Comply
- Failure to Reappear
- Misdemeanor or Felony Conviction
- Restriction Violation
- Threat or Harm Violation
- Other/Miscellaneous

Chi-square analyses were used to compare treatment and control group clients on the occurrence of any probation violation. These results indicate that there is no difference between treatment and control clients on having a probation violation ($\chi2 = 2.762$; $p = .0965$). This finding that ICARE does not largely inform probation violations is reasonable given that reminders to

attend TASC appointments attendance do not directly inform client's efforts related to other probation requirements.

Thematic Analysis

In addition to analyzing administrative data on care management and probation violation outcomes, RTI conducted brief telephone interviews with 13 TASC clients regarding their experiences with ICARE automated appointment reminders (research question #5). No demographic or personal information was collected prior to or during the interview. All but one (n = 12) of the TASC clients interviewed affirmed that they received at least one TASC appointment reminder. Ten of those individuals confirmed replying to at least one notification message confirming their plans to attend the appointment. This subsample represents about 2.5% of the participants who received ICARE reminders and therefore must be viewed with appropriate caveats.

A few individuals (n = 3) indicated that they felt the message and/or their subsequent response was helpful in reminding them of the appointment and prompting them to coordinate around their appointment time. Others (n = 3) confirmed they thought letting TASC know they would be in attendance was helpful for the care management agency. Two other participants felt that complying with the prompt in the message was important and reported feeling that they were required to respond or that it was connected more directly to their probation status in some way.

When asked if they had received other forms of reminders from their TASC CM or PO, six participants (of the 12 who received an ICARE message) indicated that the ICARE message was the only contact they had received reminding them about their upcoming TASC appointment. The other seven participants indicated that they received some other form of reminder, either directly from TASC or from their PO. These other reminders were often received via phone call or text message. Participants had varying experiences in their contacts

with their POs and TASC, with some having heard from both and others from only one other source, indicating that there may be some inconsistency in which these other forms of reminders are delivered. Some participants even indicated having never heard from or having trouble contacting either TASC or their PO or that some of these alternative reminders came on the day of their appointment, serving as an inadequate notice for them to make arrangements to be present.

All respondents who received the reminders (n = 12) reported that they were helpful for remembering and prioritizing TASC appointment attendance. Several participants reported having busy schedules, with several other responsibilities and probation-related appointments, and found that these reminders served as a concrete visual aid. Despite using time management systems and tools, such as a planner or calendar, participants noted that having the reminder right there on their phones/in messages that they look at frequently was a helpful tool. Most participants also reported feeling comfortable when they received the appointment reminders. Some participants mentioned that the first reminder aided them in starting to coordinate things such as travel and childcare, while others felt the short-term message served as a great last-minute reminder. Several participants also acknowledged that the reminders helped them feel informed about their care management and generally appreciated receiving the reminders. Only two participants indicated some discomfort at the time of messaging—one because they thought it was related to their probation status and the other because it reminded them of their system involvement. However, both also acknowledged that the reminders were a helpful tool for remembering to attend their TASC appointments.

Nine of the 12 participants who received appointment reminders indicated that they would not change anything about the reminder messages or cadence. These participants indicated that they felt the tool was helpful, appreciated the brevity of messaging, and felt that the message itself contained the right information (date, time, location of appointment). Among those who did

have recommended changes, one participant suggested that the message was sent too far in advance of an appointment, while another would have liked to receive the short-term reminder prior to the day before their appointment. Conversely, another participant recommended not sending the notification outside of business hours (i.e., they felt an 8 a.m. reminder was too early). Another recommendation was to begin the message with a clearer indication that it was an appointment reminder, rather than with "Hello," which is the current opening text of each reminder message.

The one participant who indicated they had not received any messages reported feeling that reminder text messages would have been helpful. Given the busy nature of their work and personal obligations, they would welcome additional notifications to help remind them to attend these important appointments. The participant did, however, receive reminders from their PO about attending TASC appointments and felt that these were a helpful form of support. Responses from other participants suggest that the ICARE reminders were more consistent than those directly provided by TASC or their PO, however, and as such, may have been more beneficial to this particular participant.

5.   Discussion and Conclusion

5.1   Summary of Findings

The ICARE tool seeks to enhance care management access for individuals on probation by providing consistent appointment reminders. This two-phased study represents the first empirical assessment of an automated appointment notification system for probation-mandated care management. Automated appointment notifications such as ICARE have been employed in several criminal legal system settings, and this work furthers the correction field's understanding of the benefit that informational content nudges provide with system-involved individuals.

The formative phase of the study found that both clients and CMs appreciate the value of automated appointment reminders in addition to their current forms of communication, which often occur through a client's PO. The results of the focus groups with these participants informed the design and implementation of the current ICARE tool. The RCT phase of the study then evaluated how the implementation and delivery of ICARE reminders informed (1) intake appointment attendance, (2) check-in appointment attendance, (3) improvements in overall care management termination, (4) lower probation violation rates, and (5) attitudes about automated appointment reminders.

Results indicate that receiving ICARE appointment notifications resulted in significant improvements in attendance rates at clients' intake appointments ($p < .01$). ICARE did not inform a significant change to check-in appointment attendance or successful care management termination, nor did it directly impact probation outcomes. However, brief surveys of 13 ICARE recipients confirmed that they felt receiving these automated reminders were helpful and informed their strategies for coordinating and meeting their many probation-related obligations. These findings provide preliminary evidence regarding whether automated appointment reminders in this context might improve behavioral health care management, increase probation

compliance, and reduce recidivism. These findings also serve as the foundation for recommendations on the design, development, and implementation of such tools in these settings.

5.1.1 Formative Study

During the formative study, RTI applied a user-centered design approach to collect input from clients and CMs, and Uptrust used this information to design the ICARE tool. Functionally, ICARE was simple and involved mobile phone SMS technology that included (1) appointment reminders with the date and time of the TASC appointment and the address and phone number of the TASC office (transmitted by Uptrust on behalf of Coastal Horizons), and (2) a question about whether the client planned to attend the appointment. A client's response to this question activated a follow-up response to thank them for their response or advised them to contact their TASC office. The system automatically sent reminders to clients 1 week and 1 day before each of their intake and check-in appointments. ICARE was deployed in 47 of 53 counties where Coastal Horizons operates a TASC office. Additionally, the message content was straight-forward. To abide by HIPAA's privacy rule and our IRB's guidance—and given that clients often share their phones with family members—we did not include any information about the purpose of the appointment in the text message body.

We learned several other important lessons during this formative study. The first pertains to the sensitivity of HIPAA-protected data and the difficulties in serving as the intermediary for information exchange between a covered entity and a vendor offering notification services. To meet the HIPAA security rule, we would have been required to transmit data through several secure storage systems, which would not have been practically possible to do each day. After consulting with Uptrust, the company agreed to enroll people into the study and send us summary information weekly, so we could monitor enrollment on the back end. Because of the sensitivity of the data, RTI and Uptrust were required to execute a Business Associate

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5-2

Agreement with Coastal Horizons to access and receive any identifiable information on TASC clients.

A second lesson is that coordinating the direct exchange of information daily between Coastal Horizons and Uptrust was a nontrivial effort. Importantly, Uptrust had to access information from Coastal Horizons' record management system, Lauris, daily to ensure that it had the most recent appointment and contact information for participants. Because CMs meet with clients regularly, this information is updated in Lauris. The planning process for this exchange required months of planning to define Uptrust's process of automatically extracting contact and appointment information from Coastal Horizons' case management system, developing mock reports that Uptrust would use each day, enrolling people in the study based on eligibility criteria, randomly assigning people to the treatment or control group, and securely transmitting administrative records to RTI weekly. To administer retroactive quality checks on the process, we arranged for Uptrust to transmit summary information on ICARE enrollment and number of text messages transmitted to RTI each week. We also conducted a 2-week soft launch of ICARE to confirm enrollment procedures were followed as instructed. We used this time to identify any inconsistencies in the tool as planned and to modify the system as needed.

A third lesson is that CM and client feedback in the process of refining the text message specification was important to ensure clients' needs were met. Based on CM feedback during the focus group, we decided to forego allowing two-way messaging between CMs and clients. Separately, given social distancing policies and that some TASC offices operated by Coastal Horizons did not operate out of an office in their county, we had to tailor messages so as to not confuse clients who would just be checking in with their CM via phone or telehealth appointment.

5.1.2   Impact Study

The results from the impact study suggest that providing people with informational content reminders to attend their first care management intake appointment is important for sustained care management. Treatment and control groups did not differ on any pre-randomized individual characteristics such as age at enrollment, race, sex, or current offense type. Compared with the control group, treatment group members had significantly higher rates of post-enrollment intake appointment attendance. There was also a significant difference in intake appointment attendance between treatment and control participants in rural counties, but not in urban counties. Although we observed little difference in check-in appointment attendance between the groups, attendance rates for both groups were high (about 9 in 10 people attended their check-in appointments). Finally, there was little difference in probation compliance between the two groups. However, this lack of a relationship between ICARE and probation compliance is not surprising and may be due to the fact that ICARE reminders were not for probation appointments themselves but for probation-mandated behavioral health appointments. As such, the theoretical linkage between ICARE and probation violations is not as direct. For instance, there is unknown variation in CM discretion in reporting a client to their PO for TASC noncompliance as opposed to continuing to attempt to contact them. Likewise, there is unknown variation in POs' discretion in issuing a technical violation for noncompliance instead of offering subsequent opportunities to continue with the probation process. Furthermore, a host of other factors including the supervision level and number of conditions could have also affected their probation success.

In general, ICARE appeared to present TASC clients with additional opportunities for receiving behavioral health care management. However, appointment reminders were not a panacea for avoiding technical violations. This tool simply encouraged people to attend their probation-mandated appointments using straightforward message content, but participants ultimately had

to make the choice to act on that information by making arrangements to attend those appointments whether that meant building it into their schedule, finding transportation, informing their employer that they would need time off to attend the appointment, or arranging for childcare.

5.2   Design Limitations and Considerations

There were some notable limitations to the current study that should be considered when interpreting our current findings, some of which were the result of technological or security constraints that hindered RTI's ability to manage or access HIPAA data and other personally identifiable information on study participants. For example, the research team at RTI was unable to directly manage procedures for the RCT. Given that this client information is protected under HIPAA, for RTI to manage this data would have required a daily transmission of all data through several secure storage systems, which was not practically feasible. Our partner Uptrust was able to develop automation procedures within HIPAA-compliant information systems to securely manage this data during the impact study. Each week during the impact study enrollment and intervention periods, Uptrust transmitted aggregate study enrollment information to RTI for quality assurance purposes. Although we do not believe there were any overrides to random assignment, this remains a limitation of the research team's ability to have control over the administration of the RCT.

Relatedly, all criminal legal system data, including the correctional outcome measure of experiencing a probation violation, was acquired from the NC DAC. Given the sensitive nature of this data, securing buy-in, capacity, and willingness of NC DAC to share information on ICARE participants required significant follow-up and ultimately a delay in the current study's data collection and analysis. In addition, the timing of this study during peak months of the COVID-19 pandemic in the United States led to significant reductions in staff and competing demands of the DAC, contributing to further delays. Although this fostered partnership

eventually resulted in the securing of all client demographic and criminal legal data, these challenges informed unexpected delays and limitations to subsequent analyses.

COVID-19 also caused intake and check-in appointments to take place virtually during the beginning of the implementation period. Although we do not believe the level of care provided during these sessions varied from in-person meetings, information on the format of sessions in our dataset would have provided interesting opportunities for exploration on the impact of ICARE on these various types of meetings. Although each TASC office's use of virtual meetings was beyond the control of the study design, future research should seek to incorporate these variable and evaluate whether there are unique reminder needs associated with each meeting format.

As with other research studies in corrections, RTI also experienced limitations in the extent to which we could acquire information on additional outcomes among RCT participants to assess the impact of the ICARE reminders. Specifically, the current study only evaluated the impact of ICARE messages on newly referred adult TASC clients in the eastern half of North Carolina. And while the impact results suggest some promising effects, particularly on intake attendance, there is the potential that the specific design and implementation of ICARE as presented in this study may not be as effective in other settings or for other populations.

Additionally, the samples in both the formative study focus groups/interviews and the impact study's ICARE group member interviews were quite small and may not be representative of the broader study population (n = 15 clients in formative phase; n = 13 clients in impact phase). This may have limited our ability to capture useful information on the needs, expectations, and ICARE experiences of clients and there may be important areas of improvement to this type of notification tool that we have not been made aware.

Lastly, this study was only able to capture the extent to which participating TASC clients attended their intake and check-in care management appointments. RTI did not have access to administrative data on actual utilization of referred services and programming nor on the reasons for successful versus unsuccessful termination or any subsequent reincarceration. These omissions prevented additional analyses for determining if ICARE improved appointment attendance and subsequently informed engagement in services and programs that CMs refer to clients. It is vital for future work to evaluate the extent to which improved care management attendance actually informs adherence to the rest of an individual's care management services and the specifics of long-term outcomes for behavioral health termination and criminal legal involvement.

5.3   Implications for Future Research

There are several ways in which the current study lays the foundation for important future efforts in probation and care management practices, as well as for empirical research and evaluation of automated notification tools in the criminal legal system. First and foremost, this work informs the potential to expand the use of automated appointment notification technology to improve outcomes for care management clients and individuals who are on community supervision. For example, some agencies' record management systems already have built-in appointment notifications that are transmitted to clients automatically and regularly. Prior to the ICARE study, Coastal Horizons had not previously taken advantage of any similar tool for its clients. After the conclusion of the impact study, RTI learned that Coastal Horizons would be leveraging an existing appointment notification feature of its record management system, Lauris, to automatically remind clients about their intake and check-in appointments. This promising outcome will not only ease burden on CMs to send manual reminders to clients, and potentially probation officers who typically remind clients about behavioral health appointments, but also will hopefully continue to improve the intake appointment attendance outcomes of future

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5-7

participants. A cost-benefit analysis on the use of ICARE in comparison with reminders as part of normal operational practices would also provide valuable insight into the longevity and investment value of operating this tool.

The relationship between ICARE, intake appointment attendance, and continued involvement in care management is also of vital consideration. Individuals who received ICARE reminders were significantly more likely to attend their intake appointments with their care management. Among individuals who attend intake, regardless of treatment condition in the current RCT, check-in attendance was extremely high. This suggests the importance of the intake appointment in capturing clients and getting them to access and adhere to their behavioral health treatment plans. Therefore, ICARE appointment notifications for improving intake appointment attendance seems to be a critical intervention point for informing care management success among clients. More work is needed to explore this pathway to success and identify the motivators that inform the strong relationship between intake attendance and subsequent treatment adherence. Our finding that ICARE significantly impacted intake attendance in rural counties but not in urban ones is also contrary to our initial assumptions, in that individuals in rural counties are more likely to experience additional barriers, such as transportation or limited cellular access that individuals residing in urban counties would be less likely to experience. Additional research should be conducted to determine if this finding is replicable and if so, what geographic considerations should be made when considering how to use such technological tools.

These findings also point to the importance of tailoring correctional interventions to the target recipients or users of tools, which has implications for how automated appointment notifications will be used within other care management settings and for other populations. The content, features, frequency, and duration of messages used during the ICARE impact study were specifically designed to be responsive to the preferences of a handful of TASC clients in the eastern half of North Carolina. The user-centered design approach during the formative study

helped inform the design and delivery of these messages, and we recommend that future efforts apply user-centered design procedures to create tailored automated appointment notifications for other care management and system-involved groups.

The current work also sheds light on a need to optimize agency record management systems to use notification tools. Justice-involved individuals may need to reschedule appointments frequently; however, automated appointment notification tools are only as effective as the extent to which they can interface with an agency or organization's record management system and automatically extract appointment information for participants. If the reminder system is not privy to real-time updates to scheduling systems and any rescheduling of a clients' appointments, the tool would become less effective in encouraging people to show up for their appointments. For agencies that seek to implement similar automated reminders, this technological consideration is paramount and should be prioritized before tools are rolled out to all clients.

As another important note, justice-involved populations in particular may face unique barriers related to their access to technology such as having consistent phone service, internet or data service, and other costly provisions that are necessary for receiving reliable text message reminders. In the formative phase of the current study, 13% of interview participants indicated that they did not have any access to a cell phone, 50% were on prepaid service plans, and large portions of the sample had changed phones or phone numbers on at least one occasion. Additionally, six people assigned to the treatment condition in the impact phase were excluded from the study for not having a reliable phone number of their own. Although this is a relatively small number, it is still a consideration that may not necessarily be anticipated given the prevalence of mobile phone usage in the general population. It is important to keep in mind the feasibility of justice-impacted individuals obtaining a cell phone and keeping the cell phone service after their release from a correctional institution. Although cell phones might be accessible to these individuals, consistent cell phone service may be difficult for them to

maintain because of data limits and the challenges they may experience paying cell phone bills (Langdon et al., 2022). Programs or service agencies that seek to implement this type of reminder system must be mindful of these potential barriers and engage in consistent efforts to keep phone numbers and alternative contact information as up to date as possible.

In addition, future research should investigate the optimal onset, frequency, duration, and content of the automated notifications for probation-mandated care management appointments. Although the current study's message design was effective in improving intake appointment attendance for the specified sample, additional work should focus on investigating the optimal use of reminder notifications. The sensitivity of these messages should also be considered, particularly when working with justice-involved clients or other groups for whom additional concerns must be considered. In conjunction with literature from BE and cognitive psychology, future work could seek to pinpoint optimal delivery methods for improving clients' likelihood of attendance at intake, check-ins, and service delivery appointments.

Related to the efficacy and optimal delivery of messages, more research is needed to understand how this technology can be expanded to support people involved in other aspects of the criminal legal system. Although the current study's focus was on TASC clients who were referred as a condition of their community supervision, the use of notifications was used solely for improving attendance at care management. The use of effective, automated appointment notifications could further be explored with community supervision populations more generally.

5.4   Conclusion

The ICARE study was a proof of concept that an automated text message system that provided appointment information is a feasible approach to improving behavioral health uptake and probation compliance. To this end, RTI shared findings from our user-centered formative assessment and lessons learned from working with a HIPAA-covered entity and technology

5-10

vendor. In our case, the formative assessment allowed us to tailor message content and features to the needs of the automated messaging system's end users (e.g., people on probation and receiving nonclinical behavioral health care management). Furthermore, the impact study showed that ICARE improved attendance to TASC intake appointment but had no effect on attendance at subsequent check-in appointments or the occurrence of a probation violation. This work suggests that simple informational content messages could be useful for getting newly referred clients who have behavioral health care management needs to attend their initial appointment, which has been shown to be critical for sustained care management.

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R-1

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Appendix A.   Formative Phase Focus Group and Interview Guides

A.1   Care Manager Focus Group Questions

A.1.1   Communication with Clients

1. How do you currently communicate with your clients?

2. How many of them have cell phones?

3. How many of them text?

4. How many of your clients have prepay phones versus contract phones?

5. How long are clients on your caseload?

6. What is the typical caseload size?

7. Do you ever assess clients as not having treatment needs? What is the most common reasoning behind that assessment?

8. What times during the day do you think clients would be open to receiving text messages from ICARE?

9. Do you ever check in with your clients between check-in meetings? If so, how and when do you do that?

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A-1

A.1.2 ICARE Messaging Content

1. Now I will provide you with sample messages, and I'd like to hear whether you think these messages would improve treatment engagement, whether you think people like your clients would respond to those messages, and your recommendations for improving the language in the messages.

   a. **Reminders:**

      i. Hi. This is a reminder that you have an appointment with your TASC care manager tomorrow, Friday, at 9am. Do you plan to attend this appointment?
      Please respond with a number (1-2):

      1=Yes

      2=No

      1. Is this message helpful?

      ii. What prevented you from attending your appointment?

      1=Transportation

      2=Childcare

      3=Work

      4=I forgot

      5=Other

      1. What other reasons may a client miss an appointment?

   b. **Motivational enhancement and wellness messages:**

      i. Today is a new day in your journey. Think about the change you are working toward.

      ii. Have you been able to exercise today?
      Please respond with a number (1-2):

      1=Yes

       2=No

   iii.   Are you getting enough sleep?

       Please respond with a number (1-2):

       1=Yes

       2=No

1. What other messages would be encouraging or motivational for you to hear on a daily or weekly basis?

2. How many times during the week or day would you like to receive these messages?

3. Do you think these messages would improve treatment engagement?

4. Do you think your clients would respond to these messages?

5. Is there anything you would change in these messages?

   c. Education/Social support information:

     i. Check out Wake County AA http://www.mcaa.org/ for meetings and events!

1. What other types of information would you like to receive (e.g., transportation support services, childcare services, etc.)?

2. Do you think these messages would improve treatment engagement?

3. Do you think your clients would respond to these messages?

4. Is there anything you would change in these messages?

A.1.3   Thoughts on Texting Tool

1. After hearing about this concept of a text appointment reminder tool, what are your initial thoughts?

   a. Do you have any concerns about clients receiving text messages that remind them about their TASC appointments with you?

2. What are your thoughts on the health and wellness promoting messages?

   a. What kinds of things do you think of when you hear the words health and wellness?

   b. What would be ideal health and wellness messages that you think would make your clients feel positive or that would motivate them to adhere to TASC care management?

   c. Do you think they would be interested in being part of a pilot study that involved them receiving health and wellness messages? Why or why not?

   d. Do you have any concerns about them receiving health and wellness promoting text messages?

   e. How do you typically encourage clients to stick with their treatment?

3. What other features in a text messaging system would be beneficial for you to communicate to clients as their care manager?

A.1.4 Potential Barriers to Participation

1. Is there anything about the ICARE text reminder tool that makes you think that they may not want to participate?

2. What specific concerns would you have about clients participating in the ICARE text reminder pilot study?

   a. What do you think would prevent you or people like you from participating in the ICARE text reminder pilot study?

   b. What could the ICARE text reminder pilot study research team do to address these concerns?

3. Do you know if people like your clients are typically the primary owners of their cell phone?

4. Do you know if their family members, spouse, children, or friends have access to their phone?

5. Do you know if they use multiple devices that can receive text messages (e.g., tablet, computer, etc.)?

6. Do you know about the types of phones they typically own (e.g., pay as you go, mobile phone plan, etc.)?

7. How often do you update their numbers when they do change phones?

Those are all of the questions we had to discuss today. Does anyone have any questions they would like to ask, or any comments to share, about any aspect of this research?

That concludes our focus group. Thank you very much for your participation!

A.2   Client Interview Questions

A.2.1   ICARE Messaging Content

1. Now I will provide you with some sample messages, and I'd like to hear your feelings about them. I also want to know whether you think that people like you would respond to these messages, what you think their responses would be, and how you would make the messages better.

   a. **Reminders:**

      i. Hi. This is a reminder that you have an appointment with your TASC care manager tomorrow, Friday, at 9am. Do you plan to attend this appointment?
      Please respond with a number (1-2):

1=Yes

2=No

1. Is this message helpful?

ii. What prevented you from attending your appointment?

1= Transportation

2=Childcare

3=Work

4=I forgot

5=Other

1. What other reasons may a client miss an appointment?

b. **Motivational enhancement and wellness messages:**

i. Today is a new day in your journey. Think about the change you are working toward.

ii. Have you been able to exercise today?
Please respond with a number (1-2):

1=Yes

2=No

iii. Are you getting enough sleep?

Please respond with a number (1-2):

1=Yes

2=No

1. What other messages would be encouraging or motivational for you to hear on a daily or weekly basis?

2. How many times during the week or day would you like to receive these messages?

3. Do you think people would respond to these messages?

4. How would you want to respond to these messages (multiple choice, free text, etc.)?

5. What would you change about these messages to make them better?

6. Do you have any concerns about receiving these messages?

    c. Education/Social support information:

        i. Check out Wake County AA http://www.mcaa.org/ for meetings and events!

        1. Do you think people would find messages like this helpful? How?

2. What would you changed about these messages to make them better?

A.2.2   Reactions to the Concept of Automatic Reminder Texts on your Mobile Phone

1. After hearing about this idea of a text appointment reminder system, what are your initial thoughts?

    a. Do you have any concerns about receiving text messages?

        1. What other types of information would you like to receive (e.g., transportation support services, childcare services, etc.)? What other types of information do you think others would like to receive?

2. How would you feel about answering brief surveys from time to time. These would include 5-7 questions. **GIVE EXAMPLES**.

3. Would it make a difference in how you responded if the questions were coming from your care manager vs. some other person who does not know you?

4. What times during the day would you want to receiving text messages?

5. Would you like appointment reminders at a different time than other texts?

6. What days or times would you benefit the most from receiving motivational or health and wellness messages?

How often do you check your mobile phone?

    b. Are there times during the day when you do not have access to your cell phone?

A.2.3   Potential Barriers to Participation

1. Based on everything you have heard, would you participate in a pilot study to try out these text messages? Why or why not?

2. What concerns, if any, do you think people would have about participating in the ICARE text reminder pilot study?

    a. What do you think would prevent you or people like you from participating in the ICARE text reminder pilot study?

    b. What could the ICARE text reminder pilot study research team do to address these concerns?

Those are all of the questions we had to discuss today. Does you have any questions you would like to ask, or any comments to share, about any aspect of this research?

Thank you very much for your participation!

Appendix B.   Formative Phase Cell Phone Access Survey

<u>**TASC Focus Group Survey**</u>
Please bubble the answer or check the box(es) that best fit your response(s) to the questions below.

To begin, we have some questions about how you may or may not use a cell phone.

1. **Do you currently have your own cell phone or do you share one?**
   - ○ I have my own cell phone (**Go to 3)**
   - ○ I share a cell phone (**Go to 2)**
   - ○ I do not have access to a cell phone (**Go to 11 on page 2)**

   Who else has access to your cell phone besides you?

2. **Which of the following best describes the type of cell phone you currently use?**
   - ○ Apple Smart Phone (iOS)
   - ○ Android Smart Phone
   - ○ Other Smart Phone (e.g., Windows)
   - ○ Mobile phone (not a smart phone)
   - ○ Other

3. **What type of payment plan do you currently use with this phone?**
   - ○ I have a contract plan
   - ○ I have a prepaid plan (e.g., "pay as you go")

4. **In the past year, how many times have you gotten a <u>new phone</u>?**
   - ○ 0 times
   - ○ 1 time
   - ○ 2-3 times
   - ○ 4-5 times
   - ○ 6 or more times

5. **In the past year, how many times have you gotten a <u>new number</u>?**
   - ○ 0 times
   - ○ 1 time
   - ○ 2-3 times
   - ○ 4-5 times
   - ○ 6 or more times

6. **Do you currently have unlimited texting?**
   - ○ Yes

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B-1

○ No

7. Can you currently view your text messages without unlocking your device?
- ○ Yes
- ○ No

8. Do you currently receive text messages on more than one device, such as tablets or computers?
- ○ Yes (**Go to 10)**
- ○ No (**Go to 11)**

Who else has access to your other devices besides you?

Now we have some questions about you.

9. How old are you?
- ○ 18-20
- ○ 21-25
- ○ 26-29
- ○ 30-39
- ○ 40-49
- ○ 50-59
- ○ 60 or older
- ○ Prefer not to answer

10. What is your sex?
- ○ Male
- ○ Female

11. Which of the following do you consider your race? Please select all that apply.
- ○ White
- ○ Black or African American
- ○ Asian
- ○ American Indian or Alaskan Native
- ○ Native Hawaiian or Other Pacific Islander
- ○ Other
- ○ Prefer not to answer

12. Are you of Hispanic, Latino, or Spanish origin?
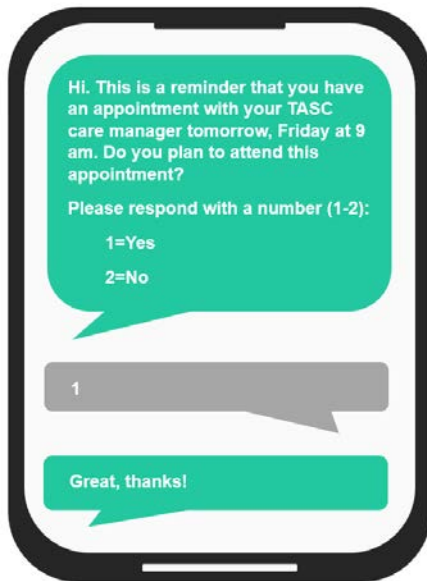- ○ Yes
- ○ No

13. What is the highest level of education you have completed?
- ○ Less than high school
- ○ High school diploma/GED
- ○ Some college
- ○ Bachelors Degree (B.A., B.S.)
- ○ Master Degree (M.A., M.S., M.P.H.)
- ○ Doctorate Degree (Ph.D, Ed.D, D.A.)
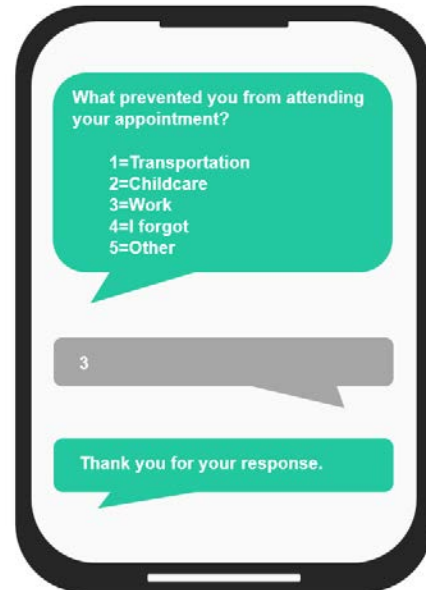- ○ Professional Degree (M.D., Pharm.D., J.D.)
- ○ Prefer not to answer

Thank you for completing this survey!
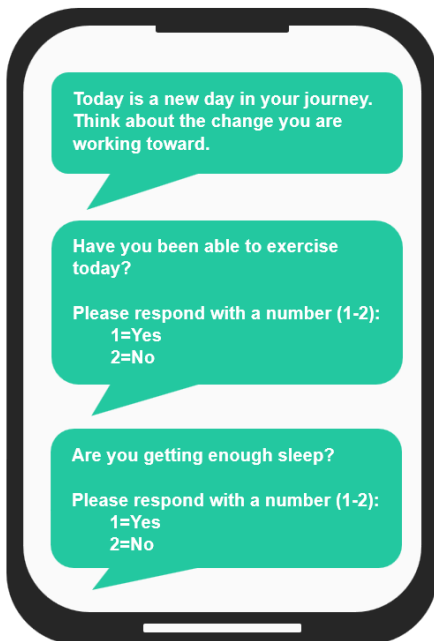
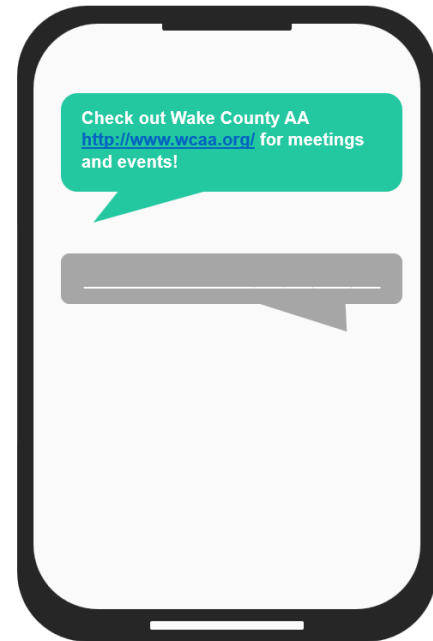# Appendix C.   Formative Phase Text Message Handout

Reminders

Care Management/Treatment Appointment Attendance

Hi. This is a reminder that you have an appointment with your TASC care manager tomorrow, Friday at 9 am. Do you plan to attend this appointment?

Please respond with a number (1-2):

1=Yes

2=No

1

Great, thanks!

What prevented you from attending your appointment?

1=Transportation
2=Childcare
3=Work
4=I forgot
5=Other

3

Thank you for your response.

Motivational Enhancement/Wellness Messages

Educational/Social Support Information

Today is a new day in your journey. Think about the change you are working toward.

Have you been able to exercise today?

Please respond with a number (1-2):
1=Yes
2=No

Are you getting enough sleep?

Please respond with a number (1-2):
1=Yes
2=No

Check out Wake County AA http://www.wcaa.org/ for meetings and events!

Care Management/Treatment Satisfaction   **Logs**   **C-2**

How satisfied are you with the TASC case management?

Please respond with a number (1-4):

  1=Not at all satisfied
  2=Somewhat satisfied
  3=Moderately satisfied
  4=Very satisfied

How satisfied are you with the TASC treatment?

Please respond with a number (1-4):

  1=Not at all satisfied
  2=Somewhat satisfied
  3=Moderately satisfied
  4=Very satisfied

How are you feeling today?

Thank you for your response!

Appendix D.   ICARE Telephone Interview Text Message

RTI International is looking for volunteers to complete a 10-minute phone interview about appointment reminders you may have received. Participants will receive a $20 Amazon gift card. Click here [Hyperlink to **ICARE Telephone Interview Sign-up** page on SurveyGizmo] to find out more.

Appendix E. ICARE Telephone Interview Consent Landing Page

RTI International is conducting 10-minute phone interviews about TASC appointment reminders. This interview is part of a research study that is being conducted by RTI International. The purpose of the interview is to receive feedback on your experiences with TASC and attending your appointments with your TASC Care Manager. The interview will take approximately 10 minutes. You will be asked questions about attending your appointments with your care manager and reminders for attending your appointments.

These interviews are confidential and completely voluntary. You do not have to answer any question you do not want to and your answers will not be shared with anyone at TASC or probation. There is minimal risk to participating in this study and include someone finding out that you are involved with TASC. To help prevent this, we will not leave any text or voice messages with your name or naming TASC. You may stop the interview or hang up at any time. You may also refuse to answer any question you do not wish to answer. Your individual responses will not be shared with TASC or probation and your name will not be connected to your answers. Your contact information will be kept separate from your interview responses and we will use an email address to send you an electronic $20 Amazon gift card. Only project team members with special access will be allowed access to this information.

You will receive a $20 Amazon gift card as a thank you for your time after completing the interview. There are no expected direct benefits to you for participating in this study. However, by participating you will be helping improve a possible appointment reminder system for TASC clients. You will also receive a $20 Amazon gift card in appreciation for your time.

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E-1

Whether or not you participate will have no effect on your TASC or probation status.

Participation in this interview is entirely voluntary and has no effect on your TASC care management or probation supervision in any way.

If you have any questions about the study, you can call the project director, Samuel Scaggs. His number is 919-316-3145. If you have any questions about your rights in taking part in this study, you can call RTI's Office of Research Protection at 1-866-214-2043 (*this is a toll-free call*).