Introducing a Clinical Summary Template From the Adult Day Center to Support Decision Making by Primary Care Providers

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Abstract

Introduction: CareMOBI (Mhealth for Organizations to Bolster Interconnectedness) is a mobile application designed to facilitate information exchange between primary care providers (PCPs) and adult day centers (ADCs). A key function of CareMOBI is to synthesize information collected outside of the provider's office (ie,: in the ADC or at home) and distill the most relevant data points into an exportable clinical summary that can help inform clinical decision making by the PCP with information from outside providers who are not formally embedded within health systems. In this study, we used a qualitative approach to understand the acceptability and utility of the clinical summary template within CareMOBI. **Methods:** Purposive sampling, followed by snowball sampling, was used to recruit PCPs from a variety of primary care practice settings (i.e. home-based, academic). Semi-structured interviews were conducted virtually to elicit feedback on the user-experience after interaction with a prototype template. Interviews were recorded, transcribed, and analyzed using content analysis. **Results:** Our sample (n = 10) consisted of physicians and nurse practitioners in a variety of settings. Feedback suggested that the summary template facilitates interdisciplinary, bidirectional, succinct, and relevant information exchange across care teams. The summary template effectively integrates observations and assessments from team members, centralizes them, and allows PCPs to hone in on the most salient components to inform clinical decision making for the geriatric patient. The summary gave PCPs "live texture" about what was happening outside the office and represented a significant improvement over other methodologies of information exchange. Prior to implementation into clinical practice, several refinements are necessary based on feedback including integration into the PCP's workflow. **Conclusions.** The template was viewed by PCPs as a concise and actionable record, in contrast to current communication which is characterized as "bloated"—containing too many pages on nonessential information. The summary could potentially save PCP's time in locating and analyzing historical data to enable rapid patient assessment and prompt more ready and informed action.

Keywords

primary care, adult day care, community health, dementia, mHealth

Introduction

Adult day services (commonly referred to as adult day care) are a vital but overlooked source of community-based long-term care for persons living with dementia (PLWD).[1] Adult day centers (ADCs), of which there are 4600 in the United States,[2] are nonresidential community-based facilities that provide respite for care partners, and simultaneously support the health and social needs of older adults through health monitoring, socialization, meals, and assistance with activities of daily living up to 8 h per day.[3,4] Serial assessments and observations by ADC staff promote early detection of adverse changes in health status. Evidence suggests that ADCs, when appropriately resourced, can work with primary care

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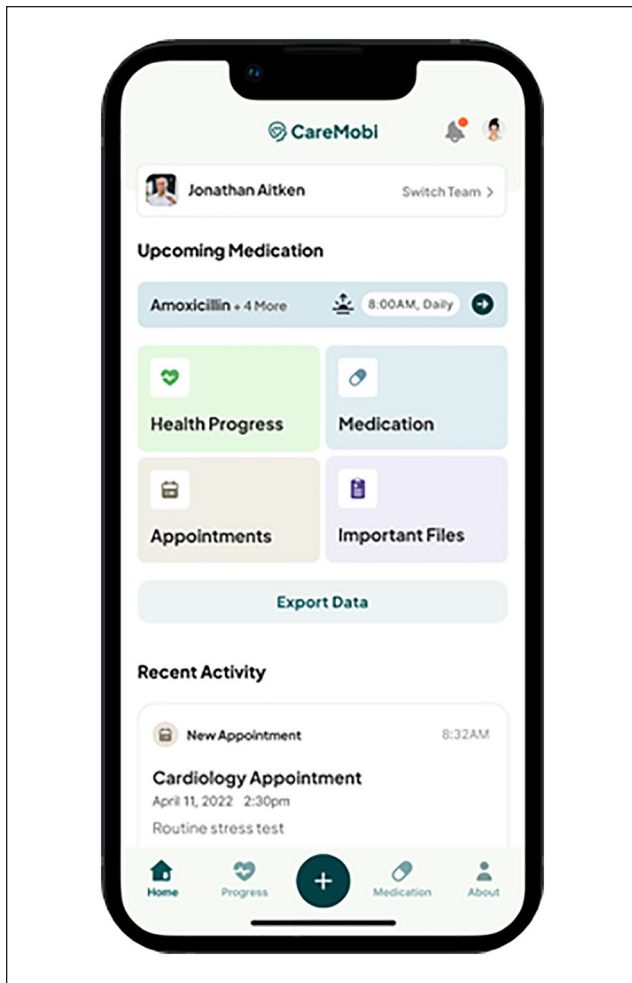Email: jz3750@nyu.edu

Figure 1. Home page of CareMOBI.

providers to manage and coordinate care for vulnerable older adults with complex health and social needs.

However, freestanding ADCs are rarely viewed as part of the formal health care continuum. A major barrier to integrating care provided by ADCs within primary care is their reliance on ineffective and cumbersome methods of communication and information exchange. It is estimated that 92% of ADCs lack interoperable electronic health record systems.[5,6] Blood pressures outside of normal parameters or acute changes in users' behavior, for example, are typically reported to primary care providers (PCPs) via facsimile or voicemail message, resulting in a delayed or non-response. This can lead to delayed referrals, diagnoses, and treatment, as well as medication errors and inadequate follow-up that result in negative sequelae. PCPs and ADC staff mutually agree that effective communication has 4 characteristics: bidirectional, interdisciplinary, succinct, and relevant.[6] To operationalize these components, we developed CareMOBI, (**M**health for **O**rganizations to **B**olster **I**nterconnectedness) a mobile health (mhealth) application

prototype designed to facilitate streamlined communication between ADCs and members of the care team (ie, PCPs and family caregivers) around the health of a mutual patient. A key function of CareMOBI is to synthesize information collected outside of the provider's office (ie,: in the ADC or at home) and distill the most relevant data points into an exportable clinical summary that can help inform clinical decision making by the PCP. However, mHealth apps, and their component parts, need to be produced with adequate consideration of the intended users' needs so that they are effective and perceived as useful. In this study, we used a qualitative approach to understand the acceptability and utility of the clinical summary template within CareMOBI based on interviews with 10 PCPs.

Methods

CareMOBI (See Figure 1) was developed using a "Design-Thinking" approach. Design Thinking is an interdisciplinary iterative approach to problem solving that emphasizes empathy for end-users and rapid prototyping of solutions that requires multiple rounds of ideation and testing done in collaboration with stakeholders. It includes 5 iterative stages: Need finding (understanding challenges facing the end user), Ideation (generating as many solutions as possible), Prototyping (building the minimally viable representation of the best solution), Testing (seeking user feedback to further refine), and Implementation (evaluating the impact and refining further).[7] CareMOBI is designed to promote the efficient communication across care team members. Target users are adult day care centers, family caregivers, and primary care providers—essentially it is meant to help centralize, track, and exchange information related to the day to day care and health progress of PLWD, and supports informed clinical decision making by the healthcare provider.

Procedures

In response to the results of need finding through qualitative interviews with stakeholders, an exportable summary template was developed in the ideation phase. The summary can be exported through the export function in CareMOBI (See Figure 2). The summary (see Figure 3) contains basic patient information, urgent clinical events (ie, falls, hospitalizations), current medications, the range and average of vitals, nutritional intake, sleep quality, and mood patterns. It was incorporated within the CareMOBI prototype in the form of interactive wireframes (or screens). The current study presents the results of the testing phase in which we examined the acceptability of the clinical summary template to support decision making by PCPs with data from ADCs and family caregivers using semi-structured interviews.
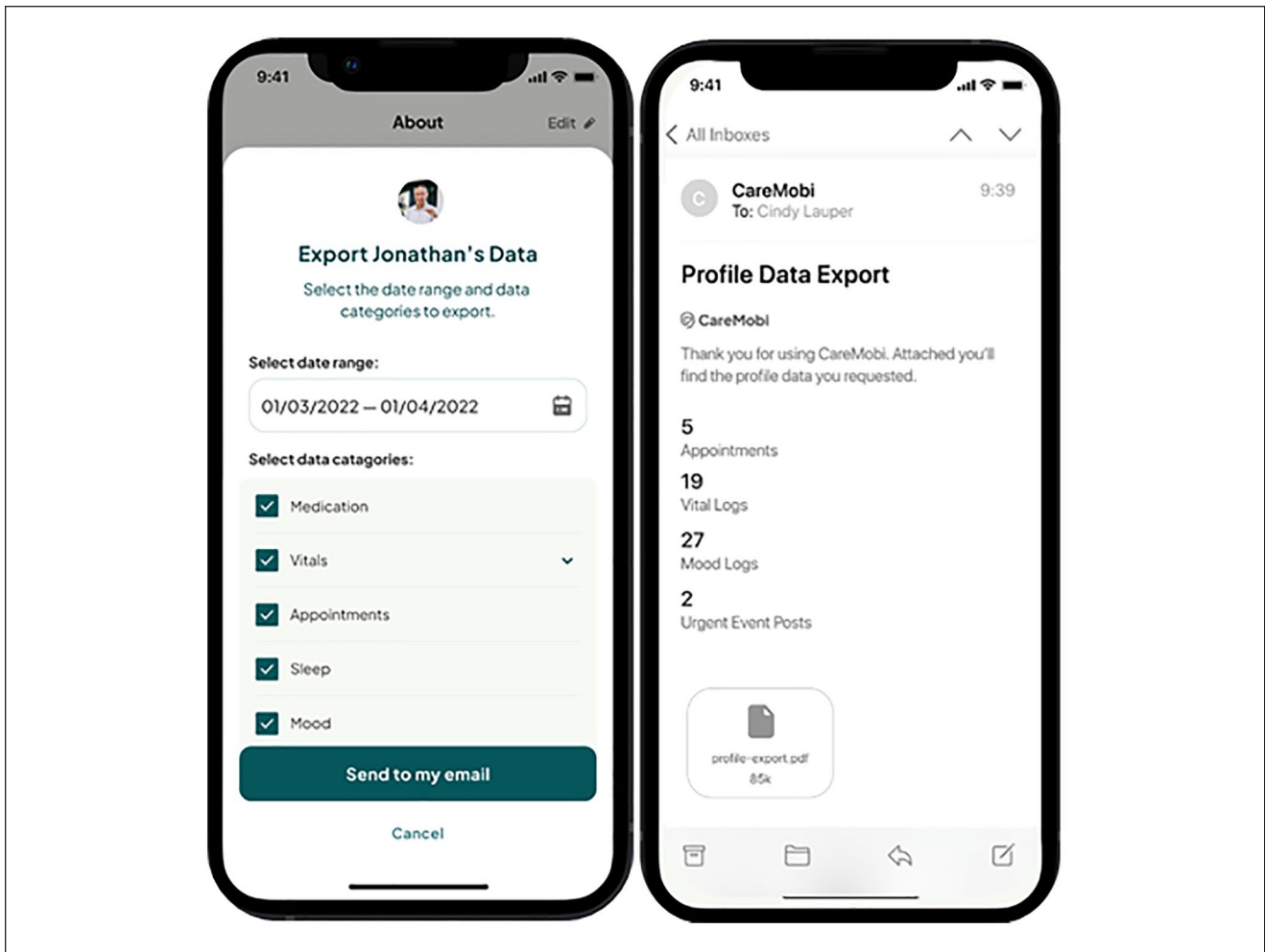
Figure 2. Export function in CareMOBI.

Sample and Setting

Purposive sampling, followed by snowball sampling, was used to recruit PCPs from a variety of primary care practice settings (home-based, academic medical, federally qualified health centers). The inclusion criteria were licensed nurse practitioners, physicians, or physician assistants whose patient panels contain patients >65 years of age. Retired PCPs and/or those not actively practicing were excluded. Participants were identified by on-the-ground consultants in primary care who made them aware of the study via e-mail. A research assistant coordinated virtual one-on-one interviews via Zoom based on the participants' availability for PCPs who satisfied the inclusion criteria.

Upon scheduling the interview, participants received a link to an interactive prototype of the application which they could access on their smartphone, tablet, or computer. Interviews were conducted by a trained research assistant using a semi-structured approach. Interviews lasted 30 min on average. At the beginning of the interview, the participants were asked to watch a 2-min video to learn about the app, and spend 10 min playing with the interactive prototype. They were specifically asked to complete certain tasks, such as logging in, adding a new medication, logging patient progress, and filtering for relevant information. All participants provided written informed consent and received a $50 incentive for completing the interview. Ethical approval was provided by the Institutional Review Board at New York University.

Data Analysis

An audit trail with dated methodological documentation throughout the interview process that was synchronized with analytic notes (eg, why a participant was asked a unique follow-up question based on his/her previous response) was maintained. They were recorded and professionally transcribed. Transcripts were deidentified and reviewed for accuracy by the study team. Data were analyzed using content analysis.[8] The Principle Investigator
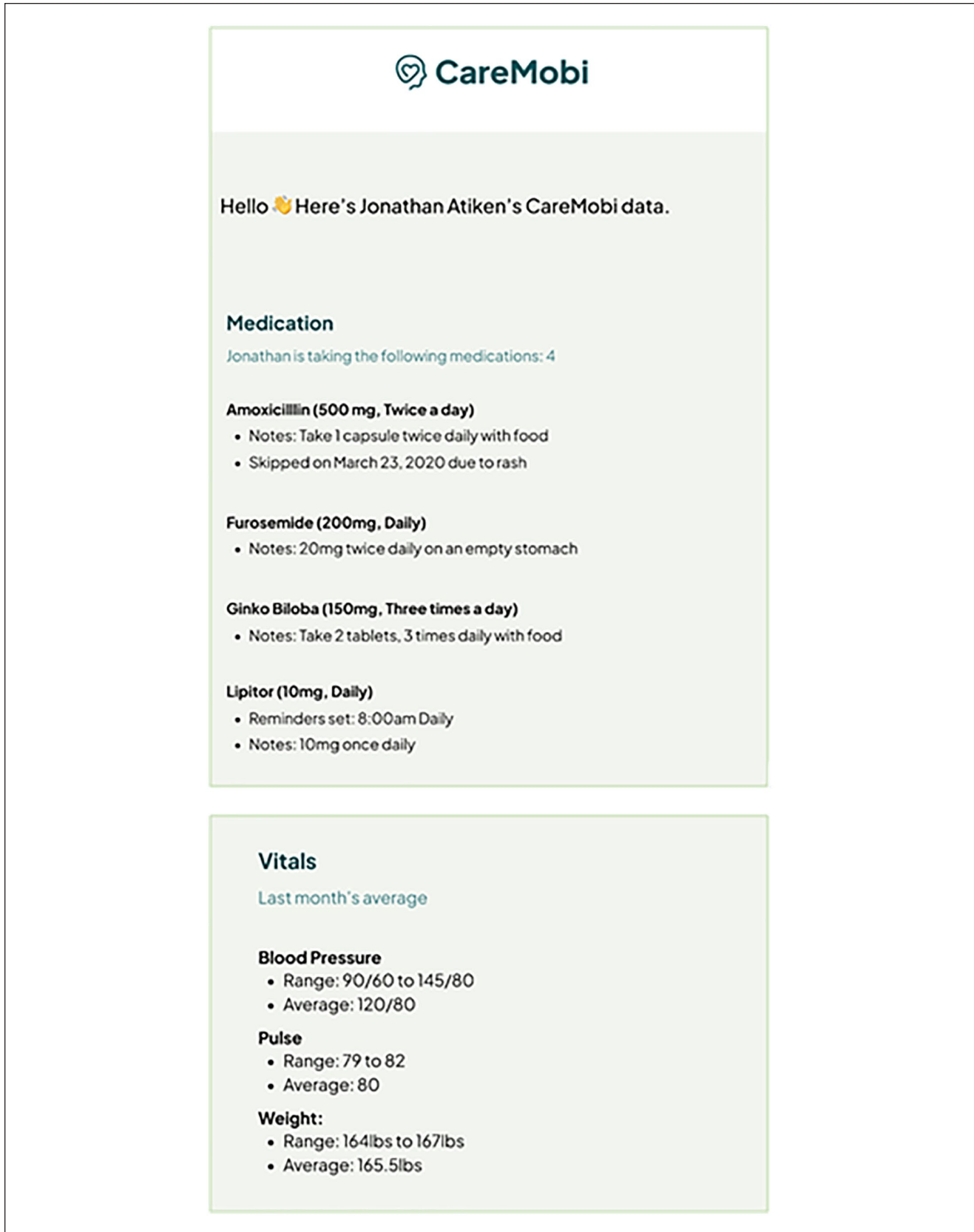
⊘ CareMobi

Hello 👋 Here's Jonathan Atiken's CareMobi data.

Medication

Jonathan is taking the following medications: 4

Amoxicilllin (500 mg, Twice a day)
- Notes: Take 1 capsule twice daily with food
- Skipped on March 23, 2020 due to rash

Furosemide (200mg, Daily)
- Notes: 20mg twice daily on an empty stomach

Ginko Biloba (150mg, Three times a day)
- Notes: Take 2 tablets, 3 times daily with food

Lipitor (10mg, Daily)
- Reminders set: 8:00am Daily
- Notes: 10mg once daily

Vitals

Last month's average

Blood Pressure
- Range: 90/60 to 145/80
- Average: 120/80

Pulse
- Range: 79 to 82
- Average: 80

Weight:
- Range: 164lbs to 167lbs
- Average: 165.5lbs

Figure 3. (continued)

Mood

June 2, 2022
- Mood: Great (Logged by: Ann Barkley)

June 4, 2022
- Mood: Something is off on (Logged by: Cindy Lauper)

Nutrition

Total nutrition logs: 20 times
Ate "All food": 10 times
Ate "About half": 5 times
Ate "Less than half": 5 times

Sleep

Total sleep logs: 10 times
"Excellent" sleep: 2 times
"Good" sleep: 5 times
"Fair" sleep: 0 times
"Poor" sleep: 0 times
"Terrible" sleep: 3 times

Events

Event: Jun 2, 2022 (Logged by: Ann)
- Jonathan went for a walk.

Urgent Event: Jun 4, 2022 (Logged by: Cindy Lauper)
- Jonathan fell down the stairs! Took him to the hospital.

Figure 3. Screenshots of the clinical summary template.

Table 1. Demographic characteristics of primary care providers (N = 10).

Characteristics	No. (%)
Age (years)	
<30	1 (10)
30-39	6 (60)
40-49	1 (10)
50-60	1 (10)
≥60	1 (10)
Race	
White	7 (70)
Asian	3 (30)
Ethnicity	
Non-Hispanic	10 (100)
Hispanic	0 (0)
Gender	
Female	9 (90)
Male	1 (10)
Highest level of education	
Doctorate	8 (80)
Master's	1 (10)
Professional	1 (10)
Health profession	
Physicians	7 (70)
Nurse practitioners	3 (30)

(PI) and research assistant generated a preliminary codebook a priori based on the interview guide and the flow of the app as a coding scheme for all transcripts. Any texts that could not be categorized within the codebook were discussed with the research team to determine if a new code needed to be defined or aligned with an existing code. The codebook was continuously updated accordingly to reflect an iterative process. For PCP transcripts, 2 coders coded independently in Dedoose, a web-based platform for qualitative and mixed-method coding, and met regularly to review coding and resolve any disagreements. To ensure the reliability and consistency of coding, a subset (20%) of transcripts were analyzed by a third independent coder. Any unresolved disagreements, as well as potential new categories or codes, were addressed in team meetings with the PI. Themes were identified by consistently comparing codes across categories. Saturation occurred when no new themes emerged. Team members regularly debriefed to discuss and validate results of the analysis.

Results

Our study sample (n = 10) consisted of physicians, nurse practitioners, and physician assistants (see Table 1). Average mean age was 39.8 years old with majority self-identifying as White (70%), female (90%) and reporting a doctorate degree (80%). The sample consisted of 7 physicians and 3 nurse

practitioners. We used results of our previous need finding study, in which we identified 4 characteristics of effective information exchange according to PCPs and ADC staff, as a framework for the current study. Here we present the results of our analysis to assess whether the proposed summary template facilitated information exchange that was bi-directional, succinct, relevant, and interdisciplinary.

Bidirectional: Bidirectional refers to interactive exchanges in which both parties are providing and responding to information. According to PCPs, the clinical summary template facilitated bidirectional communication by providing a focused summary of data that served as basis for discussion with outside providers and family members and prompted action by the PCP.

> PCP-SRM: Yeah, this [summary] is amazing. If I got this information on my patients every three months, I'd be delighted. This is really, really actionable, useful, and well laid out information.

The app itself provides PCPs with an electronic platform to readily respond to the findings and address ADC staff's concerns (which current methods like fax do not do). However, the clinical summary template uniquely helped PCPs hone in on concerns and action items. For example, the previous respondent went on to cite an example in which they could use the vital signs summary to improve blood pressure management in conjunction with care team members.

> PCP-JB: I'm just thinking of a couple patients who I was managing actively with their team, and their teams was super active. It was the back and forth about the blood pressure, and at some point, that would be amazing to have that all live in one place.

A significant limitation of the template's bidirectional capacity is that its design does not provide PCPs with a space to respond with a summary of their clinical visit/assessment. The PCPs EHR based summary would need to be appended into another area of the app.

Interdisciplinary: Interdisciplinary communication draws on the findings of all individuals involved in the care of an individual and promotes care continuity. According to the PCPs, the summary template effectively integrates observations and assessments from team members, centralizes them, and allows PCPs to hone in on the most salient components to inform clinical decision making. This gets "everyone on the same page." Here they elaborate on key areas of interest that they might focus on within the summary, and suggest that an additional immunization summary may be helpful:

> PCP-NMC: Are they a one-to-one feeder? Are they incontinent?. . .That would be super helpful, so that everyone's

on the same page. If the cardiologist asks, "Have you ever gotten your shingles vaccine?" (Family caregivers would say) "Yeah, we did. Let me show you." That would be helpful.

The other advantage of drawing from multiple disciplines within the summary is that it provides PCPs with a more holistic picture of a patient's life that includes their time at the ADC.

> PCP-CC: I could see this being very helpful to feel like you've got this really live texture on the ground for all the care staff and the family to dialog back with because that's a real gap, huge gap for the family to feel disconnected from what's happening on the ground with the ADHC or even in an assisted living. Black box, you don't know what's happening after you drop your loved one off.

Relevant communication focuses on bringing the most pertinent elements of the geriatric assessment that support clinical decision making to the forefront of documentation. Multiple PCPs praised the fact that the summary captured changes in mood and behavior, as these were often indicative of an acute infection and a focus of PCPs and sentinel events (ie, falls, hospitalizations). In addition, the proposed summary of changes in sleep and nutrition were relevant to patient care. PCPs also offered suggestions for other assessment data that could support their decision-making process. Examples include changes in: wound progression, bowel movement, functional status, and hearing or vision.

> PCP-RM: With dementia, the things we definitely look at are mood, behavior, sleep, and nutrition. There are other aspects that PCPs are [also] interested in such as wound care, symptom diary, and bowel movements etc.

Succinct documentation was defined as being brief and to the point. The summary template does not present a series of individual data points, instead it is a brief overview of health progress logs, including appointments, vitals, mood, urgent events, nutrition, and sleep in a selected period of time.

> PCP-NK: I feel like it really helps understanding the bigger picture if I really needed to search what was going on at what point. If they were hospitalized, I could review and look back on what's going on with their vitals, what's going on with how they're eating, how they're interacting, and what the nurses were worried about at what time.

This format and presentation were most valuable because it saved PCPs time locating and analyzing historical data, and allowed them to simply "eyeball" it.

> PCP-SRM: It's annoying for me as a doctor to click into the vitals, then click into the sleep, then click into the medications, then click into the whatever. If what I get is this summary, then I'm delighted. This summary is perfect.

According to PCP's perspectives, the summary represented a significant improvement over other methodologies of information exchange, such as phone or paper and pencil logs, because it was more streamlined and less cumbersome.

> PCP-JB: I'm thinking about a couple of examples of people where they would come in with a notebook, and it was essentially this, but it was in a notebook. Then I'm left with like, do I scan all these pages in? How are we gonna extract this information? I think there's so many people who are already tracking this, right? Then it's amazing to have something that's more living—instead of me scanning down two sheets.

Discussion

ADCs are invaluable sources of community-based care for older adults, but staff experience challenges in effectively communicating clinical concerns about clients with their PCPs. We used a design-thinking approach to develop and test a template that summarizes information collected by ADCs about clients within a portable mhealth application, CareMOBI. The overall goal of the template was to concisely present data being collected by ADCs to enhance clinical decision making by PCPs at the point of care. Through qualitative interviews with PCPs in diverse practice settings, we assessed whether the template reflected the characteristics of effective communication identified by PCPs and ADC staff in a previous study and identified necessary modifications that would enhance the clinical value of the template. Our overall findings showed that the summary template facilitates interdisciplinary, bidirectional, succinct, and relevant information exchange across care teams.

The management of the older patient in the primary care setting is often complicated by factors such as multimorbidity, atypical presentation of illness, communication problems due to hearing loss and/or cognitive impairment, and banalization of symptoms considered to be part of the normal aging process.[9] The most valuable aspect of the summary was its succinct and focused presentation of aspects most salient to the geriatric assessment—such as patterns in mood, behavior, and sleep. This helps PCPs distinguish unstable patterns indicative of acute illness from benign day-to-day variations.

The data summary also facilitated collaboration between ADCs and PCPs within the community-based care continuum. According to PCPs interviewed, the template was highly inclusive of the perspectives of the interdisciplinary staff within ADCs. PCP's seemed to not only appreciate that the template captured multiple perspectives, but that it centralized them in one place giving PCPs "live texture"

about what is happening outside the office. Research suggests that, compared to working alone, interdisciplinary communication leads to improved patient and family outcomes, and better diagnosis and prognostic abilities of health professionals.[10] Information contained in the summary from different disciplines housed within the ADC can help PCPs identify emerging clinical problems and facilitate early intervention. Other elements respondents said might enhance the summary include information on continence from the ADC nurse, as well as dietary and feeding concerns which could be provided by the ADC's registered dietician.

Despite housing information on health and functional status from multiple providers, the template was viewed as a concise and actionable record. Communication across healthcare settings is often characterized as "bloated"—containing too many pages on nonessential information that bury the most important aspects of the patient's record.[5] The summary could potentially save PCP's time in locating and analyzing historical data to enable rapid patient assessment and prompt more ready and informed action.

Prior to implementation into clinical practice, several refinements are necessary. First, the contents will need to be adjusted to include the features' PCPs recommended (ie, bowel movements, continence, wound care, etc.) Second, the template will need to be more easily integrated within the electronic health record to encourage bidirectional communication between PCPs and ADCs. Finally, we will need to ensure that ADC staff are consistently entering data to provide PCPs with a reliable clinical picture.

There are 2 major limitations to be considered. First, our sample was small (n = 10 PCPs). As part of the user testing process, a larger sample would have potentially offered richer insight. However, as part of the iterative design thinking approach, we use multiple rapid iteration cycles; thus, we will modify the template based on this cycle, and recruit additional PCPs in subsequent phases. A second key limitation was that participants had an interactive prototype, not a fully launched version that was testable in their day-to-day practice. This will be conducted in later phases and help us understand specific barriers to implementation which cannot be gleaned from this study.

Conclusion

The CareMOBI summary template represents an important step toward improving communication between ADCs and PCPs to enhance the care of older adults. Its innovative user-centered design accounts for practical needs of PCPs with respect to clinical decision making, including constraints on their time. With future refinements and eventual integration into electronic health records systems, it can eventually support meaningful streamlined information exchange between PCPs and ADCs that yields better outcomes for older adults.

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Supplemental Material

Supplemental material for this article is available online.

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