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Reducing Smoking Cessation Disparities: Capacity for a Primary Care- and Technology-Based Approach Among Medicaid Recipients

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Abstract

While cigarette use among U.S. adults has recently decreased, vulnerable subgroups continue to smoke at high rates, including individuals receiving Medicaid insurance. These individuals have also experienced treatment access disparities, highlighting the need for approaches that leverage their strong desire to quit. We conducted interviews with 100 adult primary care patients receiving Medicaid who were current tobacco users about their use, openness to technology-based interventions, and readiness to change. Most (92%) reported current cigarette use and readiness to change averaged 6.98 out of 10 (SD = 2.82). Nearly all were open to completing an iPad-based tobacco screening (95%) and brief intervention (90%) at their next appointment, while 91% and 88% were willing to talk with their provider or a cessation counselor, respectively, about the subsequent results. Results persisted across age, sex, and race/ethnicity. Openness to technology-based interventions in this population provides support for future work that may ultimately reduce disparities.

Keywords Medicaid · Disparities · Technology · Tobacco · Cessation

Introduction

Tobacco use is the largest preventable cause of disease, disability, and premature death in the United States with approximately 480,000 deaths per year due to tobacco smoking (U.S. Department of Health & Human Services, 2014). In addition to a wide range of negative health outcomes including premature mortality, smoking is responsible for a high burden of healthcare utilization costs, with \$300 billion spent via smoking-associated direct healthcare expenditures and losses of productivity annually in the United States (U.S. Department of Health & Human Services, 2014).

The prevalence of smoking among adults has significantly declined in the last several decades, with a 69.6% (52.0% to 15.8%) and 64.2% (34.1% to 12.2%) relative decline among men and women, respectively, from 1965 to 2017 (U.S. Department of Health & Human Services, 2020). This decline is credited to population-based interventions (i.e., price increases, media campaigns, smoke-free laws, barrier-free quitting assistance), evidenced-based psychotherapy treatments (in-person and via phone or telehealth), and FDA-approved medications, which continue to be considered critical to reducing smoking and its affiliated health conditions and costs (Centers for Disease Control and Prevention, 2014; U.S. Department of Health & Human Services, 2020).

While rates of smoking have seen an overall decline, several U.S. sub-populations continue to demonstrate higher levels of smoking, including individuals on Medicaid. Compared to 14.0% of the general population, nearly a quarter of all U.S. adults receiving Medicaid (24.9%) smoked cigarettes in 2019 (Cornelius et al., 2020). It is estimated that \$40 billion—or 15.0% of the annual Medicaid budget—is attributable to smoking-related disease (U.S. Department of Health & Human Services, 2014). Given that Medicaid's total expenditures exceeded \$600 billion in 2019, achieving health equity in smoking cessation rates could be a key

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mechanism in reducing Medicaid spending (Kaiser Family Foundation, 2020). In fact, a recent economic evaluation found that 1% reductions in smoking prevalence among Medicaid patients in each state would be associated with a total savings of \$2.5 billion one year following the reduction (Glantz, 2019).

Smoking reduction for individuals receiving Medicaid is a clear public health priority; however, in addition to disparities in smoking prevalence and associated health outcomes, individuals on Medicaid also experience clear disparities in access to empirically supported treatment for smoking cessation (Centers for Disease Control & Prevention, 2020; Singleterry et al., 2015). Long-term cessation is difficult; research shows that most people who smoke regularly want to quit and make many attempts each year before quitting successfully (Centers for Disease Control & Prevention, 2020). In 2015, 69.2% of individuals who were enrolled in Medicaid and smoked regularly reported wanting to quit smoking; however, only 5.9% successfully quit (Babb et al., 2017). Lack of access to empirically supported smoking cessation treatments among Medicaid patients is one key mechanism behind the continuing high rates of smoking in this population. Although Medicaid expansion through the Affordable Care Act may have increased cessation among younger enrollees without dependents (Koma et al., 2017) and having more treatment options has been associated with increased cessation (Kostova et al., 2018), few states cover all major cessation approaches, including all medication treatments (DiGiulio et al., 2018). Even when cessation benefits are available, many enrollees face significant external barriers to accessing care including inability to afford copays, prior authorization requirements, limits on frequency and duration of treatments, annual and yearly limits on treatments, and stepped care therapy requirements, especially among states that did not participate in Medicaid expansion (DiGiulio et al., 2018; Ku et al., 2016).

In addition to these systemic barriers to treatment availability, patients enrolled in Medicaid face additional challenges to treatment engagement including lack of awareness of services and difficulty navigating complex healthcare and community systems in which to access treatment (Knox et al., 2017; Saunders & Alexander, 2009). The Medicaid population is, by definition, low income and consists of disproportionate numbers of individuals from racial and ethnic minority identities, as well as large proportions of older adults and individuals with disabilities (Kaiser Family Foundation, 2019). Patients from low-income and minority backgrounds demonstrate increased lack of trust in both providers and the effectiveness of treatments, and stigma associated with working with healthcare providers (Andrade et al., 2014; Hines-Martin et al., 2003; Mojtabei et al., 2011; Satcher, 2001). Concerns about confidentiality and privacy are also key barriers to treatment utilization and engagement

for all populations (Brooks et al., 1997; Gonzalez et al., 2005; McClelland & Thomas, 2002). Given the difficulties in accessing empirically supported treatment faced by patients enrolled in Medicaid, innovative approaches that expand delivery and dissemination are needed. Moreover, such approaches must address barriers to treatment engagement in order to be palatable, and thus utilized, by a low-income Medicaid population.

Recent years have seen an increase in psychosocial interventions delivered via technology-based platforms. Given the continued growth and distribution of technology across the globe, many more people have access to internet and mobile technology. This number is growing (Pew Research Center, 2021a, 2021b), giving tech-based interventions the potential to increase access to treatment and reduce health disparities, including those seen in the Medicaid population. Efficacy of mobile- and internet-based treatments has been established for several health outcomes including mental health (Burger et al., 2020; Linardon & Fuller-Tyszkiewicz, 2020), suicide prevention (Melia et al., 2020), substance use (Ashford et al., 2020; Marsch et al., 2020; Singh et al., 2020), and smoking cessation (Black et al., 2020; Free et al., 2013; Regmi et al., 2017). Moreover, technological delivery of smoking cessation programs has shown effectiveness among several vulnerable patient populations including low-income adults (Zhou et al., 2020) and pregnant women (Polak et al., 2020), demonstrating the ability to increase access and reduce barriers to treatment. Tech-based interventions for smoking cessation may be well suited for patients receiving Medicaid, but important gaps in the literature remain in understanding the perspectives of these patients in utilizing these types of interventions.

A key area of focus for implementing smoking cessation interventions has been in integrated primary care clinics. National guidelines recommend primary care providers identify individuals who smoke, make referrals, and offer psychosocial and pharmacological treatments for smoking cessation (Verbiest et al., 2017). Survey research shows that recommendations and referrals by a healthcare provider increase the use of and engagement in treatment, particularly among individuals on Medicaid and other groups less likely to access treatment (Cokkinides et al., 2005). Delivery of smoking cessation treatments within primary care may close the service gaps in treatment for smoking, significantly reducing incidents of smoking-associated death, disease, and disability, as well as lower associated healthcare costs (Curry et al., 2008; Maciosek et al., 2006). Despite the clear potential of integrating smoking cessation treatments into primary care, many barriers exist to successful integration, including limits on billing for services and both the time and training need for providers to adequately assess for and refer to services (Awoyinka et al., 2015; Klein & Hostetter, 2014; Quanbeck et al., 2018). Moreover, with the push of increased

mental health and substance use treatment integration, primary care clinics have become overburdened, as they are asked to integrate more and more services into an already limited clinical practice (Korownyk, 2020; Murray, 2020; Yarnall et al., 2003). Therefore, implementing technology-based services into primary care clinics may be an innovative way to increase access and engagement in smoking cessation treatments for individuals enrolled in Medicaid, without further burdening already constrained primary care providers. Further empirical data are still needed to understand the capacity and willingness of patients receiving Medicaid to engage with tech-based approaches to smoking cessation.

Current Study

The current study aimed to fill a gap in the field by assessing the capacity and willingness to engage in a tech-based approach to smoking cessation embedded in primary care. While tech-based primary care approaches provide a unique opportunity to address the goals of minimizing health disparities in smoking while minimally impacting primary care clinic workflow, careful planning and attention to patient perspectives and preferences are required for maximum sustainability. This study surveyed 100 primary care patients who used a tobacco product in the past month as well as a Medicaid insurance product. Surveys assessed tobacco use, motivation to quit, interest in different cessation options, and specific interest in an iPad-based screening and brief intervention that our team has developed and implemented for a variety of healthcare needs within Henry Ford and among other populations (iHeLP; Braciszewski et al., 2018). We examined the capacity and willingness of individuals insured by Medicaid to engage in tech-based smoking cessation interventions in primary care, with the long-term goal of increasing access to treatment and thus reducing health disparities among this population. Specifically, these data will be used to inform the design and conduct of a randomized trial to assess the efficacy and implementation of such an intervention.

Method

Procedures

Participants were recruited from Henry Ford Health System, an integrated healthcare system in Detroit, MI. All adult patients who met the eligibility requirements (18 years or older, receiving Medicaid, and current tobacco use) were potential participants for this study. Individuals were initially identified using these criteria through our electronic health record. Potential participants were then randomized (for order of outreach) and mailed an information sheet, consent

form, and HIPAA authorization form in batches of 25. One week after mailing the packets, study recruiters outreached potential participants by phone and provided additional study information. Recruiters confirmed the current smoking status of interested participants, obtained verbal consent, and either completed or scheduled a time to complete the survey at a later date. Surveys took approximately 15 min and were administered by recruiters over the phone in a private room. Participants were provided with a \$5 gift card for completing the survey and were assured that their participation would not impact service receipt in the health system in any way. Study procedures were reviewed and approved by the Henry Ford Health System Institutional Review Board.

Participants

Outreach packets were sent to 856 patients who were identified as eligible through the electronic health record (see Fig. 1). Recruiters were able to contact 320 (37%), 259 of whom were verified as eligible. Among the 259 eligible participants, 100 completed the survey with the majority ($n = 92$ of 159) of those declining citing disinterest in participation. The final sample was representative of the larger population pulled from the electronic health record. Specifically, participants were mostly female (57%) with a mean age of 37.7 (SD = 9.4). With regard to ethnicity and race, only one participant identified as Hispanic/Latino; 50% as non-Hispanic, White; 46% non-Hispanic, Black/African-American; 1% non-Hispanic, Native Hawaiian/Pacific Islander; and 3% other/unknown. Given the low number of Hispanic/Latino participants, we did not examine differences by ethnicity; race was dichotomized into non-Hispanic White and other.

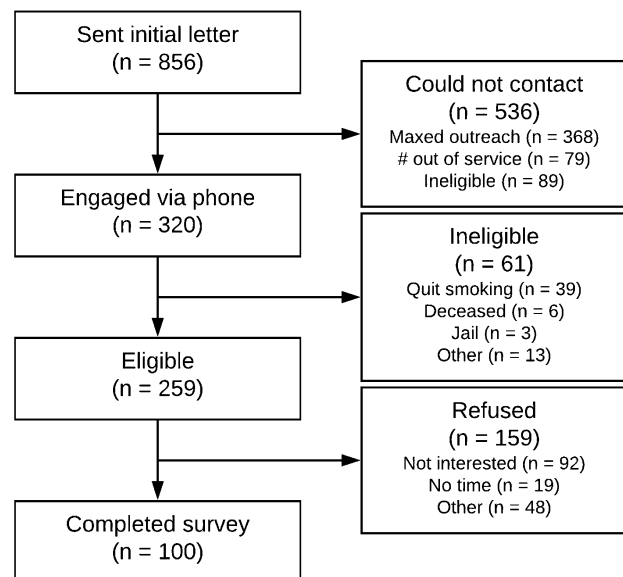


Fig. 1 CONSORT diagram of study recruitment

Measures

The survey consisted of several different sections, framed using the Population Assessment of Tobacco and Health (PATH) Baseline Survey (Hyland et al., 2016). Participants were asked about their lifetime and current use (defined as use in the past 30 days) of cigarettes, electronic cigarettes, cigars/cigarillos/filtered cigars, and pipe tobacco. Current cigarette smokers were also asked about quantity of use, while lifetime e-cigarette users were asked about various reasons for their use (e.g., appealing flavors, cost, smell, curiosity). Those endorsing past 30-day use of any tobacco product were asked about (1) the average time to first use of tobacco in the morning as an index of nicotine dependence (Baker et al., 2007); (2) diagnosis of health conditions caused by or made worse by tobacco use; (3) past year quit attempts; (4) motivation to quit using the Readiness Ruler (“On a scale from 0 to 10, where 0 is not at all ready and 10 is ready or already trying, how ready are you to quit using tobacco?”); (5) past year advice to quit by a health professional (yes/no); and (6) general interest in trying various cessation methods (e.g., medication, individual counseling, computer/internet approaches; yes/no).

Finally, we were specifically interested in understanding participant capacity and willingness to engage in a web- and text message-based intervention formerly shown to be useful in reducing alcohol, cannabis, and tobacco use among youth aging out of foster care (Braciszewski, Colby, Bock, & Vose-O’Neal, 2019; Braciszewski et al., 2018), another vulnerable and economically disadvantaged population. This intervention, iHeLP, utilizes any web-enabled device to provide screening and brief intervention for a targeted outcome in a manner consistent with Motivational Interviewing (Miller & Rollnick, 2013) and guided by a three-dimensional animated narrator. Following the brief intervention, individuals receive daily text messages using their brief intervention results that are also dynamically tailored to their level of readiness to change (for more detailed information, see Braciszewski et al., 2018). As such, we asked participants about their access to a reliable cellphone or smartphone and engagement in text messaging. We did not ask about use of iHeLP specifically, but rather participant willingness to engage with each of its key components, including (1) complete an iPad-based screening and brief intervention about tobacco use during their next primary care appointment, (2) share that information with their provider and a smoking cessation counselor, and (3) receive daily text messages and answer questions via text message for various lengths of time.

Data Analysis Strategy

We calculated descriptive univariate statistics for all data, including correlations, chi-squares, and *t* tests to examine associations between key study variables and demographics. Our main goal was to determine capacity (e.g., technology access) and interest in/willingness to participate in a technology-based smoking cessation intervention within primary care.

Results

Combustible Cigarette Use

Nearly all participants (99%) endorsed lifetime cigarette use and most (92%) had smoked cigarettes in the past 30 days (Table 1). The majority (86%) of individuals who had smoked tobacco in the past month reported daily smoking; overall, individuals who reported current smoking averaged 25.65 (SD = 9.37) days of use out of the last 30. Nearly half of those currently smoking (47%) reported smoking more than a half a pack (> 10 cigarettes) each day. Females ($M = 27.5$, $SD = 7.1$) reported smoking on more days in the last 30 than males ($M = 23.2$, $SD = 11.4$; $t = -2.17$, $p = 0.03$). Age and race were not associated with past month frequency of cigarette use ($r = -0.11$, $p = 0.26$; $t = 0.63$, $p = 0.53$, respectively).

E-cigarette Use

Just over half of participants (56%) reported lifetime e-cigarette use, yet only 9% of those individuals had used in the past 30 days ($n = 3$ of the total sample; Table 1). Among those endorsing lifetime use, curiosity was listed as the most frequent reason for trying e-cigarettes (57%), followed by using them as a cessation aid (47%), offering a healthier alternative to combustible cigarettes (41%), the ability to use it anywhere (36%), the more pleasant smell (32%), the appealing flavors (29%), and the low cost (16%). Current e-cigarette use occurred too infrequently to reliably examine associations with age, gender, or race.

Table 1 The prevalence of tobacco product use

	<i>n</i> (%)		
	Ever use	Current use*	Daily use**
Cigarettes	99 (99)	92 (93)	79 (86)
E-cigarettes	56 (56)	9 (16)	3 (33)
Cigars	63 (63)	18 (29)	4 (22)
Pipe	22 (22)	2 (9)	1 (50)

*among ever use; **among current use

Other Tobacco Product Use

Lifetime cigar/cigarillo/filtered cigar use prevalence was 63% of participants, 18% of whom reported past 30-day use ($n=4$ of all participants; Table 1). Pipe tobacco use was less prevalent, with 22% endorsing lifetime use, 2% of whom indicated pipe tobacco use in the last 30 days ($n=1$ of all participants). Similar to e-cigarette use, the limited frequency of cigar and pipe tobacco use precluded examination of trends by age and gender. Current cigar/cigarillo/filtered cigar use was more frequently endorsed by participants identifying as non-White (27%) compared to non-Hispanic Whites (10%; $\chi^2=4.55, p=0.03$).

Nicotine Dependence, Motivation, and Quitting

Nearly two-thirds (61%) of respondents met criteria for possible nicotine dependence. Close to one-third (29%) of individuals had received a medical diagnosis caused or made worse by nicotine use and 74% had tried to quit tobacco products in the last year. Reflective of this high frequency of quit attempts, 51% of participants reported that their motivation to quit was an 8 out of 10 or higher ($M=6.98, SD=2.82$); readiness was not significantly related to sex ($t=0.78, p=0.44$), age ($r=0.20, p=0.05$), or race ($t=-1.92, p=0.06$). Most (92%) participants had been to the doctor in the last year and, of those who had a visit, 74% had been advised by a doctor to quit using tobacco. Finally, contingency management (“receiving prizes or payment in exchange for quitting”) was the most frequently endorsed method of cessation that individuals were willing to try (74%), followed by one-on-one counseling (57%), patches/gum (56%), a computer/internet-based program (54%), text messaging (52%), medications (42%), a quit line (39%), and group counseling (36%). Preference for these types of approaches was not significantly related to sex, age, or race.

Capacity and Willingness for a Tech-Based Approach

Cell phone ownership was nearly ubiquitous, with 98% of respondents indicating that they owned any type of cell phone

and 93% stating that they owned a smartphone. Among individuals with a cell phone, all but 1 reported that they engage in text messaging. Consistent cell phone service, however, was not widespread, as 23% had changed their number in the last year and 37% had lost coverage for at least a day or two in the last year. Most participants (57%) reported using a pay-as-you-go cell phone plan.

With regard to openness to engaging with the tobacco screening, brief intervention, and text messaging, 95% were willing to complete a screening assessment on an iPad at their next appointment, 90% were open to engaging with a brief intervention for tobacco use, and 91% and 88% were willing to talk with their primary care provider and a cessation counselor, respectively, about the results of the screening and brief intervention (see Table 2). More than three-quarters (78%) were open to receiving daily cessation-related text messages for one month after completing the screening and brief intervention; fewer (66%) were willing to do this for six months. Slightly more (81%) stated that they would answer weekly questions via text that drive the intervention for one month, while 63% were willing to do so for six months. On average, respondents were willing to receive text messages for 6.02 months ($SD=4.83$) and answer weekly questions for 5.81 months ($SD=4.39$). Responses were unrelated to age, gender, and race with one exception: fewer non-White participants (53%) than non-Hispanic Whites (74%) were willing to receive weekly questions for six months ($\chi^2=4.69, p=0.03$).

Discussion

This study provides promising support for tech-based treatments in primary care to address smoking cessation among individuals using Medicaid. Specifically, participants were open to utilizing web-enabled devices in clinic, as well as their mobile devices, to engage in a cessation program. Given the need for low-cost, efficient interventions that are easily accessible to patients enrolled in Medicaid, this paper highlights the potential for implementing scalable tech interventions in primary care, which could dramatically

Table 2 Willingness to engage with various iHeLP components

Would you be willing to...	% or M (SD)
Complete a screening on an iPad in a waiting room	95
Complete a brief intervention on an iPad in a waiting room	90
Talk with your provider about screening results	91
Talk with a smoking cessation counselor about screening results	88
Receive text messages for 1 month	78
Months willing to receive text messages	6.0 (4.8)
Receive weekly questions via text	81
Months willing to receive weekly questions	5.8 (4.4)

improve uptake of smoking cessation treatment. Thus, these approaches may have the potential to decrease tobacco-related health disparities in this population and corresponding Medicaid costs.

Smoking Frequency, Dependence, and Motivation to Quit

This study surveyed patients currently enrolled in Medicaid who also regularly used tobacco. Despite the high smoking frequency and dependency of this sample, the majority of participants reported strong desires to quit. This trend is consistent with the previous work that suggests that smoking prevalence among individuals enrolled in Medicaid is not due to lack of awareness or motivation to stop smoking, but often a lack of access to empirically supported cessation treatment (Babb et al., 2017; Kostova et al., 2018). Thus, developing innovative and patient-centered approaches to increase access to treatment is a clear health and economic priority for reducing smoking and smoking-associated health costs for Medicaid patients (U.S. Department of Health & Human Services, 2014).

Capacity and Willingness to Engage in Technology-Based Care

This study furthers the field by providing important support for the capacity and willingness of individuals insured by Medicaid to use technology-based interventions. The majority of study participants were open to both computer/internet and text messaging based-programs, which were more frequently endorsed than medication, quit lines, and group therapies. The only interventions that were more popularly endorsed by participants were contingency management and one-on-one counseling, both interventions that while highly efficacious and well received by many patients, also require high amounts of provider time and expertise and are often high in cost, therefore limiting their large-scale dissemination and accessibility, especially for low-income and vulnerable patient populations (Boyd et al., 2016; Loree et al., 2019; Wilson et al., 2018). Technology-based interventions—that were also very well received by this sample—are a potential lower-cost, less time intensive alternative to individual counseling and contingency management approaches (Olmstead et al., 2019), though their widespread implementation also remains to be realized (Ross et al., 2016; Vis et al., 2018). It is also important to note that interest in different interventions did not vary by sex, age, or race. Contrary to prior work suggesting that older adults may be unlikely to use technology (Czaja et al., 2006), this study found that individuals across the lifespan were overwhelmingly interested in using tech-based interventions for smoking cessation, further lending credence to the possibility that

technology may cessation access to a wide variety of individuals using Medicaid.

This study also assessed access to internet, cell phones, and other devices among patients enrolled in Medicaid. Results were consistent with other recent work highlighting the continued expanse of internet and cellular technology access, including in under-resourced communities (Pew Research Center, 2021a, 2021b). Nearly all participants reported having access to phones, including both cell phones and smart phones (with cellular internet access). All but one participant also reported they engage in texting, indicating further familiarity with and access to technology platforms. However, despite having access and engaging regularly with cell phones, additional barriers associated with interrupted access to phone services (i.e., changing phone numbers, lost coverage, having a pay-as-you-go plan) were common in about one-quarter to one-third of study participants. This suggests the need for additional considerations when making technology-based interventions available to Medicaid patients that may include provision of waiting room devices for initial screening and intervention, assessing for continuous phone access, using web-based messaging services not associated with cellular service, and asking for permission to text alternative phone numbers if service may be shut off before recommending a cell phone delivered treatment.

Willingness to Engage in Primary Care- and Technology-Based Care

This study also assessed patient willingness to engage with several components of a specific iPad-based intervention within primary care. Overall, participants reported openness to engaging with the screening, brief intervention, and text messaging components of iHeLP. Most study participants indicated that they would be willing to complete both tobacco use screenings and brief waiting room interventions as well as discuss the results of their screening with either a primary care provider or smoking cessation counselor, signifying strong interest among this population. Our findings are build on previous work showing that even very brief interventions and referral from healthcare professionals can significantly improve smoking cessation rates in a highly cost-effective manner (U.S. Department of Health & Human Services, 2020). Integrating technology-based interventions that are highly palatable to patients in primary care clinics may be one mechanism to increase access to care for individuals using Medicaid. Additionally, patients in this study indicated openness to receiving text message follow ups and answering related questions at home after an initial assessment at a primary care appointment. Given that this approach has shown promise even as a standalone intervention (Kong et al., 2014; Scott-Sheldon et al., 2016; Spohr et al., 2015), adding it as a supplement to the initial brief

intervention and referral to addition care has potential to move patients along the spectrum of motivation to reduce or eliminate smoking behavior.

Limitations

Although this study provides important data on the perspectives on tech-based smoking interventions of patients enrolled in Medicaid, limitations should be noted. Initial recruitment was based on documented smoking status in the electronic health record, possibly excluding individuals who use tobacco, but who have not disclosed to their provider. Furthermore, these data are from a single health system and were gathered purposefully to reflect the demographics of that health system and, thus, may not be representative of other healthcare settings serving this population. Indeed, our sample was primarily non-Hispanic White (50%) and Black/African-American (46%) and does not include large samples of other important racial and ethnic minority individuals who receive Medicaid benefits. Finally, our response rate among eligible patients was just under 40%. Those who did not participate may be less interested in cessation overall, given our recruitment literature focus on improving cessation options at the health system.

Future Directions

This study provides strong preliminary evidence for utilizing technology-based screening and brief intervention, accompanied by periodic text messaging, as a smoking cessation option for individuals receiving Medicaid benefits and being seen in primary care. Given the burden on primary care clinics to integrate numerous health prevention screeners into healthcare appointments, tech-based interventions may be a promising mechanism to address time and financial limitations experienced by primary care providers (Korownyk, 2020; Murray, 2020; Yarnall et al., 2003). While health system time and resources may be limited, patients can complete brief screening and intervention items in the waiting room on an iPad or at home via an electronic health portal on their phones or computers. Such innovations can also reduce provider load and clinical workflow burden, such as having screening results prepopulated into electronic health records and best practice alerts for providers built into the health record system to signal when a patient may need further intervention or referral to treatment. An initial pilot randomized trial is needed to provide preliminary data on efficacy of iHeLP in promoting tobacco cessation in this population, with the longer-term goal of reducing Medicaid disparities.

Author Contributions All authors contributed to the study conception and design. Material preparation, data collection, and analysis were performed by JMB. The first draft of the introduction was written by KJS-H, the methods and results by JMB, and the discussion by KJS-H and LZ. All authors commented on the previous versions of the manuscript, as well as the revision drafts. All authors read and approved the final and revised manuscripts. Dr. KJS-H is now at the Michigan Public Health Institute, 2436 Woodlake Cir, Okemos, MI 48864 USA.

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Data Availability Available upon request.

Code Availability Available upon request.

Declarations

Conflict of interest Jordan M. Braciszewski, Kelsey J. Sala-Hamrick, Logan Zelenak, Jordan Gootee, Farah Elsis, Jonathan Ottolini, Ana Lanier, Suzanne M. Colby, and Brian K. Ahmedani have no relevant financial or non-financial interests to disclose.

Ethical Approval This study was approved by the Henry Ford Health Institutional Review Board.

Consent to Participate Informed consent was obtained from all individual participants included in the study.

Consent for Publication Patients signed informed consent regarding publishing their data.

Human and Animal Rights This study was approved by the Henry For Health System Institutional Review Board and was performed in accordance with the ethical standards noted in the 1964 Declaration of Helsinki and its later amendments.

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