Mobile Health Access and Use Among Individuals With or At Risk for Cardiovascular Disease: 2018 Health Information National Trends Survey (HINTS)

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***Background*—**Mobile health (mHealth) technologies can deliver interventions to prevent and manage cardiovascular disease (CVD), but mHealth uptake among those with or at risk for CVD remains incompletely explored. Therefore, in this group, we assessed the prevalence of mHealth access and usage, and the association between CVD risk and mHealth uptake.

***Methods and Results*—**Data were from 3248 adults in the 2018 Health Information National Trends Survey. We defined CVD risk as reporting a heart condition, diabetes mellitus, hypertension, and/or current smoking (n=1903). Multivariable logistic regression, adjusting for demographics, was used to assess the relationship between CVD risk and mHealth uptake. Most individuals with CVD risk owned a smartphone (73%, 95% CI: 69%–76%) and 48% (95% CI: 44%–52%) had a health app. Among men, those with CVD risk were more likely to use a wearable device (odds ratio 2.43, 95% CI: 1.44–4.10) than those without CVD risk, while there was no difference among women. In both sexes, CVD risk was associated with sharing information from a smartphone/wearable with a clinician (odds ratio 1.63, 95% CI 1.12–2.35 in women; odds ratio 3.99, 95% CI 2.30–6.95 in men). However, there was no difference in the odds of using mHealth to track health progress, make health decisions, aid healthcare discussions, or text a clinician.

***Conclusions*—**In a nationally representative sample, there was high prevalence of smartphone ownership but incomplete mHealth uptake. Having CVD or its risk factors was associated with sharing information from smartphone/wearables, suggesting potential to leverage clinically validated mHealth interventions for CVD prevention. **(*J Am Heart Assoc*. 2019;8:e014390. DOI: 10.1161/JAHA.119.014390.)**

Key Words: cardiovascular disease • epidemiology • mobile health • smartphone • wearable

Cardiovascular disease (CVD) is the leading cause of global morbidity and mortality and is preventable by controlling risk factors like smoking and physical inactivity, diabetes mellitus, hypertension, and hyperlipidemia.[1] Mobile technology may enhance current population prevention strategies, as 92% of US adults own a cell phone and 81% own a smartphone in 2019.[2] With the rapid growth of mobile device ownership and the growing market of health-related mobile apps, there is potential for mobile health (mHealth) interventions to facilitate the prevention and management of CVD through risk factor modification.[1] Contemporary mHealth access and usage in the CVD population has not been fully investigated.

Much of the initial interest in mHealth has focused on cardiology patients, given the range of monitoring tools available, including ECG and heart rate sensors,[3] physical activity tracking,[4] and blood pressure monitoring.[5] mHealth is also suited for interventions addressing risk factors such as smoking and diabetes mellitus.[6,7] Understanding the current patterns of mHealth access and use among the CVD primary and secondary prevention populations would aid in the development, clinical validation, and dissemination of CVD-related mHealth interventions.

We aimed to fill this gap by using most recent data from the 2018 Health Information National Trends Survey (HINTS) 5, Cycle 2 data set, a nationally representative survey of the US population. We assessed: (1) the prevalence of mHealth access and use in individuals with CVD or its risk factors, compared with those without CVD or risk factors, and (2) the association of having known CVD or risk factors with mHealth access and use.

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Methods

Data Source

This study used publicly available data (see https://hints.cancer.gov) from the 2018 HINTS 5, Cycle 2 data set, a nationally representative mailed survey of non-institutionalized adults in the United States aged ≥18 years, which focuses on health information and includes questions on mHealth. HINTS 5, Cycle 2 was administered from January 26 through May 2, 2018 with 3527 complete respondents.[8] The survey uses 2-stage stratified random sampling, which first selects households from residential addresses in the United States and then selects 1 adult within each household.[8] The sampling frame was a database of addresses grouped into 2 sampling strata, high-minority strata (defined as census tracts with at least 34% population proportion of African Americans or Hispanics) and low-minority strata. The household response rate was 23% in high-minority strata (which were oversampled) and 37% in low minority strata. The HINTS survey weights reflect selection probabilities and compensate for non-response. Weights were demographically calibrated using data from the American Community Survey (age, sex, educational attainment, race, ethnicity, and Census region) and HINTS-reported insurance status and cancer status.[8]

For this analysis, we excluded individuals with cancer diagnosis in the past 5 years, as mHealth usage among cancer patients would more likely be related to the cancer diagnosis rather than for CVD prevention or management. Analyses using HINTS database met criteria for non-human subjects' research by the Johns Hopkins University School of Medicine institutional review board, and this analysis did not require review.

mHealth Uptake Measures

mHealth uptake was assessed from responses to 9 survey questions listed in Table S1. The measures included: smartphone ownership, tablet ownership, having a health or wellness app, using a smartphone/tablet to track progress towards a health goal, using smartphone/tablet to help make a health decision, using an electronic device ("wearable") to monitor health (eg Fitbit, blood pressure monitor, blood glucose monitor), sharing information from smartphone/wearable with a clinician, using smartphone/tablet to aid discussion with clinicians, and texting with a clinician.

CVD Risk Factors

Having known CVD was derived from the question "Has a doctor or other health professional ever told you that you had a heart condition such as heart attack, angina or congestive heart failure?" Cardiovascular risk factors assessed included diabetes mellitus ("Has a doctor or other health professional ever told you that you had diabetes or high blood sugar?"), hypertension ("Has a doctor or other health professional ever told you that you had high blood pressure or hypertension?"), and current smoking. Current smoking was based on a smoking status variable derived by HINTS (current, former, never). HINTS derived this variable from a combination of "Have you smoked at least 100 cigarettes in your entire life?" and "How often do you now smoke cigarettes?" (responses include "every day," "some days," and "never"). Having known CVD or CVD risk factors was defined by reporting at least 1 of the following conditions (heart condition, diabetes mellitus, hypertension, or current smoking), based on the conditions included in the pooled cohort equations for cardiovascular risk assessment.[9]

Statistical Analysis

Demographic characteristics were described as the weighted proportion among the subpopulation with or at risk for CVD and the subpopulation without CVD or risk factors. Prevalence estimates and standard errors were calculated using survey weighting and Taylor series variance estimation according to HINTS analytics recommendations.[8] Pearson Chi-squared assessed differences in characteristics between groups. Multivariable logistic regression, using survey weighting, estimated the odds ratio for mHealth uptake, in relationship to CVD risk status. Adjustment variables were introduced into the model in a 2-tier process: age was initially adjusted for (age-adjusted model), followed by controlling for race/ethnicity, education, annual household income, health insurance status, and urban/rural location (fully adjusted model). Interactions between CVD risk status and other covariates were also assessed. All analyses were conducted using Stata version 15.1 (StataCorp, College Station, TX). We considered $P<0.05$ to indicate statistical significance. To adjust for multiple comparisons, we calculated the adjusted P values to control for the false discovery rate. We used the Benjamini-Hochberg procedure[10] with a false discovery rate of 0.10.

Results

The analysis included a sample size of 3248 participants after excluding 256 individuals with cancer diagnosed in the past 5 years. Table 1 shows the weighted prevalence of demographic characteristics in populations with or at risk of CVD versus those without known CVD or risk factors. Compared with individuals without CVD or risk factors, those with CVD or risk factors were older and more often men, non-Hispanic

Table 1. Demographics Characteristics by Presence of History of or Risk Factors for CVD

	All Participants (N=3248)	No CVD or Risk Factors (n=1345)	Known CVD or CVD Risk Factors (n=1903)	Unadjusted *P* Value (χ^2)
	% US Adult Population Weighted Estimate (n)			
Age				
18–24 y	24.0 (400)	37.4 (296)	11.2 (104)	<0.001
35–49 y	26.7 (637)	28.2 (367)	25.3 (270)	
50–65 y	29.2 (1031)	24.7 (414)	33.6 (617)	
≥65 y	20.0 (1180)	9.7 (268)	29.9 (912)	
Sex				
Women	51.3 (1931)	56.4 (888)	46.3 (1043)	0.001
Men	48.7 (1278)	43.6 (449)	53.7 (829)	
Race/Ethnicity				
Non-Hispanic white	64.2 (1821)	65.2 (805)	63.2 (1016)	0.0130
Non-Hispanic black	11.0 (420)	8.0 (119)	13.9 (301)	
Hispanic	16.3 (440)	17.2 (208)	15.4 (232)	
Non-Hispanic other	8.5 (254)	9.6 (126)	7.5 (128)	
Education				
Less than high school	9.1 (254)	5.7 (66)	12.3 (188)	<0.001
High school graduate	22.3 (575)	18.1 (171)	26.3 (404)	
Some college	39.7 (958)	39.3 (327)	40.2 (631)	
Bachelor's degree or more	28.9 (1420)	36.9 (765)	21.3 (655)	
Household income				
<$20 000	17.8 (536)	15.4 (157)	20.2 (379)	<0.001
$20 000 to <$35 000	11.7 (391)	9.8 (125)	13.5 (266)	
$35 000 to <$50 000	13.3 (376)	10.5 (140)	16.1 (236)	
$50 000 to <$75 000	17.8 (530)	17.5 (228)	18.0 (302)	
≥$75 000	39.5 (1051)	46.8 (573)	32.1 (478)	
Health insurance				
Private or other insurance	59.2 (1601)	70.5 (887)	48.2 (714)	<0.001
Medicare/Medicaid	32.0 (1417)	21.4 (359)	42.3 (1058)	
Uninsured	8.8 (174)	8.0 (78)	9.6 (96)	
Location				
Urban	86.5 (2800)	88.1 (1174)	84.9 (1626)	0.116
Rural	13.5 (448)	11.9 (171)	15.1 (277)	

Population size for all participants=237 035 958. CVD indicates cardiovascular disease.

black, less educated, with lower income, and Medicare/Medicaid insured.

Prevalence of mHealth Access and Usage

Figure depicts the weighted prevalence of mHealth access and usage by presence of known CVD or CVD risk factors. With regards to mHealth access, 73% of individuals with or at risk of CVD owned a smartphone (1269/1857, 95% CI: 69%–76%), 54% owned a tablet (957/1857; 95% CI: 40%–58%), 46% owned both a smartphone and tablet (805/1857; 95% CI: 43%–50%), and 48% had a health/wellness app on their mobile device (650/1144, 95% CI: 50%–61%). Forty-three percent of individuals with or at risk of CVD reported using a smartphone/tablet to track progress towards a health goal (547/1409, 95% CI: 39%–46%). These measures of mHealth uptake were less prevalent among individuals with CVD risk than among those without (Table S2). However, the

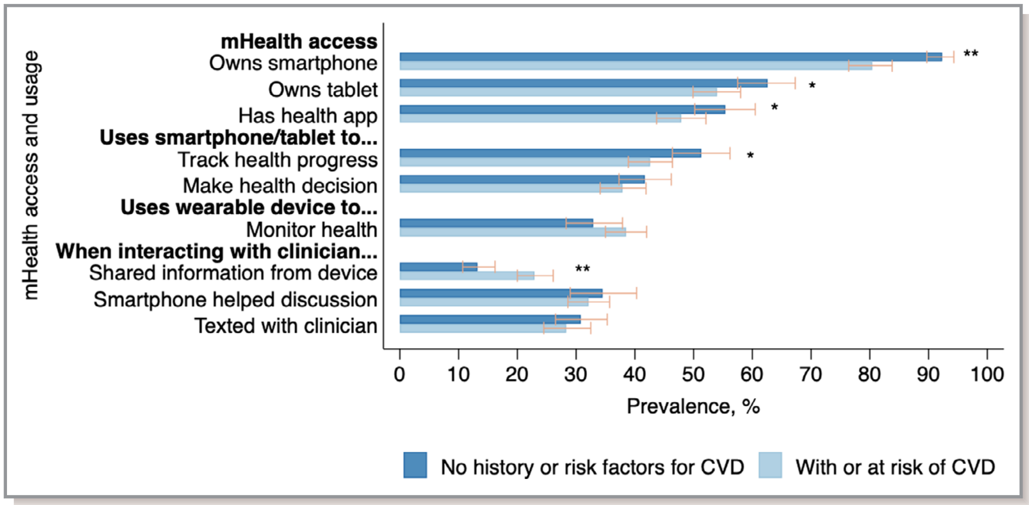

Figure. Weighted US adult population prevalence estimates and 95% CI of mHealth access and usage. *unadjusted $P<0.05$; **unadjusted $P<0.01$. CVD indicates cardiovascular disease; mHealth, mobile health.

prevalence of sharing information from a smartphone/wearable with a clinician was higher among those with CVD risk (23%, 457/1748, 95% CI: 20%–26%) than among those without CVD risk (13%, 183/1254, 95% CI 11%–16%).

Among individuals with or at risk of CVD, 38% (546/1404, 95% CI: 34%–42%) used a smartphone/tablet to make a health decision, 39% (766/1836, 95% CI: 35%–42%) used a wearable device to monitor health, 32% (501/1402, 95% CI: 29%–36%) used a smartphone/tablet to aid in discussion with a clinician, and 28% (556/1852, 95% CI: 25%–33%) had texted with a clinician. The prevalence of these mHealth usage measures was similar between those with CVD risk and those without CVD risk (Table S2).

Relationship Between Known CVD or CVD Risk Factors and mHealth Access and Usage

In the entire cohort, having CVD risk was associated with higher odds of using a wearable device or sharing information from a smartphone/wearable with a clinician after controlling for age and sex (Table S3). In an age-adjusted model, there were interactions between sex and CVD risk with regards to using a wearable device to monitor health (P=0.012) and sharing information from a smartphone/wearable (P=0.009). Thus, the entire cohort was stratified by sex and the associations between CVD risk and mHealth outcome measures were examined for men and women separately.

After stratifying the analysis by sex and adjusting for age and other demographic confounders, there was no association between having CVD risk and the odds of owning a smartphone/tablet, having a health app, or using a smartphone/tablet to track progress towards a health goal (Table 2). There was also no difference in the odds of using smartphone/tablet to help in discussion with a clinician or to text a clinician.

While there was no difference in the estimated prevalence of using a wearable device to monitor health between those with and without CVD risk, there was a sex-specific difference in the odds of using a wearable device, after adjusting for age and other demographic confounders. Men with known CVD or CVD risk factors were more likely to use a wearable device to monitor health compared with men without CVD risk (fully adjusted OR 2.43, 95% CI: 1.44–4.10). There was no association between CVD risk and wearable device use among women. The higher estimated prevalence of sharing information from a smartphone or wearable with a clinician among individuals with known CVD or risk factors was reflected in the adjusted models. Among both men and women, having known CVD or risk factors was associated with greater odds of sharing information from a smartphone or wearable device with a clinician, though the odds ratios were higher among men than women (fully adjusted OR 1.63, 95% CI 1.12–2.35 in women; fully adjusted OR 3.99, 95% CI 2.30–6.95 in men). All the raw P values in Table 2 that were below the conventional 0.05 level in the fully adjusted models remained significant after adjustment for multiple comparisons.[10]

Discussion

In this nationally representative sample, we found that although smartphone ownership was common among adults with or at risk of CVD, the uptake of mHealth usage was lower than among those without CVD risk. Among men, those with CVD risk were more likely to use a wearable device than those without CVD risk. We did not observe a difference among

Table 2. Multivariable Logistic Regression Models for Association Between Having Known CVD or CVD Risk Factors and mHealth Access and Usage, Stratified by Sex

	Women				Men			
	Age-Adjusted OR (95% CI)	*P* Value	Fully Adjusted OR* (95% CI)	*P* Value	Age-Adjusted OR (95% CI)	*P* Value	Fully Adjusted OR* (95% CI)	*P* Value
mHealth access; has a								
Smartphone	0.74 (0.50–1.10)	0.136	1.23 (0.75–2.02)	0.416	0.78 (0.45–1.35)	0.371	1.28 (0.75–2.18)	0.369
Tablet	0.72 (0.54– 0.96)	0.027	0.90 (0.64–1.27)	0.546	1.08 (0.70–1.68)	0.720	1.44 (0.89–2.32)	0.138
Health/wellness app	0.96 (0.70–1.30)	0.780	1.24 (0.85–1.81)	0.262	0.87 (0.56–1.33)	0.507	1.12 (0.68–1.84)	0.649
Used smartphone/tablet to								
Track health progress	1.09 (0.78–1.52)	0.626	1.42 (0.94–2.14)	0.099	1.09 (0.68–1.73)	0.723	1.36 (0.80–2.32)	0.254
Make health decision	1.10 (0.80–1.51)	0.553	1.25 (0.89–1.77)	0.199	0.93 (0.63–1.38)	0.711	1.06 (0.68–1.63)	0.802
Used wearable device† to								
Monitor health‡	1.06 (0.78–1.44)	0.699	1.26 (0.86–1.84)	0.239	1.86 (1.20–2.86)	0.006	2.43 (1.44–4.10)	0.001
When interacting with a clinician								
Shared info from smartphone/wearable‡	1.51 (1.08– 2.13)	0.017	1.63 (1.12–2.35)	0.010	3.01 (1.83–4.95)	0.000	3.99 (2.30–6.95)	0.000
Smartphone/tablet helped discussion	1.00 (0.71–1.41)	0.995	1.24 (0.82–1.87)	0.305	1.02 (0.67–1.57)	0.913	1.38 (0.89–2.14)	0.153
Sent/received text with a clinician‡	0.97 (0.69–1.37)	0.861	1.33 (0.91–1.94)	0.140	0.97 (0.62–1.53)	0.901	1.09 (0.68–1.77)	0.714

Reference group is no history or risk factors for CVD. CVD indicates cardiovascular disease; mHealth, mobile health; OR, odds ratio.
*Adjusting for age, race, education, household income, health insurance, and urban/rural location.
†Eg, Fitbit, blood pressure monitor, or blood glucose monitor.
‡In prior 12 months.

women. Both men and women with CVD risk were more likely to share information from a smartphone or wearable with their clinician. However, there was no difference in the adjusted odds of using mHealth to track health progress, make health decisions, help in discussion with clinicians, or text a clinician. Less than half of individuals with known CVD or risk factors use mHealth, but they are more likely to share information from devices with their clinicians, suggesting potential to leverage clinically validated mHealth interventions for CVD.

This study expands on prior reports of mHealth access from national surveys. The Pew Research Center found that 81% of the US population owned a smartphone in 2019,[2] which is consistent with our finding that 73% of individuals with CVD risk and 89% of individuals without CVD risk owned a smartphone. Prior analyses of 2014 HINTS data reported that the prevalence of smartphone ownership was 63.8% among cigarette smokers,[11] and the prevalence of having a health app was 35.9% among the general population.[12] We found that in 2018, among individuals with or at risk of CVD (which includes cigarette smokers), the prevalence of smartphone ownership has increased to 73%, and the prevalence of having a health app has increased to 48%.

This study expands on and updates a study by Asan and colleagues[13] which used 2014 HINTS data. The 2018 HINTS data set includes more contemporary questions specifically targeted towards smartphone/tablet and wearable use in a healthcare setting, and this analysis includes current smokers in the group of patients at risk for CVD. In comparing both studies, it appears that over the interim 4 years, mHealth uptake remains confounded by demographic factors, but there are certain areas of mHealth usage that are independently associated with CVD and its risk factors. Asan and colleagues found that individuals with CVD, diabetes mellitus, or hypertension had higher odds of accessing personal health information through a website or app, while this analysis found that individuals with or at risk of CVD had higher odds of sharing information from a smartphone/wearable with a clinician and using a wearable to monitor health.

The presence of demographic confounders in this analysis corroborates results from a prior analysis of the 2014 HINTS data set, which revealed that among the general US population, younger age, higher education, higher income, health insurance coverage, living in urban area, and confidence in ability to take care of one's own health were associated with greater odds of health app ownership.[12] Furthermore, a separate US national survey found that individuals more likely to use health apps were younger, had higher incomes and education, were more likely Latino/

Hispanic, and had a BMI in the obese range.[14] This suggests that demographic factors play a significant role in the uptake of mHealth, and that having a health condition such as obesity may impact uptake as well. Although we did not find an association between CVD history or risk factors and having a health app, use of mHealth to achieve health goals, make health decisions, or aid in discussion with clinicians, this may be because of fitness and weight loss apps being more commonly used than apps targeted towards health conditions such as CVD or diabetes mellitus.[15]

A notable observation from this study was that men may be more inclined to use sensors and wearable devices and share that information with clinicians, if they have a health condition that provides a need for monitoring, such as hypertension, diabetes mellitus, smoking, or heart disease. These sex-specific trends warrant further study and suggest that development of mHealth interventions could be tailored by sex. Additionally, the increased odds of using wearable health monitoring devices among those at increased risk of CVD suggests potential for further uptake of sensor technology, such as monitors for physical activity, blood pressure, blood glucose, heart rate, and rhythm. However, given the unregulated nature of health apps, some sensors and interventions can be ineffective or even dangerous when not properly validated.[16]

Furthermore, it is unclear why there is a relatively large discrepancy between the ≈40% of individuals with CVD risk who used a smartphone/tablet or wearable to monitor health and the 23% who shared that information with a clinician. This may reflect a lack of integration of mHealth tools into clinician workflow, lack of time to address patient-monitored data during brief clinic visits, or potentially lack of access to formal medical care among mHealth users. Further research should address the factors contributing to how patients and clinicians use the data gathered from mHealth tools.

Strengths and Limitations

This study used a nationally representative data set to assess a comprehensive set of mHealth usage behaviors. It is also one of the first to assess mHealth usage among patients at increased risk of CVD and sets a baseline understanding of current access and usage in this population.

There were several unavoidable limitations to this study. First, this was a cross-sectional analysis of survey data and thus does not show causation. Second, the response rate for HINTS was low, raising concern for selection bias; however, survey weighting was calibrated to adjust for demographic variables correlating with non-response. There are inherent reporting errors and recall bias because of the self-report nature of the data, and responses may be limited by literacy levels, as HINTS is a mailed survey. Conversely, the individuals most technologically literate and inclined to use web-based communication may be less likely to respond to a mailed survey. It is also unclear from the questions specifically which apps, interventions, or monitoring devices participants used, or the extent of their clinical validation.

Furthermore, the current version of HINTS collects incomplete data on CVD history and risk factors. First, there were no questions on cholesterol levels or diagnosis of hyperlipidemia, so we were unable to specifically include participants with hyperlipidemia in the population of increased CVD risk, which may have biased our estimates. Second, the wording of the question assessing history of heart disease does not distinguish between atherosclerotic cardiovascular disease and other types of heart disease (eg, cardiomyopathy, arrhythmias, valvular disease, or congenital heart disease), thus there may have been some participants without atherosclerotic risk who were included in the CVD risk group, though this is likely to be a relatively small proportion of the group.

Conclusions

Despite a high prevalence of mHealth access, most mHealth usage measures were less prevalent among those with or at risk for CVD. Individuals with or at risk of CVD were more likely to use wearables, with the association more pronounced in men. Individuals with or at risk of CVD were also more likely to share information from smartphone or wearables with a clinician. There is potential for expansion of clinically validated mHealth interventions to reach a larger population for CVD prevention and management.

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Disclosures

Dr Martin is a founder of and holds equity in Corrie Health, which intends to further develop the platform. This arrangement has been reviewed and approved by the Johns Hopkins University in accordance with its conflict of interest policies. He has served as a consultant to Sanofi, Regeneron, Amgen, Quest Diagnostics, Akcea, Novo Nordisk, and Esperion. The remaining authors have no disclosures to report.

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SUPPLEMENTAL MATERIAL

Table S1. Health Information National Trends Survey (HINTS 5 Cycle 2) survey questions assessing mobile health (mHealth) access and usage.

Outcome Measure	**Survey Question(s)**
Owns smartphone	"Please indicate if you have a - Smartphone (for example, an iPhone, Android, Blackberry, or Windows Phone)"
Owns tablet	"Please indicate if you have a - Tablet computer (for example, an iPad, Samsung Galaxy, Motorola Xoom, or Kindle Fire)."
Has a health/wellness app	"On your tablet or smartphone, do you have any apps related to health and wellness?"
Used smartphone/tablet to track health progress	"Has your tablet or smartphone helped you track progress on a health-related goal, such as quitting smoking, losing weight, or increasing physical activity?"
Used smartphone/tablet to make health decision	"Has your tablet or smartphone helped you make a decision about how to treat an illness or condition?"
Used wearable to monitor health	"Other than a tablet or smartphone, have you used an electronic device to monitor or track your health within the last 12 months?"
When interacting with a clinician, shared information from smartphone or wearable	"Have you shared health information from either an electronic monitoring device or smartphone with a health professional within the last 12 months?"
When interacting with a clinician, smartphone or tablet helped discussion	"Has your tablet or smartphone helped you in discussions with your health care provider?"
Sent/received text with a clinician	"Have you sent or received a text message from a doctor or other health care professional within the last 12 months?"

Table S2. Weighted prevalence and 95% CI of mHealth Access and Usage outcomes, among all participants, those without CVD risk, and those with CVD risk.

		All participants (n=3248)	**No CVD or risk factors (n=1345)**	**Known CVD or CVD risk factors (n=1903)**	**Unadjusted P-value (Chi^2)**
		% US adult population weighted estimate (95% CI)			
mHealth Access	Owns smartphone	80.5 (78.2, 82.7)	88.5 (85.5, 90.9)	72.8 (68.9, 76.3)	<.001
	Owns tablet	58.2 (55.2, 61.2)	62.6 (57.5, 67.3)	54.0 (49.9, 58.0)	0.013
	Owns a smartphone and tablet	1562/3178 52.5 (49.4, 55.6)	757/1321 58.8 (53.6, 63.8)	805/1857 46.4 (42.6, 50.2)	<.001
	Has a health/wellness app	51.9 (48.6, 55.2)	55.4 (50.2, 60.5)	47.9 (43.7, 52.1)	0.029
Uses smartphone or tablet to…	…Track health progress	47.2 (44.4, 50.1)	51.3 (46.4, 56.2)	42.6 (38.8, 46.4)	0.012
	…Make health decision	39.9 (36.9, 43.0)	41.7 (37.3, 46.2)	37.9 (34.1, 41.9)	0.200
Uses wearable device* to…	…monitor health†	35.7 (32.9, 38.6)	32.9 (28.3, 37.9)	38.5 (35.0, 42.0)	0.080
When interacting with clinician…	…shared info from smartphone/ wearable†	18.1 (16.0, 20.4)	13.2 (10.7, 16.2)	22.9 (20.0, 26.1)	<.001
	…smartphone/ tablet helped discussion	33.4 (29.7, 37.2)	34.5 (29.0, 40.3)	32.1 (28.6, 35.7)	0.435
	Sent/received text with a clinician†	29.5 (26.5, 32.7)	30.8 (26.5, 35.3)	28.3 (24.5, 32.5)	0.390

* E.g. Fitbit, blood pressure monitor, or blood glucose monitor
† In prior 12 months

Unadjusted p-value reflects prevalence comparison between those with CVD or CVD risk factors and those without. CVD: cardiovascular disease. CI: confidence interval. mHealth: mobile health.

Table S3. Age and sex adjusted associations between having known cardiovascular disease (CVD) or CVD risk factors and mHealth uptake among the entire cohort.

	Age and sex adjusted OR (95% CI)	**P-value**
mHealth access; has a…		
…smartphone	0.75 (0.52, 1.08)	0.122
…tablet	0.89 (0.68, 1.15)	0.355
…health/wellness app	0.91 (0.69, 1.20)	0.505
Used smartphone/tablet to…		
…track health progress	1.09 (0.81, 1.46)	0.575
…make health decision	1.02 (0.80, 1.30)	0.863
Used wearable device* to…		
…monitor health†	1.37 (1.05, 1.79)	0.022
When interacting with a clinician…		
…shared info from smartphone/ wearable†	1.97 (1.51, 2.57)	<0.001
…smartphone/tablet helped discussion	1.02 (0.80, 1.29)	0.897
Sent/received text with a clinician†	0.97 (0.72, 1.29)	0.814

* E.g. Fitbit, blood pressure monitor, or blood glucose monitor
† In prior 12 months

Reference group is no CVD risk. OR: odds ratio. CI: confidence interval.