


Use of At-Home Medical Tests Among Older US Adults: A Nationally Representative Survey

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Abstract

The availability of direct-to-consumer, at-home medical tests has grown over the last decade, but it is unknown how frequently older adults purchase at-home tests, how they perceive such tests, and how interested they are in using at-home tests in the future. We conducted a cross-sectional, nationally representative survey of non-institutionalized US adults aged 50 to 80 about their previous use of, perceptions of, and future intentions to use at-home medical tests. We found that nearly half of older adults (48.1%) have purchased an at-home medical test (95% CI 45.2%-51.0%), including 32.0% (95% CI 29.3%-34.8%) who purchased a COVID-19 test, 16.6% (95% CI 14.7%-18.7%) who purchased an at-home DNA or genetic test, 5.6% (95% CI 4.5%-7.0%) who purchased a screening test for cancer, and 4.4% (95% CI 3.4%-5.6%) who purchased a test for an infection other than COVID-19. Compared with White, non-Hispanic adults, Black, non-Hispanic adults were less likely to have purchased an at-home test (35.5% vs 49.6%, $P < .01$). Those with a college degree and those with an annual household income greater than \$100K were more likely than others to have purchased at-home tests (55.5% vs 42.0%, $P < .01$; 60.6% vs 39.0%, $P < .001$, respectively). Most older adults had positive perceptions about at-home tests and expressed interest in using at-home tests in the future. At-home medical testing is now common among older adults. Clinicians should be familiar with different tests that patients can purchase and be prepared to discuss the potential advantages and disadvantages of at-home testing.

Keywords

direct-to-consumer testing, COVID-19, survey, aging research

What do we already know about this topic?

The availability of direct-to-consumer, at-home medical tests has grown over the last decade and increased during the COVID-19 pandemic.

How does your research contribute to the field?

This study presents the first national estimates for purchase of, perceptions of, and interest in future use of at-home medical tests among older US adults.

What are your research's implications toward theory, practice, or policy?

Clinicians should be prepared to discuss the potential advantages and disadvantages of at-home tests with their patients; and when these tests are reliable and serve a potential public health benefit, policymakers, insurers, and healthcare systems should consider the racial, ethnic, and socioeconomic differences highlighted in this research.

Introduction

Early restrictions due to the COVID-19 pandemic limited access to routine primary care services and yet, also necessitated a way to provide patients with access to rapid, reliable

medical tests that have historically been offered via primary care.¹ In 2021 the Food and Drug Administration (FDA) granted emergency use authorization (EUA) to several companies to sell and market at-home COVID-19 antigen tests.² In January 2022, the Biden administration began making



COVID-19 test kits freely available to every US household, marking a massive, nationwide initiative to increase direct-to-consumer, at-home testing.³

Throughout the US, individuals can now purchase a variety of screening, diagnostic, and other informational medical tests directly from pharmacies, supermarkets, and online companies without the assistance of a clinician. Using saliva, respiratory secretions, urine, or blood, individuals can test for a variety of conditions and biomarkers of disease such as urinary tract infections, sexually transmitted infections, hormone levels, certain cancers, and genetic polymorphisms.⁴ Some of these tests can be conducted completely at home (eg, COVID-19 antigen tests) and others require a self-collected specimen to be mailed to outside companies and laboratories for testing (eg, direct-to-consumer genetic tests). Although different, common to these various types of at-home tests is their potential to quickly provide individuals with information that can impact the health and well-being of themselves and others.⁵⁻⁸

However, numerous concerns have been raised about the use of at-home medical tests. For example, the validity, reliability, and utility of at-home tests is often uncertain.⁹⁻¹² Some individuals may have difficulty understanding the implications of their results.¹³⁻¹⁵ Because at-home tests depart from the traditional model of medical testing within an established patient-clinician relationship, when at-home tests are used clinicians can be excluded from health-related evaluations and decisions. This can result in a range of unintended consequences^{16,17} including a potential cascade of increased costs to patients and healthcare systems.⁶ Older adults, who on average have a greater number of medical conditions than other populations,¹⁸ may be particularly vulnerable to such negative consequences.

Despite these concerns, little is known about how many patients have purchased at-home tests and their perceptions of these tests. Existing studies have generally focused on a single type of at-home test,¹⁹ have not specifically addressed use among older adults,²⁰ or have focused on a different demographic of high-risk patients.²¹ We conducted a nationally representative survey to better understand how many older US adults have purchased at-home tests, their perceptions of these tests, how often they shared their results with

their primary care clinicians, and their intentions to use at-home tests in the future.

Methods

Study Design

This study was conducted through the University of Michigan National Poll on Healthy Aging (NPHA). The NPHA is a recurring, cross-sectional survey of US adults aged 50 to 80 years on health and health care issues affecting older adults.²² Samples are drawn from the NORC AmeriSpeak Panel[®], a probability-based panel designed to be representative of the non-institutionalized, US population aged 50 to 80.²³ Panel participants can complete surveys online or by phone. Data were collected in January 2022. Overall, 2163 respondents completed the survey (1971 by web and 192 by phone). Median survey duration was 12 min. The survey completion rate was 75.2%. This study was determined to be exempt by the University of Michigan Institutional Review Board.

Survey Instrument

Participants were asked “Have you ever bought an at-home test for COVID-19?” and “Have you ever bought any other types of at-home medical tests?” Options for other types of at-home tests included: (1) test for an infection other than COVID-19 (such as HIV, urinary tract infection); (2) screening test for cancer (such as colon cancer, prostate cancer); (3) DNA or genetic test (such as 23andMe, Ancestry.com); (4) hormone test (such as testosterone, menopause); (5) food sensitivity test, (6) allergy test; or (7) some other test. Participants were asked about *purchase* of at-home tests rather than *use* of at-home tests in order to draw a distinction from any tests ordered by a doctor, those covered by insurance and the free COVID-19 test kits made available by government agencies and community organizations. Home monitoring tests such as ambulatory blood pressures and glucose monitoring were excluded. Participants who had purchased an at-home test were asked if they shared their results with their primary care provider. All participants were asked how interested they were in using each type of at-home test

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in the future. To assess participants' overall perceptions of at-home tests, they were asked to indicate their level of agreement that at-home tests "are more convenient than tests through my health care providers"; "can be trusted to give reliable results"; "are regulated by the government"; "are a good value"; and "should be discussed with my doctor." The full survey instrument is available as a Supplemental Material.

Sociodemographic and Health Outcome Measures

Data on sociodemographic characteristics were collected by NORC from AmeriSpeak[®] panel participants and assigned to categories for age group, gender, race and ethnicity, marital status, education, and annual household income. Data on self-reported physical health status and mental health status were also collected.

Statistical Analysis

Multivariable logistic regression models were estimated to measure associations between respondents' age, gender, race/ethnicity, income, education, marital status, and health status with the following dependent variables: any previous purchase of an at-home medical test, any previous purchase of specific types of at-home tests, overall perceptions of at-home tests, and interest in future use of different types of at-home tests. Given the relatively low prevalence of purchase of allergy, food sensitivity, and hormone tests, purchase of these tests was combined into a single variable for the models estimating previous purchase of at-home tests and future interest in at-home tests. Previous purchase of any at-home test was added as an independent variable in the models to predict overall perceptions of at-home medical tests and interest in future use. The primary outcomes are reported as marginal estimates of the models. Frequencies of sharing results of at-home tests with primary care providers are reported as unadjusted bivariate associations due to relatively small sample sizes for previous purchase of some types of at-home tests. Responses for level of interest in future use of different types of at-home tests were dichotomized as being interested or not interested in each test type. Responses to statements about at-home test perceptions were dichotomized into agree or disagree. All analyses used sample weights to yield nationally representative estimates. Missing or "no answer" responses were excluded. All analyses were performed using STATA 17.

Results

Purchase of At-Home Medical Tests

Estimates of population characteristics are shown in the Supplemental Material. Nearly half of adults aged 50 to 80

(48.1%) reported having purchased any type of at-home medical test (95% CI 45.2%-51.0%, Table 1). Almost one-third (32.0%, 95% CI 29.3%-34.8%) had purchased a COVID-19 test, 16.6% (95% CI 14.7%-18.7%) had purchased an at-home DNA or genetic test, and 5.6% (95% CI 4.5%-7.0%) had purchased a screening test for cancer. Few older adults (4.4%, 95% CI 3.4%-5.6%) had purchased a test for an infection other than COVID-19, and 7.8% (95% CI 6.3%-9.5%) had purchased some other type of at-home test (eg, a hormone, allergy, or food sensitivity test).

In multivariable analyses, Black, non-Hispanic adults were less likely to have purchased any type of at-home test compared to White, non-Hispanic adults (35.5% vs 49.6%, $P = .006$). Black, non-Hispanic adults were also less likely to have purchased a test for an infection other than COVID-19 (0.5% vs 4.9%, $P < .001$) and a DNA/genetic test (9.6% vs 17.3%, $P = .026$). Older adults with a college degree (vs high school or less) and those with a household income greater than \$100,000 (vs less than \$30,000) were more likely to have purchased any type of at-home test (55.5% vs 42.0%, $P = .001$; 60.6% vs 39.0%, $P < .001$, respectively). Similar differences in purchase of an at-home tests by education and income were observed for COVID-19 tests (36.4% vs 28.5%, $P = .034$; 44.9% vs 24.5% $P < .001$, respectively) and DNA/genetic tests (23.6% vs 9.6%, $P < .001$; 21.9% vs 12.1% $P = .011$, respectively). Women were more likely than men to have purchased an at-home test for an infection other than COVID-19 (5.6% vs 2.7%, $P = .016$).

Perceptions of At-Home Medical Tests

Most older adults agreed that at-home medical tests are more convenient than tests through their health care provider (75.1%, 95% CI 72.5%-77.6%), can be trusted to give reliable results (59.9%, 95% CI 57.1%-62.8%), are regulated by the government (54.8%, 95% CI 51.9%-57.7%), and are a good value (66.0%, 95% CI 63.2%-68.7%). In multivariable analyses, Black, non-Hispanic and Hispanic adults were less likely than White, non-Hispanic adults to agree that at-home tests are more convenient (65.2% vs 78.4%, $P = .002$, 66.9% vs 78.4% $P = .002$, respectively), but Black, non-Hispanic adults were more likely than White, non-Hispanic adults to agree that at-home tests are a good value (76.7% vs 65.0%, $P = .012$). Those with some college or at least a bachelor's degree were more likely than those with high school education or less to agree that at-home tests are more convenient (77.4% and 82.4% vs 68%, $P = .002$ and $P < .001$, respectively). Those with annual household incomes of at least \$100,000 were more likely to agree that at-home tests are more convenient (80.7% vs 71.9%, $P = .043$) and are a good value (71.2% vs 61.2%, $P = .04$). Compared with those who had not previously purchased an at-home test, those who had previously purchased an at-home test had significantly higher prevalence of agreement with each of the perception statements (Table 2).

Table 1. Adjusted Prevalence of Purchase of Different Types of at Home Medical Tests.

Variable	Any test (n=2105)	COVID-19 (n=2103)	Other infection (n=2094)	Cancer screening (n=2089)	DNA/genetic test (n=2091)	Hormone/allergy/ food sensitivity/other (n=2105)
Age, % (95% CI)						
50-64	48.9 (45.0-52.8)	34.2 (30.5-37.9)	4.8 (3.1-6.4)	5.1 (3.4-6.7)	15.0 (12.4-17.7)	9.4 (7.1-11.6)
65-80	47.3 (43.3-51.3)	29.6 (25.8-33.4)	3.4 (2.1-4.7)	6.2 (4.3-8.1)	18.8 (15.9-21.6)	5.3 (3.6-7.0)**
Gender, % (95% CI)						
Male	45.3 (41.3-49.3)	30.2 (26.6-33.9)	2.7 (1.4-4.0)	5.5 (3.6-7.1)	15.7 (13.1-18.4)	6.4 (4.4-8.4)
Female	50.8 (46.9-54.7)	34.1 (30.2-38.0)	5.6 (3.9-7.3)*	5.8 (3.9-7.7)	17.5 (14.6-20.4)	8.9 (6.5-11.3)
Race/Ethnicity, % (95% CI)						
Black	35.5 (26.7-44.4)**	24.4 (16.8-32.0)	0.5 (0.0-1.0)***	4.5 (0.8-8.2)	9.6 (4.6-14.6)*	7.1 (1.2-13.0)
Hispanic	52.5 (44.6-60.4)	33.9 (25.8-41.9)	4.6 (1.1-8.2)	3.4 (0.9-5.9)	21.8 (16.1-27.6)	8.9 (4.8-13.0)
White	49.6 (46.3-52.8)	32.9 (29.9-36.0)	4.9 (3.5-6.2)	6.4 (4.8-8.0)	17.3 (15.0-19.6)	7.1 (5.5-8.7)
Other race/ethnicity	45.7 (31.6-59.8)	33.1 (19.6-46.6)	1.9 (-0.9 to 4.7)	3.3 (-0.6 to 7.2)	11.2 (3.4-19.0)	11.4 (2.9-19.9)
Education, % (95% CI)						
High school or less	42.0 (36.3-47.7)	28.5 (23.1-33.9)	4.4 (2.2-6.5)	4.7 (2.4-6.9)	9.6 (6.4-12.8)	6.7 (3.8-9.7)
Some college	47.8 (44.0-51.8)	31.6 (28.0-35.3)	3.9 (2.4-5.4)	5.5 (3.7-7.3)	16.8 (13.9-19.7)**	7.4 (5.3-9.6)
Bachelor's degree or higher	55.5 (50.8-60.2)**	36.4 (32.0-40.8)*	4.1 (2.4-5.8)	6.8 (4.5-9.1)	23.6 (19.6-27.6)***	8.8 (6.1-11.4)
Household income, % (95% CI)						
Less than \$30000	39.0 (31.9-46.1)	24.5 (17.9-31.2)	3.1 (0.5-5.7)	4.6 (1.9-7.2)	12.1 (7.4-16.7)	6.2 (3.0-9.4)
\$30000-less than \$60000	42.8 (37.4-48.2)	25.2 (20.3-30.1)	4.5 (2.2-6.8)	6.2 (3.3-9.1)	14.1 (10.3-18.0)	7.9 (4.8-10.9)
\$60000-less than \$100000	47.9 (42.2-53.6)	30.9 (25.8-36.1)	3.9 (1.9-6.0)	6.1 (3.7-8.4)	15.5 (12.0-19.1)	8.6 (5.2-12.0)
\$100000 or more	60.6 (54.5-66.7)***	44.9 (38.6-51.3)***	4.9 (2.4-7.5)	5.4 (2.9-7.8)	21.9 (17.5-26.4)*	7.6 (4.6-10.6)
Overall prevalence, ^a % (95% CI)	48.1 (45.2-51.0)	32.0 (29.3-34.8)	4.4 (3.4-5.6)	5.6 (4.5-7.0)	16.6 (14.7-18.7)	7.8 (6.3-9.5)

Note. Prevalences reported as marginal estimates with 95% confidence intervals. Models also adjusted for self-reported mental health, physical health, and marital status.

^aUnadjusted, overall weighted estimate with 95% CI.

* $P < .05$. ** $P < .01$. *** $P < .001$.

A large majority of older adults agreed that the results of at-home tests should be discussed with one's doctor (93.6%, 95% CI 92.1%-94.9%). Among those who had purchased each respective type of at-home test, 90.5% (95% CI 82.4%-95.0%) shared the result of an at-home cancer screening test with their primary care provider (PCP), 63.1% (95% CI 46.7%-76.9%) shared the result of some other type of at-home test (eg, hormone, food sensitivity, or allergy tests) with their PCP, 55.4% (95% CI 41.4%-68.5%) shared the result of an at-home test for an infection other than COVID-19 with their PCP, and 9.0% (95% CI 5.6%-13.9%) shared the result of an at-home DNA/genetic test with their PCP (Figure 1).

Interest in Future Use

Most older adults (82.4%, CI 80.1%-84.4%) were interested in using some type of at-home medical test in the future. Women and those with a bachelor's degrees or higher were more likely to report interest in using any type of at-home test in the future (87.4% vs 76.1%, $P < .001$; 88.5% vs 77.8%, $P = .011$, respectively). Compared with those with annual household incomes less than \$30,000, all other income groups were more likely to be interested in future use of at-home testing (Table 3).

Adults aged 65 to 80 were less likely than those aged 50 to 64 to report interest in future use of at-home tests other

than COVID-19 tests (Table 3). Women were more likely than men to express interest in future use of COVID-19 tests (74.6% vs 63.1%, $P < .001$), tests for infections other than COVID-19 (50.0% vs 34.6%, $P < .001$), DNA/genetic tests (44.2% vs 34.6%, $P = .001$), and other types of at-home tests such as hormone, allergy, or food sensitivity tests (50.1% vs 38.7%, $P < .001$). Compared with White, non-Hispanic adults, Black, non-Hispanic adults reported greater future interest in use of COVID-19 tests (79.3% vs 66.9%, $P = .005$) and DNA/genetic tests (49.8% vs 38.6%, $P = .033$). Hispanic adults, compared to White non-Hispanic adults, reported greater interest in future use of at-home tests for cancer screening (63.6% vs 53.9%, $P = .029$) and other at-home tests such as hormone, allergy, or food sensitivity tests (53.8% vs 43.0%, $P = .015$).

Those with bachelor's degrees or higher were more likely than those with lower levels of education to report interest in future use of every type of at-home test (Table 3). Individuals with household incomes of at least \$100,000 were more likely to report interest in future use of COVID-19 tests (76.0% vs 62.4%, $P = .003$) and other at-home tests such as hormone, allergy, or food sensitivity tests (48.0% vs 38.4%, $P = .049$). Those reporting fair or poor physical health were more likely than those reporting better physical health to be interested in purchasing other types of at-home tests such as hormone, allergy, or food sensitivity tests (51.8% vs 42.7%, $P = .013$). Those who had previously bought an at-home test

Table 2. Adjusted Prevalence of Perceptions About At-Home Medical Tests.

Variable	More convenient (n=2087)	Can be trusted (n=2070)	Are regulated by government (n=2034)	Good value (n=2017)	Should be discussed with my doctor (n=2077)
Age, % (95% CI)					
50-64	77.3 (73.9-80.7)	60.7 (56.8-64.7)	54.5 (50.3-58.6)	67.9 (64.2-71.6)	93.2 (91.2-95.2)
65-80	72.5 (68.8-76.1)	59.0 (55.0-62.9)	55.7 (51.6-59.9)	63.5 (59.6-67.3)	94.0 (92.3-95.8)
Gender, % (95% CI)					
Male	73.1 (69.4-76.7)	59.4 (55.6-63.3)	55.2 (51.1-59.4)	64.5 (60.8-68.3)	93.4 (91.5-95.4)
Female	77.0 (73.7-80.4)	60.5 (56.4-64.5)	54.8 (50.7-58.9)	67.3 (63.5-71.0)	93.6 (91.5-95.8)
Race/Ethnicity, % (95% CI)					
Black	65.2 (56.5-73.9)**	66.3 (57.7-74.9)	60.3 (50.9-69.7)	76.7 (69.2-84.3)**	94.4 (91.3-97.6)
Hispanic	66.9 (59.7-74.2)**	53.5 (45.4-61.6)	52.4 (44.4-60.4)	61.7 (53.4-69.9)	92.9 (89.0-96.8)
White	78.4 (75.7-81.1)	60.0 (56.8-63.1)	54.9 (51.6-58.3)	65.0 (62.0-68.1)	93.6 (92.1-95.1)
Other race/ethnicity	73.8 (58.2-89.5)	61.5 (45.9-77.2)	52.5 (36.8-68.2)	64.6 (50.3-78.9)	92.7 (83.1-102.3)
Education, % (95% CI)					
High school or less	68.2 (63.0-73.4)	56.0 (50.2-61.9)	51.4 (45.4-57.4)	64.7 (59.6-69.9)	93.7 (90.9-96.5)
Some college	77.4 (74.2-80.7)**	61.4 (57.4-65.3)	57.0 (53.0-61.1)	65.2 (61.4-69.1)	91.1 (88.8-93.4)
Bachelor's degree or higher	82.4 (78.6-86.1)***	63.5 (58.9-68.1)	57.5 (52.7-62.3)	68.0 (63.5-72.4)	95.0 (93.0-97.0)
Household income, % (95% CI)					
Less than \$30 000	71.9 (65.7-78.0)	57.9 (50.9-65.0)	54.5 (47.1-62.0)	61.2 (54.2-68.3)	93.9 (90.7-97.0)
\$30 000-less than \$60,000	74.0 (69.3-78.7)	61.1 (56.0-66.2)	55.9 (50.4-61.4)	66.7 (61.6-71.9)	92.7 (89.8-95.6)
\$60 000-less than \$100 000	74.3 (69.2-79.5)	61.6 (56.1-67.1)	53.8 (48.1-59.5)	63.5 (58.1-69.0)	96.0 (94.0-97.9)
\$100 000 or more	80.7 (75.7-85.6)*	58.7 (52.2-65.3)	55.7 (49.3-62.1)	71.2 (65.9-76.6)*	91.7 (88.5-95.0)
Bought any at-home test, % (95% CI)					
Yes	79.7 (76.2-83.1)**	70.5 (66.7-74.4)***	59.6 (55.4-63.8)**	75.0 (71.5-78.5)***	92.3 (90.1-94.5)
No	71.4 (67.8-75.0)	50.0 (45.9-54.1)	50.6 (46.5-54.7)	57.2 (53.1-61.3)	94.7 (93.2-96.3)
Overall perception, ^a % (95% CI)	75.1 (72.5-77.6)	59.9 (57.1-62.8)	54.8 (51.9-57.7)	66.0 (63.2-68.7)	93.6 (92.1-94.9)

Note. Prevalence reported as marginal estimates with 95% confidence intervals. Models also adjusted for self-reported mental health, physical health, and marital status.

^aUnadjusted, overall weighted estimate with 95% CI.

* $P < .05$. ** $P < .01$. *** $P < .001$.

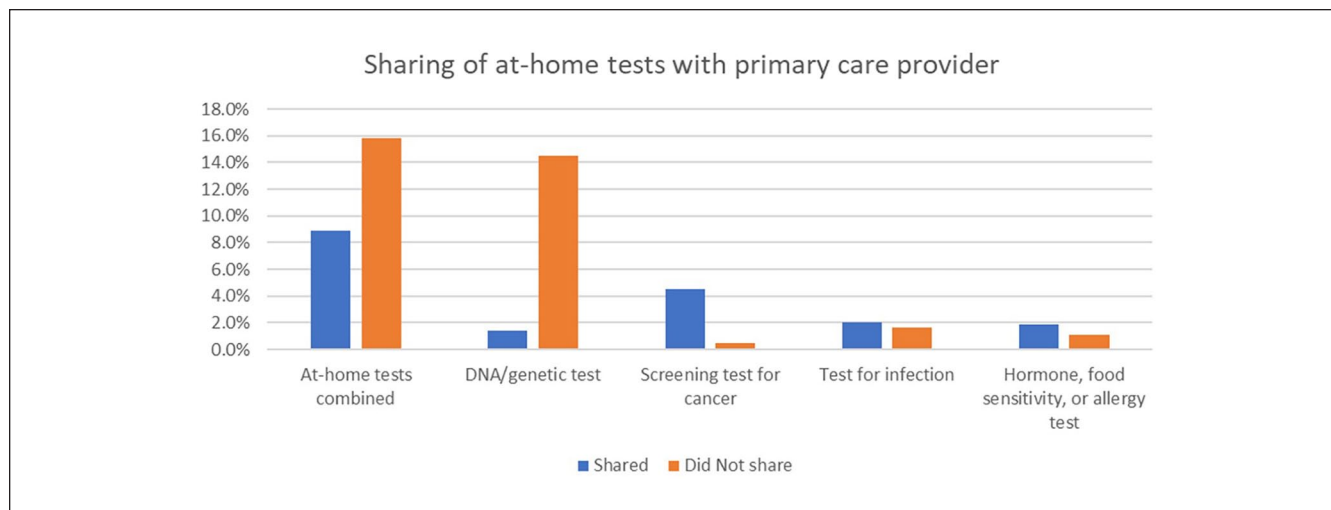


Figure 1. Percentage of those who shared the results of an at-home test with their primary care provider (blue) versus those who purchased an at-home test but did not share the result (orange) by test type.

were more likely to express interest in purchasing any type of at-home in the future (Table 3).

Discussion

In this nationally representative survey, we found that about half of US adults aged 50 to 80 have purchased some type of

direct-to-consumer, at-home medical test. About one-third have purchased a COVID-19 test, and just over 16% have purchased at-home genetic tests. There were important socioeconomic and racial/ethnic differences in prior purchase and perceptions of at-home tests, though most older adults across subgroups had positive perceptions. We also found that a considerable percentage of older US adults are

Table 3. Adjusted Prevalence of Interest in Future Use of At-Home Medical Tests.

Variable	Any test (n = 2105)	COVID-19 (n = 2098)	Other infection (n = 2098)	Cancer screening (n = 2098)	DNA/genetic test (n = 2099)	Hormone/allergy/ food sensitivity/other (n = 2105)
Age, % (95% CI)						
50-64	83.3 (80.5-86.2)	69.1 (65.5-72.6)	45.8 (41.9-49.8)	58.6 (54.6-62.6)	43.1 (39.1-47.1)	49.8 (45.8-53.8)
65-80	80.8 (77.9-83.7)	69.4 (65.9-72.9)	38.4 (34.5-42.4)*	52.5 (48.3-56.8)*	35.0 (31.1-38.8)**	38.1 (34.3-41.9)***
Gender, % (95% CI)						
Male	76.1 (72.7-79.5)	63.1 (59.3-66.9)	34.6 (30.8-38.4)	53.1 (49.0-57.2)	34.6 (30.9-38.3)	38.7 (34.9-42.5)
Female	87.4 (85.0-89.8)***	74.6 (71.3-77.9)***	50.0 (46.0-54.0)***	58.5 (54.5-62.5)	44.2 (40.1-48.3)**	50.1 (46.2-54.1)***
Race/Ethnicity, % (95% CI)						
Black	85.5 (79.4-91.6)	79.3 (72.2-86.4)**	43.9 (34.6-53.3)	60.9 (51.7-70.0)	49.8 (40.0-59.6)*	40.7 (31.8-49.6)
Hispanic	84.6 (79.3-90.0)	72.7 (66.0-79.5)	47.8 (39.5-56.1)	63.6 (55.9-71.2)*	40.2 (32.2-48.2)	53.8 (45.8-61.8)*
White	80.4 (78.0-82.9)	66.9 (64.0-69.8)	41.4 (38.3-44.4)	53.9 (50.7-57.1)	38.6 (35.5-41.7)	43.0 (39.8-46.1)
Other race/ethnicity	*90.8 (83.3-98.2)	67.9 (54.5-81.4)	43.6 (28.3-58.8)	54.7 (36.4-73.0)	32.7 (19.1-46.4)	51.6 (36.3-66.8)
Education, % (95% CI)						
High school or less	77.8 (73.8-81.9)	63.1 (58.0-68.2)	36.9 (31.4-42.3)	51.5 (45.5-57.5)	33.5 (28.1-38.9)	40.5 (34.9-46.0)
Some college	82.4 (79.5-85.3)	68.5 (64.9-72.0)	42.0 (38.1-45.9)	56.8 (52.9-60.7)	43.1 (39.1-47.0)**	45.3 (41.3-49.2)
Bachelor's degree or higher	88.5 (85.7-91.3)***	77.5 (73.6-81.3)***	49.5 (44.9-54.2)**	60.5 (55.8-65.1)*	43.9 (39.2-48.6)**	49.0 (44.4-53.5)*
Household income, % (95% CI)						
Less than \$30000	75.4 (69.7-81.1)	62.4 (55.9-68.9)	38.6 (31.9-45.3)	52.0 (45.1-59.0)	35.5 (28.4-42.7)	38.4 (31.8-44.9)
\$30000-less than \$60000	83.5 (79.9-87.0)*	69.3 (64.5-74.1)	43.4 (38.0-48.8)	56.8 (51.4-62.2)	38.2 (33.0-43.3)	45.1 (39.7-50.6)
\$60000-less than \$100000	84.3 (80.5-88.0)*	68.5 (63.6-73.4)	42.9 (37.3-48.4)	56.0 (50.1-62.0)	39.3 (33.7-44.9)	45.7 (40.2-51.2)
\$100000 or more	85.7 (81.3-90.1)*	76.0 (70.9-81.0)**	44.6 (38.5-50.6)	58.1 (52.1-64.2)	44.2 (38.0-50.4)	48.0 (42.0-54.0)*
Physical health, % (95% CI)						
Excellent-good	81.3 (78.8-83.8)	67.8 (64.8-70.7)	41.3 (38.0-44.5)	55.8 (52.4-59.2)	38.9 (35.7-42.2)	42.7 (39.5-45.9)
Fair/poor	84.7 (80.8-88.6)	74.0 (68.9-79.0)	47.3 (41.0-53.7)	56.4 (50.1-62.8)	41.9 (35.4-48.4)	51.8 (45.6-58.0)*
Bought any at-home test, % (95% CI)						
Yes	90.7 (88.3-93.2)***	79.3 (75.9-82.7)***	49.1 (44.9-53.3)***	61.9 (57.7-66.1)***	45.2 (41.1-49.3)***	50.5 (46.3-54.7)***
No	75.3 (72.2-78.5)	60.4 (56.7-64.2)	36.4 (32.5-40.2)	50.5 (46.5-54.5)	34.3 (30.4-38.2)	39.1 (35.3-43.0)
Overall interest, ^a % (95% CI)	82.4 (80.1-72.1)	69.5 (66.7-72.1)	42.6 (39.8-45.5)	56.3 (53.4-59.2)	39.7 (36.9-42.6)	44.6 (41.7-47.5)

Note. Prevalence reported as marginal estimates with 95% confidence intervals. Models also adjusted for mental health and marital status.

^aUnadjusted, overall weighted estimate with 95% CI.

* $p < .05$. ** $p < .01$. *** $p < .001$.

interested in future use of at-home tests, although this too varied among different demographic groups. To our knowledge, this is the first study to generate national estimates for purchase of, perceptions of, and interest in future use of at-home tests among older US adults.

We found significant disparities in prior purchase of at-home tests by education and income. In a survey on use of at-home COVID-19 tests from fall 2021 to spring 2022, the US Centers for Disease Control and Prevention similarly found increased test use among those with higher education and income.²⁴ Differences in income and education level have also been found regarding direct-to-consumer genetic testing awareness in the US²⁵ and at-home testing in the Netherlands.²⁶ Given the convergence of these prior results with the current study, we hypothesize differences in income may be attributable to the often high out-of-pocket costs of at-home tests.⁶ Furthermore, the differences observed by education level may be due to a greater sense of self-efficacy to use and interpret at-home test results without the assistance of a clinician among respondents with a higher education level.²⁷

Income and education-level disparities were also observed regarding future interest in at-home tests, and to some extent

regarding perceptions. These differences may be due to greater financial ability and confidence to purchase, perform, and interpret at-home tests among those with higher levels of education and income. Among these subgroups, it is also possible that at-home testing could be viewed as more favorable than the time it takes to schedule, attend, and await results from a doctor's appointment.

We also found significant racial/ethnic differences in at-home test purchase. This is in contrast to a 2019 study within the Kaiser Permanente system that found no difference in prior use of direct-to-consumer genetic testing between Hispanic, Black, non-Hispanic, and White, non-Hispanic participants.²⁸ However, their overall estimates of such testing were much lower than in our study (5% compared with 16%), and other studies have shown lower use of certain at-home tests among black individuals compared with White individuals.²⁴ At the same time, Black, non-Hispanic older adults reported significantly greater future interest in COVID-19 and DNA genetic testing compared with White, non-Hispanic older adults. Some have hypothesized that at-home testing could assist in decreasing health disparities,^{6,29} but these findings suggest that more research is needed before this is realized.

Most older adults stated that at-home tests are more convenient than those from their doctors, which is consistent with prior hypotheses that a strength of at-home tests is their accessibility.^{5,6} Particularly in a time when primary care services are more difficult to access due to greater patient volumes and a shrinking primary care workforce,³⁰ at-home tests could at times provide greater, more timely access to health information. Assuming valid and reliable at-home tests, the growing availability of telemedicine may be an especially apt place for more at-home testing as this would enable clinicians to continue to be a part of the decision-making process.

Most adults thought the results of at-home tests could be trusted and that these tests were regulated by the government. The validity, reliability, and overall utility of at-home tests has been debated among experts, and much of this debate has focused on the regulation of such tests.⁹⁻¹¹ The FDA has approved a number of diagnostic at-home tests for “over-the-counter” use,⁴ but many tests on the market remain unregulated or under-regulated.^{6,31} Our results suggest, however, that patients generally believe at-home tests are regulated by government but a substantial minority did not, which may reflect public confusion in how at-home testing is regulated. Indeed, the nuances between some regulatory policies and exemptions created confusion about the meaning of EUAs during the COVID-19 pandemic among both patients and clinicians.³² Additionally, there are a number of exclusions for FDA oversight of at-home tests that makers of direct-to-consumer, at-home tests could use to advertise them without formal approval.³³ Greater clarity surrounding the regulation of at-home tests from the FDA and retailers alike could assist individuals in better understanding the veracity of at-home test results. Broader public messaging or more explicit marketing standards about non-FDA approved tests could assist in this.

Older adults with prior purchase of an at-home test were far more likely to report positive perceptions, and this association was also seen regarding interest in future use. We also found that women and younger respondents (50-64 years old) were more likely to be interested in future use of at-home tests. Given that many older adults have already purchased at-home tests and that prior purchase may predict interest and use in the future, clinicians should be prepared to see more older patients who have used at-home tests and be prepared to discuss the potential benefits, risks, and results of at-home tests with their patients. However, our study identified a key obstacle to such discussions. Although nearly 90% of older adults reported at-home test results should be shared with their PCP, actual rates of sharing varied by type for test and thus clinicians may often have no idea that at-home testing has occurred. For instance, while nearly all patients who had bought an at-home cancer screening test shared the results with their PCP, only about half of those who tested for an infection other than COVID-19 had. This could have important clinical implications as those who are testing for

infections such as UTIs or HIV are likely testing for some reason—whether that is due to the presence of symptoms or certain behaviors that increase infection risk. Use of at-home testing in such situations could lead to unintended consequences such as false reassurance or missed opportunities for additional necessary testing or counseling about risk reduction strategies. This finding also highlights the need for consumer protections around at-home tests, which could take the form of official consumer reports, greater coverage by media outlets, and educational outreach campaigns by health insurance companies, healthcare systems, or community-based organizations.

Limitations

Purchase of at-home tests was self-reported and is vulnerable to recall and social desirability biases. Our results may not be generalizable to adults beyond 50 to 80 years or those older adults residing in long term care or other institutions. Our survey was administered in January 2022 during the White House’s announcement to make COVID-19 tests freely available, and this may have affected perceptions and interest in future use as well as overestimated the purchase of COVID-19 tests specifically.

Conclusion

Half of older adults have used some form of at-home medical test, and such use is likely to grow given positive perceptions and interest in future use of at-home tests. Clinicians should be aware of the different types of at-home tests now available, be prepared to discuss with patients the risks and benefits of using at-home tests, and consider asking about prior at-home testing. When at-home tests have the potential to mitigate personal and public health risk, policymakers should explore strategies to promote equity in access to evidence-based at-home tests that have potential to reduce health care disparities.

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None

Data Availability Statement

The National Poll on Healthy Aging regularly releases data from each survey wave for public use at <https://www.healthyagingpoll.org/reports-more/data>. Those interested in using this dataset should contact the National Poll on Healthy Aging.

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Ethical Statement

This study was determined to be exempt by the University of Michigan Institutional Review Board.

Informed Consent

This study was determined to be exempt by the University of Michigan IRB, thus informed consent for this individual study was not necessary. All panelists are consented by NORC prior to participating on the AmeriSpeak panel.

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Supplemental Material

Supplemental material for this article is available online.

References

- Kim E, Kojima N, Vangala S, et al. Impact of COVID-19 on primary care quality measures in an academic integrated health system. *J Gen Intern Med.* 2022;37(5):1161-1168. doi:10.1007/s11606-021-07193-7
- Food and Drug Administration. At-home OTC COVID-19 diagnostic tests. Published March 3, 2023. Accessed March 7, 2023. <https://www.fda.gov/medical-devices/coronavirus-covid-19-and-medical-devices/home-otc-covid-19-diagnostic-tests>
- The White House. Fact sheet: The Biden administration to begin distributing at-home, rapid COVID-19 tests to Americans for free. Published January 14, 2022. Accessed March 7, 2023. <https://www.whitehouse.gov/briefing-room/statements-releases/2022/01/14/fact-sheet-the-biden-administration-to-begin-distributing-at-home-rapid-covid-19-tests-to-americans-for-free/>
- Food and Drug Administration. Home use tests. Published June 21, 2022. <https://www.fda.gov/medical-devices/in-vitro-diagnostics/home-use-tests>
- Gronowski AM, Haymond S, Master SR. Improving direct-to-consumer medical testing. *JAMA.* 2017;318(16):1613-1613. doi:10.1001/jama.2017.13733
- Rockwell KL. Direct-to-Consumer medical testing in the era of value-based care. *JAMA.* 2017;317(24):2485-2486. doi:10.1001/jama.2017.5929
- Nielsen DE, Carere DA, Wang C, Roberts JS, Green RC. Diet and exercise changes following direct-to-consumer personal genomic testing. *BMC Med Genomics.* 2017;10(1):24. doi:10.1186/s12920-017-0258-1
- Ashenhurst JR, Nhan H, Shelton JF, et al. Prevalence of alpha-1 antitrypsin deficiency, self-reported behavior change, and health care engagement among direct-to-consumer recipients of a personalized genetic risk report. *Chest.* 2022;161(2):373-381. doi:10.1016/j.chest.2021.09.041
- Wynn J, Chung WK. 23andMe paves the way for direct-to-consumer genetic health risk tests of limited clinical utility. *Ann Intern Med.* 2017;167(2):125-126. doi:10.7326/M17-1045
- Wong AWY, White HEG, Plant A, Shipman AR, Shipman KE. Issues surrounding consumer-bought food-allergy testing. *Clin Exp Dermatol.* 2022;47(3):547-552. doi:10.1111/ced.14978
- Petersen LM, Lefferts JA. Lessons learned from direct-to-consumer genetic testing. *Clin Lab Med.* 2020;40(1):83-92. doi:10.1016/j.cll.2019.11.005
- Isbell TS. Direct-to-consumer tests on the market today: identifying valuable tests from those with limited utility. *Clin Lab Med.* 2020;40(1):13-23. doi:10.1016/j.cll.2019.11.008
- Tolan NV. Health literacy and the desire to manage one's own health. *Clin Lab Med.* 2020;40(1):1-12. doi:10.1016/j.cll.2019.11.007
- Woloshin S, Dewitt B, Krishnamurti T, Fischhoff B. Assessing how consumers interpret and act on results from at-home COVID-19 self-test kits: a randomized clinical trial. *JAMA Intern Med.* 2022;182(3):1-10. doi:10.1001/jamainternmed.2021.8075
- Galior KD, Baumann NA. Challenges with at-home | mail-in direct-to-consumer testing: preanalytical error, reporting results, | result interpretation. *Clin Lab Med.* 2020;40(1):25-36. doi:10.1016/j.cll.2019.11.006
- Holmes DT. Self-ordering laboratory testing: limitations when a physician is not part of the model. *Clin Lab Med.* 2020;40(1):37-49. doi:10.1016/j.cll.2019.11.002
- Kilbride MK, Joffe S. The new age of patient autonomy: implications for the patient-physician relationship. *JAMA.* 2018;320(19):1973-1974. doi:10.1001/jama.2018.14382
- Cigolle CT, Langa KM, Kabeto MU, Tian Z, Blaum CS. Geriatric conditions and disability: the health and retirement study. *Ann Intern Med.* 2007;147(3):156-164. doi:10.7326/0003-4819-147-3-200708070-00004
- Charbonneau J, Nicol D, Chalmers D, et al. Public reactions to direct-to-consumer genetic health tests: a comparison across the US, UK, Japan and Australia. *Eur J Hum Genet.* 2020;28(3):339-348. doi:10.1038/s41431-019-0529-8

20. Ickenroth MH, Grispen JE, Ronda G, et al. Motivation and experiences of self-testers regarding tests for cardiovascular risk factors. *Health Expect*. 2014;17(1):60-72.
21. Bil JP, Prins M, Stolte IG, et al. Usage of purchased self-tests for HIV and sexually transmitted infections in Amsterdam, the Netherlands: results of population-based and serial cross-sectional studies among the general population and sexual risk groups. *BMJ Open*. 2017;7(9):e016609. doi:10.1136/bmjopen-2017-016609
22. Institute for Healthcare Policy and Innovation, University of Michigan. National Poll on Healthy Aging. Accessed March 7, 2023. <https://www.healthyagingpoll.org/>
23. NORC. Amerispeak. Accessed March 7, 2023. <https://amerispeak.norc.org/us/en/amerispeak.html>
24. Rader B, Gertz A, Iuliano AD, et al. Use of At-Home COVID-19 Tests - United States, August 23, 2021-March 12, 2022. *MMWR Morb Mortal Wkly Rep*. 2022;71(13):489-494.
25. Apathy NC, Menser T, Keeran LM, Ford EW, Harle CA, Huerta TR. Trends and gaps in awareness of direct-to-consumer genetic tests from 2007 to 2014. *Am J Prev Med*. 2018;54(6):806-813. doi:10.1016/j.amepre.2018.02.013
26. Ronda G, Portegijs P, Dinant GJ, Buntinx F, Norg R, van der Weijden T. Use of diagnostic self-tests on body materials among Internet users in the Netherlands: prevalence and correlates of use. *BMC Public Health*. 2009;9(1):100. doi:10.1186/1471-2458-9-100
27. Grispen JE, Ronda G, Dinant GJ, de Vries NK, van der Weijden T. To test or not to test: A cross-sectional survey of the psychosocial determinants of self-testing for cholesterol, glucose, and HIV. *BMC Public Health*. 2011;11(1):112. doi:10.1186/1471-2458-11-112
28. Carroll NM, Blum-Barnett E, Madrid SD, et al. Demographic differences in the utilization of clinical and direct-to-consumer genetic testing. *J Genet Couns*. 2020;29(4):634-643. doi:10.1002/jgc4.1193
29. Rockwell KL. Improving direct-to-consumer medical testing-reply. *JAMA*. 2017;318(16):1613-1614. doi:10.1001/jama.2017.13756
30. Jabbarpour Y, Petterson S, Jetty A, Byun H. *The Health of US Primary Care: A Baseline Scorecard Tracking Support for High-Quality Primary Care*. Millibank Memorial Fund; 2023. https://www.milbank.org/publications/health-of-us-primary-care-a-baseline-scorecard/?gad=1&gclid=EAIAIQobChMI_vH4ztX8_gIVp2pvBB16CwQsEAAYASAAEgKp-vD_BwE
31. Gill J, Obley AJ, Prasad V. Direct-to-consumer genetic testing: the implications of the US FDA's first marketing authorization for BRCA mutation testing. *JAMA*. 2018;319(23):2377-2378. doi:10.1001/jama.2018.5330
32. Moshkovits I, Shepshelovich D. Emergency use authorizations of COVID-19-related medical products. *JAMA Intern Med*. 2022;182(2):228-229. doi:10.1001/jamainternmed.2021.7257
33. U.S. Food & Drug Administration. *Direct-to-Consumer Tests*. U.S. Food & Drug Administration. December 20, 2019. Accessed August 29, 2024. <https://www.fda.gov/medical-devices/in-vitro-diagnostics/direct-consumer-tests>