

Aspirin Use Among Adults in the U.S.

Results of a National Survey



Craig D. Williams, PharmD, Andrew T. Chan, MD, MPH, Miriam R. Elman, MPH, Alyson H. Kristensen, MPH, W. Fred Miser, MD, Michael P. Pignone, MD, MPH, Randall S. Stafford, MD, PhD, Jessina C. McGregor, PhD

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Introduction: The use of aspirin in patients without cardiovascular disease remains controversial. Patients' understanding of the risks and benefits of aspirin likely contribute to the decision of whether or not to use aspirin regularly. The purpose of this study is to assess patients' knowledge of aspirin and identify factors contributing to regular use.

Methods: A survey of U.S. adults aged 45–75 years was performed to ascertain aspirin use and factors that may be associated with use. Multivariate logistic regression was used to identify predictors of current use of aspirin among those with a primary prevention indication. The survey was completed in 2012 with data analysis performed in 2013.

Results: Among 2,509 respondents, 52% reported current aspirin use. Among 2,039 respondents without a history of cardiovascular disease, current use of aspirin was 47%. Regular use of aspirin for primary prevention was associated with the presence of major cardiovascular disease risk factors (OR=3.0, 95% CI=2.4, 3.7), high self-assessed knowledge of aspirin (OR=9.1, 95% CI=5.2, 15.7), and having discussed aspirin therapy with a provider (OR=25.9, 95% CI=19.7, 34.1). Several markers of healthy lifestyle choices were also associated with regular use. After multivariate analysis, the strongest independent predictor of regular aspirin use was having discussed aspirin therapy with a provider (OR=23.79, 95% CI=17.8, 31.5).

Conclusions: Approximately half of the nationwide survey of U.S. adults reported regular aspirin use. Among those with a primary prevention indication, having discussed aspirin with a provider was the strongest predictor of regular use.

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Introduction

Aspirin reduces recurrent cardiovascular disease (CVD) events in individuals with CVD, as well as first events in those with high CVD risk.¹ Recommendations regarding aspirin use for primary prevention differ among organizations. Although aspirin

is recommended for moderately high-risk individuals by the U.S. Preventive Services Task Force,² it is not recommended for primary prevention for any risk level by the European Society of Cardiology.³ Recently, the U.S. Food and Drug Administration also recommended⁴ against routine use of aspirin for primary prevention but stated it may still be appropriate when prescribed by a healthcare provider to higher-risk patients.

New data suggesting that aspirin prevents certain forms of cancer may add to the potential benefits of regular use.⁵ These new findings, along with conflicting recommendations for primary prevention of CVD, have led to renewed efforts to clarify aspirin's role in individuals without CVD.^{6,7}

Despite ongoing debate regarding the optimal role of aspirin in prevention, its use among U.S. adults is increasing. A recent report found a 57% increase in regular use between 2005 and 2010.⁸ Respondents' perceptions about aspirin, their CVD health, and their

From the Department of Pharmacy Practice (Williams, Elman, McGregor), Oregon State University/Oregon Health & Science University College of Pharmacy, Portland, Oregon; Division of Gastroenterology (Chan), Massachusetts General Hospital, Boston, Massachusetts; Partnership for Prevention (Kristensen), Washington, District of Columbia; Division of Family Medicine (Miser), The Ohio State University, Columbus, Ohio; Department of Medicine (Pignone), University of North Carolina, Chapel Hill, North Carolina; and the Department of Medicine (Stafford), Stanford University, Palo Alto, California

Address correspondence to: Craig D. Williams, PharmD, Oregon State University/Oregon Health & Science University College of Pharmacy, 2730 SW Moody Ave., CL5CP, Portland OR 97201. E-mail: williacr@ohsu.edu. 0749-3797/\$36.00

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interactions with care providers likely impact the decision to use aspirin on a daily basis. To better understand the current level of regular aspirin use and predictors of use, U.S. adults were surveyed about their aspirin use and factors that might be associated with that decision.

Methods

Survey Development and Administration

A 25-question web-based survey was developed to assess the following domains: use of aspirin by adults in the U.S., beliefs about the risks and benefits of aspirin, self-assessed CVD risk, and discussions about regular aspirin use with healthcare providers. The survey also collected respondent demographic data as well as personal and family medical history. All collected data were de-identified. An exemption from oversight was granted by the Oregon Health & Science University IRB.

The survey was prepared by the Council on Aspirin for Health and Prevention (CAHP). CAHP is convened by Partnership for Prevention, a non-profit organization focused on disease prevention and health promotion. The survey was administered through Survey Sampling International (SSI) in August 2012. SSI maintains a library of online sampling databases to allow selection of samples that reflect specific populations. The sample for this survey was adults aged between 45 and 75 years living in the U.S. This age range was chosen because it defines adults with a sufficiently high CVD risk to derive benefit from aspirin therapy and it also represents a common age range that has been studied in randomized trials. A dynamic sampling platform was constructed to identify potential study subjects. Real-time eligibility was assessed and potential survey subjects were notified electronically of their eligibility. Consenting subjects who completed the survey were offered a small incentive such as frequent flyer miles or rewards program points with various companies.

Survey Definitions and Analysis

The primary outcome of interest was regular aspirin use, defined by answering *currently* to the question *Please indicate if you are currently on, have previously taken, or have never taken aspirin on a regular basis for one or more of the following reasons: prevention of a heart attack; prevention of stroke; prevention of cancer; prevention of dementia or Alzheimer's; relief of pain, inflammation or swelling; prevention of blood clots.*

Respondents with a higher objective CVD risk were identified based upon age, sex, and number of self-reported CVD risk factors as defined in Table 1. Major risk factors were defined as current smoking; personal history of high cholesterol, hypertension, diabetes, or metabolic syndrome; and a family history of CVD. Respondents were also asked to provide a subjective assessment of their CVD risk by identifying themselves as being at greater than average, average, or less than average risk of heart attack or stroke over the next 10 years compared to individuals of the same age and sex. Analysis of the association of aspirin use with prostate cancer was limited to men and association with breast cancer limited to women.

A subgroup of respondents having an indication for aspirin use for secondary prevention of CVD was identified as persons who responded *yes* when asked whether they had a history of CVD (i.e.,

Table 1. Criteria Used to Identify Patients with Higher Objective CVD risk^a

Age group, years	No. of risk factors	
	Men	Women
45–54	≥ 3	≥ 4
55–64	≥ 2	≥ 3
65–75	≥ 1	≥ 2

^aRisk factors include (1) self-reported family history of stroke, angina, heart attack, or heart surgery; (2) current smoking; (3) high cholesterol; (4) hypertension; (5) diabetes, metabolic syndrome, pre-diabetes, or insulin resistance.

CVD, cardiovascular disease.

had ever been told they had stroke, heart attack, or angina). Of the remaining respondents, individuals not currently using non-aspirin anti-thrombotic agents were considered the primary prevention cohort.

Chi-squared and *t* tests were used to compare patient characteristics, including personal and family history as well as knowledge and beliefs on aspirin use according to current, previous, or never regular aspirin use. We constructed simple and multivariable logistic regression models to assess the relationship between current aspirin use and predictors of interest. Previous aspirin users were excluded from this analysis. The multivariable logistic regression model was constructed using stepwise selection. Predictors of interest, including discussion of aspirin with a healthcare provider, objective CVD risk, and subjective CVD risk, were forced into the model along with potential confounders including age and sex. All bivariate associations at the $p < 0.20$ level between the outcome and aforementioned covariates were considered for inclusion in the final multivariable model. Predictors found to significantly contribute to the model at $p < 0.05$ or to have a confounding effect were retained. A confounding effect was defined as a change of at least 10% in the measure of association between discussion with a healthcare provider and current aspirin use. AORs and corresponding 95% CIs were calculated from the final model. All analyses were conducted in 2013 using SAS, version 9.2.

Results

The survey was initiated by 2,724 respondents and completed by 2,537 (93%). Respondents outside of the specified age range ($n=28$) were excluded. Data were analyzed for the remaining 2,509 respondents; their characteristics are presented in Table 2. Briefly, 41% of respondents were women and 38% were aged ≥ 65 years. Major risk factors for CVD were prevalent, with 49% of respondents reporting high cholesterol, 49% reporting hypertension, and 61% reporting either current or previous smoking.

Based on their survey responses, 301 (12%) respondents were classified as the secondary prevention cohort; 2,039 (81%) as the primary prevention cohort; and 169 (7%)

Table 2. Respondent Characteristics^a

Characteristic	Primary prevention (n=2,039)	Secondary prevention (n=301)	Total ^b (N=2,509)
Age group, years			
45–54	22	18	21
55–64	43	35	41
65–75	35	47	38
Female sex	42	36	41
CVD history ^c	0	100	12
High cholesterol	44	72	49
Smoking status			
Current	27	28	26
Former	33	44	35
Never	40	29	39
High blood pressure or hypertension	44	69	49
Diabetes	16	38	20
Metabolic syndrome, “pre-diabetes,” or insulin resistance	2	9	3
Cancer			
Colon	1	3	1
Breast (among female respondents)	2	3	2
Prostate (among male respondents)	3	9	4
Other cancer	7	16	9
Subjective CVD risk ^d			
Higher than average	14	44	19
Average	58	44	57
Lower than average	28	12	25
Objective increased risk of CVD ^e	50	87	56
History of GI or stomach bleeding	2	5	3
Discussed regular aspirin use with healthcare provider	51	87	57
Initiator of discussion about regular aspirin use			
Respondent	35	10	30
Respondent’s companion at visit	1	2	1
Healthcare provider	50	68	55
Medical staff at primary care provider’s office	5	8	6

(continued on next page)

were not classified into either group. Characteristics of primary and secondary prevention cohorts are described in [Table 2](#).

Rates of cancer were low among respondents: 4% reported a history of prostate cancer, 2% breast cancer, and 1% lung cancer. Only 1% reported a history of colon cancer, though 15% reported a history of colon polyps. Few respondents reported a history of past stomach or gastrointestinal (GI) bleed (3%) ([Table 2](#)).

A majority of respondents reported discussing regular aspirin use with a provider, with the secondary prevention cohort reporting the highest proportion ([Table 2](#)). Discussions about heart health, including aspirin use, most commonly occurred with a primary care provider (65%) or a cardiologist (12%) (data not shown). Among patients who discussed aspirin use with a provider, the discussion was most frequently initiated by a health-care provider (55%), followed by the respondent themselves (30%); other medical staff (6%); the respondent’s companion at their visit (1%); and other individuals (4%) ([Table 2](#)). Within the secondary prevention cohort, a larger proportion (68%) reported having the discussion initiated by their health-care provider.

When asked to self-assess their aspirin knowledge through a 5-point Likert-type scale, 13% of respondents self-rated as extremely knowledgeable and 7% as not at all knowledgeable

Table 2. Respondent Characteristics^a (continued)

Characteristic	Primary prevention (n=2,039)	Secondary prevention (n=301)	Total ^b (N=2,509)
Other initiator	4	7	4
Not sure/do not remember	5	5	5
Self-assessment of aspirin knowledge			
Not at all knowledgeable	7	3	7
Not very knowledgeable	12	7	11
Somewhat knowledgeable	38	32	37
Very knowledgeable	30	41	32
Extremely knowledgeable	12	18	13
Aspirin use			
Currently taking aspirin on a regular basis	47	80	52
Previously took aspirin on a regular basis	21	14	21
Never took aspirin on a regular basis	32	6	27
Agreement with “benefits of aspirin therapy outweigh risks”			
Strongly agree	25	45	28
Somewhat agree	27	29	27
Neither agree nor disagree	35	16	32
Somewhat disagree	7	3	6
Strongly disagree	7	7	7
Currently taking aspirin for the following reasons			
Prevention of heart attack	38	72	44
Prevention of cancer	8	14	9

^aPercentage response shown for each group.

^bTotal cohort is greater than sum of primary and secondary prevention cohorts because respondents who identified themselves as being on non-aspirin antithrombotic agents were not counted in the primary prevention group but also excluded from the secondary prevention group if no CVD history was reported (i.e., prior MI, stroke, or angina).

^cCVD history determined by including respondents who answered “yes” to prior history of stroke, angina, or heart attack.

^dSubjective CVD risk determined by respondent’s self-assessed risk of heart attack over the next 10 years compared to an individual of his or her age and sex.

^eObjective CVD risk defined in Table 1.

CVD, cardiovascular disease; GI, gastrointestinal; MI, myocardial infarction.

(Table 2). For the primary prevention cohort, respondents’ reported aspirin knowledge was stratified by whether they were a current or previous/never aspirin user (Table 3). A majority of both current and previous/never users rated themselves as being somewhat knowledgeable or very knowledgeable (77% and 62%, respectively). Current aspirin users, however, tended to rate their knowledge higher than current/never users, as 91% ranked themselves as being somewhat knowledgeable or

better whereas only 72% of previous/never users responded equivalently. When asked to agree or disagree with the statement *For me, the benefits of aspirin generally outweigh the risks*, 28% of all respondents strongly agreed, 27% somewhat agreed, 6% somewhat disagreed, and 7% strongly disagreed. The remaining 32% responded that they neither agreed nor disagreed (Table 2).

Aspirin Use

Among all respondents, 52% indicated that they currently use aspirin on a regular basis and 21% previously used aspirin. Eighty-four percent of current users of aspirin indicated they were using it for heart attack prevention, 66% for stroke prevention, 18% for cancer prevention, and 11% for prevention of Alzheimer disease (reasons for use not exclusive). The most common dosage among current users was 81 mg daily, reported by 67%. Other reported daily doses included 325 mg (21%); 162 mg daily (5%); > 325 mg (5%); and unsure (2%).

Of respondents currently taking aspirin for any reason, 71% reported missing no doses in the past 2 weeks, 16% reported missing one or two doses, and 13% reported missing three or more doses.

Among the secondary prevention cohort, the proportion of current and previous aspirin users was 80% and 14%, respectively, and among the primary prevention cohort was 47% and 21%, respectively (Table 2).

Among the 520 respondents reporting previous aspirin use, the most commonly reported reason for stopping therapy was concern about adverse effects (32%), with the top three side effects cited all bleeding related (gastrointestinal, 82%; cerebral, 33%; bleeding in

Table 3. Self-Assessed Knowledge of Aspirin Among Primary Prevention Respondents: Current Versus Non-current Users^a

Self-assessment	Aspirin use, n (%)	
	Current users (n=958)	Previous/never users (n=1,081)
Knowledge of aspirin therapy		
Extremely knowledgeable	130 (13.6)	116 (10.7)
Very knowledgeable	361 (37.7)	260 (24.1)
Somewhat knowledgeable	380 (39.7)	404 (37.4)
Not very knowledgeable	65 (6.8)	173 (16.0)
Not at all knowledgeable	22 (2.3)	128 (11.8)
Aspirin's efficacy to reduce stroke or heart attack		
Extremely effective	206 (21.5)	129 (11.9)
Very effective	507 (52.9)	337 (31.2)
Somewhat effective	229 (23.9)	482 (44.6)
Not very effective	11 (1.2)	85 (7.9)
Not at all effective	5 (0.5)	48 (4.4)

^aExcludes current or previous users of antithrombotic medications besides aspirin as well as respondents with a reported history of cardiovascular disease (n=2,039).

other parts of the body, 44%). Owing to the strong indication for aspirin therapy for secondary prevention, a separate analysis was performed looking at reasons for aspirin discontinuation in this cohort. Compared to the overall study cohort, a greater percentage of previous users for secondary prevention indicated concern about side effects as a reason for stopping therapy (54%), and 1 in 3 (33%) indicated that they already take too many pills and 30% indicated that their provider advised them to stop.

Predictors of Aspirin Use in the Primary Prevention Cohort

Factors associated with aspirin use for primary prevention in the bivariate analysis are summarized in Table 4. They included older age (65–75 vs 45–54 years, OR=2.40, 95% CI=1.82, 3.16); smoking (OR=1.51, 95% CI=1.17, 1.94); diabetes (OR=2.03, 95% CI=1.53, 2.70); hypertension (OR=2.46, 95% CI=2.00, 3.03); and prostate cancer (OR=5.47, 95% CI=1.64, 18.31). Other forms of cancer that were assessed (breast, colon, and lung cancer) were not associated with aspirin use. Because of the relatively higher survival rate of prostate cancer patients versus other cancers assessed in this survey, the age-adjusted OR for prostate cancer was also calculated (OR=4.06, 95% CI=1.20, 13.73). Respondent

sex, history of GI or stomach bleed, and screening for breast cancer were also not significant predictors.

Several healthy lifestyle behaviors were identified as significant predictors of aspirin use, including engaging in physical activity (OR=2.08, 95% CI=1.48, 2.92); eating healthy foods (OR=2.36, 95% CI=1.66, 3.35) (Table 4); achieving healthy weight (OR=1.71, 95% CI=1.25, 2.34); managing stress (OR=1.74, 95% CI=1.31, 2.30); attempting to quit smoking (OR=2.94, 95% CI=1.67, 5.17); and screening for both colon (OR=1.94, 95% CI=1.58, 2.37) and prostate (OR=2.83, 95% CI=2.17, 3.71) cancer.

Respondents' assessment of their 10-year CVD risk as well as their self-assessed knowledge of aspirin was associated with current aspirin use for primary prevention as was objective CVD risk (Table 4). Discussing aspirin with a healthcare provider was strongly associated with current aspirin use for primary prevention (OR=25.88, 95% CI=19.66, 34.08) (Table 4). After adjusting for age and sex in the multivariable model, objective CVD risk, subjective CVD risk, and discussion about aspirin use with a healthcare provider were all significant, independent predictors of current aspirin use (Table 5).

Discussion

This survey provides an update to the authors' previous 2004 national survey assessing patterns of aspirin use among middle-aged and older Americans.⁹ Overall, the prevalence of aspirin use was slightly higher than the earlier survey (52% vs 41%) and consistent with recent findings by other investigators.⁸ Compared to the previous survey, current use of aspirin for secondary prevention increased from 69% to 80%, while current use for primary prevention increased from 36% to 47%.⁹

For primary prevention, discussion with a healthcare provider about aspirin remained the strongest independent predictor of aspirin use, even after controlling for subjective and objective CVD risk. Only 25% of respondents who had not had a discussion about aspirin with a provider reported regular use versus 90% of those who

Table 4. Associations for Primary Prevention Respondents Comparing Current Aspirin Users to Previous or Never Users^a

Characteristic	Percent using aspirin ^b	OR (95% CI) ^c
Age group, years		
65–75	55	2.40 (1.82, 3.16)
55–64	45	1.52 (1.17, 1.97)
45–54	37	ref
Sex		
Women	45	0.96 (0.78, 1.18)
Men	48	ref
Smoking status		
Current	51	1.51 (1.17, 1.94)
Former	50	1.52 (1.20, 1.93)
Never	42	ref
Medical history		
High cholesterol	55	2.09 (1.70, 2.57)
No high cholesterol	41	ref
Hypertension	58	2.46 (2.00, 3.03)
No hypertension	38	ref
Diabetes	63	2.03 (1.53, 2.70)
No diabetes	44	ref
History of GI or stomach bleed	53	1.42 (0.66, 3.04)
No history of GI or stomach bleed	47	ref
Prostate cancer ^d	75	5.47 (1.64, 18.31)
No prostate cancer	48	ref
History of colon polyps	55	1.91 (1.39, 2.62)
No history of colon polyps	46	ref
Subjective CVD risk ^e		
Higher than average	59	2.85 (2.03, 4.00)
Average	48	1.52 (1.20, 1.93)
Lower than average	38	ref
Healthy lifestyle behaviors		
Currently engage in physical activity	49	2.08 (1.48, 2.92)
Previously engaged in physical activity	47	2.15 (1.48, 3.13)
Never engaged in physical activity	35	ref
Currently eat healthy foods	49	2.36 (1.66, 3.35)
Previously ate healthy foods	44	1.99 (1.26, 3.14)
Never ate healthy foods	35	ref
Objective CVD risk ^f		
Objective CVD risk	59	2.97 (2.41, 3.65)
No objective CVD risk	35	ref

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did. This finding is important given that aspirin is available without a prescription and decisions about its use do not necessarily involve a healthcare provider. However, correct use of aspirin for primary prevention is complicated and failure to include a healthcare provider in the decision may result in low-risk patients inappropriately taking aspirin or high-risk patients not being on therapy.

It was also observed in the bivariate analyses that the choice to use aspirin for primary prevention was associated with multiple markers of a healthy lifestyle, including trying to stop smoking, eating healthy, and getting more exercise. Thus, the choice to use aspirin for primary prevention itself might be a marker of healthy lifestyle decisions. However, associations of current use were much stronger, with both high objective and subjective CVD risk. Still, all of these associations are modest compared with discussing aspirin therapy with a healthcare provider.

Among respondents with a history of cancer, only prostate cancer was associated with aspirin use. Although older age explains part of that association, prostate cancer remains a significant predictor even after adjusting for age. A correlation between prostate cancer and multiple other CVD risk factors also might explain part of the association but its effect was as strong in the primary prevention cohort as the secondary prevention cohort. Thus, this seems like an unlikely explanation.

It is noteworthy that 21% of respondents identified themselves as previous aspirin users.

Table 4. Associations for Primary Prevention Respondents Comparing Current Aspirin Users to Previous or Never Users^a (continued)

Characteristic	Percent using aspirin ^b	OR (95% CI) ^c
Self-assessment of aspirin knowledge		
Extremely knowledgeable	53	9.05 (5.22, 15.70)
Very knowledgeable	58	12.28 (7.42, 20.32)
Somewhat knowledgeable	48	6.69 (4.10, 10.91)
Not very knowledgeable	27	2.95 (1.69, 5.17)
Not at all knowledgeable	15	ref
Discussed regular aspirin use with healthcare provider	75	25.88 (19.66, 34.08)
No discussion of regular aspirin use with healthcare provider	19	ref

^aExcludes current or previous users of antithrombotic medications besides aspirin as well as respondents with a reported history of CVD.

^bPercent calculated among current aspirin users compared to current or never users ($n=2,039$).

^cOR and CI are for comparison of current use to never use ($n=1,602$).

^dOnly prostate cancer associated with acetylsalicylic acid use; no association with breast, lung, or colon cancer (data not shown).

^eSubjective CVD risk determined by respondent's self-assessed risk of heart attack over the next 10 years compared to an individual of his or her age and sex.

^fObjective CVD risk defined in Table 1.

CVD, cardiovascular disease; GI, gastrointestinal.

The most common reason for discontinuing aspirin in the primary prevention cohort was concern for adverse effects, with bleeding being the most commonly cited effect. Nevertheless, a significant association was not observed between past GI or stomach bleeding and

current use of aspirin for the primary prevention cohort (53% vs 47%; Table 4). As a prescription is not needed to obtain aspirin, surveying individuals about their use of this medication can be an effective gauge of usage rates. However, as with any survey-based research method, important limitations apply. In this study specifically, an Internet-based survey was used; thus, individuals with limited access or ability to use the Internet are less likely to participate, and these people may differ in their healthcare utilization, which may affect the validity of these findings. Notably, however, use of an Internet-based survey did not result in reduced participation of older adults. Per 2010 U.S. Census data, slightly more than 20% of the U.S. population are aged 65–74 years; in this study, approximately 35% of respondents fell into this age category. Further, selection bias may have been introduced through the use of incentives for study participation; however, the value of incentives was kept very small to minimize the magnitude of this potential

Table 5. Multivariable Logistic Regression for Primary Prevention Respondents Comparing Current Aspirin Users to Never Users ($n=1,602$)^a

Characteristic	OR (95% CI)
Discussion of aspirin with provider and reported aspirin use for primary prevention	
Unadjusted	25.9 (19.5, 34.4)
Adjusted for age, sex, objective CVD risk, ^b and subjective CVD risk ^c	23.7 (17.8, 31.5)
Objective CVD risk and reported aspirin use	
Unadjusted	3.0 (2.4, 3.7)
Adjusted for age, sex, discussion of aspirin with provider, and subjective CVD risk	1.4 (1.01, 1.95)
Association of subjective heart attack or stroke risk and reported aspirin use	
Unadjusted	2.9 (2.0, 4.0)
Adjusted for age, sex, aspirin discussion with provider, and objective CVD risk	1.8 (1.1, 2.9)

^aExcludes previous users of aspirin, current or previous users of antithrombotic agents besides aspirin, and respondents with a reported history of CVD.

^bObjective CVD risk defined in Table 1.

^cSubjective CVD risk based on respondent's self-assessed risk of heart attack or stroke over the next 10 years compared to an individual of his or her age and sex.

CVD, cardiovascular disease.

bias. As with all survey data, it is important to recognize the potential for misclassification. In this study, regular aspirin use was not explicitly defined; thus, the potential exists for intermittent or “as-needed” use to be misclassified as regular use and vice versa. Likewise, some individuals may have been misclassified incorrectly into either the primary or secondary prevention cohorts.

Finally, although the reliability and validity of the survey questions were not formally assessed, the survey questions were developed through a rigorous and iterative process led by experts in CVD and primary prevention. The assessment of objective CVD risk is not precise, as the authors did not have access to clinical information such as blood pressure measurements or cholesterol values. This study also could not assess respondents’ access to healthcare nor the quality or accuracy of the discussions about aspirin that might have taken place.

Conclusions

Use of aspirin is increasing among patients both with and without a history of CVD. Among patients without a history of CVD, high objective CVD risk, high self-assessed CVD risk, and having discussed aspirin with a healthcare provider are strongly associated with current aspirin use. Further, although prevention of heart attack and stroke are the most common reasons cited for the regular use of aspirin, 18% of current users indicate prevention of cancer as a reason for use. Given conflicting recommendations regarding primary prevention for CVD and the increasing interest in aspirin for cancer prevention, more studies are needed to appropriately direct regular aspirin use and balance the associated risks and benefits.

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