

# UCSF

## UC San Francisco Previously Published Works

### Title

Increasing Delivery of Preventive Services to Adolescents and Young Adults: Does the Preventive Visit Help?

### Permalink

<https://escholarship.org/uc/item/3z36z5zc>

### Journal

Journal of Adolescent Health, 63(2)

### ISSN

1054-139X

### Authors

Adams, Sally H  
Park, M Jane  
Twietmeyer, Lauren  
et al.

### Publication Date

2018-08-01

### DOI

10.1016/j.jadohealth.2018.03.013

Peer reviewed



ELSEVIER

---



---

JOURNAL OF  
**ADOLESCENT  
 HEALTH**

---



---

[www.jahonline.org](http://www.jahonline.org)

Original article

## Increasing Delivery of Preventive Services to Adolescents and Young Adults: Does the Preventive Visit Help?

Sally H. Adams, Ph.D.<sup>a</sup>, M. Jane Park, M.P.H.<sup>a</sup>, Lauren Twietmeyer, M.P.H.<sup>a,\*</sup>,  
 Claire D. Brindis, Dr.P.H.<sup>a,b</sup>, and Charles E. Irwin, Jr., M.D.<sup>a</sup>

<sup>a</sup> Division of Adolescent and Young Adult Medicine, Department of Pediatrics, UCSF Benioff Children's Hospital, University of California San Francisco, San Francisco, California

<sup>b</sup> Philip R. Lee Institute for Health Policy Studies, University of California, San Francisco, California

Article History: Received November 10, 2017; Accepted March 6, 2018

Keywords: Preventive visit; Preventive services; Adolescents; Young adults



### A B S T R A C T

**Purpose:** Despite decades of emphasizing the delivery of adolescent preventive care visits and evidence that many preventive services reduce risk, little evidence links preventive visits to increased preventive service delivery. This study examined whether a preventive healthcare visit versus any nonpreventive healthcare visit was associated with higher rates of adolescent and young adult preventive services.

**Methods:** Analyzed Medical Expenditure Panel Survey data (2013–2015) to determine whether those with a preventive versus nonpreventive healthcare visit had higher rates of past-year preventive services receipt; adolescents (N = 8,474, ages 10–17) and young adults (N = 5,732, ages 18–25). Bivariable and multivariable analyses adjusting for personal/sociodemographic covariates tested for differences in preventive services rates between preventive versus nonpreventive care groups. Adolescent services were blood pressure, height and weight measured, and all three measured; and guidance given regarding healthy eating, physical activity, seatbelts and helmets, secondhand smoke, dental care, all six topics received, and time alone with provider. Young adult services were blood pressure and cholesterol checked, received influenza immunization, and all three services received.

**Results:** All preventive services rates were significantly higher in those attending preventive visits versus those with nonpreventive visits. Adolescent services increase ranged from 7% to 19% and young adults increase from 9% to 14% (all bivariable and multivariable analyses,  $p < .001$ ). However, most rates were low overall.

**Conclusions:** Higher rates of preventive services associated with preventive visits support its clinical care value. However, low preventive services rates overall highlight necessary increased efforts to promote preventive care and improve the provider delivery of prevention for both age groups.

© 2018 Society for Adolescent Health and Medicine. All rights reserved.

### IMPLICATIONS AND CONTRIBUTION

This study demonstrates a strong association between receiving a preventive visit and higher rates of receiving preventive services among adolescents and young adults. These findings support the preventive visit's value as an important strategy for increasing receipt of preventive services and can guide policy and clinical decision making.

**Conflict of interest:** The authors declare that they have no conflict of interest.

**Disclaimer:** This information or content and conclusions are those of the author and should not be construed as the official position or policy of, nor should any endorsements be inferred by HRSA, HHS, or the U.S. Government.

\* Address correspondence to: Lauren Twietmeyer, M.P.H., Division of Adolescent and Young Adult Medicine, Department of Pediatrics, UCSF Benioff Children's Hospital, University of California, San Francisco, 3333 California Street, Suite 245, San Francisco, CA 94118.

E-mail address: [Lauren.Twietmeyer@ucsf.edu](mailto:Lauren.Twietmeyer@ucsf.edu) (L. Twietmeyer).

Adolescence and young adulthood present important opportunities to improve health across the lifespan through prevention and early intervention. The adolescent health field has long emphasized clinical preventive services, among other preventive interventions. Evidence points to the effectiveness of these services in improving adolescent health outcomes. The U.S. Preventive Services Task Force (USPSTF) recommends screening for tobacco use, depression, and obesity, among other areas [1]. Studies

support the effectiveness of preventive services in additional areas, including nutrition, suicide risk, substance use, and physical activity [2–5]. Despite this evidence, receipt of preventive services remains low [6,7]. Roughly half of adolescents who received healthcare in the past year, for example, did not receive guidance about physical activity (55%) or healthy eating (46%), according to national data from 2012 to 2014 [8]. Research also underscores the need for confidential care with evidence suggesting that adolescents will forego needed care when confidentiality is not assured [9–13]. National data from 2012 to 2014 suggest that only 31% of adolescents had time alone with a clinician, making it unlikely that confidential care was provided [8].

Since the early 1990s, professional health organizations have recommended that adolescents attend an annual preventive visit as an important strategy for assuring receipt of clinical preventive services [14]. This visit was reaffirmed in *Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents, 4th edition*, issued in 2017 by the American Academy of Pediatrics; Bright Futures' recommendations cover youth through age 21 [15]. National estimates of adolescents' receipt of an annual preventive visit ranges widely, from 43% to 81% [16]. Despite the longstanding focus on the adolescent preventive visit, there is no published literature, to our knowledge, showing that preventive visits are associated with greater receipt of preventive services.

The growing field of young adult health recognizes that many markers of preventable "adolescent" health issues worsen in young adulthood [17,18], leading to a similar emphasis on clinical preventive services for this population. In 2012, researchers identified a set of USPSTF and consensus recommendations for preventive services for young adults that are similar to many recommendations issued for adolescents [19]. A 2014 report from the Institute of Medicine (renamed the National Academy of Medicine in 2015) includes research recommendations focused on preventive care guidelines and a comprehensive behavioral health screen [20]. As with adolescents, receipt of preventive services among young adults is low: in 2011 only two thirds received blood pressure screening (68%) and about a quarter received cholesterol screening (29%), according to national data [21]. The authors were unable to locate guidelines or recommendations related to preventive visits, or any visit, as a strategy for increasing receipt of preventive services. As with adolescents, receipt of a past-year preventive visit among young adults varies across national surveys; 26% to 58% among young adults. [16].

In short, the adolescent health field has long emphasized the need for preventive services and an annual preventive visit and the nascent field of youth adult health recognizes the importance of preventive services. As with adolescents, there is little or no evidence showing that young adults who attend a preventive visit are more likely to receive preventive services than young adults utilizing nonpreventive healthcare. In this context, the overall goal of this study is to examine the value of a preventive visit for adolescents and young adults who have used the healthcare system in the past year. Using nationally representative data, the present study aims to assess—for adolescents and for young adults—whether receipt of a preventive visit is associated with greater receipt of preventive services, comparing those who received a past-year preventive visit to those who had at least one healthcare visit in the past year, but not a preventive visit. Analyses utilized the Medical Expenditure Panel Survey (MEPS) from years 2013 to 2015. MEPS preventive service measures, while not entirely conforming to published guidelines, provide monitoring on important protective health factors. If results show that preventive service

measures analyzed in MEPS are higher for those attending a preventive visit versus a nonpreventive visit, it would indicate support for the preventive visit as a venue for emphasizing preventive care for these age groups.

## Methods

### Study design and sampling

MEPS is an annual survey sponsored by the Agency for Healthcare Research and Quality that consists of a set of household surveys of health, insurance coverage, and healthcare utilization and expenditures of the United States civilian noninstitutionalized population. It uses an overlapping panel design in which a new cohort is recruited annually to complete face-to-face interviews at five-time periods across 2 years [22]. The present analysis utilized three MEPS data sets: the Full-Year Consolidated Data; the Office-Based Medical Provider Visits; and the Outpatient Visits files. The study protocol was approved by the Committee on Human Research at the University of California, San Francisco under the exempt status.

### Participants

The analyses utilized subsamples for adolescents (ages 10–17) and young adults (18–25 years). To ensure adequate sample sizes, we pooled data from years 2013 to 2015 for adolescents (N = 12,832) and young adults (N = 11,055). To examine differences in preventive services received between those with a past-year preventive care visit and those with any healthcare visit but not a preventive care visit (the referent group), we utilized further subsamples of adolescents (N = 8,474) and young adults (N = 5,732) who had received at least one healthcare visit in the past year (total analytic sample, N = 14,206). For adolescents, adult caregivers (most frequently a parent) answered questions about health, insurance, and healthcare utilization and associated expenditures. For young adults, the household member with the most knowledge about the family's healthcare utilization, most frequently a parent, served as the respondent. Analyses were conducted separately for the adolescent and the young adult samples.

### Objectives and measures

Study objectives were the following: To determine whether rates of preventive services for adolescents and young adults were higher for those with a past-year preventive visit compared to those who had any healthcare visit excluding a preventive visit.

*Outcome variables* were reports of adolescents' and young adults' receipt of preventive services in the past year. Preventive service variables in the MEPS data set differed for adolescents and young adults. For adolescents, past-year services assessed included physical parameters (height, weight, and blood pressure), and all three parameters measured, anticipatory guidance in six areas (healthy eating, physical activity, seatbelt use, helmet use, second-hand smoke, and dental visits), and all six areas covered. Caregivers (primarily parents) were asked if their adolescent had the physical parameters assessed, if they or their adolescent received advice in the six anticipatory guidance areas, and if yes (for both the physical parameters and anticipatory guidance areas), whether these had taken place within the past year. Past-year time alone with a provider was also assessed for adolescents 12–17 years of age; for these youth, caregivers were asked if their child had time

alone with their doctor/health provider during their most recent healthcare visit. For young adults, past-year preventive services assessed included the following: blood pressure assessed; cholesterol checked; flu shot received; and whether all three had occurred. All preventive services variables were recoded as having received the service in the past year versus not.

*Independent Variable* was the receipt of a preventive visit in the past year versus the receipt of any healthcare visit exclusive of a preventive visit (referred to as a nonpreventive visit), coded from respondent medical office-based and outpatient healthcare visits. MEPS respondents maintained calendars to track their healthcare visits that included visit dates, provider name and type, and primary reason for visit. Based on previous research, visits were recoded as a preventive visit if the main reason for the visit was a general checkup, well-child exam, or receipt of immunizations or shots [6,16,23]. The preventive visit variable was coded as having at least one of these visits versus none.

Demographic covariate variables were sex, age, region, race/ethnicity, income group, insurance status variables, and total number of healthcare visits. MEPS race/ethnicity was coded as non-Hispanic white (referred to as white), non-Hispanic black (referred to as black), non-Hispanic Asian (referred to as Asian), Hispanic, and non-Hispanic other. MEPS income level was coded into four federal poverty level (FPL) categories: 1 = <100% FPL; 2 = 100%–<200% FPL; 3 = 200%–<400% FPL; and 4 = ≥400% FPL. Insurance status for each month was recoded into a past-year variable: 12 months of private insurance coverage was recoded as full-year private coverage; 12 months of public coverage was recoded as full-year public coverage; fewer than 12 months but at least 1 month of any coverage was recoded as partial-year uninsured; and no coverage for 12 months was recoded as full-year uninsured. A small percentage reported 12 months of insurance either with both private and public insurance or some combination. Region was coded as 1 = Northeast; 2 = Midwest; 3 = South; 4 = West.

### Statistical analysis

All analyses were conducted using statistical weights to provide estimates that reflect national population totals. The weights are equal to the inverse of the sampling probability for each case, adjusted for nonresponse. We conducted weighted frequencies to determine the demographic characteristics of the adolescent and young adult samples. Bivariable logistic regressions were conducted to determine differences in preventive services between those with a preventive visit and those with a nonpreventive visit for adolescents and young adults. Multivariable analyses were conducted, controlling for age, sex, total number of past-year healthcare visits, race/ethnicity, income, insurance, and region, to determine the extent that demographic factors and amount of healthcare utilization accounted for differences in preventive services between visit groups. Analyses were conducted using SAS and SUDAAN software that takes into account the complex sample design of the survey [24].

## Results

### Demographic descriptions of adolescents and young adults

The adolescent analytic sample was 50% female, 56% white, 21% Hispanic, 13% black, 4% Asian, and 6% other. Thirty-three percent were at ≥400% FPL, 31% at 200–<400% FPL, 20% at 100–<200% FPL, and 16% at <100% FPL (Table 1). Greater than 85% of

**Table 1**

Demographic descriptors of adolescent and young adult analytic samples (Subsample of those having any type of past-year healthcare visit: MEPS 2013–2015)

| Variable  | Adolescents<br>(ages 10–17) % | Young adults<br>(ages 18–25) % |
|---|-------------------------------|--------------------------------|
| <i>Sex</i>  |                               |                                |
| Male  | 49.8                          | 41.1                           |
| Female  | 50.2                          | 58.9                           |
| <i>Race/ethnicity</i>                                     |                               |                                |
| NH-white  | 55.9                          | 61.7                           |
| NH-black  | 13.0                          | 12.0                           |
| NH-Asian  | 4.3                           | 5.1                            |
| Hispanic  | 20.9                          | 17.2                           |
| NH-other  | 5.9                           | 4.1                            |
| <i>Income group</i>                                       |                               |                                |
| <100% FPL   | 16.3                          | 17.4                           |
| 100–<200% FPL   | 19.8                          | 18.5                           |
| 200–<400% FPL   | 31.1                          | 30.4                           |
| ≥400% FPL   | 32.8                          | 33.8                           |
| <i>Insurance status</i>                                   |                               |                                |
| Full-year private insurance                               | 53.8                          | 55.7                           |
| Full-year public insurance                                | 29.7                          | 12.3                           |
| Partial-year uninsured                                    | 10.5                          | 19.6                           |
| Full-year uninsured                                       | 2.7                           | 8.4                            |
| Full-year private and public insurance                    | 2.2                           | 2.0                            |
| Full-year insured with either private or public insurance | 1.2                           | 2.0                            |
| <i>Region</i>   |                               |                                |
| Northeast   | 18.1                          | 19.1                           |
| Midwest   | 21.5                          | 23.8                           |
| South   | 37.4                          | 35.2                           |
| West  | 23.0                          | 21.9                           |
| <i>Past-year healthcare utilization</i>                   |                               |                                |
| At least one well care visit                              | 69.2                          | 53.2                           |
| At least one healthcare visit but no well care visit      | 30.8                          | 46.8                           |

adolescents had full-year insurance, and of those with any past-year healthcare utilization, 69% had received a preventive visit. The young adult analytic sample was 59% female, 62% white, 17% Hispanic, 12% black, 5% Asian, and 4% other. Thirty-four percent were at ≥400% FPL, 30% at 200–<400% FPL, 19% at 100–<200% FPL, and 17% at <100% FPL. Greater than 70% of young adults had full-year insurance, and of those with any past-year healthcare utilization, 53% had received a preventive visit.

### Preventive services for adolescents: rates and differences

For the analytic sample, rates of having physical parameters measured were very high, ranging from 82% reporting blood pressure measurement to 90% reporting having weight assessed (Table 2). Compared to the referent group, those with a past-year preventive visit were significantly more likely to have each of the three physical parameters measured, as well as all of them combined: 92% versus 80% for height assessment; 93% versus 83% for weight; 86% versus 73% for blood pressure; and 84% versus 69% for all three assessed; all  $p < .001$  for both bivariable and multivariable analyses. Rates for anticipatory guidance were lower than rates for having physical parameters measured. As with the physical parameters, rates for anticipatory guidance remained significantly higher in the group who had a preventive visit, in each topic area and all areas addressed,  $p < .001$  in both unadjusted and adjusted analyses. The differences in receipt of anticipatory guidance between the groups with the preventive visit and those with a nonpreventive visit were large relative to differences for physical parameters measured. For example, healthy eating (the most frequently

**Table 2**

Preventive services receipt rates by healthcare utilization: Preventive visit versus a nonpreventive visit. Adolescents, ages 10–17, with a past-year healthcare visit (MEPS 2013–2015)

|  | Preventive services received: Physical parameters   |                   |                          |                                    |
|--|---|-------------------|--------------------------|------------------------------------|
|  | Height assessed                                     | Weight assessed   | Blood pressure assessed  | All three measures assessed        |
| Analytic sample (N) %  | (7,324) 88.2  | (7,527) 90.3      | (6,591) 82.2             | (6,320) 79.1                       |
| Healthcare utilization:  |   |                   |                          |                                    |
| At least one preventive visit %                                      | 91.8  | 93.4              | 86.2                     | 83.5                               |
| OR <sup>a</sup> (95% CI <sup>b</sup> )                               | 2.8 (2.4–3.3)*                                      | 2.9 (2.4–3.5)*    | 2.3 (2.0–2.7)*           | 2.3 (2.0–2.6)*                     |
| aOR <sup>c,d</sup> (95% CI)  | 2.5 (2.1–3.0)*                                      | 2.7 (2.2–3.3)*    | 2.2 (1.9–2.6)*           | 2.2 (1.9–2.5)*                     |
| At least one healthcare visit but no preventive visit <sup>e</sup> % | 80.1  | 83.2              | 73.1                     | 69.1                               |
|  | Preventive services received: Anticipatory guidance |                   |                          |                                    |
|  | Eating healthy                                      | Physical activity | Seatbelt use             | Helmet use                         |
| Total sample (N) %   | (4,902) 57.5  | (4,011) 47.3      | (2,487) 32.9             | (2,646) 30.4                       |
| At least one preventive visit %                                      | 63.3  | 52.1              | 37.3                     | 34.6                               |
| OR <sup>a</sup> (95% CI <sup>b</sup> )                               | 2.2 (1.9–2.5)*                                      | 1.9 (1.6–2.2)*    | 2.0 (1.7–2.4)*           | 2.0 (1.7–2.4)*                     |
| AOR <sup>c,d</sup> (95% CI)  | 2.0 (1.7–2.3)*                                      | 1.8 (1.5–2.1)*    | 1.9 (1.6–2.2)*           | 1.8 (1.5–2.2)*                     |
| At least one healthcare visit but no preventive visit <sup>e</sup> % | 44.5  | 36.6              | 23.1                     | 21.1                               |
|  | 2nd-hand smoke                                      | Dental visit      | All six topics addressed | Met with doctor alone <sup>f</sup> |
|  | Total sample (N) %                                  | (3,230) 32.9      | (4,072) 46.4             | (1,183) 12.8                       |
| At least one preventive visit %                                      | 36.0  | 50.0              | 14.9                     | 33.4                               |
| OR <sup>a</sup> (95% CI <sup>b</sup> )                               | 1.6 (1.4–1.9)*                                      | 1.6 (1.4–1.9)*    | 1.9 (1.5–2.5)*           | 1.6 (1.3–2.0)*                     |
| AOR <sup>c,d</sup> (95% CI)  | 1.6 (1.3–1.8)*                                      | 1.5 (1.3–1.8)*    | 1.8 (1.4–2.3)*           | 1.6 (1.3–2.0)*                     |
| At least one healthcare visit but no preventive visit <sup>e</sup> % | 26.1  | 38.4              | 8.3                      | 24.1                               |

Note:  $p < .001$  \*.<sup>a</sup> OR = odds ratio.<sup>b</sup> CI = confidence interval.<sup>c</sup> aOR = adjusted odds ratio.<sup>d</sup> aOR controlled for age, gender, race/ethnicity, federal poverty level, insurance status, region, number of total healthcare visits.<sup>e</sup> Referent group.<sup>f</sup> Ages 12–17.

covered area) was addressed for 63% of those with a preventive visit compared to 45% for those with a nonpreventive visit. For helmet use (the area least likely to be covered), these figures were 35% versus 21%, respectively. Groups varied significantly on spending time alone with a provider at most recent healthcare visit, 33% for preventive visit group and 24% for nonpreventive visit group,  $p < .001$ .

#### Preventive services for young adults—rates and differences

Eighty-six percent of young adults in the analytic sample had their blood pressure checked in the past year, 40% had cholesterol checked, and 33% had a flu shot in the past year (Table 3). As with the adolescent sample, rates of receipt were significantly higher

among those with a past-year preventive visit than the referent group, across all services: for blood pressure, 90% versus 81%; cholesterol check, 47% versus 33%; and flu shot, 39% versus 25%; all  $p < .001$  in both unadjusted and adjusted analyses.

#### Discussion

The present study found strong evidence linking receipt of a preventive visit to increased receipt of preventive services. Receipt of a preventive visit was associated with an increased likelihood of receiving preventive services: this held true for every service variable measured at highly significant levels. This study assessed a range of services; including services readily available outside the clinic setting (e.g., blood pressure). To our knowledge, this is the

**Table 3**

Past-year preventive services receipt rates by healthcare utilization: Preventive care versus a nonpreventive visit. Young adults ages 18–25 with a past-year healthcare visit (MEPS 2013–2015)

|  | Blood pressure checked | Cholesterol checked | Flu shot       | All three services |
|--|------------------------|---------------------|----------------|--------------------|
| Analytic sample (N) %  | (4,729) 85.7           | (2,357) 40.2        | (1,842) 32.7   | (945) 15.5         |
| Healthcare utilization:  |                        |                     |                |                    |
| At least one preventive visit %                                      | 90.0                   | 46.6                | 39.3           | 19.6               |
| OR <sup>a</sup> (95% CI <sup>b</sup> )                               | 2.1 (1.7–2.6)*         | 1.8 (1.5–2.1)*      | 1.9 (1.6–2.3)* | 2.0 (1.7–2.4)*     |
| AOR <sup>c,d</sup> (95% CI)  | 1.8 (1.5–2.2)*         | 1.8 (1.5–2.1)*      | 1.8 (1.6–2.2)* | 1.9 (1.6–2.4)*     |
| At least one healthcare visit but no preventive visit <sup>e</sup> % | 80.9                   | 32.7                | 25.1           | 10.9               |

Note: \* $p < .001$ .<sup>a</sup> OR = odds ratio.<sup>b</sup> CI = confidence interval.<sup>c</sup> aOR = adjusted odds ratio.<sup>d</sup> aOR controlled for age, gender, race/ethnicity, federal poverty level, insurance status, region, number of total healthcare visits.<sup>e</sup> referent group.

first study to demonstrate the value of a preventive visit among adolescents and young adults.

While the vast majority of adolescents who attended any health-care visit had height, weight, or blood pressure measured in the past year (range 82%–90%), rates of receipt of anticipatory guidance were much lower. The degree of differences between those with a preventive visit and those with nonpreventive visit were greatest in the anticipatory guidance areas. Compared to those with a nonpreventive visit, four of the six adolescent anticipatory guidance areas (healthy eating, physical activity, and seatbelt and helmet use) were between 30% and 40% higher in the group with a preventive visit. The two topic areas that adolescents were most likely to receive guidance in were healthy eating and physical activity; both highly relevant for obesity prevention. Differences between visit groups for physical parameters measurement were modest by comparison (15%–18% higher rates). While physical parameters are routinely assessed in any type of healthcare visit, often by a medical assistant, discussion of health promotion and risk prevention is considered an integral component of a preventive visit. Many of the topic areas included here are among those recommended for annual screening in *Bright Futures* and the USPSTF [1,15].

Our finding of higher rates of time alone with a provider among adolescents 12–17 years of age with a preventive visit compared to the referent group points to greater participation in recommended preventive services for this age group. Still, two thirds of adolescents did not have time alone, thus did not have the opportunity to talk with their provider about sensitive health topic areas such as sexual health or substance use.

Our findings of higher rates for all of the preventive services for those young adults who had a past-year preventive visit indicate that health promotion activities for this age group are also advanced by the attendance of a preventive visit. Unlike for adolescents, some of the preventive services examined here are not recommended annually for young adults or for all young adults. Of all services examined, receipt of a flu shot was the least likely to occur with only one third reporting receipt. More than three quarters reported having their blood pressure checked.

While the study demonstrates strong associations between receipt of a preventive visit and preventive services, there are limitations. The purpose of the analysis was to demonstrate differences in preventive services received between those with a preventive visit and those with a nonpreventive visit. Thus, we are unable to address preventive care for adolescents and young adults who did not access healthcare in this analysis. One limitation of MEPS is that parents provide the survey responses for all adolescents and for young adults; it relies on the household adult with the most knowledge of the healthcare utilization of the household family members (usually parents). In households of more than one person, it is not possible to identify when a young adult reported for themselves. There may be several reasons why parents are not fully aware of the services accessed by their children. Adolescents and young adults attending preventive visits may not remember to tell a parent about screening or advice topics covered in the visit, which could contribute to lower reporting rates for some screenings, such as seatbelt or helmet use. Those attending confidential visits may not report the visit at all and those with time alone with a provider may not report fully on the content. Therefore, the present findings could underrepresent preventive visits and services rates. The guidelines for preventive service content areas, issued by *Bright Futures* and the USPSTF for adolescents and for young adults, are not fully represented in the MEPS assessments.

Sensitive topics including substance use and reproductive health are excluded. While it is unclear why sensitive topics are excluded in MEPS, the decreased likelihood of parents being fully aware of sensitive services would likely result in greater underrepresentation of rates in these areas compared to less sensitive issues. Improved monitoring of preventive care for the young adult population should include attention for collecting data from young adults rather than from their parents. Additionally, because professional guidelines for some of the young adult preventive services measured here (blood pressure and cholesterol checks) do not include annual assessment for all young adults; we were unable to interpret the level of guideline compliance with those services received. So far as we know, despite the limitations, MEPS is the only national survey that provides assessment of preventive services for adolescents including time alone with a provider as part of a healthcare visit. The time alone measure does not provide detail about content or length of time. It does indicate the likelihood, however, that in its absence, sensitive health topics were not addressed in the visit. Improved national monitoring of healthcare services that have shown evidence of efficacy in reducing negative health factors could contribute to greater understanding of their effects at a large population level. The assessment of preventive services included in the present analysis was not linked to a specific healthcare visit, thus the services reported could have been from sources other than the preventive visits documented by respondents.

Our finding that greater receipt of preventive services for both adolescents and young adults was associated with a past-year preventive visit highlights its value and importance. Increased delivery of preventive services to these age groups can help address many critical public health issues. The Department of Health and Human Services has identified three priority health areas: childhood obesity, serious mental illness, and the opioid epidemic [25]. These areas are highly relevant for adolescents and young adults and are addressed in preventive service guidelines. Obesity, mental health issues, and substance use screening are recommended in the 4th edition of *Bright Futures*, and the USPSTF has found evidence supporting the effectiveness of screening for obesity and depression [1,15]. Current federal efforts to promote preventive visits for adolescents and young adults have included identifying it as a National Performance Measure for the Maternal and Child Health Bureau State Public Health Agencies. To date, 38 states have chosen increasing rates of preventive visits for adolescents, ages 12–21, as a priority area [26]. Additional emphases have included the work of the Unity Consortium, an organization focused on improving adolescent health through prevention and immunization [27] and the American Academy of Pediatrics Adolescent Health Consortium Health Project [28]. Efforts to engage families and communities in increasing awareness of the importance of preventive care are crucial to increase prevention in healthcare. Integration and coordination of such efforts can help shape deliberations on how best to use federal, state, and other resources to improve health and healthcare for these developing age groups.

### Funding Sources

This study was supported by the Health Resources and Services Administration (HRSA) of the United States. Department of Health and Human Services (HHS) (under #U45MC27709, Adolescent and Young Adult Health Capacity Building Program); with supplemental support from HRSA grant #UAGMC27378.



## References

- [1] U.S. Preventive Services Task Force. Published Recommendations. <http://www.uspreventiveservicestaskforce.org/BrowseRec/Index?age=Pediatric,Adolescent>. Accessed August 10, 2016.
- [2] Walker Z, Townsend J, Oakley L, et al. Health promotion for adolescents in primary care: Randomized controlled trial. *BMJ* 2002;325:524.
- [3] Wintersteen M. Standardized screening for suicidal adolescents in primary care. *Pediatrics* 2010;125:938–44.
- [4] Harris S, Csemy L, Sherritt L, et al. Computer-facilitated substance use screening and brief advice for teens in primary care: An international trial. *Pediatrics* 2012;129:1072–82.
- [5] Ozer EM, Adams SH, Orell-Valente J, et al. Does delivering preventive health services in primary care reduce adolescent risky behavior? *J Adolesc Health* 2011;49:476–82.
- [6] Irwin Jr. CE, Adams SH, Park MJ, Newacheck PW. Preventive care for adolescents: Few get visits and fewer get services. *Pediatrics* 2009;123:565–72.
- [7] Centers for Disease Control and Prevention. Sexually transmitted disease surveillance 2015. Atlanta: U.S. Department of Health and Human Services; 2016.
- [8] Adams S, Twietmeyer L, Park J, Brindis CD, et al. Association between adolescent preventive care and the role of the Affordable Care Act. *JAMA Pediatr* 2017. <https://doi.org/10.1001/jamapediatrics.2017.3140>.
- [9] Ford CA, Bearman PS, Moody J. Foregone health care among adolescents. *JAMA* 1999;282:2227–34.
- [10] Jones RK, Purcell A, Singh S, Finer LB. Adolescents' reports of parental knowledge of adolescents' use of sexual health services and their reactions to mandated parental notification for prescription contraception. *JAMA* 2005;293:340–8.
- [11] Lehrer JA, Pantell R, Tebb K, Shafer MA. Foregone health care among US adolescents: Associations between risk characteristics and confidentiality concern. *J Adolesc Health* 2007;40:218–26.
- [12] English A, Ford CA. More evidence supports the need to protect confidentiality in adolescent health care. *J Adolesc Health* 2007;40:199–200.
- [13] Klein JD, Wilson KM, McNulty M, et al. Access to medical care for adolescents: Results from the 1997 Commonwealth fund survey of the health of adolescent girls published correction appears in *J Adolesc Health* 1999;25:120–30.
- [14] Elster AB, Kuznets NJ. American medical association guidelines for adolescent preventive services: Recommendations and rationale. Baltimore, MD: Williams & Wilkins; 1994.
- [15] Hagan J, Shaw J, Duncan P, editors. Bright futures: Guidelines for health supervision of infants, children, and adolescents: Pocket guide. 4th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2017.
- [16] Adams S, Park J, Irwin CE. Adolescent and young adult preventive care: comparing national survey rates. *Am J Prev Med* 2015;49:238–47.
- [17] Park MJ, Mulye TP, Adams SH, et al. The health status of young adults in the United States. *J Adolesc Health* 2006;39:305–17.
- [18] Park MJ, Scott JT, Adams SH, et al. Adolescent and young adult health in the US in the past decade: little improvement and young adults remain worse off. *J Adolesc Health* 2014;55:3–16.
- [19] Ozer EM, Urquhart J, Brindis CB, et al. Young adult preventive health care guidelines: There but can't be found. *Arch Pediatr Adolesc Med* 2012;166:240–7.
- [20] Institute of Medicine and National Research Council. Investing in the health and well-being of young adults. Washington, D.C.: National Academies Press; 2015.
- [21] Lau JS, Irwin Jr. CE, Adams SH, et al. Young adults and preventive care: The Affordable Care Act is helping. *JAMA Pediatr* 2014;168:1101–6.
- [22] Agency for Healthcare Research and Quality. Medical Expenditure Panel Survey. Washington, DC: U.S. Department of Health and Human Services; 2009. August 21 [https://meps.ahrq.gov/mepsweb/about\\_meps/survey\\_back.jsp](https://meps.ahrq.gov/mepsweb/about_meps/survey_back.jsp) Accessed September 27, 2017.
- [23] Mangione-Smith R, DeCristofaro AH, Setodji CM, et al. The quality of ambulatory care delivered to children in the United States. *N Engl J Med* 2007;357:1515–23.
- [24] Shah BV, Barnwell BG, Bieler GS. SUDAAN user's manual. Release 7.0. Research Triangle Park, NC: Research Triangle Institute; 1996.
- [25] Washington, DC: U.S. Department of Health and Human Services; 2017. September 27 <https://www.hhs.gov/about/news/2017/09/27/hhs-office-of-minority-health-awards-5-million-to-help-communities-address-the-opioid-crisis-childhood-obesity-and-serious-mental-illness.html> Accessed November 1, 2017.
- [26] National Performance Measure Distribution. U.S. department of health and human services, health resources & services administration, maternal and child health bureau. <https://mchb.tvisdata.hrsa.gov/PrioritiesAndMeasures/NPMDistribution>. Accessed November 8, 2017.
- [27] Adolescent Health and Immunization Poll. UNITY consortium. <http://www.unity4teenvax.org/unity-projects/>. Accessed November 8, 2017.
- [28] Research Projects from Other Funding Sources. American Academy of Pediatrics <https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/Richmond-Center/Pages/Research-Projects-from-Other-Funding-Sources.aspx>. Accessed November 8, 2017.