

Original article

Adolescent Preventive Services: Rates and Disparities in Preventive Health Topics Covered during Routine Medical Care in a California Sample

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Manuscript received February 2, 2008; manuscript accepted August 27, 2008

Abstract

Purpose: The objective was to examine rates and disparities in preventive health topics covered during routine medical care for adolescents, using a California sample.

Methods: Utilizing 2003 California Health Interview Survey data, the sample included 2192 adolescents attending a physical exam within the past 6 months. Adolescents reported whether nine health topics: tobacco, alcohol, drugs, seatbelts, helmets, violence, exercise, nutrition, and sexually transmitted diseases (STDs) were discussed during their most recent physical exam. Outcomes were rates of health topics discussed and disparities in rates based on age, gender, race/ethnicity, income level, and insurance status.

Results: Rates ranged from 15% (violence) to 76% (nutrition, exercise). Compared to older teens, younger teens reported discussing safety more, but substances, nutrition, and STDs less. Compared to males, females reported discussing tobacco and helmets less, but exercise and STDs more. Compared to white youths, Hispanic youths reported more discussion of most topics, black youths reported more discussion of nutrition and less of violence, and Asian youths reported more discussion of seatbelts and helmets. Lower income and uninsured groups reported more discussion of health topics compared to higher income and insured groups.

Conclusions: Rates of coverage of health topics are below recommended levels. Contrary to expectations, minority, uninsured, and lower income groups reported higher rates of discussing health topics. Strategies to increase the coverage of preventive health topics during routine medical care should address these findings. © 2009 Society for Adolescent Medicine. All rights reserved.

Keywords: Adolescent prevention services; Preventive screening

Healthcare access and quality are crucial elements of health promotion across all stages of the life span. Widespread disparities in healthcare access and quality have been identified and targeted as potential mechanisms explaining inequalities in health status in underserved populations, particularly within racial/ethnic minority groups, and

lower income groups [1]. Unfortunately, inequalities in healthcare access increased between the years 1977 and 1996 for racial minority groups [2], indicating that greater effort is needed to reverse this phenomenon. *The Healthy People 2010* initiative represents an attempt to eliminate inequalities in health status for all Americans by setting goals, with adolescents and young adults among the targeted groups [3]. Although healthcare disparities have been studied intensively in adults, similar issues have not been explored in depth for adolescents [4].

Preventive care is a crucial element of quality primary care for adolescents because: (1) the majority of morbidity

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and mortality during adolescence is preventable, and (2) many of the health and lifestyle behaviors established during adolescence have longstanding health effects across the entire life span [5]. Several national agencies and professional organizations have published guidelines recommending that all adolescents have an annual, confidential visit during which primary care providers screen and counsel adolescent patients for multiple risk behaviors [6–9]. Underlying these guidelines is the supposition that the discussion of risky behavior with adolescents through screening and counseling mechanisms will result in decreased risky behavior and associated unhealthy consequences. Despite the presence of guidelines, the provision of preventive services to all adolescents remains far below the recommended levels [10–13].

It is well established that nonwhite and lower income adolescents are less likely to have health insurance and access to preventive care [14–16] than their white and higher income counterparts. However, the few studies that have examined disparities in the content of preventive visits have shown inconsistent results. A study of the Medical Expenditures Panel Survey (MEPS) using parental/caregiver report of children's care showed that preventive counseling rates were the same for black children and lower in two of eight topics for Hispanic children when compared to white children [17]. In contrast, a recent MEPS study of children with special healthcare needs showed that black and Hispanic children were more likely to receive preventive counseling than white children [18]. Also, using MEPS, Perry and Kenney showed that among low-income children, those with public insurance were more likely to receive preventive counseling compared to those with private insurance [19]. Using the National Ambulatory Medical Care Survey (NAMCS) based on physician records, Hambidge et al [20] found that black and Hispanic children, when compared to white children, were less likely to receive counseling in one of five health topics and in the overall likelihood of receiving any counseling services.

These studies of all children, both younger and older, provide an indication of services given overall. However, preventive care for adolescents merits separate analysis, because the health concerns change as children enter adolescence. As recognized by the professional guidelines, adolescents, unlike younger children, need private time with their healthcare provider to discuss sensitive health topics including substance use and sexuality [6–9]. Parents cannot report reliably on the inclusion of these topics in healthcare visits.

Research addressing disparities in the delivery of preventive services to adolescents has been limited. Igra and Millstein [10], analyzing 1990 NAMCS data, found that compared to white adolescents, black adolescents were more likely to receive counseling regarding HIV, smoking cessation, and weight reduction, and that Hispanic adolescents were less likely to receive these counseling services. In a more recent study of NAMCS and National Hospital Ambulatory Medical Care Survey data from years 1997 to 2000, Rand et al [12] found that black adolescents were less likely

than white adolescents to receive exercise counseling, but that counseling in five other topics—tobacco use, diet, sexually transmitted diseases (STDs), pregnancy, and injuries—did not differ significantly between the groups. Rates did not differ for Hispanic versus nonHispanic adolescents.

Information on disparities other than racial/ethnic differences in adolescent preventive counseling is sparse, despite the fact that economic, gender, and age factors may also contribute to disparities in healthcare delivery [21]. Findings from the NAMCS studies suggest that older adolescents receive more counseling than younger adolescents regarding sensitive behaviors involving substance use and sexuality [10,12]. Rand et al found no significant differences in counseling based on gender or insurance type.

These limited findings from large-scale studies of preventive screening and counseling come from physician records or parental recall. Quality improvement efforts for adolescent preventive care have increasingly used adolescents' reports of their care to evaluate progress [22]. Adolescent report is a valid measure of physician behavior during clinical encounters [23] and provides crucial information on the content of healthcare visits.

The Present Study

As clinicians focus increasingly on prevention related to sensitive health topics during adolescence, it is important to understand preventive services from an adolescent perspective. In this study, we examined rates of preventive health topics covered with adolescents during routine physical exams, utilizing adolescents' reports of discussions with their providers during routine visits. We examined two questions: (1) what were the basic rates of preventive health topics covered during routine care? (2) Were there disparities in this preventive care based on age, gender, race/ethnicity, family income, or insurance status? We hypothesized that older, rather than younger adolescents would be more likely to report discussing substance use and STDs, that males would report more discussion of risky health topics than females, and that nonwhite adolescents, poor adolescents, and adolescents without insurance would be less likely to have preventive health discussions than their more advantaged counterparts. We utilized the 2003 California Health Interview Survey (CHIS) to conduct these analyses.

Method

We examined data from the 2003 Adolescent CHIS, a broad public health surveillance system providing state and local population-based health data for California. The variables used in these analyses come from the 2003 CHIS public use files, made available for research purposes. This study was approved by the University internal review board (IRB). All CHIS procedures were approved by the IRB at the University of California, Los Angeles, the State of California,

Westat (the data collection organization), and the federal Office of the Management of the Budget.

CHIS, the largest multiethnic, multilingual state survey in the United States, is a random digit-dial telephone survey of the California population that has been conducted every 2 years, starting in 2001. CHIS is designed to provide statewide estimates for California's population on a range of health topics. Representative of California residents living in households with telephones, CHIS includes three separate components: (1) adult survey, ages 18 and older; (2) adolescent survey, ages 12 to 17 years; and (3) child survey, under age of 12 years, completed by a parent or guardian most knowledgeable of that child's health. The adolescent data were collected over a 9-month period during 2003, and includes sociodemographic information and information regarding health topics covered in most recent routine healthcare visits.

CHIS sampling

Households were scientifically sampled from every county in the state, and interviews were conducted with one randomly selected adult from each household. In households with adolescents, one adolescent was randomly selected for an interview, and parental or legal guardian verbal consent was required. In 2003, roughly 83% of parent participants gave permission for their adolescents to participate in the interview, and of those, 83% of the adolescents participated. To ensure that the sample was representative of the California population, data were weighted to adjust for the joint probabilities of selection under the complex, stratified CHIS sampling design. Detailed descriptions of the sampling and weighting methods can be found in the CHIS 2003 Methodology Series, posted on the web at <http://www.chis.ucla.edu>.

Study sample

All 2003 CHIS adolescent participants ($n = 4010$) were asked the length of time since their last physical examination. Those who reported attending a physical exam within the past 2 years ($n = 3,675$) completed a set of questions asking whether they had talked with their provider about specific health-related topics at their most recent physical exam. To reduce the risk of recall bias, our analyses included a subsample of adolescents who had attended a physical examination in the past 6 months ($n = 2,192$), a sample size that corresponds to an estimated 1.75 million adolescents in California. To determine the presence of potential bias in selecting our subsample ($n = 2,192$), we compared adolescents in the subsample to all other adolescents in the 2003 CHIS sample. There were no significant differences in race/ethnicity or income level in the groups.

Demographic variables

Adolescents reported their age, gender, and race/ethnicity. We created two age categories: 12–14 and 15–17 years old.

Race/ethnicity data were coded into a combined race/ethnicity variable that included six categories: white, Hispanic/Latino, black, Asian, American Indian/Alaskan Native, and other/multiple categories. Income level and insurance status were obtained from the adult respondent data files. We created three categories from the income data as percent of the federal poverty level (FPL): (1) 0%–199% FPL representing the lowest income group; (2) 200%–399% FPL representing the middle income group; and (3) 400% FPL and above representing the highest income group. FPL is a ratio of annual family income to the federal poverty threshold, which is adjusted for family size. For example, the poverty threshold for a family of four was \$18,810 in 2003 [24]. Insurance status was categorized as currently insured versus not currently insured. Approximately 51% of the sample were male, 56% were ages 12–14, 41% were white, 10% were black, 35% were Hispanic, 9% were Asian, 2% were American Indian/Alaskan Native, and 3% were other/multiple race or ethnicity. Table 1 presents a sample description.

Assessment of health topics discussed during routine exams

The questions addressing coverage of health topics during routine exams were adapted from the Young Adult Health Care Survey, a well-established and frequently used evaluation of preventive screening [22]. These were administered to adolescents who had reported attending a physical examination in the past 2 years. Participants were asked about a range of health topics, using the stem: “When you had your last routine physical exam, did you and a doctor or other health-care provider talk about...” The individual topics queried

Table 1
Descriptive statistics of study sample

CHIS sample	N	Weighted percent	Estimated population
Total sample	2,192		1,785,526
Age			
12–14	1,232	56%	999,895
15–17	960	44%	785,631
Gender			
Male	1,130	51%	910,618
Female	1,062	49%	874,907
Race/ethnicity			
White	1,129	41%	732,066
Black	156	10%	178,553
Hispanic	624	35%	624,934
Asian	159	9%	160,698
American Indian/Alaskan Native	41	2%	35,711
Other/multiple	83	3%	53,566
Income group			
≥400% FPL ^a	837	31%	553,513
200–399% FPL	605	27%	482,092
<200% FPL	750	42%	749,921
Insurance status			
Insured	2,076	93%	1,660,539
Uninsured	116	7%	124,987

^a FPL = federal poverty level.

included: “cigarettes or smoking;” “alcohol use;” “drug use;” “seatbelt use;” “helmet use;” “sexually transmitted diseases or STDs, such as gonorrhea or chlamydia;” “violence or violence prevention;” “exercise or physical activity;” and “nutrition or healthy eating.” The wording of the items reflects adolescent’s perceptions of health topics discussed during the physical exam. Although it is typically assumed that the provider asks a question, it is also possible that the adolescent raised the topic as a concern or that the provider offered guidance in a particular area.

Analysis plan

Estimates presented here have been statistically weighted to represent California population totals. The weights, provided as part of the public use files by CHIS investigators, are equal to the inverse of the sampling probability for each case, adjusted for nonresponse. All analyses, including estimates and regression statistics, were conducted using STATA software that accommodates replicate weights and allowed us to take into account the survey’s complex sample design [25].

Discussion rates for each health topic were calculated for the total sample, by age category (12–14, 15–17 years), gender, race/ethnicity, income group, and insurance status. For each topic area, we conducted a separate bivariate logistic regression model for each of the following variables: age category, gender; race/ethnicity, income group, and insurance status. This yielded unadjusted odds ratios for each of these variables, for each health topic area. The referent group was designated as younger age for the age analyses, female for gender, white for race/ethnicity, highest income for income level, and currently insured for insurance status. We then conducted a multivariate logistic regression for each health topic area that included all of these independent variables, yielding adjusted odds ratios for each individual variable (age, gender, etc.).

Results

Below, we present the significant results for the discussion of each health topic area. The full results are present in each table indicated.

Tobacco use

Twenty-nine percent of the adolescents reported discussing tobacco use with their providers.

Age/gender differences. Older adolescents ($p < .001$) and males ($p < .05$) were more likely to report discussion of tobacco use, compared to their younger or female counterparts, and these differences remained unchanged when we adjusted for confounding factors (see Table 2).

Alcohol use

Twenty-seven percent of the adolescents reported discussion of alcohol use with their providers.

Age/gender differences. Older adolescents were more likely to report discussing alcohol use than younger adolescents ($p < .001$), and this difference remained unchanged in the adjusted analyses (see Table 2).

Drug use screening

Thirty percent of the sample reported discussing drug use with their providers.

Age/gender differences. Older adolescents were more likely to report discussion of drug use than younger adolescents ($p < .01$), and this difference remained unchanged when we adjusted for confounding factors (see Table 2).

Seatbelt use

Nineteen percent of the adolescents reported discussing seatbelt use with their providers.

Age/gender differences. Younger adolescents were more likely than older adolescents to report discussion of seatbelts ($p < .01$), a difference that remained significant, although attenuated, in the adjusted analyses ($p < .05$).

Race/ethnicity differences. Hispanic ($p < .01$) and Asian ($p < .05$) adolescents were more likely to report discussing seatbelt use than were white adolescents; however, these differences were not significant in the adjusted analyses.

Income/insurance differences. Adolescents in the lowest income group were more likely to report discussion of seatbelt use than those in the highest income groups ($p < .001$), a difference that remained significant at a lower level in the adjusted analyses ($p < .05$). Uninsured teens were more likely to report discussing seatbelts than insured teens ($p < .01$), and this remained significant when we adjusted for confounding factors ($p < .05$) (see Table 3).

Helmet use

Twenty percent of the adolescents reported discussing helmet use with their providers.

Age/gender differences. Younger adolescents were more likely than older to report discussion of helmets, and this difference remained unchanged when we adjusted for confounding factors (both $p < .001$). Males were more likely to report discussing helmet use than females ($p < .05$), a difference that remained significant in the adjusted analyses ($p < .05$).

Table 2

Tobacco, alcohol, and drug use topics covered during routine care: percentage rates, odds ratios, adjusted odds ratios, 95% confidence intervals

	Tobacco use	Alcohol use	Drug use
Total sample rate	28.6%	27.0%	30.3%
Age			
12–14 rate ^a	23.9%	22.0%	25.9%
15–17 rate	34.5%	33.4%	35.3%
OR ^b (95% CI) ^c	1.68*** (1.24–2.29)	1.78*** (1.31–2.40)	1.56** (1.12–2.17)
AOR ^d (95% CI) ^f	1.80*** (1.33–2.45)	1.86*** (1.37–2.54)	1.66** (1.19–2.32)
Gender			
Male rate ^a	31.0%	27.6%	32.2%
Female rate	26.1%	26.3%	28.2%
OR (95% CI)	.79* (.64–.97)	.94 (.75–1.17)	.83 (.65–1.05)
AOR (95% CI) ^g	.76* (.61–.94)	.91 (.73–1.14)	.81 (.64–1.02)
Race/ethnicity			
White rate ^a	26.3%	24.2%	28.3%
Black rate	30.2%	31.2%	33.2%
OR (95% CI)	1.21 (.69–2.11)	1.42 (.82–2.47)	1.26 (.72–2.19)
AOR (95% CI) ^h	1.25 (.71–2.18)	1.51 (.87–2.64)	1.26 (.73–2.16)
Hispanic rate	29.1%	27.0%	29.0%
OR (95% CI)	1.14 (.87–1.51)	1.16 (.88–1.53)	1.04 (.76–1.42)
AOR (95% CI) ^h	1.12 (.81–1.55)	1.16 (.84–1.61)	.96 (.68–1.35)
Asian rate	30.2%	31.6%	34.3%
OR (95% CI)	1.21 (.72–2.02)	1.45 (.85–2.45)	1.32 (.82–2.15)
AOR (95% CI) ^h	1.20 (.72–2.00)	1.45 (.86–2.43)	1.27 (.78–2.05)
American Indian/Alaskan	54.6%	39.4%	58.7%
Native rate ^k			
Other/multiple rate ^k	24.7%	29.2%	30.6%
Income group			
≥400% FPL ^c rate ^a	27.3%	26.2%	28.4%
200–399% FPL rate	28.2%	27.2%	30.3%
OR (95% CI)	1.05 (.77–1.43)	1.05 (.77–1.43)	1.1 (.79–.52)
AOR (95% CI) ⁱ	.99 (.72–1.37)	1.01 (.74–1.37)	1.06 (.76–1.46)
<200% FPL rate	29.7%	27.5%	31.6%
OR (95% CI)	1.13 (.86–1.48)	1.07 (.80–1.44)	1.16 (.84–1.61)
AOR (95% CI) ⁱ	1.08 (.79–1.48)	1.03 (.74–1.44)	1.17 (.83–1.67)
Insurance status			
Insured rate ^a	28.0%	26.6%	29.4%
Uninsured rate	36.3%	32.0%	41.1%
OR (95% CI)	1.47 (.83–2.60)	1.30 (.72–2.33)	1.68 (.95–2.97)
AOR (95% CI) ^j	1.35 (.77–2.36)	1.20 (.66–2.18)	1.56 (.90–2.70)

* $p < .05$; ** $p < .01$; *** $p < .001$.^a Indicates referent group for logistic regression.^b OR = odds ratio.^c CI = confidence interval.^d AOR = adjusted odds ratio.^e FPL = federal poverty level.^f Adjusted for: gender, race/ethnicity, FPL, insurance status.^g Adjusted for: age, race/ethnicity, FPL, insurance status.^h Adjusted for: age, gender, FPL, insurance.ⁱ Adjusted for: age, gender, race/ethnicity, insurance status.^j Adjusted for: age, gender race/ethnicity, FPL.^k Sample size insufficient to conduct logistic regressions.

Race/ethnicity differences. Hispanic and Asian adolescents were more likely to report discussing helmet use than were white adolescents (both $p < .05$); however, the differences were no longer significant in the adjusted analyses.

Income/insurance differences. Adolescents in the lowest income group were more likely to report discussion of helmet use than adolescents in the highest income groups ($p < .01$); however, this did not remain significant in the

adjusted analyses. Uninsured teens were more likely to report discussing helmets than their insured counterparts, a difference that remained significant in the adjusted analyses (both $p < .001$) (see Table 3).

Violence

Fifteen percent of the adolescents reported discussion of violence with their providers.

Table 3

Seatbelt use, helmet use, and violence topics covered during routine care: percentage rates, odds ratios, adjusted odds ratios, 95% confidence intervals

	Seatbelt use	Helmet use	Violence
Total sample	18.9%	19.7%	15.4%
Age			
12–14 rate ^a	21.4%	24.6%	18.2%
15–17 rate	15.6%	13.5%	11.8%
OR ^b (95% CI) ^c	.68** (.51–.91)	.48*** (.36–.63)	.60* (.41–.89)
AOR ^d (95% CI) ^f	.72* (.53–.98)	.49*** (.37–.65)	.61* (.41–.91)
Gender			
Male rate ^a	18.0%	21.9%	15.6%
Female rate	19.8%	17.4%	15.1%
OR (95% CI)	1.13 (.85–1.49)	.75* (.57–.99)	.97 (.69–1.36)
AOR (95% CI) ^g	1.11 (.85–1.45)	.74* (.56–.96)	.93 (.66–1.31)
Race/ethnicity			
White rate ^a	15.0%	16.2%	10.4%
Black rate	15.1%	14.2%	5.9%
OR (95% CI)	1.01 (.54–1.88)	.86 (.49–1.50)	.54 (.26–1.12)
AOR (95% CI) ^h	.84 (.45–1.57)	.71 (.41–1.23)	.45* (.21–.95)
Hispanic rate	21.7%	22.6%	23.2%
OR (95% CI)	1.58** (1.12–2.22)	1.51* (1.08–2.12)	2.61*** (1.79–3.80)
AOR (95% CI) ^h	1.19 (.80–1.76)	1.24 (.86–1.78)	2.15*** (1.46–3.16)
Asian rate	24.2%	25.6%	16.5%
OR (95% CI)	1.81* (1.00–3.27)	1.79* (1.05–3.02)	1.71 (.95–3.06)
AOR (95% CI) ^h	1.57 (.90–2.75)	1.63 (.98–2.73)	1.55 (.84–2.84)
American Indian/Alaskan	51.9%	42.3%	32.4%
Native rate ^k			
Other/multiple rate ^k	11.2%	18.3%	7.3%
Income group			
≥400% FPL ^c rate ^a	14.5%	17.0%	9.4%
200–399% FPL rate	15.6%	15.9%	15.2%
OR (95% CI)	1.08 (.75–1.57)	.93 (.65–1.32)	1.74* (1.11–2.72)
AOR (95% CI) ⁱ	1.02 (.70–1.48)	.85 (.59–1.23)	1.56 (.98–2.48)
<200% FPL rate	24.2%	24.2%	19.9%
OR (95% CI)	1.87*** (1.34–2.62)	1.56** (1.13–2.15)	2.41*** (1.65–3.53)
AOR (95% CI) ⁱ	1.52* (1.02–2.25)	1.20 (.82–1.75)	1.50 (.97–2.33)
Insurance status			
Insured rate ^a	17.7%	18.3%	14.3%
Uninsured rate	33.5%	37.6%	28.9%
OR (95% CI)	2.35** (1.38–4.01)	2.69*** (1.61–4.51)	2.44** (1.40–4.25)
AOR (95% CI) ^j	1.90* (1.15–3.13)	2.42*** (1.47–3.98)	1.89* (1.04–3.44)

* $p < .05$; ** $p < .01$; *** $p < .001$.^a Indicates referent group for logistic regression.^b OR = odds ratio.^c CI = confidence interval.^d AOR = adjusted odds ratio.^e FPL = federal poverty level.^f Adjusted for: gender, race/ethnicity, FPL, insurance status.^g Adjusted for: age, race/ethnicity, FPL, insurance status.^h Adjusted for: age, gender, FPL, insurance.ⁱ Adjusted for: age, gender, race/ethnicity, insurance status.^j Adjusted for: age, gender race/ethnicity, FPL.^k Sample size insufficient to conduct logistic regressions.

Age/gender differences. Younger adolescents were more likely to report discussion of violence than their older counterparts, in both unadjusted and adjusted analyses (both $p < .05$).

Race/ethnicity differences. When compared to white adolescents, black adolescents reported discussion of violence less frequently, however this difference was only significant when we adjusted for confounding factors ($p < .05$). Hispanic

adolescents were more likely to report discussion of violence than their white counterparts, a difference that was significant in both unadjusted and adjusted analyses ($p < .001$).

Income/insurance differences. Adolescents in both the lowest ($p < .01$) and middle ($p < .05$) income groups reported discussion of violence more frequently compared to adolescents in the highest income group; however, these

Table 4

Nutrition, physical activity, and sexually transmitted disease (STD) topics covered during routine care: percentage rates, odds ratios, adjusted odds ratios, 95% confidence intervals

	Nutrition	Physical activity	STDs
Total sample	76.4%	75.7%	32.4%
Age			
12–14 rate ^a	80.3%	75.6%	28.0%
15–17 rate	71.5%	75.9%	37.5%
OR ^b (95% CI) ^c	.62*** (.47–.80)	1.01 (.76–1.35)	1.54** (1.12–2.12)
AOR ^d (95% CI) ^f	.64** (.48–.84)	1.01 (.75–1.36)	1.66** (1.20–2.30)
Gender			
Male rate ^a	75.3%	73.0%	29.1%
Female rate	77.5%	78.6%	35.8%
OR (95% CI)	1.13 (.88–1.45)	1.36* (1.06–1.74)	1.35* (1.05–1.74)
AOR (95% CI) ^g	1.14 (.89–1.46)	1.36* (1.06–1.75)	1.31* (1.02–1.68)
Race/ethnicity			
White rate ^a	72.1%	74.4%	29.1%
Black rate	82.2%	81.8%	41.3%
OR (95% CI)	1.78* (1.05–3.04)	1.55 (.77–3.11)	1.71 (.98–3.01)
AOR (95% CI) ^h	1.58 (.91–2.75)	1.65 (.81–3.35)	1.62 (.93–2.82)
Hispanic rate	81.0%	74.9%	35.5%
OR (95% CI)	1.65** (1.15–2.35)	1.03 (.74–1.43)	1.34* (1.02–1.76)
AOR (95% CI) ^h	1.42 (.98–2.04)	1.09 (.78–1.52)	1.04 (.75–1.45)
Asian rate	71.4%	79.3%	27.1%
OR (95% CI)	.97 (.56–1.67)	1.32 (.77–2.27)	.91 (.52–1.58)
AOR (95% CI) ^h	.89 (.52–1.54)	1.33 (.78–2.28)	.77 (.43–1.37)
American Indian/Alaskan Native rate ^k	81.9%	84.2%	37.7%
Other/multiple rate ^k	75.4%	67.4%	23.8%
Income group			
≥400% FPL ^c rate ^a	71.7%	77.8%	26.8%
200–399% FPL rate	75.3%	74.1%	30.6%
OR (95% CI)	1.20 (.86–1.67)	.81 (.57–1.17)	1.20 (.85–1.71)
AOR (95% CI) ⁱ	1.13 (.80–1.58)	.80 (.55–1.15)	1.17 (.82–1.67)
<200% FPL rate	80.6%	75.2%	37.9%
OR (95% CI)	1.64** (1.20–2.24)	.86 (.65–1.16)	1.67** (1.20–2.32)
AOR (95% CI) ⁱ	1.29 (.92–1.83)	.80 (.58–1.09)	1.55* (1.06–2.28)
Insurance status			
Insured rate ^a	75.8%	75.6%	30.9%
Uninsured rate	83.3%	77.2%	49.0%
OR (95% CI)	1.59 (.83–3.04)	1.09 (.64–1.86)	2.14** (1.26–3.64)
AOR (95% CI) ^j	1.35 (.68–2.69)	1.09 (.64–1.87)	1.84* (1.09–3.10)

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

^a Indicates referent group for logistic regression. ^b OR = odds ratio.

^c CI = confidence interval.

^d AOR = adjusted odds ratio.

^e FPL = federal poverty level.

^f Adjusted for: gender, race/ethnicity, FPL, insurance status.

^g Adjusted for: age, race/ethnicity, FPL, insurance status.

^h Adjusted for: age, gender, FPL, insurance.

ⁱ Adjusted for: age, gender, race/ethnicity, insurance status.

^j Adjusted for: age, gender, race/ethnicity, FPL.

^k Sample size insufficient to conduct logistic regressions.

differences did not remain significant in the adjusted analyses. Uninsured adolescents were more likely than their insured counterparts to report discussion of violence ($p < .001$), and this difference was attenuated but remained significant in the adjusted analyses ($p < .05$) (see Table 3).

Nutrition

Seventy-six percent of the adolescents reported discussion of nutrition with their providers.

Age/gender differences. Younger adolescents were more likely than older adolescents to report discussing nutrition ($p < .001$), a difference that remained significant at a lower level in the adjusted analyses ($p < .01$).

Race/ethnicity differences. Black ($p < .05$) and Hispanic ($p < .01$) adolescents were more likely than their white counterparts to report discussing nutrition; however, differences did not remain significant in the adjusted analyses.

Incomel/insurance differences. Adolescents in the lowest income group were more likely to report discussion of nutrition than those in the highest income group ($p < .01$), a difference that did not remain significant when we adjusted for confounding factors (see Table 4).

Physical activity

Seventy-six percent of adolescents reported discussion of physical activity with their providers.

Age/gender differences. Females reported discussing physical activity more frequently than did males ($p < .05$), and this difference remained unchanged when we adjusted for confounding factors ($p < .05$) (see Table 4).

STDs

Thirty-two percent of the sample reported discussing STDs with their providers.

Age/gender differences. Older adolescents reported discussion of STDs more frequently than their younger counterparts ($p < .01$), and this remained unchanged in the adjusted analyses ($p < .01$). Females reported more discussion of STDs than males ($p < .05$), a finding that remained significant in the adjusted analyses ($p < .05$).

Race/ethnicity differences. Hispanic adolescents reported discussion of STDs more frequently than their white counterparts ($p < .05$); however, this difference did not remain significant in the adjusted analyses.

Incomel/insurance differences. Adolescents in the lowest income group reported discussion of STDs more frequently than their highest income counterparts ($p > .01$), a difference that remained significant in the adjusted analyses ($p < .05$). Uninsured adolescents were more likely to report discussion of STDs than those who were insured ($p < .01$), and this remained significant in the adjusted analyses at a somewhat lower level ($p < .05$) (see Table 4).

Discussion

This study extends current research on services by describing rates of preventive services and disparities utilizing an adolescent-report perspective. These findings, from state-level data, represent the status of discussions of preventive health topics for approximately 1.75 million adolescents throughout California.

Our finding of low rates of preventive discussions for most topics, as reported by adolescents, is consistent with research based on provider records of counseling delivered and parental recall [10,12,13,18]. Discussion of prevention topics during regular physical exams varied widely across risk topics. At least four out of five adolescents did not discuss helmet use, violence issues, or seatbelt use at their last physical

exam visit. The latter is of particular concern, given that automobile crashes are the leading cause of death in this age group. More than two-thirds of adolescents did not discuss substance use or STDs, and one-quarter did not discuss nutrition or physical activity. Overall, adolescents were most likely to talk with their providers about nutrition and exercise, a finding consistent with other research [12], and least likely to talk about violence prevention.

Our analyses indicated that the presence of significant disparities in rates of health topics covered varied depending on the topic area. Our findings that younger adolescents were more likely to have discussions about safety and that older adolescents were more likely to discuss substance use and STD topics suggests that the content covered during the physical exam was influenced by adolescent age. Although this may make intuitive sense in terms of which adolescents are more likely to be engaging in particular behaviors, discussing health behaviors with adolescents before they initiate risky behaviors is an important component of preventive services.

We had expected that minority adolescents and those in lower income or uninsured groups would be less likely to report health discussions during routine visits. Although we found disparities in several topics, in all but one instance the disparities were in the opposite direction of what we had anticipated. Hispanic adolescents reported significantly higher levels of discussing health topics than white adolescents in five of nine content areas including seatbelt, helmet, violence, nutrition, and STD screening, although only violence remained significant when we controlled for confounding factors. Asian adolescents were more likely to discuss seatbelt and helmet use in the unadjusted analyses, but these differences were no longer significant in the adjusted analyses.

Similar to findings from Rand et al [12], black adolescents in our study reported preventive discussion rates that were either not significantly different from or were higher than rates for white adolescents in eight of nine content areas. In the cases where minority adolescents had higher health discussion rates than their white counterparts, we suggest that it is likely that clinicians may think that minority families require greater screening, either because of perceived elevated risk levels in families or communities, or because of perceptions that minority families may have reduced access to alternative resources for preventive health services. By contrast, black adolescents reported lower rates of discussing violence compared to their white counterparts. Further research regarding violence prevention in primary care settings is required to gain an adequate understanding of this finding.

Also contrary to our expectations, adolescents in the lowest income group were more likely to discuss five of nine the topics during health visits, including seatbelts, helmets, violence, nutrition, and STDs, compared to their highest income counterparts. Those who lacked insurance reported higher levels of discussing seatbelt, helmet, violence, and STD topics compared to those with insurance. It is possible that

providers perceived that lower income and uninsured youth had greater exposure to risk factors; thus, they made a point to cover more topic areas. It is also possible that insured adolescents and those in higher income groups were seen more frequently for physical exams and some health discussions took place at earlier visits.

There are limitations to the data set that require mentioning. The present assessment of health topics covered in routine visits allows us to quantify the breadth of preventive topics were covered during routine visits. However, we are unable to discern detail of the discussions and whether they included screening and/or counseling. Because the wording of the items asked whether the adolescent and their provider had talked about topics, we cannot identify who initiated the discussions. Although we assume that it is primarily providers who initiate discussions about health topics, it is possible that adolescents may have initiated topics by raising a concern. Nevertheless, the pattern of rates that we found was similar to those found in previous research that specifically assessed provider behaviors, suggesting that there is correspondence between this measure and measures of provider screening [26]. As necessitated by large surveys, the wording of the screening question topics (e.g., nutrition, violence, or violence prevention) was brief. It is possible that adolescents may have talked about aspects of the topics with providers at their exams, but did not identify that discussion as fitting into one particular topic. More in-depth research focusing on adolescent perception of preventive services during physical exams, including clear identification of who initiates discussions would help improve our understanding of what adolescents experience during their physical exam visits.

Although the presence of disparities is noteworthy, it is important to keep in mind that regardless of age, gender, race/ethnicity, income, and insurance levels, the delivery of preventive services were distressingly low for all topics except nutrition and physical activity. This is of concern, given the wide promotion of the new *Bright Futures* [27], a consensus document that promotes preventive care for pediatric populations, and the evidence that training and tools in clinical practice can increase the delivery of preventive services [28–30]. Increased investment and effort are required to improve of the delivery of preventive services, so that all adolescents may benefit from adequate knowledge about the importance of healthy behaviors across the life span.

Acknowledgments

We wish to acknowledge the help of Jane Park and Tina Paul Mulye in the preparation of the manuscript. This study was supported by grant #NR009397 from the Department of Health and Human Services, the National Institutes of Health, the National Institutes of Nursing Research, by grant # U45MC 00023 from the Maternal and Child Health Bureau, Health Resources and Services Administration, U.S. Department of Health and Human Services, and by the

Young Adult & Family Center, Department of Psychiatry, University of California, San Francisco.

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