RESEARCH LETTERS

How to Measure Secondhand Smoke Exposure in a Pediatric Clinic Setting

There has been a recent focus to decrease environmental tobacco smoke (ETS) exposure among children,[1,2] but an important obstacle to overcome is how to accurately measure ETS exposure. Standardized questionnaires are associated with a high frequency of underreporting.[3,4] Cotinine, a biomarker for tobacco exposure, appears to be a more promising method to accurately detect ETS exposure,[5] but testing is currently expensive and results are not immediately available. We conducted a study to evaluate the use of a urine dipstick to measure cotinine as an alternative to the current complex testing.

Methods. Patients between the ages of 5 and 15 years and their smoking or nonsmoking caregiver who attended a busy urban Pediatric Pulmonary Clinic during February and March of 2010 were invited to participate in the study. The protocol was approved by the University of South Florida institutional review board.

The caregiver completed a smoking behavior questionnaire and a random urine sample was collected from the child to measure cotinine levels using Nymox TobacAlert test strips (Nymox Pharmaceutical Corporation, Saint-Laurent, Quebec, Canada). A level of 0 (0-6 ng/mL) represents no smoke exposure, levels of 1 (6-30 ng/mL) and 2 (30-100 ng/mL) represent secondhand smoke exposure, and levels of 3 to 6 (>100 ng/mL) represent a smoker.

Descriptive statistics were used to summarize smoking behavior, and group comparisons between smoking households and nonsmoking households were tested by Fisher exact test or χ^2 test for the categorical data or by 2-sample *t* test for the continuous data.

Results. Of the 47 patients eligible for the study, 35 were enrolled. The most common reason for not enrolling was that the child had already voided. Approximately 77% of the population was white and 23% were black, with 26% of Hispanic ethnicity. Medicaid was the primary insurance for 51% of the patients. There were no significant differences in the demographics of the smoke-exposed and non–smoke-exposed children. The mean (SD) age of participants was 9 (3) years, with 50% of the population being male. The Smoking Behavior Questionnaire results are summarized in the **Table**. Of 17 patients living with a smoker, the most common family member who smoked was the mother (70%). Urine cotinine levels did not vary based on whether the smoker was the mother or another member of the household. While 29% of children lived with more than 1 household smoker, their urine cotinine levels were not higher than those living with 1 smoker. With the exception of 1 child, who had a cotinine level of 2 ng/mL (range, 30-100 ng/mL), all cotinine levels were at level 1 (range, 6-30 ng/mL). Of 17 children living with a household smoker, 16 children had positive cotinine levels. The patient with a negative cotinine level lived in a home with an enforced smoking ban in their home and car. Of 18 patients living in a nonsmoking household, 3 patients had positive urine cotinine levels with an identifiable source of exposure (a carpool parent, a visiting uncle, and a school bathroom).

Table. Summary of the Smoking Behavior of the Household Smokers[a]

	No. (%)
No. of smokers in the household	
1	12 (70.6)
2	5 (29.4)
>2	0
Relationship to the child	
Mother only	9 (52.9)
Father only	4 (23.5)
Both mother and father	2 (11.8)
Other	2 (11.8)
Smoke in the house while child is present	
Yes	2 (11.8)
No	15 (88.2)
Smoke in the house while the child is out	
Yes	0
No	17 (100)
Smoke in the car while the child is present	
Yes	7 (41.2)
No	10 (58.8)
Smoke in the car while child is out	
Yes	12 (70.6)
No	5 (29.4)

[a] Households with smokers, n=17.

Comment. Urine cotinine test strips are a noninvasive, quick, and easy alternative to measuring urine cotinine in a busy clinic setting. Testing does not require any instrumentation or special training, and results are available in less than 15 minutes.

The test strip is a sensitive indicator of ETS exposure in both smoking and nonsmoking households; however, it is not an effective measure of small changes in urine cotinine levels. The cotinine test strips, in conjunction with a smoking behavior questionnaire, were successful in documenting the source of ETS exposure

in our study. A larger clinical trial with measurements over serial visits is needed to support the findings of this trial.

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Reference Range for Cerebrospinal Fluid Protein Concentration in Children and Adolescents

Elevated cerebrospinal fluid (CSF) protein concentration measured during diagnostic lumbar puncture (LP) can indicate a pathologic central nervous system process. Interpretation of CSF protein concentration requires established reference values. However, evidence-based, standardized assessments of CSF protein concentration do not exist. Ethical considerations prohibit subjecting healthy children to invasive procedures solely for research purposes. Consequently, normative values in children must be determined from diagnostic LPs.

Limitations of prior studies of CSF protein concentration in children include small sample sizes, varying inclusion and exclusion criteria, and presentation of mean and standard deviation rather than ranges.[1-6] The objective of this study was to determine age-specific reference values for CSF protein concentration.

Methods. This was a secondary analysis of a prospective cohort study performed at The Children's Hospital of Philadelphia. Subjects aged 1 to 18 years undergoing diagnostic LP were eligible. Consent from the parent and assent from the child were obtained following institutional review board approval. Subjects were screened for enrollment between January 15, 2007, and February 28, 2009, as described previously.[7]

Subjects were not approached for enrollment in the primary study of CSF opening pressure measurements if they were medically unstable or had a brain tumor.[7] Enrolled subjects with conditions that had the potential to alter CSF protein concentration (eg, meningitis, demyelinating disease) and those with CSF pleocytosis (>10 white blood cells/mm^3) or traumatic LP (>500 red blood cells/mm^3) were excluded. When a patient received multiple LPs, only results of the first LP were included.

Results. Initially, 1066 patients with LP were screened for enrollment and 439 were enrolled[7]; of these, 210 subjects remained in the study (**Table**).

The median patient age was 11.1 years (interquartile range, 5.2-14.5 years); 68 (32%) were black. The Table presents CSF protein concentrations among children in the reference group. There was an age-related increase in CSF protein concentration (eFigure, http://www.archpediatrics.com). In linear regression, CSF protein concentration increased by 0.97 mg/dL (95% confidence interval, 0.75-1.18 mg/dL; $P<.001$) for each 1-year increase in age. Comparisons across different age categories suggested that a cutoff of age 10 years was most clinically applicable (Table).

Comment. We prospectively examined CSF protein concentrations in children and adolescents to establish clinically useful reference values. These findings are important because a variety of infectious and noninfectious conditions may cause elevations in CSF protein concentrations in the absence of CSF pleocytosis.

The median and 90th percentile CSF protein concentrations in our study were higher than the values reported by Wong et al.[6] Our larger sample size may have resulted in a greater distribution of older children, which could account for these differences. The CSF protein values for children aged 1 to 9 years were comparable with a prior report.[1] It is unclear why children aged 10 to 18 years in our study had higher values than those reported by Biou et al[1] (median, 22 mg/dL; 95th percentile, 41 mg/dL).

The CSF protein concentration increased nearly 1 mg/dL for each additional year of age. The CSF protein concentration was significantly lower for subjects younger than 10 years compared with older subjects, suggesting that age 10 years may be an accurate and practical cutoff.

Children with unrecognized conditions associated with elevated CSF protein concentration may have been

Table. CSF Protein Concentrations in Children Aged 1 to 18 Years[a]

	CSF Protein Value, mg/dL					
			Percentile			
	Mean (SD)	Median (IQR)	5th	10th	90th	95th
All subjects (N=210)[b]	28 (10)	27 (21-35)	15	16	43	46
Age, y[c]						
1-9 (n=92)	22 (8)	22 (17-25)[d]	12	15	30	35
10-18 (n=118)	33 (10)	33 (26-40)	19	21	45	49
Season						
During enteroviral season (n=79)	28 (9)	28 (23-33)[e]	13	17	40	44
Outside of enteroviral season (n=131)	28 (11)	25 (19-36)	15	16	44	49
CSF red blood cell count <100/mm^3 (n=183)	28 (10)	25 (19-34)	15	16	43	46

Abbreviations: CSF, cerebrospinal fluid; IQR, interquartile range.

[a] Quantitative protein assay was performed on the institution's standard Vitros chemistry system (Johnson & Johnson, Rochester, New York); the protein assay is a modified biuret reaction.

[b] One hundred ninety-three subjects with exclusionary conditions and 36 repeated lumbar punctures were excluded; the remaining 210 subjects were included.

[c] There were no statistically significant differences (ie, $P < .05$) when comparing CSF protein values for subjects 1 to 4 years of age (median, 21 mg/dL; IQR, 16-25 mg/dL; 90th percentile, 30 mg/dL) with those 5 to 9 years of age (median, 22 mg/dL; IQR, 18-27 mg/dL; 90th percentile, 32 mg/dL; $P=.24$, Wilcoxon rank sum test) or when comparing those 10 to 14 years of age (median, 31 mg/dL; IQR, 26-39 mg/dL; 90th percentile, 44 mg/dL) with those 15 to 18 years of age (median, 34 mg/dL; IQR, 26-43 mg/dL; 90th percentile, 46 mg/dL; $P=.21$, Wilcoxon rank sum test).

[d] $P<.001$ (Wilcoxon rank sum test) compared with children 10 to 18 years of age.

[e] Enteroviral season was defined as June to October of each study year; $P=.62$ (Wilcoxon rank sum test) compared with subjects presenting outside of enteroviral season.

included despite our systematic exclusions. This limitation would cause us to overestimate the upper range of normal values. However, subjects with medical indications for LP may be a more clinically appropriate reference population than children without an indication for LP.

Our study quantifies the age-related increase in CSF protein concentration between 1 and 18 years of age. The 90th percentile values of 30 mg/dL (ages 1-9 years) and 45 mg/dL (ages 10-18 years) represent reference values to be used to guide the interpretation of CSF protein concentration.

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Disclaimer: The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.
Online-Only Material: The eFigure is available at http://www.archpediatrics.com.

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Access to Autism Evaluation Appointments With Developmental-Behavioral and Neurodevelopmental Subspecialists

Autism spectrum disorders impact 1 in 110 children in the United States.[1] Early intervention can improve the developmental trajectory of children with autism spectrum disorders,[2] but eligibility and guidance for services can benefit from comprehensive diagnostic medical evaluation from a developmental-behavioral (DB) or neurodevelopmental disabilities (NDD) subspecialist.[1,3,4]

Concerns regarding increasing need and shortage of DB/NDD subspecialists have been raised,[5] but the extent of access barriers to DB/NDD evaluations is unknown. In light of recent expansions of Medicaid and the Children's Health Insurance Programs (CHIP), there is also a need to determine whether DB/NDD subspecialist access is limited by insurance status. Prior studies of insurance-related barriers relied on family reports,[6] which are prone to recall/response biases. The goal of this study was to measure real-life experiences of accessing appointments with DB/NDD subspecialists.[7]

Methods. From April to May 2010, one of us (J.B.) called all DB/NDD subspecialists' offices in the Chicago, Illinois, metropolitan area posing as a mother requesting a new patient appointment for her 4-year-old son. The standardized script, reporting a primary care referral because of symptoms of autism and speech delay, was developed and piloted with input from 2 DB pediatricians and a parent of 2 children with autism. If paperwork was

Table. Appointment Availability, Acceptance of Insurance, and Procedures for Scheduling Appointments at 14 Developmental-Behavioral Pediatrics and Neurodevelopmental Disabilities Subspecialty Physician Clinics

Characteristics	No. (%)	Mean (SD) [Range]
Appointment availability and acceptance of insurance		
Clinic accepts Medicaid/CHIP coverage (n=14)	13 (93)	
Clinic accepts BCBS coverage (n=14)	13 (93)	
Wait time for appointments, Medicaid/CHIP, No. of days (n=11)[a]		85 (56) [18-165]
Wait time for appointments, BCBS, No. of days (n=10)[b]		77 (52) [18-164]
Clinic treats BCBS and Medicaid/CHIP the same	12 (86)	
Clinic disclosed preferential treatment for Medicaid/CHIP (n=14)	0	
Clinic disclosed preferential treatment for BCBS (n=14)	2 (14)	
Insurance type was requested by the clinic (n=14)	8 (57)	
Insurance type was the first question asked (n=14)	4 (29)	
Clinic accepts only cash (n=14)	1 (7)	
Total cash payment amount, $ (n=1)		1100
Cash payment amount needed on day of appointment, $ (n=1)		275
Wait time for cash-only appointment, No. of days (n=1)		9
Appointment scheduling procedures (n=14)		
Duration of the call, No. of minutes		8 (4) [4-17]
Length of time on hold during the call, No. of minutes		2 (4) [0-11]
Written screening form required prior to scheduling appointment	5 (36)	
Written screening form requested to bring to appointment	1 (7)	
Verbal screening required prior to scheduling appointment	1 (7)	
In-person screening required prior to scheduling appointment[c]	2 (14)	
Referral forms are requested (but not required to schedule)	7 (50)	
Referral forms are required prior to scheduling appointment	0	
Insurance/Medicaid ID number required prior to scheduling	1 (7)	
Child's social security number required prior to scheduling	1 (7)	
Details pertaining to written screening forms (n=6)		
Length of written screen form, No. of questions		158 (58) [71-242]
Method of delivering written screening form		
E-mailed	2 (33)	
Faxed or mailed (for this study, faxes were requested)	3 (50)	
Downloaded off the Internet	1 (7)	

Abbreviations: BCBS, Blue Cross Blue Shield; CHIP, Children's Health Insurance Programs.
[a] Of the 13 clinics that accepted Medicaid/CHIP coverage, 11 gave real or hypothetical appointment times; 2 clinics could not estimate wait time conditional on completing the scheduling procedures.
[b] One clinic scheduler thought the BCBS wait time would be shorter but could not quote a wait time for BCBS without consulting others in the clinic (this case was considered missing BCBS wait time information).
[c] Includes 1 clinic requiring patients to go to the institution's walk-in screening center prior to scheduling an appointment and 1 clinic requiring the patients to be seen by a primary care provider at their institution prior to scheduling an appointment.

required, the caller asked for an appointment conditional on returning the paperwork the following day. If asked, she reported her son's enrollment in Illinois' combined Medicaid/CHIP program. If insurance information was not requested by the end of the call, the caller confirmed that Medicaid/CHIP was accepted. On all calls, she indicated that she could enroll in Blue Cross Blue Shield, inquiring if that would help in obtaining a sooner appointment. The study was institutional review board approved with a debriefing letter; calls were kept as short as possible and appointments were cancelled immediately.

We developed an exhaustive list and called all DB/NDD clinics in the target counties. Clinics were considered "out of scope" if the practice said they did not see patients with autism concerns (before knowing insurance type). Any referrals to other numbers/clinics were followed up. If multiple sites were scheduled through a single number, the caller asked for the soonest appointment at any site. If a screening/"intake" form was requested, forms were collected via a nondescript e-mail address or local fax number. Descriptive statistics are reported for appointment availability, insurance acceptance, and number of questions/information fields per screening form.

Results. Initially, 30 DB/NDD physicians with 40 unique telephone numbers (ie, clinics) were identified. Of these, 26 were out of scope. The 14 remaining clinics scheduled appointments for 15 physicians, 2 clinics (14%) scheduled appointments for 2 sites, 9 (64%) had a DB subspecialist(s) only, 4 (29%) had an NDD subspecialist(s) only, and 1 had both DB and NDD subspecialists. As depicted in the **Table**, 12 clinics gave the caller appointments and 2 clinics declined to estimate appointment times conditional on next-day completion of the screening process. All clinics accepted both public and private coverage except 1 clinic that rejected both insurances, required $1100 cash payment, and had the shortest wait time (9 days). Two clinics (14%) disclosed preferential treatment (ie, sooner appointments) for private vs public coverage, but only 1 provided an estimate of the shorter wait time. Overall, the mean (SD) wait time was 85 (56) days for Medicaid/CHIP–enrolled children and 77 (56) days for Blue Cross Blue Shield–enrolled children. Of the 14 clinics, 8 (57%) required completion of a clinical screening prior to scheduling appointments. Screening forms averaged 158 questions (range, 71-242 questions).

Comment. In a large metropolitan area with a relatively high density of DB/NDD subspecialists, there was a 3-month average wait time for autism evaluations, regardless of insurance status, as well as screening/intake processes that required high levels of parental health literacy and persistence. Findings signal the need to explore mechanisms for more efficient use of scarce DB/NDD subspecialty resources and for professional consensus regarding the kind of screening that is clinically necessary as a prerequisite for scheduling new patient evaluations.

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Alcohol Brand Preference and Binge Drinking Among Adolescents

Adolescents commonly misuse alcohol, with 24.2% reporting current binge drinking in surveys of US high school students.[1] Early-onset drinking raises risks for drinking-related morbidity[2] and alcohol dependence. The alcohol industry spent $1.7 billion in media advertising in 2009 (The Nielsen Co, unpublished data, 2009. Ratings and other data contained herein are the copyrighted property of The Nielsen Co. Unauthorized use of this copyrighted material is expressly prohibited. Violators may be subject to criminal and civil penalties under Federal Law [17 USC 101 et seq.]. All rights reserved.), operating only under voluntary limits regarding youth. Moreover, in 1996, the Distilled Spirits Council of the United States ended its ban on television advertising. If such advertising is reaching adolescents, brands with larger ad expenditures may be chosen as favorites, and adolescents might choose a distilled spirit as their favorite brand to drink. We report favorite brand and its association with ad expenditures and binge drinking in a population survey of underage adolescents.

See also pages 610 and 680

Methods. As part of a longitudinal telephone survey of US adolescents and media use,[3] we surveyed 2699 youth aged 16 to 20 years about their alcohol use and report on favorite brand to drink among the underage drinkers (n=1734). Adolescents from all regions of the United States were represented, parental consent was obtained for those younger than 18 years, and the study was approved by the Committee for the Protection of Human Subjects at Dartmouth.

Results. Of the ever drinkers, 21% (26% males, 16% females) had drunk 5 or more drinks in a row in the past 30 days (current binge drinking) and 68% (71% males, 65% females) endorsed a favorite brand to drink, naming 158 brands in all. A distilled spirit brand was named by 53%; a beer brand, by 42%; and wine/cider, by 3.3% (unable to determine brand in 1.1%). Favorite brands are shown in the **Table**, with brands identified by fewer than 15 respondents collapsed into "other" categories. The most commonly chosen favorites among underage females and males were Smirnoff (Diageo, London, England) and Budweiser (Anheuser-Busch Companies, St Louis, Missouri), respectively. The eFigure (http://www.archpediatrics.com) illustrates the proportion of current binge drinkers by sex and favorite brand to drink (see the eTable for numeric data). Whereas the current binge drinking rate among underage drinkers with no favorite brand ("none" category) was 0.11 (95% confidence interval, 0.08-0.14), rates among those identifying a favorite brand were higher, ranging from 0.28 to 0.71. Beer brand favorites seemed as likely to be associated with binge drinking as distilled spirits brands, but choice of wine/cider was not. Annual advertising expenditures for alcohol brands in all media were obtained from The Nielsen Company for 95 of the named alcohol brands (The Nielsen Co, unpublished data, 2009). The Spearman correlation between annual ad expenditures and the proportion of adolescent drinkers overall who chose each brand was 0.64 ($P<.001$).

Table. Percentage of US Underage Drinkers Reporting Favorite Brand of Alcohol to Drink by Favorite Brand and Sex

	No. (%)
Females	
Smirnoff (Diageo, London, England)	130 (15.3)
Budweiser (Anheuser-Busch Companies, St Louis, Missouri)	51 (6.0)
Corona (Grupo Modelo, Mexico City, Mexico)	26 (3.1)
Grey Goose (Bacardi, Hamilton, Bermuda)	25 (2.9)
Bacardi (Bacardi)	24 (2.8)
Captain Morgan (Diageo)	20 (2.4)
Coors (MillerCoors, Chicago, Illinois)	16 (1.9)
SKYY (SKYY Spirits LLC, San Francisco, California)	14 (1.6)
Miller (MillerCoors)	13 (1.5)
Absolut (V&S Group [Pernod Ricard], Åhus, Skåne Sweden)	9 (1.1)
Other distilled	148 (17.4)
Other beer	45 (5.3)
Wine/cider	29 (3.4)
None	302 (35.3)
Males	
Budweiser	115 (13.0)
Smirnoff	42 (4.8)
Coors	42 (4.8)
Corona	33 (3.7)
Miller	27 (3.1)
Captain Morgan	26 (3.0)
Heineken (Heineken International, Amsterdam, the Netherlands)	25 (2.8)
Grey Goose	18 (2.0)
Jack Daniel's (Jack Daniel Distillery, Lynchburg, Tennessee)	17 (1.9)
Bacardi	16 (1.8)
Other distilled	139 (15.8)
Other beer	108 (12.2)
Wine/cider	10 (1.1)
None	264 (30.0)

Comment. Within this national sample of underage drinkers, two-thirds reported a favorite brand of alcohol. Distilled spirit brands were cited as often as beer, consistent with a regional survey[4] and suggesting that concentrated forms of alcohol are among the alcohol brands underage drinkers currently aspire to consume. The correlation between underage drinkers' brand preference and marketing expenditures suggests a marketing influence on choice of beverage. Moreover, higher rates of binge drinking among adolescents who named a favorite brand suggest that alcohol advertising campaigns may influence the likelihood that alcohol will be consumed at levels that pose a risk to health.

This cross-sectional study cannot answer questions on temporality and did not distinguish among products within brand. Specifically what youths drink when they report Smirnoff as their favorite (eg, Smirnoff Ice) is an important topic for further research. This sample, while national, may not be representative of responses for sub-

jects with higher attrition (in this case, poorer families and minorities). Finally, as with any observational study, there may be a third variable besides exposure to alcohol advertising that represents the true cause of the development of an alcohol preference and its associated binge drinking.

Despite the limitations, youths chose distilled spirit brands in large numbers, brands preferred by youth have tended to have high advertising expenditures, and choosing a favorite brand was associated with binge drinking. Youth exposure to alcohol advertising on television has increased significantly since 2001.[5] These findings support the premise that alcohol advertising plays a role in youth consumption patterns and that more effective means are needed to reduce youth exposure to alcohol advertising.

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If you tell me how you get your feeling of importance, I'll tell you what you are. That determines your character.
—Dale Carnegie