Thinking Outside the (Cigarette) Box: Implementing Smoking Cessation Interventions

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Blair Dickinson, MD, FAAP
Matthew Garber, MD, FAAP
Susan C. Walley, MD, CTTS, FAAP
Brian Wilson, MD, FAAP
Karen M. Wilson, MD, MPH, FAAP

Disclosure:

In the past 12 months, the speakers have had no relevant financial relationships to disclose.

The speakers do not intend to discuss off-label, experimental or investigatory drugs or devices.

Illustrated Surgeon General’s Report on Smoking - Alfred Gescheidt, 1964
Learning objectives

• Understand the impact of tobacco smoke exposure on the health of children
• Review the emerging data on electronic cigarettes/vape devices
• Discuss parental smoking cessation interventions
• Review implementation of inpatient smoking cessation initiatives

Parental Tobacco Dependence Treatment: Helping Parents Quit Smoking

Susan C. Walley, MD, CTTS, FAAP
Associate Professor of Pediatrics
Division of Pediatric Hospital Medicine
University of Alabama at Birmingham
Children’s of Alabama
About 70 of them are known to cause cancer.

There are more than 7,000 chemicals in tobacco smoke.

- Lung Cancer
- Other Cancers
- COPD
- Pneumonia, Flu, TB
- Heart Disease
- Stroke
- Vascular Disease
- Diabetes
- Secondhand Smoke
- Hypertensive Heart
- Kidney
- Various respiratory Infections
- Intestinal ischemia
- Breast & Prostate Cancer
- Perinatal

578,000 Yearly Deaths in the U.S. Due to Smoking
Population Attributable Risks for Children

• Annually:
  ▪ 200,000 cases of childhood asthma
  ▪ 150,000-300,000 cases of lower respiratory illness
  ▪ 800,000 middle ear infections
  ▪ 25,000-72,000 low birth weight or preterm infants
  ▪ 430 cases of SIDS

Brain development

• Yolton et al:
  ▪ NHANES analysis examining cognition in children exposed to SHS
  ▪ Significant inverse relationship between cotinine level and block design, reading, and math scores
  ▪ Greatest decrease was at the lowest cotinine levels (.1-1 ng/mL)
• Particular disadvantage for poor children
Effect on antioxidant levels

- Wilson, et al
  - Also using NHANES
  - Relationship between cotinine levels and serum levels of antioxidants
  - Significant association between levels of cotinine and vitamin C, and carotenoids
  - Association was significant even at low levels of exposure (.015-2 ng/mL)

Effect on immune function

- Increased levels of eosinophilic cationic protein (ECP), CRP, and IL-13 in smoke-exposed children
- Exposed healthy children have decreased IFN-γ
- Shift to Th2 from Th1 immune regulation may cause increase of asthma and atopy, as well as decreased Th1 response to pathogens
Children hospitalized with influenza

- The odds of being admitted to the PICU for children with SHS exposure were 4.7 (95% CI: 1.4-18.5) higher than children not exposed to SHS.
- The odds of being intubated were 8.8 higher (95% CI: 0.9-232.4).
- SHS exposure was associated with a 70% longer LOS in a negative binomial regression analysis (p<.01).
  - Effects were greater for children with complex chronic conditions

Other hospital outcomes

- Asthma hospitalization:
  - 22-fold increased risk of intubation
  - 1-year readmission risk:
    - Detectable serum cotinine: AOR 1.6
    - Detectable salivary cotinine: AOR 2.4
- 10-fold greater risk of laryngospasm during surgery
- Increased risk of hospitalization for all causes (OR 1.8)
- Increased severity of RSV bronchiolitis
- Increased risk of sickle cell crisis hospitalization (OR 1.9)
- Increased risk of acute gastroenteritis (OR 2.6)
- Interferes with bone healing (in smoking adults)
Other effects

- A pack-a-day habit costs $1000 to $1500 a year
- Children whose parents smoke are more likely to smoke themselves
  - Role for nicotine priming in addition to behavioral modeling

Question #1

What percentage of children in the United States age 3-11 years of age had detectable levels of serum cotinine, a metabolite of nicotine?

a. 41%
b. 56%
c. 78%
d. 30%
e. 17%

- https://api.cvent.com/polling/v1/api/polls/splo51p7
Epidemiology

- Smoking rates among adults have decreased from 24% to 17% from 1999-2014.
- Home smoking bans have increased from 58% to 84% from 1995-2007.
- 18% of children ages 3-11 are regularly exposed to secondhand tobacco smoke (SHS) in the home.
- 41% of children ages 3-11 had detectable cotinine levels in the 2012 NHANES.
  - 68% of black children
  - 15 million children exposed
Epidemiology

• Of parents who smoke and have a car, 48% have smoked with a child in the car.
• 73% reported there was smoking in the car in the past 3 months.

What can YOU do? The 5 A’s

• Public Health Service Guidelines- the 5 As...
  ▪ ASK all parents about smoking
  ▪ Educate parents about SHS and ADVISE them to quit
  ▪ ASSESS readiness to quit
  ▪ ASSIST by offering treatment or referral (Quitline or local system)
  ▪ ARRANGE follow-up
Question #2

What are the 2 A’s and an R in smoking cessation?

a. Ask, Assist, Refer
b. Advise, Adapt, Reiterate
c. Ask, Adjust, Reduce
d. Aware, Adapt, Restrict
e. Ask, Assent, Relieve

https://api.cvent.com/polling/v1/api/polls/sp-8a7bx2
Parents, even those who smoke, want and expect providers to bring up second-hand smoke exposure.

It’s important to address smoking in a non-judgmental manner.
Ask... the right question!

• You don’t smoke in front of her, do you?

• You don’t smoke in front of her, do you?
• No one smokes in the home, right?
<table>
<thead>
<tr>
<th>Ask... the right question!</th>
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Ask... the right question!

• You don’t smoke in front of her, do you?
• No one smokes in the home, right?
• Does anyone smoke in the home?
• Is your child exposed to cigarette smoke?
• Is there anyone who lives in your home or who cares for your child that uses tobacco?
  ▪ Who is that? What do they use? Where do they smoke? How often do they use tobacco?

Ask... the right question!

• Don’t forget other sources of exposure:
  ▪ Other homes the child may stay at:
    • Divorced parents
    • Grandparents
    • Daycare providers
  ▪ Cars
  ▪ Seepage from other apartments
What is Thirdhand Smoke?

- Secondhand smoke: Sidestream smoke and smoke exhaled
- Thirdhand smoke
  - The “legacy” of SHS: the contamination that remains in a room/car that persists after the smoke is gone
    - Residual pollutants that remain on surfaces and in dust
    - Re-emit into the gas phase (nicotine) or as ultrafine particles or in dust
    - Some enter textiles and create reservoirs for off-gassing over time (nicotine)
    - React with other compounds in the environment (ozone, nitrous acid) at surfaces to yield secondary pollutants

Thirdhand Smoke Exposure

Photos Courtesy of Susan Morrison, NH DHHS, from NH Property Managers
Advise...Be specific

• Quitting smoking is the best thing you can do to help protect your health and the health of your child.
• We can help you.
• Have you thought about quitting (Assess)?
  ▪ No- exposure reduction
  ▪ Yes- exposure reduction and Assist/Arrange

Advise...exposure reduction

• Having a smoke free home means no smoking ANYWHERE- home or car.
• It does NOT mean smoking:
  ▪ Near a window or exhaust fan
  ▪ In a basement, garage, or screen porch
  ▪ In the car with the windows open
  ▪ Inside only when the weather is bad
  ▪ Cigars, pipes, or hookahs
  ▪ On the other side of the room
  ▪ Marijuana!
The bacon analogy

Negotiation over time

• Even small doses of counseling can add up over time.
• A complete ban may not be a reasonable first step for some smoking parents:
  ▪ Negotiate small, acceptable steps with the parent
  ▪ Reinforce health benefits to the child of reducing smoke exposure
Motivational Interviewing

• Patient-centered, directive method for enhancing motivation to change
  ▪ By exploring and resolving AMBIVALENCE
  ▪ “I want to quit smoking, but I like to smoke”
  ▪ Can be used in brief doses!

• Training is available at many institutions or online
• Useful for all behavior change

Advice?

• Non-evidence-based, but potentially helpful interim measures for smokers outside:
  ▪ Washing hands after smoking
  ▪ Wearing a separate smoking jacket or shirt
  ▪ Using indoor air filters (NOT to smoke indoors)
  ▪ Keeping young kids’ hands clean
REFER families who use tobacco to outside help

- Refer tobacco users to the Quitline 1-800-QUIT NOW or 1-866-NY-QUITS
  - Fax referrals
  - EMR
- Document referral given to families in the child’s chart
- Document exposure in the EMR
Question # 3

Which form of Nicotine Replacement Therapy is over the counter?

a. Nicotine lozenge
b. Bupropion
c. Nicotine inhaler
d. Varenicline

https://api.cvent.com/polling/v1/api/polls/sp-gk37e9
Pharmacotherapies for Tobacco Dependence

- Combining pharmacotherapy with counselling **DOUBLES** a patient’s chance of successfully quitting smoking
- Under the Affordable Care Act, all first-line pharmacotherapy is covered
- Types:
  - Nicotine Replacement Therapy (NRT)
    - Nicotine transdermal
    - Nicotine gum
    - Nicotine lozenge
    - Nicotine inhaler
  - Non-nicotine replacement therapy
    - Bupropion SR
    - Varenicline

Nicotine Replacement Therapy

- Non-nicotine components of tobacco cause many of the adverse health effects
- NRT is most effective when long-acting is combined with short acting
- Long acting NRT (maintenance)
  - Nicotine transdermal patch (Over The Counter)
- Short acting NRT (rescue)
  - Nicotine gum (OTC)
  - Nicotine lozenge (OTC)
  - Nicotine inhaler (prescription)
- **UNDERDOSE** is the most common reason for failure
Using NRT: Treatment Goals

- Providing psychoactive ingredient in cigarettes with overall reduction of nicotine withdrawal symptoms
- Opportunities to modify habitual behavior
- Postponement of smoking when in environment in which smoking is not allowed
- Contraindications:
  - MI within the past 2 weeks
  - Severe arrhythmias
  - Worsening or severe angina
  - Hypersensitivity to drug class
- Side effects
  - Nausea, dyspepsia, “the jitters”

Breakout Session:
Practice the 2 A’s and an R

Case 1: You are admitting for an 18 month old with bronchiolitis. This is the patient’s 2nd admission for bronchiolitis. Two of the siblings have asthma. Both parents smoke and told the admitting physician they “want help to quit.”

Case 2: You are admitting a 11 year old patient was admitted with status asthmaticus. In asking about triggers, the patient notes cigarette smoke makes him wheeze. The mother admits she smokes but states it is always outside so she doesn’t feel her smoking could be affecting her child.

Case 3: You are caring for a 3 year old patient with meningitis receiving antibiotics. The history states “no smoke exposure” but the father carries cigarettes in his pocket and the nurses state he leaves frequently to smoke.
Smoking Cessation Inpatient Interventions: Systems Level Change

Karen M. Wilson, MD, MPH, FAAP
Debra and Leon Black Professor and Division Chief of General Pediatrics
Vice-Chair for Clinical and Translational Research
Icahn School of Medicine at Mount Sinai

Smoking Cessation Interventions

• Every person who uses tobacco should be offered treatment
• One of the most cost-effective interventions by healthcare professionals
• Recommended by the American Academy of Pediatrics and the American Medical Association

*Fiore et al. Treating Tobacco Use and Dependence 2008
**Question # 4**

Which states have the lowest and highest adult smoking rates?

- a. Utah and Kentucky
- b. California and West Virginia
- c. New York and Alabama
- d. Colorado and Mississippi
- e. Washington and Arkansas

https://api.cvent.com/polling/v1/api/polls/spsmnoe9
Pediatric Inpatient Interventions

- Limited studies have been performed in the inpatient setting
- Several recent and ongoing studies
  - Rady Children’s Hospital
  - Stewardship in Bronchiolitis
  - INSPIRE
**ASK**

- Screening needs to be systematic with the “right question”
  - Nursing intake form
  - Physician history and progress note templates
  - Consider making it a “vital sign”

- Improved identification when multiple providers ask

- Can piggyback on inpatient requirements to ask about tobacco use

- You can’t improve what you don’t measure

**ASSIST**

- Need a method for identification of those with a positive screen (caretaker who smokes)
  - Consider starting with a certain population (i.e. asthma)

- The goal is to create a team who can provide certain elements of smoking cessation interventions
  - Train non-physician champions

- Develop metrics which could include:
  - Brief counseling
  - Referring to resources
  - Providing or recommending Nicotine Replacement Therapy
**ASSIST**

- Add interventions as a prechecked order to Order Sets
- Delegate smoking cessation to a member of the team
  - Medical student
  - Respiratory therapy
  - Social worker
  - Case manager
  - Nurses
- Ensure educational materials are available
  - Videos
  - Brochures

**REFER**

- Even in states with (very) limited resources, the Quitline is available
- Consider partnering with the Quitline
  - Develop an integrated system
  - Opt-to-quit
Rady Children’s Hospital Experience

- Identify Key Stakeholders
  - IT, RN leadership
- Get Data
  - Baseline Screening Documentation: 66%
  - Baseline Rate of Smoker Exposure in patients: 9%
  - Baseline Referrals to the California Smoker’s Helpline: 0%
- Make Simple Goals
- Use Data to Drive
  - And keep people focused!

How to make Changes at Your Institution

- Goal: Increase Tobacco Screening Documentation from 66% to >95%
  - Made Documentation “Required” by RN on Admission (Cycle 4)
How to make Changes at Your Institution

• Goal: Increase Documentation of “Smoke Exposure” to 25% of patients (based on local smoke exposure rates)
  ▪ Uniform Screening Template Provided in Electronic Record

How to make Changes at Your Institution

• Goal: Increase Rates of Referrals to Smoker’s Helpline
  ▪ Built order within Medical Record to Refer Smoker through the child’s chart
  ▪ Order Automatically fires to RN when patient screens + for Smoke Exposure
How to make Changes at Your Institution

- Keep Track of your Data!
- Use Data to Continue to Drive Change

Stewardship in Bronchiolitis

- National QI bronchiolitis collaborative with the aims of:
  - Promote ER and inpatient collaboration
  - Decrease unnecessary testing and treatment
  - Increase evidence based interventions for children with tobacco smoke exposure
- Based on the 2 A’s and an R
  - ASK
  - ASSIST
  - REFER
- 36 hospitals participated with almost 4400 charts reviewed
Metrics:
If You Don’t Measure, You Can’t Improve

- Identify children with SHS exposure (ASK)
- If positive screen for SHS exposure:
  - Recommendation for smoking cessation (ASSIST)
  - Recommend nicotine replacement therapy (ASSIST)
  - Refer to Quitline 1800-QUIT-NOW (REFER)
- Screening for tobacco smoke exposure increased from relatively high 79.5% to goal 90%
INSPIRE

- Intervening with smoking parents of inpatients to reduce exposure (INSPIRE)
  - 5 year R01
  - National Cancer Institute
- Randomized controlled trial
- Comprehensive, 5As based inpatient parent smoking cessation program can decrease children’s exposure and parent quit 12 months after hospitalization
Results so far...

• 196 enrolled; 96 intervention, 100 control
• 63% followed up at 1 year
  ▪ Parent reported quit: 33% intervention; 14% control (p=NS)
  ▪ Parent cotinine with good confirmation
  ▪ Child cotinine less clear
• Learning areas:
  ▪ There aren’t enough RTs to have them do the intervention
  ▪ MI can be used for recruiting, not just counseling

Breakout Session:
Develop Your Key Driver Diagram

Possible Specific Aim Statements:
1. By December 2017, we will screen 90% of all patients admitted to the pediatric service for tobacco smoke exposure.
2. By December 2017, we will provide smoking cessation interventions for 50% of parents whose children screen positive for tobacco smoke exposure.

Possible Key Drivers or Issues:
1. Hospitalist Time
2. Resident Expectations

Possible Secondary Drivers/Interventions:
1. Designate champions in nursing, RT, or SW to provide interventions
2. Incorporate screening into electronic history (i.e. TSE as a vital sign) and order sets
Question # 5

What is currently the most common tobacco product used by youth?

a. Vape devices  
b. Hookah  
c. Vape devices  
d. Cigarettes  
e. Snus

https://api.cvent.com/polling/v1/api/polls/sp1zp2v5
What About Electronic Cigarettes?

Electronic Cigarette Take Home Points

- E-cigarettes are now the most common tobacco product used by youth
- E-cigarette solution and emissions have been found to contain ultra-fine particles and toxicants, including nicotine and carcinogens, which has adverse health effects
- Longitudinal data demonstrates e-cigarette use leads to traditional cigarette use, even in youth that are considered low risk for tobacco use
- Smokers who use e-cigarettes are less likely to quit traditional cigarettes
High School Student Current Tobacco Use

National Youth Tobacco Survey, United States, 2011-2016.**,

<table>
<thead>
<tr>
<th>Type of tobacco product</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
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<tr>
<td>Any</td>
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<td>Any combustible</td>
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<td>≥2 types</td>
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<tr>
<td>E-cigarettes</td>
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<td>Cigarettes</td>
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<td>Cigars</td>
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<tr>
<td>Hookah</td>
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<tr>
<td>Smokeless tobacco</td>
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<td>Pipe tobacco</td>
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<td>Bidis</td>
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Percentage of students

Inside the e-cigarette

1. A sensor detects when a smoker takes a drag, sending a signal to a processor that switches on a heater, known as an atomiser.

2. The atomiser heats up a nicotine solution to produce a vapour that can then be inhaled.

3. As someone draws on the e-cigarette, an LED light is also switched on by the processor, simulating a flame.
Electronic Cigarettes Names

- Vape devices and vape pens
- Personal vaporizers
- Electronic Nicotine Delivery Systems (ENDS)
- Alternative Nicotine Delivery Systems (ANDS)
- Electronic cigars or e-cigarettes
- E-hookah or hookah sticks/pens
- Mechanical mods and tanks
- Cigalikes

What's In Them?

- Humectant
- Flavoring
- +/- Nicotine
- Toxicants
- Carcinogens
- Ultrafine particles
- Metallic nano-particles (from the coil/heating element)
- Other psychoactive ingredients (added by users)
Health Harms to the User and Public Health Harms

- Mouse models with decreased lung function and growth
- Ultrafine particles have been found to have cardiovascular effects similar to smoking traditional cigarettes
- Addiction potential of nicotine, particularly for youth but also adult nonsmokers and former smokers
- Potential to glamourize and re-normalize smoking
- May maintain combusted tobacco use
- Risk of injury from battery explosions
- Increase in e-cigarette solution poisoning

High School Students Who Use E-cigarettes Were More Likely to Use Cigarettes After One Year

<table>
<thead>
<tr>
<th>Study</th>
<th>Weight</th>
<th>Odds Ratio [95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leventhal et al. (2015)</td>
<td>23.3%</td>
<td>1.8 [1.1, 2.8]</td>
</tr>
<tr>
<td>Primack et al. (2015)</td>
<td>4.8%</td>
<td>8.3 [1.2, 58.0]</td>
</tr>
<tr>
<td>Wills et al. (2016)</td>
<td>25.9%</td>
<td>2.9 [2.0, 4.1]</td>
</tr>
<tr>
<td>Primack et al. (2016)</td>
<td>8.0%</td>
<td>6.8 [1.7, 27.7]</td>
</tr>
<tr>
<td>Unger et al. (2016)</td>
<td>5.7%</td>
<td>9.7 [1.7, 55.9]</td>
</tr>
<tr>
<td>Barrington-Trimis (2016)</td>
<td>15.1%</td>
<td>4.3 [1.8, 10.0]</td>
</tr>
<tr>
<td>Gibson et al. (2016)</td>
<td>17.1%</td>
<td>5.4 [2.6, 11.4]</td>
</tr>
<tr>
<td>RE Model</td>
<td>100.0%</td>
<td>3.7 [2.3, 5.8]</td>
</tr>
</tbody>
</table>
Smokers Who Vape are 30% Less Likely to Quit

Here is a table showing the results of different studies on the effect of vaping on quitting smoking.

<table>
<thead>
<tr>
<th>Study</th>
<th>OR (95% CI)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orosa</td>
<td>0.78 (0.58, 1.06)</td>
<td>8.51</td>
</tr>
<tr>
<td>Aversion</td>
<td>0.91 (0.43, 1.93)</td>
<td>9.22</td>
</tr>
<tr>
<td>Vokernan</td>
<td>0.50 (0.40, 0.63)</td>
<td>12.90</td>
</tr>
<tr>
<td>Chol</td>
<td>0.92 (0.15, 4.63)</td>
<td>2.95</td>
</tr>
<tr>
<td>Pooak</td>
<td>0.69 (0.02, 0.34)</td>
<td>13.27</td>
</tr>
<tr>
<td>Berromut</td>
<td>0.60 (0.30, 0.83)</td>
<td>10.70</td>
</tr>
<tr>
<td>West</td>
<td>1.38 (1.06, 1.78)</td>
<td>13.01</td>
</tr>
<tr>
<td>Genetic intense</td>
<td>0.07 (1.11, 13.23)</td>
<td>2.69</td>
</tr>
<tr>
<td>Minor-mild</td>
<td>0.31 (0.04, 2.90)</td>
<td>1.86</td>
</tr>
<tr>
<td>SHI</td>
<td>0.44 (0.32, 0.79)</td>
<td>9.95</td>
</tr>
<tr>
<td>Pavlov</td>
<td>0.06 (0.03, 0.37)</td>
<td>13.50</td>
</tr>
<tr>
<td>Overall</td>
<td>0.72 (0.52, 0.95)</td>
<td>109.00</td>
</tr>
</tbody>
</table>

NOTE: Weights are from random effects analysis.

Resources

- **Smoke Free Homes Project:** A great resource for providers, with links about cessation and smokefree homes. [www.kidslivesmokefree.org](http://www.kidslivesmokefree.org)
- **EPA:** Another great source of information, and where to order the Smoke Free Homes trifold brochures. [www.epa.gov/smokefree](http://www.epa.gov/smokefree)
- **AAP/Julius B. Richmond Center of Excellence:** The AAP’s Center for pediatric SHS research. [www.aap.org/richmondcenter](http://www.aap.org/richmondcenter)
- **National Quitlines:** The phone number connects callers with the local quitline: 1-800-QUITNOW, or [http://1800quitnow.cancer.gov](http://1800quitnow.cancer.gov).
- **CEASE Program:** A program for healthcare providers to help families quit smoking. [www.ceasetobacco.org](http://www.ceasetobacco.org)
- **Clean Air For Healthy Children:** [www.cleanairforhealthychildren.org](http://www.cleanairforhealthychildren.org)
- **Campaign for Tobacco Free Kids:** [www.tobaccofreekids.org](http://www.tobaccofreekids.org)
- **A guide to getting reimbursement for tobacco cessation counseling:** [http://www.kidslivesmokefree.org/toolbox/PACTReimbursementforSmokingCessation.pdf](http://www.kidslivesmokefree.org/toolbox/PACTReimbursementforSmokingCessation.pdf)
Question # 6

What percentage of mothers who quit during pregnancy restart smoking?

a. 85%
b. 17%
c. 60%
d. 42%

https://api.cvent.com/polling/v1/api/polls/spd5mdk
Acknowledgements

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Jonathan D. Klein, MD, MPH
Fan Tait, MD
Suzanne Tanski, MD, MPH

2009 FAMRI/AAP Art Contest 1st Place winner: Jessica Liu
“That’s what I like best about smoking—it gets me out in the fresh air a couple times a day.”