

Letters

RESEARCH LETTER

Are Emergency Departments Appropriately Treating Adolescent Pelvic Inflammatory Disease?

Of the almost 1 million annually diagnosed cases of pelvic inflammatory disease (PID), 20% occur among adolescents.¹ Because reproductive health concerns are the most common reasons for emergency department (ED) visits among adolescent girls, it is critical that ED providers are knowledgeable about the diagnosis and treatment of PID. The objective of this study was to evaluate adherence to the Centers for Disease Control and Prevention (CDC) PID treatment guidelines among a nationally representative sample of adolescent ED PID visits.

Methods | This study was considered exempt from formal review by our institutional review board. We conducted a retrospective cross-sectional analysis of the National Hospital Ambulatory Medical Care Survey from 2000 to 2009. The National Hospital Ambulatory Medical Care Survey is an annual, national probability sample survey of hospital EDs conducted by the National Center for Health Statistics branch of the CDC.² The eligible study population included all sampled ED visits by females between ages 14 and 21 years during 2000 to 2009 with the diagnosis of PID captured by *International Classification of Diseases, Ninth Revision* codes. Our outcome measure was adherence to CDC recommended PID treatment guidelines by evaluating whether patients were prescribed antibiotics that were considered first- or second-line treatment for PID for the respective year based on the published CDC sexually transmitted disease treatment guidelines for PID management.³ Given that the CDC treatment guidelines changed in 2006, we also calculated the average proportion of appropriately treated PID cases before and after the 2006 CDC treatment guideline change. We used descriptive statistics and logistic regression with appropriate weighting to account for the complex survey methods to calculate all estimates and perform all analyses.

Results | During the study period, there were an estimated 704 882 (95% CI, 571 807-837 957) PID cases in EDs. Among these, only 37.1% (95% CI, 30.6%-45.5%) were prescribed antibiotics that adhered to the CDC recommended treatment guidelines. Prior to 2006, only 30.7% (95% CI, 9.2%-52.3%) of PID cases received appropriate antibiotic therapy. This increased to 49.5% (95% CI, 22.9%-76.6%) after the guideline change ($P = .01$). The most common antibiotic regimen found among inappropriately treated patients was the combination of ceftriaxone sodium and azithromycin (17.1%).

Discussion | To our knowledge, this analysis represents the first population-based assessment of recent compliance with CDC recommended treatment guidelines for adolescent ED patients diagnosed with PID. Only 37% of PID cases were treated

according to the CDC treatment guidelines in our study. Furthermore, the common use of a third-generation cephalosporin and azithromycin suggests that clinicians may erroneously believe that PID treatment is identical to cervicitis treatment and/or that patients are incapable of adherence to doxycycline. This finding has substantial implications because inadequate treatment of PID may lead to serious long-term sequelae such as chronic pelvic pain or tubal infertility. Additionally, the lack of adherence to the CDC guidelines suggests a need to further study strategies for optimal diffusion and acceptance of the CDC guidelines.

Our finding of low adherence to the CDC treatment guidelines is consistent with those of other single-center studies and studies of adult populations.⁴⁻⁶ However, to our knowledge, our study is the first to evaluate whether treatment adherence had changed since the dissemination of the CDC 2006 sexually transmitted disease treatment guidelines. Even with the sizeable increase in the percentage of patients who were treated appropriately from prior to 2006 to afterward, more than 50% of patients are still not receiving treatment consistent with national guidelines. Furthermore, these nationally representative data demonstrate the need and potential high impact of using the ED as a strategic setting to further understand these issues and change clinical practice.

Monika Goyal, MD
Adam Hersh, MD, PhD
Xianqun Luan, MS
Russell Localio, MS, PhD
Maria Trent, MD, MPH
Theoklis Zaoutis, MD, MSCE

Author Affiliations: Children's National Medical Center, George Washington University, Washington, DC (Goyal); Center for Clinical Epidemiology and Biostatistics, Perelman School of Medicine, University of Pennsylvania, Philadelphia (Goyal, Localio, Zaoutis); Leonard Davis Institute, University of Pennsylvania, Philadelphia (Goyal); University of Utah, Salt Lake City (Hersh); Children's Hospital of Philadelphia, Philadelphia, Pennsylvania (Luan, Localio, Zaoutis); Johns Hopkins School of Medicine, Baltimore, Maryland (Trent).

Corresponding Author: Dr Goyal, Children's National Medical Center, 111 Michigan Ave NW, Washington, DC 20010 (mgoyal@cnmc.org).

Published Online: May 3, 2013. doi:10.1001/jamapediatrics.2013.1042.

Author Contributions: Dr Goyal had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Study concept and design: Goyal, Hersh, Localio, Trent, and Zaoutis.

Acquisition of data: Goyal and Luan.

Analysis and interpretation of data: Goyal, Hersh, Luan, Localio, Trent, and Zaoutis.

Drafting of the manuscript: Goyal, Luan, Localio, and Trent.

Critical revision of the manuscript for important intellectual content: Hersh, Luan, Localio, Trent, and Zaoutis.

Statistical analysis: Goyal, Luan, and Localio.

Obtained funding: Goyal.

Study supervision: Localio and Zaoutis.

Conflict of Interest Disclosures: None reported.

Funding/Support: We thank the Children's Hospital of Philadelphia Department of Pediatrics (Dr Goyal) and the National Institutes of Health (grant K23 HD070910-01A1 [Dr Goyal]) for providing funding to support this research.

Role of the Sponsors: The funders had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; and preparation, review, or approval of the manuscript.

1. Pelvic inflammatory disease (PID): CDC fact sheet. Centers for Disease Control and Prevention website. <http://www.cdc.gov/std/pid/STDFact-PID.htm>. Accessed May 4, 2012.
2. Ambulatory health care data: National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey descriptions. Centers for Disease Control and Prevention website. www.cdc.gov/nchs/ahcd/about_ahcd.htm. Accessed May 7, 2012.
3. Workowski KA, Berman SM; Centers for Disease Control and Prevention. Sexually transmitted diseases treatment guidelines, 2006. *MMWR Recomm Rep*. 2006;55(RR-11):1-94.
4. Beckmann KR, Melzer-Lange MD, Gorelick MH. Emergency department management of sexually transmitted infections in US adolescents: results from the National Hospital Ambulatory Medical Care Survey. *Ann Emerg Med*. 2004;43(3):333-338.
5. Kane BG, Degutis LC, Sayward HK, D'Onofrio G. Compliance with the Centers for Disease Control and Prevention recommendations for the diagnosis and treatment of sexually transmitted diseases. *Acad Emerg Med*. 2004;11(4):371-377.
6. Shih TY, Gaydos CA, Rothman RE, Hsieh YH. Poor provider adherence to the Centers for Disease Control and Prevention treatment guidelines in US emergency department visits with a diagnosis of pelvic inflammatory disease. *Sex Transm Dis*. 2011;38(4):299-305.

Preordering School Lunch Encourages Better Food Choices by Children

Nearly one-third of children between ages 6 and 19 years are considered obese¹ and their choosing of less healthy foods in school lunchrooms may contribute.² To encourage students to select healthier foods, recent research has focused on how environmental changes and behavioral economics can guide children to make healthier choices.^{3,4} This includes the preordering of lunch. Preordering could preempt hunger-based, spontaneous selections and eliminate the sensory cues—evocative smells and sights—that lead to less healthy choices. We examine whether having students preorder their entrée (main dish) improves the healthfulness of entrées selected for lunch.

Methods | The Cornell University institutional review board approved this study and waived written consent, yet teachers, staff, school administrators, and parents were notified. In 2 elementary schools in upstate New York, students use an electronic system to preorder their lunch entrée. The schools are located in a predominantly white (96.6%) county where 55% of students receive free or reduced-price lunches. Over a 4-week period (November 14–December 9, 2011), 14 class-

rooms (grades 1-5) were randomly assigned to 1 of 3 conditions. In weeks 1 and 2, all classrooms preordered as usual. In week 3, 4 classrooms discontinued preordering but resumed preordering in week 4. (Because this could lead to contamination of behavior in week 4, we omit these observations.) In week 4, 5 classrooms discontinued preordering. Five classrooms never stopped preordering.

Sales records, including school, grade, classroom, student identifiers, and daily entrée choice, were collected for 272 students. Entrées with the greatest nutrient density on any given day were coded as healthy while others were coded as unhealthy. Data were analyzed with Stata 12 (StataCorp) using a mixed-effects logistic model with students nested within classroom.

Results | When students preordered their entrée, 29.4% selected the healthier entrée compared with 15.3% when preordering was not available (Table). Conversely, the less healthy entrée was chosen 70.8% of the time by students who preordered, and students who ordered in the lunch line selected the less healthy entrée 85.7% of the time (Table). When students did not order but instead selected their entrée as they entered the lunch line, it appears that hunger-based, spontaneous selection diminished healthy entrée selection by 48% and increased less healthy entrée selection by 21% (Table).

Consumption data (not reported), which were collected in the cafeterias via a visual estimation technique, support this robust result and suggest preordering the entrée also affects selection and consumption of side items. Together, both consumption and selection data demonstrate how a simple environmental change—preordering—can prompt children to choose healthier food.

Discussion | In a school setting, preordering can effectively lead students to pick healthier entrées. Students who selected their entrée in the lunch line, where decisions are biased by aromas and sights of tasty, less healthy foods, decreased selection of healthy entrées by 48% and increased selection of less healthy entrées by 21%. Though this research did not change the layout of the lunch line, students precommitted to a lunch entrée outside of the cafeteria, effectively modifying the decision environment. A smarter lunchroom is not confined to the space within the cafeteria walls.

Whereas this research used a computerized preordering system, paper-based systems are easy, inexpensive, and an immediately implementable alternative. The ease of implementing these systems can allow future research to examine the effectiveness of these systems on the selection of entrées, side

Table. Preordering Nearly Doubles the Selection of Healthy Entrées^a

	%		Change	Odds Ratio (95% CI)
	Preordered Entrée in the Morning	Purchased Entrée at Lunchtime		
Selected a healthy entrée	29.4	15.3	-48.0	0.55 (0.35-0.86)
Selected a less healthy entrée	70.8	85.7	21.0	1.81 (1.14-2.87)

^a N = 2422. Results are based on a mixed-effects logistic regression where students were nested within grades. Dependent variables were healthy entrée and less healthy entrée. Healthy and less healthy entrées were determined using a nutrient-based method.