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Brief Report

Use of an annual art competition to promote Web site traffic and engage children in antimicrobial stewardship in Pennsylvania

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We used Google Analytics to assess whether annual kids' art competitions changed traffic to a Web site on appropriate antibiotic use. We found that announcements about kids' art competitions correlated with increased traffic to the Web site, suggesting that this innovation has promise in promoting antimicrobial stewardship efforts.

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An estimated 421 antibiotics per 1,000 children are prescribed annually, mostly for upper respiratory infections, and at least 34% (141 per 1,000 children) of these drugs are inappropriate.^{1,2} In addition to exacerbating antimicrobial resistance and unnecessary costs, antibiotics can be harmful. Among children ≤5 years, antibiotics were the most frequent cause of emergency department visits for all drug adverse event-related visits during 2013–2014.³ National- and state-level campaigns to promote antimicrobial stewardship have been directed toward clinicians, but limited efforts have targeted parents and children.^{4–7} Although considerable progress has been made, reduction in unnecessary prescriptions of antibiotics in children has plateaued, and there is need for new approaches.⁸ By educating parents on childhood illnesses and engaging children in activities related to antibiotics use, vaccination, and hand hygiene practices, we sought to enlarge participation in antimicrobial stewardship efforts.

In 2013, the Pennsylvania Department of Health, in collaboration with the Centers for Disease Control and Prevention Get Smart About Antibiotics Campaign, created a Web portal (Fig A1 in Appendix 1) and launched an annual art competition to promote awareness of appropriate antibiotic use among pediatricians,

childcare providers, parents, and children. Using a Web-based intervention for antimicrobial stewardship allows us to reach a broad audience. By educating and improving awareness among consumers of antibiotics, we may reduce demand for antibiotic prescriptions by parents for childhood ailments. In addition, by engaging children to draw about prevention topics, such as handwashing, we can bolster the fundamental elements of preventing disease transmission in pediatric populations. Our objective was to evaluate how the art competition increased awareness about our Web site on appropriate antibiotic use.

METHODS

Our collaborative team developed and has maintained an educational Web site promoting antibiotic stewardship since 2012 (<http://www.knowwhentosayno.org>). The Web site provides an educational portal with resources for groups, including childcare providers, clinicians, teachers, parents, and children. Web site content is built on the foundation of primary prevention and ways to implement these practices. Information regarding the Centers for Disease Control and Prevention Get Smart About Antibiotics program and current activities are available for viewers, and are regularly updated.

To engage children in primary prevention and increase traffic to the Web site (Fig A1 in Appendix 1), the Get Smart team developed an annual art competition including submission and selection of winners. Information regarding the competition was posted on the Web site. In 2013, children aged ≤8 years were allowed to participate. In 2014 and 2015, children ≤12 were invited to submit

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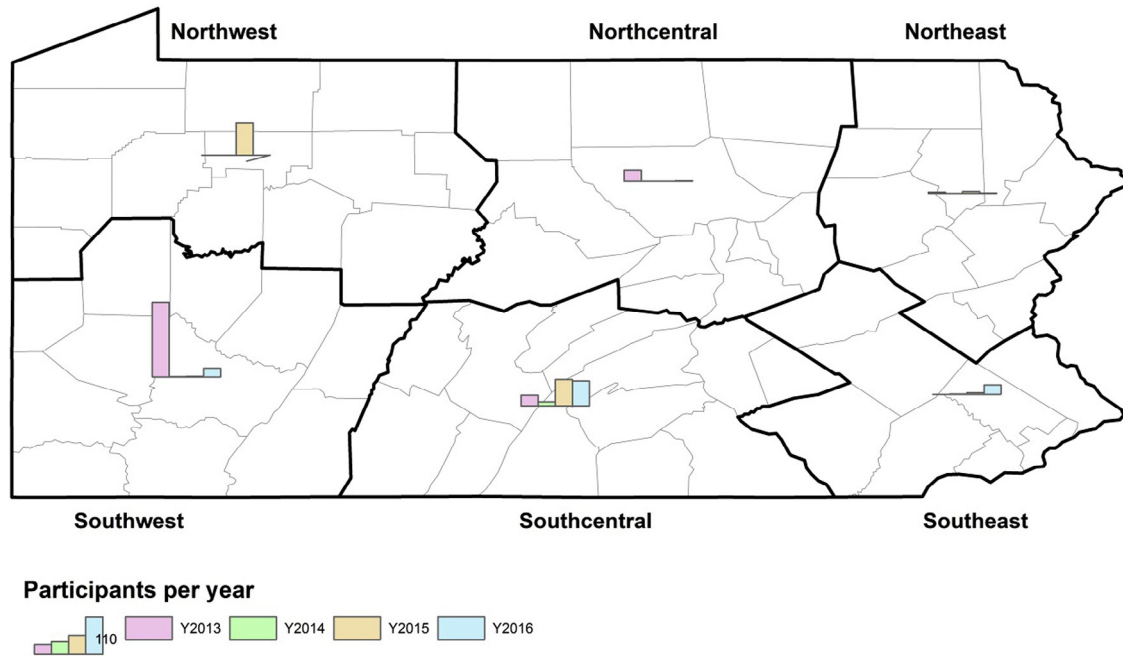


Figure 1. Get Smart drawing competition submission data, 2013–2016. During the 4-year period, participation varied over time and by region with exception of the southcentral and northwest regions, which consistently had high submission of competition entries by children.

an illustration or a written composition representing hand hygiene, appropriate use of antibiotics, or the annual flu vaccination. Posters, flyers, and various electronic communications were used to promote the art competition, with each media directing viewers to the Web site for full details. The primary form of publicity for the contest was through electronic advertisements targeted to parents in childcare facilities and elementary schools. We also engaged parents through the social media platforms: Facebook and Twitter. Starting 2015, the state library began distributing electronic versions of the flyers to all 452 child library sections across Pennsylvania. To increase awareness about the competition, the Get Smart coordinator conducted hands-on Glo Germ (Glo Germ Company, Moab, UT) demonstrations for children and childcare providers in various settings, including early learning centers and an annual Halloween event at the state museum.

From 2013–2015, the art competition was posted and advertised for several months, with the conclusion of the submission period at the end of October each year. Winners were selected by a panel of judges from a variety of professions, including clinical professionals, illustrators, and academic professionals. Winners were announced during the third week of November each year to coincide with the observation of National Get Smart Week. We used participation records from the children's art competition and Google Analytics to assess Web site traffic during 2013–2015.

RESULTS

Children from across Pennsylvania submitted illustrations or stories for the art competition aimed at increasing awareness about hand hygiene, appropriate use of antibiotics, and annual flu vaccination. Participation was greatest during year 1, 2013, with participation of 388 children. Although 21 of the 67 counties in Pennsylvania were represented in 2013, children of 7 counties submitted entries in 2014. In 2015, 328 entries were received from 27 counties, a 9% increase from 2013. Google Analytics (Table 1) data compiled from each year revealed spikes in page views after major competition announcements (Fig A2 in Appendix 1). Over the 3-year time period,

Table 1

Web traffic during 2013–2015*

Measures	2013	2014	2015
No. of sessions	1,740	3,031	4,671
No. of users	1,383	2,453	3,787
New/old users, %	79/21	80/20	81.5/19.5
Bounce rate, %	69.9	76.2	69.0

*Based on Google Analytics results (Appendix 1).

an average of 78% of the total number of sessions were unique visitors to the Web portal. The number of users doubled from 861 in year 1 to 1,700 in year 3. There was a small decrease in the bounce rate, which indicates that fewer users were clicking on the Web site but navigating away in <1 minute. A lower bounce rate suggests that more users were clicking on the Web site and staying there to review its content.

Of the 878 total entries for the annual drawing competition received during 2013–2016, 781 were available for analysis. During the 4-year period, participation rates varied over time and by region, with the exception of southcentral and northwestern regions, which remained relatively high throughout the study period. Two-thirds of the submissions were from southcentral ($n = 424$) and northwest ($n = 216$) regions (Fig 1).

DISCUSSION

We found that announcements about an art competition were associated with increased Web traffic to a site devoted to antimicrobial stewardship and preventive activities. Although a direct correlation cannot be determined, introducing an annual art competition initiative may have contributed to increasing the number of visitors to the Web site, which contains practical public health information regarding primary prevention and antimicrobial stewardship.

To engage more children and expand the reach of this intervention, the age range was expanded in 2015 to include 9- to 12-year-old children, whereas the first 2 contests only invited entries from children ≤ 8 years of age. During year 3, the initial announcement

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