RESEARCH LETTER

Adverse Events Reported to the US Food and Drug Administration for Cosmetics and Personal Care Products

The US Food and Drug Administration (FDA) defines cosmetics as articles for beautification, cleansing, or altering physical appearance. There have been multiple public health controversies surrounding cosmetics involving lip balms, lipsticks, and eyelash makeup adulterated with prostaglandins. In 2014, the FDA began investigating WEN by Chaz Dean Cleansing Conditioners after directly receiving 127 consumer reports. The FDA later learned the manufacturer had already received 21,000 complaints of alopecia and scalp irritation. The product remains on the market with the FDA currently soliciting additional consumer reports. To encourage greater transparency and more reporting, the FDA’s Center for Food Safety and Applied Nutrition’s Adverse Event Reporting System (CFSAN), a repository of adverse events related to foods, dietary supplements, and cosmetics, was made publicly available in 2016. Our objective was to examine adverse events in CFSAN to inform future policymaking.

Methods | We extracted the entire CFSAN data file (2004-2016), including all voluntary submissions by consumers and health care professionals. We categorized all cosmetic-related adverse events by FDA-designated product class. For 5% of entries, no product class was identifiable. We collected self-reported adverse health outcomes (nonserious injury, serious injury, disability, congenital defects, or death) for each event. We used a logit transform to estimate 95% CIs for proportions, and a logistic regression model to compare the proportion of serious adverse health outcomes (serious injury, disability, congenital defect, or death) reported for each product class compared with the global average. Because this study used only publicly available data, it was exempt from Northwestern University institutional review board approval.

Results | From 2004 to 2016, a total of 5,144 events were submitted (an average of 396 events per year). From 2015 (n = 706) to 2016 (n = 1,591), there was an increase in adverse events,

Figure 1. Adverse Event Reports for Cosmetics and Personal Care Products From 2004 to 2016

The US Food and Drug Administration (FDA) provides definitions for all product classes. Briefly, skin care products constitute a broad range of items, including cleansing lotions and creams, deodorants, sprays, moisturizers, and anti-wrinkle products. Personal cleanliness products included bath soaps, deodorants, and douches. Baby products included shampoos, lotions, oils, creams, and powders marketed toward newborns and infants. Hair care products, which include shampoos (noncoloring), rinses (noncoloring), hair spray, and hair straighteners, constituted 35% (n = 1,805) of all adverse health reports. Skin care products were the next most common source of complaints at 22% (n = 1,148). Five percent of products (n = 257) were not classifiable based on the available data. The data label for each year indicates the total number of adverse events reported. On average, 396 cosmetic-related adverse events were sent to the FDA every year. There was a 78% increase in 2015 and a 300% increase in 2016 for adverse event reports compared with the mean across the entire time period (2004-2016). This increase was largely driven by the hair care products class, specifically the WEN product line by Chaz Dean.
Figure 1. Reported Adverse Health Outcomes Indicated as Serious, %

<table>
<thead>
<tr>
<th>Product Class</th>
<th>Serious Health Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baby Product</td>
<td>20.6% (95% CI, 18.6%-22.6%)</td>
</tr>
<tr>
<td>Unclassified</td>
<td>23.0% (95% CI, 20.2%-25.8%)</td>
</tr>
<tr>
<td>Personal Cleanliness</td>
<td>47.1% (95% CI, 44.1%-50.1%)</td>
</tr>
<tr>
<td>Hair Care</td>
<td>34.6% (95% CI, 31.7%-37.5%)</td>
</tr>
<tr>
<td>Hair Coloring</td>
<td>28.6% (95% CI, 25.7%-31.4%)</td>
</tr>
<tr>
<td>Skin Care</td>
<td>53.0% (95% CI, 50.1%-55.8%)</td>
</tr>
<tr>
<td>Fragrance</td>
<td>31.7% (95% CI, 28.8%-34.6%)</td>
</tr>
<tr>
<td>Other</td>
<td>35.0% (95% CI, 31.8%-38.2%)</td>
</tr>
<tr>
<td>Sun tan</td>
<td>44.1% (95% CI, 41.3%-46.9%)</td>
</tr>
<tr>
<td>Oral Hygiene</td>
<td>43.5% (95% CI, 40.7%-46.3%)</td>
</tr>
<tr>
<td>Eye Makeup</td>
<td>53.0% (95% CI, 50.1%-55.8%)</td>
</tr>
<tr>
<td>Makeup</td>
<td>51.0% (95% CI, 48.2%-53.9%)</td>
</tr>
<tr>
<td>Manicuring</td>
<td>49.5% (95% CI, 46.7%-52.3%)</td>
</tr>
</tbody>
</table>

A "serious" adverse health outcome was counted whenever a reporter attributed a specific adverse event with any of the following: serious injury, disability, congenital anomaly, or death. We collapsed 5 product types that had 20 or fewer adverse outcomes, which included bath preparation products, shaving products, cosmetic raw materials, cosmetic devices, and multiple category products into the "other" category. The dashed vertical line illustrates the average percentage of reported adverse events across the 14 product types for each of the adverse health outcomes. An orange dot signifies a higher-than-average percentage compared with the mean (P < .05). A purple dot signifies a lower-than-average percentage compared with the mean (P > .05). A black dot signifies no significant difference compared with the average. Error bars indicate 95% CIs. As expected, products with high percentages of serious adverse events also had lower percentages of nonserious adverse events.

Discussion | Better cosmetic surveillance is needed given their ubiquity and lack of a premarket approval pathway. Unlike devices, pharmaceuticals, and dietary supplements, cosmetic manufacturers have no legal obligation to forward adverse events to the FDA; CFSAN reflects only a small proportion of all events. The data suggest that consumers attribute a significant proportion of serious health outcomes to cosmetics. The lack of high-quality data leads to reactionary responses by the FDA subject to consumer pressure as evidenced by the WEN conditioners controversy. The first step to improve cosmetic safety is broader reporting, especially from manufacturers. Greater coordination with other databases (eg, National Poison Data System) may yield useful collateral information.

There are several limitations to this analysis. Although the FDA removes duplicate reports, there is no causality determination and health outcomes are all self-reported. Demographic information is also limited to sex and age. Additional data on medical comorbidities or concomitant product use would be relevant. Finally, we cannot distinguish reports from consumers vs those from health care professionals.

In 2014, the FDA expressed "profound disappointment" with the industry’s draft legislation to modernize cosmetics regulation and refused to invest additional taxpayer dollars for further negotiations. Since then, California’s Senator Diane Feinstein has introduced the Personal Care Products Safety Act (PCPSA) with a coalition of supporters. The bill’s key components include granting the FDA authority to recall unsafe cosmetics, mandatory manufacturer reporting of adverse events, and a yearly safety review of 5 ingredients. However, the law does not provide more investment to the National Toxicology Program for more rigorous scientific testing. For products blurring the line between drug and cosmetic (cosmeceuticals), a form of premarket approval should be considered. Ultimately, PCPSA is a first step in the right direction to protect consumers.

Michael Kwa, BA
Leah J. Welty, PhD
Shuai Xu, MD, MSc

Author Affiliations: Northwestern University Feinberg School of Medicine, Chicago, Illinois (Kwa); Division of Biostatistics, Department of Preventive Medicine, Northwestern University Feinberg School of Medicine, Chicago, Illinois (Welty); Department of Dermatology, Northwestern University Feinberg School of Medicine, Chicago, Illinois (Xu).

Corresponding Author: Shuai Xu MD, MSc, Department of Dermatology, Northwestern University Feinberg School of Medicine, 676 N St Clair St, Ste 1600, Chicago, IL 60611 (steveuxu@northwestern.edu).

Accepted for Publication: May 1, 2017.

Published Online: June 26, 2017. doi:10.1001/jamainternalmed.2017.2762

Author Contributions: Dr Xu and Mr Kwa had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

Study concept and design: Xu.

Acquisition, analysis, or interpretation of data: All authors.

Drafting of the manuscript: Kwa, Xu.

Critical revision of the manuscript for important intellectual content: All authors.

Statistical analysis: All authors.

Obtained funding: Welty, Xu.

Administrative, technical, or material support: Xu.

Conflict of Interest Disclosures: Dr Xu reports an advisory role with Logical Images Inc, a healthcare diagnostic software firm. Dr Xu and Mr Kwa own an equity interest in a consumer-oriented online health resource providing evidence-based safe product recommendations to patients. The resource has no financial relationships with manufacturers. No other disclosures are reported.

Funding/Support: This study was supported by Northwestern University Department of Dermatology’s Education and Research Endowment Fund, Northwestern University’s Biostatistics Collaboration Core, and the Biostatistics Collaboration Center within the Northwestern University Clinical and Translational Sciences Institute.

Role of the Funder/Sponsor: The funding source had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

LESS IS MORE
Persistent Gaps in Use of Advance Directives Among Nursing Home Residents Receiving Maintenance Dialysis

Patients with end-stage renal disease receiving dialysis have a symptom burden and prognosis comparable to patients with incurable cancer. They frequently and increasingly receive intensive procedures near the end of life. Because the benefits of these interventions remain controversial, a key question is whether increasing intensity of end-of-life care reflects changes in the extent to which patient preferences are elicited and documented with advance directives. Nursing homes offer an important setting to evaluate advance directive use because they accept full responsibility for care during patient stay.

To shed light on a potentially remediable care gap, we sought to determine whether changes in the use of advance directives between 2000 and 2010 are related to changing patterns of end-of-life care among nursing home residents receiving dialysis.

Methods | We used data from a national registry of patients receiving dialysis linked to Medicare claims and the Minimum Data Set to identify 153 285 nursing home residents who died in 2000 or 2010 with continuous Medicare coverage in the last 6 months of life and a nursing home record between 31 and 365 days before death. The institutional review board at Stanford University and the Veterans Affairs Palo Alto Research Committee approved the study.

We categorized patients according to the presence or absence of 2 advance directive components: a treatment-limiting advance directive (TLD), defined as documentation of patient goals—and the care that is actually delivered. This gap is noteworthy because advance directives have increased in other segments of the population over the same period. Hospitalization may be the most effective way to care for some chronically ill patients, while for others it is the path of least resistance that leads to an unintended escalation in care.