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Selected Topics: Toxicology

REFERRAL OF PEDIATRIC LAUNDRY DETERGENT PACK EXPOSURE REPORTED TO POISON CENTERS

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☐ **Abstract—Background: Concentrated laundry detergent packs are new products that may be more likely to cause adverse effects and serious medical outcomes among young children than traditional laundry detergent products. Objective: The intent of this study was to examine whether certain factors might be associated with the referral of pediatric laundry detergent pack exposures by poison centers. Methods: Cases were laundry detergent pack exposures involving patients age 5 years or younger reported to Texas poison centers during February 2012 to August 2013. The health care facility referral rate was calculated for selected factors. Results: Of 912 exposures, 720 were managed on site and 192 were referred to a health care facility. The referral rate was 16.1% for patients with not serious outcomes and 71.6% for serious outcomes. The referral rate was 32.0% for patients age younger than 1 year and 14.3% to 22.1% for the older age groups. 31.0% of Purex™, 25.5% of All™, and 19.3% of Tide™ product exposures were referred. The referral rate was 33.3% for ocular exposures, 19.4% for dermal contact, and 20.2% for ingestions. The most common clinical effects and their referral rates were vomiting (30.5%), cough or choke (45.1%), ocular irritation (34.6%), red eye (25.4%), nausea (25.4%), drowsiness or lethargy (67.5%), oral irritation (16.7%), and dermal edema (68.4%). Conclusions: Pediatric exposures to laundry detergent packs were more likely to be referred to health care facilities if the laundry detergent pack brand was Purex™, the exposure was ocular, or particular ocular, respiratory, dermal, or neurologic clinical effects were present.** © **2014 Elsevier Inc.**

☐ **Keywords—laundry detergent; pediatric; poison center; referral**

INTRODUCTION

In February 2012, multiple manufacturers began selling a new type of laundry detergent product in the United States (1,2). These products consist of small, single-use packs (ie, pods, packets, capsules) that contain concentrated liquid detergent within a water-soluble membrane. Examples include Tide™ Pods, Purex™ Ultra Packs, and All™Mighty Packs (3–6).

Because their appearance and size resemble candy or toys, these laundry detergent packs might be attractive to children (5,6). Around May 2012, United States poison centers began to observe potentially serious exposures to laundry detergent packs among young children (1,3,5,6). Symptoms included vomiting, cough or choking, eye irritation or pain, red eyes, drowsiness or lethargy, nausea, respiratory distress, and seizure-like activity (1,3,4,6,7). Through July 2013, > 12,000 pediatric exposures to the products had been reported to poison centers nationally. In August 2013, a 7-month-old child died after eating a laundry detergent packet, although causality had not been confirmed (8).

Reports have suggested that these laundry detergent packs may be more likely to cause adverse effects and

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serious medical outcomes than traditional laundry detergent formulations (1,5,6). Possible reasons for this include differences in ingredients, concentration, or delivery mechanism (1). The packets have been reported to contain highly concentrated chemicals, such as ethanolamine, alcohol ethoxylate, and benzenesulfonic acid (8). In addition, one study found that exposures to laundry detergent packs were more likely than traditional laundry formulations to be referred to health care facilities by Texas poison centers (7). Poison center and other health care provider guidelines for deciding whether to refer patients to health care facilities that were created for traditional laundry detergent exposures might not be as useful for laundry detergent pack exposures. In a survey of 12 US poison centers, 5 possessed formal laundry detergent pack triage guidelines (9). The intent of the present investigation was to examine whether certain demographic or clinical factors might be associated with the referral of pediatric laundry detergent pack exposures by a large poison center system. Because the known or anticipated outcomes of an exposure might be expected to affect whether a patient is referred to a health care facility, the same factors were examined with respect to medical outcomes. It is hoped that such information might prove useful in designing referral guidelines for these exposures.

METHODS

The Texas Poison Center Network (TPCN) is a system composed of six poison centers that together service the entire state, a total population currently > 25 million, > 3 million of which are children 5 years old or younger. The TPCN is a telephone consultation service that provides information on and assists in the management of potentially adverse exposures to a variety of substances, including laundry detergents. The six poison centers use a single computer database to collect a variety of demographic and clinical information on each call in a consistent manner. The data fields and allowable data options in the database are standardized by the American Association of Poison Control Centers (AAPCC) (10).

Cases for this retrospective study were laundry detergent pack exposures involving patients age 5 years or younger reported to the TPCN during February 2012 to August 2013. Details for how laundry detergent pack exposures were identified are provided elsewhere (11). No laundry detergent pack exposures were reported to the TPCN before February 2012. Calls received from outside of Texas were excluded. Exposures involving other substances in addition to the laundry detergent pack (n = 1) were included.

The management site field in the TPCN database includes codes for the following options: managed on site (non–health care facility), patient already in (en route to) health care facility when poison center called, patient was referred by poison center to a health care facility, other, and known. This investigation was limited to the exposures where the management site was managed on site (non–health care facility) and patient was referred by poison center to a health care facility because these are the options where the poison center could influence whether the patient was referred to a health care facility or not.

According to the AAPCC reference manual, the medical outcomes or severity of an exposure are assigned by the poison center staff and are based on all of the information available when the case is closed, primarily the observed adverse clinical effects (10). Medical outcomes are classified according to the following criteria: no effect (no symptoms due to exposure), minor effect (some minimally troublesome symptoms, eg, mild gastrointestinal symptoms, drowsiness, skin irritation, transient cough), moderate effect (more pronounced, prolonged symptoms, eg, corneal abrasion, high fever, disorientation, isolated brief seizures, gastrointestinal symptoms causing dehydration), major effect (symptoms that are life-threatening or cause significant disability or disfigurement, eg, repeated seizures, ventricular tachycardia with hypotension, cardiac arrest, respiratory arrest, ventricular fibrillation, esophageal stricture, cerebrovascular accident), and death. A portion of exposures are not followed to a final medical outcome because of resource constraints or the inability to obtain subsequent information on the patient. In these instances, the poison center staff record the expected outcome of the exposure. These expected outcomes are grouped into the following categories: not followed but judged as nontoxic exposure (symptoms not expected), not followed but minimal symptoms possible (no more than minor symptoms possible), and unable to follow but judged as a potentially toxic exposure. Another medical outcomes category is unrelated effect, where the exposure was probably not responsible for the symptoms.

Those exposures not followed to a final medical outcome were included in this study because they accounted for almost 37% of the total exposures; excluding these exposures might bias the analysis. Preliminary analysis suggested that exclusion of these exposures would not seriously affect the results of the analysis; however, the referral rate for cases followed to a final medical outcome was 27.1%, and the referral rate for cases not followed to a final medical outcome was 10.9%. In addition, a final medical outcome is not necessarily known when poison center staff are deciding whether to refer a patient to a health care facility. For convenience, the medical outcomes were grouped into those known or expected to not be serious (no effect, minor effect, not followed and judged nontoxic, not followed and judged minimal