

North Carolina's Operation Medicine Drop: Results From One of the Nation's Largest Drug Disposal Programs

Eleanor Fleming, Scott Proescholdbell, Nidhi Sachdeva, Apostolos A. Alexandridis, Lewis Margolis, Kelly Ransdell

INTRODUCTION In 2013, a total of 1,085 North Carolina residents died due to unintentional poisoning; 91% of these deaths were attributed to medications or drugs (over-the-counter, prescription, or illicit). Proper disposal of unused, unneeded, and/or expired medications is an essential part of preventing these unintentional deaths, as well as averting the other adverse consequences of these drugs on the environment and population health.

METHODS Operation Medicine Drop is a medication take-back program coordinated by Safe Kids North Carolina, a county-level, coalition-based injury prevention organization. The Operation Medicine Drop program and event registration system were used to review and validate the number of events, the counties where the events were held, and the number of unit doses (pills) collected from March 2010 to June 2014. SAS version 9.4 was used to generate basic counts and frequencies of events and doses, and ArcGIS version 10.0 was used to create the map.

RESULTS From March 2010 to June 2014, Operation Medicine Drop held 1,395 events with 245 different participating law enforcement agencies in 91 counties in North Carolina, and it collected 69.6 million unit doses of medication. More than 60 local Safe Kids North Carolina community coalitions had participated as of June 2014. Every year, Operation Medicine Drop has witnessed increases in events, participating agencies, participating counties, and the number of doses collected.

CONCLUSION Operation Medicine Drop is an excellent example of a successful and ongoing collaboration to improve public health. Medication take-back programs may play an important role in preventing future overdose deaths in North Carolina.

Unintentional poisoning is the 5th leading cause of death in North Carolina [1]. In 2013, a total of 1,085 North Carolinians died due to unintentional poisoning. Of these unintentional poisonings, 91% were attributed to medications or drugs (over-the-counter, prescription, or illicit), and 49% were due to opioid prescriptions [1]. While some recommendations to reduce this epidemic have focused on health care providers' prescribing practices and prescription drug monitoring programs, one of the major sources of the problem is Americans' medicine cabinets [2-4]. More than 19 million prescriptions of controlled substances are dispensed every year in North Carolina (Alex Asbun, program manager, Controlled Substance Reporting System; Division of Mental Health, Developmental Disabilities, and Substance Abuse Services; oral communication; August 20, 2014). These controlled substances, combined with over-the-counter medications and noncontrolled prescriptions, have resulted in countless homes having surplus medications. Proper disposal of unused, unneeded, and/or expired medications [5-7] is an essential part of preventing unintentional poisoning deaths.

From September 2010 to October 2014, the US Drug Enforcement Administration (DEA) funded take-back events to allow for the safe disposal of unwanted, expired, and/or unneeded medications. The purpose of this article is to describe the results of Operation Medicine Drop, a state-wide drug take-back effort in North Carolina.

Safe Kids North Carolina (Safe Kids NC) launched Operation Medicine Drop in March 2010, coinciding with

Poison Prevention Week. Safe Kids NC is an organization of 41 local coalitions covering 71 of the state's 100 counties; its mission is to prevent injuries among children under the age of 19 years [8]. Working with local health departments, hospital systems, fire departments, police departments,

TABLE 1.
Annual Summary Data for Operation Medicine Drop Events, March 2010 to June 2014

Year	Registered events ^a	Doses collected (in millions) ^b	Participating law enforcement agencies ^c	Participating counties
2010 ^d	186	1.4	112	67
2011	301	10.2	152	68
2012	215	18.3	112	68
2013	367	22.9	149	75
2014	326	16.8	236	71
2010-2014	1,395	69.6	781	91

^aData from Safe Kids NC event registration database, 2011-2014.

^bDoses collected in millions, reported by number of pills.

^cLaw enforcement agencies as reported to the US Drug Enforcement Administration from the North Carolina State Bureau of Investigation.

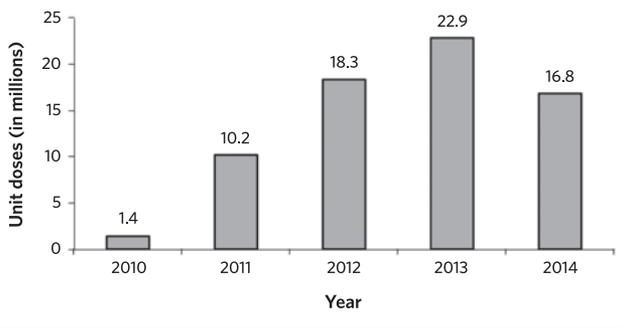
^d2010 data was not included in the event database but was provided by the Safe Kids NC program.

Electronically published January 13, 2016.

Address correspondence to Mr. Scott Proescholdbell, 1915 Mail Service Center, Raleigh, NC 27699-1915 (Scott.Proescholdbell@dhs.nc.gov).

N C Med J. 2016;77(1):59-62. ©2016 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved. 0029-2559/2016/77108

FIGURE 1.
Unit Doses (in Millions) Collected by North Carolina's Operation Medicine Drop, by Year, March 2010 to June 2014



medical practices, and individuals committed to injury prevention, Safe Kids NC has taken the lead in coordinating drug take-back events in North Carolina. As early as 2009, there were a few small, local drug take-back efforts, but there was no single statewide organization coordinating their efforts. Safe Kids NC leveraged its internal leadership, activated its network of partners, and organized statewide efforts that could scale up these local drug take-back events.

Operation Medicine Drop is a partnership between the Riverkeepers of North Carolina, the North Carolina State Bureau of Investigation (SBI), Community Anti-Drug Coalitions of North Carolina, and local law enforcement agencies. With its community-based events, Operation Medicine Drop allows people to discard unused medications with no questions asked, and these medications are then safely and legally disposed of using an EPA-approved incinerator. Local coalitions register their events with Safe Kids NC and work with local law enforcement agencies, who take possession of the medications and report the number or pounds of medications to Operation Medicine Drop and the SBI.

Methods

We used the Safe Kids NC Operation Medicine Drop event registration system and program documents to review and validate the number of events, the counties where events were held, and the number of unit doses (pills) collected for the period March 2010 to June 2014. We used unit dose—that is, the number of pills collected—as the general outcome measure. When final collection data were reported in pounds, we converted to unit dose (number of pills) using a standard law enforcement convention of 1 pound equal to 750 pills (Donnie R. Varnell, North Carolina State Bureau of Investigation, Diversion and Environmental Crimes Unit; written communication; April 8, 2015).

The University of North Carolina Injury Prevention Research Center downloaded a complete file of take-back events from the Safe Kids NC database, cleaned and analyzed the data, and confirmed results with documentation from the SBI. We used SAS version 9.4 to generate basic

counts and frequencies of outcome variables, and we used ArcGIS version 10.0 to create the map.

Results

From March 2010 to June 2014, Operation Medicine Drop held 1,395 events with 245 different participating law enforcement agencies in 91 of the state's 100 counties, and these events collected 69.6 million unit doses. More than 60 local Safe Kids NC community coalitions had participated as of June 2014. From March 2010 to June 2014, there was a 35.8% increase in the number of participating counties and a 597% increase in the number of participating law enforcement agencies.

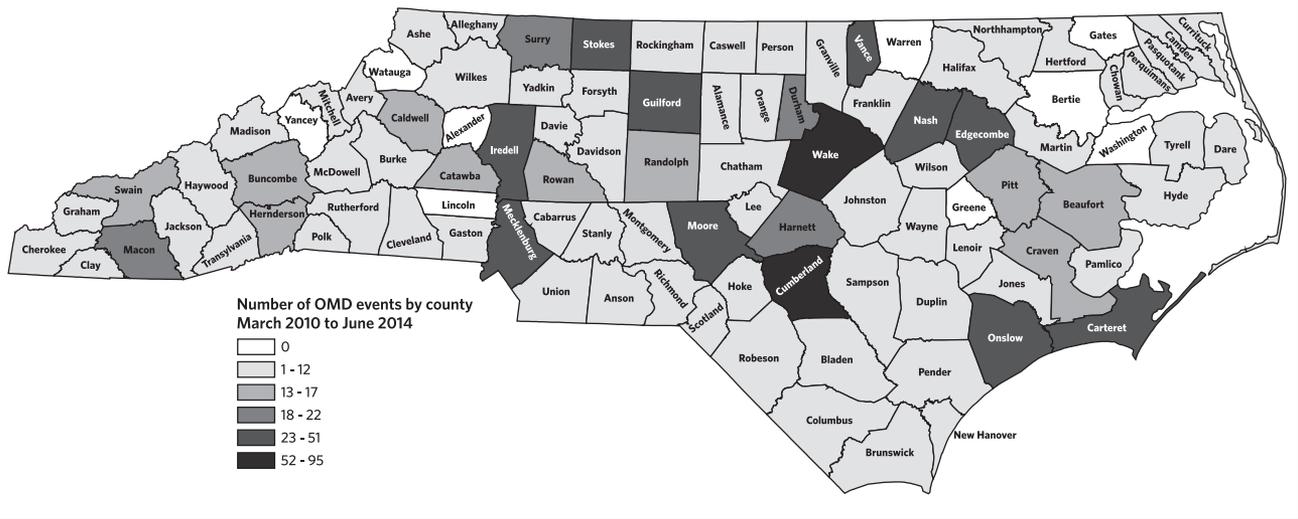
Discussion

Over the course of 5 years, Operation Medicine Drop collected 69.6 million doses of unwanted drugs. These numbers exceed reports in the media from fall take-back events in other states, which reported collecting between 500 and 1,000 lbs [9-12]. Despite collecting 69.6 million unit doses of medications (with considerable commitment and enthusiasm at the local level), drug take-back events face barriers that may prevent communities from hosting these events. The Controlled Substances Act requires the participation of law enforcement in drug take-back events to prevent possible diversion. In addition, pharmacists or pharmacy technicians are needed to identify and verify controlled substances and other drugs of concern.

Cost is another major barrier that potentially limits whether community-based groups can maintain these efforts. It costs \$1.25 per pound to incinerate unwanted drugs. For events held on September 27, 2014, for example, North Carolina collected 10,800 lbs of drugs, and the cost for incineration alone was estimated at \$13,500. For the Operation Medicine Drop events reported here, only EPA-approved incinerators for biohazardous materials were allowed to be used. North Carolina has only one EPA-approved incinerator. In June 2013, when that incinerator was temporarily shut down, medications were shipped to Alabama for destruction, with DEA paying the additional cost of transporting the items to Alabama. Community and state programs engaging in drug take-back efforts must consider the costs associated with maintaining this kind of operation and providing the necessary oversight and approvals.

In its final rule regarding the disposal of pharmaceutical controlled substances, DEA did not require a particular method of destruction "so long as the desired result is achieved" and the method is secure, convenient, and responsible, "consistent with preventing the diversion of such substances" [13]. The rule, which went into effect on October 9, 2014, allows participating pharmacies, long-term care facilities, hospitals, and pharmaceutical companies to take back unused prescription medications. Prior to the implementation of this rule, only law enforcement agencies were allowed

FIGURE 2.
Map of Operation Medicine Drop (OMD) Events, by County and Agency, March 2010 to June 2014



to collect drugs. It is unclear whether pharmacies, narcotics treatment programs, hospitals, and clinics will establish take-back programs, but this ruling suggests that Operation Medicine Drop may have more options for disposing of collected medicines or could partner with state law enforcement agencies to pursue more cost-effective and convenient means of disposal. In the meantime, Operation Medicine Drop staff members hope to continue events into the future.

The expansion of Operation Medicine Drop to include permanent drop-off boxes could dramatically change individuals' ability to discard unused medications. Operation Medicine Drop is working with various programs—including Community Care of North Carolina's Project Lazarus, a statewide overdose prevention program—to place permanent drop boxes in every county. Housed in law enforcement offices, these drop boxes would be more accessible to people than the Operation Medicine Drop events, which operate on a limited schedule. However, anecdotal evidence suggests that some community members might not be as willing to take unused medications and drugs to law enforcement agencies. Currently, according to the SBI, most drop boxes average approximately 12-15 lbs of collected medications per week.

Our efforts to measure the impact of Operation Medicine Drop are limited by the electronic system that is currently in place. In this system, groups organizing take-back events are only asked to record the quantity of pills collected. Thus there is no way to divide the total collection by drug class. With increased funding, Operation Medicine Drop could potentially hire pharmacists to classify the drugs collected.

Second, we are limited in our ability to explore the causal relationship between Operation Medicine Drop's take-back events and the number of drug poisoning deaths in the counties where Operation Medicine Drop has held events. Currently, we are only able to describe what Operation Medicine Drop has done in bringing partners together to col-

lect and safely destroy unwanted prescription drugs. With more robust data collection and evaluation measures, perhaps, we could describe the overall impact on public health.

Finally, our analysis is limited by the data reported to DEA. Individual weights for the drugs collected at each police department or sheriff's office are not reported. Instead, DEA only receives a total weight, which limited our ability to account for all drugs that had been dropped off in each county in the fall 2014 take-back events.

Despite limited resources, Safe Kids NC has organized a statewide drug disposal collection program that has resulted in more than 69 million doses of medications being taken out of circulation. Thus, Operation Medicine Drop has been successful in safely disposing of unwanted prescription drugs. While we cannot say what proportion of those drugs are controlled substances that are partially responsible for the epidemic of overdose deaths in this state, Operation Medicine Drop has helped to communicate the message that safely disposing of unwanted, unused, and/or expired medications is key to keeping children safe. **NCMJ**

Eleanor Fleming, PhD, DDS chronic disease epidemiologist, Epidemiology and Surveillance Branch, Division of Population Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia; chronic disease epidemiologist, Division of Public Health, North Carolina Department of Health and Human Services, Raleigh, North Carolina.

Scott Proescholdbell, MPH epidemiologist, Division of Public Health, North Carolina Department of Health and Human Services, Raleigh, North Carolina.

Nidhi Sachdeva, MPH, CHES program manager, Injury Prevention Research Center, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina.

Apostolos A. Alexandridis, MPH graduate research assistant, Injury Prevention Research Center, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina.

Lewis Margolis, MD, MPH associate professor, Department of Maternal and Child Health, Gillings School of Global Public Health, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina.

Kelly Ransdell, MA deputy director, Office of State Fire Marshal, North Carolina Department of Insurance, Raleigh, North Carolina.

Acknowledgments

We thank all of the coalitions, organizations, and agencies that have participated in these Operation Medicine Drop events. Without their willingness to participate, this program would not be as successful. We also thank Donnie Varnell at the North Carolina State Bureau of Investigation for helping to verify the data, and Ruth Petersen and Geraldine Perry for reviewing the manuscript.

Disclaimer. The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention. L.M., S.P., and K.R. are all members of the Safe Kids NC Advisory Committee.

Potential conflicts of interest. All authors have no relevant conflicts of interest.

References

1. Austin A, Finkbeiner S. The Burden of Unintentional Poisonings in North Carolina. Raleigh, NC: North Carolina Department of Health and Human Services; 2013.
2. Baumblatt JAG, Wiedeman C, Dunn JR, Schaffner W, Paulozzi LJ, Jones TF. High-risk use by patients prescribed opioids for pain and its role in overdose deaths. *JAMA Intern Med.* 2014;174(5):796-801.
3. Brady JE, Wunsch H, DiMaggio C, Lang BH, Giglio J, Li G. Prescription drug monitoring and dispensing of prescription opioids. *Public Health Rep.* 2014;129(2):139-147.
4. Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration. Results from the 2012 National Survey on Drug Use and Health: Summary of National Findings. NSDUH Series H-46, HHS Publication No. (SMA) 13-4795. Rockville, MD: US Department of Health & Human Services; 2013. <http://www.samhsa.gov/data/NSDUH/2012SummNatFindDetTables/NationalFindings/NSDUHresults2012.htm#ch2.16>. Accessed March 4, 2014.
5. American Society of Consultant Pharmacists (ASCP). Pharmaceutical Waste Practice Resource Center. ASCP website. <https://www.ascp.com/articles/pharmaceutical-waste-practice-resource-center>. Accessed August 5, 2014.
6. Glassmeyer ST, Hinchey EK, Boehme SE, et al. Disposal practices for unwanted residential medications in the United States. *Environ Int.* 2009;35(3):566-572.
7. Daughton CG. Pharmaceuticals in the environment: sources and their management. In: *Analysis, Removal, Effects and Risk of Pharmaceuticals in the Water Cycle*. Petrovic M, Perez S, Barcelo D, eds. Oxford, UK: Elsevier Science; 2007: 37-64.
8. Safe Kids Worldwide. Who we are. Safe Kids Worldwide website. <http://www.safekids.org/who-we-are>. Accessed September 24, 2014.
9. Michigan State Police. State police collects more than 500 pounds of prescription drugs on national prescription drug take-back day. Michigan.gov website. http://www.michigan.gov/msp/0,4643,7-123-58995_67828-338619--,00.html. Accessed October 14, 2014.
10. 'Drug take back' reclaims over 700 pounds of unused prescription drugs. Ozarks First website. http://www.ozarksfirst.com/story/d/story/drug-take-back-reclaims-over-700-pounds-of-unused/27536/_cW64JtloEGhXiFjHdkKw. Accessed October 14, 2014.
11. Lange K. Howard Co. police collect 821 lbs. of prescription drugs. WBALTV.com. <http://www.wbal.com/health/howard-co-police-collect-821-lbs-of-prescription-drugs/28315784#ixzz3G8CEcnhE>. Accessed October 14, 2014.
12. Prescription drug takeback day yields more than 970 pounds of prescription drugs. Victorville Daily Press website. <http://www.vv.dailypress.com/article/20140929/NEWS/140929790#sthash.J6BFUbZb.dpuf>. Accessed October 14, 2014.
13. National Archives and Records Administration. Disposal of controlled substances: A rule by the Drug Enforcement Administration. Federal Register website. <https://federalregister.gov/a/2014-20926>. Published September 9, 2014. Accessed October 27, 2015.