



Toxic Substance Releases from North Carolina's National Toxic Substance Incidents Program, 2010–2012

Definition

To help monitor and prevent unintentional releases of toxic substances, North Carolina participates in the Agency for Toxic Substances and Disease Registry's National Toxic Substance Incidents Program (NTSIP), along with nine other states. North Carolina has participated in NTSIP since its inception in 2010 and previously participated in a similar program called the Hazardous Substances Emergency Events Surveillance Program. For the purpose of this report, a toxic substance release is defined as an unintentional, acute emergency release (lasting 72 hours or less) of a toxic substance that meets NTSIP's eligibility criteria. These criteria are based on the toxicity of the chemical and the amount released.

This report summarizes surveillance findings for the period of 2010 to 2012. During this time period, NTSIP captured information on 854 toxic substance releases meeting NTSIP's eligibility criteria. In 2010, North Carolina had the 12th highest number of NTSIP-eligible releases in the United States, based on data from other participating NTSIP states and estimates for non-participating states (NTSIP Annual Report 2010). For more information about NTSIP, please visit <http://www.atsdr.cdc.gov/ntsip/>.

Data Source

Toxic substance releases are identified through reports from the National Response Center, the North Carolina Emergency Management, the U.S. Department of Transportation (Hazardous Materials Incidents), the media and on-call notifications from the N.C. Public Health Preparedness and Response and Communicable Disease Branches. All toxic substance releases that occur in North Carolina and come to the attention of North Carolina NTSIP staff are evaluated to determine whether they meet NTSIP eligibility criteria. All events meeting the criteria are promptly entered into the online NTSIP database.

Findings

From 2010 through 2012, North Carolina's NTSIP database captured 854 chemical release incidents, of which 108 (13%) resulted in one or more injuries and 109 (13%) led to an official evacuation (Table 1). The total number of reported incidents decreased from 2010 (n=347) to 2011 (n=251), and increased slightly from 2011 to 2012 (n=256). The number of incidents that

resulted in injuries and the number of incidents that led to an evacuation of persons decreased every year from 2010 to 2012.

Toxic substance releases can occur when hazardous materials are transported or at a fixed-facility (i.e., if an event is not transportation-related). Fixed-facility releases were more common than transportation releases (Table 2). There was a decline in the number of fixed-facility releases that were reported each year from 2010 to 2012. The number of reported transportation releases decreased from 2010 (n=162) to 2011 (n=108), but increased in 2012 (n=125).

From 2010 to 2012, 183 persons were injured as a result of toxic substance release incidents in North Carolina (Table 3). Respiratory system problems were the most common type of injury reported. Fourteen (8%) of the injured persons died from their injuries, 31 (17%) were admitted to a hospital, and 58 (32%) were treated at a hospital and not admitted (Table 4). Of the 14 reported fatalities, 6 were the result of an unintentional chemical releases and 8 were chemical suicides (Table 5). Specific event circumstances related to the 6 fatalities from unintentional chemical releases are described in Table 6.

A little more than half of the evacuations lasted 5 hours or less (n=56) and about a quarter of the evacuations involved 50 people or less (Table 7).

From 2010 to 2012, methamphetamine chemicals were involved in the greatest number of NTSIP-eligible releases (n=80) (Table 8). The second most commonly released substance was ammonia (58 releases), followed by natural gas (53 releases) and sodium hydroxide (46 releases). The occurrence of these commonly released substance incidents (excluding methamphetamine chemicals) throughout the state are visually depicted in Figure 1.

Public Health Significance

Toxic substance releases are a public health concern in North Carolina. Methamphetamine chemicals contributed to the greatest number of releases in the state from 2010 through 2012, followed by ammonia, natural gas, and sodium hydroxide. Toxic substance release incidents often result in evacuations and injuries and even in fatalities.

To help educate North Carolinians on the hazards of toxic chemicals and how to prevent unintentional releases, the Occupational and Environmental Epidemiology Branch plans to conduct focus groups, distribute prevention materials, and partner with other agencies, such as fire departments and the Ammonia Safety & Training Institute, to reach high risk groups across the state.

The Chemical Release Investigation Kit & Template, also known as CRIKT, was developed to provide guidance for local health departments when responding to chemical releases. CRIKT is comprised of three distinct parts for each chemical of concern: 1) a step-by-step response guide; 2) one-page chemical fact sheets; 3) and a line listing template. Toolkits will be

developed for each chemical. Each toolkit will ensure local health departments have easily accessible chemical information, guidance on how to respond, and who to contact to strengthen public health response in the event of a chemical release. For more information about CRIKT, please visit <http://epi.publichealth.nc.gov/oeo/chemrad/chemkit.html>.

Limitations

The toxic substance releases captured in North Carolina's database are limited to those meeting NTSIP eligibility criteria. NTSIP has developed a list of substances that must be reported at any quantity when released, as well as a list of substances that must be reported when at least one pound is released. Other toxic substances are only entered into NTSIP if at least 10 pounds or one gallon was released. For certain commonly released substances that are less toxic, such as paint, releases are only entered if the quantity released is above a certain threshold, and releases of petroleum fuels are only entered if an injury or public health action (such as an evacuation) occurred. Releases that occur at a private residence are only entered if a public health action occurred.

It should also be noted that North Carolina NTSIP program staff stopped receiving methamphetamine laboratory incident reports from the State Bureau of Investigation (SBI) in 2011, so NTSIP staff have relied on media reports in their place. Since media reports do not include the same level of detail as SBI reports, many of these incidents may not be captured in NTSIP after 2010.

Reference

National Toxic Substance Incidents Program (NTSIP) Annual Report 2010. U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry. Available from http://www.atsdr.cdc.gov/ntsip/docs/ATSDR_Annual%20Report_031413_FINAL.pdf.

Appendix

Table 1. NTSIP-eligible toxic substance releases in North Carolina, 2010–2012

	2010	2011	2012	Total
Toxic substance releases	347	251	256	854
Releases resulting in one or more injuries	54 (16%)	34 (14%)	20 (8%)	108 (13%)
Releases that led to an official evacuation	42 (12%)	39 (16%)	28 (11%)	109 (13%)

Table 2. Fixed-facility and transportation NTSIP-eligible toxic substance releases in North Carolina, 2010–2012

	2010	2011	2012	Total
Fixed-facility releases	185	143	131	459
Transportation releases	162	108	125	395

Table 3. Number and type of injuries that resulted from NTSIP-eligible toxic substance releases, North Carolina, 2010–2012

Injury type	2010	2011	2012	Total
Respiratory system problems	20	23	28	71
Burns	12	18	5	35
Dizziness or other CNS symptoms	7	6	0	13
Trauma	0	2	7	9
Eye irritation	1	5	2	8
Skin irritation	3	0	4	7
Heat stress ^a	3	0	1	4
Shortness of breath	0	3	0	3
Headache	2	0	0	2
Other	2	2	19	23
Unknown	22	0	4	26
Total injured persons ^{b, c}	65	56	62	183

^a Include exposure to high temperatures accompanied by symptoms such as cramps, nausea, dizziness, stroke, muscle fatigue, exhaustion, dehydration, elevated blood pressure, heart palpitation or weakness as heat stress.
^b Excludes injuries that occurred during toxic substance release incidents but were not chemical-related.
^c Some victims sustained more than one type of injury.

Table 4. Severity of injuries that resulted from NTSIP-eligible toxic substance releases, North Carolina, 2010–2012

Severity of injury	2010	2011	2012	Total
Death on scene or on arrival at hospital	4	5	5	14
Treated at hospital (admitted)	6	10	15	31
Treated at hospital (not admitted)	16	12	30	58
Treated on scene	26	28	3	57
Observed at hospital (not treated)	2	0	7	9
Unknown	11	1	2	14
Total injured persons	65	56	62	183

Table 5. Types of NTSIP-eligible toxic substance release incidents that led to chemical-related fatalities, North Carolina, 2010–2012

Type of incident	2010	2011	2012	Total
Unintentional chemical release	2	2	2	6
Chemical suicide	2	3	3	8
Total fatalities	4	5	5	14

Table 6. Synopsis of chemical-related unintentional fatalities (n=6)

Substance	Year	Description of Incident
Methamphetamine chemicals	2010	<i>Subject was overcome by vapors of methamphetamine chemicals and found deceased in home.</i>
Carbon monoxide	2010	Car accidentally left running in garage resulting in <i>one fatality</i> from carbon monoxide poisoning.
Hydrogen gas	2011	A hydrogen gas explosion at a power plant killed <i>one employee</i> .
Propane	2011	Propane was released when a gas company was undergoing repair work resulting in <i>one fatality</i> .
Carbon monoxide	2012	Family used a generator inside their home for heating, resulting in death of <i>two children</i> from carbon monoxide poisoning.

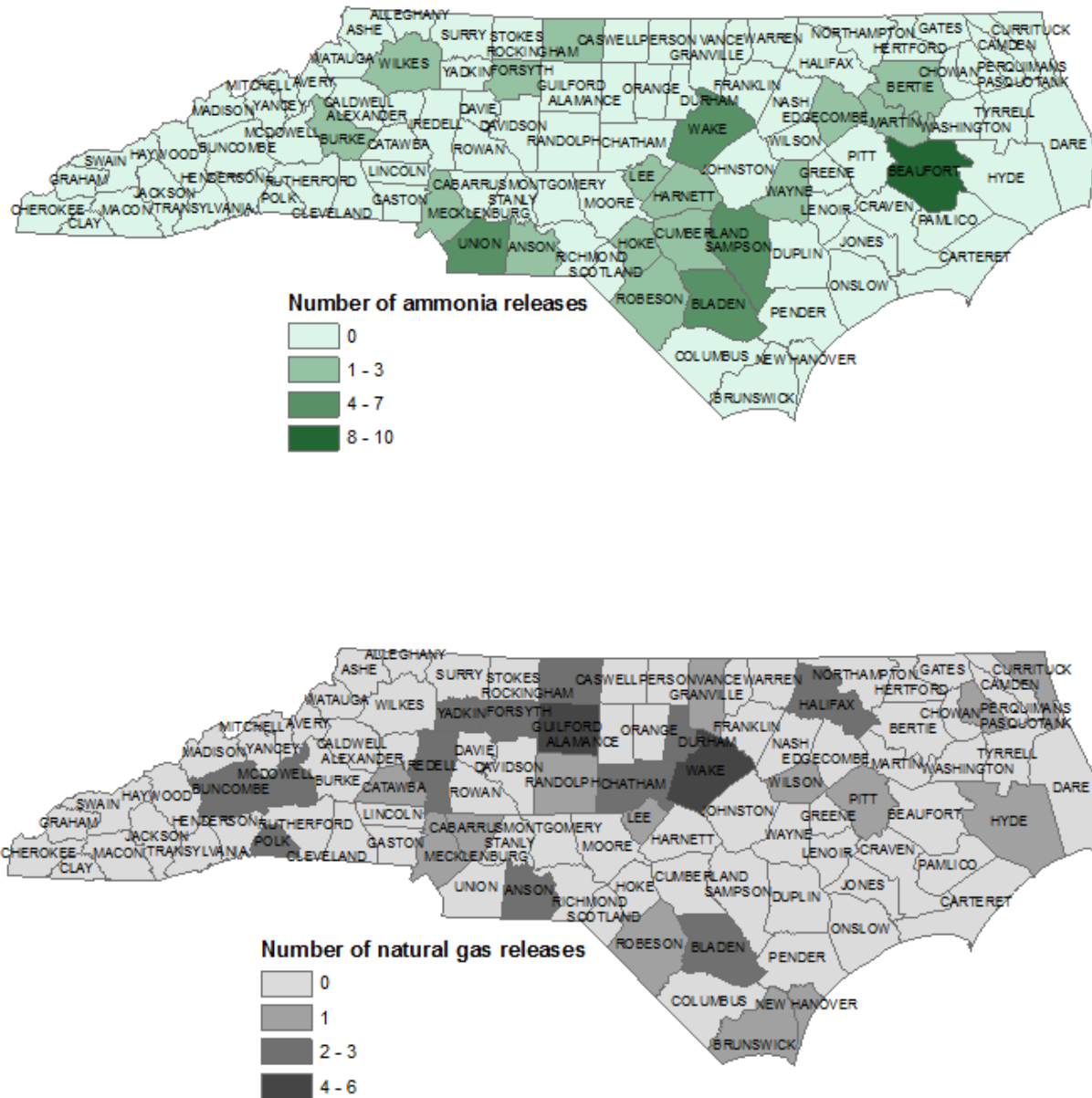
Table 7. Evacuations after NTSIP-eligible toxic substance releases, North Carolina, 2010–2012

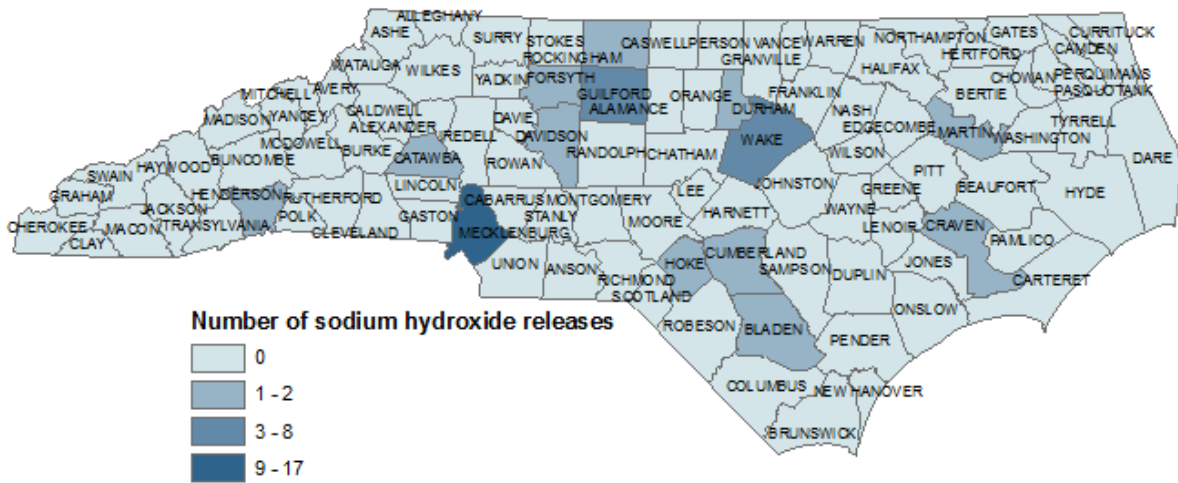
	2010	2011	2012	Total
Length of evacuation				
Less than 3 hours	10	4	5	19
3 to 5 hours	23	9	5	37
>5 to 24 hours	5	4	2	11
More than 24 hours	0	1	3	4
Unknown	4	21	13	38
Number of people evacuated				
1 to 5	2	3	3	8
6 to 20	2	4	3	9
21 to 50	2	2	6	10
51 to 100	2	0	1	3
101 to 500	2	1	1	4
Unknown	32	29	14	75
Total number of evacuations	42	39	28	109

Table 8. Chemicals that contributed to >15 NTSIP-eligible toxic substance releases, North Carolina, 2010–2012

Chemical	Releases	Deaths	Treated at hospital (admitted)	Treated at hospital (not admitted)	Treated on scene	Observed at hospital (no treatment)	Severity of injury unknown	Total victims
Methamphetamine chemicals	80	1	8	6	39	0	7	61
Ammonia	58	0	0	1	0	0	0	1
Natural gas	53	0	1	2	2	0	0	5
Sodium hydroxide	46	0	0	0	0	0	0	0
Mercury	23	0	0	6	0	4	0	10
Paint thinner	23	0	0	0	0	0	0	0
Sulfuric acid	23	0	1	1	0	0	0	2
Resin	21	0	0	0	0	0	0	0
Hydrochloric acid	19	0	0	0	0	2	2	4
Potassium hydroxide	18	0	0	0	0	0	0	0

Figure 1. Map of frequency of the most commonly released toxic substances (excluding methamphetamine chemicals) by type and county, North Carolina, 2010–2012





This document was supported by funds from the Comprehensive Environmental Response, Compensations, and Liability Act (CERCLA) trust fund provided to the North Carolina Department of Health and Human Services under Cooperative Agreement 5U61TS000112 from the Agency for Toxic Substances and Disease Registry and the Centers for Disease Control.