Emergency Response in Outbreaks of Non-Infectious Conditions: A story of three outbreaks

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Outline

- Case study: CO poisoning post-windstorm
- Prevention
- Surveillance
- Intervention
- Emergency Operations Centers
- Data responsibilities

Emergency preparedness & response

- Planning and readiness
- Surveillance and epidemiology
- Laboratory capacity
- Information technology
- Risk communications
- Education and training

Haddon injury prevention matrix

	Human	Environment (physical and social)	Agent and vehicle
Pre-exposure phase			
Exposure phase			
Post-exposure phase			

Haddon principles

- Reduce hazard
- Separate hazard from human
  - Physical barriers
  - Separation in time or space
- Harden the human
- Early event detection
- Prompt medical care

Purposes of surveillance

- Immediate public health action
  - individual case reports trigger investigations and preventive interventions
- Planning & evaluation
  - estimate magnitude and monitor trends
  - identify high-risk groups and modifiable risk factors
  - assess effectiveness of interventions
- Finding causal pathways
  - cluster investigation
  - linkage study

Dimensions of Carbon monoxide

- Emergency-disaster and “routine” settings
- Occupational, residential, recreational
- Intentional and unintentional
- Acute and chronic
- Vehicular and non-vehicular
- Seasonal and non-seasonal

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

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MMWR
MORBIDITY AND MORTALITY WEEKLY REPORT

Epidemiologic Notes and Reports

Unintentional Carbon Monoxide Poisoning Following a Winter Storm — Washington, January 1993

Carbon monoxide (CO) poisoning was a major health consequence of a severe storm that struck the Puget Sound region of western Washington state the morning of January 20, 1993. Wind gusts up to 94 miles per hour interrupted electrical power for an estimated 776,000 residents, and during the 4 nights following the storm, temperatures fell to near freezing. Because of the use of alternative sources of energy for indoor cooking and home heating, the risk of exposure to CO increased for many persons. This report summarizes cases of storm-related CO poisoning among persons who were initially evaluated at Seattle's Harborview Medical Center (HMC) or who

Post-storm surveillance

- Immediate action needs real-time data
  - Magnitude of problem
  - Track daily trends
- Plan interventions
  - Geographic distribution
  - High-risk groups
  - Modifiable factors

Chronic Joint Symptoms — Continued

4. CDC. Prevalence of arthritis—Arizona, Missouri, and Ohio, 1991–1992. MMWR 1994;43:305–9.
5. CDC. Health risks in America: gaining insight from the Behavioral Risk Factor Surveillance System. Revised edition. Atlanta, Georgia: US Department of Health and Human Services, CDC, 1997.
6. Shah BV. SUDAAN user's manual, release 6.0. Research Triangle Park, North Carolina: Research Triangle Institute, 1992.
7. Rao JK, Callahan LF, Helmick CG III. Characteristics of persons with self-reported arthritis and other rheumatic conditions who do not see a doctor. J Rheumatol 1997;24:169–73.
8. Lorig KR, Mazonson PD, Holman HR. Evidence suggesting that health education for self-management in patients with chronic arthritis has sustained health benefits while reducing health care costs. Arthritis Rheum 1993;36:439–46.
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Community Needs Assessment and Morbidity Surveillance Following an Ice Storm — Maine, January 1998

On January 7, 1998, an ice storm struck the northeastern United States and southeastern Canada. In Maine, 3 consecutive days of rain combined with ground temperatures consistently below freezing resulted in heavy accumulations of ice on trees and electric power lines. Falling trees and branches and breaking utility poles resulted in the loss of electrical power to an estimated 600,000 persons. Although the rain had stopped by January 11, temperatures declined to <10 F (<–12 C) over most of the state, exacerbating the danger. On January 16, an estimated 50,000 households, primarily in the interior portion of the state, remained without power. This report summarizes a community needs assessment and a study of emergency department (ED) visits conducted during the aftermath of this storm.

Health effects surveillance

- Case reports from clinicians
- Workers compensation claims data
- Poison Control call data of symptomatic illnesses
- Hospital Emergency Department data
- Pre-hospital EMS data
- Hyperbaric chamber data
- Hospital discharge data
- Vital Statistics mortality data
- Medical Examiner/Coroner records
- Media reports

Hyperbaric chamber data

- Case notification – day 2
  - Daily updates
- Case information
  - Geographic distribution
  - High-risk groups

Poison Control call data

- Case data reports – day 2
  - Daily updates
- Case information
  - Geographic distribution
  - High-risk groups

Hospital Emergency Department data

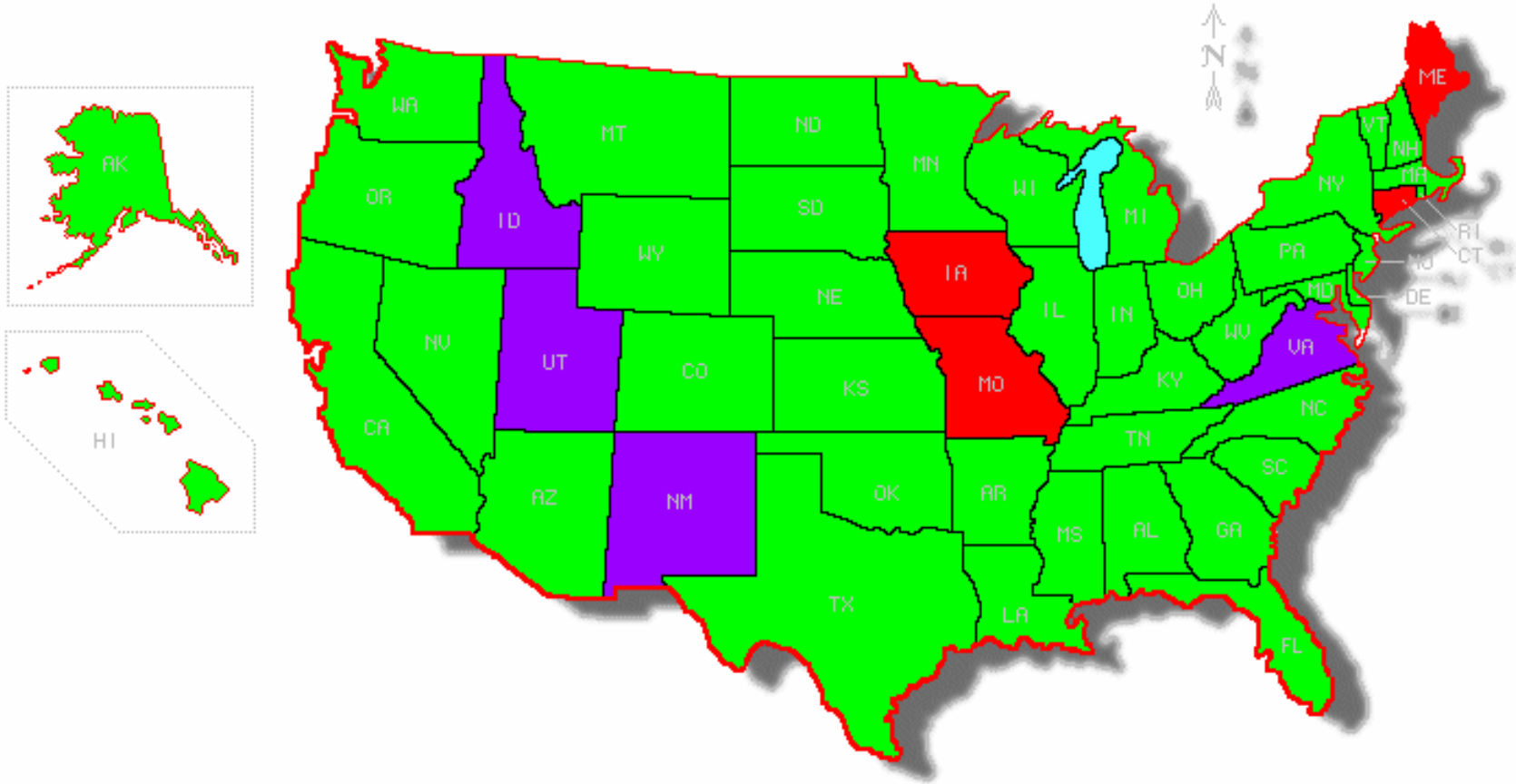
- "Syndromic surveillance" data systems
  - Pierce – reliable estimate on day 3; no subsequent cases
  - King – estimate on day 4, daily updates; counts revised on day 7 after de-duplication
  - Kitsap – system server down

Case reports from clinicians

- Notifiable conditions rule WAC 246-101
  - Provisional rules
- County rules – day 4
  - King, Snohomish
  - ED-based reports

States with CO Poisoning as a Notifiable Condition

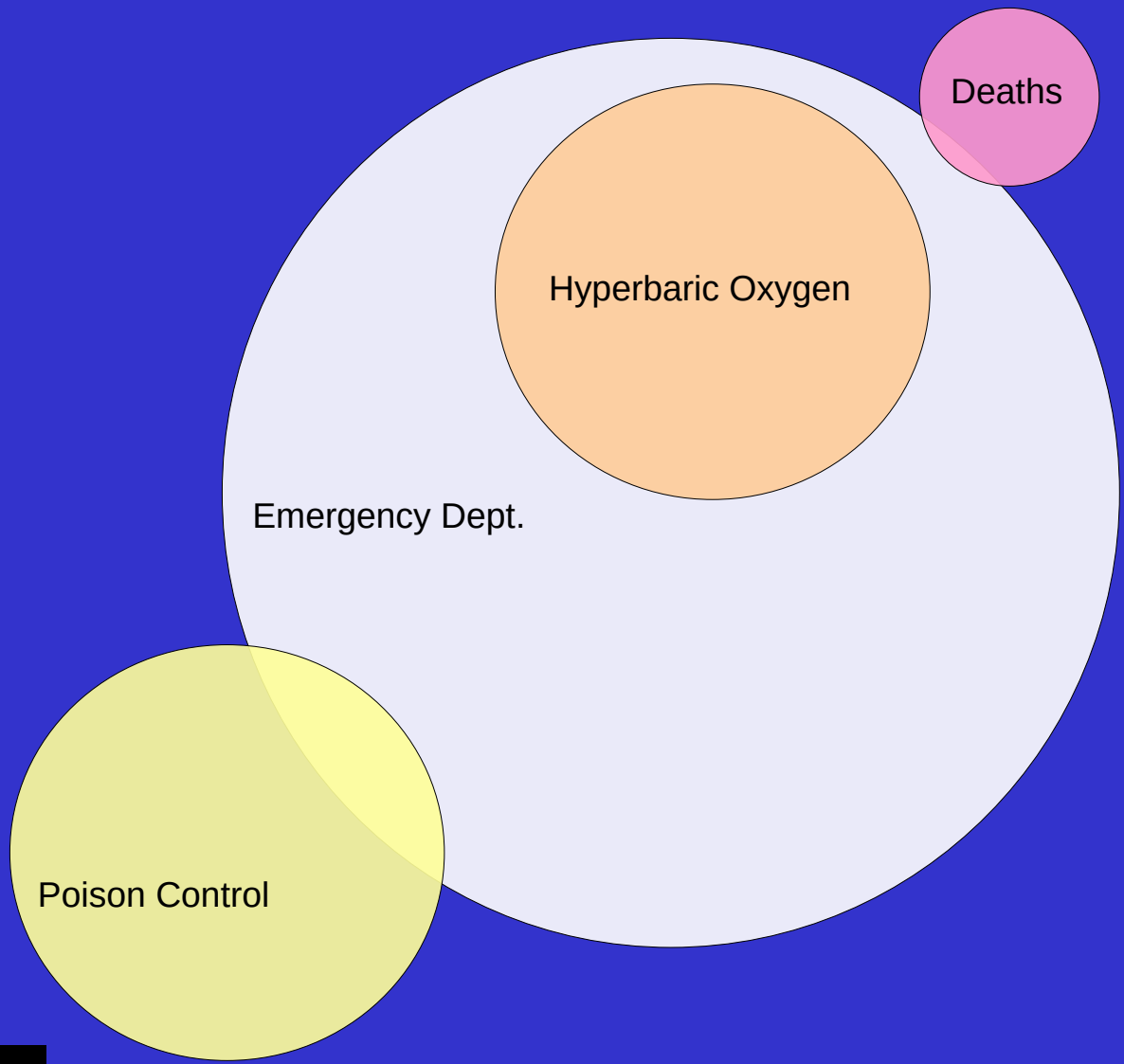
- Not Notifiable
- Notifiable
- Unknown*



NOTES:
*Unknown - Indicates that CO poisoning is not included on the state Notifiable Conditions list, however, direct conversation with the State Dept. indicates that it is reportable.

11-20-06

CO Poisoning outbreak cases



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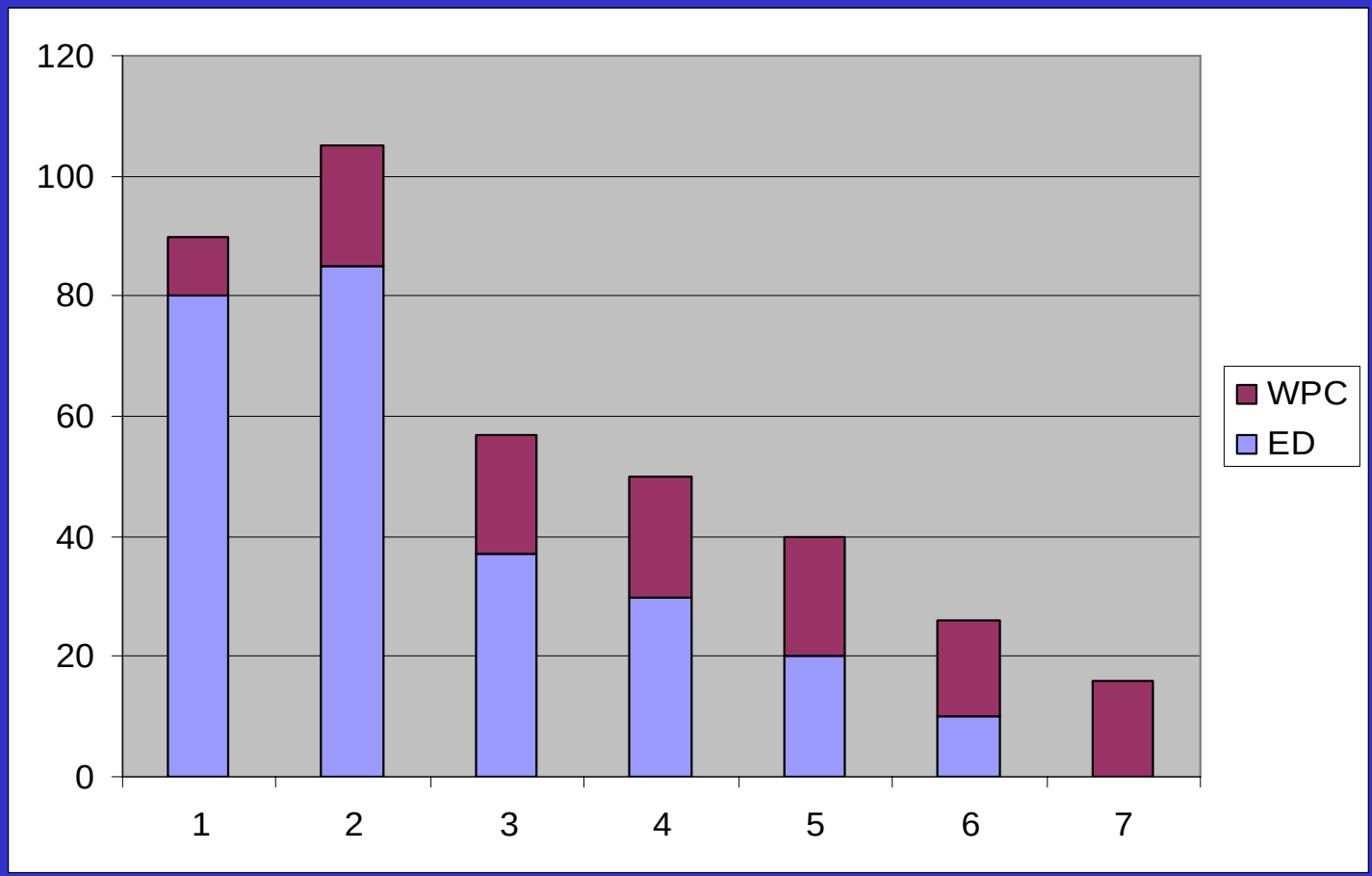
CO Poisoning cases by day



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Intervention

- Education
- CO detectors

Education: Communications

- Message distribution
  - Day 1 – email to 50+ media outlets
- Message coordination
  - State-local
  - DOH-EOC, Governor's news releases
- Languages: translation
  - CDC assistance

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Use of Carbon Monoxide Alarms to Prevent Poisonings During a Power Outage — North Carolina, December 2002

Each year in the United States, approximately 500 persons die from unintentional carbon monoxide (CO) poisoning (*1*), often during electric power outages caused by severe storms (*2–4*). Use of residential CO alarms has been recommended to reduce the incidence of CO poisoning (*5,6*). In September 2000, Mecklenburg County, North Carolina (2002 population: 722,367), adopted a public health ordinance requiring a CO alarm in the majority of residences; all-electric residences without attached garages (35.4% of all homes) were exempt. The ordinance also permitted use of alarms without battery back-up. On December 4, 2002, an ice storm caused 78.9% of county households to lose power. During the next 9 days, 124 cases of symptomatic CO poisoning were reported. To characterize these poisonings and the effectiveness of the CO alarm ordinance, local emergency physicians, fire department authorities, and CDC conducted an investigation. This report summarizes the results of that investigation, which determined that 96.2% of the severe poisonings occurred in homes with no reported functioning CO alarm. As a result of these findings, on October 8, 2003, Mecklenburg County officials amended the ordinance to require alarms with battery back-ups in all residences (*7*). Officials in other communities should consider

FIGURE 1. A firefighter uses a portable meter to measure the carbon monoxide (CO) level after CO exposure caused by a generator forced evacuation of an apartment building — Charlotte, North Carolina, 2003

States with CO Detector Laws

- - No Law
- - Entire State
- - Counties w/in State

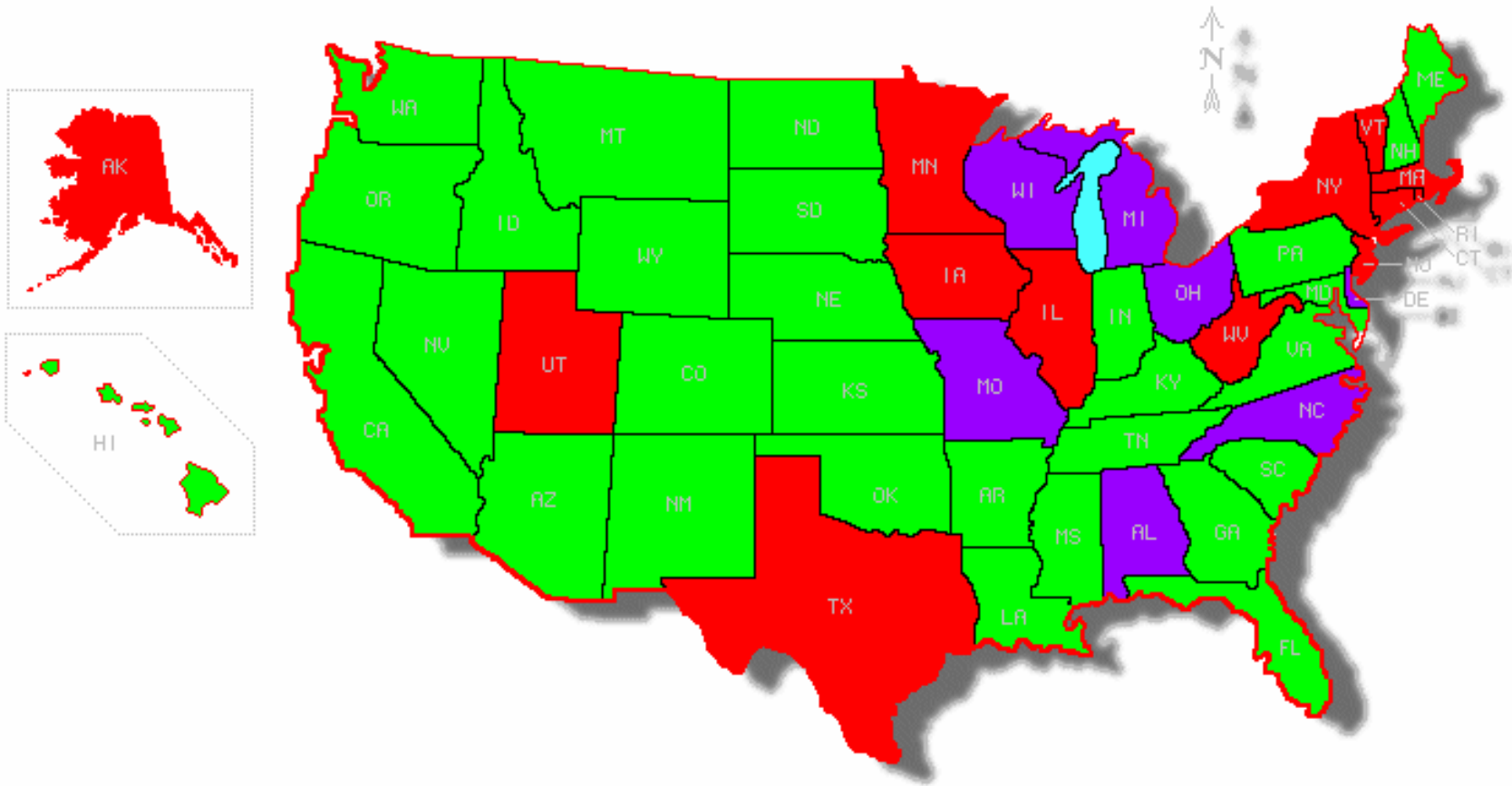

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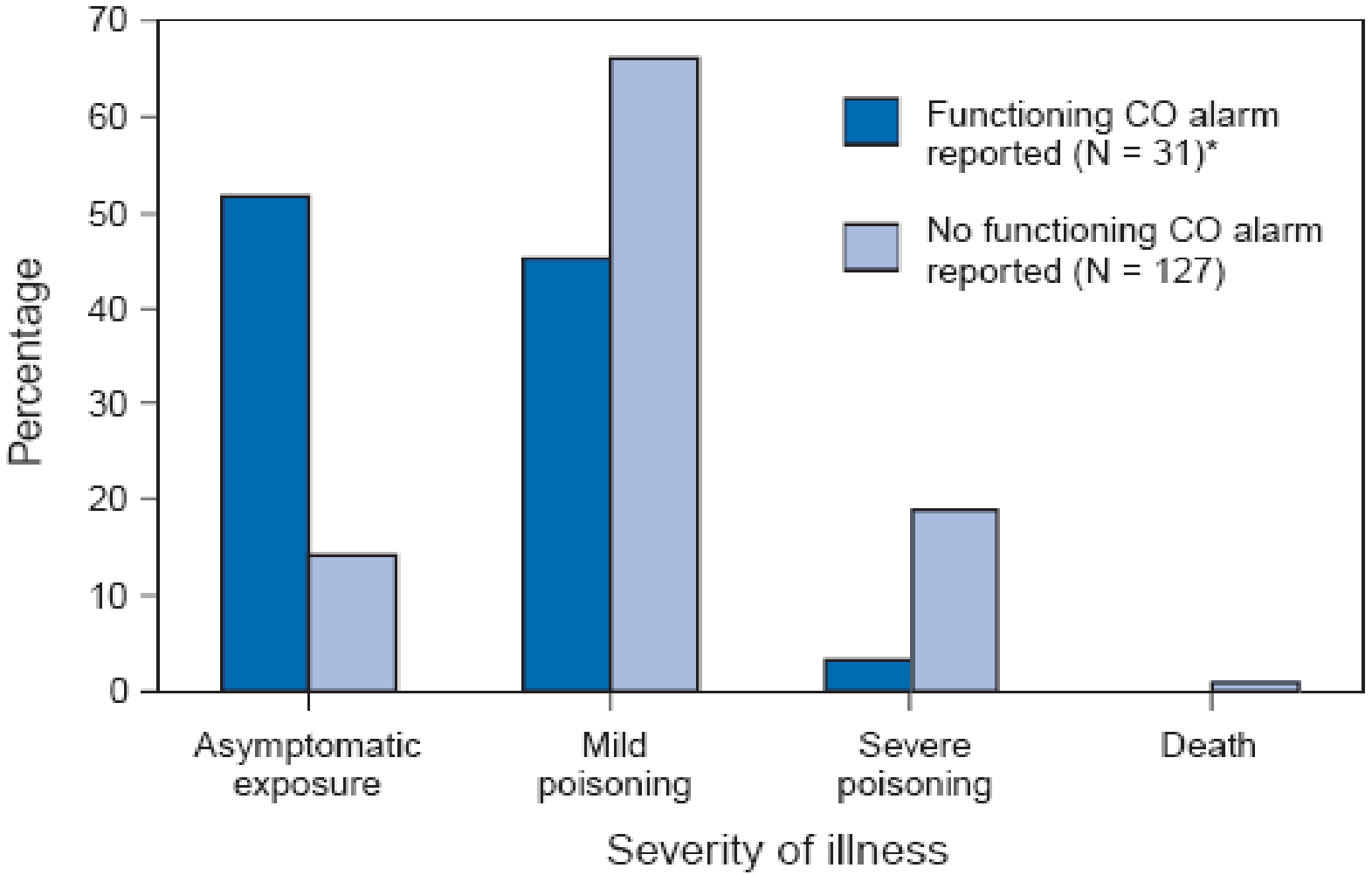
FIGURE 2. Percentage of persons exposed to household carbon monoxide (CO) during a power outage, by severity of illness and CO alarm status — Mecklenburg County, North Carolina, December 2002



CO detectors

- Thurston request (day 6)
  - Volunteer firefighters to distribute
  - Focus on areas with power outage
  - Free of charge to residents without power
- DOH and CDC attempt to obtain
- Stockpile of emergency supplies
  - Does not include detectors

Emergency Operations Centers

- State-local collaboration
- State EOC power outage data
  - County-based public utilities
  - Private firms span county lines
- Information flow, requests for assistance
  - Local health agency to local EOC to state EOC
  - State EOC to state health agency EOC

Partnerships

- Routine work of prevention
- Emergency preparedness
- Emergency response
- Special populations

Three simultaneous outbreaks

- Outbreak of CO poisoning
- Outbreak of blaming the victim
- Outbreak of “not my job”

Victim blaming

- Many persons, including some public health professionals, believe that only stupid people are poisoned by CO.
- The media were effective in victim-blaming initially, and only came around to seeing the importance of conveying prevention messages rather late in the outbreak.

The Seattle Times

If you don't have electricity

Do not burn charcoal or use gasoline generators indoors, including the garage. Never use gas ovens to heat your home. Do not use gas or kerosene heaters in closed rooms.

These things produce deadly carbon monoxide, which has killed several people since Thursday's storm.

For more information, call:
1-800-222-1222

Note to readers

Carbon-monoxide poisoning has killed six people and sickened scores of others in our community since Thursday's storm. In hope of preventing more tragedies, The Seattle Times, in cooperation with Public Health — Seattle & King County, has dedicated the top of today's front page to warning local residents in their native languages. In addition, you can help spread the word among your friends and neighbors. Use this page, or look online at seattletimes.com for a printable version that can be posted or handed out. Also, for more detailed information about the dangers of carbon monoxide, go to the Public Health Web site: www.metrokc.gov/health.

Nếu quý vị không có điện

Không đốt than củi hoặc dùng máy phát điện chạy bằng xăng trong nhà, kể cả nhà đậu xe. Không bao giờ nên dùng bếp lò đun gas để sưởi ấm nhà. Không dùng lò sưởi chạy bằng khí ga hoặc kerosene trong các phòng khép kín. Các chất này tạo ra khí carbon monoxide gây chết người và đã gây tử vong cho nhiều người kể từ cơn bão hôm thứ Năm.

Để biết thêm chi tiết, xin gọi số 1-800-222-1222.

(Vietnamese translation)

如果你家裏斷電

切勿在室內（包括在車房內）燒炭或使用汽油發電機。
切勿在家裏使用煤氣爐取暖。
切勿在密封的房間裏使用煤氣或煤油取暖器。
這些產品會產生致命的一氧化碳，自週四的風暴至今，已有數人因一氧化碳中毒而死亡。

想知道詳情，請致電 1-800-222-1222。

(Chinese translation)

Si usted no tiene electricidad

No queme carbón ni use generadores con gasolina dentro de la casa, esto incluye el garaje. Nunca use hornos a gas para calentar su casa. No use calentadores a gas o queroseno en habitaciones cerradas. Estas cosas producen monóxido de carbono, el cual ha causado la muerte de varias personas desde la tormenta del pasado jueves.

Para obtener mayor información, llame al 1-800-222-1222.

(Spanish translation)

Если у вас прекратилась подача электроэнергии

Во внутренних помещениях, в том числе в гараже, не жгите древесный уголь и не пользуйтесь генераторами, работающими на бензине. Не применяйте в закрытом помещении газовые или керосиновые обогреватели. Эти устройства вырабатывают смертоносный угарный газ, от которого с тех пор, как в четверг пронеслась буря, погибли несколько человек.

За дополнительной информацией обращайтесь по телефону 1-800-222-1222.

(Russian translation)

Haddii ay Koronradu kaa Maqantahay

Ha ku shidin dhuxusha ama matoorka korontada dhaliya aqalka gudihiisa, oo uu ku jiro garaashka. Marna ha u isticmaalin foornada gaaska ku shaqeysa in aad aqalka ku kululeysid. Ha ku isticmaalin qalalka xiran gaaska ama kuleylleyaasha ku shaqeysa kerosene-ka. Waxyaabahani waxaa ay dhaliyaan carbon monoxide-ka laga dhinto, kaasoo dhowr qof illay tan iyo duufaantii Khamiisti.

Haddii aad macluumaad dheeraad ah doonayaan, waxaad wacdaa 1-800-222-1222.

(Somali translation)

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Not my job

- Many public health professionals believe that emergency response to a non-infectious outbreak is something that someone else should do.

Data responsibilities

- Data analysts in LHAs most familiar with non-infectious conditions: assessment staff
  - Experienced with annual data files, not daily case information
- LHA staff collecting daily case data: mostly from communicable disease programs
  - Completely familiar with case finding in real-time, but least familiar with non-infectious conditions

Limitations of case study

- Some issues are particular to CO poisoning following power outage
  - no single point source for hazard/exposure
  - blaming the victim
- Most issues are not unique

Solutions?

- Multi-disciplinary collaboration
  - Cross-fertilization
  - Cross-training
- Emergency response protocols
  - Near-real-time data from county registrars
  - Near-real-time data from hospital EDs, EMS
  - Notifiable conditions rule (case data from clinicians)
  - Data sharing: state to/from local agencies
- Drills
- Stockpile detectors and educational materials

Discussion & questions