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Epidemiologic Notes and Reports

Occupational Burns Among Restaurant Workers — Colorado and Minnesota

Work-related burns are a leading cause of occupational injury in the United States (*1*). A substantial proportion of these burns occur among restaurant workers—often affecting adolescents working in fast-food establishments. This report summarizes investigations of restaurant-associated occupational burns by the state health departments in Colorado and Minnesota.

Colorado

Case report. On June 3, 1991, the Colorado Department of Health (CDH) was notified of a work-related burn sustained by a 20-year-old employee of a fast-food restaurant. The employee had been following the restaurant's standard procedure for cleaning exhaust filters located approximately 5 feet above a deep fryer. She had placed a wooden cover over three of the fryer's four bins, all four of which contained hot grease; no cover was available for the fourth bin. While standing on a chair she had placed on the wooden cover to reach and remove the filters, she fell, sustaining second- and third-degree burns over 10% of her body when she immersed her arm and shoulder in the hot grease contained in the uncovered fourth bin. She was hospitalized for 4 days and later required plastic surgery for scarring.

Investigation of occupational burns in the restaurant industry. Because of recent reports of incidents similar to the case reported here, CDH initiated an investigation into the occurrence of grease burns in the restaurant industry in Colorado. Health department investigators analyzed data from the CDH Occupational Hospitalized Burn Surveillance (OHBS) data base and the Colorado Workers' Compensation First Reports of Injury and Illness (FRII) data base for additional information about restaurant-associated burns.

The OHBS data base was established in 1989 by CDH, with support from CDC's National Institute for Occupational Safety and Health (NIOSH) Sentinel Event Notification System for Occupational Risk (SENSOR) program*, to initiate surveillance for

*From October 1987 through September 1992, NIOSH funded SENSOR projects in 10 states to develop state-based capacity for recognizing, reporting, investigating, and preventing selected occupational injuries and illnesses. These 10 states and four addtional states received renewed SENSOR funding commencing in October 1992.

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occupational burns that required inpatient hospital care[†]. Voluntary reporting by hospitals of all inpatients with occupational burns in Colorado began in February 1989; mandatory reporting began in May 1990.

From February 1989 through March 1993, CDH received 676 reports of burns occurring in Colorado that required inpatient hospital care. Of these, 226 (33%) were identified by the reporting hospitals as occupational; 29 (13%) occurred in 28 Colorado restaurants. The 29 burned employees ranged in age from 16 to 60 years (median: 26 years); 16 were male. Seventeen employees sustained grease burns. Of these, 15 (88%) were associated with use of deep fryers: in four incidents, the employee slipped on the floor and landed in the cooking grease in the fryer; in three, the employee fell into the fryer while standing on or jumping over it; in three, burns occurred during transport of grease to the disposal bin outside; in three, burns occurred when the employee lowered food into the fryer; and in two, burns occurred when the employee emptied grease from the fryer into plastic containers.

For the 29 patients, the proportion of body surface burned ranged from 1% to 30%. Five workers were burned on the face; seven, the hand(s); and eight, the feet; the remainder were burned on other parts of the body. Eight (28%) patients underwent excision and skin grafting for treatment of their injuries. Total costs for medical payments, lost wages, and compensation settlements (for permanent disability) for 24[§] of the 29 persons ranged from $1690 to $100,445 (mean: $17,426).

Follow-up workplace investigations by CDH identified several specific incidents associated with use of deep fryers, particularly older models, that increase the risk for inadvertent contact with hot grease: 1) changing exhaust filters located above fryers often requires employees to stand on fryers or other unstable surfaces; 2) filtering or replacing grease often requires manual opening of drain valves and use of open-top, metal collection vessels that must be hand-lifted and hand-carried to filtering systems or disposal bins; 3) lowering damp or frozen food into a hot fryer often causes the water droplets or ice crystals to boil explosively, resulting in splashback of hot grease, 4) cleaning a restaurant often requires moving a fryer when it and the contents are still hot, and 5) accumulating grease and water on the floors adjacent to a fryer increases the risk for slipping and falling into the fryer.

Data from Colorado Workers' Compensation FRII for 1989–1991 indicated that 36% (938/2596) of work-related thermal burns occurred in restaurants—a proportion seven times greater than that for any other single industry represented in the data. Thirty percent of the restaurant-associated thermal burns were coded by Workers' Compensation as grease burns.

Minnesota

Case 1. In February 1991, the Minnesota Department of Health (MDH) was notified of a work-related burn sustained by a 17-year-old waitress in a delicatessen who had slipped on a wet floor. As she fell, she stepped into a bucket of hot grease that had been placed on the floor while the grease in a deep fryer was being replaced. She was

[†] CDH is one of three state health departments conducting surveillance for persons hospitalized with occupational burns. The Oklahoma State Department of Health began surveillance in 1987, and the Oregon State Health Division obtained SENSOR funding to conduct surveillance in October 1992.

[§] Cost data were not available for the remainder of the reported cases.

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hospitalized for 3 days and required surgery for split-thickness skin grafting. She suffered permanent scarring of her burned ankle.

Case 2. On July 24, 1991, MDH was notified of a work-related burn sustained by a 16-year-old crew cook in a fast-food restaurant. He was pushing a container of hot grease from the kitchen to the outside for filtration. When he reached to hold open a door, the container slipped, the lid fell off, and hot grease spilled over much of his body. He sustained second- and third-degree burns to his ankles, arms, chest, and face and was hospitalized for 2 weeks. Scarring occurred on all burned areas.

Assessment of occupational burns among adolescent workers. To assess work-related injuries among adolescent (aged 13–17 years) workers in Minnesota, MDH conducted the Minnesota Adolescent Occupational Injury Study. Using data from the Minnesota Workers' Compensation FRII[¶], 742 adolescent workers injured during August 15, 1990–August 14, 1991, were identified. Of these, data for 534 (72%) were sufficient to evaluate the nature and severity of injury, demographics, and risk factors for injury.

Of the 534 reported work-related injuries, 71 (13%) were burns. Of the 11 reported hospitalizations (overall hospitalization rate: 2%), burns accounted for four (36%). Burns sustained in fast-food restaurants and in full-service restaurants constituted 28 (39%) and 26 (37%), respectively, of the 71 burn injuries. The most frequent source of burn injury occurring in fast-food restaurants was hot grease (14 [50%] of 28 injuries), followed by hot grills and other cooking equipment (seven [25%] injuries). In full-service restaurants, 11 (42%) of 26 burns were caused by hot grease and nine (35%) by hot water. Thirty-one adolescents (44%) suffered permanent scarring at the burn site.

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Editorial Note: Approximately 1.4 million persons in the United States sustain burns each year; of these, an estimated 54,000–108,000 are hospitalized (*2*). Work-related burns account for 20%–25% of all serious burns (*3*). Based on data from a Bureau of Labor Statistics survey, in 1985, 6% of all work-related thermal burns occurred among adolescent workers aged 16–19 years (*4*). As indicated by the investigations in Colorado and Minnesota, restaurant-related burns, especially those associated with use of deep fryers, continue to represent a major and preventable source of occupational burn morbidity, particularly among adolescents. These findings are consistent with the findings in other studies that emphasize the risk for burns associated with hot grease (*3,5*).

An estimated 400,000 commercial eating and drinking establishments in the United States employ approximately 6 million workers (*6*). In 1989, the Bureau of Labor Statistics ranked these establishments first in total number of recordable work-related injuries and illnesses; in 1991, they accounted for approximately 5% of on-the-job injuries and illnesses reported nationwide (*6*). In restaurants, thermal burns ac-

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¶Minnesota law requires that employers file a FRII for persons who miss work and/or are restricted from normal activities for 3 or more days or have permanent impairment resulting from a work-related injury or illness. These data are compiled in a centralized data base within the Minnesota Department of Labor and Industry. Data include personal identifiers of the injured worker, source and nature of injury, event type (e.g., fall or explosion), body part injured, and date of injury.

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counted for 12% of work-related injuries (*6*). Workers' Compensation FRII from 1987 through 1990 indicate that, in Colorado, thermal burns accounted for 9% of the injuries occurring in restaurants (Colorado Department of Labor, unpublished data); in this report, findings were similar in Minnesota.

The findings from the Minnesota Adolescent Occupational Injury Study help to define the risk for burn injuries among adolescent workers. Because a substantial number of adolescents are employed in the full-service and fast-food restaurant industries, they are at increased risk for sustaining burn injuries; however, this risk has not been sufficiently documented. These findings emphasize the need for improved surveillance for this problem, as well as improved design of engineering controls and work practices for the prevention of burns in the food-service industry.

To reduce risks associated with use of deep fryers, newer-model fryers have exhaust vents in closer proximity to the fryer and built-in grease filters (*5*). Employers should replace existing deep fryers with newer models equipped with these features, as well as with improved grease-disposal systems, automatic food-lowering devices, and associated vat covers. In addition, floor surfaces in restaurant kitchens should be slip-resistant and cleaned often with grease-cutting solutions.

When older-model deep fryers are used, employers should develop written safety guidelines for maintenance and routine operating procedures and ensure that employees adhere to the requirements; employees should receive formal training regarding these guidelines. In particular, no employee should be required or allowed to 1) stand on top of a hot deep fryer to clean ventilation components, 2) roll a fryer containing hot grease, 3) lift and carry a metal receptacle containing hot grease, or 4) work in proximity to hot fryers when the floor is wet.

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Current Trends

Alcohol Involvement in Pedestrian Fatalities — United States, 1982–1992

Pedestrian deaths constitute the second largest category of motor-vehicle–related fatalities (following vehicle-occupant deaths) and account for 14% of all traffic-associated deaths and approximately 3% of all traffic-associated injuries. In 1992, 5546 pedestrians were killed and 96,000 were injured in traffic crashes (*1,2*). Alcohol is an

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important determinant for both the likelihood of a motor vehicle colliding with a pedestrian and the outcomes for pedestrians in crashes (*3*). This report summarizes data from the Fatal Accident Reporting System of the National Highway Traffic Safety Administration (NHTSA) on trends in alcohol use in traffic fatalities involving pedestrians in the United States during 1982–1992.

NHTSA considers a fatal crash to be alcohol-related if either a driver or a nonoccupant (e.g., pedestrian) had a blood alcohol concentration (BAC) of ≥0.01 g/dL in a police-reported traffic crash. NHTSA defines a BAC ≥0.01 g/dL but ≤0.09 g/dL as a low alcohol level. A BAC of 0.10 g/dL is the statutory level of intoxication for drivers in most states, although 10 states have established lower levels (e.g., 0.08 g/dL) as defining driver intoxication. There is no statutory level of intoxication for pedestrians. Because BACs are not available for all drivers and nonoccupants involved in fatal crashes, NHTSA uses statistical models, based on discriminant function analysis, to estimate BACs of drivers and pedestrians where driver or nonoccupant BAC data are not available (*4*).

From 1982 through 1992, the number of pedestrians aged >14 years who were killed decreased 22%, from 6079 to 4770, with decreases during 1990–1992 accounting for most of this decline (Table 1). Each year, the percentage of drivers in these crashes who had consumed alcohol was substantially lower than the percentage of pedestrians who had consumed alcohol. In 1982, a BAC ≥0.10 g/dL (i.e., intoxication) was detected in 20% of the drivers involved in fatal pedestrian crashes, compared with 39% of the fatally injured pedestrians. By 1992, the percentage of drivers who were legally intoxicated decreased to 12%, and the percentage of pedestrians with BACs ≥0.10 g/dL had decreased to 36%.

Because NHTSA's models estimate BACs in only three ranges (0.00 g/dL, 0.01–0.09 g/dL, and ≥0.10 g/dL), additional data regarding BACs were obtained from

TABLE 1. Estimated total number of pedestrian* fatalities in motor-vehicle crashes and estimated number and percentage in whom alcohol was detected, and estimated total number of drivers in fatal pedestrian* crashes and estimated number and percentage in whom alcohol was detected, by year and blood alcohol concentration (BAC) level — United States, 1982–1992

	Pedestrian fatalities					Drivers involved in pedestrian fatalities				
	No.	BAC=0.01–0.09 g/dL		BAC≥0.10 g/dL		No.	BAC=0.01–0.09 g/dL		BAC≥0.10 g/dL	
Year	fatalities†	No.	(%)	No.	(%)	fatalities†	No.	(%)	No.	(%)
1982	6079	476	(7.8)	2395	(39.4)	5456	478	(8.8)	1089	(20.0)
1983	5645	451	(8.0)	2196	(38.9)	5107	417	(8.2)	950	(18.6)
1984	5830	427	(7.3)	2230	(38.3)	5363	404	(7.5)	938	(17.5)
1985	5639	474	(8.4)	2097	(37.2)	5169	381	(7.4)	794	(15.4)
1986	5636	460	(8.2)	2060	(36.6)	5210	394	(7.6)	804	(15.4)
1987	5667	459	(8.1)	2023	(35.7)	5224	387	(7.4)	754	(14.4)
1988	5767	422	(7.3)	2022	(35.1)	5291	391	(7.4)	758	(14.3)
1989	5604	446	(8.0)	2028	(36.2)	5155	369	(7.2)	725	(14.1)
1990	5544	381	(6.9)	2002	(36.1)	5127	348	(6.8)	734	(14.3)
1991	4948	331	(6.7)	1795	(36.3)	4609	335	(7.3)	610	(13.2)
1992	4770	332	(7.0)	1727	(36.2)	4468	284	(6.4)	533	(11.9)

*Aged >14 years.
†Includes those with 0.00 BAC.

Source: Fatal Accident Reporting System, National Highway Traffic Safety Administration, 1982–1992.

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individual states. In the 23 states that tested at least 75% of all fatally injured pedestrians aged >14 years during 1992, 40% of the pedestrians had consumed alcohol; the national prevalence estimate based on NHTSA's statistical models was 43% (Table 1). Of the fatally injured pedestrians who were tested in these states, BACs were low (0.01–0.09 g/dL) in 6%, high (0.10–0.19 g/dL) in 12%, and very high (≥0.20 g/dL) in 22%. Of the fatally injured pedestrians with BACs ≥0.01 g/dL, 55% had a BAC ≥0.20 g/dL, 30% had a BAC of 0.10–0.19 g/dL, and 15% had a BAC of 0.01–0.09 g/dL.

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Editorial Note: The findings in this report indicate that, since 1982, the percentage of drivers involved in fatal pedestrian crashes in whom alcohol was detected has decreased substantially; in comparison, the percentage of pedestrians involved in fatal crashes in whom alcohol was detected has decreased only slightly. These findings are similar to those reported by the American College of Surgeons' Major Trauma Outcome Study, in which 49% of seriously or fatally injured pedestrians consumed alcohol, and 24% had BACs >0.20 g/dL (NHTSA, US Department of Transportation, unpublished data, 1992). Substantial progress has been made in reducing drinking and driving in the United States (*5*), and the national health objectives for the year 2000 for reducing alcohol-related fatalities had already been surpassed by 1991 (objective 4.1) (*6*). Risk factors for death for alcohol-impaired pedestrians are not yet well defined (*7,8*).

Public health strategies that may assist in reducing alcohol-related pedestrian fatalities include increasing the priority of preventing pedestrian injuries for public health agencies, traffic safety offices, and law enforcement officials; separating pedestrians from traffic lanes using guard rails or overpasses; providing public education in high-risk locations such as center-city nightspots; increasing the availability of buses, taxis, and other forms of public transportation; and increasing training in responsible alcohol service for establishments that serve alcohol.

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Current Trends

Enumerating Deaths Among Homeless Persons: Comparison of Medical Examiner Data and Shelter-Based Reports — Fulton County, Georgia, 1991

Characteristics of causes of death and mortality patterns in homeless populations have been constrained by limitations in both the accuracy of estimates of the size of the homeless population and enumeration of the number of deaths of homeless persons (*1,2*). For example, studies of mortality among homeless persons in Fulton County (Atlanta), Georgia, based on medical examiner records estimated approximately 40 deaths of homeless persons annually (*1,3*); in contrast, a media report based on information supplied by shelters for homeless persons reported 191 deaths of homeless persons in Atlanta during 1991 (*4,5*). As a basis for improving characterization of mortality patterns in the homeless population of Fulton County, Emory University and CDC assessed the differences in the estimates of deaths among homeless persons that were obtained from medical examiner records and those based on death reports from shelters that are in or adjacent to Fulton County (1990 population: 648,951) during 1991. This report summarizes the findings of that study.

The office of the Fulton County Medical Examiner (FCME) and the Atlanta Task Force for the Homeless (ATFH) each attempt to monitor mortality in the homeless population of Fulton County (estimated homeless population: 10,000–15,000 [*3*]). Since 1987, the FCME has maintained computerized death investigation records that can be used to categorize a deceased person as homeless if the person resided in an official shelter for homeless persons, had no regular residential address, or resided at a place not generally recognized as a habitable dwelling. The ATFH, which defines a homeless person as a person with "no predictable address," maintains a list of names of homeless persons whom the FCME or shelters for homeless persons have reported to the ATFH as having died. However, there is no mechanism to enable the ATFH to routinely verify the occurrence or location of deaths reported to it by the shelters.

Fulton County death certificates were searched for persons who died in 1991 to locate records for persons who were categorized as homeless based on FCME investigations for deaths that occurred in 1991 or who were reported by the FCME or shelters to the ATFH as having died during 1991. Death certificates were reviewed to determine where death was pronounced, the agency affiliation of the certifier of death, alterations in the decedent's name during the death certificate filing process, and the number of certificates identifying decedents as homeless.

During 1991, the ATFH received reports of 188 deaths exclusive of stillbirths. Fulton County death certificates confirmed 37 (20%) deaths. Of the 37 confirmed deaths, 31 (84%) had been reported to the FCME. Of the six deaths not listed in FCME records, two were certified by the medical examiner in an adjacent county (death occurred in Fulton County but the incident leading to death occurred in the adjacent county), two

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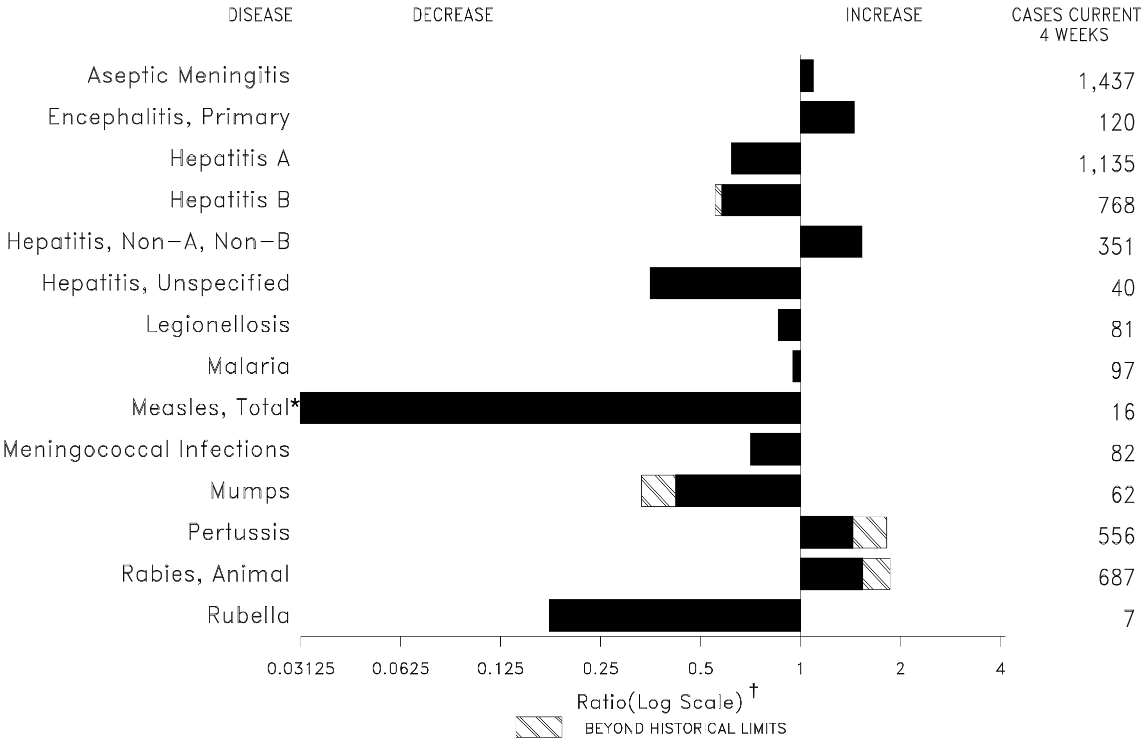
FIGURE I. Notifiable disease reports, comparison of 4-week totals ending September 18, 1993, with historical data — United States



*The large apparent decrease in reported cases of measles(total) reflects dramatic fluctuations in the historical baseline. (Ratio (log scale) for week thirty-seven is 0.03023).

†Ratio of current 4-week total to mean of 15 4-week totals (from previous, comparable, and subsequent 4-week periods for the past 5 years). The point where the hatched area begins is based on the mean and two standard deviations of these 4-week totals.

TABLE I. Summary — cases of specified notifiable diseases, United States, cumulative, week ending September 18, 1993 (37th Week)

	Cum. 1993		Cum. 1993
AIDS*	75,768	Measles: imported	43
Anthrax	-	indigenous	206
Botulism: Foodborne	8	Plague	7
Infant	47	Poliomyelitis, Paralytic§	-
Other	2	Psittacosis	42
Brucellosis	64	Rabies, human	1
Cholera	16	Syphilis, primary & secondary	18,110
Congenital rubella syndrome	7	Syphilis, congenital, age < 1 year¶	677
Diphtheria	-	Tetanus	28
Encephalitis, post-infectious	122	Toxic shock syndrome	172
Gonorrhea	269,805	Trichinosis	9
Haemophilus influenzae (invasive disease)†	854	Tuberculosis	14,453
Hansen Disease	118	Tularemia	95
Leptospirosis	28	Typhoid fever	232
Lyme Disease	4,722	Typhus fever, tickborne (RMSF)	331

*Updated monthly; last update September 11, 1993.
†Of 791 cases of known age, 258 (33%) were reported among children less than 5 years of age.
§Two (2) cases of suspected poliomyelitis have been reported in 1993; 4 of the 5 suspected cases with onset in 1992 were confirmed; the confirmed cases were vaccine associated.
¶Reports through first quarter of 1993.

TABLE II. Cases of selected notifiable diseases, United States, weeks ending September 18, 1993, and September 12, 1992 (37th Week)

Reporting Area	AIDS*	Aseptic Menin-gitis	Encephalitis		Gonorrhea		Hepatitis (Viral), by type				Legionel-losis	Lyme Disease
			Primary	Post-in-fectious			A	B	NA,NB	Unspeci-fied		
	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1992	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1993
UNITED STATES	75,768	7,860	554	122	269,805	348,787	14,928	8,593	3,398	438	831	4,722
NEW ENGLAND	3,666	231	13	5	5,843	7,362	346	369	387	10	41	1,330
Maine	113	23	2	-	63	65	13	10	4	-	4	6
N.H.	83	34	-	2	47	82	33	66	309	3	2	51
Vt.	48	30	4	-	18	19	4	7	2	-	1	5
Mass.	2,053	93	5	3	2,087	2,675	165	225	64	7	30	144
R.I.	248	51	2	-	297	512	61	17	8	-	4	203
Conn.	1,121	-	-	-	3,331	4,009	70	44	-	-	-	921
MID. ATLANTIC	17,807	522	40	8	32,313	38,548	746	952	252	4	164	2,367
Upstate N.Y.	2,783	267	28	5	6,009	7,573	249	289	160	1	54	1,277
N.Y. City	9,670	104	1	-	8,300	13,571	177	121	1	-	3	3
N.J.	3,272	-	-	-	5,091	5,508	211	269	61	-	25	532
Pa.	2,082	151	11	3	12,913	11,896	109	273	30	3	82	555
E.N. CENTRAL	6,022	1,281	131	25	51,804	64,953	1,677	1,037	458	11	214	54
Ohio	1,147	447	49	4	16,330	19,292	215	147	32	-	113	29
Ind.	685	152	14	11	5,614	6,147	494	166	8	1	40	14
Ill.	2,132	274	26	3	13,208	21,781	495	188	51	4	10	5
Mich.	1,468	376	32	7	12,594	14,632	151	300	333	6	43	6
Wis.	590	32	10	-	4,058	3,101	322	236	34	-	8	-
W.N. CENTRAL	2,563	486	22	1	13,648	18,471	1,699	464	111	11	60	136
Minn.	531	63	7	-	1,747	1,979	320	51	4	4	1	52
Iowa	149	86	3	1	658	1,205	37	19	7	1	8	7
Mo.	1,456	146	1	-	7,883	10,329	1,061	334	79	6	16	38
N. Dak.	1	12	3	-	38	58	63	-	-	-	1	2
S. Dak.	22	17	5	-	192	122	13	-	-	-	-	-
Nebr.	142	8	1	-	476	1,213	141	12	8	-	27	4
Kans.	262	154	2	-	2,654	3,565	64	48	13	-	7	33
S. ATLANTIC	15,987	1,749	139	53	71,896	104,867	884	1,640	469	59	155	666
Del.	279	50	3	-	1,004	1,253	9	125	93	-	10	313
Md.	1,884	178	23	-	11,739	10,923	126	199	14	5	37	120
D.C.	1,006	30	-	-	3,494	4,383	7	34	-	-	13	2
Va.	1,227	185	29	6	8,535	11,521	103	107	26	27	6	56
W. Va.	55	22	63	-	454	637	17	29	21	-	3	41
N.C.	918	171	18	-	17,707	17,606	53	224	55	-	20	66
S.C.	959	24	-	-	7,690	8,027	11	40	3	1	18	8
Ga.	2,173	112	1	-	4,660	31,126	67	150	73	-	27	30
Fla.	7,486	977	2	47	16,613	19,391	491	732	184	26	21	30
E.S. CENTRAL	1,999	487	24	7	31,590	35,132	201	904	673	1	34	17
Ky.	248	194	8	6	3,379	3,411	83	59	10	-	12	4
Tenn.	811	105	7	-	9,328	11,024	49	762	649	-	14	10
Ala.	584	129	1	-	11,416	12,417	44	78	4	1	2	3
Miss.	356	59	8	1	7,467	8,280	25	5	10	-	6	-
W.S. CENTRAL	7,634	907	42	2	32,237	38,417	1,510	1,198	217	132	23	44
Ark.	293	48	1	-	6,234	5,523	38	41	2	2	3	1
La.	981	64	5	-	8,616	10,818	58	162	96	3	3	1
Okla.	621	1	7	-	2,362	3,815	114	233	74	9	11	18
Tex.	5,739	794	29	2	15,025	18,261	1,300	762	45	118	6	24
MOUNTAIN	3,157	482	21	4	7,959	8,784	2,904	424	233	61	55	20
Mont.	23	-	-	1	53	83	58	4	2	-	5	-
Idaho	56	10	-	-	126	78	146	34	-	1	1	2
Wyo.	32	5	-	-	63	42	12	21	71	-	5	8
Colo.	1,061	140	10	-	2,555	3,206	687	53	39	35	6	-
N. Mex.	249	101	3	2	668	655	277	156	72	2	4	2
Ariz.	1,043	140	6	-	2,931	2,988	1,048	72	13	11	12	-
Utah	217	37	1	-	249	235	588	41	24	11	7	3
Nev.	476	49	1	1	1,314	1,497	88	43	12	1	15	5
PACIFIC	16,933	1,715	122	17	22,515	32,253	4,961	1,605	598	149	85	88
Wash.	1,153	-	1	-	2,730	2,838	559	163	140	8	9	3
Oreg.	620	-	-	-	1,157	1,205	68	25	11	-	-	2
Calif.	14,872	1,607	117	17	17,839	27,337	3,728	1,391	435	138	69	82
Alaska	49	16	3	-	412	485	547	8	9	-	-	-
Hawaii	239	92	1	-	377	388	59	18	3	3	7	1
Guam	-	2	-	-	38	49	2	2	-	1	-	-
P.R.	2,106	39	-	-	376	163	67	272	56	2	-	-
V.I.	35	-	-	-	79	72	-	4	-	-	-	-
Amer. Samoa	-	-	-	-	37	31	15	-	-	-	-	-
C.N.M.I.	-	3	-	-	58	61	-	1	-	1	-	-

N: Not notifiable U: Unavailable C.N.M.I.: Commonwealth of Northern Mariana Islands

*Updated monthly; last update September 11, 1993.

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending September 18, 1993, and September 12, 1992 (37th Week)

Reporting Area	Malaria	Measles (Rubeola) Indigenous		Imported*		Total	Meningococcal Infections	Mumps		Pertussis			Rubella		
	Cum. 1993	1993	Cum. 1993	1993	Cum. 1993	Cum. 1992	Cum. 1993	1993	Cum. 1993	1993	Cum. 1993	Cum. 1992	1993	Cum. 1993	Cum. 1992
UNITED STATES	797	-	206	1	43	2,139	1,721	16	1,176	144	3,307	1,792	1	156	133
NEW ENGLAND	59	-	57	-	5	55	96	-	8	12	563	157	-	1	6
Maine	2	-	2	-	-	3	5	-	-	-	19	8	-	1	1
N.H.	6	-	2	-	-	13	12	-	-	2	228	31	-	-	-
Vt.	1	-	30	-	1	-	5	-	-	3	61	7	-	-	-
Mass.	29	-	14	-	3	14	54	-	2	-	199	76	-	-	-
R.I.	2	-	-	-	1	21	1	-	2	-	6	1	-	-	4
Conn.	19	-	9	-	-	4	19	-	4	7	50	34	-	-	1
MID. ATLANTIC	119	-	10	-	6	202	204	1	91	28	366	83	-	49	10
Upstate N.Y.	44	-	-	-	2	111	91	-	33	-	158	45	-	9	7
N.Y. City	24	-	5	-	2	54	19	-	2	-	7	9	-	22	-
N.J.	31	-	5	-	2	37	33	-	8	-	35	29	-	13	3
Pa.	20	-	-	-	-	-	61	1	48	28	166	-	-	5	-
E.N. CENTRAL	48	-	15	-	6	60	264	2	168	49	670	289	-	5	9
Ohio	10	-	5	-	3	6	76	2	65	36	257	47	-	1	-
Ind.	3	-	-	-	-	20	45	-	3	-	63	22	-	1	-
Ill.	25	-	5	-	-	17	73	-	41	-	151	33	-	-	8
Mich.	10	-	5	-	1	13	42	-	56	13	55	8	-	2	1
Wis.	-	-	-	-	2	4	28	-	3	-	144	179	-	1	-
W.N. CENTRAL	22	-	1	-	2	11	112	-	38	3	294	160	-	1	8
Minn.	4	-	-	-	-	10	7	-	2	-	147	33	-	-	-
Iowa	3	-	-	-	-	1	18	-	7	3	23	5	-	-	3
Mo.	7	-	1	-	-	-	45	-	22	-	89	73	-	1	1
N. Dak.	2	-	-	-	-	-	3	-	5	-	3	13	-	-	-
S. Dak.	2	-	-	-	-	-	3	-	-	-	8	11	-	-	-
Nebr.	3	-	-	-	-	-	9	-	1	-	9	7	-	-	-
Kans.	1	-	-	-	2	-	27	-	1	-	15	18	-	-	4
S. ATLANTIC	220	-	23	1	6	125	328	6	369	18	336	117	-	9	13
Del.	2	-	1	-	-	1	11	-	5	1	13	6	-	2	-
Md.	31	-	-	-	4	16	42	3	68	4	104	20	-	2	5
D.C.	10	-	-	-	-	-	5	1	1	-	6	1	-	-	-
Va.	20	-	-	1†	2	15	33	-	21	6	48	10	-	-	-
W. Va.	2	-	-	-	-	-	12	1	15	-	9	7	-	-	1
N.C.	91	-	-	-	-	24	56	-	195	1	53	22	-	-	-
S.C.	1	-	-	-	-	29	30	-	15	2	12	9	-	-	2
Ga.	13	-	-	-	-	3	73	-	14	2	19	14	-	-	-
Fla.	50	-	22	-	-	37	66	1	35	2	72	28	-	5	5
E.S. CENTRAL	24	-	1	-	-	460	105	-	40	1	232	24	-	-	1
Ky.	4	-	-	-	-	443	19	-	-	-	20	1	-	-	-
Tenn.	9	-	-	-	-	-	27	-	11	1	151	6	-	-	1
Ala.	6	-	1	-	-	-	34	-	22	-	50	14	-	-	-
Miss.	5	-	-	-	-	17	25	-	7	-	11	3	-	-	-
W.S. CENTRAL	19	-	7	-	3	1,090	165	6	172	5	106	192	-	17	6
Ark.	3	-	-	-	-	-	17	-	4	-	7	12	-	-	-
La.	2	-	1	-	-	-	30	1	16	-	8	7	-	1	-
Okla.	4	-	-	-	-	11	25	1	11	5	69	27	-	1	-
Tex.	10	-	6	-	3	1,079	93	4	141	-	22	146	-	15	6
MOUNTAIN	27	-	3	-	1	28	140	-	48	11	291	271	1	8	7
Mont.	2	-	-	-	-	-	12	-	-	-	4	4	-	-	-
Idaho	1	-	-	-	-	-	10	-	5	3	96	39	-	1	1
Wyo.	-	U	-	U	-	1	2	U	2	U	1	-	U	-	-
Colo.	16	-	2	-	1	22	27	-	14	6	84	27	-	-	1
N. Mex.	5	-	-	-	-	2	4	N	N	-	33	67	-	-	-
Ariz.	-	-	-	-	-	3	67	-	7	-	43	108	-	2	2
Utah	1	-	-	-	-	-	11	-	4	2	27	24	1	4	1
Nev.	2	-	1	-	-	-	7	-	16	-	3	2	-	1	2
PACIFIC	259	-	89	-	14	108	307	1	242	17	449	499	-	66	73
Wash.	23	-	-	-	-	10	57	-	10	6	48	155	-	-	6
Oreg.	4	-	-	-	-	3	22	N	N	2	13	30	-	3	1
Calif.	226	-	78	-	4	54	207	1	206	9	373	288	-	36	44
Alaska	1	-	-	-	1	9	13	-	8	-	5	7	-	1	-
Hawaii	5	-	11	-	9	32	8	-	18	-	10	19	-	26	22
Guam	1	U	2	U	-	10	1	U	6	U	-	-	U	-	2
P.R.	-	-	224	-	-	339	7	-	2	-	2	12	-	-	-
V.I.	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-
Amer. Samoa	-	-	1	-	-	-	-	-	-	-	2	6	-	-	-
C.N.M.I.	-	-	-	-	1	2	-	-	12	-	1	1	-	-	-

*For measles only, imported cases include both out-of-state and international importations.

N: Not notifiable U: Unavailable † International § Out-of-state

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending September 18, 1993, and September 12, 1992 (37th Week)

Reporting Area	Syphilis (Primary & Secondary)		Toxic-Shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1993	Cum. 1992	Cum. 1993	Cum. 1993	Cum. 1992	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1993
UNITED STATES	18,110	24,293	172	14,453	15,992	95	232	331	6,248
NEW ENGLAND	282	482	11	354	318	-	21	4	1,079
Maine	4	5	2	27	19	-	-	-	-
N.H.	26	33	2	9	14	-	1	-	75
Vt.	1	1	1	4	4	-	-	-	19
Mass.	103	238	5	196	158	-	14	4	440
R.I.	12	24	1	39	23	-	-	-	-
Conn.	136	181	-	79	100	-	6	-	545
MID. ATLANTIC	1,703	3,383	30	3,334	3,871	1	47	23	2,391
Upstate N.Y.	145	257	15	323	496	1	10	4	1,839
N.Y. City	816	1,900	1	1,983	2,263	-	26	-	-
N.J.	236	431	-	546	657	-	8	10	302
Pa.	506	795	14	482	455	-	3	9	250
E.N. CENTRAL	2,646	3,665	40	1,352	1,557	4	29	11	86
Ohio	857	562	16	230	235	-	6	7	5
Ind.	226	199	1	154	123	1	1	1	8
Ill.	821	1,654	6	580	779	2	16	1	15
Mich.	426	693	17	324	355	1	5	2	14
Wis.	316	557	-	64	65	-	1	-	44
W.N. CENTRAL	1,116	1,033	11	331	386	31	2	16	265
Minn.	55	64	2	41	112	-	-	1	37
Iowa	33	37	5	38	27	-	-	5	47
Mo.	914	789	1	176	169	12	2	7	12
N. Dak.	1	1	-	5	7	-	-	-	51
S. Dak.	1	-	-	11	18	15	-	2	36
Nebr.	10	24	-	14	16	1	-	-	7
Kans.	102	118	3	46	37	3	-	1	75
S. ATLANTIC	4,902	6,654	22	2,557	2,924	2	36	152	1,482
Del.	85	154	1	32	36	-	1	1	113
Md.	268	471	1	273	251	-	8	11	443
D.C.	249	298	-	119	84	-	-	-	14
Va.	464	546	6	299	265	-	3	8	277
W. Va.	11	14	-	61	72	-	-	6	68
N.C.	1,383	1,748	3	357	375	1	2	87	73
S.C.	730	911	-	283	297	-	-	10	114
Ga.	816	1,313	2	554	624	-	1	22	334
Fla.	896	1,199	9	579	920	1	21	7	46
E.S. CENTRAL	2,810	3,038	9	927	1,028	4	5	43	160
Ky.	233	109	2	264	275	-	1	5	13
Tenn.	802	824	3	144	283	3	1	25	72
Ala.	601	1,075	2	351	285	1	3	4	75
Miss.	1,174	1,030	2	168	185	-	-	9	-
W.S. CENTRAL	3,888	4,372	2	1,649	1,840	38	4	72	409
Ark.	563	637	-	130	137	23	-	4	28
La.	1,861	1,807	-	-	138	-	1	1	5
Okla.	289	247	2	109	112	12	-	63	57
Tex.	1,175	1,681	-	1,410	1,453	3	3	4	319
MOUNTAIN	177	255	10	367	421	10	8	10	139
Mont.	1	7	-	15	-	5	-	1	17
Idaho	-	1	1	9	17	-	-	-	6
Wyo.	7	3	-	2	-	2	-	8	18
Colo.	51	38	2	32	30	-	5	1	23
N. Mex.	24	29	-	46	61	1	1	-	7
Ariz.	78	129	1	160	192	-	2	-	51
Utah	4	7	4	23	60	1	-	-	4
Nev.	12	41	2	80	61	1	-	-	13
PACIFIC	586	1,411	37	3,582	3,647	5	80	-	237
Wash.	44	68	7	180	214	1	4	-	-
Oreg.	53	31	-	77	90	2	-	-	-
Calif.	478	1,300	30	3,106	3,113	2	73	-	220
Alaska	6	4	-	39	47	-	-	-	17
Hawaii	5	8	-	180	183	-	3	-	-
Guam	1	3	-	28	58	-	-	-	-
P.R.	387	243	-	185	174	-	-	-	30
V.I.	34	51	-	2	3	-	-	-	-
Amer. Samoa	-	-	-	2	-	-	-	-	-
C.N.M.I.	3	5	-	23	44	-	-	-	-

U: Unavailable

TABLE III. Deaths in 121 U.S. cities,* week ending September 18, 1993 (37th Week)

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	519	337	100	55	17	10	35
Boston, Mass.	145	89	31	19	3	3	18
Bridgeport, Conn.	37	25	7	3	2	-	1
Cambridge, Mass.	27	18	5	4	-	-	2
Fall River, Mass.	19	13	3	2	-	1	-
Hartford, Conn.	49	29	8	7	4	1	-
Lowell, Mass.	19	12	4	3	-	-	1
Lynn, Mass.	8	6	2	-	-	-	-
New Bedford, Mass.	12	9	3	-	-	-	-
New Haven, Conn.	41	25	3	5	7	1	-
Providence, R.I.	34	25	8	1	-	-	-
Somerville, Mass.	8	5	2	1	-	-	1
Springfield, Mass.	40	27	5	4	1	3	4
Waterbury, Conn.	27	22	4	1	-	-	1
Worcester, Mass.	53	32	15	5	-	1	7
MID. ATLANTIC	2,398	1,494	433	332	65	74	126
Albany, N.Y.	41	27	7	5	-	2	3
Allentown, Pa.	28	17	9	2	-	-	-
Buffalo, N.Y.	100	53	21	18	4	4	-
Camden, N.J.	28	17	4	6	-	1	4
Elizabeth, N.J.	10	9	-	1	-	-	3
Erie, Pa.§	51	38	8	3	1	1	3
Jersey City, N.J.	45	30	7	8	-	-	3
New York City, N.Y.	1,299	769	253	200	43	34	53
Newark, N.J.	73	36	14	19	2	2	5
Paterson, N.J.	18	3	8	6	-	1	-
Philadelphia, Pa.	295	186	46	34	12	17	18
Pittsburgh, Pa.§	71	51	12	8	-	-	6
Reading, Pa.	U	U	U	U	U	U	U
Rochester, N.Y.	111	90	10	5	1	5	13
Schenectady, N.Y.	19	14	4	1	-	-	1
Scranton, Pa.§	19	17	2	-	-	-	1
Syracuse, N.Y.	112	83	17	6	-	6	5
Trenton, N.J.	30	20	6	3	1	-	1
Utica, N.Y.	23	20	1	2	-	-	2
Yonkers, N.Y.	25	14	4	5	1	1	5
E.N. CENTRAL	2,365	1,505	403	240	141	75	94
Akron, Ohio	66	47	9	4	1	5	-
Canton, Ohio	29	26	3	-	-	-	1
Chicago, Ill.	503	190	98	93	97	25	10
Cincinnati, Ohio	161	111	28	14	5	3	12
Cleveland, Ohio	128	79	21	14	6	8	1
Columbus, Ohio	238	160	46	21	4	7	14
Dayton, Ohio	117	89	19	7	1	1	8
Detroit, Mich.	260	152	48	45	8	7	3
Evansville, Ind.	36	34	2	-	-	-	2
Fort Wayne, Ind.	79	57	11	6	2	3	-
Gary, Ind.	25	9	6	8	1	-	-
Grand Rapids, Mich.	72	46	15	5	2	4	4
Indianapolis, Ind.	180	122	34	14	4	6	14
Madison, Wis.	32	25	3	-	4	-	1
Milwaukee, Wis.	137	107	23	2	3	2	11
Peoria, Ill.	44	39	5	-	-	-	1
Rockford, Ill.	54	43	10	1	-	-	1
South Bend, Ind.	60	48	8	3	1	-	5
Toledo, Ohio	100	85	7	3	2	3	6
Youngstown, Ohio	44	36	7	-	-	1	-
W.N. CENTRAL	664	495	89	44	20	16	32
Des Moines, Iowa	U	U	U	U	U	U	U
Duluth, Minn.	33	29	4	-	-	-	4
Kansas City, Kans.	12	9	2	-	-	1	-
Kansas City, Mo.	73	56	11	5	1	-	4
Lincoln, Nebr.	34	23	7	3	-	1	2
Minneapolis, Minn.	196	148	25	14	5	4	16
Omaha, Nebr.	84	67	9	5	-	3	-
St. Louis, Mo.	136	98	15	9	9	5	3
St. Paul, Minn.	51	38	7	1	3	2	3
Wichita, Kans.	45	27	9	7	2	-	-

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	≥65	45-64	25-44	1-24	<1	
S. ATLANTIC	1,159	692	234	149	44	39	50
Atlanta, Ga.	212	127	43	29	6	7	6
Baltimore, Md.	196	117	32	34	8	5	16
Charlotte, N.C.	58	31	12	8	6	1	-
Jacksonville, Fla.	120	67	25	17	3	8	4
Miami, Fla.	102	52	27	17	3	3	-
Norfolk, Va.	71	43	16	3	3	6	3
Richmond, Va.	68	38	15	10	5	-	2
Savannah, Ga.	50	36	8	2	4	-	4
St. Petersburg, Fla.	65	39	15	4	2	5	5
Tampa, Fla.	195	125	39	23	4	3	10
Washington, D.C.	U	U	U	U	U	U	U
Wilmington, Del.	22	17	2	2	-	1	-
E.S. CENTRAL	697	438	155	64	31	9	42
Birmingham, Ala.	122	74	33	7	5	3	3
Chattanooga, Tenn.	66	45	11	7	3	-	5
Knoxville, Tenn.	54	37	12	3	2	-	3
Lexington, Ky.	67	41	17	6	3	-	3
Memphis, Tenn.	148	97	32	12	7	-	9
Mobile, Ala.	90	57	14	11	6	2	8
Montgomery, Ala.	40	29	6	4	-	1	1
Nashville, Tenn.	110	58	30	14	5	3	10
W.S. CENTRAL	1,518	912	309	187	69	41	74
Austin, Tex.	82	52	13	9	7	1	4
Baton Rouge, La.	40	27	9	3	1	-	-
Corpus Christi, Tex.	51	31	12	5	2	1	1
Dallas, Tex.	200	121	44	24	7	4	1
El Paso, Tex.	76	44	19	8	4	1	5
Ft. Worth, Tex.	90	53	15	12	3	7	7
Houston, Tex.	343	182	76	60	16	9	38
Little Rock, Ark.	74	45	12	6	6	5	1
New Orleans, La.	185	106	39	27	7	6	-
San Antonio, Tex.	200	132	34	20	9	5	11
Shreveport, La.	86	61	16	6	3	-	3
Tulsa, Okla.	91	58	20	7	4	2	3
MOUNTAIN	866	582	168	76	18	21	37
Albuquerque, N.M.	118	82	16	13	3	4	2
Colo. Springs, Colo.	52	37	11	1	1	2	4
Denver, Colo.	109	83	19	4	1	2	6
Las Vegas, Nev.	156	87	50	16	1	1	8
Ogden, Utah	25	18	5	2	-	-	-
Phoenix, Ariz.	164	106	25	18	6	9	10
Pueblo, Colo.	15	9	2	4	-	-	-
Salt Lake City, Utah	69	49	10	5	3	2	4
Tucson, Ariz.	158	111	30	13	3	1	3
PACIFIC	1,887	1,228	311	241	63	42	101
Berkeley, Calif.	9	8	-	1	-	-	-
Fresno, Calif.	86	58	12	5	6	5	2
Glendale, Calif.	17	15	-	2	-	-	2
Honolulu, Hawaii	77	54	10	8	3	2	3
Long Beach, Calif.	86	52	19	11	2	2	8
Los Angeles, Calif.	478	304	83	68	17	4	12
Pasadena, Calif.	26	15	3	4	1	3	-
Portland, Oreg.	134	92	16	16	7	3	5
Sacramento, Calif.	168	108	31	19	3	7	9
San Diego, Calif.	150	94	19	27	8	2	27
San Francisco, Calif.	160	90	37	30	1	2	2
San Jose, Calif.	184	119	35	20	6	4	17
Santa Cruz, Calif.	27	22	3	2	-	-	3
Seattle, Wash.	152	99	24	18	5	6	3
Spokane, Wash.	51	40	5	4	1	1	5
Tacoma, Wash.	82	58	14	6	3	1	3
TOTAL	12,073¶	7,683	2,202	1,388	468	327	591

*Mortality data in this table are voluntarily reported from 121 cities in the United States, most of which have populations of 100,000 or more. A death is reported by the place of its occurrence and by the week that the death certificate was filed. Fetal deaths are not included.
†Pneumonia and influenza.
§Because of changes in reporting methods in these 3 Pennsylvania cities, these numbers are partial counts for the current week. Complete counts will be available in 4 to 6 weeks.
¶Total includes unknown ages.
U: Unavailable.

Deaths Among Homeless Persons — Continued

were certified by private physicians, and two were certified by physicians at the county public hospital. Of three deaths reported to but not certified by the FCME, two were certified by physicians at the county public hospital, and one was certified by the medical examiner in an adjacent county (death occurred in Fulton County but the incident that led to death occurred in the adjacent county). Medical examiners certified 31 (84%) of all deaths.

Of the 37 decedents, eight (22%) were pronounced dead by the FCME, two (5%) were pronounced dead at private hospitals, and 27 (73%) were pronounced dead at the county public hospital. A nonshelter, residential address was listed as the home address on 28 death certificates (76%); five (14%) death certificates for homeless persons contained information alluding to the homeless condition of the decedent. The address was listed as unknown for four (11%). Two (5%) of 37 death certificates listed the decedent's name differently than it appeared in FCME or shelter records.

Reported by: R Hanzlick, MD, Dept of Pathology and Laboratory Medicine, Emory Univ School of Medicine; Fulton County Medical Examiner's Office; Fulton County Vital Records Office; Atlanta Task Force for the Homeless. Surveillance and Programs Br, Div of Environmental Hazards and Health Effects, National Center for Environmental Health, CDC.

Editorial Note: In Fulton County, no routine, comprehensive mechanism exists to document deaths of homeless persons that are unknown to both the FCME and shelters for homeless persons. Therefore, the sensitivity of medical examiner and shelter data for enumerating deaths among homeless persons cannot be clearly established.

The difference in the number of death certificates filed for homeless persons in Fulton County and the number of deaths reported by shelters may reflect factors such as transiency (i.e., death in a county other than Fulton County) and the use of aliases; in addition, some persons may not have died during the period studied. Because only two of 37 death certificates involved changes of decedents' names, the use of aliases is unlikely to be the sole explanation. However, because the purpose of this study was to compare the usefulness of FCME data and shelter reports for enumerating deaths of homeless persons in Fulton County only, a determination was not made of the number of deaths reported by shelters that occurred in other counties.

If a mechanism had been in place to routinely document, in a retrievable form, when homeless persons were pronounced dead at the county public hospital, 95% of the decedents in this report could have been detected through medical examiner or county hospital records. Death certifiers or funeral directors (who often complete the residential address and personal information on death certificates) also could assist in documenting when a homeless person dies by indicating homelessness on the certificate—either in place of or in addition to a previous residential or current shelter address. Development of a mechanism to verify the occurrence and location of deaths reported by shelters also may assist in public health monitoring, particularly if information is included regarding the county of death.

Using the existence of a completed death certificate filed in Fulton County as the standard, shelter-based data were slightly more sensitive than FCME data for enumerating deaths that occurred in Fulton County among the homeless population; however, death reports from shelters were less specific for that purpose. As an alternative to shelter-based reports, and especially because they contain cause-of-death information, medical examiner records may be useful to agencies that monitor mortality of the homeless and that plan mortality-prevention strategies for these persons.

Deaths Among Homeless Persons — Continued

Additional efforts are required in different geographic areas or jurisdictions to enumerate all deaths of homeless persons, to evaluate the sensitivity of medical examiner data and shelter-based reports for detecting such deaths, and to assist in planning efforts for public health services for homeless persons.

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Epidemiologic Notes and Reports

Carbon Monoxide Poisoning Associated with a Propane-Powered Floor Burnisher — Vermont, 1992

On July 28, 1992, two employees of a pharmacy in Vermont fainted within four hours after arriving for work; at a local hospital emergency department, carbon monoxide (CO) poisoning was diagnosed based on elevated carboxyhemoglobin (HbCO) levels. The pharmacy was evacuated, and the remaining eight employees were transported to the hospital for evaluation. Further investigation by the Vermont Department of Health (VDH) revealed that, on July 24, one of the employees had fainted, but CO poisoning was not suspected, and vasovagal syncope was diagnosed. This report summarizes the investigation of these cases by VDH.

A case of CO poisoning was defined as an arterial HbCO ≥2% (for nonsmokers) or ≥9% (for smokers) (*1*) in an employee who worked at the pharmacy on July 28. Based on analysis of arterial blood samples, nine of the 10 employees met the case definition; six were women. The mean age was 26.8 years (range: 17–42 years). Reported symptoms included headache (nine patients), lightheadedness (seven), tunnel vision (five), nausea/vomiting (four), syncope (two), difficulty breathing (two), chest pain (two), and decreased hearing (one). Serum samples were taken from six case-patients within 1½ hours of exposure and from the other three case-patients within 3 hours of exposure. Mean HbCO was 16.6% (range: 6.7%–25.3%). Three patients received hyperbaric oxygen therapy: one had psychometric test abnormalities, and two had syncope without psychometric testing. All nine patients recovered.

On both July 24 and July 28, the store's floors had been cleaned with a liquid propane-powered floor burnisher by a subcontractor to a cleaning service company. The floor burnisher was independently owned and operated. On both days, the subcontractor had cleaned and polished the pharmacy floors before employees arrived. No cases of illness consistent with CO poisoning were reported among cleaning service employees.

The Division of Occupational and Radiological Health, VDH, impounded the burnisher and tested its emissions 2 days after the incident. Readings obtained outdoors

Carbon Monoxide Poisoning — Continued

from the burnisher's exhaust pipe reached 2000 parts per million (ppm) CO after less than 1 minute of measurement, 3000 ppm while idling, and 50,000 ppm at full throttle. All other possible sources of CO (i.e., heating and air-conditioning system, water-heater system, and truck traffic outside the store) were excluded as causes of the exposure.

HbCO levels among case-patients were used to estimate CO concentration in the work environment by the Coburn equation (*2*); this approach estimated that, on the morning of exposure, the CO concentration in the pharmacy was 507–1127 ppm. The Occupational Safety and Health Administration (OSHA) standard for CO is 50 ppm averaged over an 8-hour work shift and a ceiling level of 200 ppm, not to be exceeded at any time. The store's ventilation system used 100% recirculated air.

As a result of this investigation, the pharmacy and the cleaning contractor and subcontractor were fined. VDH recommended that liquid propane-powered burnishers be replaced with electric-powered burnishers and that CO alarms be installed if use of liquid propane-powered machines continued.

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Editorial Note: Unintentional exposure to CO is a major environmental hazard in the United States (*3,4*): each year, approximately 10,000 persons seek medical attention because of CO intoxication (*5*). Unintentional deaths attributable to CO poisoning result primarily from combustion of gasoline in motor vehicles, coal for heating or cooking, kerosene, and wood (*3,6*). In contrast to these fuels, propane—the source of fuel involved in this report—normally undergoes complete combustion in the presence of sufficient oxygen, producing nontoxic CO_2 and water vapor (*7*); only when the oxygen supply at the point of combustion is inadequate does combustion of propane produce CO.

Symptoms of mild CO poisoning are nonspecific, and affected persons may not seek medical care. Because the cleaning service employees involved in the episode described in this report were exposed to elevated CO levels for limited periods (i.e., less than 1 hour), they may not have suffered ill effects of exposure. Pharmacy employees likely were exposed to peak CO levels on arrival to work and to elevated levels throughout the day.

The floor burnisher involved in this incident was factory-labeled with a warning to "shut off the engine if headache occurs and check emissions." OSHA permissible exposure levels regulate indoor air quality but do not require that such machines meet emission standards or receive routine maintenance. The most likely cause of CO poisoning in this case was failure to maintain or routinely service the burnisher. In addition, inadequate ventilation may have contributed to elevated concentrations of CO in the work environment. Episodes of CO poisoning, such as that described in this report, can be prevented by using only electric burnishers indoors, maintaining and routinely servicing fuel-burning burnishers, ensuring proper ventilation of the workplace, and educating persons regarding the signs and symptoms of CO poisoning.

Deaths resulting from CO poisoning are more common in winter months (*3*). Prevention efforts should be aimed at persons who live in homes with old heating systems, gas-powered space heaters, or wood stoves. Proper use and maintenance of

Carbon Monoxide Poisoning — Continued

such home-heating systems and cleaning of obstructed chimneys can prevent CO poisoning in the home.

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Notice to Readers

ATSDR/National Governors' Association Report on Closed and Restricted Toxic Sites

The National Governors' Association (NGA), through a cooperative agreement with the Agency for Toxic Substances and Disease Registry, has released a report on NGA's fourth biennial survey of sites closed or restricted to the public because of contamination by toxic substances. The report, *Restrictions Imposed on Contaminated Sites: A Status of State Actions* (*1*), describes the affected environmental media (i.e., land, groundwater, surface water, and buildings), types of contaminants (i.e., organic chemicals, inorganic chemicals, gasoline, fuel oil, and radionuclides), and nature of restrictions (e.g., fencing, well closings, fish consumption advisories, or posted warnings) at 2302 sites nationwide.

Information on the survey and copies of the report are available from Barbara Wells, Senior Policy Analyst, NGA, 444 North Capitol Street, Washington, DC 20001; telephone (202) 624-5822; fax (202) 624-5313.

Reference

1. Wells BB. Restrictions imposed on contaminated sites: a status of state actions. Washington, DC: National Governors' Association, 1992.

Quarterly Table Reporting Alcohol Involvement in Fatal Motor-Vehicle Crashes

The following table reports alcohol involvement in fatal motor-vehicle crashes in the United States for July–September 1992. This table, published quarterly in *MMWR*, focuses attention on the impact of alcohol use on highway safety.

A fatal crash is considered alcohol-related by the National Highway Traffic Safety Administration (NHTSA) if either a driver or nonoccupant (e.g., pedestrian) had a blood alcohol concentration (BAC) of ≥0.01% (≥0.01g/dL) in a police-reported traffic crash. Those with a BAC ≥0.10% (≥0.10 g/dL; the legal level of intoxication in most states) are considered intoxicated. Because BACs are not available for all persons in fatal crashes, NHTSA estimates the number of alcohol-related traffic fatalities based on a discriminant analysis of information from all cases for which driver or nonoccupant BAC data are available. There may be seasonal trends associated with these data.

Estimated number and percentage of total traffic fatalities* and drivers involved in fatal crashes, by age and blood alcohol concentration (BAC) level — United States, July–September 1992

		Fatalities, by BAC†					
		BAC=0.00		0.01%≤BAC≤0.09%		BAC≥0.10%	
Age group (yrs)	No. fatalities§	No.	(%)	No.	(%)	No.	(%)
0–14	840	650	(77.4)	62	(7.3)	128	(15.2)
15–20	1,658	964	(58.1)	196	(11.8)	498	(30.1)
21–24	1,219	464	(38.1)	147	(12.0)	608	(49.9)
25–34	2,242	827	(36.9)	238	(10.6)	1,178	(52.5)
35–64	3,088	1,654	(53.6)	265	(8.6)	1,169	(37.9)
≥65	1,575	1,316	(83.6)	90	(5.7)	169	(10.7)
Total	**10,622**	**5,875**	**(55.3)**	**997**	**(9.4)**	**3,750**	**(35.3)**

		Drivers,¶ by BAC**					
		BAC=0.00		0.01%≤BAC≤0.09%		BAC≥0.10%	
Age group (yrs)	No. drivers§	No.	(%)	No.	(%)	No.	(%)
0–14††	45	42	(93.9)	2	(4.9)	1	(1.2)
15–20	2,069	1,521	(73.5)	179	(8.7)	369	(17.8)
21–24	1,716	998	(58.2)	186	(10.9)	532	(31.0)
25–34	3,563	2,205	(61.9)	275	(7.7)	1,083	(30.4)
35–64	4,781	3,615	(75.6)	264	(5.5)	902	(18.9)
≥65	1,403	1,294	(92.2)	40	(2.8)	70	(5.0)
Total	**13,577**	**9,675**	**(71.3)**	**946**	**(7.0)**	**2,956**	**(21.8)**

*Fatalities include all occupants and nonoccupants who died within 30 days of a motor-vehicle crash on a public roadway.
†BAC distributions are estimates for drivers and nonoccupants involved in fatal crashes. Numbers of fatalities are rounded to the nearest whole number.
§Includes only those for whom age is known.
¶Driver may or may not have been killed.
**BAC distributions are estimates for drivers involved in fatal crashes. Numbers of drivers are rounded to the nearest whole number.
††Although usually too young to drive legally, persons in this age group are included for completeness of the data set.

Source: Fatal Accident Reporting System, National Highway Traffic Safety Administration.

The *Morbidity and Mortality Weekly Report (MMWR)* Series is prepared by the Centers for Disease Control and Prevention (CDC) and is available on a paid subscription basis from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; telephone (202) 783-3238.

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