CENTERS FOR DISEASE CONTROL

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Epidemiologic Notes and Reports

Occupationally Related Neurologic Abnormalities – Massachusetts

A recent study sponsored by the National Institute for Occupational Safety and Health (NIOSH) and conducted by the Occupational Health Program, Harvard School of Public Health, shows that some workers, who were found in 1978 to have bladder neuropathy as a result of occupational exposure to dimethylaminopropionitrile (DMAPN), continue to have persistent neurologic abnormalities.

In 1978, Harvard and NIOSH evaluated workers who had developed bladder neuropathy at a plant in Marblehead, Massachusetts, that produced polyurethane-foam products (*1,2*). A similar outbreak was investigated by NIOSH at a plant in Baltimore, Maryland, which used the same chemical process (*3,4*).

Symptoms of urinary tract dysfunction at the Marblehead plant were associated with the introduction of a catalyst containing DMAPN, and most workers' symptoms resolved rapidly after the catalyst was removed from the process. Three months after the catalyst was removed, 14 (13%) of the 104 workers originally diagnosed as having DMAPN toxicity were found to have persistent symptoms. Eleven of these 14, as well as 2 other workers who were subsequently identified as having persistent symptoms, participated in the follow-up study in June 1980. This study included questionnaire evaluations of urinary symptoms and sexual history; neurologic examinations; urologic evaluations, including cystometrography; electromyography of the anal sphincter and measurement of sacral latency time; nerve conduction studies of the right peroneal and right sural nerves; and studies of visual- and auditory-evoked responses. Results were compared, when possible, with those of the 1978 study.

Although the overall prevalence of urologic and other symptoms was considerably lower than in 1978, a high proportion of the group examined continued to report symptoms of urologic and sexual difficulties. Of the 11 workers evaluated in both studies, 10 (90%) still had symptoms. Seven (64%) still reported urinary hesitancy and 6 (55%), incomplete bladder emptying. Five (45%) reported sexual difficulties (loss of libido or impaired sexual function) as compared with 3 (27%) in 1978. Three of the 10 symptomatic individuals had abnormalities on general neurologic examination—1 with lower extremity sensorimotor neuropathy; 1 with hyper-reflexic knee jerks and ankle clonus; and 1 with a right lower extremity radiculopathy. Three of 4 workers examined in both studies had objective neurologic findings in 1978 which were not present in this recent study. Electromyographic abnormalities were present in 3 of 10 workers; visual- and auditory-evoked responses, sacral latency, and sphincter electromyograms were normal in all 10. Two individuals were found on cystometrography to have the first sensation that they needed to void only when abnormally large volumes of urine were in

Neurologic Abnormalities — Continued

the bladder. The persons most severely affected in 1978 were most likely to have persistent neurologic abnormalities at the time of the recent study.

Reported by EL Baker Jr, MD, DC Christiani, MD, DH Wegman, MD, Occupational Health Program, Harvard School of Public Health; RG Feldman, MD, CA Niles, MD, Dept of Neurology, M Siroky, MD, Dept of Urology, Boston University Medical Center; Hazard Evaluations and Technical Assistance Br, Div of Surveillance, Hazard Evaluations, and Field Studies, NIOSH, CDC.

Editorial Note: This investigation documents the persistence of neurologic abnormalities in a small group of workers exposed more than 2 years ago to DMAPN. While some symptoms improved considerably after removal from exposure, many symptoms and neurologic abnormalities persisted, and symptoms of sexual dysfunction appeared to become more prominent. The biphasic course of DMAPN toxicity observed in the Maryland plant (initial bladder symptomatology that resolved, followed by the appearance of lower extremity peripheral neuropathy) was not observed in the Marblehead group (*1,4*).

The neurologic syndrome associated with DMAPN differs significantly from previously reported occupational neuropathies in the predominance of genitourinary dysfunction. Although the neurotoxicity of DMAPN has been demonstrated in the laboratory (*5*), additional animal studies are needed to clarify the pathogenesis of this unique disorder. Follow-up studies of workers affected by other industrial neurotoxins (methyl-n-butyl ketone, n-hexane) are also needed to assess the rate of permanent disability in these workers.

References

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Lead Toxicity Secondary to Gasoline Sniffing among Navajos — Arizona

In the period July 1974-June 1980, 23 patients (19 males and 4 females) were admitted to Navajo Area Indian Service Hospitals for lead toxicity secondary to gasoline sniffing. Ages at diagnosis ranged from 10-20 years (mean 14.6); 8 patients had 3 or more separate admissions, and 15 had 1.

Table 1 summarizes the blood lead levels by clinical classification of these Navajo adolescents. Fifteen patients (65%) had lead encephalopathy when seen initially. Of 5 patients (22%) who were asymptomatic, 3 had blood-lead levels of $\geq$80 μg/dL. Of 3 patients (13%) who initially had focal neurologic signs, 2 had blood-lead levels of $\geq$80 μg/dL. Hematologic examination showed that 3 patients had basophilic stippling, and 2 had radiographic "lead lines" in the metaphyses and epiphyses of the radius and ulna. Free erythrocyte protoporphyrin (FEP) levels measured for 8 patients were not consistently elevated and did not correlate closely with blood-lead levels.

Patients were treated with chelation therapy, either ethylenediaminetetraacetate

Lead Toxicity – Continued

(EDTA, 75 mg/kg body weight/day) alone or in conjunction with dimercaprol (i.e., British Anti-Lewisite, BAL, 24 mg/kg/day). For 4 patients with focal symptoms and blood-lead levels of ≥80 µg/dL and for 4 with encephalopathy, oral penicillamine (35-40 mg/kg/day) was added. Six hospitalized patients (26%) left the hospital against medical advice before completing treatment. One patient died while hospitalized after developing respiratory complications secondary to a gasoline-sniffing incident.

Toward the end of the 6-year period, the Indian Health Service conducted a questionnaire survey of 174 seventh and eighth grade students at a reservation public school. Twenty-seven students (15.5%) reported having sniffed gasoline, while 35 (20%) had sniffed other substances such as glue or paint. Most of these students reported that sniffing was a group activity involving classmates or siblings.

Reported by P Colaiaco, J Coulehan, MD, J Brillman, University of Pittsburgh; TK Welty, MD, Navajo Area Indian Health Service, Health Services and Mental Health Administration; Special Studies Br, Chronic Diseases Div, Center for Environmental Health, CDC.

Editorial Note: Gasoline contains aliphatic hydrocarbons, paraffins, olefins, naphthenes, and aromatics including benzene. Inhalation and absorption of tetraethyl lead (TEL), an additive that may be present at a concentration of 3 ml/gallon, can cause acute and chronic lead encephalopathy (*1*). Because of its high lipid solubility, TEL rapidly accumulates in the central nervous system. Symptoms of organic lead poisoning include disturbances in sleep pattern, hallucinations, nausea, anorexia, vomiting, vertigo, headache, weakness, loss of weight, tremor, diarrhea, abdominal pain, and hyperexcitability (*2*).

The toxicity of TEL is greater than that of inorganic lead. TEL is metabolized to triethyl lead and then to inorganic lead. Therefore, although hematologic changes may occur, they are frequently not prominent in the acute phase (*3*). Thus, unless tests are performed within 1-2 days of the last inhalation of fumes containing TEL, there is usually little correlation between blood-level and symptomatology.

A nationwide drug-abuse survey indicated that 9% of all 12- to 17-year olds reported deliberately inhaling fumes of some sort at least once (*4*). Gasoline sniffing has frequently been associated with situations in which isolation, poverty, and local prohibition of alcohol combine with the ready availability of gasoline to make this form of substance abuse hyperendemic.

Hospital admissions probably reflect only a portion of the problem of toxicity from

TABLE 1. Blood lead levels among Navajos, by class of symptom, Arizona, July 1974-June 1980

Clinical classification	First admission			Total admissions		
	Number of patients (%)	Blood lead (µg/dL) Mean	Range	Number of patients (%)*	Blood lead (µg/dL) Mean	Range
Asymptomatic	5 (26)	88	60-132	14 (31)	74	42-132
Focal neurologic symptoms (e.g., tremor, ataxia, seizures)	3 (13)	88	56-142	14 (31)	90	33-344
Encephalopathy (e.g., hallucinations, disorientation)	15 (61)	95	60-140	19 (38)	93	60-174
Total	23 (100)			47 (100)		

*Of 51 admissions, 4 were excluded because of lack of clinical information or data on lead analysis.

Lead Toxicity — Continued

gasoline sniffing. Mild or asymptomatic cases can be missed unless patients are identified as being at high risk through history, social considerations, or screening programs. The apparent increase in frequency of intoxication in Arizona reported here may simply represent a heightened appreciation of the problem by health personnel.

Organic lead intoxication is associated with a high rate of toxicity; an earlier review indicated that the case-fatality rate might approach 20% (*5*). Therefore, emphasis must be placed on preventing exposure to organic lead.

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TABLE I. Summary — cases of specified notifiable diseases, United States

[Cumulative totals include revised and delayed reports through previous weeks.]

DISEASE	30th WEEK ENDING		MEDIAN 1976-1980	CUMULATIVE, FIRST 30 WEEKS		
	August 1 1981	July 26 1980		August 1 1981	July 26 1980	MEDIAN 1976-1980
Aseptic meningitis	302	169	174	2,997	2,437	1,829
Brucellosis	3	3	5	85	108	108
Chickenpox	609	1,042	798	164,423	154,953	154,953
Diphtheria	–	–	–	3	2	54
Encephalitis: Primary (arthropod-borne & unspec.)	37	24	28	504	409	409
Post-infectious	1	3	6	49	122	134
Hepatitis, Viral: Type B	364	369	309	11,479	9,789	8,712
Type A	458	615	615	14,432	15,728	16,886
Type unspecified	214	235	176	6,462	6,411	5,114
Malaria	49	50	22	804	1,141	367
Measles (rubeola)	47	178	229	2,514	12,434	22,581
Meningococcal infections: Total	37	32	32	2,258	1,755	1,598
Civilian	37	32	32	2,246	1,743	1,576
Military	–	–	–	12	12	16
Mumps	41	63	150	2,892	6,750	12,710
Pertussis	31	65	50	596	757	734
Rubella (German measles)	37	56	87	1,590	3,052	10,376
Tetanus	1	2	2	34	45	36
Tuberculosis	662	577	577	15,483	15,408	16,742
Tularemia	6	7	3	122	101	83
Typhoid fever	7	6	10	275	242	242
Typhus fever, tick-borne (Rky. Mt. spotted)	62	59	57	733	632	579
Venereal diseases:						
Gonorrhea: Civilian	20,589	20,790	21,319	563,698	550,842	551,768
Military	389	528	528	16,581	15,423	15,560
Syphilis, primary & secondary: Civilian	536	621	486	16,982	14,776	13,661
Military	11	8	9	226	180	176
Rabies in animals	112	151	78	4,165	3,946	1,789

TABLE II. Notifiable diseases of low frequency, United States

	CUM. 1981		CUM. 1981
Anthrax	–	Poliomyelitis: Total	1
Botulism	34	Paralytic	1
Cholera	3	Psittacosis (Tex. 1, Calif. 3)	70
Congenital rubella syndrome (Ariz. 1)	7	Rabies in man	1
Leprosy (Kans. 1, Calif. 2, Hawaii 6)	153	Trichinosis (Upstate N.Y. 2)	97
Leptospirosis (Hawaii 1)	23	Typhus fever, flea-borne (endemic, murine)	28
Plague	5		

All delayed reports and corrections will be included in the following week's cumulative totals.

TABLE III. Cases of specified notifiable diseases, United States, weeks ending August 1, 1981 and July 26, 1980 (30th week)

REPORTING AREA	ASEPTIC MENINGITIS	BRUCELLOSIS	CHICKEN-POX	DIPHTHERIA		ENCEPHALITIS			HEPATITIS (VIRAL), BY TYPE			MALARIA	
						Primary		Post-infectious	B	A	Unspecified		
	1981	1981	1981	1981	CUM. 1981	1981	1980	1981	1981	1981	1981	1981	CUM. 1981
UNITED STATES	302	3	609	–	3	37	24	1	364	458	214	49	804
NEW ENGLAND	10	–	65	–	–	3	–	–	16	12	14	2	40
Maine	1	–	8	–	–	–	–	–	–	1	–	–	1
N.H.	–	–	3	–	–	–	–	–	–	–	1	–	3
Vt.	–	–	–	–	–	–	–	–	1	1	–	–	2
Mass.	1	–	22	–	–	1	–	–	3	5	12	2	22
R.I.	7	–	11	–	–	–	–	–	–	2	–	–	2
Conn.	1	–	21	–	–	2	–	–	12	3	1	–	10
MID. ATLANTIC	23	–	89	–	–	2	1	–	58	38	28	3	97
Upstate N.Y.	6	–	56	–	–	1	1	–	20	11	4	2	28
N.Y. City	–	–	33	–	–	–	–	–	4	5	2	–	32
N.J.	3	–	NN	–	–	–	–	–	34	22	22	1	27
Pa.	14	–	–	–	–	1	–	–	NA	NA	NA	–	10
E.N. CENTRAL	38	–	192	–	–	10	11	–	41	68	21	3	35
Ohio	7	–	12	–	–	6	4	–	19	11	5	–	6
Ind.	16	–	31	–	–	3	5	–	–	7	3	–	6
Ill.	–	–	62	–	–	–	1	–	9	28	9	–	9
Mich.	10	–	30	–	–	1	1	–	12	21	3	3	14
Wis.	5	–	57	–	–	–	–	–	1	1	1	–	–
W.N. CENTRAL	21	–	72	–	–	3	1	–	8	11	4	1	22
Minn.	–	–	–	–	–	–	1	–	–	–	–	–	9
Iowa	5	–	5	–	–	2	–	–	2	5	1	–	2
Mo.	12	–	1	–	–	–	–	–	1	2	3	–	3
N. Dak.	–	–	1	–	–	–	–	–	–	–	–	–	1
S. Dak.	–	–	–	–	–	–	–	–	–	3	–	–	1
Nebr.	1	–	65	–	–	1	–	–	4	1	–	1	1
Kans.	3	–	–	–	–	–	–	–	1	–	–	–	5
S. ATLANTIC	34	–	103	–	1	5	5	–	76	63	32	5	86
Del.	–	–	2	–	–	–	–	–	2	1	–	–	1
Md.	4	–	14	–	–	1	–	–	10	4	7	1	20
D.C.	–	–	–	–	–	–	–	–	–	–	–	–	1
Va.	7	–	40	–	–	2	1	–	15	11	10	2	14
W. Va.	2	–	27	–	–	–	–	–	1	4	1	1	4
N.C.	2	–	NN	–	–	1	2	–	7	1	1	–	7
S.C.	1	–	1	–	–	–	–	–	8	2	–	–	1
Ga.	7	–	1	–	–	1	–	–	11	11	–	–	8
Fla.	11	–	18	–	1	–	2	–	22	29	13	1	30
E.S. CENTRAL	46	1	4	–	–	3	2	–	8	10	6	2	10
Ky.	1	–	2	–	–	–	–	–	–	–	–	–	–
Tenn.	34	–	NN	–	–	3	1	–	7	6	–	–	–
Ala.	10	1	–	–	–	–	1	–	–	1	6	2	9
Miss.	1	–	2	–	–	–	–	–	1	3	–	–	1
W.S. CENTRAL	42	1	45	–	–	6	2	–	26	53	38	3	60
Ark.	1	1	–	–	–	–	–	–	–	9	5	–	4
La.	10	–	NN	–	–	–	–	–	7	5	6	–	3
Okla.	3	–	–	–	–	1	1	–	14	8	4	1	5
Tex.	28	–	45	–	–	5	1	–	5	31	23	2	48
MOUNTAIN	6	1	1	–	1	3	–	–	12	53	13	2	27
Mont.	–	–	–	–	1	–	–	–	–	–	2	–	1
Idaho	–	–	–	–	–	–	–	–	–	14	–	–	1
Wyo.	–	–	–	–	–	–	–	–	–	1	–	–	–
Colo.	3	–	–	–	–	1	–	–	3	13	3	2	13
N. Mex.	2	–	–	–	–	–	–	–	1	3	–	–	2
Ariz.	1	–	NN	–	–	–	–	–	4	20	6	–	4
Utah	–	–	–	–	–	2	–	–	–	2	1	–	3
Nev.	–	1	1	–	–	–	–	–	4	–	1	–	3
PACIFIC	82	–	38	–	1	2	2	1	119	150	58	28	427
Wash.	4	–	20	–	–	–	–	–	6	7	2	–	20
Oreg.	5	–	1	–	–	–	–	–	9	12	4	–	11
Calif.	70	–	7	–	–	2	1	1	101	130	52	28	391
Alaska	1	–	2	–	1	–	1	–	1	–	–	–	1
Hawaii	2	–	8	–	–	–	–	–	2	1	–	–	4
Guam	NA	NA	NA	NA	–	NA	–	–	NA	NA	NA	NA	1
P.R.	–	–	9	–	–	–	–	–	–	–	2	–	9
V.I.	–	–	–	–	–	–	–	–	–	–	–	–	4
Pac. Trust Terr.	NA	NA	NA	NA	–	NA	–	–	NA	NA	NA	NA	–

NN: Not notifiable. NA: Not available.

All delayed reports and corrections will be included in the following week's cumulative totals.

TABLE III (Cont.'d). Cases of specified notifiable diseases, United States, weeks ending August 1, 1981 and July 26, 1980 (30th week)

REPORTING AREA	MEASLES (RUBEOLA)			MENINGOCOCCAL INFECTIONS TOTAL			MUMPS		PERTUSSIS	RUBELLA		TETANUS
	1981	CUM. 1981	CUM. 1980	1981	CUM. 1981	CUM. 1980	1981	CUM. 1981	1981	1981	CUM. 1981	CUM. 1981
UNITED STATES	47	2,514	12,434	37	2,258	1,755	41	2,892	31	37	1,590	34
NEW ENGLAND	3	75	667	2	143	106	2	142	1	1	105	2
Maine	–	5	33	–	21	5	–	27	1	–	33	–
N.H.	–	4	330	1	16	5	–	17	–	–	35	–
Vt.	–	1	226	–	6	13	–	6	–	–	–	–
Mass.	3	57	54	–	33	35	–	39	–	1	25	–
R.I.	–	–	2	–	13	7	–	20	–	–	–	–
Conn.	–	8	22	1	54	41	2	33	–	–	12	2
MID. ATLANTIC	18	774	3,679	3	309	299	10	508	4	6	195	1
Upstate N.Y.	2	205	658	1	101	102	6	90	1	5	91	–
N.Y. City	2	68	1,140	–	51	74	3	65	1	1	48	1
N.J.	1	53	818	–	69	62	1	83	–	–	46	–
Pa.	13	448	1,063	2	88	61	–	270	2	–	10	–
E.N. CENTRAL	2	77	2,254	9	276	225	7	813	9	7	336	6
Ohio	–	15	353	7	103	69	1	126	1	–	3	1
Ind.	2	10	89	–	40	35	1	92	2	4	118	1
Ill.	–	23	327	–	66	60	–	162	1	–	79	–
Mich.	–	28	230	2	63	49	2	297	–	–	33	3
Wis.	–	1	1,255	–	4	12	3	136	5	3	103	1
W.N. CENTRAL	–	6	1,309	–	102	71	–	176	–	–	76	3
Minn.	–	2	1,075	–	36	18	–	8	–	–	6	2
Iowa	–	1	20	–	18	8	–	41	–	–	4	–
Mo.	–	1	64	–	30	32	–	28	–	–	3	1
N. Dak.	–	–	–	–	1	1	–	–	–	–	–	–
S. Dak.	–	–	–	–	4	4	–	1	–	–	–	–
Nebr.	–	1	83	–	–	–	–	3	–	–	1	–
Kans.	–	1	67	–	13	8	–	95	–	–	62	–
S. ATLANTIC	3	335	1,845	7	510	414	8	404	2	–	129	7
Del.	–	–	3	–	4	2	–	9	–	–	1	–
Md.	–	2	71	–	36	41	–	78	–	–	1	–
D.C.	–	1	–	–	1	1	–	1	–	–	–	–
Va.	–	6	298	1	64	36	3	113	–	–	6	–
W. Va.	–	8	9	–	19	14	1	66	–	–	22	–
N.C.	–	4	125	1	75	78	1	13	–	–	5	2
S.C.	–	–	157	1	66	50	–	10	1	–	8	2
Ga.	–	109	799	–	84	72	–	33	–	–	35	1
Fla.	3	205	383	4	161	120	3	81	1	–	51	2
E.S. CENTRAL	2	4	325	1	163	157	4	70	1	1	28	2
Ky.	–	–	51	–	45	49	1	33	–	1	17	–
Tenn.	2	2	168	–	47	43	–	20	1	–	10	–
Ala.	–	2	22	1	55	42	2	15	–	–	1	2
Miss.	–	–	84	–	16	23	1	2	–	–	–	–
W.S. CENTRAL	11	888	924	10	377	185	–	168	8	6	141	5
Ark.	–	1	16	–	20	14	–	1	–	–	1	1
La.	–	2	11	4	92	66	–	4	–	–	9	2
Okla.	–	6	769	2	32	16	–	–	–	–	–	1
Tex.	11	879	128	4	233	89	–	163	8	6	131	1
MOUNTAIN	–	32	434	–	75	62	–	103	2	–	74	2
Mont.	–	–	2	–	6	3	–	6	–	–	4	–
Idaho	–	1	–	–	3	4	–	4	–	–	3	–
Wyo.	–	–	–	–	1	2	–	1	–	–	3	–
Colo.	–	9	23	–	32	15	–	42	–	–	27	–
N. Mex.	–	8	11	–	6	7	–	–	–	–	5	–
Ariz.	–	4	344	–	17	10	–	23	2	–	19	1
Utah	–	–	46	–	5	2	–	16	–	–	4	1
Nev.	–	10	8	–	5	19	–	11	–	–	9	–
PACIFIC	8	323	997	5	303	236	10	508	4	16	506	6
Wash.	–	3	170	–	55	43	1	134	1	–	61	–
Oreg.	–	3	–	3	46	42	2	59	–	–	31	–
Calif.	8	315	817	1	191	146	7	291	3	16	405	6
Alaska	–	–	5	1	7	5	–	7	–	–	–	–
Hawaii	–	2	5	–	4	–	–	17	–	–	9	–
Guam	NA	4	5	–	–	1	NA	6	NA	NA	1	–
P.R.	2	247	104	–	10	8	–	105	–	–	3	3
V.I.	5	18	6	1	1	1	–	4	–	–	1	–
Pac. Trust Terr.	NA	1	6	–	–	–	NA	8	NA	NA	1	–

NA: Not available.
All delayed reports and corrections will be included in the following week's cumulative totals.

TABLE III (Cont.'d). Cases of specified notifiable diseases, United States, weeks ending August 1, 1981 and July 26, 1980 (30th week)

REPORTING AREA	TUBERCULOSIS		TULAREMIA	TYPHOID FEVER		TYPHUS FEVER (Tick-borne) (RMSF)		VENEREAL DISEASES (Civilian)						RABIES (in Animals)
								GONORRHEA			SYPHILIS (Pri. & Sec.)			
	1981	CUM. 1981	CUM. 1981	1981	CUM. 1981	1981	CUM. 1981	1981	CUM. 1981	CUM. 1980	1981	CUM. 1981	CUM. 1980	CUM. 1981
UNITED STATES	662	15,483	122	7	275	62	733	20,589	563,698	550,842	536	16,982	14,776	4,165
NEW ENGLAND	13	435	1	–	12	–	6	449	14,077	13,843	9	357	309	16
Maine	–	26	–	–	1	–	–	31	703	808	–	2	4	8
N.H.	2	13	–	–	–	–	–	22	506	457	–	11	1	2
Vt.	2	14	–	–	–	–	–	3	237	311	–	13	5	–
Mass.	8	252	–	–	7	–	4	211	5,717	5,718	7	238	176	2
R.I.	–	26	–	–	–	–	–	11	736	887	2	21	19	–
Conn.	1	104	1	–	4	–	2	171	6,178	5,662	–	72	104	4
MID. ATLANTIC	95	2,461	10	2	47	7	29	2,371	67,307	59,234	88	2,579	2,121	44
Upstate N.Y.	15	427	10	1	10	–	9	459	11,115	10,839	10	242	171	34
N.Y. City	32	959	–	1	26	–	2	950	28,460	23,031	49	1,545	1,403	–
N.J.	13	510	–	–	7	1	8	506	12,572	10,718	10	350	260	6
Pa.	35	565	–	–	4	6	10	456	15,160	14,646	19	442	287	4
E.N. CENTRAL	73	1,971	1	–	16	–	33	1,878	82,069	84,144	9	1,023	1,378	560
Ohio	16	386	–	–	2	–	28	352	28,721	22,557	–	149	227	46
Ind.	–	148	–	–	–	–	2	257	7,584	8,118	1	112	107	52
Ill.	35	791	–	–	6	–	3	207	19,785	26,323	–	520	771	412
Mich.	17	537	1	–	6	–	–	783	18,230	19,019	4	186	221	5
Wis.	5	109	–	–	2	–	–	279	7,749	8,127	4	56	52	45
W.N. CENTRAL	21	550	14	1	10	2	28	762	27,052	24,999	8	334	185	1,788
Minn.	4	95	–	–	2	–	–	69	4,293	4,208	–	118	65	313
Iowa	3	58	–	–	2	1	3	123	2,969	2,755	1	14	9	566
Mo.	7	241	13	1	3	–	15	339	12,432	10,724	7	177	92	144
N. Dak.	3	21	–	–	–	–	–	10	375	366	–	4	3	289
S. Dak.	–	42	–	–	1	–	–	21	738	779	–	2	2	209
Nebr.	–	18	1	–	1	–	2	65	2,062	2,008	–	4	6	132
Kans.	4	75	–	–	1	1	8	135	4,183	4,159	–	15	8	135
S. ATLANTIC	161	3,447	8	1	38	36	420	5,185	139,575	137,941	166	4,498	3,540	248
Del.	2	47	1	–	–	–	2	80	2,187	1,911	–	7	10	–
Md.	11	337	–	–	12	6	44	517	15,661	14,703	20	338	247	13
D.C.	5	218	–	–	1	–	–	259	8,476	9,522	2	363	257	–
Va.	28	352	–	–	1	15	73	603	12,802	12,028	17	412	322	42
W. Va.	4	114	–	–	4	–	4	91	2,130	1,784	3	16	14	12
N.C.	35	598	1	–	1	13	183	794	21,620	19,832	8	343	245	2
S.C.	9	319	2	–	1	2	75	306	13,417	13,088	12	300	196	15
Ga.	34	563	4	–	2	–	31	1,395	28,958	26,166	36	1,160	1,008	115
Fla.	33	899	–	1	16	–	8	1,140	34,324	38,907	68	1,559	1,241	49
E.S. CENTRAL	72	1,368	5	–	5	9	76	1,465	46,082	44,969	37	1,107	1,210	268
Ky.	12	357	2	–	–	–	2	262	5,978	6,737	–	51	77	81
Tenn.	33	457	3	–	1	6	51	640	17,683	16,192	4	426	499	143
Ala.	17	370	–	–	2	3	8	NA	13,396	12,950	NA	303	256	44
Miss.	10	184	–	–	2	–	15	563	9,025	9,090	33	327	378	–
W.S. CENTRAL	86	1,744	58	–	36	7	120	4,298	75,367	71,432	114	4,160	2,902	736
Ark.	8	183	32	–	1	1	24	240	5,510	5,459	3	79	91	98
La.	7	307	2	–	2	–	–	1,839	12,789	12,829	44	982	704	22
Okla.	11	206	14	–	3	4	72	245	7,947	7,001	8	97	58	145
Tex.	60	1,048	10	–	30	2	24	1,974	49,121	46,143	59	3,002	2,049	471
MOUNTAIN	11	441	21	–	20	–	18	842	22,250	21,171	47	469	346	129
Mont.	–	23	5	–	4	–	10	35	809	792	2	11	1	74
Idaho	–	6	2	–	–	–	4	40	935	961	–	15	13	1
Wyo.	–	8	1	–	–	–	3	18	515	634	–	8	8	6
Colo.	–	50	5	–	5	–	–	237	5,994	5,780	5	142	97	16
N. Mex.	3	77	1	–	–	–	–	67	2,413	2,635	8	86	62	20
Ariz.	7	207	–	–	10	–	–	259	6,842	5,651	25	105	107	10
Utah	1	33	6	–	1	–	–	50	1,045	983	–	16	10	–
Nev.	–	37	1	–	–	–	1	136	3,697	3,735	7	86	48	2
PACIFIC	130	3,066	4	3	91	1	3	3,339	89,919	93,109	58	2,455	2,785	376
Wash.	13	226	1	–	3	–	–	250	7,129	7,855	–	68	147	6
Oreg.	2	109	–	–	4	–	–	107	5,392	6,419	1	56	65	4
Calif.	113	2,610	3	3	83	1	3	2,821	73,441	74,694	56	2,282	2,463	352
Alaska	–	39	–	–	–	–	–	93	2,235	2,245	–	6	7	14
Hawaii	2	82	–	–	1	–	–	68	1,722	1,896	1	43	103	–
Guam	NA	7	–	NA	–	NA	–	NA	47	81	NA	–	4	–
P.R.	–	183	–	–	4	–	–	42	1,863	1,497	10	388	308	46
V.I.	–	1	–	2	6	–	–	2	106	108	–	15	10	–
Pac. Trust Terr.	NA	38	–	NA	–	NA	–	NA	211	237	NA	–	–	–

NA: Not available.
All delayed reports and corrections will be included in the following week's cumulative totals.

TABLE IV. Deaths in 121 U.S. cities,* week ending August 1, 1981 (30th week)

REPORTING AREA	ALL CAUSES, BY AGE (YEARS)						P&I** TOTAL
	ALL AGES	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	616	411	137	33	16	19	26
Boston, Mass.	166	99	42	14	6	5	5
Bridgeport, Conn.	36	29	6	1	–	–	4
Cambridge, Mass.	14	12	2	–	–	–	1
Fall River, Mass.	26	20	5	1	–	–	–
Hartford, Conn.	55	32	16	2	2	3	–
Lowell, Mass.	27	22	4	1	–	–	2
Lynn, Mass.	16	14	2	–	–	–	–
New Bedford, Mass.	18	13	5	–	–	–	1
New Haven, Conn.	41	23	6	7	3	2	1
Providence, R.I. §	61	41	15	3	–	2	4
Somerville, Mass.	15	11	3	–	–	1	–
Springfield, Mass.	38	25	9	1	1	2	–
Waterbury, Conn.	48	33	10	1	2	2	6
Worcester, Mass.	55	37	12	2	2	2	2
MID. ATLANTIC	2,262	1,438	573	125	67	59	89
Albany, N.Y.	47	27	13	3	3	1	–
Allentown, Pa.	20	16	4	–	–	–	–
Buffalo, N.Y.	100	65	23	5	1	6	12
Camden, N.J.	37	21	14	1	1	–	–
Elizabeth, N.J.	33	24	8	1	–	–	4
Erie, Pa.†	35	19	13	–	3	–	–
Jersey City, N.J.	54	33	12	7	1	1	2
N.Y. City, N.Y.	1,306	841	306	84	44	31	42
Newark, N.J.	52	29	13	4	1	5	3
Paterson, N.J.	15	13	1	1	–	–	–
Philadelphia, Pa.†	200	117	66	9	4	4	11
Pittsburgh, Pa.†	42	19	16	1	3	3	–
Reading, Pa.	24	17	6	1	–	–	1
Rochester, N.Y.	105	63	33	4	2	3	8
Schenectady, N.Y.	14	12	2	–	–	–	–
Scranton, Pa.†	25	19	5	–	1	–	1
Syracuse, N.Y.	76	51	18	2	1	4	1
Trenton, N.J.	38	22	13	1	1	1	–
Utica, N.Y.	17	12	4	–	1	–	2
Yonkers, N.Y.	22	18	3	1	–	–	2
E.N. CENTRAL	2,087	1,255	532	146	73	81	58
Akron, Ohio	55	38	10	4	–	3	–
Canton, Ohio	27	20	7	–	–	–	1
Chicago, Ill.	474	262	125	43	16	28	10
Cincinnati, Ohio	139	82	44	7	4	2	12
Cleveland, Ohio	169	91	58	7	7	6	2
Columbus, Ohio	138	75	38	13	6	6	4
Dayton, Ohio	91	55	26	6	3	1	2
Detroit, Mich.	239	150	49	24	7	9	1
Evansville, Ind.	45	31	9	4	1	–	3
Fort Wayne, Ind.	47	32	13	2	–	–	1
Gary, Ind.	17	11	1	2	2	1	–
Grand Rapids, Mich.	52	34	14	2	–	2	2
Indianapolis, Ind.	167	90	52	12	9	4	–
Madison, Wis.	45	23	13	3	–	6	8
Milwaukee, Wis.	114	78	23	5	6	2	–
Peoria, Ill.	40	25	9	3	1	2	3
Rockford, Ill.	34	22	5	2	1	4	3
South Bend, Ind.	45	29	9	3	2	2	1
Toledo, Ohio	93	62	20	4	5	2	4
Youngstown, Ohio	56	45	7	–	3	1	1
W.N. CENTRAL	868	482	228	92	31	35	31
Des Moines, Iowa	68	39	15	6	4	4	–
Duluth, Minn.	37	27	7	3	–	–	5
Kansas City, Kans.	47	20	19	6	1	1	2
Kansas City, Mo.	231	90	86	40	9	6	2
Lincoln, Nebr.	25	16	9	–	–	–	2
Minneapolis, Minn.	87	52	15	6	5	9	3
Omaha, Nebr.	89	55	16	6	5	7	3
St. Louis, Mo.	148	88	39	13	4	4	7
St. Paul, Minn.	61	48	5	6	1	1	2
Wichita, Kans.	75	47	17	6	2	3	5

REPORTING AREA	ALL CAUSES, BY AGE (YEARS)						P&I** TOTAL
	ALL AGES	≥65	45-64	25-44	1-24	<1	
S. ATLANTIC	1,055	636	254	79	39	47	27
Atlanta, Ga.	127	73	24	13	6	11	3
Baltimore, Md.	240	145	63	17	6	9	3
Charlotte, N.C.	79	42	22	7	2	6	–
Jacksonville, Fla.	80	53	13	5	6	3	2
Miami, Fla.	105	55	37	5	2	6	1
Norfolk, Va.	50	29	12	4	1	4	2
Richmond, Va.	63	37	15	7	2	2	5
Savannah, Ga.	46	25	18	3	–	–	2
St. Petersburg, Fla.	82	66	13	2	1	–	3
Tampa, Fla.	64	41	12	5	5	1	6
Washington, D.C.	82	47	18	11	3	3	–
Wilmington, Del.	37	23	7	–	5	2	–
E.S. CENTRAL	679	416	161	37	26	39	20
Birmingham, Ala.	122	71	32	10	4	5	2
Chattanooga, Tenn.	42	26	9	4	2	1	3
Knoxville, Tenn.	47	32	9	3	2	1	2
Louisville, Ky.	90	60	20	1	2	7	6
Memphis, Tenn.	172	97	37	7	9	22	2
Mobile, Ala.	47	29	12	2	3	1	1
Montgomery, Ala.	41	28	7	3	2	1	–
Nashville, Tenn.	118	73	35	7	2	1	4
W.S. CENTRAL	1,245	685	327	112	60	61	33
Austin, Tex.	35	23	6	1	–	5	1
Baton Rouge, La.	39	25	13	–	1	–	4
Corpus Christi, Tex.	52	27	8	7	5	5	1
Dallas, Tex.	179	98	43	17	14	7	2
El Paso, Tex.	60	25	22	5	4	4	1
Fort Worth, Tex.	67	38	20	7	1	1	3
Houston, Tex.	229	101	73	21	19	15	1
Little Rock, Ark.	84	58	20	4	2	–	5
New Orleans, La.	183	104	56	14	1	8	–
San Antonio, Tex.	173	93	45	17	7	11	7
Shreveport, La.	64	48	7	7	–	2	2
Tulsa, Okla.	80	45	14	12	6	3	6
MOUNTAIN	520	294	126	34	27	39	22
Albuquerque, N. Mex.	61	30	19	4	6	2	–
Colo. Springs, Colo.	36	26	7	2	1	–	4
Denver, Colo.	117	65	20	6	3	23	5
Las Vegas, Nev.	56	26	22	7	–	1	4
Ogden, Utah	19	10	4	3	1	1	2
Phoenix, Ariz.	90	55	16	5	4	10	1
Pueblo, Colo.	17	14	3	–	–	–	2
Salt Lake City, Utah	52	30	13	3	4	2	1
Tucson, Ariz.	72	38	22	4	8	–	3
PACIFIC	1,578	999	344	118	51	66	61
Berkeley, Calif.	17	14	2	1	–	–	–
Fresno, Calif.	77	43	21	4	2	7	3
Glendale, Calif.	20	14	4	2	–	–	–
Honolulu, Hawaii	66	43	11	8	3	1	4
Long Beach, Calif.	55	37	15	1	–	2	6
Los Angeles, Calif.	433	245	111	38	15	24	11
Oakland, Calif.	64	47	10	2	4	1	2
Pasadena, Calif.	27	20	3	2	–	2	–
Portland, Oreg.	92	69	16	1	2	4	1
Sacramento, Calif.	75	42	19	8	4	2	5
San Diego, Calif.	139	88	30	8	5	8	8
San Francisco, Calif.	151	99	30	9	4	9	3
San Jose, Calif.	139	84	28	16	8	3	10
Seattle, Wash.	139	95	27	10	4	3	5
Spokane, Wash.	40	24	11	5	–	–	–
Tacoma, Wash.	44	35	6	3	–	–	3
TOTAL	10,910††	6,616	2,682	776	390	446	367

*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 4 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.

§Data not available this week. Figures are estimates based on average percent of regional totals.

Salmonella dublin Associated with Raw Milk — Washington State

A recent outbreak of *Salmonella dublin* infection in Washington has been associated with drinking raw milk from a commercial dairy. In an investigation at the dairy, *S. dublin* was isolated from a milk sample and from a milk filter.

From November 1980 to July 1981, *S. dublin* was isolated from 18 persons living in King or adjacent counties in western Washington. The median age of the affected persons was 28.5 years (range 8 months-71 years). There were 12 males and 5 females; the sex of 1 patient was not reported. Fifteen were ill with either febrile or diarrheal illness; 11 of these were hospitalized. Five patients had pre-existing severe chronic disease (3 had cancer, 2 had diabetes).

Eleven of the *S. dublin* isolates were from stool specimens, 6 from blood, and 1 from synovial fluid. Three persons with isolates from blood also had *S. dublin* isolated from 1 or more of the following sites: sputum, urine, and pleural fluid. *S. dublin* infection was associated with 2 deaths; one occurred in a person with lung cancer, and the other in a person with diabetes who developed heart failure while infected.

Sixteen infected persons in 13 families were interviewed; 14 (87.5%) of the 16 had consumed raw milk produced by a single dairy (Figure 1). In contrast, 75 persons from whom other *Salmonella* serotypes were isolated gave no history of raw milk consumption.

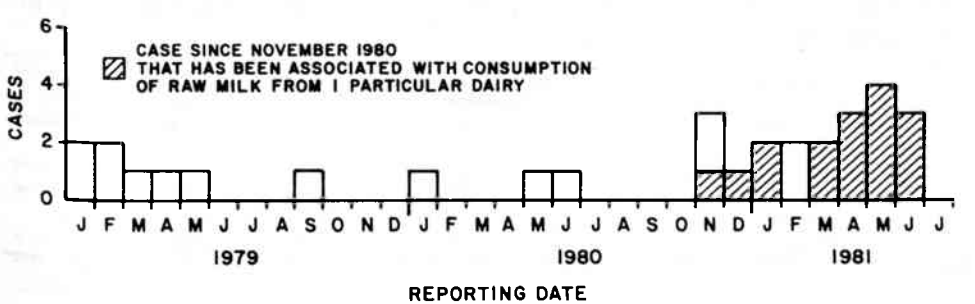
The dairy produces approximately 1,500 gallons of milk per day; 1,000 gallons are sold unpasteurized, primarily to consumer cooperatives in King County. The dairy has 200-300 cattle divided into 3 herds. On May 22, using selective enrichment with selenite-cysteine broth, incubated at 43 C (109.4 F) (*1*), *S. dublin* was isolated from milk and a milk filter from 1 of the 3 herds. However, multiple stool cultures from these animals have failed to yield isolates of the organism. There were no overt signs of mastitis in any of the cattle.

During the month of June the raw milk was removed from the market while investigation of the dairy continued. After excluding milk from the implicated herd, the sale of raw milk from the other 2 herds was resumed on July 21.

Reported by H Anderson, Seattle-King County Health Dept; J Ballard, N Christopherson, J Lewis, J Allard, State Epidemiologist, Office of Public Health Laboratory and Epidemiology, Washington State Dept of Social and Health Svcs; BJ Edmundson, Animal Industry Div, Washington Dept of Agriculture; Field Svcs Div, Epidemiology Program Office, Enteric Diseases Br, Bacterial Diseases Div, Center for Infectious Diseases, CDC.

Editorial Note: *S. dublin* infection is not common: there were only 103 reports of isolation in the United States in 1980—most in the West. When the vehicle of transmission

FIGURE 1. Isolates of *Salmonella dublin*, Washington State, January 1979-July 1981



Salmonella dublin — Continued

has been determined, it has usually been raw milk (*2*). The association of *S. dublin* with milk can be explained by its adaptation to a bovine host, but even so, infection has rarely been associated with handling cattle or raw beef. Milk and dairy products such as cheese may be extremely efficient vehicles of transmission because their high fat content buffers stomach acid, allowing more bacteria to survive transit through the stomach (*3,4*).

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International Notes

Outbreak of *Vibrio cholerae* non O-1 Gastroenteritis — Italy

After a group of 16 U.S. soldiers ate dinner in a restaurant in Venice, Italy, on September 20, 1980, 15 developed gastrointestinal illness with vomiting and diarrhea. One was hospitalized. All recovered within 1-5 days. Strains of *Vibrio cholerae* non O-1 were isolated from stool samples from 4 patients. Because this outbreak of gastroenteritis was the first identified as being caused by *V. cholerae* non O-1 in Italy, an epidemiologic investigation was conducted.

A patient was defined as a person who ate dinner at the restaurant mentioned above on September 20 and who had a gastrointestinal illness with diarrhea or vomiting within 5 days. Of 83 patrons of the restaurant that evening, 50 persons (U.S. soldiers included) could be reached and interviewed. Of this group, 24 were identified as patients. Only the 1 soldier required hospitalization. All recovered completely. No cases were identified among the restaurant staff.

Epidemiologic findings suggested that raw oysters might have been involved in transmission of the infection. Of the 24 patients interviewed, 19 (79.2%) had eaten raw oysters, as had 10 (38.5%) of 26 healthy individuals interviewed ($p<0.01$). No other statistically significant differences could be found in either food or beverage consumption.

The mean incubation period was 21.5 hours, with a reported range of half an hour to 5 days. One individual, who developed a gastrointestinal illness after 7 days, was not

TABLE 2. Symptoms of patients with gastrointestinal illness after eating raw oysters, Venice, Italy, September 1980

Symptom	Number of patients*	Percentage
Diarrhea	22	91.7
Vomiting	7	29.2
Cramps	11	45.8
Abdominal pain	12	50.0
Nausea	10	41.7
Dizziness	5	20.8

*N=24.

Vibrio cholerae – Continued

classified as a patient because of the defined limits of the incubation period. Symptoms consisted mainly of diarrhea (liquid stools) and/or vomiting (Table 2). The mean duration of illness was 46.3 hours—with a reported range of <1 hour to 5 days.

Rectal swabs obtained from all persons interviewed (approximately 1 month after the incident) and from the restaurant staff (about 2 weeks after the incident) were cultured. All cultures were negative for *Vibrio* organisms. The 4 isolates from the U.S. soldiers were sent to Japan for typing. The strains were nontoxigenic in the CHO* assay. Results of ileal-loop tests are not yet known.

The source of the oysters the patients ate could not be determined. The distributor stored them in pools for 4-5 days before selling them. In the restaurant, oysters were eaten within 2 days after they were obtained. There were no reports of comparable illness among patrons of other restaurants. Two months later, strains of *V. cholerae* non O-1 were isolated from shellfish caught in the northern Adriatic, near Venice, but no other cases of gastrointestinal illness associated with vibrios have been reported.

Reported by P Piergentili, MD, M Castellani, MD, Istituto Superiore di Sanità, Rome; RD Fellini, MD, U.S. Army Base, Ederle, Venice; G Farisano, MD, C Bonello, DB, Dolo, Venice; E Rigoli, MD, Centro Enterobatteri Patogeni, Regione Veneto, Treviso; Enteric Diseases Br, Bacterial Diseases Div, Center for Infectious Diseases, CDC.

Editorial Note: Each year, approximately 20 isolates of non-O1 *V. cholerae* isolated from persons in the United States are submitted to CDC for confirmation and serotyping. Recent reports on such isolates from U.S.-acquired cases of gastroenteritis indicate that all of the patients with stool isolates gave a history of having eaten raw oysters within 72 hours of having symptoms (*1*).

Reference

1. Morris JG Jr, Wilson R, Davis BR, et al. Non-O group 1 *Vibrio cholerae* gastroenteritis in the United States: clinical, epidemiologic, and laboratory characteristics of sporadic cases. Ann Intern Med 1981;94:656-8.

*Chinese hamster ovary.

Addendum, Vol. 30, No. 25

p306. The following persons should be added to the credits for the article "Kaposi's Sarcoma and *Pneumocystis* Pneumonia Among Homosexual Men – New York City and California": GS Hammer, MD, SZ Hirschman, MD, M Chapman, MD, J Romeu, MD, Mt. Sinai Hospital, New York.

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William H. Foege, M.D.
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Philip S. Brachman, M.D.
Editor
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Managing Editor
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