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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 were referred to the Virginia Mason Medical Center (VMMC) for hyperbaric oxygen therapy.

All patient data were extracted from medical records. A case of CO poisoning was defined as an arterial carboxyhemoglobin (HbCO) level of ≥2% (for nonsmokers) or ≥9% (for smokers) in a person who sought medical care during January 20–25 and had not been involved in a fire or intentional CO exposure.

The 44 patients who met the case definition and were evaluated or treated at HMC or VMMC represented 17 separate incidents of CO exposure (median: two patients per incident; range: one–nine patients). Eight hospitals referred 35 of the patients to VMMC for hyperbaric oxygen therapy; these 35 included five of 14 patients initially evaluated at HMC. Nine (20%) patients had lost consciousness. The median arterial HbCO level on initial evaluation was 17% (range: 5%–46%).

The median age of patients was 29 years (range: 2–87 years); 26 (59%) were female. Eighteen (41%) patients were Asian, 14 (32%) were non-Hispanic white, nine (20%) were Hispanic, two (5%) were of Middle Eastern ancestry and unknown ethnicity, and one (2%) was black. Fifty percent of the patients did not speak English, including 11 (61%) who were Asian and all nine who were Hispanic.

Within 9 hours of the onset of the storm, case-patients began seeking care in emergency rooms; 38 (86%) patients sought care between 6 p.m. and 6 a.m. on one of the three nights following the storm (Figure 1). The source of CO was burning charcoal briquettes in 11 (65%) incidents (all involving racial/ethnic minorities), gasoline-

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powered generators in four (24%), a generator and a propane-powered space heater in one, and an automobile in one.

During the night of January 21, radio stations first broadcast reports of CO poisoning and the danger of using charcoal briquettes, gasoline-powered generators, and propane-powered heaters in poorly ventilated areas; newspaper and television reports appeared during January 22–23. On January 22, one fire department distributed more than 2000 written warnings door-to-door. All reports and warnings were in English only.

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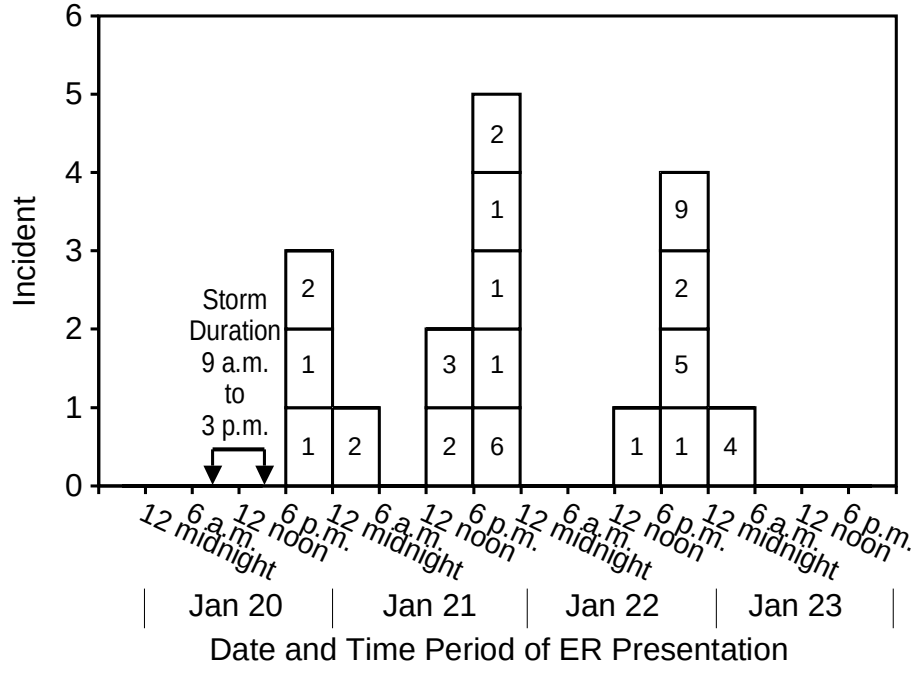
Editorial Note: The findings in this report differ from previous descriptions of CO poisoning following winter storms in the northern United States because of the large number of cases involved, especially among non-English–speaking persons (*1–3*). Because VMMC is the only hyperbaric referral facility in the region, and the indications for hyperbaric therapy (e.g., arterial HbCO level ≥25%, any neurologic impairment regardless of HbCO level on initial evaluation, or ischemic changes on electrocardiogram [*4*]) have been publicized among emergency physicians in the area, the 35 patients referred for hyperbaric oxygen therapy probably represent most

FIGURE 1. Unintentional carbon monoxide poisoning* following a winter storm, by date and time period of emergency room (ER) presentation† — Washington, January 1993



*An arterial carboxyhemoglobin level of ≥2% (for nonsmokers) or ≥9% (for smokers) in a person seeking medical care who had not been involved in a fire or intentional carbon monoxide exposure.

†Each box represents one exposure incident. Numbers within boxes indicate the number of patients in each incident.

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of the cases of severe poisoning resulting from this storm. Efforts to identify additional, less severe cases are in progress.

In Washington, burning charcoal briquettes were a common source of CO, especially for persons who were members of racial/ethnic minorities. Nonstorm-related CO poisoning resulting from indoor cooking with charcoal briquettes has been reported as a problem in Korea (*5*) and for non-English–speaking residents of the United States (*6,7*). A previous health advisory about the danger of CO poisoning was targeted at Asian immigrants because of their traditional use of briquettes for cooking (*7*).

The impact of media reports and other warnings to prevent CO poisoning following the storm in Washington cannot be determined. On January 23—when most reports had been publicized—more than 160,000 persons remained without electrical power, but no cases occurred after 4 a.m. that day. However, the non-English–speaking members of the population would probably not have understood these warnings, even if they had had the electrical power to receive them.

The relation of culture and language to the risk of CO poisoning following this storm is under investigation. However, when such storms occur, public health and safety agencies and other organizations should attempt to provide public health warnings that are prepared in both English and the languages of groups that might be at increased risk because of cultural or linguistic factors.

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Toddler Deaths Resulting from Ingestion of Iron Supplements — Los Angeles, 1992–1993

During June 1992–January 1993, five children aged 11–18 months in the Los Angeles area died after ingesting iron supplement tablets. The first death was reported by the Consumer Product Safety Commission (CPSC) to the Los Angeles County Department of Health Services (LADHS) in November 1992 and then reviewed by the Los Angeles County Child Death Review Committee. On January 6, the Los Angeles County coroner's office reported three additional deaths associated with ingestion of iron to the Child Death Review Committee and the health department. A fifth death resulting from iron poisoning was reported January 29. This report summarizes preliminary information from an investigation of these cases.

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Case 1. A 16-month-old boy died in June 1992 after ingesting 30–35 prenatal iron tablets that had been in a loosely capped container on a table. Prenatal 325 mg ferrous sulfate tablets, with an elemental iron content of 60 mg per tablet, were identified as the toxic agent. Medical treatment was delayed because clinical manifestations were not present initially.

Case 2. An 18-month-old boy died in September 1992 after consuming an estimated 30–40 prenatal iron tablets. Prenatal 325 mg ferrous sulfate tablets, with an elemental iron content of 60 mg per tablet, were identified as the toxic agent. The tablets were in an uncapped bottle on a table.

Case 3. A 12-month-old boy died in November 1992 after consuming an estimated 30 iron tablets. No container was available for confirmation of the strength of the dosage.

Case 4. An 11-month-old girl died in December 1992. A 2-year-old sibling had fed the younger child 30–35 prenatal iron tablets. Prenatal 325 mg ferrous sulfate tablets, with an elemental iron content of 60 mg per tablet, were identified as the toxic agent. The iron tablets were in a box on the floor.

Case 5. A 13-month-old girl died in January 1993 after consuming an unknown number of prenatal iron tablets prescribed for an older sister. Prenatal 325 mg ferrous sulfate tablets, with an elemental iron content of 60 mg per tablet, were identified as the toxic agent. The tablets were spilled on the floor for an unspecified period of time before the child was observed to have them in her mouth.

The prenatal iron supplements ingested in these five cases were red or green disk-shaped tablets with a glossy sugar coating; they are commonly used as an iron supplement for prenatal patients. All of the recovered containers had child-resistant safety caps and a warning that specified the need to keep all medications away from children.

On January 20, the LADHS issued a warning through the local media to parents and medical practitioners regarding the potential dangers of iron overdose.

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Editorial Note: Iron is the most common cause of pediatric poisoning deaths reported to poison control centers in the United States (*1*). During 1991, 5144 ingestions of iron supplements were reported to poison control centers in the United States; 11 were fatal. Children aged <6 years accounted for 3578 (69.6%) ingestions of iron and nine of the deaths. In addition, 18,457 ingestions of iron in the form of multivitamin or combination preparations were reported; 16,021 (87%) occurred among children aged <6 years (*1*). During 1991, consumption of multivitamin preparations in the form of prenatal vitamins with iron caused two additional deaths among children aged 17 and 18 months (*1*).

Although a toxic dose of elemental iron is 30 mg/kg, and a fatal dose is typically more than 250 mg/kg, ingestion of doses as low as 60 mg/kg have resulted in death (*2*). More than 120 different iron-containing preparations are available by prescription and over-the-counter purchase (*3*). The children in this report each consumed approximately 30 tablets of iron supplements; the number of tablets associated with a

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toxic dose varies, depending on the form and amount of iron used. Although in three cases the iron supplement was a prescription item, the 60 mg per tablet dosage is also available in over-the-counter preparations. Ingestion of as few as five or six tablets of a high-potency preparation could be fatal for a 10-kg (22-lb) child.

Iron poisoning is characterized by four clinical stages (*2*). The first stage—with a duration of up to 6 hours after ingestion—is characterized by acute onset of gastrointestinal symptoms (i.e., vomiting and diarrhea) that may progress to shock, coma, seizures, and death. During stage two—from 6 to 24 hours after ingestion—patients may be asymptomatic; however, evaluation and treatment for iron poisoning should not be delayed. During stage three—from 12 to 48 hours after ingestion—there may be hepatic and renal failure and cardiovascular collapse. Stage four—from 3 to 4 weeks after ingestion—may include gastrointestinal obstruction and hepatic cirrhosis.

From 1982 through 1992, three children died from iron toxicity in Los Angeles County: one each in 1986, 1988, and 1990. Thus, the five deaths in 7 months reported here represent a substantial increase in iron-related deaths. Measures to prevent toxic ingestions (e.g., child-resistant packages and warning labels) were present in at least four cases described in this report. However, iron supplements may be sold over the counter, and public perception of the potential danger of a vitamin or mineral supplement product may be low. County and state health officials are investigating the morbidity and mortality associated with these supplements; CPSC is also assisting the LADHS in the investigation of this problem.

The following measures may help prevent iron toxicity-associated deaths: 1) iron supplements should be prescribed in limited amounts and dosages and when medically indicated; 2) health-care providers and others who prescribe or dispense iron supplements should emphasize to parents the hazards of unintentional iron consumption by children; and 3) adults should be instructed in the proper use of child-resistant packages when they receive them. Other considerations include the need to re-evaluate the effectiveness of child-resistant packaging and warning labels; for example, because ingestion of a small number of iron tablets may cause toxicity, tablets packaged in child-resistant individual blister packs may limit the number of tablets a child can access. Iron tablets should be made less appealing to children by eliminating use of sugar coating or attractive colors. Finally, educational efforts should be aimed at persons who use iron supplements and who have young children at home.

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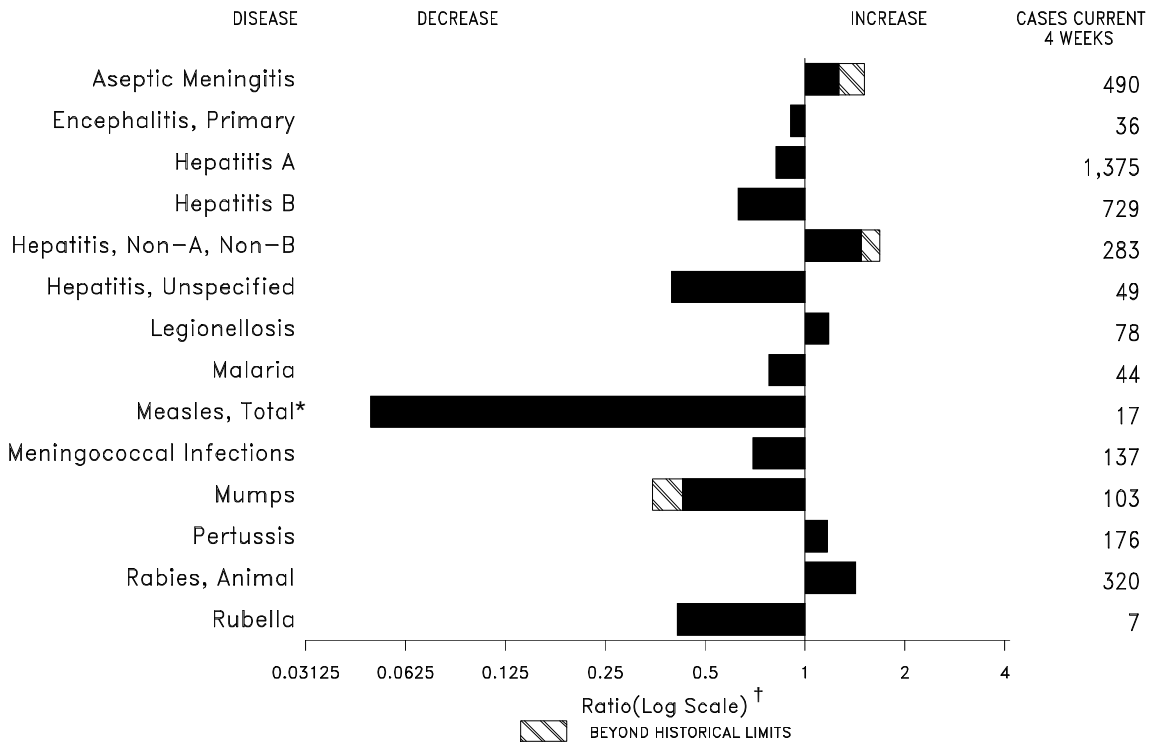
FIGURE I. Notifiable disease reports, comparison of 4-week totals ending February 13, 1993, with historical data — United States



*The large apparent decrease in reported cases of measles(total) reflects dramatic fluctuations in the historical baseline.

† 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 thehatched 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 February 13, 1993 (6th Week)

	Cum. 1993		Cum. 1993
AIDS*	4,278	Measles: imported	3
Anthrax	-	indigenous	18
Botulism: Foodborne	-	Plague	-
Infant	4	Poliomyelitis, Paralytic§	-
Other	1	Psittacosis	10
Brucellosis	5	Rabies, human	-
Cholera	-	Syphilis, primary & secondary	3,221
Congenital rubella syndrome	1	Syphilis, congenital, age < 1 year	-
Diphtheria	-	Tetanus	1
Encephalitis, post-infectious	13	Toxic shock syndrome	20
Gonorrhea	42,785	Trichinosis	5
Haemophilus influenzae (invasive disease)†	118	Tuberculosis	1,355
Hansen Disease	11	Tularemia	6
Leptospirosis	1	Typhoid fever	37
Lyme Disease	264	Typhus fever, tickborne (RMSF)	14

*Updated monthly; last update January 30, 1993.
†Of 107 cases of known age, 46 (43%) were reported among children less than 5 years of age.
§No cases of suspected poliomyelitis have been reported in 1993; 4 cases of suspected poliomyelitis were reported in 1992; 6 of the 9 suspected cases with onset in 1991 were confirmed; all were vaccine associated.

TABLE II. Cases of selected notifiable diseases, United States, weeks ending February 13, 1993, and February 8, 1992 (6th Week)

Reporting Area	AIDS*	Aseptic Meningitis	Encephalitis		Gonorrhea		Hepatitis (Viral), by type				Legionellosis	Lyme Disease
			Primary	Post-infectious			A	B	NA,NB	Unspecified		
	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	4,278	722	58	13	42,785	55,471	2,232	1,032	430	60	127	264
NEW ENGLAND	195	16	2	-	913	1,208	88	53	1	1	5	24
Maine	8	2	-	-	11	12	3	-	-	-	1	-
N.H.	8	1	-	-	9	-	2	9	-	-	-	5
Vt.	3	1	-	-	5	1	2	-	-	-	-	-
Mass.	102	10	2	-	410	502	51	36	1	1	4	9
R.I.	4	2	-	-	49	83	22	8	-	-	-	8
Conn.	70	-	-	-	429	610	8	-	-	-	-	2
MID. ATLANTIC	948	57	1	2	3,778	4,685	113	100	22	2	20	199
Upstate N.Y.	160	26	-	1	479	12	42	21	10	1	3	126
N.Y. City	677	5	-	-	925	2,470	10	1	-	-	-	-
N.J.	100	-	-	-	717	878	43	42	9	-	4	7
Pa.	11	26	1	1	1,657	1,325	18	36	3	1	13	66
E.N. CENTRAL	333	118	18	2	8,121	10,784	336	144	84	1	44	3
Ohio	85	55	10	-	2,431	3,331	62	34	2	-	23	3
Ind.	59	16	2	-	892	1,044	216	44	3	-	10	-
Ill.	118	10	1	-	2,618	3,663	28	7	-	-	-	-
Mich.	51	35	4	2	1,829	2,339	28	58	79	1	11	-
Wis.	20	2	1	-	351	407	2	1	-	-	-	-
W.N. CENTRAL	86	35	2	-	2,253	2,957	388	58	16	-	7	8
Minn.	19	2	2	-	276	345	26	2	-	-	-	1
Iowa	13	13	-	-	206	159	3	4	2	-	-	-
Mo.	39	9	-	-	1,306	1,691	272	41	12	-	2	-
N. Dak.	-	-	-	-	5	9	4	-	-	-	-	-
S. Dak.	1	-	-	-	19	29	4	-	-	-	-	-
Nebr.	3	1	-	-	-	8	54	-	2	-	4	-
Kans.	11	10	-	-	441	716	25	11	-	-	1	7
S. ATLANTIC	977	174	10	4	12,350	20,577	110	154	49	9	19	14
Del.	15	1	-	-	160	201	1	15	19	-	4	10
Md.	142	14	5	-	1,607	1,970	21	37	1	1	9	-
D.C.	106	4	-	-	861	930	1	3	-	-	3	1
Va.	13	21	3	1	756	2,333	6	3	-	1	-	-
W. Va.	3	2	1	-	84	118	-	3	-	3	-	1
N.C.	60	13	1	-	3,010	1,914	8	23	6	-	1	1
S.C.	55	1	-	-	1,285	1,449	2	6	-	-	-	-
Ga.	131	16	-	-	1,655	8,455	19	18	13	-	2	-
Fla.	452	102	-	3	2,932	3,207	52	46	10	4	-	1
E.S. CENTRAL	195	55	1	-	4,918	4,290	36	125	122	-	10	1
Ky.	16	26	-	-	564	558	22	9	3	-	2	-
Tenn.	107	11	1	-	1,590	1,495	9	100	117	-	6	1
Ala.	57	15	-	-	1,621	1,028	3	14	2	-	-	-
Miss.	15	3	-	-	1,143	1,209	2	2	-	-	2	-
W.S. CENTRAL	603	14	2	-	6,199	4,619	69	27	6	4	4	2
Ark.	16	5	-	-	763	400	6	4	1	-	-	1
La.	140	-	-	-	1,333	1,028	3	7	2	-	-	-
Okla.	38	-	1	-	314	534	6	-	3	1	4	1
Tex.	409	9	1	-	3,789	2,657	54	16	-	3	-	-
MOUNTAIN	103	28	3	3	1,097	1,344	429	69	26	12	10	-
Mont.	-	-	-	1	10	6	14	2	-	-	-	-
Idaho	2	2	-	-	12	12	29	4	-	-	1	-
Wyo.	1	-	-	-	6	3	1	-	3	-	2	-
Colo.	4	7	1	-	361	491	136	9	9	8	-	-
N. Mex.	10	8	1	2	111	89	38	28	10	-	-	-
Ariz.	31	8	1	-	393	508	141	16	2	3	2	-
Utah	17	-	-	-	4	17	67	3	1	1	-	-
Nev.	38	3	-	-	200	218	3	7	1	-	5	-
PACIFIC	838	225	19	2	3,156	5,007	663	302	104	31	8	13
Wash.	26	-	-	-	493	456	55	14	14	-	-	-
Oreg.	23	-	-	-	174	147	21	12	3	-	-	-
Calif.	776	215	18	2	2,408	4,242	497	275	85	30	8	13
Alaska	3	3	1	-	45	112	78	1	-	-	-	-
Hawaii	10	7	-	-	36	50	12	-	2	1	-	-
Guam	-	-	-	-	8	10	-	-	-	-	-	-
P.R.	127	5	-	-	53	1	1	20	3	-	-	-
V.I.	30	-	-	-	13	9	-	1	-	-	-	-
Amer. Samoa	-	-	-	-	4	5	3	-	-	-	-	-
C.N.M.I.	-	2	-	-	7	5	-	-	-	-	-	-

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

*Updated monthly; last update January 30, 1993.

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending February 13, 1993, and February 8, 1992 (6th Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported*		Total									
	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	72	6	18	-	3	79	238	27	155	28	246	98	2	13	23
NEW ENGLAND	7	4	12	-	-	4	19	-	1	9	59	1	-	1	4
Maine	-	-	-	-	-	-	2	-	-	-	3	-	-	1	-
N.H.	1	-	-	-	-	-	4	-	-	4	48	-	-	-	-
Vt.	-	4	9	-	-	-	2	-	-	4	5	-	-	-	-
Mass.	5	-	-	-	-	2	10	-	-	-	-	1	-	-	-
R.I.	1	-	-	-	-	-	-	-	1	-	1	-	-	-	4
Conn.	-	-	3	-	-	2	1	-	-	1	2	-	-	-	-
MID. ATLANTIC	8	-	-	-	-	17	32	4	18	7	50	28	-	1	3
Upstate N.Y.	5	-	-	-	-	2	13	3	7	3	16	7	-	-	2
N.Y. City	2	-	-	-	-	2	3	-	-	-	-	-	-	-	-
N.J.	1	-	-	-	-	13	6	-	1	-	11	15	-	1	1
Pa.	-	-	-	-	-	-	10	1	10	4	23	6	-	-	-
E.N. CENTRAL	8	-	-	-	-	3	46	3	35	5	34	13	-	-	5
Ohio	2	-	-	-	-	2	7	2	18	4	25	-	-	-	-
Ind.	2	-	-	-	-	-	24	-	-	1	3	5	-	-	-
Ill.	2	-	-	-	-	-	9	-	5	-	-	3	-	-	5
Mich.	2	-	-	-	-	-	5	1	12	-	5	1	-	-	-
Wis.	-	-	-	-	-	1	1	-	-	-	1	4	-	-	-
W.N. CENTRAL	-	-	-	-	-	-	7	-	6	3	12	12	-	1	1
Minn.	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Iowa	-	-	-	-	-	-	2	-	2	-	-	1	-	-	-
Mo.	-	-	-	-	-	-	-	-	3	1	7	5	-	1	-
N. Dak.	-	-	-	-	-	-	-	-	1	-	1	2	-	-	-
S. Dak.	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-
Nebr.	-	-	-	-	-	-	-	-	-	-	1	2	-	-	-
Kans.	-	-	-	-	-	-	5	-	-	2	2	-	-	-	1
S. ATLANTIC	20	-	2	-	2	13	48	3	19	1	8	13	-	1	1
Del.	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Md.	3	-	-	-	1	1	2	-	7	-	3	6	-	-	-
D.C.	2	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Va.	-	-	-	-	1	4	5	1	5	-	-	2	-	-	-
W. Va.	-	-	-	-	-	-	1	-	2	1	1	-	-	-	-
N.C.	9	-	-	-	-	-	6	-	-	-	-	4	-	-	-
S.C.	-	-	-	-	-	-	6	1	2	-	2	-	-	-	-
Ga.	2	-	-	-	-	-	17	-	-	-	-	-	-	-	-
Fla.	3	-	2	-	-	8	9	1	3	-	2	1	-	1	1
E.S. CENTRAL	2	-	-	-	-	31	16	2	6	-	4	1	-	-	-
Ky.	-	-	-	-	-	29	4	-	-	-	-	-	-	-	-
Tenn.	-	-	-	-	-	-	6	-	3	-	1	-	-	-	-
Ala.	1	-	-	-	-	-	3	2	3	-	3	1	-	-	-
Miss.	1	-	-	-	-	2	3	-	-	-	-	-	-	-	-
W.S. CENTRAL	1	1	1	-	-	-	6	6	25	1	7	5	-	-	-
Ark.	-	-	-	-	-	-	2	-	1	-	-	3	-	-	-
La.	-	1	1	-	-	-	1	1	2	-	-	-	-	-	-
Okla.	1	-	-	-	-	-	-	-	2	1	7	2	-	-	-
Tex.	-	-	-	-	-	-	3	5	20	-	-	-	-	-	-
MOUNTAIN	2	1	1	-	-	-	17	4	15	-	11	9	1	2	-
Mont.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Idaho	-	-	-	-	-	-	1	1	3	-	-	4	1	1	-
Wyo.	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-
Colo.	1	-	-	-	-	-	-	1	2	-	-	3	-	-	-
N. Mex.	1	-	-	-	-	-	1	N	N	-	8	2	-	-	-
Ariz.	-	1	1	-	-	-	14	-	5	-	2	-	-	-	-
Utah	-	-	-	-	-	-	-	-	3	-	-	-	-	1	-
Nev.	-	-	-	-	-	-	-	2	2	-	-	-	-	-	-
PACIFIC	24	-	2	-	1	11	47	5	30	2	61	16	1	7	9
Wash.	-	-	-	-	-	-	5	2	5	1	2	1	-	-	-
Oreg.	1	-	-	-	-	-	6	N	N	-	-	2	-	1	-
Calif.	23	-	1	-	-	6	34	3	23	1	56	12	1	4	9
Alaska	-	-	-	-	-	5	1	-	2	-	-	-	-	1	-
Hawaii	-	-	1	-	1	-	1	-	-	-	3	1	-	1	-
Guam	-	U	-	U	-	3	-	U	1	U	-	-	U	-	-
P.R.	-	-	18	-	-	6	-	-	-	-	-	1	-	-	-
V.I.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amer. Samoa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C.N.M.I.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*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 February 13, 1993, and February 8, 1992 (6th 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	3,221	3,479	20	1,355	1,685	6	37	14	547
NEW ENGLAND	58	73	3	69	6	-	4	2	112
Maine	-	-	-	3	-	-	-	-	-
N.H.	-	4	-	-	-	-	-	-	3
Vt.	-	-	-	-	-	-	-	-	3
Mass.	35	25	3	1	3	-	3	2	28
R.I.	1	3	-	54	-	-	-	-	-
Conn.	22	41	-	11	3	-	1	-	78
MID. ATLANTIC	219	497	3	236	387	-	3	1	193
Upstate N.Y.	19	35	2	5	48	-	-	-	120
N.Y. City	163	259	-	157	241	-	2	-	-
N.J.	30	67	-	39	52	-	-	1	54
Pa.	7	136	1	35	46	-	1	-	19
E.N. CENTRAL	442	554	7	140	165	2	2	-	3
Ohio	162	62	4	19	33	-	2	-	-
Ind.	32	26	1	10	15	1	-	-	-
Ill.	150	265	-	89	71	-	-	-	-
Mich.	68	104	2	14	39	1	-	-	-
Wis.	30	97	-	8	7	-	-	-	3
W.N. CENTRAL	201	150	3	20	49	-	-	-	35
Minn.	10	7	1	-	24	-	-	-	9
Iowa	14	1	1	5	4	-	-	-	4
Mo.	177	140	-	8	18	-	-	-	1
N. Dak.	-	1	-	-	1	-	-	-	6
S. Dak.	-	-	-	2	-	-	-	-	-
Nebr.	-	1	-	2	-	-	-	-	1
Kans.	-	-	1	3	2	-	-	-	14
S. ATLANTIC	946	1,068	2	185	297	-	8	2	178
Del.	18	21	-	-	3	-	-	-	17
Md.	49	90	-	37	47	-	3	-	47
D.C.	55	73	-	8	12	-	-	-	3
Va.	59	78	-	-	18	-	-	-	47
W. Va.	5	1	-	5	9	-	-	-	5
N.C.	276	213	1	49	38	-	-	2	4
S.C.	161	159	-	24	31	-	-	-	9
Ga.	161	244	-	62	37	-	1	-	46
Fla.	162	189	1	-	102	-	4	-	-
E.S. CENTRAL	416	470	-	80	91	2	-	3	10
Ky.	41	16	-	21	28	-	-	2	1
Tenn.	120	114	-	-	-	1	-	-	-
Ala.	107	213	-	47	37	1	-	-	9
Miss.	148	127	-	12	26	-	-	1	-
W.S. CENTRAL	815	406	-	9	4	-	-	6	4
Ark.	77	36	-	9	3	-	-	-	2
La.	260	190	-	-	-	-	-	-	-
Okla.	59	22	-	-	1	-	-	6	2
Tex.	419	158	-	-	-	-	-	-	-
MOUNTAIN	14	78	-	25	26	-	1	-	5
Mont.	-	2	-	-	-	-	-	-	-
Idaho	-	1	-	-	4	-	-	-	-
Wyo.	-	-	-	-	-	-	-	-	2
Colo.	6	11	-	-	-	-	-	-	-
N. Mex.	1	7	-	-	6	-	-	-	1
Ariz.	7	28	-	17	11	-	1	-	2
Utah	-	1	-	-	-	-	-	-	-
Nev.	-	28	-	8	5	-	-	-	-
PACIFIC	110	183	2	591	660	2	19	-	7
Wash.	5	11	-	19	19	-	-	-	-
Oreg.	7	6	-	6	5	-	-	-	-
Calif.	97	164	2	549	603	2	19	-	-
Alaska	-	-	-	-	10	-	-	-	7
Hawaii	1	2	-	17	23	-	-	-	-
Guam	-	1	-	1	10	-	-	-	-
P.R.	46	2	-	-	12	-	-	-	2
V.I.	11	8	-	1	1	-	-	-	-
Amer. Samoa	-	-	-	-	-	-	-	-	-
C.N.M.I.	-	-	-	1	3	-	-	-	-

U: Unavailable

TABLE III. Deaths in 121 U.S. cities,* week ending February 13, 1993 (6th Week)

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	689	496	109	50	16	18	66
Boston, Mass.	187	121	31	15	8	12	21
Bridgeport, Conn.	66	47	11	4	2	2	10
Cambridge, Mass.	20	15	4	-	1	-	2
Fall River, Mass.	32	26	4	2	-	-	-
Hartford, Conn.	47	31	7	8	-	1	1
Lowell, Mass.	34	28	6	-	-	-	1
Lynn, Mass.	19	15	3	1	-	-	-
New Bedford, Mass.	22	17	4	1	-	-	4
New Haven, Conn.	32	25	3	3	-	1	2
Providence, R.I.	57	42	11	3	1	-	11
Somerville, Mass.	11	8	2	1	-	-	-
Springfield, Mass.	48	32	10	5	1	-	3
Waterbury, Conn.	40	34	4	1	1	-	3
Worcester, Mass.	74	55	9	6	2	2	8
MID. ATLANTIC	2,623	1,733	484	277	67	62	153
Albany, N.Y.	53	39	10	3	1	-	3
Allentown, Pa.	21	14	2	4	1	-	2
Buffalo, N.Y.	100	72	19	4	1	4	4
Camden, N.J.	39	22	9	6	1	1	-
Elizabeth, N.J.	25	19	1	4	1	-	3
Erie, Pa.§	55	46	7	1	1	-	4
Jersey City, N.J.	73	45	17	5	3	3	2
New York City, N.Y.	1,374	897	263	160	26	28	78
Newark, N.J.	76	33	23	13	3	4	5
Paterson, N.J.	36	15	9	9	1	2	3
Philadelphia, Pa.	336	216	52	37	15	16	13
Pittsburgh, Pa.§	81	57	15	6	3	-	10
Reading, Pa.	17	11	1	4	1	-	1
Rochester, N.Y.	127	100	15	6	5	1	12
Schenectady, N.Y.	33	27	5	1	-	-	4
Scranton, Pa.§	27	17	9	1	-	-	1
Syracuse, N.Y.	87	58	16	7	4	2	7
Trenton, N.J.	46	34	6	5	-	1	1
Utica, N.Y.	17	11	5	1	-	-	-
Yonkers, N.Y.	U	U	U	U	U	U	U
E.N. CENTRAL	2,108	1,321	392	203	128	64	110
Akron, Ohio	61	44	10	6	-	1	-
Canton, Ohio	39	33	4	2	-	-	6
Chicago, Ill.	451	168	83	94	91	15	10
Cincinnati, Ohio	100	62	24	10	-	4	8
Cleveland, Ohio	175	116	38	13	4	4	2
Columbus, Ohio	U	U	U	U	U	U	U
Dayton, Ohio	158	108	35	9	3	3	8
Detroit, Mich.	241	144	49	21	11	16	12
Evansville, Ind.	37	29	7	1	-	-	3
Fort Wayne, Ind.	66	51	7	3	2	3	5
Gary, Ind.	21	10	1	6	4	-	-
Grand Rapids, Mich.	70	53	12	3	-	2	3
Indianapolis, Ind.	178	124	30	15	5	4	12
Madison, Wis.	34	24	7	-	-	3	1
Milwaukee, Wis.	165	114	33	11	2	5	14
Peoria, Ill.	36	23	10	2	1	-	4
Rockford, Ill.	50	39	5	3	2	1	6
South Bend, Ind.	53	40	11	1	1	-	4
Toledo, Ohio	101	81	14	2	2	2	8
Youngstown, Ohio	72	58	12	1	-	1	4
W.N. CENTRAL	926	652	166	58	27	22	52
Des Moines, Iowa	128	90	26	7	3	1	12
Duluth, Minn.	30	26	2	-	1	1	3
Kansas City, Kans.	69	45	12	5	2	5	2
Kansas City, Mo.	110	80	16	7	3	4	5
Lincoln, Nebr.	25	20	3	-	1	1	6
Minneapolis, Minn.	211	152	39	13	3	4	14
Omaha, Nebr.	90	63	16	3	7	1	5
St. Louis, Mo.	133	85	27	16	4	1	-
St. Paul, Minn.	48	33	12	2	-	1	2
Wichita, Kans.	82	58	13	5	3	3	3

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	≥65	45-64	25-44	1-24	<1	
S. ATLANTIC	1,259	759	270	149	38	42	65
Atlanta, Ga.	183	105	42	29	5	2	8
Baltimore, Md.	84	47	18	10	5	4	8
Charlotte, N.C.	100	61	21	13	3	2	3
Jacksonville, Fla.	131	70	34	14	3	10	7
Miami, Fla.	121	65	24	26	4	1	2
Norfolk, Va.	40	25	7	6	1	1	5
Richmond, Va.	79	51	14	5	2	7	5
Savannah, Ga.	68	45	15	4	2	2	9
St. Petersburg, Fla.	61	51	6	3	-	1	1
Tampa, Fla.	153	105	27	17	1	3	10
Washington, D.C.	225	126	58	20	12	9	7
Wilmington, Del.	14	8	4	2	-	-	-
E.S. CENTRAL	863	600	172	57	18	16	71
Birmingham, Ala.	132	95	22	9	3	3	7
Chattanooga, Tenn.	85	54	18	7	1	5	11
Knoxville, Tenn.	80	58	17	4	1	-	5
Lexington, Ky.	74	59	10	5	-	-	12
Memphis, Tenn.	183	124	36	16	6	1	17
Mobile, Ala.	123	79	31	7	3	3	5
Montgomery, Ala.	36	29	5	1	-	1	1
Nashville, Tenn.	150	102	33	8	4	3	13
W.S. CENTRAL	1,079	698	211	113	31	26	47
Austin, Tex.	67	44	14	7	1	1	7
Baton Rouge, La.	47	34	6	1	1	5	3
Corpus Christi, Tex.	53	37	10	3	1	2	1
Dallas, Tex.	228	139	45	35	5	4	5
El Paso, Tex.	64	42	13	8	1	-	7
Ft. Worth, Tex.	96	63	13	11	5	4	5
Houston, Tex.	U	U	U	U	U	U	U
Little Rock, Ark.	64	39	17	5	1	2	2
New Orleans, La.	105	58	23	16	6	2	-
San Antonio, Tex.	197	127	43	15	7	5	6
Shreveport, La.	38	30	6	1	1	-	2
Tulsa, Okla.	120	85	21	11	2	1	9
MOUNTAIN	900	600	165	91	28	16	73
Albuquerque, N.M.	117	74	23	17	2	1	3
Colo. Springs, Colo.	50	32	8	3	6	1	4
Denver, Colo.	126	75	25	16	4	6	13
Las Vegas, Nev.	135	100	21	12	1	1	6
Ogden, Utah	36	28	5	2	-	1	6
Phoenix, Ariz.	174	106	39	19	8	2	24
Pueblo, Colo.	24	18	5	1	-	-	4
Salt Lake City, Utah	105	67	22	9	4	3	7
Tucson, Ariz.	133	100	17	12	3	1	6
PACIFIC	1,183	882	172	75	34	19	87
Berkeley, Calif.	13	8	3	2	-	-	1
Fresno, Calif.	76	48	15	7	4	2	5
Glendale, Calif.	U	U	U	U	U	U	U
Honolulu, Hawaii	58	47	5	3	3	-	5
Long Beach, Calif.	74	53	9	6	4	1	13
Los Angeles, Calif.	U	U	U	U	U	U	U
Pasadena, Calif.	30	24	4	1	-	1	1
Portland, Oreg.	152	113	20	11	6	2	6
Sacramento, Calif.	161	113	30	10	7	1	14
San Diego, Calif.	U	U	U	U	U	U	U
San Francisco, Calif.	U	U	U	U	U	U	U
San Jose, Calif.	208	157	36	10	1	4	23
Santa Cruz, Calif.	32	28	1	1	-	2	2
Seattle, Wash.	199	152	26	17	2	2	2
Spokane, Wash.	51	40	9	-	1	1	3
Tacoma, Wash.	129	99	14	7	6	3	12
TOTAL	11,630¶	7,741	2,141	1,073	387	285	724

*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.

Current Trends

Prenatal Care and Pregnancies Complicated by Diabetes — U.S. Reporting Areas, 1989

Women who are pregnant and who have diabetes (either established [i.e., diabetes mellitus diagnosed before conception] or gestational [i.e., carbohydrate intolerance of variable severity with onset or first recognition during pregnancy]) are at increased risk for adverse fetal and maternal outcomes (*1,2*). To reduce these risks, CDC, the American Diabetes Association, and other health-care professionals recommend that women who are of childbearing age and have diabetes undergo prepregnancy counseling and that all pregnant women receive early and continued prenatal care, including screening for gestational diabetes sometime during weeks 24–28 of pregnancy (*3,4*). Although appropriate prenatal-care practices, including screening for gestational diabetes, have been recommended by CDC and others, there is no system to routinely monitor national trends in prenatal practices among mothers with diabetes mellitus. This report summarizes an analysis of U.S. birth certificates in 1989 to characterize racial/ethnic differences in prenatal care for live births, including those among mothers whose pregnancies were complicated by diabetes.

The 1989 revision of the *U.S. Standard Certificate of Live Birth* lists the month of pregnancy in which prenatal care was initiated and demographic and medical information related to the pregnancy (*5*). Although the presence of diabetes is listed, the type of diabetes in pregnancy is not indicated. Rates of pregnancies complicated by diabetes were age-standardized to the aggregate population of all races/ethnicities, using the direct method. Rates with numerators less than 20 were not calculated because the numbers were too small to provide stable estimates.

During 1989, 3,600,184 (89.1%) of the 4,040,958 live-birth certificates reported on both Hispanic ethnicity and the presence of maternal diabetes. Because the District of Columbia, Rhode Island, Texas, and Virginia did not implement the revised certificates until March or April 1989, data on maternal diabetes were not available for those areas for all of 1989. In addition, Louisiana, New Hampshire, and Oklahoma did not require reporting of Hispanic ethnicity; and Louisiana, Nebraska, and Oklahoma did not require reporting of maternal diabetes.

The month of pregnancy in which prenatal care started was not reported for 2.1% of all women and 1.8% of women with diabetes. For all live births, 22.4% of mothers initiated delayed or late prenatal care*; 2.2% of mothers received no prenatal care. Delayed, late, or no prenatal care was more prevalent among women who were black, American Indian, Asian/Pacific Islander, Hispanic, and other minorities than among women who were non-Hispanic white (Table 1); those who received no prenatal care ranged from 1.1% (white women) to 5.2% (black women). The percentage who could not have been appropriately screened for gestational diabetes (i.e., received no care or initiated care after the 7th month of pregnancy) ranged from 2.1% (non-Hispanic white women) to 8.4% (American Indian women).

*Prenatal care was considered delayed if initiated in the second trimester and late if initiated in the third trimester.

Prenatal Care — Continued

For all women, the rate of established or gestational diabetes was 211.0 per 10,000 live births. This rate increased proportionately with age of the mother (age-standardized rates range: 73.3 per 100,000 [women aged <20 years] to 649.3 [women aged 40–49 years]) (Table 2).

In addition, for all women, the rate of both diabetes and a lack of prenatal care was 1.4 per 10,000 live births; such pregnancies occurred approximately three times more often among women aged 40–49 years than among those aged ≤39 years (Table 3).

TABLE 1. Percentage distribution of prenatal care, by race/ethnicity of mother — U.S. reporting areas,* 1989

Race/ethnicity of mother	No. births†	Delayed§ or late¶ prenatal care	No prenatal care	No screening for gestational diabetes**
White, non-Hispanic	2,490,746	16.3	1.1	2.1
Black, non-Hispanic	592,752	34.9	5.2	7.9
Hispanic	517,440	36.0	4.5	8.1
Asian/Pacific Islander	121,400	23.8	1.2	3.4
American Indian	32,093	39.2	3.4	8.4
Other	1,236	26.5	2.5	5.3
Total	**3,755,667**	**22.4**	**2.2**	**3.9**

*Excludes data for Louisiana, New Hampshire, and Oklahoma, which did not require reporting of Hispanic ethnicity.
†Includes births among mothers for whom Hispanic ethnicity and month of prenatal care were reported.
§Initiation in the second trimester.
¶Initiation in the third trimester.
**Includes mothers who received no prenatal care or who initiated care in the 8th or 9th month of pregnancy and for whom diabetes was not indicated as a medical risk factor. The denominators are births among mothers for whom diabetes status, Hispanic ethnicity, and month of prenatal care were reported.

TABLE 2. Rate* of pregnancy complicated by established or gestational diabetes, by race/ethnicity and age of mother — U.S. reporting areas†, 1989

Race/ethnicity of mother	No. births§	Age (yrs) of mother <20	20–29	30–39	40–49	All ages	Age-adjusted¶
White, non-Hispanic	2,384,806	90.9	179.8	301.3	562.4	213.7	207.4
Black, non-Hispanic	571,546	51.9	155.0	398.0	800.4	182.2	218.2
Hispanic	490,024	59.0	155.9	416.5	871.0	206.8	225.6
Asian/Pacific Islander	120,926	39.7	178.9	372.9	603.8	262.1	221.2
American Indian	31,689	111.6	301.2	837.2	1971.8	394.5	448.1
Other	1,193	NR**	NR	557.1	NR	301.8	NR
Total	**3,600,184**	**73.3**	**173.7**	**330.9**	**649.3**	**211.0**	**Referent**

*Per 10,000 live births in specified population.
†Excludes data for states that did not require reporting of medical risk factors (Louisiana, Nebraska, and Oklahoma) or Hispanic ethnicity (Louisiana, New Hampshire, and Oklahoma).
§Births among mothers for whom diabetes status and Hispanic ethnicity were reported.
¶Directly standardized to the aggregate population of all races/ethnicities.
**Not reported; numerators were less than 20 and too small for analysis.

Prenatal Care — Continued

TABLE 3. Rate* of pregnancy complicated by diabetes and a lack of prenatal care, by race/ethnicity and age of mother — U.S. reporting areas†, 1989

Race/ethnicity of mother	No. births§	Age (yrs) of mother				
		<20	20–29	30–39	40–49	All ages
White, non-Hispanic	2,354,042	1.0	0.6	0.9	NR	0.7
Black, non-Hispanic	555,048	NR¶	2.4	5.4	NR	2.8
Hispanic	477,422	NR	2.1	4.0	NR	2.5
Asian/Pacific Islander	117,019	NR	NR	NR	NR	2.4
Total**	**3,535,630**	**1.2**	**1.1**	**1.9**	**5.4**	**1.4**

*Per 10,000 live births in specified population.
†Excludes data for states that did not require reporting of medical risk factors (Lousiana, Nebraska, and Oklahoma) or Hispanic ethnicity (Louisiana, New Hampshire, and Oklahoma).
§Births to mothers for whom diabetes status, Hispanic ethnicity and month of prenatal care were reported.
¶Not reported; numerators were less than 20 and too small for analysis.
**Includes American Indians (whose rates are not shown because numerators were less than 20) and mothers of other racial/ethnic populations (whose rates are zero).

Black, Asian/Pacific Islander, and Hispanic women experienced such pregnancies more often than did non-Hispanic white women.

Reported by: Epidemiology and Statistics Br, Div of Diabetes Translation, National Center for Chronic Disease Prevention and Health Promotion; Natality, Marriage, and Divorce Statistics Br, Div of Vital Statistics, National Center for Health Statistics, CDC.

Editorial Note: The findings in this report indicate that in 1989 the likelihood of screening for gestational diabetes was lower and the risk of established or gestational diabetes was higher among women who were black, American Indian, Asian/Pacific Islander, or Hispanic. In addition, the risk of pregnancy complicated by diabetes and a lack of prenatal care was greater for women who were older.

The association between maternal diabetes mellitus and the risk of adverse outcomes is well established for pregnant women with diabetes (*6*). Preconception and prenatal care ensure the best outcomes for mothers with diabetes and their infants (*1–3*). Furthermore, prenatal care that is associated with hospital-based labor and delivery services has been linked to declines in rates of infant and maternal morbidity and mortality (*7,8*) and is cost-effective (*8*). Because the racial disparity in the timely receipt of prenatal care is substantial (*9*), race and other factors (e.g., socioeconomic status) must be considered when comparing incidence of gestational diabetes among populations (*10*).

The findings in this report are subject to at least four limitations. First, because gestational diabetes occurs in up to 3% of pregnancies (*2*), pregnancies complicated by diabetes may have been underreported on birth certificates in 1989. Second, the Hispanic population (as are births to Hispanic women) is concentrated in a few states (*10*). Third, diabetes during pregnancy has been overreported for women who are Chippewa Indians (Indian Health Service, unpublished data, 1992), and the exclusion of data for Oklahoma eliminated information for up to 24% of American Indian mothers with diabetes and for up to 22% of all American Indian mothers (Indian Health Service, unpublished data, 1985). Finally, because these measures do not include other outcomes of pregnancy (e.g., miscarriages and abortions), the total impact of lack of screening for gestational diabetes and prenatal care may be underestimated.

Prenatal Care — Continued

CDC is assessing the feasibility of national surveillance for diabetes in pregnancy. Ongoing analyses of national data from the current *U.S. Standard Certificate of Live Birth* can provide some measures of the occurrence of diabetes during pregnancy and associated negative outcomes. Also, additional information (e.g., prenatal care among pregnant women with established diabetes) may be available because birth-certificate forms now used by the departments of vital records in some states distinguish established and gestational diabetes as medical risk factors.

These findings underscore the need for physicians and other health-care professionals to 1) encourage patient participation in early and continued prenatal care, 2) record information about prenatal care on vital records such as birth certificates, and 3) develop prenatal programs that target women in populations at risk for not receiving prenatal care and gestational diabetes screening (e.g., older women). In addition, health-care professionals providing prenatal care are urged to identify, manage, and report on diabetes during pregnancy.

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