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Table 1-25. Deaths From 282 Selected Causes, by 5-Year Age Groups, Race, and Sex: United States, 1986—Con.

[Numbers after causes of death are category numbers of the Ninth Revision International Classification of Diseases, 1975]

Cause of death, race, and sex [1]	40-44 years	45-49 years	50-54 years	55-59 years	60-64 years	65-69 years	70-74 years	75-79 years	80-84 years	85-89 years	90-94 years	95-99 years	100 years and over	Not stated
Accidents and adverse effects-Con.														
Other accidents, including late effects (E900-E929)	828	768	715	848	968	952	1,062	1,159	1,100	912	544	170	41	70
All races, male	705	636	607	672	716	680	711	692	510	421	224	55	15	68
All races, female	123	132	108	176	252	272	351	467	590	491	320	115	26	2
White, male	568	480	494	528	612	565	613	581	434	375	198	49	10	59
White, female	96	107	81	144	201	226	277	402	514	439	283	104	18	2
Black, male	119	133	103	124	91	107	87	100	67	42	24	4	4	8
Black, female	24	22	20	31	47	41	67	57	72	48	33	9	8	-
Lightning (E907)	3	4	1	7	3	1	2	2	-	-	-	-	-	-
All races, male	3	4	1	7	3	1	1	2	-	-	-	-	-	-
All races, female	-	-	-	-	-	-	1	-	-	-	-	-	-	-
White, male	2	2	1	6	3	1	1	2	-	-	-	-	-	-
White, female	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Black, male	1	1	-	-	-	-	-	-	-	-	-	-	-	-
Black, female	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Accidental drowning and submersion (E910)	161	141	129	103	125	95	109	97	79	42	16	3	2	42
All races, male	142	111	108	87	80	67	76	64	37	22	8	1	2	41
All races, female	19	30	21	16	45	28	33	33	42	20	8	2	-	1
White, male	103	82	81	68	66	52	68	55	32	21	8	1	1	36
White, female	15	24	12	15	38	26	28	30	40	16	4	1	-	1
Black, male	33	25	22	14	13	13	6	7	4	-	-	-	-	5
Black, female	4	4	5	1	6	1	3	3	2	2	3	-	-	-
Inhalation and ingestion of food or other object causing obstruction of respiratory tract or suffocation (E911-E912)	90	97	119	164	220	297	346	414	461	443	290	98	19	1
All races, male	60	62	76	96	137	177	197	233	197	202	119	31	8	-
All races, female	30	35	43	68	83	120	149	181	264	241	171	67	11	1
White, male	52	44	62	74	117	150	168	197	174	180	108	28	6	-
White, female	24	29	36	60	61	95	120	162	237	225	156	63	7	1
Black, male	8	14	14	19	18	27	26	35	18	20	10	2	2	-
Black, female	5	6	5	8	20	23	29	18	27	15	13	4	4	-
Accident caused by handgun (E922.0)	5	3	4	2	4	2	3	1	1	-	1	-	-	-
All races, male	2	3	3	1	4	2	2	1	-	-	1	-	-	-
All races, female	3	-	1	1	-	-	1	-	1	-	-	-	-	-
White, male	2	3	2	1	4	2	2	1	-	-	1	-	-	-
White, female	3	-	1	-	-	-	1	-	1	-	-	-	-	-
Black, male	-	-	1	-	-	-	-	-	-	-	-	-	-	-
Black, female	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Accidents caused by all other and unspecified firearms (E922.1-E922.9)	75	53	49	36	45	32	24	22	11	7	1	-	-	3
All races, male	57	46	41	33	35	30	22	21	11	7	1	-	-	3
All races, female	18	7	8	3	10	2	2	1	-	-	-	-	-	-
White, male	43	40	39	29	34	26	20	20	10	7	1	-	-	3
White, female	16	5	7	3	10	2	2	-	-	-	-	-	-	-
Black, male	12	6	2	4	1	4	2	1	1	-	-	-	-	-
Black, female	2	2	1	-	-	-	-	1	-	-	-	-	-	-
Accident caused by explosive material (E923)	16	13	14	32	11	8	7	8	8	3	2	1	-	-
All races, male	16	13	13	26	10	7	4	6	6	-	-	1	-	-
All races, female	-	-	1	6	1	1	3	2	2	3	2	-	-	-
White, male	14	10	10	21	10	7	3	5	5	-	-	-	-	-
White, female	-	-	1	5	1	1	2	2	1	2	2	-	-	-
Black, male	1	3	3	5	-	-	1	1	1	-	-	1	-	-
Black, female	-	-	-	1	-	-	1	-	1	1	-	-	-	-
Accident caused by hot substance or object, caustic or corrosive material, steam, and exposure to radiation (E924,E926)	5	4	1	7	6	7	12	13	18	7	8	1	1	-
All races, male	3	2	1	4	5	4	8	6	4	1	5	1	-	-
All races, female	2	2	-	3	1	3	4	7	14	6	3	-	1	-
White, male	2	1	1	4	5	2	6	4	3	1	5	1	-	-
White, female	1	2	-	3	1	-	3	6	12	6	2	-	1	-
Black, male	1	1	-	-	-	2	2	2	1	-	-	-	-	-
Black, female	1	-	-	-	-	3	-	1	2	-	1	-	-	-
Accident caused by electric current (E925)	61	51	31	31	25	17	10	10	2	-	-	-	-	1
All races, male	59	49	30	29	23	17	9	9	2	-	-	-	-	1
All races, female	2	2	1	2	2	-	1	1	-	-	-	-	-	-
White, male	52	44	28	23	22	15	9	9	2	-	-	-	-	1
White, female	2	2	1	1	1	-	1	1	-	-	-	-	-	-
Black, male	7	5	2	5	1	1	-	-	-	-	-	-	-	-
Black, female	-	-	-	1	1	-	-	-	-	-	-	-	-	-
All other accidents and late effects of accidental injury (E900-E906,E908-E909, E913-E921,E927-E929)	412	402	367	466	529	493	549	592	520	410	226	67	19	23
All races, male	363	346	334	389	419	375	392	350	253	189	90	21	5	23
All races, female	49	56	33	77	110	118	157	242	267	221	136	46	14	-
White, male	298	254	270	302	351	310	336	288	208	166	75	19	3	19
White, female	35	45	23	57	89	102	119	201	223	190	119	40	10	-
Black, male	56	78	59	77	58	60	50	54	42	22	14	1	2	3
Black, female	12	10	9	19	20	14	34	34	40	30	16	5	4	-
Drugs, medicaments, and biological substances causing adverse effects in therapeutic use (E930-E949)	10	8	15	11	18	25	17	18	18	6	4	-	-	-
All races, male	6	3	10	7	8	10	8	9	5	1	1	-	-	-
All races, female	4	5	5	4	10	15	9	9	13	5	3	-	-	-
White, male	4	2	8	7	8	8	8	9	5	-	1	-	-	-
White, female	3	3	4	2	7	14	7	8	13	4	3	-	-	-
Black, male	2	1	2	-	-	2	-	-	-	1	-	-	-	-
Black, female	1	2	1	2	2	1	1	1	-	1	-	-	-	-
Suicide (E950-E959)	2,161	1,895	1,841	1,916	1,866	1,707	1,707	1,433	850	434	122	21	1	12
All races, male	1,552	1,380	1,328	1,417	1,371	1,344	1,368	1,161	695	365	100	18	1	11
All races, female	609	515	513	499	495	363	339	272	155	69	22	3	-	1
White, male	1,441	1,283	1,254	1,354	1,309	1,269	1,313	1,129	674	352	98	17	1	7
White, female	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	261	150	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 1-25. Deaths From 282 Selected Causes, by 5-Year Age Groups, Race, and Sex: United States, 1986—Con.

[Numbers after causes of death are category numbers of the Ninth Revision International Classification of Diseases, 1975]

Cause of death, race, and sex [1]	Total	Under 1 year	1 year	2 years	3 years	4 years	Under 5 years	5-9 years	10-14 years	15-19 years	20-24 years	25-29 years	30-34 years	35-39 years
Accidents and adverse effects-Con.														
Other accidents, including late effects (E900-E929)	19,264	511	410	297	226	139	1,583	515	665	1,244	1,441	1,432	1,231	1,016
All races, male	14,289	290	250	182	152	96	970	376	560	1,125	1,313	1,269	1,082	882
All races, female	4,975	221	160	115	74	43	613	139	105	119	128	163	149	134
White, male	11,505	192	203	157	131	79	762	266	401	895	1,044	1,001	865	705
White, female	4,058	151	130	94	57	33	465	91	63	97	105	124	109	110
Black, male	2,379	85	39	16	16	12	168	91	139	200	217	217	184	150
Black, female	807	62	23	18	16	8	127	47	35	19	17	31	33	19
Lightning (E907)	78	–	–	–	–	–	–	3	3	9	22	4	9	5
All races, male	69	–	–	–	–	–	–	2	3	7	19	4	7	5
All races, female	9	–	–	–	–	–	–	1	–	2	3	–	2	–
White, male	56	–	–	–	–	–	–	1	3	5	14	4	6	5
White, female	8	–	–	–	–	–	–	–	–	2	3	–	2	–
Black, male	9	–	–	–	–	–	–	–	–	2	4	–	1	–
Black, female	1	–	–	–	–	–	–	1	–	–	–	–	–	–
Accidental drowning and submersion (E910)	4,777	94	239	200	140	69	742	311	300	590	572	494	361	263
All races, male	3,856	47	145	130	105	53	480	229	246	548	524	436	320	227
All races, female	921	47	94	70	35	16	262	82	54	42	48	58	41	36
White, male	2,845	31	127	120	93	41	412	148	130	382	387	311	227	174
White, female	719	36	80	61	29	12	218	47	28	31	41	43	28	33
Black, male	836	13	11	5	8	7	44	69	106	144	110	101	79	41
Black, female	168	8	12	7	5	3	35	35	22	10	7	11	11	3
Inhalation and ingestion of food or other object causing obstruction of respiratory tract or suffocation (E911-E912)	3,692	157	64	28	16	15	280	21	28	28	46	71	78	81
All races, male	2,003	96	37	18	8	10	169	14	18	19	33	44	52	59
All races, female	1,689	61	27	10	8	5	111	7	10	9	13	27	26	22
White, male	1,637	60	21	11	6	8	106	10	10	15	21	30	41	44
White, female	1,438	44	19	8	6	3	80	4	8	6	9	21	18	16
Black, male	324	28	16	5	2	2	53	3	7	4	11	12	10	11
Black, female	232	15	6	2	2	2	27	2	1	3	3	6	7	6
Accident caused by handgun (E922.0)	183	–	–	3	3	2	8	5	23	39	36	22	17	7
All races, male	156	–	–	2	3	2	7	3	21	36	34	19	11	6
All races, female	27	–	–	1	–	–	1	2	2	3	2	3	6	1
White, male	131	–	–	1	2	2	5	3	20	29	28	14	11	3
White, female	19	–	–	1	–	–	1	1	1	3	1	2	3	1
Black, male	23	–	–	1	1	–	2	–	1	6	5	5	–	3
Black, female	8	–	–	–	–	–	–	1	1	–	1	1	3	–
Accidents caused by all other and unspecified firearms (E922.1-E922.9)	1,269	3	4	5	9	5	26	52	120	199	169	143	117	85
All races, male	1,098	2	3	3	5	2	15	37	104	174	149	129	105	78
All races, female	171	1	1	2	4	3	11	15	16	25	20	14	12	7
White, male	922	1	2	1	4	2	10	27	95	147	120	101	87	63
White, female	138	1	1	–	2	3	7	9	11	22	16	13	10	5
Black, male	149	1	1	1	1	–	4	8	7	24	22	21	16	14
Black, female	31	–	–	2	2	–	4	6	4	3	3	1	2	2
Accident caused by explosive material (E923)	242	1	3	2	–	2	8	4	5	10	12	31	24	25
All races, male	203	–	1	–	–	2	3	2	4	8	12	28	21	23
All races, female	39	1	2	2	–	–	5	2	1	2	–	3	3	2
White, male	175	–	1	–	–	2	3	2	4	8	11	26	17	19
White, female	32	–	2	1	–	–	3	2	–	2	–	3	3	2
Black, male	26	–	–	–	–	–	–	–	–	–	1	2	3	4
Black, female	7	1	–	1	–	–	2	–	1	–	–	–	–	–
Accident caused by hot substance or object, caustic or corrosive material, steam, and exposure to radiation (E924,E926)	134	12	10	3	–	–	25	2	–	1	6	4	2	4
All races, male	71	5	6	1	–	–	12	1	–	1	6	2	2	3
All races, female	63	7	4	2	–	–	13	1	–	–	–	2	–	1
White, male	54	4	3	1	–	–	8	–	–	1	4	2	1	3
White, female	48	3	3	2	–	–	8	1	–	–	–	2	–	–
Black, male	17	1	3	–	–	–	4	1	–	–	2	–	1	–
Black, female	14	4	1	–	–	–	5	–	–	–	–	–	–	1
Accident caused by electric current (E925)	854	4	9	4	5	1	23	11	24	86	128	141	113	69
All races, male	805	2	5	2	2	1	12	10	18	81	126	136	111	63
All races, female	49	2	4	2	3	–	11	1	6	5	2	5	2	6
White, male	734	2	3	1	2	1	9	9	16	76	120	121	105	73
White, female	40	2	4	2	3	–	11	1	3	4	2	4	2	4
Black, male	67	–	2	1	–	–	3	1	1	5	6	14	6	10
Black, female	8	–	–	–	–	–	–	–	2	1	–	1	–	2
All other accidents and late effects of accidental injury (E900-E906,E908-E909, E913-E921,E927-E929)	8,035	240	81	52	53	45	471	106	162	282	450	522	510	457
All races, male	6,028	138	53	25	29	26	272	78	146	251	410	471	453	398
All races, female	2,007	102	28	26	24	19	199	28	16	31	40	51	57	59
White, male	4,951	94	46	22	24	23	209	66	123	232	339	392	370	321
White, female	1,616	65	21	19	17	15	137	26	12	27	33	36	43	49
Black, male	928	42	6	3	4	3	58	9	17	15	56	62	68	67
Black, female	338	34	4	6	7	3	54	2	4	2	3	11	10	5
Drugs, medicaments, and biological substances causing adverse effects in therapeutic use (E930-E949)	196	1	1	–	–	–	2	1	6	4	11	5	7	10
All races, male	90	–	–	–	–	–	–	1	4	–	3	2	5	7
All races, female	106	1	1	–	–	–	2	–	2	4	8	3	2	3
White, male	77	–	–	–	–	–	–	1	3	–	3	2	4	4
White, female	86	1	1	–	–	–	2	–	1	4	6	1	2	2
Black, male	13	–	–	–	–	–	–	–	1	–	–	–	1	3
Black, female	18	–	–	–	–	–	–	–	1	–	2	2	–	1
Suicide (E950-E959)	30,904	...	...	...	...	...	...	5	250	1,896	3,224	3,429	3,282	2,852
All races, male	24,226	...	...	...	...	...	...	3	198	1,552	2,724	2,825	2,625	2,190
All races, female	6,678	...	...	...	...	...	...	2	54	344	500	604	657	662
White, male	22,270	...	...	...	...	...	...	2	166	1,414	2,427	2,471	2,336	1,953
White, female	6,167	...	...	...	...	...	...	–	46	305	449	523	579	513
													245	

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Alcohol, Drug Abuse and
Mental Health Administration
Rockville MD 20857

June 22, 1989

Note to: Ms. Peggy Dooley
White House Speechwriting Office

From: Eve K. Moscicki, Sc.D., M.P.H.
Assistant Chief, Epidemiology and Psychopathology Research Branch,
Division of Clinical Research, NIMH

Subject: Information on Suicide

Attached is the material you requested as background information on suicide among young people. Included in the packet are:

- A "Suicide Fact Sheet" that summarizes the essential epidemiological information;
- Tables from the National Center for Health Statistics showing suicide rates by age, sex, and race;
- The introductory chapter to Volume 1 of the four-volume Report of the Secretary's Task Force on Youth Suicide. This gives a nice overview of what we know and what we can do. The Report itself is at the printer's, and should be available in the fall of 1989.

Please don't hesitate to call me if I can be of any further help.

Eve Moscicki

SUICIDE FACT SHEET

Completed suicides, U.S., 1986

- Suicide is the 8th leading cause of death in US
- The age-adjusted rate is 12.5/100,000
  - Contrast this with the leading cause of death, diseases of the heart, at 175/100,000
- Suicide by firearms is the most common method
  - Nearly 60% of all suicides are by means of firearms
- Suicide is primarily a white male problem
  - 72% of all suicides are committed by white males
  - The gender ratio is 3.8:1
  - 65% of firearm suicides are committed by white males
- Suicide is primarily a problem of older adults
  - The highest suicide rates are for persons over 65 at 22/100,000

Completed Suicides among Young People, 1986

- Suicide is the second leading cause of death among young people 15 to 19 years of age
  - Rates in this age group, while low, have quadrupled in 30 years
  - From approximately 2.5/100,000 in mid-1950s to 10.2/100,000 in 1986
  - The total number of deaths in 1986 was 1896, compared with 30,904 for all ages
  - Many more young men than young women kill themselves, with a gender ratio of 4.3:1
  - Firearms is the most common method of suicide in this age group for both young men and young women
- Suicide is the third leading cause of death among young people 20 to 24 years of age
  - Rates in this age group have tripled in 30 years
  - From approximately 5.5/100,000 in mid-1950s to 15.8/100,000 in 1986
  - The total number of deaths in 1986 was 3224, compared with 30,904 for all ages
  - Many more young men than young women kill themselves, with a gender ratio of 5.4:1
  - Firearms is the most common method of suicide in this age group for both young men and young women

- Suicide is the third leading cause of death among young people 15 to 24 years of age
  - Rates in this age group have tripled in 30 years
  - From approximately 4-5/100,000 in mid-1950s to 13.1/100,000 in 1986
  - The total number of deaths in 1986 was 5120, compared with 30,904 for all ages
  - Many more young men than young women kill themselves, with a gender ratio of nearly 5:1.
  - Firearms is the most common method of suicide for both young men and young women

- Completed suicides among young people have been associated with several indicators of distressed and disrupted lives, including
  - Psychiatric disorder
  - Familial factors, such as family history of suicide or psychiatric disorder, family disruption (including separation or divorce, family violence, and emotional, physical, or sexual abuse)
  - Alcohol and/or other drug abuse
  - Incarceration
  - Exposure to the suicidal behavior of others, including family members, peers, and/or via the media - news or fiction stories
  - Recent severe stress
  - Prior suicide attempt
  - Firearm in the home

- The effectiveness of most school-based prevention programs focused solely on suicide has not been demonstrated.

- Programs designed to address suicide and suicidal behavior in the context of broader issues such as stress, coping skills, substance abuse, etc. offer one potentially effective approach to prevention.

Prepared by: Dr. Eve K. Mościcki
Epidemiology and Psychopathology Research Branch
National Institute of Mental Health

Source: National Center for Health Statistics

COLOR, AND SEX: UNITED STATES, 1979-86 - (RATES PER 100,000 POPULATION)

CAUSE-OF-DEATH CODE, COLOR, SEX, AND YEAR	TOTAL	UNDER 1 YEAR	1-4 YEARS	5-9 YEARS	10-14 YEARS	15-19 YEARS	20-24 YEARS	25-29 YEARS	30-34 YEARS	35-39 YEARS
SUICIDE (E950-E959)										
TOTAL, BOTH SEXES										
1986	12.8	...	...	0.0	1.5	10.2	15.8	15.6	15.8	15.2
1985	12.3	...	...	0.0	1.6	10.0	15.6	15.5	14.9	14.3
1984	12.4	...	...	0.0	1.3	9.0	15.6	15.7	15.3	15.1
1983	12.1	...	...	0.1	1.1	8.7	14.8	16.0	15.5	14.5
1982	12.2	...	...	0.0	1.1	8.7	15.1	16.6	15.4	15.2
1981	12.0	...	...	0.0	0.9	8.7	15.6	17.1	15.5	15.8
1980	11.9	...	...	0.0	0.8	8.5	16.1	16.5	15.3	15.4
1979	12.1	...	...	0.0	0.8	8.4	16.4	17.1	15.2	15.4
TOTAL, MALE										
1986	20.6	...	...	0.0	2.3	16.4	26.6	25.6	25.3	23.7
1985	19.9	...	...	0.0	2.3	16.0	26.2	25.3	23.5	22.2
1984	19.7	...	...	0.1	1.9	14.3	26.1	25.7	24.1	23.1
1983	19.2	...	...	0.1	1.6	14.0	24.3	25.6	24.7	21.9
1982	19.2	...	...	0.0	1.7	14.1	25.1	26.6	23.7	22.3
1981	18.7	...	...	0.0	1.2	13.6	25.6	26.8	24.0	23.4
1980	18.6	...	...	0.0	1.2	13.8	26.8	26.7	23.2	22.9
1979	18.6	...	...	0.0	1.1	13.4	26.5	27.3	22.9	21.8
TOTAL, FEMALE										
1986	5.4	...	...	0.0	0.7	3.8	4.9	5.5	6.3	7.0
1985	5.1	...	...	-	0.9	3.7	4.9	5.6	6.3	6.5
1984	5.4	...	...	0.0	0.6	3.5	5.2	5.7	6.6	7.3
1983	5.4	...	...	0.0	0.6	3.2	5.2	6.5	6.6	7.2
1982	5.6	...	...	0.0	0.4	3.2	5.1	6.7	7.2	8.3
1981	5.8	...	...	-	0.5	3.6	5.6	7.5	7.2	8.5
1980	5.5	...	...	-	0.3	3.0	5.5	6.5	7.7	8.1
1979	6.0	...	...	-	0.5	3.2	6.3	7.1	7.8	9.2
WHITE, BOTH SEXES										
1986	13.9	...	...	0.0	1.6	11.3	17.0	16.2	16.6	16.0
1985	13.4	...	...	0.0	1.8	10.8	16.4	16.3	15.6	15.2
1984	13.4	...	...	0.1	1.4	9.9	16.6	16.4	16.2	16.0
1983	13.1	...	...	0.1	1.1	9.4	15.5	17.0	16.5	15.3
1982	13.2	...	...	0.0	1.1	9.6	16.0	17.4	16.1	16.0
1981	12.9	...	...	0.0	1.0	9.5	16.5	17.9	16.0	16.6
1980	12.7	...	...	0.0	0.9	9.2	16.9	17.3	15.8	16.3
1979	12.9	...	...	-	0.9	8.9	16.7	17.5	15.5	16.1

COLOR, AND SEX: UNITED STATES, 1979-86 - (RATES PER 100,000 POPULATION)

CAUSE-OF-DEATH CODE, COLOR, SEX, AND YEAR	TOTAL	UNDER 1 YEAR	1-4 YEARS	5-9 YEARS	10-14 YEARS	15-19 YEARS	20-24 YEARS	25-29 YEARS	30-34 YEARS	35-39 YEARS
SUICIDE (E950-E959)										
WHITE MALE										
1986	22.3	...	...	0.0	2.4	18.2	28.4	26.4	26.4	24.3
1985	21.5	...	...	0.0	2.5	17.3	27.4	26.3	24.3	23.4
1984	21.3	...	...	0.1	2.1	15.8	27.5	26.5	25.1	24.1
1983	20.6	...	...	0.1	1.7	15.1	25.5	26.7	25.7	22.9
1982	20.7	...	...	0.0	1.7	15.5	26.4	27.5	24.5	23.1
1981	20.0	...	...	0.0	1.4	14.9	26.8	27.6	24.7	24.3
1980	19.9	...	...	0.0	1.4	15.0	27.8	27.5	23.5	24.0
1979	19.6	...	...	-	1.2	14.3	26.8	27.5	23.0	22.3
WHITE FEMALE										
1986	5.9	...	...	-	0.7	4.1	5.3	5.8	6.7	7.7
1985	5.6	...	...	-	0.9	4.1	5.2	6.1	6.7	7.0
1984	5.9	...	...	0.0	0.6	3.8	5.5	6.1	7.1	7.9
1983	5.9	...	...	0.0	0.4	3.5	5.5	7.1	7.2	7.8
1982	6.1	...	...	0.0	0.5	3.4	5.4	7.3	7.7	8.9
1981	6.2	...	...	-	0.6	3.8	5.9	8.0	7.4	9.1
1980	5.9	...	...	-	0.3	3.3	5.9	6.9	8.1	8.8
1979	6.5	...	...	-	0.6	3.4	6.5	7.4	8.1	10.0
ALL OTHER, BOTH SEXES										
1986	6.7	...	...	0.1	1.2	5.3	10.1	12.1	11.4	10.5
1985	6.6	...	...	-	1.0	6.1	11.7	11.0	10.9	8.6
1984	6.5	...	...	-	0.9	4.9	10.8	11.9	10.4	9.7
1983	6.2	...	...	0.0	1.0	5.4	10.6	10.7	10.2	9.2
1982	6.2	...	...	-	0.9	4.6	10.6	12.2	10.9	9.8
1981	6.6	...	...	0.0	0.3	4.7	10.9	12.7	12.3	10.4
1980	6.4	...	...	0.0	0.3	4.7	11.9	12.3	12.6	9.3
1979	7.3	...	...	0.0	0.4	5.4	14.6	15.0	13.2	11.0
ALL OTHER MALE										
1986	11.1	...	...	0.1	1.8	8.0	17.5	21.1	19.0	19.3
1985	11.0	...	...	-	1.3	10.0	20.2	19.7	18.9	14.2
1984	10.8	...	...	-	1.1	7.3	18.4	21.2	17.9	16.8
1983	10.3	...	...	0.1	1.0	8.7	17.8	18.8	18.5	15.1
1982	10.3	...	...	-	1.6	7.2	17.5	21.6	18.2	16.1
1981	10.6	...	...	0.1	0.3	7.2	18.4	21.7	19.8	16.9
1980	10.6	...	...	0.1	0.4	7.5	20.9	21.4	20.8	15.2
1979	12.0	...	...	0.1	0.6	8.5	24.6	25.8	22.2	18.7

COLOR, AND SEX: UNITED STATES, 1979-86 - (RATES PER 100,000 POPULATION)

CAUSE-OF-DEATH CODE, COLOR, SEX, AND YEAR	TOTAL	UNDER 1 YEAR	1-4 YEARS	5-9 YEARS	10-14 YEARS	15-19 YEARS	20-24 YEARS	25-29 YEARS	30-34 YEARS	35-39 YEARS
SUICIDE (E950-E959)										
ALL OTHER FEMALE										
1986	2.7	...	...	0.1	0.5	2.5	2.9	3.9	4.6	3.0
1985	2.5	...	...	-	0.6	2.2	3.5	3.1	3.8	3.8
1984	2.6	...	...	-	0.6	2.3	3.5	3.6	3.8	3.8
1983	2.5	...	...	-	1.1	2.1	3.8	3.5	3.0	4.1
1982	2.5	...	...	-	0.2	1.9	3.9	3.7	4.6	4.4
1981	2.9	...	...	-	0.3	2.2	3.8	4.8	5.8	4.8
1980	2.6	...	...	-	0.1	1.8	3.6	4.4	5.5	4.3
1979	3.1	...	...	-	0.2	2.3	5.3	5.5	5.6	4.6
BLACK, BOTH SEXES										
1986	6.5	...	...	0.1	1.0	4.6	9.0	11.9	12.2	10.7
1985	6.2	...	...	-	0.8	4.9	10.2	10.7	10.9	9.3
1984	6.2	...	...	-	0.7	3.8	9.6	11.9	11.2	10.1
1983	5.8	...	...	-	1.0	4.1	9.9	10.3	10.5	8.7
1982	5.9	...	...	-	0.8	3.9	9.3	12.0	10.9	10.5
1981	6.1	...	...	0.0	0.2	3.6	9.9	13.0	12.2	10.0
1980	6.0	...	...	0.0	0.3	3.6	11.2	11.9	12.9	9.1
1979	6.9	...	...	0.0	0.3	4.4	13.1	14.9	13.9	10.5
BLACK MALE										
1986	11.1	...	...	0.1	1.5	7.1	16.0	21.4	21.1	20.5
1985	10.8	...	...	-	1.3	8.2	18.5	19.5	19.7	15.7
1984	10.6	...	...	-	1.0	5.9	16.7	21.4	20.0	18.0
1983	9.9	...	...	-	0.9	6.5	16.7	18.7	19.5	15.6
1982	10.1	...	...	-	1.5	6.2	16.0	21.6	18.7	17.3
1981	10.2	...	...	0.1	0.3	5.5	17.1	22.8	20.5	17.3
1980	10.3	...	...	0.1	0.5	5.6	20.0	21.5	22.1	15.3
1979	11.5	...	...	0.1	0.3	6.7	22.5	25.7	23.8	17.9
BLACK FEMALE										
1986	2.3	...	...	0.1	0.4	2.1	2.4	3.3	4.4	2.4
1985	2.1	...	...	-	0.4	1.5	2.4	2.8	3.2	3.9
1984	2.2	...	...	-	0.4	1.7	3.0	3.4	3.5	3.4
1983	2.0	...	...	-	1.1	1.7	3.6	3.0	2.8	3.0
1982	2.1	...	...	-	0.2	1.5	2.9	3.3	4.2	4.8
1981	2.4	...	...	-	0.2	1.6	3.2	4.3	5.0	3.9
1980	2.2	...	...	-	0.1	1.6	3.1	3.5	5.0	3.9
1979	2.8	...	...	-	0.2	2.1	4.6	5.4	5.4	4.4

COLOR, AND SEX: UNITED STATES, 1979-86 - (RATES PER 100,000 POPULATION)

CAUSES-OF-DEATH CODE, COLOR, SEX, AND YEAR	40-44 YEARS	45-49 YEARS	50-54 YEARS	55-59 YEARS	60-64 YEARS	65-69 YEARS	70-74 YEARS	75-79 YEARS	80-84 YEARS	85 + YEARS
SUICIDE (E950-E959)										
TOTAL, BOTH SEXES										
1986	15.1	15.9	16.9	17.0	17.0	17.7	22.3	25.4	24.8	20.8
1985	14.9	15.5	15.8	17.0	16.3	16.8	20.7	23.3	25.3	19.1
1984	15.0	16.2	16.2	17.8	16.6	17.2	20.7	21.4	23.0	18.4
1983	14.9	15.5	17.0	17.1	15.9	16.4	19.4	21.5	23.6	19.0
1982	15.6	16.3	16.9	17.3	16.5	16.7	18.4	20.7	19.8	17.6
1981	16.0	15.9	16.3	17.1	15.5	15.6	16.9	18.3	19.0	17.7
1980	15.3	15.3	16.4	16.3	15.5	16.2	17.8	19.6	18.3	19.2
1979	15.5	16.0	17.0	16.3	17.0	17.5	18.2	20.9	20.6	17.9
TOTAL, MALE										
1986	22.1	23.7	25.2	26.4	26.9	30.7	41.8	52.8	58.6	61.6
1985	22.3	23.0	24.0	26.8	26.8	29.0	38.9	48.4	61.9	55.4
1984	22.0	23.5	23.8	27.5	26.8	29.1	39.3	45.2	54.7	51.7
1983	22.0	22.5	25.3	26.2	25.3	27.7	35.9	45.1	56.5	53.0
1982	22.8	23.4	24.9	26.1	26.4	28.3	34.9	43.7	47.8	50.2
1981	22.8	22.2	22.9	25.1	24.9	26.1	31.4	38.8	46.0	50.2
1980	21.9	21.9	23.8	24.9	23.9	28.1	33.5	41.5	43.8	50.6
1979	21.7	21.9	23.7	24.0	26.1	29.6	33.9	43.0	47.9	47.6
TOTAL, FEMALE										
1986	8.3	8.4	9.1	8.4	8.4	6.9	7.7	7.9	6.9	4.7
1985	7.8	8.4	8.1	8.2	7.2	6.7	7.2	7.4	6.0	4.6
1984	8.2	9.3	9.1	9.2	7.8	7.6	7.1	6.3	6.3	4.9
1983	8.0	8.8	9.2	9.0	7.7	7.3	7.3	6.5	6.1	5.1
1982	8.7	9.5	9.5	9.5	8.0	7.3	6.4	6.3	5.1	3.9
1981	9.4	10.1	10.1	10.0	7.4	7.2	6.4	5.5	4.7	3.8
1980	8.9	9.1	9.6	8.6	8.2	6.6	6.4	5.9	4.7	5.5
1979	9.5	10.4	10.9	9.4	9.2	7.9	6.8	7.0	5.9	4.7
WHITE, BOTH SEXES										
1986	16.2	17.2	18.4	18.4	18.2	18.7	23.7	27.3	26.3	22.1
1985	16.0	16.7	17.2	18.4	17.4	17.8	21.9	25.0	26.7	20.3
1984	16.1	17.5	17.5	19.1	17.7	18.4	22.0	22.9	24.5	19.5
1983	16.0	16.5	18.5	18.4	17.0	17.6	20.6	22.9	24.7	20.1
1982	16.8	17.7	18.1	18.5	17.7	17.7	19.7	22.2	20.8	18.6
1981	17.1	17.1	17.6	18.2	16.5	16.7	18.0	19.4	20.0	18.5
1980	16.2	16.5	17.6	17.3	16.5	17.3	19.0	21.0	19.2	19.9
1979	16.4	17.0	18.2	17.3	18.0	18.6	19.2	22.2	21.5	18.8

COLOR, AND SEX: UNITED STATES, 1979-86 - (RATES PER 100,000 POPULATION)

CAUSES-OF-DEATH CODE, COLOR, SEX, AND YEAR	40-44 YEARS	45-49 YEARS	50-54 YEARS	55-59 YEARS	60-64 YEARS	65-69 YEARS	70-74 YEARS	75-79 YEARS	80-84 YEARS	85 + YEARS
SUICIDE (E950-E959)										
WHITE MALE										
1986	23.5	25.4	27.2	28.6	28.8	32.3	44.5	57.0	62.4	66.3
1985	23.7	24.4	25.8	28.7	28.5	30.6	41.5	52.5	65.7	60.3
1984	23.3	25.1	25.6	29.2	28.4	31.0	41.7	48.3	58.6	55.8
1983	23.5	23.6	27.3	27.9	26.9	29.4	38.2	48.6	59.6	56.8
1982	24.3	25.2	26.3	27.7	28.2	29.9	37.4	47.2	50.8	53.9
1981	24.2	23.2	24.5	26.4	26.2	27.7	33.8	41.2	48.6	53.6
1980	23.0	23.2	25.3	26.2	25.4	30.0	35.9	44.9	46.5	52.8
1979	22.6	23.0	25.0	25.3	27.5	31.5	35.9	46.4	51.0	50.2
WHITE FEMALE										
1986	9.1	9.3	10.0	9.0	9.0	7.4	8.1	8.4	7.3	5.0
1985	8.5	9.2	8.9	9.0	7.7	7.1	7.5	7.6	6.2	4.7
1984	9.0	10.1	9.9	9.9	8.3	8.1	7.5	6.9	6.7	5.1
1983	8.7	9.7	10.1	9.8	8.3	8.0	7.8	6.8	6.4	5.3
1982	9.5	10.5	10.4	10.3	8.7	7.8	6.9	6.7	5.2	3.9
1981	10.1	11.1	11.0	10.7	8.0	7.8	6.6	5.8	5.0	3.7
1980	9.6	10.0	10.3	9.3	8.9	7.2	6.9	6.2	4.9	5.8
1979	10.4	11.3	11.9	10.1	9.7	8.3	7.2	7.2	5.9	5.0
ALL OTHER, BOTH SEXES										
1986	7.7	7.7	7.2	6.9	7.4	9.0	9.6	7.9	9.1	7.8
1985	7.9	8.2	6.8	6.9	7.2	8.2	9.0	7.6	10.8	5.9
1984	8.1	8.3	7.0	8.3	7.8	7.0	9.0	7.3	6.3	6.6
1983	7.5	8.4	6.3	7.5	6.0	5.9	7.8	7.9	11.1	7.3
1982	7.7	6.7	7.6	7.2	5.8	7.1	6.2	5.8	8.9	6.6
1981	9.2	8.4	6.1	8.5	6.6	6.4	6.3	8.2	7.6	8.4
1980	9.4	7.5	7.6	7.6	6.1	6.0	5.9	5.7	7.0	10.6
1979	9.0	8.7	7.6	7.7	8.2	7.5	8.2	7.5	9.4	7.5
ALL OTHER MALE										
1986	12.5	12.8	11.2	10.2	11.3	16.7	17.1	14.7	19.8	20.0
1985	12.8	13.5	11.0	12.7	11.8	15.0	15.2	11.4	23.3	11.7
1984	13.5	12.4	10.8	13.7	12.9	11.9	17.2	16.6	14.0	13.5
1983	11.4	14.2	9.7	12.3	10.4	12.0	15.0	13.5	25.8	17.6
1982	12.6	10.5	13.0	12.0	9.8	13.5	11.7	11.5	18.8	13.6
1981	13.5	14.4	9.3	13.7	12.4	11.6	9.3	17.0	19.1	15.6
1980	14.7	12.2	12.1	13.4	10.5	11.2	10.9	9.5	14.9	28.0
1979	14.9	14.2	12.9	12.0	12.4	12.1	15.5	11.5	15.1	20.3

COLOR, AND SEX: UNITED STATES, 1979-86 - (RATES PER 100,000 POPULATION)

CAUSES-OF-DEATH CODE, COLOR, SEX, AND YEAR	40-44 YEARS	45-49 YEARS	50-54 YEARS	55-59 YEARS	60-64 YEARS	65-69 YEARS	70-74 YEARS	75-79 YEARS	80-84 YEARS	85 + YEARS
SUICIDE (E950-E959)										
ALL OTHER FEMALE										
1986	3.6	3.3	3.9	4.3	4.3	2.9	4.2	3.4	2.8	1.8
1985	3.8	3.7	3.3	2.2	3.5	3.0	4.6	5.1	3.4	3.2
1984	3.5	4.8	3.9	3.8	3.6	3.3	3.0	1.0	1.8	3.3
1983	4.1	3.6	3.5	3.6	2.4	1.3	2.6	4.1	2.5	2.1
1982	3.5	3.5	3.2	3.4	2.7	2.4	2.2	2.1	3.0	3.1
1981	5.5	3.5	3.5	4.3	2.1	2.4	4.1	2.2	0.6	4.7
1980	4.9	3.7	3.9	2.9	2.5	2.0	2.2	3.0	2.1	1.7
1979	4.0	4.1	3.3	4.1	4.9	4.0	2.6	4.7	5.8	0.9
BLACK, BOTH SEXES										
1986	7.7	7.9	7.1	6.5	7.0	8.2	8.7	7.3	8.4	5.7
1985	8.0	8.2	7.4	5.8	7.0	7.2	8.7	7.7	10.7	3.4
1984	8.2	7.6	6.6	7.8	7.7	6.0	9.0	6.7	4.8	4.1
1983	7.6	7.9	6.3	6.7	5.5	6.2	6.9	5.9	8.5	5.8
1982	7.9	6.0	8.0	7.2	5.6	6.8	5.7	4.1	7.8	5.8
1981	8.5	8.1	5.7	8.0	6.2	5.7	6.1	8.1	6.5	5.4
1980	10.2	7.0	6.9	6.6	6.3	5.9	5.3	4.6	5.5	6.3
1979	9.3	7.8	7.8	7.7	8.0	7.3	7.0	5.1	7.0	5.8
BLACK MALE										
1986	13.1	13.7	11.8	9.5	10.3	15.9	16.3	14.2	19.8	17.9
1985	13.8	14.6	12.3	11.2	11.8	14.7	17.4	11.0	25.0	7.7
1984	14.6	11.6	11.5	13.3	13.5	10.5	18.4	16.7	12.0	11.1
1983	12.0	13.9	10.2	13.0	10.1	12.8	14.8	12.0	23.5	12.7
1982	13.6	9.8	13.8	13.4	10.2	12.9	11.2	9.3	17.6	16.1
1981	13.3	15.0	9.5	13.2	11.7	10.5	8.6	18.2	17.5	12.7
1980	16.0	11.8	12.2	12.2	11.1	11.4	10.7	9.2	13.3	18.9
1979	15.8	13.5	14.0	12.7	12.9	13.0	14.2	9.3	13.0	15.4
BLACK FEMALE										
1986	3.2	3.1	3.3	4.0	4.4	2.3	3.4	2.9	2.0	-
1985	3.2	3.0	3.5	1.3	3.1	1.5	2.7	5.6	2.7	1.4
1984	3.0	4.3	2.7	3.2	3.0	2.6	2.4	0.4	0.7	0.8
1983	4.0	2.9	3.2	1.5	1.9	1.3	1.4	1.9	-	2.3
1982	3.1	2.9	3.3	2.4	2.0	2.3	1.9	0.8	2.1	0.9
1981	4.5	2.5	2.6	3.9	1.8	2.1	4.3	1.6	-	1.8
1980	5.4	3.0	2.6	2.1	2.5	1.8	1.5	1.7	0.8	-
1979	3.8	3.0	2.8	3.6	4.1	3.1	1.9	2.1	3.2	1.0

Volume 1:
Overview and
Recommendations

Report of the Secretary's Task Force on **Youth Suicide**

January 1989

U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES
Public Health Service
Alcohol, Drug Abuse, and Mental Health Administration

EXECUTIVE SUMMARY

BACKGROUND

The suicide rate for young people between ages 15 and 24 almost tripled during the past 30 years. Suicide is now the second leading cause of death for young people in this age group. This sharp increase in suicide rates in one segment of the population, especially when rates for most other causes of death were decreasing in the United States, prompted the Secretary of Health and Human Services to organize a task force to investigate this pressing problem.

The task force was charged with investigating what could be done to prevent youth suicide. In the past, suicide had traditionally been considered a mental health problem of older adults. Its prevention was based on the detection and treatment of psychological illness in adults, most commonly depression. Beginning in 1980, however, more than half of all suicides occurred among persons under the age of 40. In addition, evidence suggested that depression was less frequently associated with suicide in young people than adults. In light of these findings, what reason was there to think that prevention based on detecting and treating depressed adults could work for nondepressed young people? Few research studies had examined suicide and suicide prevention in young people; nor was it known whether inferences drawn from research on adults could be applied to youth.

The major functions of the task force were to review, assess, and consolidate the available information about suicide; provide forums for communication among health care professionals, educators, researchers, social service workers, and families; and recommend activities to address the problem. The task force was also charged with coordinating suicide activities among Federal agencies, Congress, State and local governments, private agencies, and professional organizations.

FINDINGS

In fulfilling its charge, the task force concluded that:

- The state of knowledge about youth suicide--what causes it, who is at greatest risk, and how to prevent it--is much less developed than that of many other health problems.
- Acquiring this knowledge will require a carefully coordinated, sustained program of focused research and an organized multidisciplinary approach that integrates the diverse interests in the field.
- We need to evaluate rigorously the effectiveness of various interventions designed to prevent suicide.
- An effective approach to suicide prevention will need to involve committed individuals in health, mental health, education, and social services in both the public and private sector.

We know that certain characteristics, called risk factors, are associated with an increased likelihood of suicide in a population. Some possible risk factors include parental loss, family disruption, emotional stress, a history of abuse and neglect, homosexuality, being a friend or a family member of a suicide victim, previous suicide attempts, mental illness or drug dependency in a family member,

chronic or acute alcohol and drug abuse, and access to firearms.

While mental illness is often related to suicide, only a portion of the young people who commit suicide have been diagnosed as mentally ill. Many young suicide victims did not have a major mental illness but had a history of conduct disorders characterized by impulsive, aggressive, antisocial behavior, often complicated by substance abuse. Another large group of young suicide victims did not fit these characteristics but included socially inhibited youngsters who were perfectionists or prone to extreme anxiety in the face of social or academic challenges. The breakup of a relationship, a recent arrest, and being the victim of beating, assault, or rape are events that most commonly precipitate suicide. Reduced levels of 5-hydroxyindoleacetic acid (5-HIAA), a serotonin metabolite found in the spinal fluid, are associated with suicide and other violent acts by some young people.

Guns are the most frequently used means for suicide for both males and females, followed by hanging, poisoning by drug overdose, and jumping from high places. Five times as many males as females in the 15 to 24 age group commit suicide. An estimated 20 or more suicides are attempted for every one completed. Approximately three times as many females attempt suicide as males.

RECOMMENDATIONS

After extensively reviewing the medical and sociological literature, and obtaining the best advice from experts in a broad range of disciplines, the task force developed six recommendations that address the most urgent needs for research, education, and services to prevent youth suicide. During this process, we actively sought to involve many individuals and interest groups at the national and community level, including health and mental health care providers, representatives of suicide prevention advocacy groups and volunteers, educators, social and behavioral scientists, and members of families in which a suicide has occurred.

The Task Force on Youth Suicide believes that the Federal government should play an active role in monitoring the implementation of these recommendations and place a high priority on supporting data collection, research, services, and information dissemination.

Summary of the Recommendations

1. Develop accurate, timely, and valid data on suicide and attempted suicide.
We must develop uniform definitions for suicide and special programs (called "surveillance systems") at the State and local levels to identify and report suicides and suicide attempts more consistently, objectively, and completely. Standardized criteria for determining suicide as a cause of death should be implemented by death certifiers. These procedures may also provide the means to detect unusual patterns, or "clusters," of suicides and help to identify methods to prevent such suicides.

2. Conduct multidisciplinary research to determine and evaluate the risk factors for suicide.
It is important to identify the many psychological, sociological, and biological factors that contribute to an increased likelihood of suicide among youth. Well-planned, coordinated, and adequately funded efforts will help elucidate the causes of suicide, facilitate the identification of youth at greatest risk, and help in targeting intervention and preventive services for young people.

Because the risk factors for suicide are very diverse, we believe that suicide research can be enriched by interdisciplinary efforts that combine, for example, educators, biologists, sociologists, and psychiatrists in research projects.

3. Evaluate the effectiveness and cost of interventions to prevent suicide.
Little is known about the effectiveness of the

many suicide prevention and intervention programs that have been initiated since the 1970s. We need to know more about the kinds of interventions that work, for whom and under what circumstances they work.

We need to evaluate suicide prevention centers, telephone hotlines, school-based intervention and education programs, and peer support groups as well as programs targeted to specific groups. These include programs that enhance the ability of gatekeepers (people who are in frequent contact with youngsters) to recognize the warning signs of potentially suicidal youth and programs that improve early identification and treatment of depression by health care professionals. We also need to evaluate specific treatment modalities for suicide attempters, and programs that give emotional support to people who have survived another's suicide.

Because firearms are the most frequently used method for committing suicide, we must assess whether programs limiting access to this lethal means of suicide, especially to persons known to be at high risk, have an overall effect on suicide rates.

4. Support the delivery of suicide prevention services.

While the physical needs of young people who come to health care facilities are usually well attended to, other personal, school, or family problems that may place an adolescent at risk for suicide, are frequently not recognized by many health care providers.

Physicians, nurses, and others in health care settings, e.g., emergency rooms, general medical clinics, health maintenance organizations, prenatal clinics, should be alert about the risk factors for suicide among youth, have the ability to identify those in danger, and have the resources to refer them to appropriate mental health care. Emergency room personnel, for example, should refer adolescents for psychological evaluation when suicide attempts are suspected. In addition, more health care professionals are needed who specialize in psychological problems of youth.

Because its roots lie in many different social, health, and educational problems experienced by youth, suicide cannot be dealt with in isolation from other self-destructive behaviors. Suicide prevention activities should be integrated into broader health promotion programs and health care delivery services directed at preventing other self-destructive behaviors, such as alcohol and substance abuse, teen pregnancy, and interpersonal violence.

These improvements in services will require cooperation among health service, social service, and juvenile justice agencies. They will also require easing the legal and financial barriers that inhibit young people from obtaining appropriate health and mental health care.

Finally, technical assistance for communities in which suicides have occurred, should be made more widely available. State and local public health departments are the most appropriate agencies for providing assistance in developing response plans that will reduce the chances of further suicides in the community.

5. Inform and educate the public and health service providers about current knowledge in the prevention, diagnosis, and treatment of suicide among youth.

We must both promote public awareness of youth suicide and provide necessary training for health care professionals in suicide prevention. Developing special programs to improve the ability of gatekeepers to recognize clues to suicide, training school system personnel to assess suicidal risk in young people, and encouraging them to refer high risk youngsters to appropriate care are important aspects of suicide education. Moreover, we must make every effort to disseminate information on youthful suicide and suicide attempts to interested individuals and organizations through resource centers or information clearinghouses.

6. Involve both public and private sectors in the prevention of youth suicide. No simple, universally effective intervention will solve the problem of suicide. Preventing youth suicide will require the efforts of all sectors of the community--public and private--implemented at the national, State, and local levels.

Businesses should provide and encourage employees to use employee assistance programs when a family member is at risk for suicide. **Foundations and corporations** should increase their support for programs to prevent youth suicide. The **media and entertainment** industry should cooperate in efforts to investigate whether television and other media affect suicidal behavior of young people. **Youth services** should include primary prevention programs directed toward disadvantaged, socially isolated, and other underserved youth. **Religious** counselors should be aware of the indicators for suicidal risk and resources from which young people can get help. **Legal** means should be investigated for ways to limit access to means of suicide and ways to alleviate liability concerns of mental health professionals who treat suicidal youth.

The **criminal justice system** should educate personnel to recognize the high risk of suicide during periods of incarceration and provide mental health services for identifying and treating suicidal individuals. States should encourage **social services** in the public and private sector to develop comprehensive, preventive approaches for families with youth at high risk for suicide, substance abuse and interpersonal violence. Programs should be developed to strengthen **families** and enable them to support their youth through life crises.

The factors contributing to youth suicide are complex and defy simplistic solutions. These recommendations are not likely to be accomplished by short term efforts, but will require a variety of long term, ongoing, prevention activities and intervention approaches.

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Medical News

August 16, 1985

'Public health problem' of violence receives epidemiologic attention

In a darkened auditorium at a national medical meeting, a series of slides flashes on the screen.

They show a young man pointing to where he shot himself in the chest. A tape player presents the man's introspective commentary, in which he speaks of how he has felt periodically depressed, abused alcohol and other drugs, alienated his girlfriend, and how one night he called the police, telling them that he was going to shoot himself.

The police came, the speaker says, and he "felt I had to go through with it." So, he says, he shot himself.

He survived to relate his story to psychiatrist Mark Rosenberg, MD, who tells the assembled physicians: "It's hard to learn about suicide because the people who have the answers are gone. His [the tape-recorded speaker's] story gives us some valuable insights."

This is only one unorthodox part of an unorthodox presentation in which Rosenberg carries out dialogues and informal surveys with the audience, asking them about their encounters with violence. This is his approach to the topic of "Violence as a Public Health Problem." As chief of the recently formed Violence Epidemiology Branch of the Centers for Disease Control, Atlanta, Rosenberg has the task of finding clues to violent behavior, using them to formulate preventive strategies, and carrying out those strategies.

For additional reports on the study of violence, see the Aug 9 MEDICAL NEWS.

But first, Rosenberg faces an almost equally difficult job. In a culture in which both domestic violence and violence perpetrated by strangers are considered social and criminal problems, he is joining other physicians and public health workers in addressing violence as a public health problem, amenable to preventive medicine approaches, and involving physicians everywhere.

Of course, medical professionals, especially psychiatrists, have been working to uncover the roots of interpersonal violence for many decades. But the Violence Epidemiology Branch of the Centers for Disease Control now becomes one of all too few formal organizations dedicated to applying epidemiologic principles to this problem.

To do this, the branch is studying suicide, homicide, domestic violence (especially spouse abuse), child abuse, rape, and other sexual abuse. Its goal (like that of others working in this field) is to reduce violence-associated morbidity and mortality through epidemiologic approaches.

"For most of us, this is a new area," Rosenberg says. "We must first become aware of what violent problems are. They are not just the random shooting in the street.

"Violence includes domestic sexual abuse, spouse abuse, and child abuse. The odds are that any doctor has some families in his practice who are victims of violence. In fact, you'd be hard-pressed to find a practice that does not contain such families. When you think you have recognized such a problem, ask questions, take a history."

In its 39-year history, the Centers for Disease Control has played a role in struggles against many formidable foes. But most of these are infectious diseases, and once an infectious agent has been identified, strategies for prevention and treatment can be formulated and widespread public health campaigns implemented.

It is only recently that public health officials have begun applying epidemiologic methods to noninfectious, or behavioral, causes of illness and death. At the Centers for Disease Control, a major impetus in this direction came from the 1980 report, "Promoting Health/Preventing Disease: Objectives for the Nation," prepared under the then-director, William Foege, MD, now special assistant for policy development (and a member of the Editorial Board of THE JOURNAL). That report led to greater emphasis on methods to reduce behavioral illness. It was also a major factor in the formation of the violence branch

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in 1981.

"Dr Foege spearheaded the public health approach to violence," says Rosenberg. "He asked [in the 1980 report], 'What's killing people?' "

The results showed that violence was a major contributor, Rosenberg says, adding: "In the 15 to 24 [year-old] age group, all the leading causes of death were violent acts—accidents, homicide, and suicide. What makes violence even more important is that it kills so many young people. So the number of years of life lost is multiplied."

Rosenberg points out that accidents, suicides, and homicides are far back on the mortality list with a combined total of 65 deaths per 100,000 people annually in the United States. But heart disease and cancer—the leading causes of death—mostly strike people in the latter decades of life. Violent deaths occur earlier. Thus, when causes of death are listed by years of potential life lost before age 65 years, the leading killer is accidents, with 2.2 million. Cancer (1.8 million years) and heart disease (1.5 million years) come next, followed closely by suicide and homicide (1.2 million years).

"Now that the outcomes of violence can be quantitated in the traditional terms in which the effects of public health programs are measured—morbidity and mortality—the Centers for Disease Control staff has become interested in applying the methods of public health to violence," Rosenberg says.

But this public health view of violence is new to some persons. "Many doctors tell me that we should stay away from this area, or that we're handling it wrong," Rosenberg says. Even among the audience at the medical meeting, who voluntarily came to hear his talk, many answer "No" to his question: "Is violence a medical problem?"

To some extent, this resistance may be personal. "This is not an area that most of us in medicine have had much experience with," Rosenberg says, contending: "Medical professionals are largely upper-middle-class whites, the social group that has the least experience with violence.

"But I believe that this is an area that we can approach scientifically and make a difference. We can mount a scientific campaign to understand it and to

Epidemiologists also studying suicidal behavior

Among the primary aspects of violence that staff members of the Centers for Disease Control, Atlanta, are working on are suicide and attempted suicide (*JAMA* [LEADS FROM THE MMWR] 1985;254:472-473).

In an application of epidemiologic methodology, Mark Rosenberg, MD, chief, violence branch, Centers for Disease Control, and colleagues studied 30,000 death certificates of young persons who committed suicide. The highest risk was associated with young white men, ages 20 to 25 years.

It appears that the suicide incidence increased as the number of men in the 15-to-24-year age bracket increased with the postwar baby boom, Rosenberg says. The rate appears to be leveling off as the "bulge" grows older, he says.

Rosenberg wonders if the increase also has been due to a kind of social crowding phenomenon. Could it involve competition for jobs? Depersonalization? Increased class size or family size? No one knows.

Another phenomenon recognized during the last few years is clusters of teenage suicides. One of the most publicized examples occurred a few years ago in a Texas community, when three young people killed themselves within three months. Shortly after intense news coverage of the incident, three more young people in the same town killed themselves.

"Is suicide contagious?" Rosenberg asks. These clusters, he says, cut across socioeconomic boundaries.

Again, Rosenberg turns to the contagion model: "It appears that the first suicide facilitates [subsequent] suicide by other kids," he speculates.

In all, the Centers for Disease Control and other health agencies have identified about 15 of these sudden outbreaks of teenage suicide. In one incident, such a cluster (17) went undetected for some time, because of an overly protective county coroner who had been classifying the deaths as accidents to avoid making the families feel guilty.

Such a well-intentioned cover-up makes the epidemiologists' job of studying teen suicide outbreaks even more difficult. This incident shows clearly that, in moving into such an emotionally charged area, the Centers for Disease Control will encounter psychological obstacles not usually seen in tracking infectious disease outbreaks.

At this time, no one knows how to intervene to head off a cluster of further suicides when the first few occur. Some advocate hushing them up. Others suggest mounting a broad-based information campaign or using a buddy system.

Work by epidemiologist Eva Dakin, DPH, has uncovered what look like warning signs for adolescents who are prone to suicide.

Dakin, who is an assistant professor in the Harvard School of Public Health, Boston, analyzed the medical records of 13-to-17-year-olds coming to a hospital emergency department for self-destructive acts.

do something about it."

Some persons argue that violence is not a disease, so it is not a medical problem. Rosenberg points out that the incidence of infectious diseases began to decline 70 to 80 years before there were vaccines, even before many organisms were identified: "People saw malnutrition and overcrowding as contributing factors and attacked them."

To be similarly successful against violence, Rosenberg suggests, medical workers will have to join a much larger effort. Except for the medical pioneers in this area, he says, "medicine and public health are [relative] newcomers to this problem."

"Who knows about violence?" he asks. Social workers, psychiatrists, psychologists, and sociologists have been working in this area for years, he notes, and have much to contribute to this effort. (The violence branch includes a sociologist, a criminologist, a medical anthropologist, a psychiatrist, and a statistician. All have training as epidemiologists.)

The violence branch is also working with other groups that have different orientations. Among these organizations is the National Institute of Justice.

In 1976, the National Institute of Mental Health, Rockville, Md, funded the first nationwide survey of domestic violence. That survey revealed that 1.8 million American women are "severely beaten" each year by their husbands or boyfriends (Straus MA, Gelles RT, Steinmetz SK: *Behind Closed Doors: Violence in American Families*, New York, Anchor, 1980).

Says Thomas Lalley, MA, of the institute: "That was the first survey to give us a real handle on the problem." The data are currently being updated in a new national survey of violence in white, black, and Hispanic families.

Lalley also says that New York state has developed a protocol that can assist hospital staff members in identifying and treating adult victims of domestic violence. He cites the Department of Social Work at Harborview Medical Center in Seattle for having developed a "very comprehensive" program for victims of sexual assault and domestic violence.

Lalley identifies another aspect of this problem: Most people have difficulty understanding why a woman continues to live with a man who abuses her.

Rosenberg lists several possible reasons. The woman may be financially dependent on her husband. Or she may have children who are financially dependent on him.

More difficult for most of us to fathom, Rosenberg suggests: "She may have grown up in a family where domestic violence was frequent, and fails to realize that it's not right to be beaten. If a daughter witnesses her mother being beaten, she has a much greater chance of tolerating a beating when she grows up." And, he says: "Some people think, if your husband beats you, you must have done something terrible to deserve it."

The best course is getting away, so that she can see her options, Rosenberg says. "It is hard to think about options if you're always worrying about your safety or your kids' safety."

Of course, getting physically away is not easy for a woman without independent means of support. When even her contact with the medical system brings no encouragement or offer of help, it is unrealistic to expect her to act on her own.

An abused woman's need for support to leave her husband or boyfriend is a strong argument for shelters for this purpose, many workers say. In a shelter, a woman can be protected temporarily and obtain the emotional encouragement of women who can empathize with her situation.

There are 500 to 1,500 shelters in the United States today, Rosenberg estimates. Most are underfunded, and many cannot afford medical help.

Even if a physician wishes to refer an abused woman to a shelter, it may not be easy. Because of the

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For each self-destructive young person, two other adolescents seen in the emergency department for nondestructive injuries (such as sunburn or sports accidents) were chosen as controls. "One of the things noted," Dakin says, "was a high frequency of family violence and child abuse reports in the records of the self-destructive children but not in the records of the other adolescents."

But young persons who are seen for self-destructive behavior are almost certain to be interviewed by a psychiatrist or social worker, so they would be much more likely to have a psychiatric history taken. To correct for this, through an elaborate coding system to protect confidentiality, Dakin found out how many children in each group were "known to" or "had had contact with" the Massachusetts Department of Social Services.

"There was a significantly higher probability for children in the proband group to be known to the department," she found. These contacts were more than 90% likely to be due to child abuse.

Dakin's next step will be to find out specifically which children are known to the agency, what the reason for the contact was, and how it was handled by the agency. The initial finding led to a preliminary intervention study, in which Dakin and her colleagues offered special services to self-destructive young persons seen at one hospital, comparing their outcome with similar young persons seen at another hospital without the extra care. "The intervention appeared to be effective in some areas, but not in others," Dakin says.—by WILLIAM A. CHECK

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very real danger for some women's husbands, some shelter locations are secret. Often only local emergency department personnel know how to contact them.

For a time, Minnesota had a law mandating reporting of suspected spouse abuse cases. But physicians and hospitals reportedly did not comply with the law. "It's hard to put out the extra effort for the added reporting burden if you don't see any clear and direct benefit," Rosenberg notes.

Another obstacle to physicians' helping battered women is the threat of legal action. "I don't think a doctor could be held liable for referring a woman for appropriate medical counseling," says Rosenberg.

But reporting such cases is different. All 50 states have laws protecting doctors from liability for reporting child abuse cases. However, the patchwork of laws in states and cities covering reporting of suspected spouse abuse creates quite a different situation. "If a doctor reports suspected domestic violence to the police or a social service agency, he may be held liable for breach of confidentiality," Rosenberg says.

The already difficult nature of this problem is sometimes aggravated by the abused women's ambivalence. One physician told Rosenberg of a case in which a woman was beaten and told him that it had been done by her spouse. He reported the case to authorities, but the woman subsequently denied that her husband had done it and sued the physician.

Perhaps the models for involving the entire medical system in what was originally considered strictly a domestic or sociological problem is child abuse. Many date the widespread entry of doctors into this area from the 1962 paper, "The Battered-Child Syndrome," by Colorado pediatrician C. Henry Kempe, MD, who died last year (*JAMA* [MEDICAL NEWS] 1984;251:2069). (For a reprinting of this "Landmark Article" and a follow-up perspective, see *JAMA* 1984;251:3288-3295.)

Even before there was a violence branch at the Centers for Disease Control, Janine Jason, MD, had started applying epidemiologic techniques to study child abuse. She came to the Atlanta facility in 1980 from a background in pediatrics practice.

Her first assignment was to analyze an existing data set on child abuse that no one had had time to work on. That work changed her orientation to the problem.

"In pediatrics, you're not taught to appreciate what in a public health sense is an important problem," she says. If such a situation is only now being remedied, more than 20 years after Kempe's article in THE JOURNAL, some observers suggest it may indicate the task Rosenberg and his colleagues have before them in changing medical attitudes toward other types of violence.

Jason's data analysis showed what previous workers had found: Classic child abuse is almost always family-perpetrated crime. This work defines the optimal interventions as parent education and improved prenatal care and teaching of mothering skills to expectant mothers.

The data also show that "for abuse of kids, there's a major role for doctors," Jason says. Even abusive parents usually bring their children to the physician for treatment. But, even with all 50 states having passed mandatory reporting laws, it appears that the incidence of child abuse has not abated, she says, and it may be increasing. However, increased awareness also may mean better reporting.

Currently, the definition of child abuse also includes psychological abuse. "But, even taking these factors [that might increase the number of reported cases] into account, it still looks as though child abuse is increasing," Jason concludes. "A major reason is the recent funding cutbacks, especially cutbacks in social work funding."

But there is a more fundamental reason why current efforts have not made any apparent dent in the problem of child abuse—including child sexual abuse—claims Boston pediatrician Eli H. Newberger, MD. Newberger believes that the very terms "child abuse," "child sexual abuse," and "battered-child syndrome" are part of the problem. They both reflect and intensify judgmental and punative attitudes. "There is a real reluctance on the part of most medical workers to implicitly condemn the parents of their patients with diagnoses that suggest blame and imply a need for punishment," he says.

"What's needed," in Newberger's opinion, "is a change in attitude fostered by a change in terminology. We have to abandon value-laden simplistic terminology in favor of a more neutral and humane classification system."

Newberger believes that this change in attitude requires a deeper understanding of families in which violence occurs, as well as better education of medical workers. "My feeling is that one of the most important ways we can do this is through epidemiology, in addition to longitudinal psychological studies."

As director of the family development program at Children's Hospital in Boston, Newberger's work covers all types of family violence. As a pediatrician, he is especially interested in child abuse and child sexual abuse.

He finds the problems are related: "We very often see child abuse and child sexual abuse in the context of interspousal violence."

He decries the classification of injuries into "accidents" on the one hand and "battered-child syndrome," or "child abuse," or "spousal violence" on the other hand. Such labels imply fault and "a mandate for intervention that many doctors are uncomfortable with."

In Newberger's view, both accidents and apparently

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deliberately inflicted injuries spring from a common situation: "What's involved in many accidents, as well as inflicted injuries, is a loss of the capacity of the family to protect its members from violent urges, sexual impulses, and environmental hazards. Rarely is it the case, in my experience, that a caregiver intentionally sets out to destroy a defenseless child."

The punitive view of family violence leads to another problem, Newberger believes. It causes a bias in case reporting.

Because abuse is perceived as a criminal act, physicians tend to report poor and black parents more often, he suggests. In January, Newberger published the results of a study that he did with sociologist Robert Hampton, PhD. They looked at medical charts of abused children in a hospital setting after diagnosis, but before reporting, and again after reporting. They report: "Race and class, but not severity of injury, tend to drive hospital case reporting practice. More than half of children with serious injuries were not reported. Underreporting of children with serious injuries was more frequent in affluent families" (*Am J Public Health* 1985;75:56-60).

This tendency, if widespread, causes several problems. For one, it is, of course, unjust. But there is another, more subtle effect. "What's represented in the knowledge base are 'caught' cases, and these tend to be of impoverished and socially marginal families," Newberger says.

This outcome distorts beliefs about child abuse, Newberger says. He cites a recent attorney general's report saying all offenders in family violence cases should be arrested. But when a federal official was revealed in February to be a long-time wifebeater, he had only to resign his job, Newberger points out.

What is needed, for one thing, is more information, Newberger says: "We are severely restricted in not knowing what happens to victims. The very names 'child abuse,' 'child sexual abuse,' and 'battered child' portend ominously for children.

"Yet, we know that there is a fantastic frequency of childhood abuse, and most of these people grow up apparently normal. There is also a serious problem anticipating what the effects of a particular intervention would be. There is a desperate need for research to help judges and social workers make the vexing decisions about criminality versus therapeutic intervention."

Finally, Newberger believes that his fellow physicians need much improved education in the area of family violence. He finds that physicians still hold to disproven assumptions, such as that there must be psychiatric illness in families where there is violence.

More physicians need to understand that many victims of child sexual abuse and spousal violence will conceal the violence and come to them with only somatic complaints, Newberger says. Physicians need to learn how to interview such patients, he says, to bring out their real concerns and also learn how to approach the offending family member in a helpful way.

For those physicians who still feel reluctant to report child abuse, the Centers for Disease Control's Rosenberg offers reassurance: "In most states, the doctor does not have to prove that child abuse is occurring. What is required is to report cases when you suspect abuse is occurring."

Rosenberg notes that, "the most common fear is that the doctor will lose contact with the child-patient after reporting. But I think the more common reaction [of parents] is relief.

"As a psychiatrist, I was in a position where I thought if I reported child abuse I would lose rapport with the parents. In truth, it's often a relief to the parent, an external restraint. You are saying: 'I'm going to help you stop doing this.'

"The doctor's message should be: 'This is a serious problem. I'd like to help you.' Parents may have trouble controlling their impulses. They often welcome the chance to get help."

But Rosenberg concedes that child abuse incidence figures are not encouraging. "No one has yet shown that reporting child abuse through a medicalized system decreases its incidence," he acknowledges.

And, in their attack on homicide, Rosenberg says, the violence branch's epidemiologists believe that they can contribute by identifying determinants of homicide, so that the optimal intervention points can be identified.

After the Centers for Disease Control's Jason worked on child abuse for a time, she gained access to police files for murdered and missing children and Federal Bureau of Identification crime reports.

In addition to the classic abuse against infants and young children, she found a pattern of abuse against older children, teenagers, and youths. Having established a partial profile of persons likely to be killed, Jason asks: "How do you get to these people? You want to get those who go to public health clinics. But adult males in the prime of life—the most common targets—don't go for continuing care."

Another way to identify persons at risk is to select families calling the police for help with domestic violence. These calls are among the most dangerous. (Of all police killed, 40% are killed responding to such calls.) There used to be domestic crisis intervention units in police departments under the Law Enforcement Assistance Act; those units died when that act ran out.

Only a few domestic crisis intervention units are left, one of them in Atlanta. The head of public safety, George Naper, is a sociologist who is "very interested" in creative approaches to homicide prevention,

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according to Rosenberg.

When a domestic violence call is received by Atlanta police, a social worker goes along with the police. The social worker attempts to perform follow-up and provide needed support services.

But the system is now overloaded, Rosenberg says. There are too many referrals for available personnel. Therein lies the role of epidemiology, according to Rosenberg: "We hope to pick up indicators of domestic violence, so officials can concentrate their attention on the families at highest risk."

Another source of important information is hospital records, says Lalley of the National Institute of Mental Health. A study of hospital emergency departments in northeast Ohio, conducted by investigators located at Case Western Reserve University, Cleveland, found that four times more cases of assault were recorded in hospital records than appeared in police records.

One year ago, the secretary of the Department of Health and Human Services set up a Task Force on Black and Minority Health. "The task force has been driven by an excess deaths model," Lalley notes. "It asked: 'What kills minority persons more often than whites?' Homicide among blacks and Hispanic males just jumps out at you." He believes that the task force's work will lead to greater research and policy attention to elevated rates of black and Hispanic homicide.

But using Federal Bureau of Investigation or police files seriously distorts the picture of domestic violence. As Rosenberg points out: "Poor people call the police; rich people go to see a therapist."

And yet homicide occurs in suburban families as well. How to detect at-risk families in that social group has yet to be determined.

Although simply asking a patient about family violence may seem trivial, it is neglected even by most mental health professionals. A recent study in the *American Journal of Psychiatry* (1984;141:378-389) found that psychiatrists rarely ask about violence. Rosenberg comments: "We ask patients in detail about hallucinations, but something the patient really saw or experienced, we rarely ask about."

How much of an impact medicine can make on the problem of violence remains to be seen. "In any political organization like the Centers for Disease Control you have to show you're making some progress," says Jason.

"But in violence," she says, "there are no quick fixes. So it's a tough problem for the Centers for Disease Control to sink its teeth into, because no one is willing to say: 'Let's work on this for 20 years and see how much impact we can have.'

"It's just sad that it took so long to recognize this problem and to start to set up programs to deal with it."—by WILLIAM A. CHECK

MISCELLANEA MEDICA

THE JOURNAL and staff have received additional recognition.

Marsha F. Goldsmith, associate editor, MEDICAL NEWS Department, has been named this year's recipient of the Morris Fishbein Award ("for distinguished achievement in medical writing") from the Greater Chicago Chapter, American Medical Writers Association, for her report on Alzheimer's disease that appeared in the April 13, 1984, issue (*JAMA* [MEDICAL NEWS] 1984; 251:1805-1813,1840). This is Marsha Goldsmith's second major medical writing award in recent weeks (*JAMA* [MEDICAL NEWS] 1985; 253:2628).

Also, this is the third time in the 15-year history of the Fishbein award that it has been earned by an associate editor of the MEDICAL NEWS Department.

In another signal honor for THE JOURNAL, the editor, **George D. Lundberg, MD**, is one of this year's Marty Mann Medallists. The award, sponsored by the National Foundation for Alcoholism Communications and given by *Alcoholism and Addiction* (formerly *Alcoholism/The National Magazine*), Seattle, honors the founder of the National Council on Alcoholism. This year's Marty Mann Award winner is **Claudia Black, PhD**, Laguna Niguel, Calif, author and lecturer in the area of children of persons with alcoholism. Lundberg and THE JOURNAL were honored for the Oct 12, 1984, issue that focused on alcohol-related problems.

Two Yale physicians will share the Ciba-Geigy-International League Against Rheumatism Rheumatology Prize for arthritis research. **Allen C. Steere, MD**, associate professor of medicine, and **Stephen E. Malawista, MD**, chief of the Section of Rheumatology and professor of medicine at Yale University



Drs Steere and Malawista

School of Medicine, New Haven, Conn, received the award for their work on the cause and treatment of Lyme disease (*JAMA* [MEDICAL NEWS] 1976;236:241-242).

Robert O. Pasnau, MD, is the new president-elect of the American Psychiatric Association. He is director of Adult Psychiatry Clinical Services at the University of California, Los Angeles, Neuropsychiatric Hospital.

NIDA FACSIMILE FORM

TO: Name, Organization, City, State

Peggy Dooley
White House Research
Staff
WASHINGTON, D.C.

Fax Number 456-6218

Confirmation # 456-7750

No. of Pages 13

FROM: Name, Office, Room, Phone Number

ABRAHAM FORMAN
NIDA/OPEA/CAPE
10A54
443-1124

National Institute on Drug Abuse
5600 Fishers Lane
Rockville, MD 20857

Date 6/21/89

STATEMENT

BY

C. EVERETT KOOP, M.D., Sc.D.

SURGEON GENERAL

U.S. PUBLIC HEALTH SERVICE

SURGEON GENERAL'S WORKSHOP ON DRUNK DRIVING: PROCEEDINGS

NOT FOR RELEASE BEFORE

10:00 A.M. EDT, May 31, 1989

RP0725

Good morning and welcome to my final press conference as Surgeon General. Since this is my last press conference, it has been referred to as my swan song. However, what you will hear today is prudent advice from a wise old owl, not a serenade from a dying swan or a lament from a lame duck.

During the past year, I have received over 1,200 letters from individuals encouraging me to address the issue of alcohol-impaired driving. I also received resolutions signed unanimously by the House of Representatives and by 99 Senators urging me to take all appropriate action to bring the problem of alcohol-impaired driving under control.

The concern expressed by both individuals and the Congress stems from personal losses and from overwhelming statistics. An estimated 2 million drivers are arrested each year in the United States for driving under the influence of alcohol.

Nearly 24,000 people lost their lives in alcohol-related traffic crashes last year -- an average of one alcohol-related fatality every 22 minutes. An additional 534,000 people suffer injuries in alcohol-related crashes every year -- an average of one every minute.

Drinking and driving continues to be the number one killer of teenagers. More than 40 percent of all deaths for people age 15 to 20 years result from motor vehicle crashes. Approximately half of these fatalities involve alcohol. These injuries and deaths from alcohol-impaired driving make it a serious threat to public health and safety.

To develop a plan for preventing the problem, I conducted a Surgeon General's Workshop on Drunk Driving in December 1988.

The workshop was attended by 120 professionals who served on 11 expert panels that made over 200 recommendations.

Today I am releasing the workshop Proceedings which contains the final workshop recommendations, as well as implementation steps. Since the United States Congress asked me to focus national attention on this problem, I am directing the Proceedings to the Congress for action. I want the Congress to provide leadership and resources to the Nation to implement the recommendations.

In particular, there are 10 key summary recommendations that I endorse and want the Congress to support. The recommendations are described in detail in your press kits; I will give you their essence now:

1. Reduce the blood alcohol concentration (BAC) from its present level of 0.10 percent to 0.04 percent by the Year 2000. Establish a level of 0.00 percent for drivers under 21 years of age.

2. Increase excise taxes on alcoholic beverages and tax beer, wine and distilled spirits equally based on alcohol content.

3. Have each State provide a system to fund comprehensive alcohol-impaired driving programs.

4. Reduce the availability of alcoholic beverages.

5. Pass legislation in each State to confiscate drivers' licenses on the spot for those found to be above the legal BAC. This is known as administrative license revocation.

6. Match the level of alcoholic beverage advertising with an equal number of pro-health and pro-safety messages.

7. Restrict certain types of advertising and marketing practices, especially those which reach underage youth.

8. Conduct public information efforts which are based on social marketing and communication strategies and on sound learning principles.

9. Conduct drinking and driving education within worksites, the communities, health care agencies and schools.

10. Increase the enforcement of drinking and driving laws and expand the use of sobriety checkpoints.

I chose these 10 key summary recommendations because collectively they have the potential for saving thousands of lives. All are based on logic and common sense. Most were supported by more than one of the 11 expert panels; many have research to document their effectiveness.

By highlighting these 10 key summary recommendations, I do not mean to play down the importance of the other workshop recommendations. All 200 plus recommendations need to be reviewed and considered for implementation. Within my time constraints, I will only comment briefly on my "Top 10."

On the BAC, enacting the lower limits will send a clear message that driving after drinking is risky. It affects judgment, vision, reaction time and ability to brake and control speed.

Three States (Maine, Oregon and Utah) make it an offense to drive at or above 0.08 percent. The BAC limit of 0.04 percent already applies to airline pilots, railroad engineers and drivers of commercial vehicles in the United States.

I have campaigned previously for a Smoke-Free Society by the Year 2000. I want a safer limit of 0.04 percent BAC by the same year and a level of 0.00 for those under 21 years of age enacted immediately.

On taxes, Federal excise tax rates on alcoholic beverages have remained frozen since 1951 except for a small increase in the tax on distilled spirits. This means that the real price of alcoholic beverages has declined over time compared to other commodities. A six-pack of beer often sells for less than a six-pack of soda. Why raise Federal excise taxes? Simple. The evidence strongly shows that an increase in price brought about by an increase in excise taxes prevents or delays underage youth from drinking and also reduces the amount that heavier drinkers consume.

For States, funding for impaired-driving programs can be accomplished in two distinct ways. Some States such as New York have imposed additional fines or fees for impaired-driving offenses. These additional monies are returned to counties to fund their programs.

Other States have increased their alcoholic beverage excise tax which I refer to as a "user fee". This user fee provides funds for programs that prevent alcohol-impaired driving.

Utah generates $8 million per year from a 3-cents-a-can increase on beer. Of this amount, almost $6.5 million is used by counties for alcohol and other drug education in elementary and secondary schools, as well as for impaired driving programs.

I strongly recommend that States consider 5 cents a drink to be the minimum tax increase. After all, who could quarrel with a

"nickel a drink" user fee that will generate billions of dollars to help save lives?

On availability, studies have shown that many drivers become alcohol-impaired at restaurants, bars, stadiums and other public facilities. To reduce availability, the following actions should be taken:

- Eliminate happy hours and other reduced-price promotions;
- Adopt "open container" laws prohibiting people from having open alcoholic beverage containers in their vehicles;
- Limit hours and density of sales outlets;
- Require impaired-driver prevention training of sellers and servers; and
- Adopt or strengthen server- and seller-liability statutes.

These actions may not make people as happy as happy hours do, but they will help keep them alive.

Another swift and sure way to decrease impaired driving is to immediately suspend the drivers' licenses of people who are found driving with a BAC above the legal limit.

Minnesota, New Mexico, Nevada, North Carolina, Oklahoma, Oregon, West Virginia and Wisconsin have all observed significant reductions in alcohol-related fatal crashes after implementing license suspension or revocation procedures. Other States should follow their lead.

Licenses should be suspended for a minimum of 30 to 90 days. Repeat offenders should lose their licenses for longer periods of time and have their license plates and vehicles confiscated.

This is tough talk and here comes some more. I have received a lot of praise as Surgeon General because of my strong stand on AIDS prevention. I was never afraid to say the "C" word, condom. I am also not afraid to say the "A" word and that word is advertising.

Certain advertising and marketing practices for alcoholic beverages clearly send the wrong messages about alcohol consumption to the wrong audiences. These practices include the following:

- Directing advertising to college students and other youth who are under the legal drinking age;

- Using celebrities who have strong appeal to youth;

- Sponsoring and promoting events such as rock music concerts and sports competitions where the audience is largely under the legal drinking age; and,

- Using advertising that portrays activities like race car driving which are dangerous to do in combination with alcohol use.

These practices -- illustrated by the posters on the stage -- tell youth that alcohol consumption leads to athletic, social and sexual success. They send the message that drinking is a normal and glamorous activity without negative consequences. And our young people are believing these messages.

A 1988 survey showed that fully 92 percent of high school seniors had tried alcohol at least once, two-thirds were regular drinkers and one-third had consumed 5 or more drinks in a row in a 2-week period. Only 43 percent believe there is great risk of harm from such binge drinking once or twice each weekend.

But this much drinking can be deadly, especially when combined with driving. It is important to note that all these kids are underage. These trends have changed little in the past decade in spite of vigorous education efforts.

Other surveys indicate that we also need to be concerned about drinking by elementary and junior high school students. For example, a study of 8th graders conducted by the Association for the Advancement of Health Education found that 1 out of 4 consumed five or more drinks at one time in the two weeks prior to the survey.

Contrary to what some media reported, the workshop participants did not recommend a ban on alcohol advertising. They called first for the alcoholic beverage producers and the media to substantially increase public service advertising.

Currently, public service announcements with pro-health and pro-safety messages are completely overshadowed by alcoholic beverage advertising. They are not as slick, not as sophisticated, and not as frequently aired as the alcohol advertisements.

If substantially increased public service time and space do not become available, Federal and State governments should be authorized and funded to pay for advertising. This has been proposed by members of Congress for AIDS education and is currently being done for smoking in several States. It could also be done with drinking.

While I am on the subject of advertising, warning labels should be required on all alcoholic beverage advertising. And please enlarge the warning labels required on bottles and cans beginning this November. Even a person my age should be able to read the warnings without using a magnifying glass.

Will the American public support these measures? The answer is yes. A recent Gallup poll shows that some 75 percent of Americans favor a Federal law requiring radio and television stations to provide equal time for public service messages to counter alcohol advertising.

In addition, the White House Conference For A Drug-Free America last year recommended restrictions on alcohol advertising. Similar restrictions have also been called for by the American Medical Association, the American Academy of Pediatrics and the American Academy of Family Practitioners.

A survey conducted for the U.S. Bureau of Alcohol, Tobacco and Firearms revealed that 80 percent of respondents believed that alcohol advertising influences underage youth to drink. Teenagers who testified before the National Commission Against Drunk Driving for its 1988 youth report agreed. "With near unanimity, the youths themselves declared that advertising encourages adolescents to drink," the Commission reported.

The National PTA and the National Governors' Association have favored "equal time" provisions to counter alcoholic beverage advertising. The American Public Health Association has endorsed similar provisions.

Going back to my key recommendations, the next one is to conduct well-planned public information efforts. Public information is the underpinning of a comprehensive program. Without high

visibility, strategies to deter drinking drivers are virtually ineffective. A large audience needs to be reached in a variety of ways with well-designed messages.

These messages should focus on the risks and consequences of alcohol-impaired driving, prevention steps and the importance of parents being good role models for their children. I personally have been dismayed in my travels around the country to hear tales about parents serving alcoholic beverages to their children's underage friends.

Alcohol or other drug education has been conducted traditionally within school and college settings. I ask that educators and other professionals use health care, worksite and community settings to reach thousands more people. A primary goal of drinking and driving education must be no use of alcohol and other drugs for those under 21 years of age.

The last key recommendation is to increase the enforcement of drinking and driving laws. Techniques that have proven effective must be used. They include sobriety checkpoints, drug testing procedures and standardized field sobriety testing.

Enforcement is a critical element in the system to deter drinking and driving. Police must detect and apprehend more drinking drivers. The public needs to believe that drivers will be arrested if they drive while intoxicated.

Sobriety checkpoints are a highly visible and effective enforcement tool. They are used successfully in many States and other countries. I urge all States to conduct them regularly, and all State legislatures to fund them.

I want the American people to implement the recommendations I have highlighted to keep themselves, their families and friends safe. Many of the lives lost this past Memorial Day weekend were lost because of alcohol-impaired driving. Impaired driving is preventable. Impaired driving crashes are not accidents. Let's work together to make sure we have safe proms, graduations, summers, holidays and highways.

There are three other recommendations I want to mention:

- Treatment for persons with an alcohol-related problem should complement, not substitute for, legal sanctions. Treatment must address the needs of the individual.

- Culturally-appropriate interventions need to be developed for special populations - Blacks, Hispanics, Native Americans, and Asians. They are represented in the crash statistics and are increasingly targeted by alcohol advertising.

- Finally, national, State and local coalitions are crucial to the success of impaired-driving prevention.

I strongly support the recommendation to establish a National Coalition to Prevent Impaired Driving. I have seed money from the McGovern Foundation and I have convened a planning group.

The planning group consists of representatives from major health, safety and advocacy organizations. The purpose of the coalition will be to promote the recognition of alcohol and other drug-impaired driving as a major health and safety problem. Coalition members will also promote policies and programs to reduce the human and economic toll resulting from impaired driving.

One function of the Coalition will be to stimulate the development of similar coalitions at the State and local level.

Before I leave office, I will be recommending to the Assistant Secretary for Health that, within the United States Public Health Service, responsibility for tracking and implementation of the workshop recommendations be assigned to the Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA). This agency must work closely with the National Highway Traffic Safety Administration (NHTSA). Both agencies are represented here with me today.

I will further suggest that assistance for the National Coalition be provided by these two organizations as part of their oversight responsibility.

As stated in the Proceedings, I agreed to accept and consider comments on the workshop until January 31, 1989. All comments received --both pro and con-- during the extended comment period are being analyzed so as to further contribute to the knowledge base on alcohol-impaired driving and help prevent this enormous problem.

In fact, the National Institute on Alcohol Abuse and Alcoholism in ADAMHA has moved quickly to address issues raised by the comments. They soon will be funding research projects that examine economic issues related to impaired driving, as well as the impact of alcohol warning labels. Research projects for preventing alcohol abuse among children, adolescents and young adults are already underway.

Isn't all this really leading us down the road to prohibition? No, it isn't and those who say it is are throwing up a smoke screen to distract attention from the real issue. I may look

like John Brown the abolitionist, but I am not a neo-prohibitionist.

With about two-thirds of Americans classifying themselves as drinkers, the United States is unlikely to ever again ban alcohol, and it shouldn't. Remember, though, that most Americans are like me and drink relatively little, but we all pay for alcohol-related crashes. These crashes cost us between $10 and $15 billion per year -- a figure that does not include the incalculable costs of grief and human suffering.

The workshop Proceedings will help this country control one of its most serious health and safety problems. As I did with my campaign for a Smoke-Free Society by the Year 2000, I am calling upon specific groups to work together to implement these lifesaving recommendations.

The first group, of course, is the United States Congress. It must act in concert with the Federal Governmental Agencies; State Legislatures; State and Local Governments; Educational, Professional and Advocacy Organizations; and the Private Sector. Such a powerful alliance can bring about change.

Selected recommendations for each group are included in your press kit. I will not go over them here; but urge you to review them. Please examine your press kit materials carefully and use them in your efforts.

I am the Nation's Surgeon General, not the Nation's Chaplain. Nevertheless, I think we should all pray that those who are caught between their conscience and their pocketbooks on this issue make the right choices.

Thank you.

If Iowa Pages remain at Pleasant Creek

3600?

June 6, 1989

MEMORANDUM

FROM: JOHN

SUBJECT: FACT CHECK ON YES LEGISLATION

These are cites on the May 29, 1989 Newsweek column by Susan Baker and Tipper Gore.

Fact: 81% of violent crime victims are 19 or younger -- Youth Indicators: Trends in the well-being of American Youth, Office of Education Research and Improvement, U.S. Department of Education, 1988. Chapter: Victims of Violent Crime, p. 112.

Fact: The 3 leading causes of death among young people are drug- and alcohol-related accidents, suicide, and homicide -- "Public Health Problems of Violence ..."; Medical News - Journal of the AMA, 9/6/85. vol. 254, no. 7, p.881-882.

Fact: 1 million teenagers run away from home each year -- Children's Defense Fund; A call for action to make our nation safe for children: a briefing book on the status for children in 1988; Children's Defense Fund, 1988, p. 7

Fact: 1 million teenagers get pregnant each year -- Ibid, p. 9.

Fact: 600,000 teenagers attempt suicide each year, and 5000 succeed -- Dr. Charlotte Ross, Director, Youth Suicide National Center, Washington, DC - Task Force Rept. on Youth Suicide Alcohol, Drug Abuse, Mental Health Admin. -

Fact: 10-year olds "often" feel pressure to try alcohol and crack -- From a Weekly Reader survey as reported by Patricia McCormack, "Kids: Fight Drugs with Fun, Talk, Rules and Facts", UPI, 4/26/87

Fact: 406 people died in Los Angeles County last year -- "LA Women shot in gang initiation rite", UPI, 9/26/88. The story quoted the figure as 387 people at that time. When PMRC called the Justice Department of Los Angeles, they said the total had risen to 406 people.

According to Jennifer Norwood of the Parents Music Resource Center, Newsweek doubled checked all figures before printing the story.

My contact for the initial cites was Jennifer Norwood, Parents Music Resource Center.

###

Some Reasons for 'Wilding'



We're sending a message to our kids that brutality is OK

BY SUSAN BAKER AND TIPPER GORE

"Wilding." It's a new word in the vocabulary of teenage violence. The crime that made it the stuff of headlines is so heinous, the details so lurid as to make them almost beyond the understanding of any sane human being.

When it was over, a 28-year-old woman, an investment banker out for a jog, was left brutally beaten, knifed and raped by teenagers. She was found near an isolated road in New York's Central Park, covered with mud, almost dead from brain damage, loss of blood and exposure.

"It was fun," one of her suspected teenage attackers, all between 14 and 17 years old, told the Manhattan district attorney's office. In the lockup, they were nonchalantly whistling at a policewoman and singing a high-on-the-charts rap song about casual sex: "Wild Thing."

Maybe it's the savagery, the remorseless brutality that brought the national attention to this crime. We all heard about this one, either directly or from a friend or family member who would end the story with an "I can't believe it."

Believe it. Because it's happening elsewhere too.

In 1987, in Brooklyn, N.Y., three teenagers methodically set fire to a homeless couple. When at first rubbing alcohol wouldn't ignite the couple, they went to a local service station for gasoline. It worked.

In 1988, in rural Missouri, three teenagers killed a friend—partly out of curiosity! They just wanted to know what it would feel like to kill someone. One of the teenagers claimed the fascination with death began with heavy-metal music. When the victim asked "Why?" over and over as his friends brutally attacked with baseball bats, the answer was "Because it's fun."

In 1988 a record 406 people died in the county of Los Angeles alone in teen-gang-related attacks. One victim who survived was a pregnant woman who was shot, allegedly by a 16-year-old as a gang initiation rite.

This is truly a "generation at risk." Indeed, the statistics reflect its pain and confusion:

- The three leading causes of death among adolescents are drug- and alcohol-related accidents, suicide and homicide.
- Every year 1 million teenagers run away from home.
- Every year 1 million teenagers get pregnant.
- Every year over half a million—600,000 teenagers—attempt suicide; 5,000 succeed.
- Alcohol and drug abuse are so prevalent among the young that a *Weekly Reader* survey recently reported that 10-year-olds often feel pressure to try alcohol and crack.
- According to the Department of Education, 81 percent of the victims of violent crime are preteens and teenagers, 19 or younger. For the first time, teenagers have topped adults in the percentages of serious crimes committed per capita.

There are many complex reasons for this sad litany. Divorce and working parents strain the family's ability to cope. Latchkey kids are the rule more than the exception. Our schools and neighborhoods have become open-air drug markets. But it is not enough to excuse these children as products of a bad environment.

As a society, we must take full responsibility. Our music, movies and television are filled with images of sexual violence and killing. The message to our kids is: it's OK to enjoy brutality and suffering: "It's fun."

The American Academy of Pediatrics released a national policy statement on the impact of rock lyrics and music videos on adolescents last November. In it, they noted that some lyrics communicate potentially harmful health messages in a culture beset with drug abuse, teenage pregnancy, AIDS and other sexually transmitted diseases.

The No. 2 album in the country this week is "GN'R Lies" from the very popular group, Guns N' Roses. This band is a favorite of sixth through 12th graders. It contains the following lyrics: "I used to love her but I had to kill her, I had to put her six feet under, and I can still hear her complain."

Teen "slasher" films, featuring scenes of graphic, sadistic violence against women are so popular that characters like Jason from "Friday the 13th" and Freddie from "Nightmare on Elm Street" are considered cult heroes, and now there are spinoff television shows.

As parents, it is our responsibility to teach our children to make wise decisions. This responsibility is not only to feed and clothe their bodies, but also to feed and nurture their spirits, their minds, their values. The moral crisis facing our nation's youth requires that we *all* share the responsibility, parents and the entertainment industry.

Too often, those who produce this violence evade any discussion of their own responsibility by pretending the entire debate begins and ends with the First Amendment. We are strong advocates of its protections of free speech and free expression. We do not and have not advocated or supported restrictions on those rights; we have never proposed government action. What we are advocating, and what we have worked hard to encourage, is responsibility.

For example, producers and songwriters don't consider putting out songs, movies or videos that would portray racism in a positive way. They could. The First Amendment provides that freedom. But they don't. In part, perhaps it's because they think those products wouldn't sell. But in part, they recognize it would be irresponsible. Why is there no similar reticence when the issue is glorifying violence, generally against women?

The same sense of responsibility should be brought to a marketplace so saturated with violence that it legitimizes it for our children. It's time to stop the spilling of blood both as "entertainment" and in real life.

Susan Baker and Tipper Gore are the cofounders of Parents' Music Resource Center, located in Arlington, Va.

Withdrawal/Redaction Sheet
(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
01. List	Re: Youth Entering Service to America - Oval Office Participants; personal information. (2 pp.)	06/21/89	P-6, (b)(6)	

Collection:

Record Group: Bush Presidential Records
Office: Speechwriting, White House Office of
Series: Speech File, Backup
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File Location: Youth Engaged in Service (YES) Event 6/21/89 [2]

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P-6 Release would constitute a clearly unwarranted invasion of personal privacy [(a)(6) of the PRA]

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THE NATIONAL ASSEMBLY

OF NATIONAL VOLUNTARY HEALTH AND SOCIAL WELFARE ORGANIZATIONS INC.

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B

American Association of Homes for the Aging
American Camping Association
Association of Junior Leagues
Child Welfare League
Interages
Lutheran Services
National Mental Health Association
Columbia Senior Center (National Council on the Aging)
United Way of America
Volunteer Bureau of Alexandria
Youth Policy Institute
Washington Council of Churches
Alexandria City Schools
Charles Houston Center - Alexandria
D. C. Public Schools
Immanuel-on-the-Hill
St. Agnes School
Joint Action in Community Service
The Circle
Congressman Regula's Office
Congressman Yatron's Office
Topeka Youth Project

AFL-CIO, Department of Community Services
American Association of Homes for the Aging
American Camping Association
American Red Cross
The Association of Junior Leagues
Big Brothers/Big Sisters of America
Boy Scouts of America
Boys Clubs of America
Camp Fire
Catholic Charities USA
Child Welfare League of America
Council of Jewish Federations
Evangelical Lutheran Church in America
Division of Mission and Ministry
Family Service America
4-H
Future Homemakers of America
Girl Scouts of the U.S.A.
Girls Clubs of America
Goodwill Industries of America
National Council of Negro Women
National Mental Health Association
The National Council on the Aging
The National Crime Prevention Council
The National Network of Runaway and Youth Services
The Salvation Army
Travelers Aid Association of America
Travelers Aid International
United Neighborhood Centers of America
United Seamen's Service
USO (United Service Organizations)
United Way of America
VOLUNTEER-The National Center
Volunteers of America
YMCA of the USA
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70001	5
Multi-Cultural/Gordon Center	5
Washington International School and Other	10
American Red Cross	10
Big Brothers	5
Big Sisters	5
Boys Clubs	10
Boy Scouts	11
Camp Fire	11
4-H	10
National Network of Runaway and Youth Services	10
YMCA of the USA	13
Girls Clubs of America	6
Girl Scouts of the USA (National)	4
Girl Scouts of the USA (Alexandria)	3
Salvation Army	10
National Crime Prevention Council	11
National Association of Homes for Children	10
Job Corps (WICS)	9
Youth Service America	10
F. X. Gallagher Center, Timonium, MD	14
Total	182

AFL-CIO, Department of Community Services
American Association of Homes for the Aging
American Camping Association
American Red Cross
The Association of Junior Leagues
Big Brothers/Big Sisters of America
Boy Scouts of America
Boys Clubs of America
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4-H
Future Homemakers of America
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Goodwill Industries of America
National Council of Negro Women
National Mental Health Association
The National Council on the Aging
The National Crime Prevention Council
The National Network of Runaway and Youth Services
The Salvation Army
Travelers Aid Association of America
Travelers Aid International
United Neighborhood Centers of America
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nchs MONTHLY VITAL STATISTICS REPORT

Final Data From the National Center for Health Statistics

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Advance Report of Final Mortality Statistics, 1986

Highlights

In 1986 a total of 2,105,361 deaths were registered in the United States, 18,921 more than in 1985 and the largest annual final number ever recorded. Contributing to the increased number of deaths were (1) population growth and the "aging" of the U.S. population, that is, the increasing proportion of older persons, and (2) an outbreak of influenza in 1986. The death rate for 1986 was 873.2 deaths per 100,000 population, about the same as the rate of 873.9 in 1985. Provisional data for 1987 indicate the death rate (874.0) to be up very slightly from 1986.

The age-adjusted death rate, which eliminates the effects of the aging of the population, was 541.7 per 100,000 population, lower than the rate of 546.1 in 1985. The age-adjusted rate decreased for the white population but remained essentially unchanged for the black population between 1985 and 1986. The rates decreased for both white males and females, although more for males; rates for both black males and females were essentially the same for the two years.

In 1986 life expectancy at birth reached a record high of 74.8 years, slightly higher than in 1985. For the white population, it also attained a record; but for the black population, it declined for the second year in a row. Although the difference in life expectancy for males and females has narrowed since the late 1970's, women are still expected to outlive men by an average of 7.0 years. Between the white and black populations, the difference in life expectancy has been narrowing over the past 25 years; however, the difference in 1986 (6.0 years higher for the white population) was greater than in 1985 (5.8 years).

As in previous years, almost three out of four deaths in the United States were caused by the first four leading causes of death—Diseases of heart; Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues (cancer); Cerebrovascular diseases (stroke); and Accidents and adverse effects. Although the age-adjusted death rate for Accidents and adverse effects increased by 1 percent between 1985 and 1986, rates for the other three leading causes declined. The decline in the age-adjusted death rate for cancer between 1985 and 1986 is in contrast to the historic upward trend for this, the second leading cause of death in the United States. The age-adjusted death rate for Motor vehicle accidents—a component of Accidents and adverse effects—increased between 1985 and 1986 compared with the downward trend between 1979 and 1983. Mortality from Homicide and legal intervention, the 12th leading cause, increased more rapidly than for any of the other leading causes of death between 1985 and 1986—by 8 percent; this contrasts with the general decline in mortality from this cause since 1980.

Males experienced higher mortality than females for each of the 15 leading causes of death. The greatest sex differential was for Suicide, where the age-adjusted rate for males was 3.8 times that for females. The smallest sex differential was for Diabetes mellitus, with a male-to-female ratio of 1.1.

The black population had higher rates than the white population for most of the leading causes of death. The largest race differential continued to be for Homicide and legal intervention, where the age-adjusted rate for the black population was 5.8 times that of the white population. The two leading causes that had lower rates for the black population were Chronic obstructive pulmonary diseases and allied conditions and Suicide.

The infant mortality rate (10.4 infant deaths per 1,000 live births) was at a record low in 1986. The rate declined for the white population, but the change between 1985 and 1986 for the black population was not statistically significant. For both the white and black populations, the downward trend in infant mortality has slowed in recent years. Neonatal mortality rates declined from 1985 to 1986, but the decline was statistically significant only for the white population; the changes in postneonatal mortality rates between 1985 and 1986 were not statistically significant.

Deaths and death rates

Death rates shown in this report are based on population estimates prepared by the U.S. Bureau of the Census. Because the population bases used for 1984, 1985, and 1986 incorporate new estimates of net migration and net undocumented immigration, death rates for these years are not strictly comparable with those for previous years. Although trends in death rates for the total population are not substantially affected, caution should be used in analyzing differences in death rates for the period 1984–86 with those of previous years for certain age-race-sex subgroups. For further discussion, see the Technical notes.

In 1986 a total of 2,105,361 deaths occurred in the United States, 18,921 more than in 1985 and the largest final number ever recorded. Contributing to the increased number of deaths were (1) the continued increase in the size of the population as well as the increasing proportion of older persons and (2) an influenza outbreak in 1986 (Centers for Disease Control, 1986) with higher mortality than in 1985. The death rate for 1986, 873.2 per 100,000 population, was essentially the same as the rate in 1985 (873.9). The 1986 rate of 29.0 deaths per 100,000 population for Pneumonia and influenza contrasts with a rate of 21.1 in 1982, when influenza mortality was not elevated. The provisional death rate for 1987 (874.0) is up slightly from 1986.

The age-adjusted death rate of 541.7 deaths per 100,000 population in 1986 was a record low, about 1 percent below the rate for 1985 (546.1) (figure 1). Age-adjusted death rates show what the level of mortality would be if there were no changes in the age composition of the population from year to year. Thus, they are better indicators than unadjusted death rates for showing changes in the risk of death over a period of time when the age distribution of the population is changing. They are also better indicators of risk when comparisons of mortality are being made for sex or race subgroups of the population that have different age compositions.

Death rates by age, sex, and race

For both sexes combined, death rates declined for most age groups between 1985 and 1986 (table A). They declined for the age groups under 1 year, 5–14 years, and each 10-year age group beginning with 45–54 years. The largest decline (3 percent) occurred for the age group under 1 year. In contrast, large increases in mortality occurred in the age groups 15–24, 25–34, and 35–44 years. The increase of 7.1 percent for persons 25–34 years is a departure from the general downward trend in mortality for this age group during the 1980's.

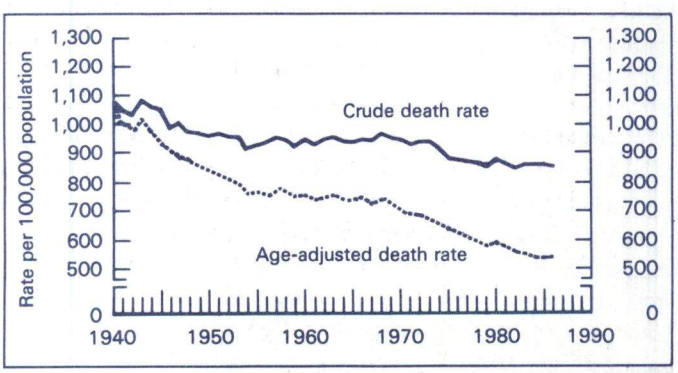


Figure 1. Crude and age-adjusted death rates: United States, 1940–86

Table A. Percent change in death rates between 1985 and 1986 by age and sex: United States

Age	Total	Male	Female
	Percent change		
All ages	−0.1	−0.5	+0.3
Under 1 year[1]	−3.3	−3.7	−2.9
1–4 years	+1.2	−0.3	+2.9
5–14 years	−1.1	+0.3	−4.3
15–24 years	+6.7	+7.3	+4.8
25–34 years	+7.1	+8.3	+3.9
35–44 years	+2.8	+3.5	+1.1
45–54 years	−2.2	−2.4	−2.1
55–64 years	−2.2	−2.6	−1.4
65–74 years	−1.3	−2.3	−0.2
75–84 years	−1.5	−1.8	−1.3
85 years and over	−0.5	−0.8	−0.3

[1]Death rates under 1 year (based on population estimates) differ from infant mortality rates (based on live births): see table E for 1986 infant mortality rates, and Technical notes for further discussion of the difference.

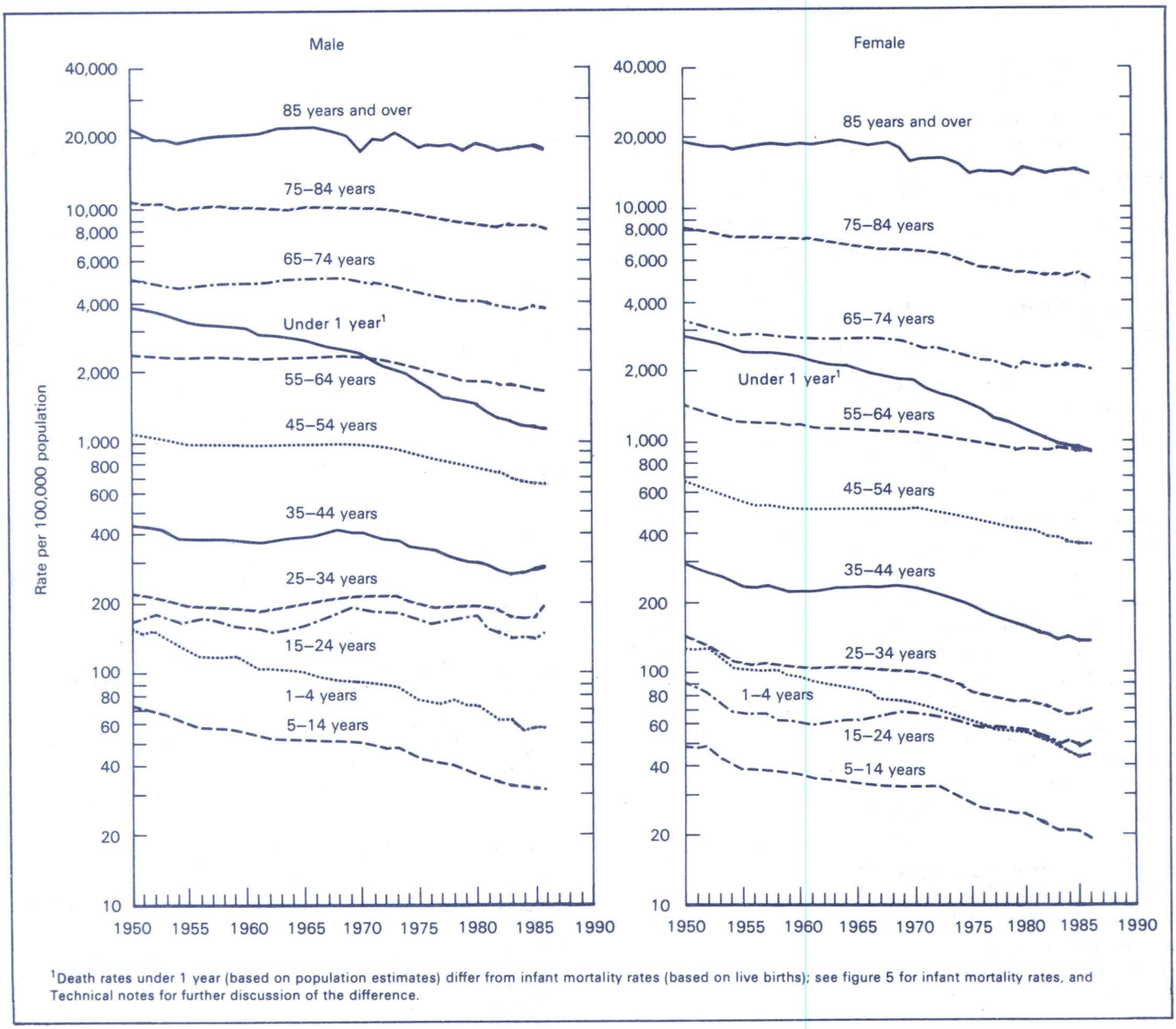
Both males and females showed essentially the same changes in mortality by age between 1985 and 1986 as the total population for both sexes combined. However, for males the increases as well as the decreases between 1985 and 1986 tended to be larger in magnitude than for females (figure 2). The change in mortality between 1985 and 1986 differed between the major race groups. The age-adjusted death rate declined by about 1 percent for the white population, while remaining about the same for the black population.

The age-adjusted death rates for both white males and females declined between 1985 and 1986—by 1.3 percent for white males, and by less than 1 percent for white females. In contrast, for the black population the age-adjusted death rate remained about the same between the two years for both males and females. In 1986 the age-adjusted death rate for males of all races was 1.7 times that for females, similar to the ratio in 1985. This ratio between male and female age-adjusted death rates differed very little between the white and black populations. As in the past three years, the age-adjusted death rate for the black population in 1986 was 1.5 times that for the white population.

Expectation of life at birth and at specified ages

In 1986 the average expectation of life at birth reached a record high of 74.8 years (figure 3). This continued the general upward trend in life expectancy in the United States.

The expectation of life at birth for 1986 represents the average number of years that a group of infants would live if



[1]Death rates under 1 year (based on population estimates) differ from infant mortality rates (based on live births); see figure 5 for infant mortality rates, and Technical notes for further discussion of the difference.

Figure 2. Death rates by age and sex: United States, 1950–86

they were to experience throughout life the age-specific death rates prevailing in 1986. In 1986 life expectancy for females was 78.3 compared with 71.3 years for males; both figures represent increases over 1985. The difference in life expectancy between the sexes, which had been widening from 1900 to 1972, has narrowed since 1979. The difference was 7.0 years in 1985 and 1986 compared with 7.4 years in 1980 and 1981, 7.7 and 7.8 years throughout the period 1972–79, 6.5 years in 1960, and 2.0 years in 1900.

Between 1985 and 1986 the white population experienced an increase in life expectancy, to a record high of 75.4 years; but the black population experienced a decrease for the second year in a row, to 69.4 years, the same level as in 1982. This is the first time that a decline in life expectancy has occurred two years in succession for the black population since 1970, the first year when the life expectancy data for the black population became available on an annual basis. While the difference in life expectancy between the white and black populations narrowed from 7.6 years in 1970 to 5.6 years in 1983 and 1984, it has increased since then, to 6.0 years in 1986.

Among the four race-sex groups, white females continued to have the highest life expectancy at birth (78.8 years), followed by black females (73.5 years), white males (72.0 years), and black males (65.2). The largest gain in life expectancy between 1970 and 1986 was for both black males and females (5.2 years), followed by white males (4.0 years) and white females (3.2 years).

The 1986 life table may be used to compare life expectancies at any age from birth onward. For example, a person who has reached age 65 years may look forward to living to an older

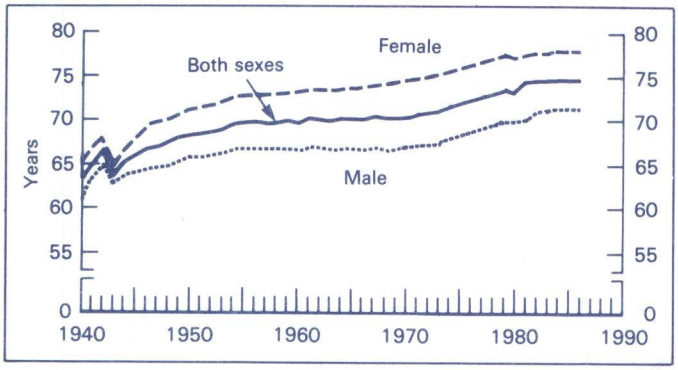


Figure 3. Life expectancy by sex: United States, 1940–86

age, on the average, than one who has reached 50 years. On the basis of mortality experienced in 1986, a person aged 50 years could expect to live an average of 28.5 more years for a total of 78.5 years, and a person aged 65 years could expect to live an average of 16.8 more years for a total of 81.8 years.

Cause of death

Deaths assigned to the 15 leading causes accounted for 87 percent of the total number of deaths in 1986 (table B). (For ranking procedures see Technical notes.) The ranking of the leading causes for 1986 changed slightly from the list based on data for 1985. Septicemia, the 14th leading cause in 1985, increased to 13th in 1986; Certain conditions originating in the perinatal period decreased in rank from the 13th to 14th. Age-adjusted death rates are shown in figure 4 and table C for 13 of the 15 leading causes. Because deaths from the other two causes (Congenital anomalies and Certain conditions originating in the perinatal period) occur mainly among infants under 1 year, age-adjusted rates for these causes are not shown. Differentials and changes in mortality for these two causes are measured by the infant mortality rate per 100,000 live births.

Table B. Death rates and percent of total deaths for the 15 leading causes of death: United States, 1986

[Rates per 100,000 population]

Rank[1]	*Cause of death* (Ninth Revision International Classification of Diseases, 1975)	*Rate*	*Percent of total deaths*
...	All causes	873.2	100.0
1	Diseases of heart	317.5	36.4
2	Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues	194.7	22.3
3	Cerebrovascular diseases	62.1	7.1
4	Accidents and adverse effects	39.5	4.5
...	Motor vehicle accidents	19.9	...
...	All other accidents and adverse effects	19.7	...
5	Chronic obstructive pulmonary diseases and allied conditions	31.8	3.6
6	Pneumonia and influenza	29.0	3.3
7	Diabetes mellitus	15.4	1.8
8	Suicide	12.8	1.5
9	Chronic liver disease and cirrhosis	10.9	1.2
10	Atherosclerosis	9.4	1.1
11	Nephritis, nephrotic syndrome, and nephrosis	9.0	1.0
12	Homicide and legal intervention	9.0	1.0
13	Septicemia	7.8	0.9
14	Certain conditions originating in the perinatal period	7.6	0.9
15	Congenital anomalies	5.2	0.6
...	All other causes	111.5	12.8

[1] Rank based on number of deaths; see Technical notes.

For 5 of these 13 leading causes of death the age-adjusted death rates decreased between 1985 and 1986 (table C). These causes were Diseases of heart; Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues; Cerebrovascular diseases; Chronic liver disease and cirrhosis; and Atherosclerosis. The largest declines were for Atherosclerosis (8 percent), and for Chronic liver disease and cirrhosis, and Cerebrovascular diseases (4 percent each). The age-adjusted death rate for Diseases of heart declined 3 percent between the two years. The declines for Atherosclerosis, Cerebrovascular diseases, and Diseases of heart are consistent with the generally downward trends observed since 1950. Chronic liver disease and cirrhosis has exhibited a downward trend since 1979. The slight decline (0.3 percent) between 1985 and 1986 in the age-adjusted death rate for Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues, is in contrast to the generally increasing trend for this cause observed since 1950. This decrease in the age-adjusted rate reflects declines in death rates for this cause for almost every age group under 65 years.

Increases in the age-adjusted death rates between 1985 and 1986 occurred for 6 of the 13 leading causes—Accidents and adverse effects; Chronic obstructive pulmonary diseases and allied conditions; Pneumonia and influenza; Suicide; Homicide and legal intervention; and Septicemia. The largest increase, 8 percent, was for Homicide and legal intervention, the first increase for this cause since 1980. Septicemia increased by 5 percent, continuing the rapid rise observed for the past three decades (figure 4). The age-adjusted death rate for Suicide increased by 4 percent between 1985 and 1986, reaching a level higher than that of 1979. Increases for the remaining three leading causes were 1 percent or less. Increases for two causes, Chronic obstructive pulmonary diseases and allied conditions and Pneumonia and influenza, reflect the outbreak of influenza in 1986 (Centers for Disease Control, 1986). Outbreaks of influenza have occurred each year since 1982; they are associated with elevated mortality for a number of causes but especially for Pneumonia and influenza, and for Chronic obstructive pulmonary diseases and allied conditions. The age-adjusted death rate for Accidents and adverse effects increased between 1985 and 1986, in contrast to the general decline in mortality for this cause since 1979. The increase for this cause reflects the 3-percent increase in its component cause Motor vehicle accidents which had declined between 1984 and 1985. In contrast, the age-adjusted death rate for the other component—All other accidents and adverse effects—declined be-

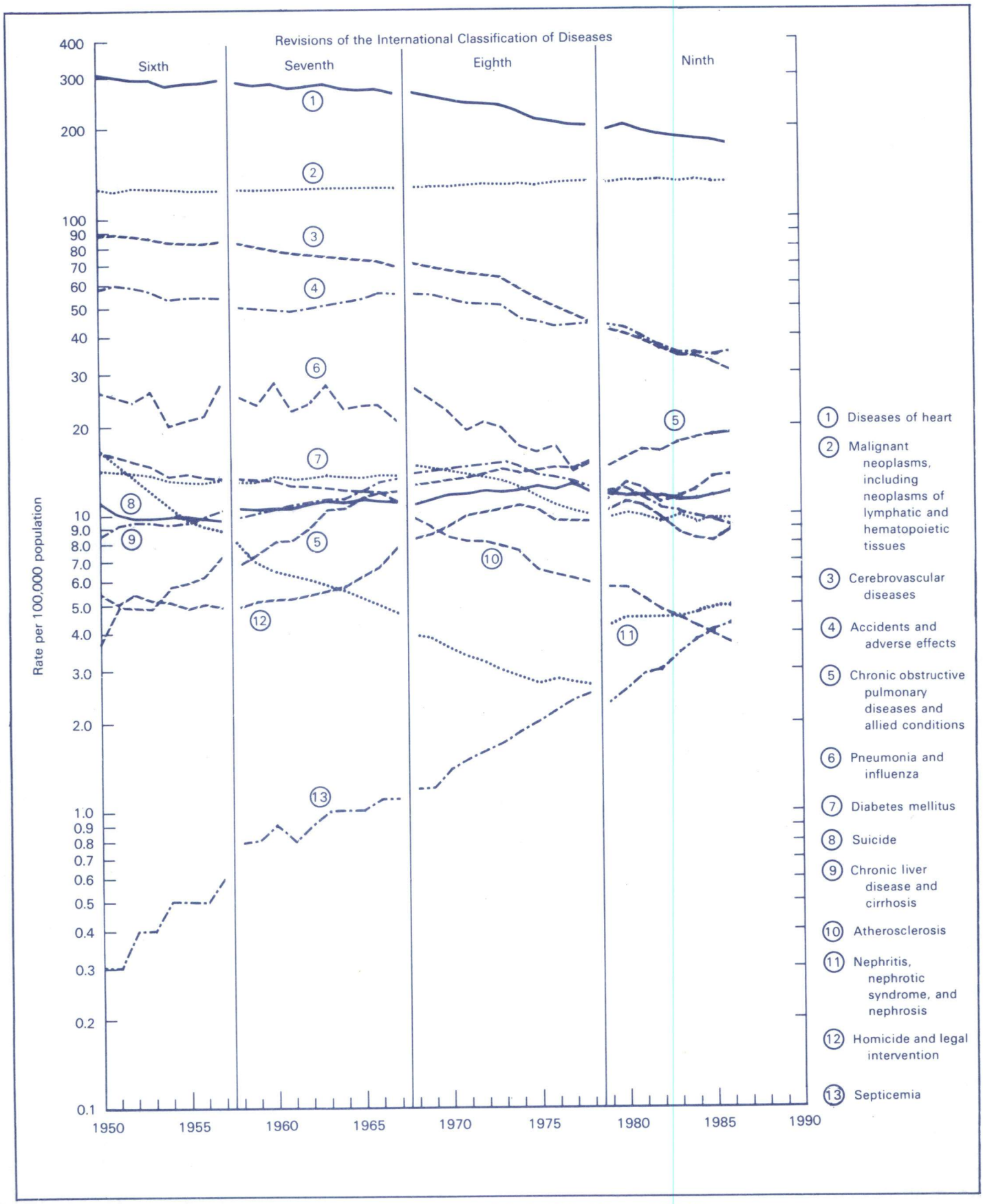


Figure 4. Age-adjusted death rates for 13 of the 15 leading causes of death: United States, 1950–86

Table C. Age-adjusted death rates for 1986 and percent changes in age-adjusted death rates for the 15 leading causes of death from 1985 to 1986 and 1979 to 1986: United States

[Rates per 100,000 population]

Rank[1]	Cause of death (Ninth Revision International Classification of Diseases, 1975)	Age-adjusted death rates for 1986	Percent change from— 1985 to 1986	Percent change from— 1979 to 1986
...	All causes	541.7	−0.8	−6.1
1	Diseases of heart	175.0	−3.0	−12.3
2	Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues	133.2	−0.3	+1.8
3	Cerebrovascular diseases	31.0	−4.0	−25.5
4	Accidents and adverse effects	35.2	+1.4	−17.9
...	Motor vehicle accidents	19.4	+3.2	−16.4
...	All other accidents and adverse effects	15.7	−1.9	−19.9
5	Chronic obstructive pulmonary diseases and allied conditions	18.8	+0.5	+28.8
6	Pneumonia and influenza	13.5	+0.7	+20.5
7	Diabetes mellitus	9.6	-	−2.0
8	Suicide	11.9	+3.5	+1.7
9	Chronic liver disease and cirrhosis	9.2	−4.2	−23.3
10	Atherosclerosis	3.7	−7.5	−35.1
11	Nephritis, nephrotic syndrome, and nephrosis	4.9	-	+14.0
12	Homicide and legal intervention	9.0	+8.4	−11.8
13	Septicemia	4.3	+4.9	+87.0
14	Certain conditions originating in the perinatal period[2]	...	−4.3	−27.3
15	Congenital anomalies[2]	...	−3.6	−14.1

[1] Rank based on number of deaths; see Technical notes.
[2] Inasmuch as deaths from these causes occur mainly among infants, percent changes are based on infant mortality rates instead of age-adjusted death rates.

tween 1985 and 1986, continuing the downward trend observed for this cause since 1979. Age-adjusted death rates did not change for two of the 13 leading causes of death—Diabetes mellitus and Nephritis, nephrotic syndrome, and nephrosis.

Mortality levels for each of the 15 leading causes of death were higher for males than for females (table D). As was true in previous years, the largest differentials were for violent and accidental causes of death. Specifically, the age-adjusted death rates for Suicide and for Homicide and legal intervention were 3.8 and 3.4 times, respectively, as high for males as for females. The rate for Accidents and adverse effects was 2.8 times as high for males as for females. The smallest sex difference was for Diabetes mellitus, with a male-to-female ratio of 1.1.

For women the age-adjusted death rate for all causes combined declined slightly between 1985 and 1986. Decreases in rates for two of the first three leading causes of death—Diseases of heart and Cerebrovascular diseases—as well as decreases for Diabetes mellitus, Chronic liver disease and cirrhosis, and Atherosclerosis were offset, in part, by increases in rates for other leading causes, among which were Chronic obstructive pulmonary diseases and allied conditions, Pneumonia and influenza, Suicide, Homicide and legal intervention, and Septicemia. Of the leading causes of death, Homicide and legal intervention had the largest increase in mortality between 1985 and 1986 for women; the age-adjusted death rate from this cause increased 5 percent. The age-adjusted rates for Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues; for Accidents and adverse effects; and for

Table D. Ratio of age-adjusted death rates for the 15 leading causes of death by sex and race: United States, 1986

Rank[1]	Cause of death (Ninth Revision International Classification of Diseases, 1975)	Ratio of— Male to female	Ratio of— Black to white
...	All causes	1.74	1.51
1	Diseases of heart	1.91	1.37
2	Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues	1.47	1.33
3	Cerebrovascular diseases	1.16	1.83
4	Accidents and adverse effects	2.81	1.22
...	Motor vehicle accidents	2.69	0.91
...	All other accidents and adverse effects	2.95	1.63
5	Chronic obstructive pulmonary diseases and allied conditions	2.16	0.80
6	Pneumonia and influenza	1.79	1.47
7	Diabetes mellitus	1.06	2.35
8	Suicide	3.78	0.52
9	Chronic liver disease and cirrhosis	2.20	1.69
10	Atherosclerosis	1.30	1.11
11	Nephritis, nephrotic syndrome, and nephrosis	1.55	2.79
12	Homicide and legal intervention	3.39	5.79
13	Septicemia	1.44	2.63
14	Certain conditions originating in the perinatal period[2]	1.28	2.50
15	Congenital anomalies[2]	1.12	1.06

[1] Rank based on number of deaths; see Technical notes.
[2] Inasmuch as deaths from these causes occur mainly among infants, ratios are based on infant mortality rates instead of age-adjusted death rates.

Nephritis, nephrotic syndrome, and nephrosis were the same in 1985 and 1986.

For men the age-adjusted death rate for all causes combined also declined between 1985 and 1986. Decreases occurred in the rates for the first three leading causes of death—Diseases of heart; Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues; and Cerebrovascular diseases—as well as for Chronic obstructive pulmonary diseases and allied conditions; Chronic liver disease and cirrhosis; and Atherosclerosis. Increases in the age-adjusted death rate occurred for Accidents and adverse effects; Pneumonia and influenza; Suicide; Nephritis, nephrotic syndrome, and nephrosis; Homicide and legal intervention; and Septicemia. For men, as for women, the largest increase was for Homicide and legal intervention (9 percent). In contrast to the 1984–85 interval, when the age-adjusted death rate for Motor vehicle accidents for men decreased and for women remained the same, between 1985 and 1986 the rate increased for both sexes. The age-adjusted death rate for Diabetes mellitus was unchanged between 1985 and 1986.

Mortality was higher for the black population than for the white population for most of the leading causes (table D). The largest differential was for Homicide and legal intervention, where the age-adjusted death rate for the black population was 5.8 times that of the white population. Other causes for which the differential was large include Nephritis, nephrotic syndrome, and nephrosis (2.8); Septicemia (2.6); Certain conditions originating in the perinatal period (2.5); and Diabetes mellitus (2.4). Age-adjusted rates for the black population were lower than those for the white population for two causes—Chronic obstructive pulmonary diseases and allied conditions and Suicide.

For the white population decreases in mortality for several of the leading causes—Diseases of heart and Cerebrovascular diseases among others—were offset, in part, by increases in Suicide, Homicide and legal intervention, and Septicemia. For the black population, rates were lower in 1986 than in 1985 for a number of the leading causes—Diseases of heart; Cerebrovascular diseases; Chronic liver disease and cirrhosis; Atherosclerosis; Nephritis, nephrotic syndrome, and nephrosis; and Congenital anomalies. Of the leading causes that increased for the black population, the largest increase was for Homicide and legal intervention (12 percent). Other increases were for Suicide, Pneumonia and influenza, and Chronic obstructive pulmonary diseases and allied conditions. Between 1985 and 1986 the age-adjusted death rate for Malignant neoplasms, including neoplasms of lymphatic and hematopoetic tissues, decreased slightly for the black population (less than 1 percent); for the white population the rate for this cause also declined slightly between 1985 and 1986, in contrast to the upward trend observed since the 1950's.

AIDS—A count of deaths due specifically to acquired immunodeficiency syndrome (as a result of human immunodeficiency virus (HIV)) is not available from the 1986 national mortality statistics. However, data from this source have been used to provide an approximation of the number of AIDS-related deaths in 1986, as described in the Technical notes.

Infant mortality

In 1986 there were 38,891 deaths of infants under 1 year of age (table E). The infant mortality rate of 10.4 infant deaths per 1,000 live births was the lowest final rate ever recorded for the United States, and it compares with a rate for the previous year of 10.6. Among white infants, the rate was 8.9, a decline of 4 percent from 1985 (9.3); the rate for black infants was 18.0 in 1986 compared with 18.2 in 1985. For all infants and for white infants considered separately, the change in infant mortality rates between 1985 and 1986 was statistically significant. (For discussion of random variation and statistical significance, see Technical notes.)

The absolute difference in infant mortality rates between black and white infants has been narrowing; in 1960 the difference in rates was 21.4 infants per 1,000 live births com-

Table E. Infant, neonatal, and postneonatal deaths and mortality rates by race and sex: United States, 1986

[Rates are infant (under 1 year), neonatal (under 28 days), and postneonatal (28 days–11 months) deaths per 100,000 live births in specified group]

Race and sex	Infant		Neonatal		Postneonatal	
	Number	Rate	Number	Rate	Number	Rate
All races	38,891	1,035.3	25,212	671.1	13,679	364.1
Male	22,224	1,154.6	14,274	741.6	7,950	413.0
Female	16,667	909.9	10,938	597.2	5,729	312.8
White	26,564	894.3	17,256	580.9	9,308	313.4
Male	15,284	1,002.9	9,824	644.7	5,460	358.3
Female	11,280	779.8	7,432	513.8	3,848	266.0
All other	12,327	1,568.1	7,956	1,012.1	4,371	556.0
Male	6,940	1,730.9	4,450	1,109.9	2,490	621.0
Female	5,387	1,398.7	3,506	910.3	1,881	488.4
Black	11,204	1,803.5	7,297	1,174.6	3,907	628.9
Male	6,305	1,996.6	4,096	1,297.1	2,209	699.5
Female	4,899	1,604.0	3,201	1,048.0	1,698	555.9

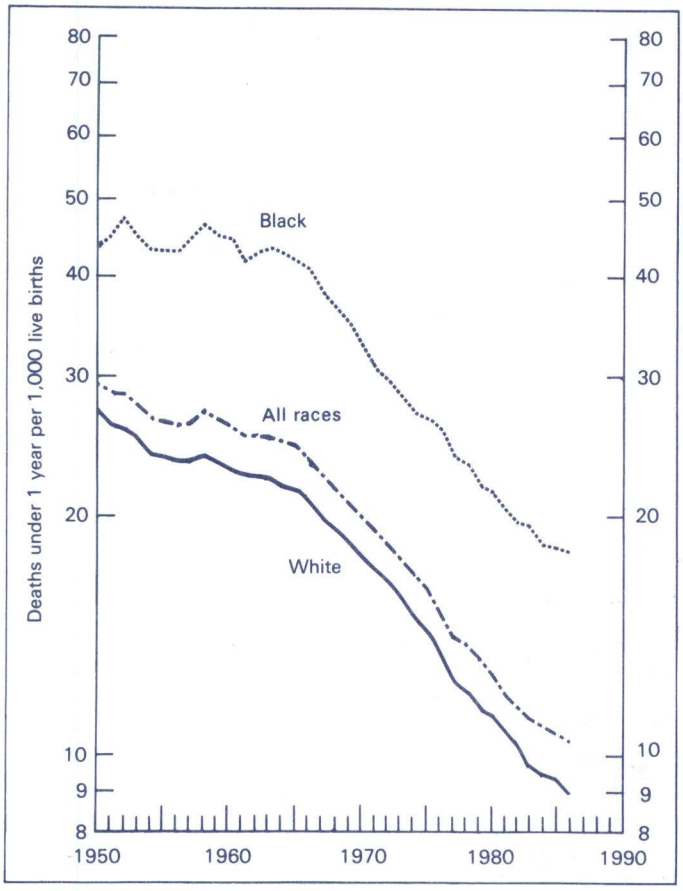


Figure 5. Infant mortality rates by race: United States, 1950–86

pared with 9.1 in 1986 (figure 5). However, because the infant mortality rates for the white and for the black populations have been decreasing by about the same average annual percent between 1960 and 1986, the black infant mortality rate in 1986 was 2.02 times the white rate. The downward trend in infant mortality has slowed for both the white and the black populations—since the late 1970's, for white infants; and since 1981, for black infants.

Between 1985 and 1986, the neonatal mortality rate declined from 7.0 to 6.7 deaths to infants under 28 days per 1,000 live births. By race, the rate in 1986 for the white population was 5.8 per 1,000 live births; and for the black population, 11.7. The difference in the neonatal mortality rate between 1985 and 1986 for the white, but not the black, population was statistically significant. Neonatal mortality rates have declined since 1960 for both races, but the rate for the white population has declined relatively faster than that for the black population—an average annual decrease of 4 percent per year for white infants compared with 3 percent for black infants.

The postneonatal mortality rate—deaths to infants 28 days–11 months per 1,000 live births—for 1986 was 3.6, compared with 3.7 in 1985. For the white population, the postneonatal mortality rate in 1986 was 3.1 compared with 3.2 in 1985; and for black infants, the rate in 1986 was 6.3 compared with a rate of 6.1 in 1985. For neither race group was the change between the two years statistically significant. In contrast to the trend for neonatal mortality, between 1960 and 1986 the postneonatal rate decreased relatively faster for the black population than for the white population—an average *annual* decline of 4 percent for black infants compared with an average decline of 2 percent for white infants.

As was seen in the overall infant mortality rates, the downward trends in neonatal and postneonatal mortality rates have slowed recently for both the black and the white populations.

The ranking of the leading causes of infant mortality for 1986 changed slightly from the list based on data for 1985. Because of an increase in the number of deaths assigned to Accidents and adverse effects, the rank of this cause changed from the ninth leading cause in 1985 to the eighth in 1986. The rank for Newborn affected by complications of placenta, cord, and membranes changed from eighth in 1985 to ninth in 1986. Among the 10 leading causes of infant death, the first 4—Congenital anomalies, Sudden infant death syndrome, Respiratory distress syndrome, and Disorders relating to short gestation and unspecified low birthweight—accounted for just over half of all deaths of infants under 1 year of age in 1986; and the next 6 causes accounted for only 15 percent of all infant deaths.

The difference between infant mortality rates for white and black infants varied by cause, although the risk was higher for black infants than for white infants for all the leading causes. For Congenital anomalies, the leading cause(s) of infant death, the difference between the rate for black infants (232.1 per 100,000 live births) and for white infants (219.5) was not statistically significant. Expressed in terms of the ratio of the infant mortality rate for black infants to that for white infants, the other leading causes may be ranked, beginning with the highest ratio, as follows: Disorders relating to short gestation and unspecified low birthweight (3.7); Pneumonia and influenza (2.5); Intrauterine hypoxia and birth asphyxia (2.1); Infections specific to the perinatal period (2.1); Accidents and adverse effects (2.1); Newborn affected by complications of placenta, cord, and membranes (1.9); Newborn affected by maternal complications of pregnancy (1.9); Sudden infant death syndrome (1.9); and Respiratory distress syndrome (1.8).

Hispanic rate—The infant mortality rate for the Hispanic population in a reporting area comprised of 18 States (see Technical notes) and the District of Columbia was 8.0 deaths of infants under 1 year of age per 1,000 live births, 7 percent below the rate for the white non-Hispanic population (8.6). Among specified subgroups of the Hispanic population, the rate for Mexican infants was lower than that for white non-Hispanic infants. The differences between the rates for Puerto Ricans and Cubans and the white non-Hispanic population were not statistically significant. These rates may be somewhat underestimated (see Technical notes).

Maternal mortality

In 1986, 272 women were reported to have died of maternal causes (table F). As in previous years, the number does not

Table F. Maternal deaths and maternal mortality rates by race: United States, 1986

[Maternal deaths are those assigned to Complications of pregnancy, childbirth, and the puerperium, category numbers 630–676 of the *Ninth Revision International Classification of Diseases, 1975*. Rates per 100,000 live births in specified group]

Race	Number	Rate
All races	272	7.2
White	146	4.9
All other	126	16.0
Black	117	18.8

include all deaths occurring to pregnant women, but only those deaths assigned to Complications of pregnancy, childbirth, and the puerperium (ICD–9 Nos. 630–676). The maternal mortality rate for 1986 was 7.2 deaths per 100,000 live births. The differences in the maternal mortality rate for white and black women between 1985 and 1986 were not statistically significant. In 1986 black women were 3.8 times as likely as white women to die of causes associated with pregnancy, childbirth, and the puerperium.

Report of autopsy

For 1986 all States requested information on the death certificate as to whether autopsies were performed. They were reported as performed on 257,890 deaths, or 12.2 percent of the deaths that occurred in 1986, a reduction from the 12.4 percent reported for the previous year. This continues the downward trend in the percent of deaths autopsied. The percent autopsied for all causes of death combined is heavily influenced by the low rates for the three leading causes of death: Diseases of heart (8.3 percent); Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues (5.0 percent); and Cerebrovascular diseases (4.1 percent). Among the 15 leading causes of death, the highest percents reported were for traumatic causes, that is, Homicide and legal intervention (96.0 percent), Suicide (51.0 percent), and Accidents and adverse effects (48.2 percent). For nontraumatic causes, the highest percents were Congenital anomalies (42.2), Certain conditions originating in the perinatal period (27.5), and Chronic liver disease and cirrhosis (20.6).

Marital status

Almost 90 percent (89.7) of the persons who died in 1986 had ever been married. The percent was larger for females (91.7) than for males (87.9) and for the white population (90.5) than for the black population (83.8). The proportion who were widowed at the time of death was considerably greater for women (57.5 percent) than for men (17.8 percent) but about the same for both major race groups: 37.2 percent of the white population and 34.4 percent of the black population.

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Symbols

- - -	Data not available
. . .	Category not applicable
-	Quantity zero
0.0	Quantity more than zero but less than 0.05
Z	Quantity more than zero but less than 500 where numbers are rounded to thousands
*	Figure does not meet standards of reliability or precision

Table 1. Deaths, death rates, and age-adjusted death rates, by race and sex: United States, 1940, 1950, 1960, 1970, and 1975–86

[Rates per 100,000 population in specified group. Rates are based on populations enumerated as of April 1 for census years and estimated as of July 1 for all other years. Beginning 1970 excludes deaths of nonresidents of the United States]

Year	All races			White			All other					
							Total			Black		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
	Number											
1986	2,105,361	1,104,005	1,001,356	1,831,083	952,554	878,529	274,278	151,451	122,827	250,326	137,214	113,112
1985	2,086,440	1,097,758	988,682	1,819,054	950,455	868,599	267,386	147,303	120,083	244,207	133,610	110,597
1984	2,039,369	1,076,514	962,855	1,781,897	934,529	847,368	257,472	141,985	115,487	235,884	129,147	106,737
1983	2,019,201	1,071,923	947,278	1,765,582	931,779	833,803	253,619	140,144	113,475	233,124	127,911	105,213
1982	1,974,797	1,056,440	918,357	1,729,085	919,239	809,846	245,712	137,201	108,511	226,513	125,610	100,903
1981	1,977,981	1,063,772	914,209	1,731,233	925,490	805,743	246,748	138,282	108,466	228,560	127,296	101,264
1980	1,989,841	1,075,078	914,763	1,738,607	933,878	804,729	251,234	141,200	110,034	233,135	130,138	102,997
1979	1,913,841	1,044,959	868,882	1,676,145	910,137	766,008	237,696	135,822	102,874	220,818	124,433	96,385
1978	1,927,788	1,055,290	872,498	1,689,722	920,123	769,599	238,066	135,167	102,899	221,340	124,663	96,677
1977	1,899,597	1,046,243	853,354	1,664,100	912,670	751,430	235,497	133,573	101,924	220,076	123,894	96,182
1976	1,909,440	1,051,983	857,457	1,674,989	918,589	756,400	234,451	133,394	101,057	219,442	123,977	95,465
1975	1,892,879	1,050,819	842,060	1,660,366	917,804	742,562	232,513	133,015	99,498	217,932	123,770	94,162
1970	1,921,031	1,078,478	842,553	1,682,096	942,437	739,659	238,935	136,041	102,894	225,647	127,540	98,107
1960	1,711,982	975,648	736,334	1,505,335	860,857	644,478	206,647	114,791	91,856	196,010	107,701	88,309
1950	1,452,454	827,749	624,705	1,276,085	731,366	544,719	176,369	96,383	79,986	169,606	92,004	77,602
1940	1,417,269	791,003	626,266	1,231,223	690,901	540,322	186,046	100,102	85,944	178,743	95,517	83,226
	Death rate											
1986	873.2	940.7	809.3	896.2	954.4	840.7	745.6	862.7	638.8	854.2	987.7	733.9
1985	873.9	945.0	806.6	897.1	960.0	837.1	743.3	858.6	638.1	845.7	976.8	727.7
1984	862.3	935.9	792.7	885.2	951.1	822.3	731.5	846.4	627.0	828.5	958.1	712.0
1983	862.8	942.6	787.4	884.6	957.4	815.3	736.6	854.9	629.2	830.5	963.3	711.2
1982	852.0	938.0	770.7	872.9	951.8	797.9	728.9	854.8	614.5	819.2	960.4	692.4
1981	862.4	954.5	775.4	880.3	965.1	799.6	755.0	889.4	633.0	841.7	991.6	707.3
1980	878.3	976.9	785.3	892.5	983.3	806.1	791.7	936.5	660.6	875.4	1,034.1	733.3
1979	852.2	957.5	752.7	865.2	963.3	771.8	771.0	920.3	635.7	839.3	999.6	695.3
1978	868.0	977.5	764.5	880.2	982.7	782.7	790.0	943.2	651.0	855.1	1,016.8	709.5
1977	864.4	978.9	756.0	874.6	983.0	771.3	798.6	951.7	659.6	864.0	1,026.0	718.0
1976	877.6	993.8	767.6	887.7	997.3	783.1	812.1	969.8	668.6	875.0	1,041.6	724.5
1975	878.5	1,002.0	761.4	886.9	1,004.1	775.1	823.1	987.6	673.1	882.5	1,055.4	726.1
1970	945.3	1,090.3	807.8	946.3	1,086.7	81[illegible]	938.4	1,115.9	775.3	999.3	1,186.6	829.2
1960	954.7	1,104.5	809.2	947.8	1,098.5	800.9	1,008.5	1,152.0	872.6	1,038.6	1,181.7	905.0
1950	963.8	1,106.1	823.5	945.7	1,089.5	803.3	1,119.4	1,251.1	993.5	---	---	---
1940	1,076.4	1,197.4	954.6	1,041.5	1,162.2	919.4	1,382.8	1,513.7	1,256.2	---	---	---
	Age-adjusted death rate[1]											
1986	541.7	709.1	406.6	518.0	679.8	387.7	693.1	905.7	524.0	781.0	1,026.9	588.2
1985	546.1	716.8	409.4	523.1	688.7	390.6	697.8	910.4	530.0	779.9	1,024.0	589.1
1984	545.9	716.7	409.6	523.6	689.9	391.3	694.5	904.4	529.0	771.9	1,011.7	585.3
1983	550.5	725.3	411.5	528.0	698.4	392.7	703.1	916.3	535.2	777.9	1,019.6	590.4
1982	553.8	733.1	411.2	531.8	706.0	393.3	704.6	928.4	529.3	778.7	1,035.0	581.4
1981	568.2	753.3	420.4	544.6	724.4	401.4	732.6	964.3	549.4	803.9	1,067.7	599.1
1980	585.8	777.2	432.6	559.4	745.3	411.1	774.2	1,015.1	582.6	842.5	1,112.8	631.1
1979	577.0	768.6	423.1	551.9	738.4	402.5	757.1	994.8	566.9	812.1	1,073.3	605.0
1978	595.0	791.4	437.4	569.5	761.1	416.4	780.0	1,021.0	585.8	831.8	1,093.9	622.7
1977	602.1	801.3	441.8	575.7	770.6	419.6	796.7	1,036.1	601.8	849.3	1,112.1	639.6
1976	618.5	820.9	455.0	591.3	789.3	432.5	818.5	1,063.4	618.3	870.5	1,138.3	654.5
1975	630.4	837.2	462.5	602.2	804.3	439.0	840.6	1,090.1	634.5	890.8	1,163.0	670.6
1970	714.3	931.6	532.5	679.6	893.4	501.7	983.4	1,231.4	770.8	1,044.0	1,318.6	814.4
1960	760.9	949.3	590.6	727.0	917.7	555.0	1,046.1	1,211.0	893.3	1,073.3	1,246.1	916.9
1950	841.5	1,001.6	688.4	800.4	963.1	645.0	1,225.7	1,358.5	1,095.7	---	---	---
1940	1,076.1	1,213.0	938.9	1,017.2	1,155.1	879.0	1,634.7	1,764.4	1,504.7	---	---	---

[1] For method of computation, see Technical notes.

Table 2. Deaths and death rates by age, race, and sex: United States, 1986

[Rates per 100,000 population in specific group]

Age	All races			White			All other					
							Total			Black		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
	Number											
All ages	2,105,361	1,104,005	1,001,356	1,831,083	952,554	878,529	274,278	151,451	122,827	250,326	137,214	113,112
Under 1 year	38,891	22,224	16,667	26,564	15,284	11,280	12,327	6,940	5,387	11,204	6,305	4,899
1–4 years	7,480	4,262	3,218	5,426	3,119	2,307	2,054	1,143	911	1,801	992	809
5–9 years	4,082	2,437	1,645	2,998	1,814	1,184	1,084	623	461	929	528	401
10–14 years	4,706	3,066	1,640	3,664	2,375	1,289	1,042	691	351	888	591	297
15–19 years	16,224	11,786	4,438	13,293	9,638	3,655	2,931	2,148	783	2,519	1,847	672
20–24 years	23,705	18,048	5,657	18,465	14,125	4,340	5,240	3,923	1,317	4,562	3,409	1,153
25–29 years	26,474	19,595	6,879	19,683	14,733	4,950	6,791	4,862	1,929	6,117	4,384	1,733
30–34 years	30,056	21,631	8,425	21,804	15,978	5,826	8,252	5,653	2,599	7,575	5,210	2,365
35–39 years	33,496	23,027	10,469	24,609	17,045	7,564	8,887	5,982	2,905	8,102	5,491	2,611
40–44 years	36,897	23,896	13,001	27,937	18,161	9,776	8,960	5,735	3,225	8,197	5,276	2,921
45–49 years	46,415	29,361	17,054	35,906	22,869	13,037	10,509	6,492	4,017	9,615	5,948	3,667
50–54 years	68,746	42,978	25,768	54,471	34,352	20,119	14,275	8,626	5,649	13,033	7,882	5,151
55–59 years	110,323	69,198	41,125	91,491	57,922	33,569	18,832	11,276	7,556	17,395	10,460	6,935
60–64 years	168,706	103,133	65,573	142,976	88,223	54,753	25,730	14,910	10,820	23,789	13,748	10,041
65–69 years	218,649	130,613	88,036	189,952	114,255	75,697	28,697	16,358	12,339	26,604	15,074	11,530
70–74 years	266,890	152,433	114,457	235,871	135,671	100,200	31,019	16,762	14,257	28,532	15,246	13,286
75–79 years	293,520	154,284	139,236	262,791	138,505	124,286	30,729	15,779	14,950	28,086	14,147	13,939
80–84 years	281,629	128,547	153,082	256,545	116,918	139,627	25,084	11,629	13,455	22,696	10,195	12,501
85 years and over	427,473	142,953	284,520	395,825	131,147	264,678	31,648	11,806	19,842	28,517	10,377	18,140
Not stated	999	533	466	812	420	392	187	113	74	165	104	61
	Rate											
All ages[1]	873.2	940.7	809.3	896.2	954.4	840.7	745.6	862.7	638.8	854.2	987.7	733.9
Under 1 year[2]	1,032.1	1,152.7	905.8	870.7	976.6	759.1	1,719.2	1,911.8	1,521.8	1,955.3	2,181.7	1,731.1
1–4 years	52.0	57.9	45.8	46.6	52.2	40.7	75.0	82.3	67.5	83.8	90.9	76.5
5–9 years	23.6	27.5	19.5	21.5	25.3	17.4	32.7	37.1	28.1	34.8	39.0	30.4
10–14 years	28.4	36.1	20.3	27.5	34.7	19.9	32.3	42.2	22.1	34.3	45.0	23.3
15–19 years	87.2	124.3	48.6	87.4	124.2	49.1	86.1	124.5	46.6	90.5	131.8	48.6
20–24 years	116.1	176.5	55.6	109.0	165.6	51.6	151.1	231.2	74.4	162.2	251.0	79.3
25–29 years	120.3	177.8	62.6	106.4	157.6	54.1	193.6	290.1	105.3	218.9	330.9	118.0
30–34 years	144.7	208.7	81.0	124.3	180.6	67.0	255.9	371.9	152.4	304.1	448.0	178.1
35–39 years	178.9	248.8	110.6	153.2	212.3	94.2	333.6	487.1	202.3	397.9	589.8	236.3
40–44 years	257.2	339.9	177.7	225.1	295.6	156.0	462.6	646.6	307.1	560.3	797.0	364.7
45–49 years	389.2	504.8	279.1	349.5	452.0	250.1	635.4	858.7	447.3	750.0	1,034.4	518.7
50–54 years	631.3	816.9	457.9	577.6	746.3	416.9	978.4	1,310.9	705.2	1,126.4	1,524.6	804.8
55–59 years	978.8	1,291.0	695.7	923.9	1,221.5	650.4	1,376.6	1,824.6	1,006.1	1,569.9	2,075.4	1,148.2
60–64 years	1,539.1	2,023.8	1,118.0	1,468.4	1,939.8	1,055.0	2,102.1	2,720.8	1,600.6	2,383.7	3,075.6	1,822.3
65–69 years	2,263.0	2,984.1	1,665.8	2,199.8	2,908.7	1,608.2	2,794.3	3,643.2	2,134.8	3,129.9	4,074.1	2,402.1
70–74 years	3,479.7	4,661.6	2,601.3	3,418.9	4,602.1	2,536.7	4,023.2	5,205.6	3,175.3	4,451.2	5,797.0	3,514.8
75–79 years	5,206.1	7,012.9	4,049.9	5,160.9	6,988.1	3,995.0	5,628.0	7,238.1	4,571.9	6,200.0	8,038.1	5,032.1
80–84 years	8,230.0	10,838.7	6,846.2	8,183.3	10,825.7	6,794.5	8,770.6	10,970.8	7,433.7	9,496.2	11,854.7	8,170.6
85 years and over	15,398.9	18,187.4	14,297.5	15,639.1	18,576.1	14,502.9	12,917.6	14,757.5	12,025.5	13,515.2	15,488.1	12,510.3

[1] Figures for age not stated included in All ages but not distributed among age groups.

[2] Death rates under 1 year (based on population estimates) differ from infant mortality rates (based on live births); see tables E, 13, 14, 15, 17, and 20 for infant mortality rates, and Technical notes for further discussion of the difference.

Table 3. Abridged life table for the total population: United States, 1986

[For explanation of the columns of the life table, see section 6 of *Vital Statistics of the United States,* 1986, Volume II]

Age interval	Proportion dying	Of 100,000 born alive		Stationary population		Average remaining lifetime
Period of life between two exact ages stated in years (1)	Proportion of persons alive at beginning of age interval dying during interval (2)	Number living at beginning of age interval (3)	Number dying during age interval (4)	In the age interval (5)	In this and all subsequent age intervals (6)	Average number of years of life remaining at beginning of age interval (7)
x *to* x + n	$_nq_x$	l_x	$_nd_x$	$_nL_x$	T_x	$\mathring{e}_x$
0–1	0.0104	100,000	1,036	99,109	7,480,776	74.8
1–5	0.0020	98,964	202	395,383	7,381,667	74.6
5–10	0.0012	98,762	117	493,491	6,986,284	70.7
10–15	0.0014	98,645	138	492,957	6,492,793	65.8
15–20	0.0043	98,507	426	491,569	5,999,836	60.9
20–25	0.0058	98,081	569	489,011	5,508,267	56.2
25–30	0.0060	97,512	585	486,096	5,019,256	51.5
30–35	0.0072	96,927	700	482,926	4,533,160	46.8
35–40	0.0090	96,227	864	479,097	4,050,234	42.1
40–45	0.0128	95,363	1,224	473,973	3,571,137	37.4
45–50	0.0193	94,139	1,814	466,492	3,097,164	32.9
50–55	0.0311	92,325	2,867	454,908	2,630,672	28.5
55–60	0.0479	89,458	4,285	437,193	2,175,764	24.3
60–65	0.0744	85,173	6,340	410,874	1,738,571	20.4
65–70	0.1076	78,833	8,480	373,881	1,327,697	16.8
70–75	0.1611	70,353	11,337	324,408	953,816	13.6
75–80	0.2320	59,016	13,692	261,685	629,408	10.7
80–85	0.3432	45,324	15,553	187,948	367,723	8.1
85 and over	1.0000	29,771	29,771	179,775	179,775	6.0

Table 4. Life expectancy at birth by race and sex: United States, 1940, 1950, 1960, 1970–1986

Year	All races			White			All other					
							Total			Black		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
1986	74.8	71.3	78.3	75.4	72.0	78.8	71.2	67.2	75.1	69.4	65.2	73.5
1985	74.7	71.2	78.2	75.3	71.9	78.7	71.2	67.2	75.0	69.5	65.3	73.5
1984	74.7	71.2	78.2	75.3	71.8	78.7	71.3	67.4	75.0	69.7	65.6	73.7
1983	74.6	71.0	78.1	75.2	71.7	78.7	71.1	67.2	74.9	69.6	65.4	73.6
1982	74.5	70.9	78.1	75.1	71.5	78.7	71.0	66.8	75.0	69.4	65.1	73.7
1981	74.2	70.4	77.8	74.8	71.1	78.4	70.3	66.1	74.4	68.9	64.5	73.2
1980	73.7	70.0	77.4	74.4	70.7	78.1	69.5	65.3	73.6	68.1	63.8	72.5
1979	73.9	70.0	77.8	74.6	70.8	78.4	69.8	65.4	74.1	68.5	64.0	72.9
1978	73.5	69.6	77.3	74.1	70.4	78.0	69.3	65.0	73.5	68.1	63.7	72.4
1977	73.3	69.5	77.2	74.0	70.2	77.9	68.9	64.7	73.2	67.7	63.4	72.0
1976	72.9	69.1	76.8	73.6	69.9	77.5	68.4	64.2	72.7	67.2	62.9	71.6
1975	72.6	68.8	76.6	73.4	69.5	77.3	68.0	63.7	72.4	66.8	62.4	71.3
1974	72.0	68.2	75.9	72.8	69.0	76.7	67.1	62.9	71.3	66.0	61.7	70.3
1973	71.4	67.6	75.3	72.2	68.5	76.1	66.1	62.0	70.3	65.0	60.9	69.3
1972[1]	71.2	67.4	75.1	72.0	68.3	75.9	65.7	61.5	70.1	64.7	60.4	69.1
1971	71.1	67.4	75.0	72.0	68.3	75.8	65.6	61.6	69.8	64.6	60.5	68.9
1970	70.8	67.1	74.7	71.7	68.0	75.6	65.3	61.3	69.4	64.1	60.0	68.3
1960	69.7	66.6	73.1	70.6	67.4	74.1	63.6	61.1	66.3	---	---	---
1950	68.2	65.6	71.1	69.1	66.5	72.2	60.8	59.1	62.9	---	---	---
1940	62.9	60.8	65.2	64.2	62.1	66.6	53.1	51.5	54.9	---	---	---

[1] Deaths based on a 50-percent sample.

Table 5. Age-specific and age-adjusted death rates for 15 leading causes and selected components: United States, 1979, 1985, and 1986

[Rates per 100,000 population in specified group]

Cause of death (Ninth Revision International Classification of Diseases, 1975)	*Year*	*Age*												*Age-adjusted rate*[3]
		All ages[1]	*Under 1 year*[2]	*1–4 years*	*5–14 years*	*15–24 years*	*25–34 years*	*35–44 years*	*45–54 years*	*55–64 years*	*65–74 years*	*75–84 years*	*85 years and over*	
All causes	1986	873.2	1,032.1	52.0	26.0	102.3	132.1	212.9	504.8	1,255.1	2,801.4	6,348.2	15,398.9	541.7
	1985	873.9	1,067.8	51.4	26.3	95.9	123.4	207.2	516.3	1,282.7	2,838.6	6,445.1	15,480.3	546.1
	1979	852.2	1,332.9	64.2	31.5	114.8	133.0	229.8	589.7	1,338.0	2,929.0	6,496.6	14,962.4	577.0
Diseases of heart 390–398,402,404–429	1986	317.5	26.1	2.5	0.9	2.8	8.6	37.5	144.6	424.2	1,043.0	2,637.5	7,178.7	175.0
	1985	323.0	24.5	2.1	0.9	2.8	8.2	38.0	152.9	439.1	1,080.6	2,712.6	7,275.0	180.5
	1979	326.5	20.2	2.1	0.8	2.6	8.4	45.3	184.6	499.0	1,199.8	2,925.2	7,310.9	199.5
Rheumatic fever and rheumatic heart disease 390–398	1986	2.7	0.1	0.0	0.0	0.1	0.3	0.7	2.1	5.0	10.7	20.2	25.7	1.8
	1985	2.8	0.2	0.0	0.0	0.2	0.4	0.8	2.3	5.3	11.2	20.6	24.5	1.9
	1979	3.5	0.1	0.0	0.0	0.2	0.4	1.4	3.9	8.0	16.0	20.6	25.2	2.6
Hypertensive heart disease . . . 402	1986	8.5	0.0	0.0	-	0.0	0.3	1.6	5.9	13.8	28.6	66.2	160.1	5.0
	1985	8.7	0.0	-	0.0	0.1	0.3	1.6	6.1	14.6	29.9	68.7	163.5	5.3
	1979	9.3	0.0	-	0.0	0.0	0.4	1.9	7.0	16.2	35.7	79.6	170.3	6.0
Hypertensive heart and renal disease 404	1986	1.0	-	-	-	0.0	0.1	0.1	0.3	1.0	3.1	9.0	29.0	0.5
	1985	1.2	-	-	-	0.0	0.0	0.1	0.4	1.1	3.2	11.3	32.4	0.6
	1979	1.6	-	-	0.0	0.0	0.0	0.2	0.4	1.4	5.1	16.8	50.9	0.9
Ischemic heart disease. 410–414	1986	216.0	0.6	0.1	0.0	0.3	3.0	22.4	95.9	292.5	733.4	1,830.0	4,748.6	118.8
	1985	224.8	0.6	0.1	0.0	0.3	3.0	23.3	104.7	309.7	776.3	1,919.6	4,932.9	125.5
	1979	245.5	0.7	0.1	0.0	0.3	3.6	30.1	136.1	381.0	926.6	2,224.8	5,376.1	149.7
Acute myocardial infarction. 410	1986	108.3	0.4	0.0	0.0	0.2	1.8	13.5	59.6	176.0	419.8	921.8	1,678.9	64.3
	1985	114.9	0.4	0.0	0.0	0.2	1.9	14.5	65.4	192.0	455.1	977.2	1,750.2	69.3
	1979	133.8	0.4	0.0	0.0	0.2	2.4	21.1	94.6	258.9	577.2	1,135.2	1,916.3	88.2
Other acute and subacute forms of ischemic heart disease 411	1986	1.6	-	-	0.0	0.0	0.1	0.4	1.4	3.4	5.9	10.4	23.3	1.0
	1985	1.7	-	0.0	-	0.0	0.1	0.3	1.7	3.6	6.1	10.9	24.5	1.1
	1979	2.1	0.1	-	-	0.0	0.1	0.5	2.0	4.8	8.2	15.3	30.2	1.5
Angina pectoris 413	1986	0.4	0.0	-	-	0.0	0.0	0.1	0.1	0.5	1.5	3.5	8.7	0.2
	1985	0.4	-	0.0	-	-	0.0	0.0	0.2	0.5	1.3	3.8	8.2	0.2
	1979	0.2	0.0	-	-	0.0	0.0	0.1	0.1	0.3	0.9	2.1	4.6	0.1
Old myocardial infarction and other forms of chronic ischemic heart disease. 412,414	1986	105.7	0.2	0.0	0.0	0.1	1.1	8.4	34.8	112.6	306.2	894.3	3,037.7	53.2
	1985	107.9	0.2	0.0	0.0	0.1	1.1	8.5	37.5	113.6	313.9	927.6	3,150.0	54.9
	1979	109.4	0.2	0.0	0.0	0.1	1.0	8.4	39.3	117.0	340.3	1,072.2	3,424.9	59.9
Other diseases of endocardium 424	1986	4.2	0.3	0.0	0.0	0.1	0.3	0.6	1.4	4.2	12.7	39.9	96.4	2.2
	1985	4.0	0.6	0.0	0.0	0.1	0.3	0.6	1.5	4.0	12.2	38.1	88.7	2.2
	1979	2.9	0.4	0.0	0.0	0.1	0.2	0.6	1.5	4.3	11.6	27.5	47.1	1.8
All other forms of heart disease 415–423,425–429	1986	85.1	24.9	2.4	0.8	2.2	4.7	12.1	38.9	107.6	254.6	672.1	2,118.9	46.6
	1985	81.5	23.1	2.0	0.8	2.1	4.2	11.6	37.9	104.4	247.8	654.3	2,033.0	45.1
	1979	63.7	19.0	2.0	0.7	1.9	3.7	11.0	35.7	88.1	204.8	555.9	1,641.4	38.4

Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues. . . . 140–208	1986	194.7	2.6	4.0	3.4	5.4	13.1	45.3	165.7	444.4	847.0	1,287.3	1,612.0	133.2
	1985	193.3	3.0	3.8	3.5	5.4	13.1	45.7	169.1	450.5	838.3	1,281.0	1,591.5	133.6
	1979	179.6	3.4	4.6	4.4	6.1	13.3	48.3	181.4	429.4	800.0	1,207.6	1,522.9	130.8
Malignant neoplasms of lip, oral cavity, and pharynx 140–149	1986	3.4	0.0	0.0	0.0	0.1	0.2	0.9	4.2	10.3	14.6	16.4	22.8	2.6
	1985	3.5	0.0	0.0	0.0	0.1	0.2	1.0	4.3	10.3	15.2	16.5	20.5	2.6
	1979	3.8	-	0.0	0.0	0.1	0.2	1.1	5.6	11.8	16.3	18.1	23.7	3.0
Malignant neoplasms of digestive organs and peritoneum 150–159	1986	48.3	0.1	0.1	0.0	0.3	1.5	7.3	32.5	98.0	209.3	363.7	533.9	30.9
	1985	48.8	0.2	0.2	0.1	0.4	1.6	7.4	33.4	100.4	211.0	373.4	537.9	31.6
	1979	48.6	0.3	0.1	0.1	0.3	1.8	8.2	36.3	103.9	221.9	388.7	547.8	33.1
Malignant neoplasms of respiratory and intrathoracic organs 160–165	1986	54.1	0.1	0.0	0.0	0.1	0.7	7.9	51.7	157.8	271.7	303.9	214.9	39.0
	1985	53.3	0.1	0.0	0.0	0.1	0.8	8.1	52.8	158.4	268.0	294.5	202.0	38.8
	1979	45.9	0.0	0.0	0.0	0.1	0.8	9.8	56.0	140.9	231.0	238.1	170.3	35.2
Malignant neoplasm of breast. 174–175	1986	16.9	-	-	0.0	0.0	1.5	9.3	23.4	43.1	61.9	85.9	129.9	12.6
	1985	16.9	0.1	-	-	0.1	1.5	8.9	24.2	44.6	60.8	87.2	126.8	12.7
	1979	15.4	-	-	-	0.0	1.6	9.1	25.3	41.3	56.6	77.4	114.2	12.2
Malignant neoplasms of genital organs 179–187	1986	21.3	-	0.0	0.0	0.3	1.4	4.0	11.8	34.3	89.8	178.2	258.2	13.1
	1985	20.8	-	0.0	0.0	0.4	1.4	3.9	12.0	34.1	87.5	178.6	247.5	13.0
	1979	20.2	0.0	0.0	0.1	0.5	1.6	4.7	14.5	35.6	88.3	176.0	252.0	13.6
Malignant neoplasms of urinary organs 188–189	1986	7.9	0.1	0.1	0.1	0.1	0.2	1.0	5.2	15.1	32.5	64.0	93.9	5.0
	1985	7.9	0.3	0.1	0.1	0.1	0.2	1.2	5.2	15.0	33.5	62.7	96.7	5.0
	1979	7.8	0.2	0.2	0.2	0.1	0.2	1.1	5.7	15.1	34.6	65.6	97.0	5.2
Malignant neoplasms of all other and unspecified sites. 170–173,190–199	1986	24.7	1.5	2.1	1.6	2.0	4.1	9.2	23.6	54.4	96.1	147.7	196.8	17.6
	1985	24.3	1.4	2.0	1.5	2.1	4.1	9.3	24.1	55.1	93.1	142.9	198.7	17.5
	1979	21.6	1.7	2.2	1.7	2.3	3.7	8.6	24.0	49.8	86.4	130.2	175.8	16.4
Leukemia 204–208	1986	7.2	0.7	1.3	1.3	1.5	1.6	2.4	4.8	11.4	25.2	50.3	74.9	5.0
	1985	7.3	0.8	1.3	1.5	1.3	1.5	2.5	5.0	11.7	25.7	50.2	77.3	5.0
	1979	7.1	1.0	1.7	1.9	1.7	1.7	2.7	5.5	11.3	25.4	50.3	76.1	5.3
Other malignant neoplasms of lymphatic and hematopoietic tissues 200–203	1986	10.9	0.1	0.2	0.3	1.0	1.9	3.4	8.3	20.0	45.9	77.2	86.7	7.4
	1985	10.5	0.1	0.2	0.3	1.0	1.8	3.4	8.1	21.0	43.5	74.8	84.2	7.3
	1979	9.1	0.1	0.3	0.4	0.9	1.8	3.0	8.6	19.5	39.5	63.1	66.0	6.7
Cerebrovascular diseases. . . 430–438	1986	62.1	2.9	0.3	0.2	0.7	2.2	7.1	20.4	53.0	164.1	573.8	1,762.6	31.0
	1985	64.1	3.6	0.3	0.2	0.8	2.1	7.2	21.1	54.3	171.3	605.8	1,837.5	32.3
	1979	75.5	4.6	0.3	0.3	0.9	2.6	9.1	26.4	68.1	226.9	793.8	2,264.9	41.6
Accidents and adverse effects E800–E949	1986	39.5	24.1	20.4	12.5	51.2	39.5	31.1	30.7	34.8	49.0	106.3	252.2	35.2
	1985	39.1	23.7	20.0	12.5	48.4	37.8	31.6	31.3	36.6	50.5	107.7	254.3	34.7
	1979	46.9	31.5	26.5	16.1	62.6	45.7	38.4	39.4	43.5	58.8	117.8	276.0	42.9
Motor vehicle accidents. E810–E825	1986	19.9	4.9	7.0	6.9	39.0	24.2	16.6	15.1	15.1	17.9	28.8	25.3	19.4
	1985	19.2	4.8	7.1	6.8	36.1	22.8	17.1	15.2	15.5	17.7	27.6	26.1	18.8
	1979	23.8	6.5	9.8	8.3	45.6	28.8	21.0	18.6	18.2	20.7	28.7	24.4	23.2

See footnotes at end of table.

Table 5. Age-specific and age-adjusted death rates for 15 leading causes and selected components: United States, 1979, 1985, and 1986—Con.

[Rates per 100,000 population in specified group]

Cause of death (Ninth Revision International Classification of Diseases, 1975)	*Year*	*Age*												
		All ages[1]	*Under 1 year*[2]	*1–4 years*	*5–14 years*	*15–24 years*	*25–34 years*	*35–44 years*	*45–54 years*	*55–64 years*	*65–74 years*	*75–84 years*	*85 years and over*	*Age-adjusted rate*[3]
Accidents and adverse effects—Con.														
All other accidents and adverse effects E800–E807, E826–E949	1986	19.7	19.3	13.4	5.5	12.2	15.3	14.5	15.6	19.7	31.2	77.5	226.9	15.7
	1985	19.9	19.0	12.9	5.7	12.3	15.0	14.5	16.1	21.1	32.8	80.1	228.3	16.0
	1979	23.1	25.0	16.7	7.7	17.0	16.9	17.4	20.8	25.2	38.1	89.2	251.6	19.6
Chronic obstructive pulmonary diseases and allied conditions 490–496	1986	31.8	1.6	0.2	0.3	0.5	0.6	1.6	9.8	47.2	149.2	294.8	362.9	18.8
	1985	31.3	1.4	0.3	0.3	0.5	0.6	1.6	10.2	47.5	147.9	291.6	360.0	18.7
	1979	22.2	1.9	0.5	0.2	0.3	0.5	1.7	9.3	40.2	117.0	200.6	230.2	14.6
Pneumonia and influenza . . . 480–487	1986	29.0	17.6	1.4	0.4	0.7	1.7	3.6	7.0	18.6	58.6	242.8	1,032.1	13.5
	1985	28.3	18.8	1.5	0.4	0.6	1.5	3.3	7.2	18.5	57.8	241.3	1,023.5	13.4
	1979	20.1	33.0	2.0	0.6	0.8	1.5	3.2	7.1	16.4	47.8	184.2	694.9	11.2
Diabetes mellitus 250	1986	15.4	0.1	0.1	0.1	0.4	1.5	3.6	9.5	26.0	59.2	121.9	213.9	9.6
	1985	15.5	0.1	0.1	0.1	0.3	1.3	3.7	8.8	26.1	59.7	128.1	214.9	9.6
	1979	14.8	0.1	0.1	0.1	0.4	1.4	3.6	9.0	25.8	61.3	130.3	211.6	9.8
Suicide E950–E959	1986	12.8	. . .	. . .	0.8	13.1	15.7	15.2	16.4	17.0	19.7	25.2	20.8	11.9
	1985	12.3	. . .	. . .	0.8	12.9	15.2	14.6	15.6	16.7	18.5	24.1	19.1	11.5
	1979	12.1	. . .	. . .	0.4	12.4	16.3	15.4	16.5	16.6	17.8	20.8	17.9	11.7
Chronic liver disease and cirrhosis 571	1986	10.9	0.5	0.1	0.0	0.2	2.8	9.6	20.3	32.2	37.2	31.5	20.8	9.2
	1985	11.2	0.3	0.1	0.0	0.2	3.0	9.8	22.0	33.8	37.5	32.6	19.8	9.6
	1979	13.2	1.0	0.1	0.0	0.2	3.4	13.9	31.0	40.9	41.8	28.3	18.1	12.0
Atherosclerosis 440	1986	9.4	-	-	-	0.0	0.0	0.1	0.8	4.0	16.0	74.8	432.6	3.7
	1985	10.0	-	-	-	0.0	0.0	0.2	0.8	4.0	17.0	82.3	465.8	4.0
	1979	12.8	0.1	-	-	0.0	0.0	0.1	0.9	4.8	24.4	125.3	649.1	5.7
Nephritis, nephrotic syndrome, and nephrosis 580–589	1986	9.0	6.7	0.2	0.1	0.2	0.6	1.3	3.2	9.5	26.8	79.4	216.4	4.9
	1985	8.9	7.4	0.2	0.1	0.2	0.6	1.4	3.2	9.7	27.7	78.1	213.7	4.9
	1979	7.0	6.4	0.2	0.2	0.3	0.7	1.5	3.7	8.5	23.7	64.7	155.2	4.3
Homicide and legal intervention E960–E978	1986	9.0	7.4	2.7	1.1	14.2	16.1	11.4	8.3	5.4	4.4	4.6	4.7	9.0
	1985	8.3	5.3	2.4	1.2	12.1	14.7	11.3	8.1	5.7	4.3	4.3	4.1	8.3
	1979	10.0	5.0	2.5	1.1	14.5	18.2	14.3	10.8	7.0	5.4	4.8	5.0	10.2
Septicemia 038	1986	7.8	8.0	0.6	0.1	0.2	0.6	1.4	3.3	8.9	22.6	64.6	181.9	4.3
	1985	7.2	8.1	0.6	0.1	0.2	0.6	1.2	3.0	8.8	21.5	61.5	159.6	4.1
	1979	3.6	7.6	0.5	0.1	0.2	0.4	0.8	2.2	4.9	12.4	29.7	70.3	2.3
Certain conditions originating in the perinatal period 760–779	1986	7.6	483.7	0.9	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	(4)
	1985	8.1	508.6	1.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	-	(4)
	1979	10.4	680.7	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(4)
Congenital anomalies 740–759	1986	5.2	218.8	6.1	1.3	1.3	0.9	1.2	1.4	2.0	2.8	4.0	5.9	(4)
	1985	5.4	228.4	5.9	1.4	1.2	1.0	1.1	1.4	1.9	2.5	3.9	5.6	(4)
	1979	6.0	260.4	8.1	1.6	1.4	1.2	1.4	1.8	2.1	2.7	3.4	5.2	(4)

[1] Figures for age not stated included in All ages but not distributed among age groups.

[2] Death rates under 1 year (based on population estimates) differ from infant mortality rates (based on live births); see tables E, 13, 14, 15, 17, and 20 for infant mortality rates, and Technical notes for further discussion of the difference.

[3] For method of computation, see Technical notes.

[4] Because deaths from these causes occur mainly among infants, age-adjusted rates are not shown.

Table 6. Deaths and death rates for the 10 leading causes of death in specified race-sex groups: United States, 1986

[Rates per 100,000 population in specified group]

Rank order	Cause of death, race, and sex (Ninth Revision International Classification of Diseases, 1975)	Number	Rate
	All races, both sexes		
...	All causes	2,105,361	873.2
1	Diseases of heart 390–398,402,404–429	765,490	317.5
2	Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues 140–208	469,376	194.7
3	Cerebrovascular diseases 430–438	149,643	62.1
4	Accidents and adverse effects E800–E949	95,277	39.5
...	Motor vehicle accidents E810–E825	47,865	19.9
...	All other accidents and adverse effects E800–E807,E826–E949	47,412	19.7
5	Chronic obstructive pulmonary diseases and allied conditions 490–496	76,559	31.8
6	Pneumonia and influenza 480–487	69,812	29.0
7	Diabetes mellitus 250	37,184	15.4
8	Suicide E950–E959	30,904	12.8
9	Chronic liver disease and cirrhosis 571	26,159	10.9
10	Atherosclerosis 440	22,706	9.4
...	All other causes Residual	362,251	150.3
	White, male		
...	All causes	952,554	954.4
1	Diseases of heart 390–398,402,404–429	347,967	348.6
2	Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues 140–208	218,381	218.8
3	Accidents and adverse effects E800–E949	54,864	55.0
...	Motor vehicle accidents E810–E825	29,163	29.2
...	All other accidents and adverse effects E800–E807,E826–E949	25,701	25.7
4	Cerebrovascular diseases 430–438	50,365	50.5
5	Chronic obstructive pulmonary diseases and allied conditions 490–496	43,341	43.4
6	Pneumonia and influenza 480–487	29,891	29.9
7	Suicide E950–E959	22,270	22.3
8	Chronic liver disease and cirrhosis 571	14,099	14.1
9	Diabetes mellitus 250	12,788	12.8
10	Nephritis, nephrotic syndrome, and nephrosis 580–589	8,754	8.8
...	All other causes Residual	149,834	150.1
	White, female		
...	All causes	878,529	840.7
1	Diseases of heart 390–398,402,404–429	333,396	319.0
2	Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues 140–208	193,971	185.6
3	Cerebrovascular diseases 430–438	79,641	76.2
4	Pneumonia and influenza 480–487	32,432	31.0
5	Chronic obstructive pulmonary diseases and allied conditions 490–496	27,781	26.6
6	Accidents and adverse effects E800–E949	25,451	24.4
...	Motor vehicle accidents E810–E825	12,026	11.5
...	All other accidents and adverse effects E800–E807,E826–E949	13,425	12.8
	White, female—Con.		
7	Diabetes mellitus 250	17,496	16.7
8	Atherosclerosis 440	13,091	12.5
9	Nephritis, nephrotic syndrome, and nephrosis 580–589	8,692	8.3
10	Septicemia 038	8,194	7.8
...	All other causes Residual	138,384	132.4
	All other, male		
...	All causes	151,451	862.7
1	Diseases of heart 390–398,402,404–429	42,945	244.6
2	Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues 140–208	32,178	183.3
3	Accidents and adverse effects E800–E949	10,706	61.0
...	Motor vehicle accidents E810–E825	4,925	28.1
...	All other accidents and adverse effects E800–E807,E826–E949	5,781	32.9
4	Cerebrovascular diseases 430–438	8,799	50.1
5	Homicide and legal intervention E960–E978	8,028	45.7
6	Pneumonia and influenza 480–487	4,312	24.6
7	Certain conditions originating in the perinatal period 760–779	3,748	21.4
8	Chronic obstructive pulmonary diseases and allied conditions 490–496	3,717	21.2
9	Chronic liver disease and cirrhosis 571	2,698	15.4
10	Diabetes mellitus 250	2,581	14.7
...	All other causes Residual	31,739	180.8
	All other, female		
...	All causes	122,827	638.8
1	Diseases of heart 390–398,402,404–429	41,182	214.2
2	Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues 140–208	24,846	129.2
3	Cerebrovascular diseases 430–438	10,838	56.4
4	Diabetes mellitus 250	4,319	22.5
5	Accidents and adverse effects E800–E949	4,256	22.1
...	Motor vehicle accidents E810–E825	1,751	9.1
...	All other accidents and adverse effects E800–E807,E826–E949	2,505	13.0
6	Pneumonia and influenza 480–487	3,177	16.5
7	Certain conditions originating in the perinatal period 760–779	2,829	14.7
8	Nephritis, nephrotic syndrome, and nephrosis 580–589	2,212	11.5
9	Homicide and legal intervention E960–E978	2,013	10.5
10	Septicemia 038	1,815	9.4
...	All other causes Residual	25,340	131.8

Table 6. Deaths and death rates for the 10 leading causes of death in specified race-sex groups: United States, 1986—Con.

[Rates per 100,000 population in specified group]

Rank order	*Cause of death, race, and sex* (Ninth Revision International Classification of Diseases, 1975)	*Number*	*Rate*
	Black, male		
...	All causes	137,214	987.7
1	Diseases of heart 390–398,402,404–429	39,076	281.3
2	Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues 140–208	29,363	211.4
3	Accidents and adverse effects E800–E949	9,035	65.0
...	Motor vehicle accidents E810–E825	3,974	28.6
...	All other accidents and adverse effects E800–E807,E826–E949	5,061	36.4
4	Cerebrovascular diseases 430–438	7,938	57.1
5	Homicide and legal intervention E960–E978	7,634	55.0
6	Pneumonia and influenza 480–487	3,836	27.6
7	Certain conditions originating in the perinatal period 760–779	3,501	25.2
8	Chronic obstructive pulmonary diseases and allied conditions 490–496	3,302	23.8
9	Chronic liver disease and cirrhosis 571	2,404	17.3
10	Diabetes mellitus 250	2,295	16.5
...	All other causes Residual	28,830	207.5
	Black, female		
...	All causes	113,112	733.9
1	Diseases of heart 390–398,402,404–429	38,650	250.8
2	Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues 140–208	22,616	146.7
3	Cerebrovascular diseases 430–438	10,014	65.0
4	Diabetes mellitus 250	4,004	26.0
5	Accidents and adverse effects E800–E949	3,550	23.0
...	Motor vehicle accidents E810–E825	1,313	8.5
...	All other accidents and adverse effects E800–E807,E826–E949	2,237	14.5
6	Pneumonia and influenza 480–487	2,864	18.6
7	Certain conditions originating in the perinatal period 760–779	2,648	17.2
8	Nephritis, nephrotic syndrome, and nephrosis 580–589	2,057	13.3
9	Homicide and legal intervention E960–E978	1,861	12.1
10	Septicemia 038	1,720	11.2
...	All other causes Residual	23,128	150.1

Table 7. Deaths and death rates for the 10 leading causes of death in specified age groups: United States, 1986

[Rates per 100,000 population in specified group]

Rank order	Cause of death and age (Ninth Revision International Classification of Diseases, 1975)	Number	Rate
	1–4 years		
...	All causes	7,480	52.0
1	Accidents and adverse effects E800–E949	2,934	20.4
...	Motor vehicle accidents E810–E825	1,005	7.0
...	All other accidents and adverse effects E800–E807,E826–E949	1,929	13.4
2	Congenital anomalies 740–759	879	6.1
3	Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues 140–208	569	4.0
4	Homicide and legal intervention E960–E978	382	2.7
5	Diseases of heart 390–398,402,404–429	366	2.5
6	Pneumonia and influenza 480–487	199	1.4
7	Meningitis 320–322	144	1.0
8	Certain conditions originating in the perinatal period 760–779	132	0.9
9	Septicemia 038	90	0.6
10	Meningococcal infection 036	64	0.4
...	All other causes Residual	1,721	12.0
	5–14 years		
...	All causes	8,788	26.0
1	Accidents and adverse effects E800–E949	4,226	12.5
...	Motor vehicle accidents E810–E825	2,350	6.9
...	All other accidents and adverse effects E800–E807,E826–E949	1,876	5.5
2	Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues 140–208	1,165	3.4
3	Congenital anomalies 740–759	453	1.3
4	Homicide and legal intervention E960–E978	379	1.1
5	Diseases of heart 390–398,402,404–429	310	0.9
6	Suicide E950–E959	255	0.8
7	Pneumonia and influenza 480–487	147	0.4
8	Chronic obstructive pulmonary diseases and allied conditions 490–496	106	0.3
9	Benign neoplasms, carcinoma in situ, and neoplasms of uncertain behavior and of unspecified nature 210–239	90	0.3
10	Cerebrovascular diseases 430–438	73	0.2
...	All other causes Residual	1,584	4.7
	15–24 years		
...	All causes	39,929	102.3
1	Accidents and adverse effects E800–E949	19,975	51.2
...	Motor vehicle accidents E810–E825	15,227	39.0
...	All other accidents and adverse effects E800–E807,E826–E949	4,748	12.2
2	Homicide and legal intervention E960–E978	5,522	14.2
3	Suicide E950–E959	5,120	13.1
4	Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues 140–208	2,115	5.4
5	Diseases of heart 390–398,402,404–429	1,096	2.8
6	Congenital anomalies 740–759	511	1.3
7	Pneumonia and influenza 480–487	276	0.7
8	Cerebrovascular diseases 430–438	263	0.7
9	Chronic obstructive pulmonary diseases and allied conditions 490–496	191	0.5
10	Diabetes mellitus 250	140	0.4
...	All other causes Residual	4,720	12.1
	25–44 years		
...	All causes	126,923	167.3
1	Accidents and adverse effects E800–E949	27,201	35.9
...	Motor vehicle accidents E810–E825	15,844	20.9
...	All other accidents and adverse effects E800–E807,E826–E949	11,357	15.0
2	Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues 140–208	20,595	27.2
3	Diseases of heart 390–398,402,404–429	16,106	21.2
4	Suicide E950–E959	11,724	15.5
5	Homicide and legal intervention E960–E978	10,687	14.1
6	Chronic liver disease and cirrhosis 571	4,370	5.8
7	Cerebrovascular diseases 430–438	3,311	4.4
8	Pneumonia and influenza 480–487	1,936	2.6
9	Diabetes mellitus 250	1,808	2.4
10	Chronic obstructive pulmonary diseases and allied conditions 490–496	789	1.0
...	All other causes Residual	28,396	37.4
	45–64 years		
...	All causes	394,190	875.1
1	Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues 140–208	136,605	303.2
2	Diseases of heart 390–398,402,404–429	127,294	282.6
3	Cerebrovascular diseases 430–438	16,428	36.5
4	Accidents and adverse effects E800–E949	14,733	32.7
...	Motor vehicle accidents E810–E825	6,799	15.1
...	All other accidents and adverse effects E800–E807,E826–E949	7,934	17.6
5	Chronic obstructive pulmonary diseases and allied conditions 490–496	12,720	28.2
6	Chronic liver disease and cirrhosis 571	11,795	26.2
7	Diabetes mellitus 250	7,938	17.6
8	Suicide E950–E959	7,518	16.7
9	Pneumonia and influenza 480–487	5,744	12.8
10	Homicide and legal intervention E960–E978	3,090	6.9
...	All other causes Residual	50,325	111.7

Table 7. Deaths and death rates for the 10 leading causes of death in specified age groups: United States, 1986—Con.

[Rates per 100,000 population in specified group]

Rank order	*Cause of death and age* (Ninth Revision International Classification of Diseases, 1975)	*Number*	*Rate*
	65 years and over		
...	All causes	1,488,161	5,102.0
1	Diseases of heart 390–398,402,404–429	619,009	2,122.2
2	Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues 140–208	308,184	1,056.6
3	Cerebrovascular diseases 430–438	129,357	443.5
4	Chronic obstructive pulmonary diseases and allied conditions 490–496	62,649	214.8
5	Pneumonia and influenza 480–487	60,801	208.5
6	Diabetes mellitus 250	27,256	93.4
	65 years and over—Con.		
7	Accidents and adverse effects E800–E949	25,134	86.2
...	Motor vehicle accidents E810–E825	6,410	22.0
...	All other accidents and adverse effects E800–E807,E826–E949	18,724	64.2
8	Atherosclerosis 440	21,555	73.9
9	Nephritis, nephrotic syndrome, and nephrosis 580–589	17,851	61.2
10	Septicemia 038	14,821	50.8
...	All other causes Residual	201,544	691.0

Table 8. Deaths from 72 selected causes by age: United States, 1986

Cause of death (Ninth Revision International Classification of Diseases, 1975)	*All ages*	*Under 1 year*	*1–4 years*	*5–14 years*	*15–24 years*	*25–34 years*	*35–44 years*	*45–54 years*	*55–64 years*	*65–74 years*	*75–84 years*	*85 years and over*	*Not stated*
All causes	2,105,361	38,891	7,480	8,788	39,929	56,530	70,393	115,161	279,029	485,539	575,149	427,473	999
Shigellosis and amebiasis 004,006	12	-	-	1	-	3	3	1	-	1	3	-	-
Certain other intestinal infections 007–009	347	114	9	3	3	17	19	16	19	33	43	70	1
Tuberculosis 010–018	1,782	1	3	4	18	107	184	183	279	373	416	211	3
Tuberculosis of respiratory system 010–012	1,407	-	1	1	12	60	135	142	226	303	343	181	3
Other tuberculosis 013–018	375	1	2	3	6	47	49	41	53	70	73	30	-
Whooping cough 033	6	5	-	-	-	-	-	-	-	1	-	-	-
Streptococcal sore throat, scarlatina, and erysipelas 034–035	12	-	-	1	2	-	-	3	2	-	1	3	-
Meningococcal infection 036	286	62	64	20	38	24	16	12	17	16	12	5	-
Septicemia 038	18,795	302	90	44	87	255	462	744	1,984	3,915	5,857	5,049	6
Acute poliomyelitis 045	-	-	-	-	-	-	-	-	-	-	-	-	-
Measles 055	2	-	-	-	1	-	-	-	1	-	-	-	-
Viral hepatitis 070	1,006	10	8	10	45	107	119	110	174	232	151	40	-
Syphilis 090–097	80	5	-	-	-	2	4	3	5	17	31	13	-
All other infectious and parasitic diseases 001–003,005,020–032, 037,039–041,046–054, 056–066,071–088,098–139	9,295	219	107	96	292	1,702	1,714	984	1,136	1,346	1,086	612	1
Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues 140–208	469,376	97	569	1,165	2,115	5,604	14,991	37,800	98,805	146,803	116,632	44,749	46
Malignant neoplasms of lip, oral cavity, and pharynx 140–149	8,292	1	2	6	25	68	293	969	2,282	2,528	1,484	634	-
Malignant neoplasms of digestive organs and peritoneum 150–159	116,508	5	20	14	125	644	2,412	7,424	21,796	36,281	32,954	14,820	13
Malignant neoplasms of respiratory and intrathoracic organs 160–165	130,450	4	2	3	52	317	2,597	11,802	35,080	47,085	27,530	5,966	12
Malignant neoplasm of breast 174–175	40,789	-	-	1	14	654	3,073	5,350	9,577	10,722	7,787	3,606	5
Malignant neoplasms of genital organs 179–187	51,247	-	6	3	134	597	1,309	2,686	7,630	15,565	16,144	7,168	5
Malignant neoplasms of urinary organs 188–189	19,113	4	20	44	25	88	336	1,183	3,365	5,639	5,800	2,607	2
Malignant neoplasms of all other and unspecified sites 170–173,190–199	59,446	55	296	529	790	1,744	3,028	5,394	12,099	16,661	13,379	5,463	8
Leukemia 204–208	17,365	25	194	448	574	669	810	1,101	2,532	4,373	4,559	2,079	1
Other malignant neoplasms of lymphatic and hematopoietic tissues 200–203	26,166	3	29	117	376	823	1,133	1,891	4,444	7,949	6,995	2,406	-
Benign neoplasms, carcinoma in situ, and neoplasms of uncertain behavior and of unspecified nature 210–239	6,730	78	56	90	132	203	262	439	918	1,541	1,963	1,046	2
Diabetes mellitus 250	37,184	2	9	25	140	634	1,174	2,158	5,780	10,269	11,048	5,939	6
Nutritional deficiencies 260–269	2,862	24	-	3	6	17	34	41	136	397	826	1,377	1

Table 8. Deaths from 72 selected causes by age: United States, 1986—Con.

Cause of death (Ninth Revision International Classification of Diseases, 1975)	*All ages*	*Under 1 year*	*1–4 years*	*5–14 years*	*15–24 years*	*25–34 years*	*35–44 years*	*45–54 years*	*55–64 years*	*65–74 years*	*75–84 years*	*85 years and over*	*Not stated*
Anemias 280–285	3,708	21	61	60	114	176	118	116	244	575	1,123	1,100	-
Meningitis 320–322	1,160	220	144	27	25	62	62	69	154	175	152	70	-
Major cardiovascular diseases 390–448	968,240	1,116	415	402	1,452	4,872	15,254	38,853	110,619	220,605	307,894	266,339	419
Diseases of heart 390–398,402,404–429	765,490	982	366	310	1,096	3,691	12,415	32,982	94,312	180,772	238,956	199,281	327
Rheumatic fever and rheumatic heart disease 390–398	6,441	5	2	6	52	138	248	477	1,120	1,848	1,829	714	2
Hypertensive heart disease. . . 402	20,509	1	2	-	19	119	528	1,349	3,077	4,962	5,998	4,445	9
Hypertensive heart and renal disease. 404	2,496	-	-	-	2	26	41	64	212	530	817	804	-
Ischemic heart disease. . . 410–414	520,729	23	8	16	119	1,272	7,418	21,886	65,036	127,111	165,799	131,821	220
Acute myocardial infarction 410	261,002	16	4	10	62	754	4,479	13,605	39,139	72,757	83,511	46,607	58
Other acute and subacute forms of ischemic heart disease. 411	3,856	-	-	1	7	27	140	312	759	1,016	945	647	2
Angina pectoris 413	990	1	-	-	1	2	17	34	110	265	319	241	-
Old myocardial infarction and other forms of chronic ischemic heart disease. 412,414	254,881	6	4	5	49	489	2,782	7,935	25,028	53,073	81,024	84,326	160
Other diseases of endocardium 424	10,130	13	7	10	43	118	192	320	935	2,198	3,618	2,676	-
All other forms of heart disease. 415–423,425–429	205,185	940	347	278	861	2,018	3,988	8,886	23,932	44,123	60,895	58,821	96
Hypertension with or without renal disease 401,403	7,984	5	1	1	7	54	123	359	878	1,817	2,627	2,108	4
Cerebrovascular diseases. . . 430–438	149,643	109	37	73	263	960	2,351	4,648	11,780	28,444	51,982	48,931	65
Intracerebral and other intracranial hemorrhage 431–432	20,479	52	10	32	106	324	892	1,655	3,085	5,135	6,014	3,161	13
Cerebral thrombosis and unspecified occlusion of cerebral arteries. 434.0,434.9	23,467	13	6	8	18	55	135	417	1,551	4,340	8,407	8,506	11
Cerebral embolism. 434.1	784	1	1	2	3	5	9	18	66	195	297	187	-
All other and late effects of cerebrovascular diseases 430,433,435–438	104,913	43	20	31	136	576	1,315	2,558	7,078	18,774	37,264	37,07741	
Atherosclerosis 440	22,706	-	-	-	1	10	40	190	889	2,765	6,781	12,009	21
Other diseases of arteries, arterioles, and capillaries 441–448	22,417	20	11	18	85	157	325	674	2,760	6,807	7,548	4,010	2
Acute bronchitis and bronchiolitis. 466	588	59	14	5	6	4	10	14	36	98	176	165	1
Pneumonia and influenza . . . 480–487	69,812	663	199	147	276	736	1,200	1,600	4,144	10,154	21,995	28,652	46
Pneumonia 480–486	67,974	656	191	133	267	724	1,177	1,564	4,087	9,945	21,451	27,733	46
Influenza 487	1,838	7	8	14	9	12	23	36	57	209	544	919	-
Chronic obstructive pulmonary diseases and allied conditions. 490–496	76,559	60	34	106	191	247	542	2,235	10,485	25,866	26,708	10,075	10
Bronchitis, chronic and unspecified. 490–491	3,750	40	12	5	9	12	33	98	422	1,046	1,281	790	2
Emphysema 492	14,471	4	-	1	2	11	63	486	2,274	5,351	4,910	1,368	1

Asthma. 493	3,955	13	17	92	166	197	251	356	688	982	843	350	-
Other chronic obstructive pulmonary diseases and allied conditions. 494–496	54,383	3	5	8	14	27	195	1,295	7,101	18,487	19,674	7,567	7
Ulcer of stomach and duodenum. 531–533	6,477	9	1	3	15	57	142	248	736	1,423	2,130	1,710	3
Appendicitis 540–543	512	6	6	17	16	15	16	24	87	126	130	69	-
Hernia of abdominal cavity and intestinal obstruction without mention of hernia. 550–553,560	5,445	104	31	25	27	39	72	135	402	924	1,812	1,872	2
Chronic liver disease and cirrhosis. 571	26,159	20	10	4	69	1,182	3,188	4,632	7,163	6,455	2,850	578	8
Cholelithiasis and other disorders of gallbladder 574–575	2,956	4	1	2	7	16	33	71	225	615	1,060	920	2
Nephritis, nephrotic syndrome, and nephrosis. 580–589	21,767	251	28	33	79	241	435	732	2,115	4,649	7,196	6,006	2
Acute glomerulonephritis and nephrotic syndrome. 580–581	293	8	5	1	6	8	12	5	36	59	95	58	-
Chronic glomerulonephritis, nephritis and nephropathy, not specified as acute or chronic, and renal sclerosis, unspecified. 582–583,587	1,505	2	2	8	12	32	47	56	164	349	481	352	-
Renal failure, disorders resulting from impaired renal function, and small kidney of unknown cause 584–586,588–589	19,969	241	21	24	61	201	376	671	1,915	4,241	6,620	5,596	2
Infections of kidney 590	1,870	4	3	1	4	18	28	56	125	298	604	727	2
Hyperplasia of prostate. 600	508	-	-	-	-	-	-	-	24	83	175	225	1
Complications of pregnancy, childbirth, and the puerperium 630–676	272	. . .	. . .	-	91	125	55	1	. . .	. . .	. . .	. . .	. . .
Pregnancy with abortive outcome 630–638	51	. . .	. . .	-	20	18	13	-	. . .	. . .	. . .	. . .	. . .
Other complications of pregnancy, childbirth, and the puerperium 640–676	221	. . .	. . .	-	71	107	42	1	. . .	. . .	. . .	. . .	. . .
Congenital anomalies 740–759	12,638	8,244	879	453	511	398	383	315	446	479	365	163	2
Certain conditions originating in the perinatal period 760–779	18,391	18,226	132	13	6	7	1	2	-	1	1	1	1
Birth trauma, intrauterine hypoxia, birth asphyxia, and respiratory distress syndrome 767–769	4,693	4,652	28	8	2	2	-	1	-	-	-	-	-
Other conditions originating in the perinatal period. 760–766,770–779	13,698	13,574	104	5	4	5	1	1	-	1	1	1	1
Symptoms, signs, and ill-defined conditions. 780–799	31,390	6,038	317	146	870	1,845	1,763	1,746	3,105	4,700	5,505	5,266	89
All other diseases . . . . . Residual	158,102	1,689	921	973	2,209	6,430	8,401	8,841	16,667	30,517	44,744	36,658	52
Accidents and adverse effects. E800–E949	95,277	909	2,934	4,226	19,975	16,906	10,295	7,005	7,728	8,499	9,633	7,002	165
Motor vehicle accidents E810–E825	47,865	183	1,005	2,350	15,227	10,358	5,486	3,442	3,357	3,096	2,612	702	47
All other accidents and adverse effects . . . E800–E807,E826–E949	47,412	726	1,929	1,876	4,748	6,548	4,809	3,563	4,371	5,403	7,021	6,300	118
Suicide E950–E959	30,904	. . .	. . .	255	5,120	6,711	5,013	3,736	3,782	3,414	2,283	578	12
Homicide and legal intervention E960–E978	21,731	278	382	379	5,522	6,904	3,783	1,895	1,195	758	417	130	88
All other external causes. E980–E999	3,120	51	53	49	465	864	617	341	291	181	127	53	28

Table 9. Death rates for 72 selected causes by age: United States, 1986

[Rates per 100,000 population in specified group]

Cause of death (Ninth Revision International Classification of Diseases, 1975)	*All ages*[1]	*Under 1 year*[2]	*1–4 years*	*5–14 years*	*15–24 years*	*25–34 years*	*35–44 years*	*45–54 years*	*55–64 years*	*65–74 years*	*75–84 years*	*85 years and over*
All causes	873.2	1,032.1	52.0	26.0	102.3	132.1	212.9	504.8	1,255.1	2,801.4	6,348.2	15,398.9
Shigellosis and amebiasis 004,006	0.0	-	-	0.0	-	0.0	0.0	0.0	-	0.0	0.0	-
Certain other intestinal infections 007–009	0.1	3.0	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.5	2.5
Tuberculosis 010–018	0.7	0.0	0.0	0.0	0.0	0.3	0.6	0.8	1.3	2.2	4.6	7.6
Tuberculosis of respiratory system 010–012	0.6	-	0.0	0.0	0.0	0.1	0.4	0.6	1.0	1.7	3.8	6.5
Other tuberculosis 013–018	0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.4	0.8	1.1
Whooping cough 033	0.0	0.1	-	-	-	-	-	-	-	0.0	-	-
Streptococcal sore throat, scarlatina, and erysipelas 034–035	0.0	-	-	0.0	0.0	-	-	0.0	0.0	-	0.0	0.1
Meningococcal infection 036	0.1	1.6	0.4	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.2
Septicemia 038	7.8	8.0	0.6	0.1	0.2	0.6	1.4	3.3	8.9	22.6	64.6	181.9
Acute poliomyelitis 045	-	-	-	-	-	-	-	-	-	-	-	-
Measles 055	0.0	-	-	-	0.0	-	-	-	0.0	-	-	-
Viral hepatitis 070	0.4	0.3	0.1	0.0	0.1	0.3	0.4	0.5	0.8	1.3	1.7	1.4
Syphilis 090–097	0.0	0.1	-	-	-	0.0	0.0	0.0	0.0	0.1	0.3	0.5
All other infectious and parasitic diseases 001–003,005,020–032,037,039–041, 046–054,056–066,071–088,098–139	3.9	5.8	0.7	0.3	0.7	4.0	5.2	4.3	5.1	7.8	12.0	22.0
Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues 140–208	194.7	2.6	4.0	3.4	5.4	13.1	45.3	165.7	444.4	847.0	1,287.3	1,612.0
Malignant neoplasms of lip, oral cavity, and pharynx 140–149	3.4	0.0	0.0	0.0	0.1	0.2	0.9	4.2	10.3	14.6	16.4	22.8
Malignant neoplasms of digestive organs and peritoneum 150–159	48.3	0.1	0.1	0.0	0.3	1.5	7.3	32.5	98.0	209.3	363.7	533.9
Malignant neoplasms of respiratory and intrathoracic organs 160–165	54.1	0.1	0.0	0.0	0.1	0.7	7.9	51.7	157.8	271.7	303.9	214.9
Malignant neoplasm of breast 174–175	16.9	-	-	0.0	0.0	1.5	9.3	23.4	43.1	61.9	85.9	129.9
Malignant neoplasms of genital organs 179–187	21.3	-	0.0	0.0	0.3	1.4	4.0	11.8	34.3	89.8	178.2	258.2
Malignant neoplasms of urinary organs 188–189	7.9	0.1	0.1	0.1	0.1	0.2	1.0	5.2	15.1	32.5	64.0	93.9
Malignant neoplasms of all other and unspecified sites 170–173,190–199	24.7	1.5	2.1	1.6	2.0	4.1	9.2	23.6	54.4	96.1	147.7	196.8
Leukemia 204–208	7.2	0.7	1.3	1.3	1.5	1.6	2.4	4.8	11.4	25.2	50.3	74.9
Other malignant neoplasms of lymphatic and hematopoietic tissues 200–203	10.9	0.1	0.2	0.3	1.0	1.9	3.4	8.3	20.0	45.9	77.2	86.7
Benign neoplasms, carcinoma in situ, and neoplasms of uncertain behavior and of unspecified nature 210–239	2.8	2.1	0.4	0.3	0.3	0.5	0.8	1.9	4.1	8.9	21.7	37.7
Diabetes mellitus 250	15.4	0.1	0.1	0.1	0.4	1.5	3.6	9.5	26.0	59.2	121.9	213.9
Nutritional deficiencies 260–269	1.2	0.6	-	0.0	0.0	0.0	0.1	0.2	0.6	2.3	9.1	49.6
Anemias 280–285	1.5	0.6	0.4	0.2	0.3	0.4	0.4	0.5	1.1	3.3	12.4	39.6
Meningitis 320–322	0.5	5.8	1.0	0.1	0.1	0.1	0.2	0.3	0.7	1.0	1.7	2.5
Major cardiovascular diseases 390–448	401.6	29.6	2.9	1.2	3.7	11.4	46.1	170.3	497.6	1,272.8	3,398.4	9,594.3
Diseases of heart 390–398,402,404–429	317.5	26.1	2.5	0.9	2.8	8.6	37.5	144.6	424.2	1,043.0	2,637.5	7,178.7
Rheumatic fever and rheumatic heart disease 390–398	2.7	0.1	0.0	0.0	0.1	0.3	0.7	2.1	5.0	10.7	20.2	25.7
Hypertensive heart disease 402	8.5	0.0	0.0	-	0.0	0.3	1.6	5.9	13.8	28.6	66.2	160.1
Hypertensive heart and renal disease 404	1.0	-	-	-	0.0	0.1	0.1	0.3	1.0	3.1	9.0	29.0
Ischemic heart disease 410–414	216.0	0.6	0.1	0.0	0.3	3.0	22.4	95.9	292.5	733.4	1,830.0	4,748.6
Acute myocardial infarction 410	108.3	0.4	0.0	0.0	0.2	1.8	13.5	59.6	176.0	419.8	921.8	1,678.9
Other acute and subacute forms of ischemic heart disease 411	1.6	-	-	0.0	0.0	0.1	0.4	1.4	3.4	5.9	10.4	23.3

Angina pectoris 413	0.4	0.0	-	-	0.0	0.0	0.1	0.1	0.5	1.5	3.5	8.7
Old myocardial infarction and other forms of chronic ischemic heart disease 412,414	105.7	0.2	0.0	0.0	0.1	1.1	8.4	34.8	112.6	306.2	894.3	3,037.7
Other diseases of endocardium 424	4.2	0.3	0.0	0.0	0.1	0.3	0.6	1.4	4.2	12.7	39.9	96.4
All other forms of heart disease 415–423,425–429	85.1	24.9	2.4	0.8	2.2	4.7	12.1	38.9	107.6	254.6	672.1	2,118.9
Hypertension with or without renal disease 401,403	3.3	0.1	0.0	0.0	0.0	0.1	0.4	1.6	3.9	10.5	29.0	75.9
Cerebrovascular diseases 430–438	62.1	2.9	0.3	0.2	0.7	2.2	7.1	20.4	53.0	164.1	573.8	1,762.6
Intracerebral and other intracranial hemorrhage 431–432	8.5	1.4	0.1	0.1	0.3	0.8	2.7	7.3	13.9	29.6	66.4	113.9
Cerebral thrombosis and unspecified occlusion of cerebral arteries 434.0,434.9	9.7	0.3	0.0	0.0	0.0	0.1	0.4	1.8	7.0	25.0	92.8	306.4
Cerebral embolism 434.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	1.1	3.3	6.7
All other and late effects of cerebrovascular diseases 430,433,435–438	43.5	1.1	0.1	0.1	0.3	1.3	4.0	11.2	31.8	108.3	411.3	1,335.6
Atherosclerosis 440	9.4	-	-	-	0.0	0.0	0.1	0.8	4.0	16.0	74.8	432.6
Other diseases of arteries, arterioles, and capillaries 441–448	9.3	0.5	0.1	0.1	0.2	0.4	1.0	3.0	12.4	39.3	83.3	144.5
Acute bronchitis and bronchiolitis 466	0.2	1.6	0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.6	1.9	5.9
Pneumonia and influenza 480–487	29.0	17.6	1.4	0.4	0.7	1.7	3.6	7.0	18.6	58.6	242.8	1,032.1
Pneumonia 480–486	28.2	17.4	1.3	0.4	0.7	1.7	3.6	6.9	18.4	57.4	236.8	999.0
Influenza 487	0.8	0.2	0.1	0.0	0.0	0.0	0.1	0.2	0.3	1.2	6.0	33.1
Chronic obstructive pulmonary diseases and allied conditions 490–496	31.8	1.6	0.2	0.3	0.5	0.6	1.6	9.8	47.2	149.2	294.8	362.9
Bronchitis, chronic and unspecified 490–491	1.6	1.1	0.1	0.0	0.0	0.0	0.1	0.4	1.9	6.0	14.1	28.5
Emphysema 492	6.0	0.1	-	0.0	0.0	0.0	0.2	2.1	10.2	30.9	54.2	49.3
Asthma 493	1.6	0.3	0.1	0.3	0.4	0.5	0.8	1.6	3.1	5.7	9.3	12.6
Other chronic obstructive pulmonary diseases and allied conditions 494–496	22.6	0.1	0.0	0.0	0.0	0.1	0.6	5.7	31.9	106.7	217.2	272.6
Ulcer of stomach and duodenum 531–533	2.7	0.2	0.0	0.0	0.0	0.1	0.4	1.1	3.3	8.2	23.5	61.6
Appendicitis 540–543	0.2	0.2	0.0	0.1	0.0	0.0	0.0	0.1	0.4	0.7	1.4	2.5
Hernia of abdominal cavity and intestinal obstruction without mention of hernia 550–553,560	2.3	2.8	0.2	0.1	0.1	0.1	0.2	0.6	1.8	5.3	20.0	67.4
Chronic liver disease and cirrhosis 571	10.9	0.5	0.1	0.0	0.2	2.8	9.6	20.3	32.2	37.2	31.5	20.8
Cholelithiasis and other disorders of gallbladder 574–575	1.2	0.1	0.0	0.0	0.0	0.0	0.1	0.3	1.0	3.5	11.7	33.1
Nephritis, nephrotic syndrome, and nephrosis 580–589	9.0	6.7	0.2	0.1	0.2	0.6	1.3	3.2	9.5	26.8	79.4	216.4
Acute glomerulonephritis and nephrotic syndrome 580–581	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	1.0	2.1
Chronic glomerulonephritis, nephritis and nephropathy, not specified as acute or chronic, and renal sclerosis, unspecified 582–583,587	0.6	0.1	0.0	0.0	0.0	0.1	0.1	0.2	0.7	2.0	5.3	12.7
Renal failure, disorders resulting from impaired renal function, and small kidney of unknown cause 584–586,588–589	8.3	6.4	0.1	0.1	0.2	0.5	1.1	2.9	8.6	24.5	73.1	201.6
Infections of kidney 590	0.8	0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.6	1.7	6.7	26.2
Hyperplasia of prostate 600	0.2	-	-	-	-	-	-	-	0.1	0.5	1.9	8.1
Complications of pregnancy, childbirth, and the puerperium 630–676	0.1	...	...	-	0.2	0.3	0.2	0.0	...	...	...	...
Pregnancy with abortive outcome 630–638	0.0	...	...	-	0.1	0.0	0.0	-	...	...	...	...
Other complications of pregnancy, childbirth, and the puerperium 640–676	0.1	...	...	-	0.2	0.3	0.1	0.0	...	...	...	...
Congenital anomalies 740–759	5.2	218.8	6.1	1.3	1.3	0.9	1.2	1.4	2.0	2.8	4.0	5.9
Certain conditions originating in the perinatal period 760–779	7.6	483.7	0.9	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0
Birth trauma, intrauterine hypoxia, birth asphyxia, and respiratory distress syndrome 767–769	1.9	123.5	0.2	0.0	0.0	0.0	-	0.0	-	-	-	-
Other conditions originating in the perinatal period 760–766,770–779	5.7	360.2	0.7	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0

See footnotes at end of table.

Table 9. Death rates for 72 selected causes by age: United States, 1986—Con.

Cause of death (Ninth Revision International Classification of Diseases, 1975)	*All ages*[1]	*Under 1 year*[2]	*1–4 years*	*5–14 years*	*15–24 years*	*25–34 years*	*35–44 years*	*45–54 years*	*55–64 years*	*65–74 years*	*75–84 years*	*85 years and over*
Symptoms, signs, and ill-defined conditions 780–799	13.0	160.2	2.2	0.4	2.2	4.3	5.3	7.7	14.0	27.1	60.8	189.7
All other diseases..... Residual	65.6	44.8	6.4	2.9	5.7	15.0	25.4	38.8	75.0	176.1	493.9	1,320.5
Accidents and adverse effects..... E800–E949	39.5	24.1	20.4	12.5	51.2	39.5	31.1	30.7	34.8	49.0	106.3	252.2
Motor vehicle accidents..... E810–E825	19.9	4.9	7.0	6.9	39.0	24.2	16.6	15.1	15.1	17.9	28.8	25.3
All other accidents and adverse effects..... E800–E807,E826–E949	19.7	19.3	13.4	5.5	12.2	15.3	14.5	15.6	19.7	31.2	77.5	226.9
Suicide..... E950–E959	12.8	...	...	0.8	13.1	15.7	15.2	16.4	17.0	19.7	25.2	20.8
Homicide and legal intervention E960–E978	9.0	7.4	2.7	1.1	14.2	16.1	11.4	8.3	5.4	4.4	4.6	4.7
All other external causes E980–E999	1.3	1.4	0.4	0.1	1.2	2.0	1.9	1.5	1.3	1.0	1.4	1.9

[1]Figures for age not stated included in All ages but not distributed among age groups.
[2]Death rates under 1 year (based on population estimates) differ from infant mortality rates (based on live births); see tables E, 13, 14, 15, 17, and 20 for infant mortality rates, and Technical notes for further discussion of the difference.

Table 10. Deaths from 72 selected causes by race and sex: United States, 1986

Cause of death (Ninth Revision International Classification of Diseases, 1975)	*All races*			*White*			*All other*					
							Total			*Black*		
	Both sexes	*Male*	*Female*	*Both sexes*	*Male*	*Female*	*Both sexes*	*Male*	*Female*	*Both sexes*	*Male*	*Female*
All causes	2,105,361	1,104,005	1,001,356	1,831,083	952,554	878,529	274,278	151,451	122,827	250,326	137,214	113,112
Shigellosis and amebiasis 004,006	12	9	3	11	8	3	1	1	-	1	1	-
Certain other intestinal infections 007–009	347	192	155	257	134	123	90	58	32	82	53	29
Tuberculosis 010–018	1,782	1,157	625	1,065	679	386	717	478	239	628	424	204
Tuberculosis of respiratory system 010–012	1,407	948	459	859	564	295	548	384	164	478	339	139
Other tuberculosis 013–018	375	209	166	206	115	91	169	94	75	150	85	65
Whooping cough 033	6	4	2	3	3	-	3	1	2	3	1	2
Streptococcal sore throat, scarlatina, and erysipelas 034–035	12	5	7	10	5	5	2	-	2	2	-	2
Meningococcal infection 036	286	146	140	216	113	103	70	33	37	66	31	35
Septicemia 038	18,795	8,786	10,009	15,156	6,962	8,194	3,639	1,824	1,815	3,417	1,697	1,720
Acute poliomyelitis 045	-	-	-	-	-	-	-	-	-	-	-	-
Measles 055	2	1	1	1	1	-	1	-	1	1	-	1
Viral hepatitis 070	1,006	619	387	830	517	313	176	102	74	126	66	60
Syphilis 090–097	80	42	38	43	22	21	37	20	17	37	20	17
All other infectious and parasitic diseases 001–003,005, 020–032,037,039–041, 046–054,056–066, 071–088,098–139	9,295	6,307	2,988	7,305	4,980	2,325	1,990	1,327	663	1,831	1,222	609
Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues 140–208	469,376	250,559	218,817	412,352	218,381	193,971	57,024	32,178	24,846	51,979	29,363	22,616
Malignant neoplasms of lip, oral cavity, and pharynx 140–149	8,292	5,514	2,778	6,879	4,476	2,403	1,413	1,038	375	1,289	956	333
Malignant neoplasms of digestive organs and peritoneum 150–159	116,508	61,137	55,371	100,884	52,533	48,351	15,624	8,604	7,020	13,858	7,554	6,304
Malignant neoplasms of respiratory and intrathoracic organs 160–165	130,450	88,813	41,637	115,179	77,647	37,532	15,271	11,166	4,105	14,112	10,368	3,744
Malignant neoplasm of breast 174–175	40,789	250	40,539	36,398	215	36,183	4,391	35	4,356	4,076	31	4,045
Malignant neoplasms of genital organs 179–187	51,247	27,878	23,369	43,437	23,257	20,180	7,810	4,621	3,189	7,322	4,420	2,902
Malignant neoplasms of urinary organs 188–189	19,113	12,153	6,960	17,435	11,218	6,217	1,678	935	743	1,536	855	681
Malignant neoplasms of all other and unspecified sites 170–173,190–199	59,446	31,663	27,783	53,038	28,284	24,754	6,408	3,379	3,029	5,813	3,055	2,758
Leukemia 204–208	17,365	9,565	7,800	15,709	8,685	7,024	1,656	880	776	1,460	771	689
Other malignant neoplasms of lymphatic and hematopoietic tissues 200–203	26,166	13,586	12,580	23,393	12,066	11,327	2,773	1,520	1,253	2,513	1,353	1,160

Table 10. Deaths from 72 selected causes by race and sex: United States, 1986—Con.

Cause of death (Ninth Revision International Classification of Diseases, 1975)	*All races*			*White*			*All other*					
							Total			*Black*		
	Both sexes	*Male*	*Female*	*Both sexes*	*Male*	*Female*	*Both sexes*	*Male*	*Female*	*Both sexes*	*Male*	*Female*
Benign neoplasms, carcinoma in situ, and neoplasms of uncertain behavior and of unspecified nature 210–239	6,730	3,114	3,616	5,895	2,740	3,155	835	374	461	756	332	424
Diabetes mellitus. 250	37,184	15,369	21,815	30,284	12,788	17,496	6,900	2,581	4,319	6,299	2,295	4,004
Nutritional deficiencies. . . 260–269	2,862	1,088	1,774	2,438	883	1,555	424	205	219	392	190	202
Anemias 280–285	3,708	1,633	2,075	2,949	1,272	1,677	759	361	398	706	334	372
Meningitis. 320–322	1,160	624	536	827	445	382	333	179	154	305	165	140
Major cardiovascular diseases 390–448	968,240	475,591	492,649	858,820	421,230	437,590	109,420	54,361	55,059	100,891	49,375	51,516
Diseases of heart. 390–398, 402,404–429	765,490	390,912	374,578	681,363	347,967	333,396	84,127	42,945	41,182	77,726	39,076	38,650
Rheumatic fever and rheumatic heart disease 390–398	6,441	2,054	4,387	5,872	1,842	4,030	569	212	357	470	177	293
Hypertensive heart disease. 402	20,509	8,614	11,895	14,982	6,043	8,939	5,527	2,571	2,956	5,312	2,465	2,847
Hypertensive heart and renal disease. 404	2,496	1,017	1,479	1,831	721	1,110	665	296	369	634	279	355
Ischemic heart disease 410–414	520,729	274,184	246,545	475,398	251,111	224,287	45,331	23,073	22,258	41,201	20,498	20,703
Acute myocardial infarction 410	261,002	145,795	115,207	238,218	133,960	104,258	22,784	11,835	10,949	20,684	10,525	10,159
Other acute and subacute forms of ischemic heart disease. 411	3,856	2,352	1,504	3,296	2,014	1,282	560	338	222	517	307	210
Angina pectoris 413	990	445	545	882	399	483	108	46	62	101	43	58
Old myocardial infarction and other forms of chronic ischemic heart disease 412,414	254,881	125,592	129,289	233,002	114,738	118,264	21,879	10,854	11,025	19,899	9,623	10,276
Other diseases of endocardium 424	10,130	4,586	5,544	9,283	4,176	5,107	847	410	437	754	356	398
All other forms of heart disease. 415–423, 425–429	205,185	100,457	104,728	173,997	84,074	89,923	31,188	16,383	14,805	29,355	15,301	14,054
Hypertension with or without renal disease 401,403	7,984	3,403	4,581	6,171	2,639	3,532	1,813	764	1,049	1,732	719	1,013
Cerebrovascular diseases 430–438	149,643	59,164	90,479	130,006	50,365	79,641	19,637	8,799	10,838	17,952	7,938	10,014
Intracerebral and other intracranial hemorrhage. 431–432	20,479	9,122	11,357	16,816	7,280	9,536	3,663	1,842	1,821	3,220	1,594	1,626
Cerebral thrombosis and unspecified occlusion of cerebral arteries. 434.0,434.9	23,467	9,206	14,261	20,878	8,086	12,792	2,589	1,120	1,469	2,385	1,023	1,362
Cerebral embolism 434.1	784	314	470	713	284	429	71	30	41	64	28	36

All other and late effects of cerebrovascular diseases 430, 433,435–438	104,913	40,522	64,391	91,599	34,715	56,884	13,314	5,807	7,507	12,283	5,293	6,990
Atherosclerosis 440	22,706	8,587	14,119	20,858	7,767	13,091	1,848	820	1,028	1,720	756	964
Other diseases of arteries, arterioles, and capillaries 441–448	22,417	13,525	8,892	20,422	12,492	7,930	1,995	1,033	962	1,761	886	875
Acute bronchitis and bronchiolitis 466	588	280	308	537	251	286	51	29	22	47	27	20
Pneumonia and influenza 480–487	69,812	34,203	35,609	62,323	29,891	32,432	7,489	4,312	3,177	6,700	3,836	2,864
Pneumonia 480–486	67,974	33,527	34,447	60,569	29,247	31,322	7,405	4,280	3,125	6,631	3,812	2,819
Influenza 487	1,838	676	1,162	1,754	644	1,110	84	32	52	69	24	45
Chronic obstructive pulmonary diseases and allied conditions 490–496	76,559	47,058	29,501	71,122	43,341	27,781	5,437	3,717	1,720	4,856	3,302	1,554
Bronchitis, chronic and unspecified 490–491	3,750	2,079	1,671	3,531	1,931	1,600	219	148	71	184	121	63
Emphysema 492	14,471	9,396	5,075	13,687	8,781	4,906	784	615	169	704	553	151
Asthma 493	3,955	1,584	2,371	3,036	1,178	1,858	919	406	513	828	360	468
Other chronic obstructive pulmonary diseases and allied conditions 494–496	54,383	33,999	20,384	50,868	31,451	19,417	3,515	2,548	967	3,140	2,268	872
Ulcer of stomach and duodenum 531–533	6,477	3,108	3,369	5,794	2,726	3,068	683	382	301	600	333	267
Appendicitis 540–543	512	280	232	394	215	179	118	65	53	109	59	50
Hernia of abdominal cavity and intestinal obstruction without mention of hernia 550–553,560	5,445	2,072	3,373	4,725	1,744	2,981	720	328	392	673	306	367
Chronic liver disease and cirrhosis 571	26,159	16,797	9,362	21,916	14,099	7,817	4,243	2,698	1,545	3,745	2,404	1,341
Cholelithiasis and other disorders of gallbladder 574–575	2,956	1,344	1,612	2,673	1,224	1,449	283	120	163	230	92	138
Nephritis, nephrotic syndrome, and nephrosis 580–589	21,767	10,863	10,904	17,446	8,754	8,692	4,321	2,109	2,212	4,020	1,963	2,057
Acute glomerulonephritis and nephrotic syndrome 580–581	293	133	160	243	107	136	50	26	24	49	25	24
Chronic glomerulonephritis, nephritis and nephropathy, not specified as acute or chronic, and renal sclerosis, unspecified 582–583,587	1,505	785	720	1,180	610	570	325	175	150	299	166	133
Renal failure, disorders resulting from impaired renal function, and small kidney of unknown cause 584–586,588–589	19,969	9,945	10,024	16,023	8,037	7,986	3,946	1,908	2,038	3,672	1,772	1,900
Infections of kidney 590	1,870	562	1,308	1,623	479	1,144	247	83	164	223	76	147
Hyperplasia of prostate 600	508	508	. . .	439	439	. . .	69	69	. . .	65	65	. . .
Complications of pregnancy, childbirth, and the puerperium 630–676	272	. . .	272	146	. . .	146	126	. . .	126	117	. . .	117
Pregnancy with abortive outcome 630–638	51	. . .	51	24	. . .	24	27	. . .	27	26	. . .	26
Other complications of pregnancy, childbirth, and the puerperium 640–676	221	. . .	221	122	. . .	122	99	. . .	99	91	. . .	91

Table 10. Deaths from 72 selected causes by race and sex: United States, 1986—Con.

Cause of death (Ninth Revision International Classification of Diseases, 1975)	*All races*			*White*			*All other*					
							Total			*Black*		
	Both sexes	*Male*	*Female*	*Both sexes*	*Male*	*Female*	*Both sexes*	*Male*	*Female*	*Both sexes*	*Male*	*Female*
Congenital anomalies. . . 740–759	12,638	6,744	5,894	10,188	5,444	4,744	2,450	1,300	1,150	2,061	1,096	965
Certain conditions originating in the perinatal period . . . 760–779	18,391	10,563	7,828	11,814	6,815	4,999	6,577	3,748	2,829	6,149	3,501	2,648
Birth trauma, intrauterine hypoxia, birth asphyxia, and respiratory distress syndrome 767–769	4,693	2,791	1,902	3,303	1,952	1,351	1,390	839	551	1,272	767	505
Other conditions originating in the perinatal period 760–766,770–779	13,698	7,772	5,926	8,511	4,863	3,648	5,187	2,909	2,278	4,877	2,734	2,143
Symptoms, signs, and ill-defined conditions 780–799	31,390	17,587	13,803	24,304	13,465	10,839	7,086	4,122	2,964	6,642	3,865	2,777
All other diseases . . . . . Residual	158,102	78,129	79,973	134,409	65,120	69,289	23,693	13,009	10,684	21,911	12,004	9,907
Accidents and adverse effects E800–E949	95,277	65,570	29,707	80,315	54,864	25,451	14,962	10,706	4,256	12,585	9,035	3,550
Motor vehicle accidents E810–E825	47,865	34,088	13,777	41,189	29,163	12,026	6,676	4,925	1,751	5,287	3,974	1,313
All other accidents and adverse effects. . . E800–E807, E826–E949	47,412	31,482	15,930	39,126	25,701	13,425	8,286	5,781	2,505	7,298	5,061	2,237
Suicide E950–E959	30,904	24,226	6,678	28,437	22,270	6,167	2,467	1,956	511	1,892	1,537	355
Homicide and legal intervention E960–E978	21,731	16,595	5,136	11,690	8,567	3,123	10,041	8,028	2,013	9,495	7,634	1,861
All other external causes E980–E999	3,120	2,270	850	2,326	1,683	643	794	587	207	684	510	174

Table 11. Death rates for 72 selected causes by race and sex: United States, 1986

[Rates per 100,000 population in specified group]

Cause of death (Ninth Revision International Classification of Diseases, 1975)	*All races*			*White*			*All other*					
							Total			*Black*		
	Both sexes	*Male*	*Female*	*Both sexes*	*Male*	*Female*	*Both sexes*	*Male*	*Female*	*Both sexes*	*Male*	*Female*
All causes	873.2	940.7	809.3	896.2	954.4	840.7	745.6	862.7	638.8	854.2	987.7	733.9
Shigellosis and amebiasis 004,006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	-
Certain other intestinal infections 007–009	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.3	0.2	0.3	0.4	0.2
Tuberculosis 010–018	0.7	1.0	0.5	0.5	0.7	0.4	1.9	2.7	1.2	2.1	3.1	1.3
Tuberculosis of respiratory system 010–012	0.6	0.8	0.4	0.4	0.6	0.3	1.5	2.2	0.9	1.6	2.4	0.9
Other tuberculosis 013–018	0.2	0.2	0.1	0.1	0.1	0.1	0.5	0.5	0.4	0.5	0.6	0.4
Whooping cough 033	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0
Streptococcal sore throat, scarlatina, and erysipelas 034–035	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	-	0.0
Meningococcal infection 036	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2
Septicemia 038	7.8	7.5	8.1	7.4	7.0	7.8	9.9	10.4	9.4	11.7	12.2	11.2
Acute poliomyelitis 045	-	-	-	-	-	-	-	-	-	-	-	-
Measles 055	0.0	0.0	0.0	0.0	0.0	-	0.0	-	0.0	0.0	-	0.0
Viral hepatitis 070	0.4	0.5	0.3	0.4	0.5	0.3	0.5	0.6	0.4	0.4	0.5	0.4
Syphilis 090–097	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
All other infectious and parasitic diseases 001–003,005,020–032, 037,039–041,046–054,056–066,071–088,098–139	3.9	5.4	2.4	3.6	5.0	2.2	5.4	7.6	3.4	6.2	8.8	4.0
Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues 140–208	194.7	213.5	176.9	201.8	218.8	185.6	155.0	183.3	129.2	177.4	211.4	146.7
Malignant neoplasms of lip, oral cavity, and pharynx 140–149	3.4	4.7	2.2	3.4	4.5	2.3	3.8	5.9	2.0	4.4	6.9	2.2
Malignant neoplasms of digestive organs and peritoneum 150–159	48.3	52.1	44.8	49.4	52.6	46.3	42.5	49.0	36.5	47.3	54.4	40.9
Malignant neoplasms of respiratory and intrathoracic organs 160–165	54.1	75.7	33.7	56.4	77.8	35.9	41.5	63.6	21.3	48.2	74.6	24.3
Malignant neoplasm of breast 174–175	16.9	0.2	32.8	17.8	0.2	34.6	11.9	0.2	22.7	13.9	0.2	26.2
Malignant neoplasms of genital organs 179–187	21.3	23.8	18.9	21.3	23.3	19.3	21.2	26.3	16.6	25.0	31.8	18.8
Malignant neoplasms of urinary organs 188–189	7.9	10.4	5.6	8.5	11.2	5.9	4.6	5.3	3.9	5.2	6.2	4.4
Malignant neoplasms of all other and unspecified sites 170–173,190–199	24.7	27.0	22.5	26.0	28.3	23.7	17.4	19.2	15.8	19.8	22.0	17.9
Leukemia 204–208	7.2	8.1	6.3	7.7	8.7	6.7	4.5	5.0	4.0	5.0	5.5	4.5
Other malignant neoplasms of lymphatic and hematopoietic tissues 200–203	10.9	11.6	10.2	11.4	12.1	10.8	7.5	8.7	6.5	8.6	9.7	7.5
Benign neoplasms, carcinoma in situ, and neoplasms of uncertain behavior and of unspecified nature 210–239	2.8	2.7	2.9	2.9	2.7	3.0	2.3	2.1	2.4	2.6	2.4	2.8
Diabetes mellitus 250	15.4	13.1	17.6	14.8	12.8	16.7	18.8	14.7	22.5	21.5	16.5	26.0
Nutritional deficiencies 260–269	1.2	0.9	1.4	1.2	0.9	1.5	1.2	1.2	1.1	1.3	1.4	1.3
Anemias 280–285	1.5	1.4	1.7	1.4	1.3	1.6	2.1	2.1	2.1	2.4	2.4	2.4
Meningitis 320–322	0.5	0.5	0.4	0.4	0.4	0.4	0.9	1.0	0.8	1.0	1.2	0.9
Major cardiovascular diseases 390–448	401.6	405.2	398.2	420.3	422.0	418.7	297.5	309.7	286.3	344.3	355.4	334.2
Diseases of heart 390–398, 402, 404–429	317.5	333.1	302.7	333.5	348.6	319.0	228.7	244.6	214.2	265.2	281.3	250.8
Rheumatic fever and rheumatic heart disease 390–398	2.7	1.8	3.5	2.9	1.8	3.9	1.5	1.2	1.9	1.6	1.3	1.9
Hypertensive heart disease 402	8.5	7.3	9.6	7.3	6.1	8.6	15.0	14.6	15.4	18.1	17.7	18.5
Hypertensive heart and renal disease 404	1.0	0.9	1.2	0.9	0.7	1.1	1.8	1.7	1.9	2.2	2.0	2.3
Ischemic heart disease 410–414	216.0	233.6	199.3	232.7	251.6	214.6	123.2	131.4	115.8	140.6	147.6	134.3
Acute myocardial infarction 410	108.3	124.2	93.1	116.6	134.2	99.8	61.9	67.4	56.9	70.6	75.8	65.9
Other acute and subacute forms of ischemic heart disease 411	1.6	2.0	1.2	1.6	2.0	1.2	1.5	1.9	1.2	1.8	2.2	1.4

Table 11. Death rates for 72 selected causes by race and sex: United States, 1986—Con.

[Rates per 100,000 population in specified group]

Cause of death (Ninth Revision International Classification of Diseases, 1975)	*All races*			*White*			*All other*					
							Total			*Black*		
	Both sexes	*Male*	*Female*	*Both sexes*	*Male*	*Female*	*Both sexes*	*Male*	*Female*	*Both sexes*	*Male*	*Female*
Major cardiovascular diseases—Con.												
Diseases of heart—Con.												
Ischemic heart disease—Con.												
Angina pectoris . . . 413	0.4	0.4	0.4	0.4	0.4	0.5	0.3	0.3	0.3	0.3	0.3	0.4
Old myocardial infarction and other forms of chronic ischemic heart disease . . . 412, 414	105.7	107.0	104.5	114.0	115.0	113.2	59.5	61.8	57.3	67.9	69.3	66.7
Other diseases of endocardium . . . 424	4.2	3.9	4.5	4.5	4.2	4.9	2.3	2.3	2.3	2.6	2.6	2.6
All other forms of heart disease . . . 415–423,425–429	85.1	85.6	84.6	85.2	84.2	86.0	84.8	93.3	77.0	100.2	110.1	91.2
Hypertension with or without renal disease . . . 401,403	3.3	2.9	3.7	3.0	2.6	3.4	4.9	4.4	5.5	5.9	5.2	6.6
Cerebrovascular diseases . . . 430–438	62.1	50.4	73.1	63.6	50.5	76.2	53.4	50.1	56.4	61.3	57.1	65.0
Intracerebral and other intracranial hemorrhage . . . 431–432	8.5	7.8	9.2	8.2	7.3	9.1	10.0	10.5	9.5	11.0	11.5	10.5
Cerebral thrombosis and unspecified occlusion of cerebral arteries . . . 434.0,434.9	9.7	7.8	11.5	10.2	8.1	12.2	7.0	6.4	7.6	8.1	7.4	8.8
Cerebral embolism . . . 434.1	0.3	0.3	0.4	0.3	0.3	0.4	0.2	0.2	0.2	0.2	0.2	0.2
All other and late effects of cerebrovascular diseases . . . 430,433,435–438	43.5	34.5	52.0	44.8	34.8	54.4	36.2	33.1	39.0	41.9	38.1	45.4
Atherosclerosis . . . 440	9.4	7.3	11.4	10.2	7.8	12.5	5.0	4.7	5.3	5.9	5.4	6.3
Other diseases of arteries, arterioles, and capillaries . . . 441–448	9.3	11.5	7.2	10.0	12.5	7.6	5.4	5.9	5.0	6.0	6.4	5.7
Acute bronchitis and bronchiolitis . . . 466	0.2	0.2	0.2	0.3	0.3	0.3	0.1	0.2	0.1	0.2	0.2	0.1
Pneumonia and influenza . . . 480–487	29.0	29.1	28.8	30.5	29.9	31.0	20.4	24.6	16.5	22.9	27.6	18.6
Pneumonia . . . 480–486	28.2	28.6	27.8	29.6	29.3	30.0	20.1	24.4	16.3	22.6	27.4	18.3
Influenza . . . 487	0.8	0.6	0.9	0.9	0.6	1.1	0.2	0.2	0.3	0.2	0.2	0.3
Chronic obstructive pulmonary diseases and allied conditions . . . 490–496	31.8	40.1	23.8	34.8	43.4	26.6	14.8	21.2	8.9	16.6	23.8	10.1
Bronchitis, chronic and unspecified . . . 490–491	1.6	1.8	1.4	1.7	1.9	1.5	0.6	0.8	0.4	0.6	0.9	0.4
Emphysema . . . 492	6.0	8.0	4.1	6.7	8.8	4.7	2.1	3.5	0.9	2.4	4.0	1.0
Asthma . . . 493	1.6	1.3	1.9	1.5	1.2	1.8	2.5	2.3	2.7	2.8	2.6	3.0
Other chronic obstructive pulmonary diseases and allied conditions . . . 494–496	22.6	29.0	16.5	24.9	31.5	18.6	9.6	14.5	5.0	10.7	16.3	5.7
Ulcer of stomach and duodenum . . . 531–533	2.7	2.6	2.7	2.8	2.7	2.9	1.9	2.2	1.6	2.0	2.4	1.7
Appendicitis . . . 540–543	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.3	0.4	0.4	0.3
Hernia of abdominal cavity and intestinal obstruction without mention of hernia . . . 550–553,560	2.3	1.8	2.7	2.3	1.7	2.9	2.0	1.9	2.0	2.3	2.2	2.4
Chronic liver disease and cirrhosis . . . 571	10.9	14.3	7.6	10.7	14.1	7.5	11.5	15.4	8.0	12.8	17.3	8.7
Cholelithiasis and other disorders of gallbladder . . . 574–575	1.2	1.1	1.3	1.3	1.2	1.4	0.8	0.7	0.8	0.8	0.7	0.9
Nephritis, nephrotic syndrome, and nephrosis . . . 580–589	9.0	9.3	8.8	8.5	8.8	8.3	11.7	12.0	11.5	13.7	14.1	13.3
Acute glomerulonephritis and nephrotic syndrome . . . 580–581	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
Chronic glomerulonephritis, nephritis and nephropathy, not specified as acute or chronic, and renal sclerosis, unspecified . . . 582–583,587	0.6	0.7	0.6	0.6	0.6	0.5	0.9	1.0	0.8	1.0	1.2	0.9
Renal failure, disorders resulting from impaired renal function, and small kidney of unknown cause . . . 584–586,588–589	8.3	8.5	8.1	7.8	8.1	7.6	10.7	10.9	10.6	12.5	12.8	12.3
Infections of kidney . . . 590	0.8	0.5	1.1	0.8	0.5	1.1	0.7	0.5	0.9	0.8	0.5	1.0
Hyperplasia of prostate . . . 600	0.2	0.4	. . .	0.2	0.4	. . .	0.2	0.4	. . .	0.2	0.5	. . .

Complications of pregnancy, childbirth, and the puerperium	630–676	0.1	...	0.2	0.1	...	0.1	0.3	..	0.7	0.4	...	0.8
Pregnancy with abortive outcome	630–638	0.0	...	0.0	0.0	...	0.0	0.1	...	0.1	0.1	...	0.2
Other complications of pregnancy, childbirth, and the puerperium	640–676	0.1	...	0.2	0.1	...	0.1	0.3	...	0.5	0.3	...	0.6
Congenital anomalies	740–759	5.2	5.7	4.8	5.0	5.5	4.5	6.7	7.4	6.0	7.0	7.9	6.3
Certain conditions originating in the perinatal period	760–779	7.6	9.0	6.3	5.8	6.8	4.8	17.9	21.4	14.7	21.0	25.2	17.2
Birth trauma, intrauterine hypoxia, birth asphyxia, and respiratory distress syndrome	767–769	1.9	2.4	1.5	1.6	2.0	1.3	3.8	4.8	2.9	4.3	5.5	3.3
Other conditions originating in the perinatal period	760–766, 770–779	5.7	6.6	4.8	4.2	4.9	3.5	14.1	16.6	11.8	16.6	19.7	13.9
Symptoms, signs, and ill-defined conditions	780–799	13.0	15.0	11.2	11.9	13.5	10.4	19.3	23.5	15.4	22.7	27.8	18.0
All other diseases	Residual	65.6	66.6	64.6	65.8	65.2	66.3	64.4	74.1	55.6	74.8	86.4	64.3
Accidents and adverse effects	E800–E949	39.5	55.9	24.0	39.3	55.0	24.4	40.7	61.0	22.1	42.9	65.0	23.0
Motor vehicle accidents	E810–E825	19.9	29.0	11.1	20.2	29.2	11.5	18.1	28.1	9.1	18.0	28.6	8.5
All other accidents and adverse effects	E800–E807, E826–E949	19.7	26.8	12.9	19.2	25.7	12.8	22.5	32.9	13.0	24.9	36.4	14.5
Suicide	E950–E959	12.8	20.6	5.4	13.9	22.3	5.9	6.7	11.1	2.7	6.5	11.1	2.3
Homicide and legal intervention	E960–E978	9.0	14.1	4.2	5.7	8.6	3.0	27.3	45.7	10.5	32.4	55.0	12.1
All other external causes	E980–E999	1.3	1.9	0.7	1.1	1.7	0.6	2.2	3.3	1.1	2.3	3.7	1.1

Table 12. Age-adjusted death rates for 72 selected causes by race and sex: United States, 1986

[Rates per 100,000 population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940]

Cause of death (Ninth Revision International Classification of Diseases, 1975)	*All races*			*White*			*All other*					
							Total			*Black*		
	Both sexes	*Male*	*Female*	*Both sexes*	*Male*	*Female*	*Both sexes*	*Male*	*Female*	*Both sexes*	*Male*	*Female*
All causes	541.7	709.1	406.6	518.0	679.8	387.7	693.1	905.7	524.0	781.0	1,026.9	588.2
Shigellosis and amebiasis 004,006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	-
Certain other intestinal infections 007–009	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.1	0.2	0.3	0.2
Tuberculosis 010–018	0.5	0.8	0.3	0.3	0.5	0.2	1.9	3.0	1.1	2.2	3.4	1.1
Tuberculosis of respiratory system 010–012	0.4	0.7	0.2	0.3	0.4	0.1	1.5	2.4	0.7	1.6	2.8	0.8
Other tuberculosis 013–018	0.1	0.1	0.1	0.1	0.1	0.0	0.5	0.6	0.4	0.5	0.7	0.4
Whooping cough 033	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0
Streptococcal sore throat, scarlatina, and erysipelas 034–035	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	-	0.0
Meningococcal infection 036	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2
Septicemia 038	4.3	5.2	3.6	3.8	4.5	3.2	8.6	10.7	7.1	10.0	12.4	8.1
Acute poliomyelitis 045	-	-	-	-	-	-	-	-	-	-	-	-
Measles 055	0.0	0.0	0.0	0.0	0.0	-	0.0	-	0.0	0.0	-	0.0
Viral hepatitis 070	0.4	0.5	0.2	0.3	0.4	0.2	0.5	0.6	0.4	0.4	0.5	0.4
Syphilis 090–097	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
All other infectious and parasitic diseases 001–003,005,020–032, 037,039–041,046–054,056–066,071–088,098–139	3.2	4.9	1.7	2.9	4.4	1.4	5.5	8.1	3.3	6.5	9.6	3.8
Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues 140–208	133.2	163.6	111.4	130.4	158.8	110.1	154.1	202.2	118.8	172.8	229.0	132.1
Malignant neoplasms of lip, oral cavity, and pharynx 140–149	2.6	3.9	1.4	2.3	3.4	1.3	4.2	7.1	1.9	4.8	8.3	2.1
Malignant neoplasms of digestive organs and peritoneum 150–159	30.9	39.4	24.3	29.6	37.5	23.4	41.2	54.2	31.3	44.7	59.0	33.8
Malignant neoplasms of respiratory and intrathoracic organs 160–165	39.0	59.8	22.9	38.4	58.0	23.1	43.3	72.8	20.7	49.4	83.9	23.3
Malignant neoplasm of breast 174–175	12.6	0.2	23.1	12.5	0.2	23.0	12.6	0.2	22.5	14.6	0.2	25.8
Malignant neoplasms of genital organs 179–187	13.1	15.5	12.5	12.4	14.3	12.1	19.5	26.0	15.6	22.2	30.6	17.3
Malignant neoplasms of urinary organs 188–189	5.0	7.6	3.1	5.0	7.8	3.0	4.3	5.7	3.3	4.8	6.5	3.7
Malignant neoplasms of all other and unspecified sites 170–173,190–199	17.6	21.9	14.2	17.7	21.9	14.2	17.3	21.4	14.1	19.4	24.2	15.7
Leukemia 204–208	5.0	6.4	3.9	5.1	6.5	3.9	4.3	5.3	3.6	4.7	5.7	3.8
Other malignant neoplasms of lymphatic and hematopoietic tissues 200–203	7.4	9.1	6.0	7.4	9.1	6.0	7.4	9.5	5.8	8.3	10.5	6.6
Benign neoplasms, carcinoma in situ, and neoplasms of uncertain behavior and of unspecified nature 210–239	1.8	2.0	1.7	1.8	2.0	1.6	2.1	2.3	2.1	2.4	2.5	2.3
Diabetes mellitus 250	9.6	9.9	9.3	8.5	9.1	8.1	17.8	16.1	19.0	20.0	17.9	21.4
Nutritional deficiencies 260–269	0.5	0.5	0.5	0.5	0.5	0.4	0.9	1.1	0.7	1.0	1.3	0.8
Anemias 280–285	0.9	1.0	0.8	0.7	0.8	0.6	1.8	2.0	1.7	2.2	2.3	2.0
Meningitis 320–322	0.4	0.5	0.3	0.3	0.4	0.3	0.9	1.0	0.7	1.0	1.2	0.8
Major cardiovascular diseases 390–448	216.8	286.1	161.8	209.7	280.1	153.8	265.5	327.9	216.9	300.0	370.4	245.8
Diseases of heart 390–398,402,404–429	175.0	238.2	124.6	170.4	234.8	119.0	205.3	260.1	162.8	232.6	294.3	185.1
Rheumatic fever and rheumatic heart disease 390–398	1.8	1.4	2.1	1.8	1.4	2.1	1.6	1.3	1.8	1.6	1.4	1.8
Hypertensive heart disease 402	5.0	5.7	4.5	3.8	4.3	3.3	14.6	16.4	13.0	17.3	19.7	15.3
Hypertensive heart and renal disease 404	0.5	0.6	0.5	0.4	0.4	0.3	1.6	1.7	1.5	1.9	2.1	1.7
Ischemic heart disease 410–414	118.8	166.9	80.7	119.6	169.9	79.5	109.6	139.6	86.3	121.7	153.9	97.0
Acute myocardial infarction 410	64.3	91.9	42.3	65.0	94.1	41.7	57.2	73.0	45.0	63.5	80.5	50.5
Other acute and subacute forms of ischemic heart disease 411	1.0	1.6	0.6	1.0	1.5	0.5	1.5	2.2	0.9	1.7	2.5	1.1

Angina pectoris 413	0.2	0.3	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3
Old myocardial infarction and other forms of chronic ischemic heart disease 412,414	53.2	73.2	37.6	53.3	74.0	37.1	50.6	64.2	40.1	56.2	70.6	45.1
Other diseases of endocardium 424	2.2	2.7	1.9	2.2	2.7	1.9	2.1	2.5	1.7	2.3	2.8	2.0
All other forms of heart disease 415–423,425–429	46.6	61.0	35.1	42.7	56.2	31.9	75.9	98.4	58.5	87.7	114.5	67.3
Hypertension with or without renal disease 401,403	1.8	2.0	1.6	1.5	1.7	1.3	4.5	4.7	4.3	5.3	5.5	5.1
Cerebrovascular diseases 430–438	31.0	33.5	29.0	28.8	31.1	27.1	47.0	52.4	42.7	52.6	58.9	47.6
Intracerebral and other intracranial hemorrhage 431–432	5.5	6.0	5.0	4.7	5.2	4.4	10.2	12.1	8.8	11.2	13.2	9.7
Cerebral thrombosis and unspecified occlusion of cerebral arteries 434.0,434.9	4.5	5.1	4.1	4.3	4.9	3.9	5.9	6.5	5.4	6.7	7.4	6.1
Cerebral embolism 434.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
All other and late effects of cerebrovascular diseases 430,433,435–438	20.8	22.2	19.7	19.5	20.8	18.5	30.6	33.7	28.3	34.4	38.1	31.6
Atherosclerosis 440	3.7	4.3	3.3	3.7	4.3	3.2	3.7	4.4	3.1	4.1	5.0	3.5
Other diseases of arteries, arterioles, and capillaries 441–448	5.4	8.1	3.3	5.3	8.3	3.2	5.0	6.3	4.0	5.4	6.7	4.5
Acute bronchitis and bronchiolitis 466	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.1
Pneumonia and influenza 480–487	13.5	18.4	10.3	12.9	17.5	9.9	17.1	24.3	11.8	19.0	27.2	13.1
Pneumonia 480–486	13.3	18.1	10.0	12.6	17.2	9.6	16.9	24.1	11.7	18.8	27.0	12.9
Influenza 487	0.3	0.4	0.3	0.3	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2
Chronic obstructive pulmonary diseases and allied conditions 490–496	18.8	27.6	12.8	19.2	28.1	13.3	14.0	22.2	8.0	15.4	24.6	8.9
Bronchitis, chronic and unspecified 490–491	0.9	1.2	0.6	0.9	1.2	0.7	0.5	0.9	0.3	0.5	0.9	0.3
Emphysema 492	3.7	5.6	2.3	3.9	5.8	2.5	2.0	3.8	0.8	2.2	4.2	0.9
Asthma 493	1.2	1.1	1.3	1.0	0.9	1.1	2.6	2.5	2.7	2.9	2.9	3.0
Other chronic obstructive pulmonary diseases and allied conditions 494–496	13.0	19.6	8.6	13.5	20.1	9.0	8.8	15.1	4.2	9.6	16.7	4.7
Ulcer of stomach and duodenum 531–533	1.4	1.9	1.2	1.4	1.8	1.1	1.7	2.3	1.2	1.8	2.5	1.3
Appendicitis 540–543	0.1	0.2	0.1	0.1	0.1	0.1	0.3	0.4	0.3	0.4	0.4	0.3
Hernia of abdominal cavity and intestinal obstruction without mention of hernia 550–553,560	1.1	1.2	1.1	1.1	1.1	1.0	1.6	1.8	1.5	1.9	2.1	1.7
Chronic liver disease and cirrhosis 571	9.2	13.0	5.9	8.6	12.2	5.4	12.9	18.4	8.5	14.5	20.8	9.3
Cholelithiasis and other disorders of gallbladder 574–575	0.6	0.7	0.5	0.6	0.7	0.5	0.6	0.7	0.6	0.6	0.6	0.6
Nephritis, nephrotic syndrome, and nephrosis 580–589	4.9	6.2	4.0	4.2	5.4	3.3	10.3	12.2	8.8	11.7	14.2	9.9
Acute glomerulonephritis and nephrotic syndrome 580–581	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.1
Chronic glomerulonephritis, nephritis and nephropathy, not specified as acute or chronic, and renal sclerosis, unspecified 582–583,587	0.3	0.5	0.3	0.3	0.4	0.2	0.8	1.0	0.6	0.9	1.2	0.7
Renal failure, disorders resulting from impaired renal function, and small kidney of unknown cause 584–586,588–589	4.4	5.7	3.6	3.8	4.9	3.0	9.4	11.1	8.1	10.7	12.8	9.2
Infections of kidney 590	0.4	0.3	0.4	0.3	0.3	0.4	0.6	0.4	0.6	0.6	0.5	0.7
Hyperplasia of prostate 600	0.1	0.2	. . .	0.1	0.2	. . .	0.1	0.4	. . .	0.2	0.4	. . .
Complications of pregnancy, childbirth, and the puerperium 630–676	0.1	. . .	0.2	0.1	. . .	0.1	0.3	. . .	0.6	0.4	. . .	0.7
Pregnancy with abortive outcome 630–638	0.0	. . .	0.0	0.0	. . .	0.0	0.1	. . .	0.1	0.1	. . .	0.2
Other complications of pregnancy, childbirth, and the puerperium 640–676	0.1	. . .	0.2	0.1	. . .	0.1	0.2	. . .	0.5	0.3	. . .	0.6
Congenital anomalies 740–759	5.1	5.4	4.7	5.0	5.3	4.6	5.6	6.0	5.2	5.9	6.4	5.5
Certain conditions originating in the perinatal period 760–779	7.5	8.4	6.5	5.9	6.7	5.2	14.1	15.9	12.3	16.5	18.6	14.4
Birth trauma, intrauterine hypoxia, birth asphyxia, and respiratory distress syndrome 767–769	1.9	2.2	1.6	1.7	1.9	1.4	3.0	3.5	2.4	3.4	4.1	2.7
Other conditions originating in the perinatal period 760–766,770–779	5.6	6.2	4.9	4.3	4.8	3.8	11.1	12.3	9.9	13.1	14.5	11.6
Symptoms, signs, and ill-defined conditions 780–799	9.4	12.3	6.9	8.2	10.7	5.9	17.2	22.9	12.5	20.1	27.1	14.5
All other diseases Residual	39.9	50.1	31.4	36.7	46.0	29.1	60.3	78.6	45.4	69.5	91.7	51.7

Table 12. Age-adjusted death rates for 72 selected causes by race and sex: United States, 1986—Con.

[Rates per 100,000 population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940]

Cause of death (Ninth Revision International Classification of Diseases, 1975)		*All races*			*White*			*All other*					
								Total			*Black*		
		Both sexes	*Male*	*Female*	*Both sexes*	*Male*	*Female*	*Both sexes*	*Male*	*Female*	*Both sexes*	*Male*	*Female*
Accidents and adverse effects	E800–E949	35.2	52.5	18.7	34.5	51.1	18.4	39.9	62.3	20.4	42.1	66.9	21.0
Motor vehicle accidents	E810–E825	19.4	28.5	10.6	19.8	28.7	11.0	18.1	28.4	9.1	18.1	29.2	8.5
All other accidents and adverse effects	E800–E807,E826–E949	15.7	23.9	8.1	14.7	22.4	7.4	21.7	33.9	11.3	24.0	37.7	12.6
Suicide	E950–E959	11.9	19.3	5.1	12.7	20.5	5.4	6.8	11.5	2.7	6.6	11.5	2.4
Homicide and legal intervention	E960–E978	9.0	13.9	4.1	5.6	8.4	2.9	27.2	46.1	10.2	32.4	55.9	11.8
All other external causes	E980–E999	1.2	1.8	0.6	1.1	1.6	0.6	2.2	3.5	1.0	2.4	3.9	1.1

Table 13. Infant, neonatal, and postneonatal mortality rates, by race and sex: United States, 1940, 1950, 1960, 1970, and 1975–86

[Rates are infant (under 1 year), neonatal (under 28 days), and postneonatal (28 days–11 months) deaths per 1,000 live births in specified group]

Year	All races			White			All other					
							Total			Black		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
						Infant mortality rate						
1986	10.4	11.5	9.1	8.9	10.0	7.8	15.7	17.3	14.0	18.0	20.0	16.0
1985	10.6	11.9	9.3	9.3	10.6	8.0	15.8	17.2	14.4	18.2	19.9	16.5
1984	10.8	11.9	9.6	9.4	10.5	8.3	16.1	17.3	14.8	18.4	19.8	16.9
1983	11.2	12.3	10.0	9.7	10.8	8.6	16.8	18.3	15.2	19.2	21.1	17.2
1982	11.5	12.8	10.2	10.1	11.2	8.9	17.3	18.9	15.5	19.6	21.5	17.7
1981	11.9	13.1	10.7	10.5	11.7	9.2	17.8	19.2	16.3	20.0	21.7	18.3
1980	12.6	13.9	11.2	11.0	12.3	9.6	19.1	20.7	17.5	21.4	23.3	19.4
1979	13.1	14.5	11.6	11.4	12.8	9.9	19.8	21.5	18.1	21.8	23.7	19.8
1978	13.8	15.3	12.2	12.0	13.4	10.6	21.1	23.1	18.9	23.1	25.4	20.8
1977	14.1	15.8	12.4	12.3	13.9	10.7	21.7	23.7	19.6	23.6	25.9	21.3
1976	15.2	16.8	13.6	13.3	14.8	11.7	23.5	25.5	21.4	25.5	27.8	23.2
1975	16.1	17.9	14.2	14.2	15.9	12.3	24.2	26.2	22.2	26.2	28.3	24.0
1970	20.0	22.4	17.5	17.8	20.0	15.4	30.9	34.2	27.5	32.6	36.2	29.0
1960	26.0	29.3	22.6	22.9	26.0	19.6	43.2	47.9	38.5	44.3	49.1	39.4
1950	29.2	32.8	25.5	26.8	30.2	23.1	44.5	48.9	39.9	43.9	48.3	39.4
1940	47.0	52.5	41.3	43.2	48.3	37.8	73.8	82.2	65.2	72.9	81.1	64.6
						Neonatal mortality rate						
1986	6.7	7.4	6.0	5.8	6.4	5.1	10.1	11.1	9.1	11.7	13.0	10.5
1985	7.0	7.8	6.1	6.1	6.9	5.3	10.3	11.3	9.4	12.1	13.2	10.9
1984	7.0	7.7	6.3	6.2	6.8	5.5	10.2	11.0	9.5	11.8	12.7	10.9
1983	7.3	8.0	6.5	6.4	7.1	5.7	10.8	11.7	9.7	12.4	13.6	11.2
1982	7.7	8.5	6.9	6.8	7.5	6.0	11.3	12.4	10.3	13.1	14.3	11.8
1981	8.0	8.8	7.2	7.1	7.8	6.3	11.8	12.8	10.9	13.4	14.6	12.3
1980	8.5	9.3	7.6	7.5	8.3	6.6	12.5	13.5	11.5	14.1	15.3	12.8
1979	8.9	9.8	7.9	7.9	8.8	6.9	12.9	13.9	11.8	14.3	15.5	13.1
1978	9.5	10.5	8.4	8.4	9.3	7.4	14.0	15.5	12.4	15.5	17.2	13.7
1977	9.9	11.0	8.7	8.7	9.8	7.6	14.7	16.0	13.3	16.1	17.6	14.5
1976	10.9	12.0	9.7	9.7	10.7	8.5	16.3	17.7	14.9	17.9	19.5	16.3
1975	11.6	12.9	10.2	10.4	11.7	9.0	16.8	18.2	15.3	18.3	19.8	16.8
1970	15.1	17.0	13.1	13.8	15.5	11.9	21.4	23.9	18.9	22.8	25.4	20.1
1960	18.7	21.2	16.1	17.2	19.7	14.7	26.9	30.0	23.6	27.8	31.1	24.5
1950	20.5	23.3	17.5	19.4	22.2	16.4	27.5	30.8	24.2	27.8	31.1	24.4
1940	28.8	32.6	24.7	27.2	30.9	23.3	39.7	44.9	34.5	39.9	44.8	34.9
						Postneonatal mortality rate						
1986	3.6	4.1	3.1	3.1	3.6	2.7	5.6	6.2	4.9	6.3	7.0	5.6
1985	3.7	4.2	3.2	3.2	3.7	2.7	5.5	6.0	5.0	6.1	6.7	5.6
1984	3.8	4.2	3.3	3.3	3.7	2.8	5.8	6.3	5.3	6.5	7.1	5.9
1983	3.9	4.3	3.4	3.3	3.7	2.9	6.0	6.6	5.4	6.8	7.4	6.1
1982	3.8	4.3	3.3	3.3	3.7	2.8	5.9	6.5	5.3	6.6	7.3	5.9
1981	3.9	4.3	3.5	3.4	3.8	3.0	6.0	6.5	5.4	6.6	7.1	6.0
1980	4.1	4.6	3.6	3.5	4.0	3.0	6.6	7.2	6.0	7.3	7.9	6.6
1979	4.2	4.7	3.7	3.5	4.0	3.0	6.9	7.6	6.3	7.5	8.2	6.7
1978	4.3	4.7	3.9	3.6	4.0	3.2	7.0	7.6	6.5	7.6	8.2	7.0
1977	4.2	4.8	3.7	3.6	4.1	3.1	7.0	7.7	6.3	7.6	8.3	6.8
1976	4.3	4.8	3.8	3.6	4.1	3.2	7.2	7.8	6.5	7.6	8.4	6.9
1975	4.5	4.9	4.0	3.8	4.2	3.3	7.5	8.0	6.9	7.9	8.5	7.2
1970	4.9	5.4	4.4	4.0	4.4	3.5	9.5	10.3	8.6	9.9	10.8	8.9
1960	7.3	8.1	6.5	5.7	6.3	4.9	16.4	17.8	14.8	16.5	18.0	14.9
1950	8.7	9.4	8.0	7.4	8.0	6.7	16.9	18.1	15.7	16.1	17.2	15.0
1940	18.3	19.9	16.6	16.0	17.5	14.5	34.1	37.3	30.7	33.0	36.4	29.7

Table 14. Deaths under 1 year and infant mortality rates for the 10 leading causes of infant death: United States, 1986

[Rates per 100,000 live births]

Rank order	*Cause of death* (Ninth Revision International Classification of Diseases, 1975)		*Number*	*Rate*
...	All causes		38,891	1,035.3
1	Congenital anomalies	740–759	8,244	219.5
2	Sudden infant death syndrome	798.0	5,278	140.5
3	Respiratory distress syndrome	769	3,403	90.6
4	Disorders relating to short gestation and unspecified low birthweight	765	3,245	86.4
5	Newborn affected by maternal complications of pregnancy	761	1,355	36.1
6	Intrauterine hypoxia and birth asphyxia	768	983	26.2
7	Infections specific to the perinatal period	771	918	24.4
8	Accidents and adverse effects	E800–E949	909	24.2
9	Newborn affected by complications of placenta, cord, and membranes	762	836	22.3
10	Pneumonia and influenza	480–487	663	17.6
...	All other causes	Residual	13,057	347.6

Table 15. Deaths under 1 year and infant mortality rates for 61 selected causes by race: United States, 1986

[Rates per 100,000 live births in specified group]

Cause of death (Ninth Revision International Classification of Diseases, 1975)	*All races*	*White*	*All other*		*All races*	*White*	*All other*	
			Total	*Black*			*Total*	*Black*
	Number				Rate			
All causes	38,891	26,564	12,327	11,204	1,035.3	894.3	1,568.1	1,803.5
Certain intestinal infections 008–009	114	54	60	54	3.0	1.8	7.6	8.7
Whooping cough 033	5	2	3	3	0.1	0.1	0.4	0.5
Meningococcal infection 036	62	49	13	11	1.7	1.6	1.7	1.8
Septicemia 038	302	189	113	104	8.0	6.4	14.4	16.7
Viral diseases 045–079	130	88	42	32	3.5	3.0	5.3	5.2
Congenital syphilis 090	4	4	-	-	0.1	0.1	-	-
Remainder of infectious and parasitic diseases 001–007, 010–032,034–035,037,039–041,080–088,091–139	101	54	47	42	2.7	1.8	6.0	6.8
Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues 140–208	97	82	15	13	2.6	2.8	1.9	2.1
Benign neoplasms, carcinoma in situ, and neoplasms of uncertain behavior and of unspecified nature 210–239	78	65	13	11	2.1	2.2	1.7	1.8
Diseases of thymus gland 254	5	4	1	1	0.1	0.1	0.1	0.2
Cystic fibrosis 277.0	16	14	2	2	0.4	0.5	0.3	0.3
Diseases of blood and blood-forming organs 280–289	65	28	37	28	1.7	0.9	4.7	4.5
Meningitis 320–322	220	135	85	74	5.9	4.5	10.8	11.9
Other diseases of nervous system and sense organs 323–389	420	320	100	90	11.2	10.8	12.7	14.5
Acute upper respiratory infections 460–465	45	31	14	11	1.2	1.0	1.8	1.8
Bronchitis and bronchiolitis 466,490–491	99	70	29	26	2.6	2.4	3.7	4.2
Pneumonia and influenza 480–487	663	421	242	223	17.6	14.2	30.8	35.9
Pneumonia 480–486	656	415	241	222	17.5	14.0	30.7	35.7
Influenza 487	7	6	1	1	0.2	0.2	0.1	0.2
Remainder of diseases of respiratory system 470–478,492–519	491	306	185	165	13.1	10.3	23.5	26.6
Hernia of abdominal cavity and intestinal obstruction without mention of hernia 550–553,560	104	71	33	27	2.8	2.4	4.2	4.3
Gastritis, duodenitis, and noninfective enteritis and colitis 535,555–558	86	48	38	31	2.3	1.6	4.8	5.0
Remainder of diseases of digestive system 520–534,536–543,562–579	205	140	65	61	5.5	4.7	8.3	9.8
Congenital anomalies 740–759	8,244	6,519	1,725	1,442	219.5	219.5	219.4	232.1
Anencephalus and similar anomalies 740	612	511	101	77	16.3	17.2	12.8	12.4
Spina bifida 741	84	74	10	9	2.2	2.5	1.3	1.4
Congenital hydrocephalus 742.3	198	148	50	43	5.3	5.0	6.4	6.9
Other congenital anomalies of central nervous system and eye 742.0–742.2,742.4–742.9,743	304	238	66	55	8.1	8.0	8.4	8.9
Congenital anomalies of heart 745–746	2,443	1,934	509	430	65.0	65.1	64.7	69.2
Other congenital anomalies of circulatory system 747	618	430	188	158	16.5	14.5	23.9	25.4
Congenital anomalies of respiratory system 748	1,100	859	241	209	29.3	28.9	30.7	33.6
Congenital anomalies of digestive system 749–751	137	111	26	21	3.6	3.7	3.3	3.4
Congenital anomalies of genitourinary system 752–753	526	440	86	67	14.0	14.8	10.9	10.8
Congenital anomalies of musculoskeletal system 754–756	615	515	100	87	16.4	17.3	12.7	14.0
Down's syndrome 758.0	95	81	14	13	2.5	2.7	1.8	2.1
Other chromosomal anomalies 758.1–758.9	758	586	172	140	20.2	19.7	21.9	22.5
All other and unspecified congenital anomalies 744,757,759	754	592	162	133	20.1	19.9	20.6	21.4
Certain conditions originating in the perinatal period 760–779	18,226	11,691	6,535	6,109	485.2	393.6	831.3	983.4
Newborn affected by maternal conditions which may be unrelated to present pregnancy 760	119	81	38	31	3.2	2.7	4.8	5.0
Newborn affected by maternal complications of pregnancy 761	1,355	948	407	379	36.1	31.9	51.8	61.0
Newborn affected by complications of placenta, cord, and membranes 762	836	581	255	235	22.3	19.6	32.4	37.8
Newborn affected by other complications of labor and delivery 763	73	44	29	28	1.9	1.5	3.7	4.5
Slow fetal growth and fetal malnutrition 764	22	13	9	6	0.6	0.4	1.1	1.0
Disorders relating to short gestation and unspecified low birthweight 765	3,245	1,790	1,455	1,400	86.4	60.3	185.1	225.4
Disorders relating to long gestation and high birthweight 766	-	-	-	-	-	-	-	-
Birth trauma 767	266	188	78	75	7.1	6.3	9.9	12.1

Table 15. Deaths under 1 year and infant mortality rates for 61 selected causes by race: United States, 1986—Con.

[Rates per 100,000 live births in specified group]

Cause of death (Ninth Revision International Classification of Diseases, 1975)	*All races*	*White*	*All other*		*All races*	*White*	*All other*	
			Total	*Black*			*Total*	*Black*
	Number				Rate			
Certain conditions originating in the perinatal period—Con.								
Intrauterine hypoxia and birth asphyxia 768	983	658	325	296	26.2	22.2	41.3	47.6
Fetal distress in liveborn infant 768.2–768.4	190	137	53	45	5.1	4.6	6.7	7.2
Birth asphyxia 768.5–768.9	793	521	272	251	21.1	17.5	34.6	40.4
Respiratory distress syndrome 769	3,403	2,422	981	896	90.6	81.5	124.8	144.2
Other respiratory conditions of newborn 770	3,576	2,295	1,281	1,195	95.2	77.3	163.0	192.4
Infections specific to the perinatal period 771	918	614	304	274	24.4	20.7	38.7	44.1
Neonatal hemorrhage 772	346	219	127	117	9.2	7.4	16.2	18.8
Hemolytic disease of newborn, due to isoimmunization, and other perinatal jaundice. 773–774	50	33	17	13	1.3	1.1	2.2	2.1
Syndrome of "infant of a diabetic mother" and neonatal diabetes mellitus. 775.0–775.1	5	4	1	1	0.1	0.1	0.1	0.2
Hemorrhagic disease of newborn 776.0	4	2	2	2	0.1	0.1	0.3	0.3
All other and ill-defined conditions originating in the perinatal period 775.2–775.9,776.1–779	3,025	1,799	1,226	1,161	80.5	60.6	156.0	186.9
Symptoms, signs, and ill-defined conditions 780–799	6,038	4,138	1,900	1,711	160.7	139.3	241.7	275.4
Sudden infant death syndrome 798.0	5,278	3,654	1,624	1,451	140.5	123.0	206.6	233.6
Symptoms, signs, and all other ill-defined conditions 780–797,798.1–799	760	484	276	260	20.2	16.3	35.1	41.9
Accidents and adverse effects. E800–E949	909	602	307	268	24.2	20.3	39.1	43.1
Inhalation and ingestion of food or other object causing obstruction of respiratory tract or suffocation . . . E911–E912	157	104	53	43	4.2	3.5	6.7	6.9
Accidental mechanical suffocation. E913	188	129	59	56	5.0	4.3	7.5	9.0
Other accidental causes and adverse effects. E800–E910,E914–E949	564	369	195	169	15.0	12.4	24.8	27.2
Homicide. E960–E969	278	160	118	113	7.4	5.4	15.0	18.2
Child battering and other maltreatment E967	106	54	52	51	2.8	1.8	6.6	8.2
Other homicide E960–E966,E968–E969	172	106	66	62	4.6	3.6	8.4	10.0
All other causes . . . . . Residual	1,884	1,279	605	552	50.2	43.1	77.0	88.9

Table 16. Maternal deaths and maternal mortality rates for selected causes by race: United States, 1986

[Maternal deaths are those assigned to Complications of pregnancy, childbirth, and the puerperium, category numbers 630–676 of the *Ninth Revision International Classification of Diseases, 1975*. Rates per 100,000 live births in specified group]

Cause of death (Ninth Revision International Classification of Diseases, 1975)	*All races*	*White*	*All other*		*All races*	*White*	*All other*	
			Total	*Black*			*Total*	*Black*
	Number				Rate			
Complications of pregnancy, childbirth, and the puerperium. 630–676	272	146	126	117	7.2	4.9	16.0	18.8
Pregnancy with abortive outcome 630–638	51	24	27	26	1.4	0.8	3.4	4.2
Ectopic pregnancy 633	36	16	20	19	1.0	0.5	2.5	3.1
Spontaneous abortion 634	2	1	1	1	0.1	0.0	0.1	0.2
Legally induced abortion 635	3	2	1	1	0.1	0.1	0.1	0.2
Illegally induced abortion. 636	2	1	1	1	0.1	0.0	0.1	0.2
Other pregnancy with abortive outcome. 630–632,637–638	8	4	4	4	0.2	0.1	0.5	0.6
Direct obstetric causes. 640–646,651–676	200	116	84	79	5.3	3.9	10.7	12.7
Hemorrhage of pregnancy and childbirth. 640–641,666	27	16	11	9	0.7	0.5	1.4	1.4
Toxemia of pregnancy. 642.4–642.9,643	40	19	21	21	1.1	0.6	2.7	3.4
Obstructed labor. 660	1	-	1	1	0.0	-	0.1	0.2
Complications of the puerperium 670–676	75	42	33	31	2.0	1.4	4.2	5.0
Other direct obstetric causes. 642.0–642.3,644–646,651–659,661–665,667–669	57	39	18	17	1.5	1.3	2.3	2.7
Indirect obstetric causes. 647–648	20	6	14	12	0.5	0.2	1.8	1.9
Delivery in a completely normal case 650	1	-	1	-	0.0	-	0.1	-

Table 17. Total deaths and death rates, and infant and neonatal deaths and mortality rates for the United States, each division, and State; and by race and sex for the United States: 1986

Race, sex, and area	Total deaths		Infant deaths (under 1 year)		Neonatal deaths (under 28 days)	
	Number	Rate[1]	Number	Rate[2]	Number	Rate[2]
United States	2,105,361	873.2	38,891	10.4	25,212	6.7
Male	1,104,005	940.7	22,224	11.5	14,274	7.4
Female	1,001,356	809.3	16,667	9.1	10,938	6.0
White	1,831,083	896.2	26,564	8.9	17,256	5.8
Male	952,554	954.4	15,284	10.0	9,824	6.4
Female	878,529	840.7	11,280	7.8	7,432	5.1
All other	274,278	745.6	12,327	15.7	7,956	10.1
Male	151,451	862.7	6,940	17.3	4,450	11.1
Female	122,827	638.8	5,387	14.0	3,506	9.1
Black	250,326	854.2	11,204	18.0	7,297	11.7
Male	137,214	987.7	6,305	20.0	4,096	13.0
Female	113,112	733.9	4,899	16.0	3,201	10.5
New England	118,206	927.7	1,601	8.8	1,118	6.2
Maine	11,237	958.8	147	8.8	94	5.6
New Hampshire	8,592	836.6	144	9.1	93	5.9
Vermont	4,760	879.9	81	10.0	61	7.5
Massachusetts	55,803	956.5	697	8.5	480	5.8
Rhode Island	9,718	996.7	126	9.4	87	6.5
Connecticut	28,096	879.9	406	9.1	303	6.8
Middle Atlantic	369,590	990.5	5,526	10.4	3,744	7.0
New York	173,540	975.2	2,824	10.7	1,937	7.3
New Jersey	71,655	939.7	1,062	9.8	715	6.6
Pennsylvania	124,395	1,045.9	1,640	10.2	1,092	6.8
East North Central	374,789	898.3	6,951	11.1	4,611	7.4
Ohio	99,716	927.8	1,680	10.6	1,086	6.9
Indiana	49,366	897.1	895	11.3	597	7.5
Illinois	103,371	894.9	2,144	12.1	1,437	8.1
Michigan	80,222	877.8	1,564	11.4	1,080	7.8
Wisconsin	42,114	880.5	668	9.2	411	5.7
West North Central	161,172	917.4	2,583	9.7	1,582	5.9
Minnesota	35,082	832.7	606	9.2	365	5.5
Iowa	27,066	949.7	329	8.5	216	5.6
Missouri	50,180	990.9	805	10.7	512	6.8
North Dakota	5,289	778.9	91	8.4	44	4.1
South Dakota	6,579	929.2	155	13.3	83	7.1
Nebraska	14,678	918.5	247	10.1	162	6.6
Kansas	22,298	906.8	350	8.9	200	5.1
South Atlantic	372,258	909.3	7,130	11.7	4,827	7.9
Delaware	5,631	889.6	112	11.5	86	8.8
Maryland	37,358	837.4	816	11.7	576	8.3
District of Columbia	7,284	1,165.4	212	21.1	162	16.1
Virginia	46,516	802.7	965	11.1	651	7.5
West Virginia	19,868	1,036.4	238	10.2	154	6.6
North Carolina	54,609	862.6	1,042	11.5	691	7.7
South Carolina	28,141	832.3	684	13.2	456	8.8
Georgia	49,347	809.0	1,224	12.5	835	8.5
Florida	123,504	1,056.1	1,837	11.0	1,216	7.3
East South Central	141,215	929.0	2,544	11.6	1,652	7.5
Kentucky	34,818	934.5	509	9.8	330	6.4
Tennessee	44,250	921.9	727	11.0	457	6.9
Alabama	37,718	931.3	790	13.3	541	9.1
Mississippi	24,429	931.0	518	12.4	324	7.7
West South Central	209,038	778.1	4,728	10.1	2,951	6.3
Arkansas	23,968	1,010.9	355	10.3	196	5.7
Louisiana	36,373	808.5	927	11.9	605	7.8
Oklahoma	29,950	905.9	525	10.4	312	6.2
Texas	118,747	711.5	2,921	9.5	1,838	6.0
Mountain	90,202	694.8	2,167	9.3	1,267	5.4
Montana	6,754	826.7	122	9.6	71	5.6
Idaho	7,388	737.3	186	11.3	111	6.7
Wyoming	3,218	634.7	94	10.9	50	5.8
Colorado	20,810	637.2	476	8.6	293	5.3
New Mexico	10,114	683.8	261	9.5	148	5.4

See footnotes and note at end of table.

Table 17. Total deaths and death rates, and infant and neonatal deaths and mortality rates for the United States, each division, and State; and by race and sex for the United States: 1986—Con.

Race, sex, and area	Total deaths		Infant deaths (under 1 year)		Neonatal deaths (under 28 days)	
	Number	Rate[1]	Number	Rate[2]	Number	Rate[2]
Mountain—Con.						
Arizona	25,569	779.8	571	9.4	332	5.5
Utah	8,939	537.2	312	8.6	184	5.1
Nevada	7,410	766.3	145	9.1	78	4.9
Pacific	268,891	751.9	5,661	9.1	3,460	5.6
Washington	34,253	767.5	678	9.8	375	5.4
Oregon	23,381	865.3	366	9.4	183	4.7
California	203,293	752.9	4,315	8.9	2,711	5.6
Alaska	2,090	392.9	131	10.8	76	6.2
Hawaii	5,874	551.5	171	9.3	115	6.3

[1] Per 100,000 population in each race-sex group and area.
[2] Per 1,000 live births in each race-sex group and area.

NOTE: Caution should be used in comparing crude death rates by State. Death rates are affected by the population composition of the area.

Table 18. Deaths and death rates for major causes of death for the United States, each division, and State; and by race and sex for the United States, 1986

[Rates per 100,000 population in each race-sex group and area. Numbers after causes of death are category numbers of the *Ninth Revision International Classification of Diseases, 1975*]

Race, sex, and area	*Diseases of heart (390–398,402, 404–429)*		*Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues (140–208)*		*Cerebrovascular diseases (430–438)*		*Accidents and adverse effects (E800–E949)*		*Motor vehicle accidents (E810–E825)*		*Suicide (E950–E959)*	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
United States	765,490	317.5	469,376	194.7	149,643	62.1	95,277	39.5	47,865	19.9	30,904	12.8
Male	390,912	333.1	250,559	213.5	59,164	50.4	65,570	55.9	34,088	29.0	24,226	20.6
Female	374,578	302.7	218,817	176.9	90,479	73.1	29,707	24.0	13,777	11.1	6,678	5.4
White	681,363	333.5	412,352	201.8	130,006	63.6	80,315	39.3	41,189	20.2	28,437	13.9
Male	347,967	348.6	218,381	218.8	50,365	50.5	54,864	55.0	29,163	29.2	22,270	22.3
Female	333,396	319.0	193,971	185.6	79,641	76.2	25,451	24.4	12,026	11.5	6,167	5.9
All other	84,127	228.7	57,024	155.0	19,637	53.4	14,962	40.7	6,676	18.1	2,467	6.7
Male	42,945	244.6	32,178	183.3	8,799	50.1	10,706	61.0	4,925	28.1	1,956	11.1
Female	41,182	214.2	24,846	129.2	10,838	56.4	4,256	22.1	1,751	9.1	511	2.7
Black	77,726	265.2	51,979	177.4	17,952	61.3	12,585	42.9	5,287	18.0	1,892	6.5
Male	39,076	281.3	29,363	211.4	7,938	57.1	9,035	65.0	3,974	28.6	1,537	11.1
Female	38,650	250.8	22,616	146.7	10,014	65.0	3,550	23.0	1,313	8.5	355	2.3
New England	44,009	345.4	28,039	220.1	7,905	62.0	4,083	32.0	1,877	14.7	1,282	10.1
Maine	4,200	358.4	2,657	226.7	768	65.5	409	34.9	205	17.5	130	11.1
New Hampshire	3,111	302.9	2,057	200.3	587	57.2	326	31.7	167	16.3	133	13.0
Vermont	1,742	322.0	1,066	197.0	320	59.1	214	39.6	96	17.7	76	14.0
Massachusetts	20,724	355.2	13,078	224.2	3,764	64.5	1,834	31.4	811	13.9	539	9.2
Rhode Island	3,813	391.1	2,331	239.1	627	64.3	308	31.6	141	14.5	99	10.2
Connecticut	10,419	326.3	6,850	214.5	1,839	57.6	992	31.1	457	14.3	305	9.6
Middle Atlantic	144,835	388.2	83,658	224.2	22,447	60.2	12,025	32.2	5,362	14.4	3,392	9.1
New York	69,072	388.2	38,437	216.0	10,035	56.4	5,509	31.0	2,263	12.7	1,359	7.6
New Jersey	27,569	361.6	17,093	224.2	4,427	58.1	2,274	29.8	1,090	14.3	581	7.6
Pennsylvania	48,194	405.2	28,128	236.5	7,985	67.1	4,242	35.7	2,009	16.9	1,452	12.2
East North Central	144,140	345.5	83,655	200.5	26,646	63.9	14,220	34.1	6,993	16.8	4,885	11.7
Ohio	38,349	356.8	22,758	211.7	6,886	64.1	3,441	32.0	1,649	15.3	1,246	11.6
Indiana	18,306	332.7	11,144	202.5	3,920	71.2	2,047	37.2	1,082	19.7	645	11.7
Illinois	40,100	347.2	23,019	199.3	7,094	61.4	3,961	34.3	1,759	15.2	1,275	11.0
Michigan	31,302	342.5	17,324	189.6	5,427	59.4	3,205	35.1	1,738	19.0	1,123	12.3
Wisconsin	16,083	336.3	9,410	196.7	3,319	69.4	1,566	32.7	765	16.0	596	12.5
West North Central	58,445	332.7	34,836	198.3	12,774	72.7	7,121	40.5	3,349	19.1	2,366	13.5
Minnesota	12,132	288.0	7,673	182.1	3,106	73.7	1,465	34.8	631	15.0	541	12.8
Iowa	10,342	362.9	5,860	205.6	2,230	78.2	1,049	36.8	462	16.2	368	12.9
Missouri	18,161	358.6	10,822	213.7	3,610	71.3	2,367	46.7	1,159	22.9	720	14.2
North Dakota	1,891	278.5	1,204	177.3	405	59.6	230	33.9	118	17.4	73	10.8
South Dakota	2,502	353.4	1,439	203.2	535	75.6	305	43.1	135	19.1	101	14.3
Nebraska	5,332	333.7	3,146	196.9	1,178	73.7	642	40.2	295	18.5	229	14.3
Kansas	8,085	328.8	4,692	190.8	1,710	69.5	1,063	43.2	549	22.3	334	13.6
South Atlantic	132,253	323.1	83,977	205.1	27,696	67.7	17,990	43.9	9,661	23.6	5,615	13.7
Delaware	2,061	325.6	1,334	210.7	273	43.1	250	39.5	152	24.0	84	13.3
Maryland	13,160	295.0	9,011	202.0	2,313	51.8	1,511	33.9	794	17.8	545	12.2
District of Columbia	2,175	348.0	1,666	266.6	410	65.6	184	29.4	52	8.3	75	12.0
Virginia	15,996	276.0	10,832	186.9	3,551	61.3	2,278	39.3	1,122	19.4	815	14.1
West Virginia	7,737	403.6	4,310	224.8	1,359	70.9	865	45.1	447	23.3	272	14.2
North Carolina	19,388	306.2	11,595	183.1	4,487	70.9	3,180	50.2	1,712	27.0	770	12.2
South Carolina	9,898	292.8	5,780	171.0	2,448	72.4	1,865	55.2	1,047	31.0	385	11.4
Georgia	16,780	275.1	10,284	168.6	4,165	68.3	2,850	46.7	1,557	25.5	793	13.0
Florida	45,058	385.3	29,165	249.4	8,690	74.3	5,007	42.8	2,778	23.8	1,876	16.0
East South Central	50,466	332.0	30,205	198.7	11,129	73.2	7,817	51.4	4,092	26.9	1,942	12.8
Kentucky	12,803	343.6	7,556	202.8	2,632	70.6	1,710	45.9	849	22.8	528	14.2
Tennessee	15,867	330.6	9,489	197.7	3,593	74.9	2,432	50.7	1,268	26.4	618	12.9
Alabama	12,946	319.7	8,175	201.9	2,991	73.9	2,197	54.2	1,192	29.4	504	12.4
Mississippi	8,850	337.3	4,985	190.0	1,913	72.9	1,478	56.3	783	29.8	292	11.1

See note at end of table.

Table 18. Deaths and death rates for major causes of death for the United States, each division, and State; and by race and sex for the United States, 1986—Con.

[Rates per 100,000 population in each race-sex group and area. Numbers after causes of death are category numbers of the *Ninth Revision International Classification of Diseases, 1975*]

Race, sex, and area	*Diseases of heart (390–398,402, 404–429)*		*Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues (140–208)*		*Cerebrovascular diseases (430–438)*		*Accidents and adverse effects (E800–E949)*		*Motor vehicle accidents (E810–E825)*		*Suicide (E950–E959)*	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
West South Central...	72,813	271.0	44,132	164.3	15,316	57.0	11,737	43.7	6,039	22.5	3,721	13.9
Arkansas.....	9,092	383.5	5,076	214.1	1,990	83.9	1,236	52.1	604	25.5	321	13.5
Louisiana	12,743	283.2	8,056	179.1	2,580	57.3	2,017	44.8	983	21.8	640	14.2
Oklahoma.....	10,957	331.4	6,387	193.2	2,460	74.4	1,465	44.3	737	22.3	482	14.6
Texas.....	40,021	239.8	24,613	147.5	8,286	49.6	7,019	42.1	3,715	22.3	2,278	13.6
Mountain	28,458	219.2	19,378	149.3	5,670	43.7	5,917	45.6	3,299	25.4	2,422	18.7
Montana.....	2,201	269.4	1,463	179.1	494	60.5	411	50.3	228	27.9	177	21.7
Idaho.....	2,396	239.1	1,591	158.2	594	59.3	528	52.7	271	27.0	177	17.7
Wyoming	990	195.3	645	127.2	198	39.1	262	51.7	152	30.0	97	19.1
Colorado.....	6,456	197.7	4,356	133.4	1,309	40.1	1,253	38.4	638	19.5	574	17.6
New Mexico.....	2,861	193.4	2,081	140.7	566	38.3	822	55.6	506	34.2	287	19.4
Arizona	8,138	248.2	5,828	177.7	1,440	43.9	1,647	50.2	956	29.2	632	19.3
Utah	2,956	177.6	1,638	98.4	650	39.1	604	36.3	328	19.7	245	14.7
Nevada	2,460	254.4	1,776	183.7	419	43.3	390	40.3	220	22.8	233	24.1
Pacific.....	90,071	251.9	61,496	172.0	20,060	56.1	14,367	40.2	7,193	20.1	5,279	14.8
Washington	11,619	260.3	7,910	177.2	2,562	57.4	1,650	37.0	810	18.1	682	15.3
Oregon	7,854	290.7	5,260	194.7	1,912	70.8	1,236	45.7	643	23.8	451	16.7
California	68,217	252.6	46,465	172.1	15,097	55.9	10,846	40.2	5,523	20.5	3,960	14.7
Alaska.....	474	89.1	442	83.1	85	16.0	362	68.0	102	19.2	79	14.8
Hawaii.....	1,907	179.1	1,419	133.2	404	37.9	273	25.6	115	10.8	107	10.8

NOTE: Caution should be used in comparing crude death rates by State. Death rates are affected by the population composition of the area.

Table 19. Deaths and percent distribution of deaths, by age according to specified Hispanic origin, race for non-Hispanic origin, and sex: Total of 18 reporting States and the District of Columbia, 1986

[For a listing of reporting States see Technical notes]

Hispanic origin, race for non-Hispanic origin, and sex	Total	Under 1 year	1–4 years	5–14 years	15–24 years	25–34 years	35–44 years	45–54 years	55–64 years	65–74 years	75–84 years	85 years and over	Not stated
						Number							
All origins	1,031,391	20,462	4,003	4,515	20,599	30,977	38,036	58,563	137,995	233,292	275,571	206,632	746
Male	540,316	11,674	2,288	2,849	15,468	22,832	25,693	36,686	84,799	134,988	134,321	68,355	363
Female	491,075	8,788	1,715	1,666	5,131	8,145	12,343	21,877	53,196	98,304	141,250	138,277	383
Hispanic	47,604	2,882	587	552	3,114	4,213	3,802	3,996	6,668	7,853	8,667	5,206	64
Male	28,874	1,624	337	341	2,572	3,376	2,836	2,636	4,074	4,464	4,418	2,144	52
Female	18,730	1,258	250	211	542	837	966	1,360	2,594	3,389	4,249	3,062	12
Mexican	29,403	1,845	408	359	2,149	2,213	1,900	2,236	4,063	4,910	5,803	3,477	40
Male	17,801	1,030	237	219	1,826	1,808	1,395	1,462	2,459	2,835	3,055	1,443	32
Female	11,602	815	171	140	323	405	505	774	1,604	2,075	2,748	2,034	8
Puerto Rican	6,865	295	71	84	348	902	926	811	1,044	1,051	866	466	1
Male	4,224	170	39	48	258	695	710	545	645	558	392	163	1
Female	2,641	125	32	36	90	207	216	266	399	493	474	303	-
Cuban	1,610	18	3	5	35	90	95	141	289	310	392	231	1
Male	986	5	2	3	33	79	80	104	207	202	187	84	-
Female	624	13	1	2	2	11	15	37	82	108	205	147	1
Central and South American	3,096	154	30	35	249	424	372	323	382	512	402	211	2
Male	1,806	92	20	24	203	338	266	197	204	227	152	81	2
Female	1,290	62	10	11	46	86	106	126	178	285	250	130	-
Other and unknown Hispanic	6,630	570	75	69	333	584	509	485	890	1,070	1,204	821	20
Male	4,057	327	39	47	252	456	385	328	559	642	632	373	17
Female	2,573	243	36	22	81	128	124	157	331	428	572	448	3
Non-Hispanic[1]	936,449	15,917	3,171	3,691	16,265	24,887	31,913	51,393	124,444	214,690	255,640	193,953	485
Male	484,651	9,119	1,805	2,345	11,985	18,054	21,158	31,885	76,186	124,037	124,251	63,662	164
Female	451,798	6,798	1,366	1,346	4,280	6,833	10,755	19,508	48,258	90,653	131,389	130,291	321
White	800,585	10,173	2,158	2,675	12,212	17,167	22,623	38,724	102,387	185,819	228,192	178,046	409
Male	409,606	5,895	1,256	1,705	8,985	12,646	15,072	24,193	63,218	108,091	110,706	57,713	126
Female	390,979	4,278	902	970	3,227	4,521	7,551	14,531	39,169	77,728	117,486	120,333	283
Black	119,841	5,144	872	851	3,475	6,955	8,334	11,354	19,789	25,593	23,855	13,559	60
Male	65,496	2,886	471	537	2,573	4,882	5,507	6,895	11,632	13,916	11,294	4,872	31
Female	54,345	2,258	401	314	902	2,073	2,827	4,459	8,157	11,677	12,561	8,687	29
Not stated[2]	47,338	1,663	245	272	1,220	1,877	2,321	3,174	6,883	10,749	11,264	7,473	197
Male	26,791	931	146	163	911	1,402	1,699	2,165	4,539	6,487	5,652	2,549	147
Female	20,547	732	99	109	309	475	622	1,009	2,344	4,262	5,612	4,924	50
						Percent							
All origins	100.0	2.0	0.4	0.4	2.0	3.0	3.7	5.7	13.4	22.6	26.7	20.0	0.1
Male	100.0	2.2	0.4	0.5	2.9	4.2	4.8	6.8	15.7	25.0	24.9	12.7	0.1
Female	100.0	1.8	0.3	0.3	1.0	1.7	2.5	4.5	10.8	20.0	28.8	28.2	0.1
Hispanic	100.0	6.1	1.2	1.2	6.5	8.9	8.0	8.4	14.0	16.5	18.2	10.9	0.1
Male	100.0	5.6	1.2	1.2	8.9	11.7	9.8	9.1	14.1	15.5	15.3	7.4	0.2
Female	100.0	6.7	1.3	1.1	2.9	4.5	5.2	7.3	13.8	18.1	22.7	16.3	0.1
Mexican	100.0	6.3	1.4	1.2	7.3	7.5	6.5	7.6	13.8	16.7	19.7	11.8	0.1
Male	100.0	5.8	1.3	1.2	10.3	10.2	7.8	8.2	13.8	15.9	17.2	8.1	0.2
Female	100.0	7.0	1.5	1.2	2.8	3.5	4.4	6.7	13.8	17.9	23.7	17.5	0.1

See footnotes at end of table.

Table 19. Deaths and percent distribution of deaths, by age according to specified Hispanic origin, race for non-Hispanic origin, and sex: Total of 18 reporting States and the District of Columbia, 1986—Con.

[For a listing of reporting States see Technical notes]

Hispanic origin, race for non-Hispanic origin, and sex	*Total*	*Under 1 year*	*1–4 years*	*5–14 years*	*15–24 years*	*25–34 years*	*35–44 years*	*45–54 years*	*55–64 years*	*65–74 years*	*75–84 years*	*85 years and over*	*Not stated*
							Percent						
Hispanic—Con.													
Puerto Rican	100.0	4.3	1.0	1.2	5.1	13.1	13.5	11.8	15.2	15.3	12.6	6.8	0.0
Male	100.0	4.0	0.9	1.1	6.1	16.5	16.8	12.9	15.3	13.2	9.3	3.9	0.0
Female	100.0	4.7	1.2	1.4	3.4	7.8	8.2	10.1	15.1	18.7	17.9	11.5	-
Cuban	100.0	1.1	0.2	0.3	2.2	5.6	5.9	8.8	18.0	19.3	24.3	14.3	0.1
Male	100.0	0.5	0.2	0.3	3.3	8.0	8.1	10.5	21.0	20.5	19.0	8.5	-
Female	100.0	2.1	0.2	0.3	0.3	1.8	2.4	5.9	13.1	17.3	32.9	23.6	0.2
Central and South American	100.0	5.0	1.0	1.1	8.0	13.7	12.0	10.4	12.3	16.5	13.0	6.8	0.1
Male	100.0	5.1	1.1	1.3	11.2	18.7	14.7	10.9	11.3	12.6	8.4	4.5	0.1
Female	100.0	4.8	0.8	0.9	3.6	6.7	8.2	9.8	13.8	22.1	19.4	10.1	-
Other and unknown Hispanic	100.0	8.6	1.1	1.0	5.0	8.8	7.7	7.3	13.4	16.1	18.2	12.4	0.3
Male	100.0	8.1	1.0	1.2	6.2	11.2	9.5	8.1	13.8	15.8	15.6	9.2	0.4
Female	100.0	9.4	1.4	0.9	3.1	5.0	4.8	6.1	12.9	16.6	22.2	17.4	0.1
Non-Hispanic[1]	100.0	1.7	0.3	0.4	1.7	2.7	3.4	5.5	13.3	22.9	27.3	20.7	0.1
Male	100.0	1.9	0.4	0.5	2.5	3.7	4.4	6.6	15.7	25.6	25.6	13.1	0.0
Female	100.0	1.5	0.3	0.3	0.9	1.5	2.4	4.3	10.7	20.1	29.1	28.8	0.1
White	100.0	1.3	0.3	0.3	1.5	2.1	2.8	4.8	12.8	23.2	28.5	22.2	0.1
Male	100.0	1.4	0.3	0.4	2.2	3.1	3.7	5.9	15.4	26.4	27.0	14.1	0.0
Female	100.0	1.1	0.2	0.2	0.8	1.2	1.9	3.7	10.0	19.9	30.0	30.8	0.1
Black	100.0	4.3	0.7	0.7	2.9	5.8	7.0	9.5	16.5	21.4	19.9	11.3	0.1
Male	100.0	4.4	0.7	0.8	3.9	7.5	8.4	10.5	17.8	21.2	17.2	7.4	0.0
Female	100.0	4.2	0.7	0.6	1.7	3.8	5.2	8.2	15.0	21.5	23.1	16.0	0.1
Not stated[2]	100.0	3.5	0.5	0.6	2.6	4.0	4.9	6.7	14.5	22.7	23.8	15.8	0.4
Male	100.0	3.5	0.5	0.6	3.4	5.2	6.3	8.1	16.9	24.2	21.1	9.5	0.5
Female	100.0	3.6	0.5	0.5	1.5	2.3	3.0	4.9	11.4	20.7	27.3	24.0	0.2

[1]Includes races other than white and black.
[2]Includes deaths that occurred in States that did not report Hispanic origin on the death certificate.

Table 20. Infant, neonatal, and postneonatal deaths and mortality rates, by specified Hispanic origin and race for non-Hispanic origin: Total of 18 reporting States and the District of Columbia, 1986

[Rates per 1,000 live births in specified group. Live births based on origin of mother. For a listing of reporting States see Technical notes]

Age	All origins	Hispanic					Non-Hispanic			Not stated[3]
		Total	Mexican	Puerto Rican	Cuban	Other Hispanic[1]	Total[2]	White	Black	
					Number					
Under 1 year	20,462	2,882	1,845	295	18	724	15,917	10,173	5,144	1,663
Under 28 days	13,218	1,902	1,200	181	13	508	10,055	6,497	3,194	1,261
28 days–11 months	7,244	980	645	114	5	216	5,862	3,676	1,950	402
					Rate					
Under 1 year	[4]10.2	8.0	7.7	8.6	5.5	9.1	10.0	8.6	16.9	...
Under 28 days	[4]6.6	5.3	5.0	5.3	3.9	6.4	6.3	5.5	10.5	...
28 days–11 months	[4]3.6	2.7	2.7	3.3	1.5	2.7	3.7	3.1	6.4	...

[1]Includes Central and South American and other and unknown Hispanic.
[2]Includes races other than white and black.
[3]Includes infant deaths that occurred in States that did not report Hispanic origin on the death certificate.
[4]Figures for origin not stated included in All origins but not distributed among origin groups.

Table 21. Number of autopsies and percent of deaths for which autopsies were reported for 15 leading causes of death: United States, 1986

Rank order	Cause of death (Ninth Revision International Classification of Diseases, 1975)		Total deaths	Reported autopsy	
				Number	Percent
...	All causes		2,105,361	257,890	12.2
1	Diseases of heart	390–398,402,404–429	765,490	63,322	8.3
2	Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues	140–208	469,376	23,376	5.0
3	Cerebrovascular diseases	430–438	149,643	6,158	4.1
4	Accidents and adverse effects	E800–E949	95,277	45,959	48.2
...	Motor vehicle accidents	E810–E825	47,865	23,801	49.7
...	All other accidents and adverse effects	E800–E807,E826–E949	47,412	22,158	46.7
5	Chronic obstructive pulmonary diseases and allied conditions	490–496	76,559	4,398	5.7
6	Pneumonia and influenza	480–487	69,812	6,867	9.8
7	Diabetes mellitus	250	37,184	1,928	5.2
8	Suicide	E950–E959	30,904	15,767	51.0
9	Chronic liver disease and cirrhosis	571	26,159	5,389	20.6
10	Atherosclerosis	440	22,706	688	3.0
11	Nephritis, nephrotic syndrome, and nephrosis	580–589	21,767	1,406	6.5
12	Homicide and legal intervention	E960–E978	21,731	20,871	96.0
13	Septicemia	038	18,795	2,025	10.8
14	Certain conditions originating in the perinatal period	760–779	18,391	5,051	27.5
15	Congenital anomalies	740–759	12,638	5,339	42.2
...	All other causes	Residual	268,929	49,346	18.3

Table 22. Deaths and percent distribution of deaths, by marital status according to race and sex: United States, 1986

Marital status	All races			White			All other					
							Total			Black		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
	Number											
Total	2,049,203	1,071,483	977,720	1,791,619	929,542	862,077	257,584	141,941	115,643	235,339	128,694	106,645
Never married	210,610	128,899	81,711	169,835	100,524	69,311	40,775	28,375	12,400	37,676	25,974	11,702
Ever married	1,828,422	935,240	893,182	1,614,719	823,935	790,784	213,703	111,305	102,398	194,760	100,612	94,148
Married	926,113	656,038	270,075	823,444	584,787	238,657	102,669	71,251	31,418	91,530	63,447	28,083
Widowed	750,027	189,900	560,127	663,787	164,898	498,889	86,240	25,002	61,238	80,057	23,155	56,902
Divorced	152,282	89,302	62,980	127,488	74,250	53,238	24,794	15,052	9,742	23,173	14,010	9,163
Not stated	10,171	7,344	2,827	7,065	5,083	1,982	3,106	2,261	845	2,903	2,108	795
	Percent distribution											
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Never married	10.3	12.1	8.4	9.5	10.9	8.1	16.0	20.3	10.8	16.2	20.5	11.1
Ever married	89.7	87.9	91.7	90.5	89.1	91.9	84.0	79.7	89.2	83.8	79.5	88.9
Married	45.4	61.6	27.7	46.1	63.3	27.7	40.3	51.0	27.4	39.4	50.1	26.5
Widowed	36.8	17.8	57.5	37.2	17.8	58.0	33.9	17.9	53.3	34.4	18.3	53.8
Divorced	7.5	8.4	6.5	7.1	8.0	6.2	9.7	10.8	8.5	10.0	11.1	8.7

Table 23. Deaths and death rates from 16 selected subcategories of Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues, by race and sex: United States, 1986

[Rates per 100,000 population in specified group]

Cause of death (Ninth Revision International Classification of Diseases, 1975)	*All races*			*White*			*All other*					
							Total			*Black*		
	Both sexes	*Male*	*Female*	*Both sexes*	*Male*	*Female*	*Both sexes*	*Male*	*Female*	*Both sexes*	*Male*	*Female*
	Number											
Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues[1] 140–208	469,376	250,559	218,817	412,352	218,381	193,971	57,024	32,178	24,846	51,979	29,363	22,616
Malignant neoplasm of esophagus 150	8,918	6,535	2,383	6,786	4,946	1,840	2,132	1,589	543	2,060	1,536	524
Malignant neoplasm of stomach 151	13,855	8,400	5,455	11,274	6,831	4,443	2,581	1,569	1,012	2,118	1,305	813
Malignant neoplasms of colon, rectum, recto-sigmoid junction, and anus 153,154	55,816	27,469	28,347	49,842	24,593	25,249	5,974	2,876	3,098	5,441	2,564	2,877
Malignant neoplasm of pancreas. 157	23,458	11,403	12,055	20,470	9,974	10,496	2,988	1,429	1,559	2,740	1,294	1,446
Malignant neoplasms of trachea, bronchus, and lung. 162	125,522	85,057	40,465	111,049	74,517	36,532	14,473	10,540	3,933	13,354	9,773	3,581
Malignant melanoma of skin 172	5,673	3,378	2,295	5,565	3,315	2,250	108	63	45	91	56	35
Malignant neoplasm of cervix uteri 180	4,558	. . .	4,558	3,391	. . .	3,391	1,167	. . .	1,167	1,067	. . .	1,067
Malignant neoplasms of body of uterus and of uterus, part unspecified. 179,182	5,853	. . .	5,853	4,968	. . .	4,968	885	. . .	885	835	. . .	835
Malignant neoplasm of ovary 183.0	11,729	. . .	11,729	10,751	. . .	10,751	978	. . .	978	855	. . .	855
Malignant neoplasm of prostate 185	27,262	27,262	. . .	22,708	22,708	. . .	4,554	4,554	. . .	4,358	4,358	. . .
Malignant neoplasm of bladder. 188	9,655	6,523	3,132	8,849	6,093	2,756	806	430	376	752	397	355
Malignant neoplasms of kidney and other and unspecified urinary organs 189	9,458	5,630	3,828	8,586	5,125	3,461	872	505	367	784	458	326
Malignant neoplasms of brain and other and unspecified parts of nervous system. . . 191,192	10,322	5,669	4,653	9,605	5,288	4,317	717	381	336	616	328	288
Hodgkin's disease. 201	1,828	1,069	759	1,659	972	687	169	97	72	155	91	64
Malignant lymphoma other than Hodgkin's disease 200,202	16,351	8,485	7,866	15,178	7,795	7,383	1,173	690	483	1,006	576	430
Multiple myeloma and other immuno-proliferative neoplasms. 203	7,987	4,032	3,955	6,556	3,299	3,257	1,431	733	698	1,352	686	666
	Rate											
Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues[1] 140–208	194.7	213.5	176.9	201.8	218.8	185.6	155.0	183.3	129.2	177.4	211.4	146.7
Malignant neoplasm of esophagus 150	3.7	5.6	1.9	3.3	5.0	1.8	5.8	9.1	2.8	7.0	11.1	3.4
Malignant neoplasm of stomach 151	5.7	7.2	4.4	5.5	6.8	4.3	7.0	8.9	5.3	7.2	9.4	5.3
Malignant neoplasms of colon, rectum, recto-sigmoid junction, and anus 153,154	23.2	23.4	22.9	24.4	24.6	24.2	16.2	16.4	16.1	18.6	18.5	18.7
Malignant neoplasm of pancreas. 157	9.7	9.7	9.7	10.0	10.0	10.0	8.1	8.1	8.1	9.3	9.3	9.4
Malignant neoplasms of trachea, bronchus, and lung. 162	52.1	72.5	32.7	54.4	74.7	35.0	39.3	60.0	20.5	45.6	70.3	23.2
Malignant melanoma of skin 172	2.4	2.9	1.9	2.7	3.3	2.2	0.3	0.4	0.2	0.3	0.4	0.2
Malignant neoplasm of cervix uteri 180	1.9	. . .	3.7	1.7	. . .	3.2	3.2	. . .	6.1	3.6	. . .	6.9
Malignant neoplasms of body of uterus and of uterus, part unspecified. 179,182	2.4	. . .	4.7	2.4	. . .	4.8	2.4	. . .	4.6	2.8	. . .	5.4

See footnote at end of table.

Table 23. Deaths and death rates from 16 selected subcategories of Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues, by race and sex: United States, 1986—Con.

[Rates per 100,000 population in specified group]

Cause of death (Ninth Revision International Classification of Diseases, 1975)	*All races*			*White*			*All other*					
							Total			*Black*		
	Both sexes	*Male*	*Female*	*Both sexes*	*Male*	*Female*	*Both sexes*	*Male*	*Female*	*Both sexes*	*Male*	*Female*
Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues—Con.												
Malignant neoplasm of ovary 183.0	4.9	. . .	9.5	5.3	. . .	10.3	2.7	. . .	5.1	2.9	. . .	5.5
Malignant neoplasm of prostate 185	11.3	23.2	. . .	11.1	22.8	. . .	12.4	25.9	. . .	14.9	31.4	. . .
Malignant neoplasm of bladder 188	4.0	5.6	2.5	4.3	6.1	2.6	2.2	2.4	2.0	2.6	2.9	2.3
Malignant neoplasms of kidney and other and unspecified urinary organs 189	3.9	4.8	3.1	4.2	5.1	3.3	2.4	2.9	1.9	2.7	3.3	2.1
Malignant neoplasms of brain and other and unspecified parts of nervous system. . . 191,192	4.3	4.8	3.8	4.7	5.3	4.1	1.9	2.2	1.7	2.1	2.4	1.9
Hodgkin's disease 201	0.8	0.9	0.6	0.8	1.0	0.7	0.5	0.6	0.4	0.5	0.7	0.4
Malignant lymphoma other than Hodgkin's disease 200,202	6.8	7.2	6.4	7.4	7.8	7.1	3.2	3.9	2.5	3.4	4.1	2.8
Multiple myeloma and other immuno-proliferative neoplasms. 203	3.3	3.4	3.2	3.2	3.3	3.1	3.9	4.2	3.6	4.6	4.9	4.3

[1] Includes figures for subcategories not shown.

Technical notes

Nature and sources of data

Data shown in this report are based on information from all death certificates filed in the 50 States and the District of Columbia.

Mortality statistics are based on information coded by the National Center for Health Statistics (NCHS) from copies of the original certificates received from the State registration offices, and on State-coded data provided to NCHS through the Vital Statistics Cooperative Program (VSCP). In 1986 all the States and the District of Columbia participated in this program and submitted part or all of the mortality data for 1986 on computer tape to NCHS. The following 22 States in the VSCP submitted precoded medical data for all deaths on computer tapes: California, Colorado, Florida, Iowa, Kansas, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Nebraska, New Hampshire, New York State (excluding New York City), North Carolina, Pennsylvania, South Carolina, Texas, Vermont, Virginia, and Wisconsin. The remaining 28 VSCP States, New York City, and the District of Columbia submitted copies of the original certificates from which NCHS coded the medical data. For 1986 all States submitted precoded demographic data for all deaths.

Data for the United States as a whole refer to events occurring within the United States. Data shown for geographic areas are by place of residence. Beginning with 1970, mortality statistics exclude deaths of nonresidents of the United States. All data exclude fetal deaths.

Cause-of-death classification

The mortality statistics presented here were compiled in accordance with the World Health Organization regulations, which specify that member nations classify causes of death by the current *Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death.*

Causes of death for 1979–86 were classified according to the Ninth Revision International Classification of Diseases (World Health Organization, 1977). For earlier years causes of death were classified according to the revisions then in use, as follows: 1968–78, Eighth Revision; 1958–67, Seventh Revision; and 1949–57, Sixth Revision. Changes in classification of causes of death due to these revisions may result in discontinuities in cause-of-death trends. Consequently, cause-of-death comparisons between revisions require consideration of comparability ratios and, where available, estimates of their standard errors. Comparability ratios between the Eighth and Ninth Revisions, between the Seventh and Eighth Revisions, and between the Sixth and Seventh Revisions may be found in other NCHS reports (NCHS, 1965, 1975, 1980).

Besides specifying the classification, the World Health Organization (WHO) regulations outline the form of medical certification and the procedures to be used in coding cause of death. Cause-of-death data presented in this publication were coded by procedures outlined in annual issues of Part 2a of the *NCHS Instruction Manual* (NCHS, published annually).

In this report, tabulations of cause-of-death statistics are based solely on the underlying cause of death. The underlying cause is defined by WHO as the disease or injury that initiated the train of events leading directly to death or as the circumstances of the accident or violence that produced the fatal injury. It is selected from the conditions entered by the physician in the cause-of-death section of the death certificate. When more than one cause or condition is entered by the physician, the underlying cause is determined by the sequence of conditions on the certificate, provisions of the International Classification of Diseases (ICD), and associated selection rules. In general, more medical information is reported on death certificates than is directly reflected in the underlying cause of death.

AIDS—The above discussion of cause-of-death information reported on death certificates is especially useful in interpreting mortality statistics relating to the category Deficiency of cell-mediated immunity (ICD No. 279.1). In 1986, acquired immunodeficiency syndrome (AIDS) and human immunodeficiency virus (HIV) infection, when reported on the death certificate, were assigned to this category, as were other diseases classifiable as deficiency of cell-mediated immunity. The category ICD No. 279.1 was selected as the underlying cause of death in 1986 for a total of 5,822 death certificates. On an additional 5,078 death certificates, conditions classifiable to category ICD No. 279.1 were reported, but ICD rules gave preference to other categories (for example, Pneumocystosis, ICD–9 No. 136.3) in selecting the underlying cause of death.

The WHO selection rules for underlying cause of death were developed prior to the identification of AIDS in 1981, and these rules often select categories other than ICD No. 279.1 as the underlying cause. Although ICD No. 279.1 was used to code other conditions classifiable as deficiency of cell-mediated immunity, it is believed that HIV infection was involved in most of the 10,900 deaths where conditions classifiable to ICD No. 279.1 were reported, irrespective of whether ICD No. 279.1 was selected as the underlying cause of death. The categories and rules for classifying HIV infection as reported on the death certificate have been revised and were implemented with deaths occurring in 1987. It may be noted that as of June 6, 1988, the Centers for Disease Control received reports of 9,676 deaths due to AIDS in the United States for 1986; this figure may underestimate true mortality by 10–30 percent (Centers for Disease Control, 1988).

Population bases for computing rates

The population used for computing rates shown in this report (furnished by the U.S. Bureau of the Census) represents

NOTE: A list of references follows the text.

the population residing in the specified area. Death rates for 1986 are based on population estimates as of July 1, 1986 (U.S. Bureau of the Census, 1988). The estimates are based on the 1980 census counts. The 1980 census counts by race were modified to be consistent with U.S. Office of Management and Budget categories and historical categories for death data. The modification procedures are discussed in detail in a report of the U.S. Bureau of the Census (1982a).

Population estimates used to compute death rates for 1984, 1985, and 1986 incorporate new estimation procedures for net migration and net undocumented immigration. Death rates for 1986 are comparable with those for 1984 and 1985 but are not strictly comparable with those of previous years. For additional detail, see *Advance Report of Final Mortality Statistics, 1984* and a report of the U.S. Bureau of the Census (1985).

Infant mortality rates shown in figure 5 and tables E, 13, 14, 15, 17, and 20 are the most commonly used index for measuring the risk of dying during the first year of life; they are calculated by dividing the number of infant deaths in a calendar year by the number of live births registered for the same period and are presented as rates per 1,000 or per 100,000 live births. Infant mortality rates use the number of live births in the denominator to approximate the population at risk of dying before the first birthday.

In contrast to infant mortality rates based on live births, infant death rates shown in figure 2 and tables A, 2, 5, and 9 are based on the estimated population under 1 year of age. Infant death rates that appear in tabulations of age-specific death rates are calculated by dividing the number of infant deaths in a calendar year by the midyear population of persons under 1 year of age (estimated from births occurring in the 12-month period ending with June) and are presented as rates per 100,000 population in this age group. Due to differences in the denominators, infant death rates may differ from infant mortality rates.

Cause-of-death rankings

The cause-of-death rankings shown in figure 4 and tables B–D, 5–7, and 21 are based on the List of 72 Selected Causes of Death; the cause-of-death ranking for infants in table 14 is based on the List of 61 Selected Causes of Infant Death.

The group titles Major cardiovascular diseases and Symptoms, signs, and ill-defined conditions are not ranked from the List of 72 Selected Causes; Certain conditions originating in the perinatal period and Symptoms, signs, and ill-defined conditions are not ranked from the List of 61 Selected Causes of Infant Death. In addition, category titles that begin with the words "Other" and "All other" are not ranked to determine the leading causes of death. When one of the titles that represents a subtotal is ranked (for example, Tuberculosis), its component parts are not ranked (in this case, Tuberculosis of respiratory system and Other tuberculosis).

NOTE: A list of references follows the text.

Age-adjusted rates

The age-adjusted rates presented in this report were computed by the direct method, that is, by applying the age-specific death rates for a given cause of death to the standard population distributed by age. The total population as enumerated in 1940 was selected as the standard. The rates for the total population and for each race-sex group were adjusted separately, by using the same standard population. The age-adjusted rates were based on 10-year age groups. It is important not to compare age-adjusted death rates with crude rates.

Random variation

Although the mortality data in this report (except data for 1972) are not subject to sampling error, they may be affected by random variation in the number of deaths involved. When the number of events is small (perhaps less than 100) and the probability of such an event is small, considerable caution must be observed in interpreting the data. Such infrequent events may be assumed to follow a Poisson probability distribution. For this distribution, a simple approximation may be used to estimate the confidence interval, as follows:

If N is the number of registered deaths in the population and R is the corresponding rate, the chances are 19 in 20 (95-percent confidence interval) that

1. $N-2\sqrt{N}$ and $N+2\sqrt{N}$

   covers the "true" number of events.

2. $R-2\frac{R}{\sqrt{N}}$ and $R+2\frac{R}{\sqrt{N}}$

   covers the "true" rate.

If the rate R corresponding to N events is compared with the rate S corresponding to M events, the difference between the two rates may be regarded as statistically significant if it exceeds

$$2\sqrt{\frac{R^2}{N}+\frac{S^2}{M}}$$

Additional information on random variation may be found in the Technical Appendix of *Vital Statistics of the United States,* Volume II, Mortality, Part A, 1985.

Infant and maternal mortality rates—Comparisons made in the text between infant, neonatal, postneonatal, and maternal mortality rates, unless otherwise specified, have passed the hypothesis test at the 0.05 level of significance, as described above. Lack of comment in the text about any two rates does not mean that the difference was tested and found not to be significant.

Life tables

U.S. abridged life tables are constructed by reference to a standard life table (NCHS, 1966).

Hispanic origin

For 1986 mortality data for the Hispanic-origin population are based on deaths to residents of 18 reporting States and the District of Columbia whose data were at least 90 percent complete on a place-of-occurrence basis and considered to be sufficiently comparable to be used for analysis. The 18 reporting States are as follows: Arizona, Arkansas, California, Colorado, Georgia, Hawaii, Illinois, Indiana, Kansas, Mississippi, Nebraska, New Jersey, New York (including New York City), North Dakota, Ohio, Texas, Utah, and Wyoming.

Infant mortality rates for Hispanic-origin population are based on numbers of resident infant deaths reported to be of Hispanic-origin and numbers of resident live births by Hispanic origin of mother for the 18 reporting States and the District of Columbia. In computing infant mortality rates, deaths and live births of unknown origin are not distributed among the specified Hispanic and non-Hispanic groups. Because for 1986 the percent of infant deaths of unknown origin was 8.1 percent and the percent of live births of unknown origin was 3.1 percent, infant mortality rates by specified Hispanic origin and race for non-Hispanic origin may be somewhat underestimated.

Small numbers of infant deaths for specific Hispanic-origin groups can result in infant mortality rates subject to relatively large random variation (see section "Random variation").

In 1980, the 18 reporting States and the District of Columbia accounted for about 80 percent of the Hispanic population in the United States, including about 89 percent of the Mexican population, 78 percent of the Puerto Rican population, 34 percent of the Cuban population, and 68 percent of the "Other Hispanic" population (U.S. Bureau of the Census, 1982b). Accordingly, caution should be exercised in generalizing mortality patterns from the reporting area to the Hispanic-origin population (especially Cubans) of the entire United States.

Computation of percent distributions

Deaths of unknown marital status were subtracted from figures for total deaths used as denominators before percent distributions were computed.

*U.S. G.P.O. 1988-201-876:80006

This report presents summary tabulations from the final mortality statistics for 1986. More detailed tabulations for 1986 will be published in *Vital Statistics of the United States, 1986, Volume II—Mortality.* Prior to the publication of that volume, the National Center for Health Statistics will respond to requests for unpublished data whenever possible.

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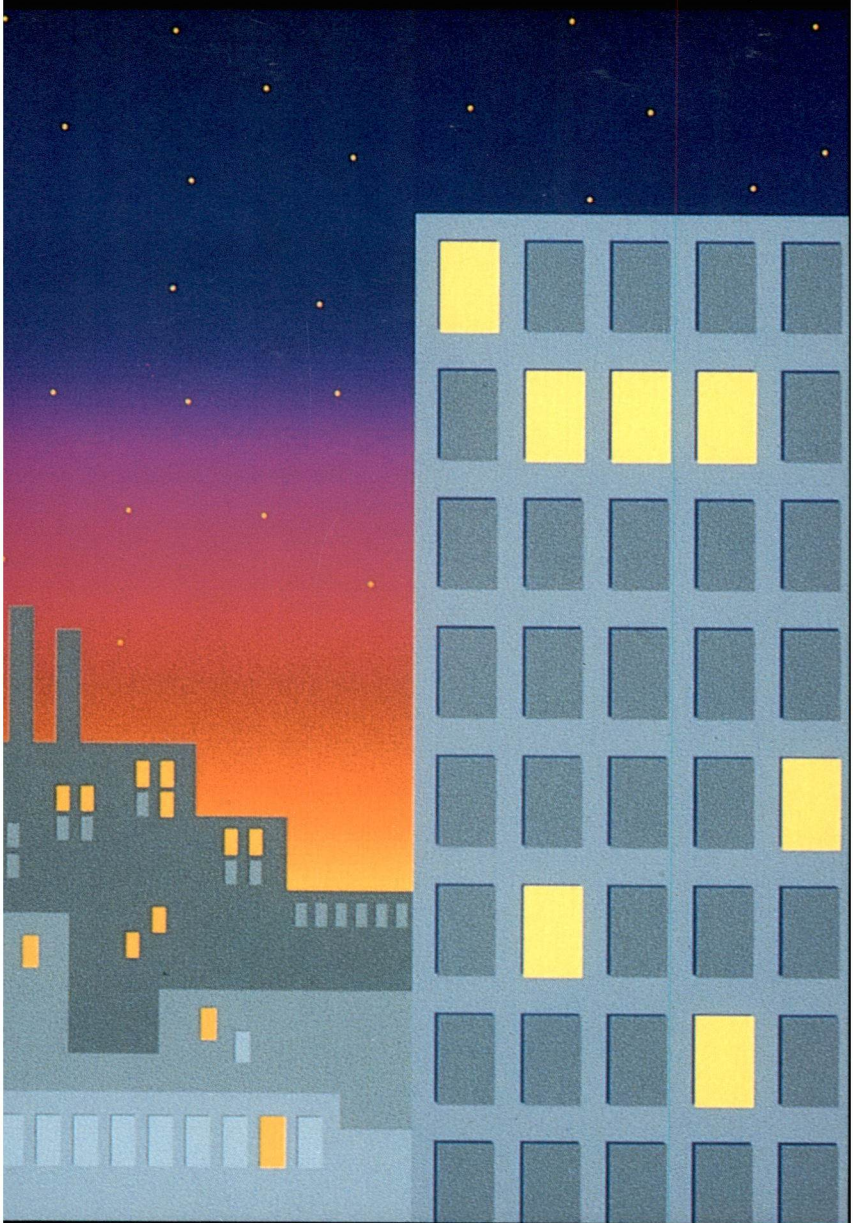
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the LEARNING ENTERPRISE



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the LEARNING ENTERPRISE

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PREFACE

This publication summarizes a portion of the research conducted under a two-year joint project of the American Society for Training and Development and the U.S. Department of Labor. It represents a brief overview of the findings from our organization and strategic role of training research. More comprehensive coverage of this topic and other findings on the organization and structure of training will be available in 1989 in four books:

ORGANIZATION AND STRATEGIC ROLE OF TRAINING explores how training is structured, financed, and linked to the strategic goals of employer institutions. It also maps the size and scope of training in employer institutions.

TECHNICAL TRAINING examines how technical workers get their training, what it costs, who provides it, how it links to strategic goals, and what the future holds for the technical work force.

ACCOUNTING AND EVALUATION includes an accounting model that represents a tested method of capturing training costs and benefits. It also explores effective evaluation methods that connect training to strategic change.

BASIC WORKPLACE SKILLS maps out the skills that employers want and charts the strategic relevance of each skill. A model for establishing a basic workplace skills program, as well as generic curriculum for each skill, is included. In addition, a comprehensive *BASIC WORKPLACE SKILLS MANUAL* will chart the step-by-step process for establishing a basic workplace skills program. It will include charts and checklists for implementation.

●

The material in this project was prepared under Grant No. 99-6-0705-75-079-02 from the Employment and Training Administration, U.S. Department of Labor, under the authority of Title IV, part D, of the Job Training Partnership Act of 1982. Grantees undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment. Therefore, points of view or opinions stated in this document do not necessarily represent the official position or policy of the Department of Labor.

INTRODUCTION

It is human nature to waste that which is abundantly supplied. Throughout most of this century, there appeared to be an overabundance of American workers.

People were plentiful, but jobs were not. The economy seemed to overflow with underemployed and unemployed people. Unemployment hovered in double digits. Pundits said the technological bogeyman was loose again and labor-saving machinery would soon make *all* workers redundant. But things rarely remain static. As the century moved on, what started out as an excess of American workers has dwindled away to nothing. In fact, by the year 2000, there are likely to be too few well-educated and well-trained workers to satisfy the nation's economic needs.

Americans are slow to recognize the new reality. Recent history encourages us to accept the view that educated and trained workers are abundant, and machinery, financial capital, and natural resources are scarce. This perception began with the Great Depression, which Americans remember as an episode when a dangerous and growing army of the unemployed was dispersed with make-work jobs. After World War II, the economy boomed, fueled by the pent-up demand for consumer goods that had been building throughout the war. Thereafter, growth was sustained by a surge in buying on personal credit. The lesson learned in the postwar expansion was to value people for their purchasing power and not as critical factors of production.

The postwar baby boom has influenced American thinking, also. The United States has been forced persistently to reshape its economy and social structures in order to bear, feed, clothe, educate, employ, and house the 76 million members of the American baby boom. As the boom ages, it has shouldered its way into American hospitals, schools, and labor markets, successively overwhelming each and then leaving it bloated and vacant. People who have had to provide for the baby boom, and the baby boomers themselves, who have spent a lifetime in one queue or another, are easily convinced that there are too many people and too few hospitals, schools, jobs, houses, and new promotions.

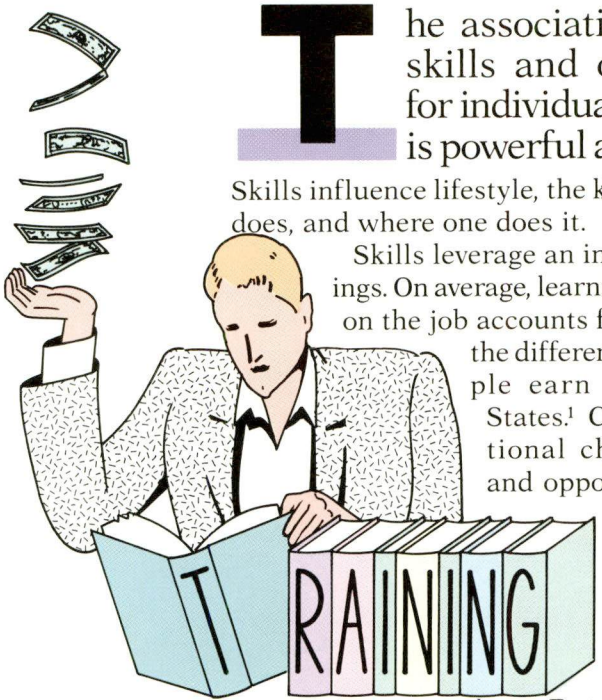
When the baby boom moved into the workplace, it found too few good jobs and promotions to go around. But the generations that will follow will be small in comparison with the baby boom. Unfortunately, the sense that people are oversupplied may mislead Americans into a strategy that favors investment in machines, financial capital, and extracted resources over investments in the education and training of people. In a very short time, however, such a course of action would prove a serious economic error.

This discussion challenges the biases spawned by recent economic history. It begins by explaining the relationship between job-related learning, individual opportunity, and the competitiveness of employer institutions. Next, it examines the dynamics that link changing skill requirements on the job to training and education. This is followed by a snapshot of the existing and emerging institutions that provide job-related training, or access to it. The next section is a closer look at the employer-based training and development system, in general, and the differences between small and large employers, in particular. The following and most sizeable section considers job-related education and training in individual occupations. The discussion concludes with recommendations for improving the nation's job-related education and training system.

PART I

Skills, Individual Opportunity, and Competitiveness

Skills and Opportunity



The association between skills and opportunity for individual Americans is powerful and growing. Skills influence lifestyle, the kind of work one does, and where one does it.

Skills leverage an individual's earnings. On average, learning in school and on the job accounts for about half of the differences in what people earn in the United States.[1] Career and locational choices, chance, and opportunity account for the other half. Each individual may trade earning power for a preferred location, occupation, or employer. But individuals with poor skills do not have much to bargain with; they are condemned to low earnings and limited choices.

Most studies show that, among Americans, about 10 percent of the differences in earnings over a lifetime can be attributed to preemployment learning in school. But this small figure masks wide variations in the importance of education in determining earning potential. For instance, education is more important in determining earnings of employees in high-tech industries than in other industries. In high-tech industries, earnings of a high school graduate are twice those of a dropout; earnings of a college graduate are twice those of a high school graduate; and earnings of someone with a postgraduate education are 30 percent higher than earnings of a college graduate.[2] Ostensibly, education is a particularly good investment in these industries because it prepares employees for the highly skilled jobs these industries generate, and because it produces adaptable employees who can cope with rapid technical change.

Education also improves earnings because it leverages learning on the job. Skills learned in school and skills learned on the job are complementary. For instance, compared with persons who have only a high school diploma, those with two years of formal education beyond high school have a 20 percent greater probability of getting training on the job. College graduates have a 50 percent greater probability of getting training on the job than high school graduates. And in most American industries, workers with education beyond four years of college have a 30 percent greater probability of getting training on the job than college graduates. In high-tech industries, postgraduate education increases the probability of receiving training on the job by almost twice as much as a college degree.[3]

Although educational attainment certainly influences earnings, learning on the job has the most powerful and substantial effect on earnings. Studies by Lillard and Tan,[4] Bishop,[5] and others consistently show that persons who receive formal training on the job enjoy an earnings' advantage of 25 percent or more over those who do not receive formal training in the workplace.

Training in the workplace has effects on productivity and earnings beyond the current job. Most people, after all, use what they learn on their current jobs to get new and better jobs. According to Lillard and Tan, employees who have had some formal training on a prior job earn 18 percent more in their current job than those

who have had no formal training on a prior job. Those who have had informal training on a prior job earn 20 percent more than those who have not had informal training on a prior job.[6]

Workplace training also seems to have a more durable influence on earnings than education and training from other sources. The positive effect of workplace learning on wages lasts 13 years, compared with 8 years in the case of learning in schools.[7]

How training affects earnings depends on the subject matter, as well as the provider. Management training and professional and technical training increase earnings more than other kinds of training (16 percent and 14 percent more, respectively).[8]

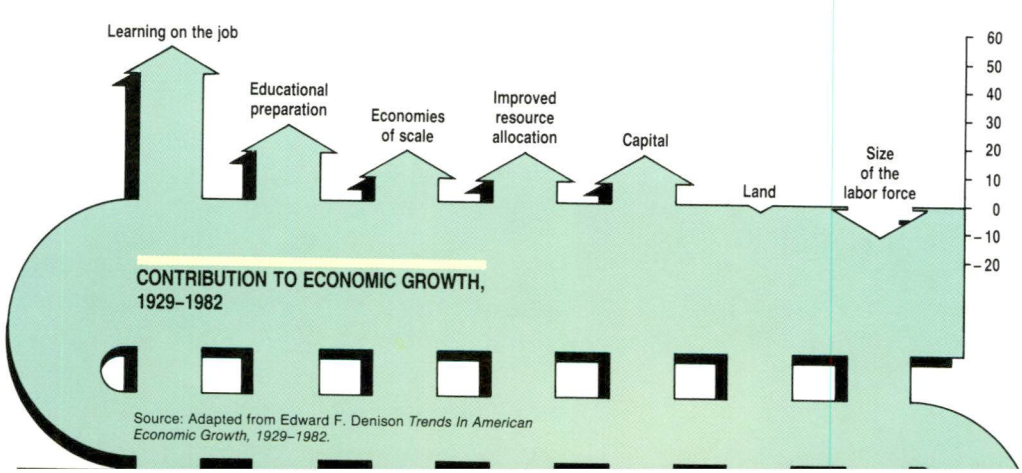
Skills and Competitiveness

Education and training are critical not only to individual opportunity, but to the productivity and competitive advantage of employing institutions and whole nations as well. Learning in school and learning on the job are by far the most important factors accounting for American economic growth and productivity in this century and will determine the nation's economic prospects in the next. In fact, both formal education and learning on the job have been consistently more important than machine capital in expanding the nation's productive capacity throughout this century. Between 1929 and 1982, education prior to work was responsible for 26 percent of the expansion in the nation's productive capacity. Learning on the job contributed over half, about 55 percent, of all improvements in the nation's productive capacity. Machine capital contributed a respectable but disappointing 20 percent.[9]

Further, the economic importance of schooling and learning on the job is increasing. The economic history of the modern world shows acquired human skills inexorably replacing natural and machine resources as the basic building blocks of production and service delivery. In 1890, resources from the earth, including minerals, energy, and food, accounted for 50 percent of the gross national product. Today, these same resources account for less than 10 percent of production and services. In contrast, human resources now account for more than four fifths of the nation's total economic output. The acquired skills and abilities of the population have become the pivotal resource.[10]

In the last century, economists routinely listed land, labor, and capital as the factors essential for economic production, but in the postindustrial economy, land is no longer a prime factor of production. Available data suggest that land played no part in the productivity increases between 1948 and 1966 and had a negative impact on productivity between 1966 and 1978.[11]

In the world economy today, high-skilled, technology-intensive production and services



are concentrating in developed nations, and low-skilled, technology-poor production and services are concentrating in less developed nations. The competitive advantage of the less developed nations lies with their low-wage, low-skilled labor pool. The competitive advantage of developed nations relies on the application of technological advances in combination with an increasingly skilled and adaptable work force. As America's baby boom moves toward retirement and birth rates stay low or decline, the United States will find it increasingly difficult to match sweat equity with the millions of new workers coming of age in less developed nations over the next quarter-century. Consequently, the nation can no longer compete on the basis of low-wage/low-skill production, but must shift to a service- and information-based economy in which highly skilled persons and large doses of technology are the critical factors of production.

In the United States, a mutually reinforcing mix of economic, technical, and demographic factors is bringing the human capital issue to the forefront of national concern. Employers are increasingly dependent on the skills of all their employees for improvements in efficiency and quality, customer service, and the development of new applications for existing products and services. This increasing reliance on human capital in the workplace is on a collision course with the emerging demographic reality in the United States: the quantity of human resources available for entry-level jobs is declining. Moreover, the quality of entry-level employees is declining as more and more young workers are drawn from populations with insufficient human capital investments prior to work. The United States faces a growing human capital deficit that threatens both its competitiveness and its ability to provide work for every able-bodied American.

The Competitive Cycle

The competitive cycle is the process by which innovations are developed and brought to the marketplace. This cycle can be divided into four phases:

- discovering or developing an innovation, such as a cost saving, quality improvement, or new product or service;
- tailoring the innovation to the employer's institutional culture, strategic niche, and production or service delivery system;
- utilizing the innovation in production or delivery of the new product or service to the marketplace; and
- developing new applications for the innovation.

"Cycle time," the time it takes to turn innovations into cost savings, quality improvements, or new products or services, is critical to winning economic competition. The speed with which individual employers and whole nations get innovations into the marketplace separates the economic winners from the losers. Learning and skill development are key ingredients in developing innovations and reducing the time it takes to get them to the marketplace.

Learning is critical to the competitive cycle from the very beginning. In order to generate innovations, employers need to be able to learn from their own employees and customers, as well as the outside world. In the initial discovery phase of the cycle, employers need structures that allow them to learn from the external research and development (R&D) community. They also need internal structures that allow them to learn from their own employees' experiences in producing and testing products and services and from their customers' use of existing products and services.

In the tailoring and design phase of the competitive cycle, roles are uncertain, job assignments are broad and overlapping, and employers rely heavily on employees' creativity, problem solving and team skills. The more involvement on the part of all the affected employees, the better. An elitist approach to tailoring and design can lead to production or service delivery problems down the line.

In the production or service delivery phase, the employer relies on the skills of production and service workers to implement the original design and to develop new quality improvements and cost-effective ways to produce products or deliver services. Similarly, in the final phase of the competitive cycle, the employer

relies on employees with hands-on production and service delivery experience or customer contact to develop new applications for the original innovation.

The American Context

Cycle time is generally too long in the United States. It takes the Japanese 40 months to get a new car to market; it takes Americans 60 months. The United Kingdom is able to get pharmaceuticals to the market in 2½ months, one half the time it takes American pharmaceutical companies.

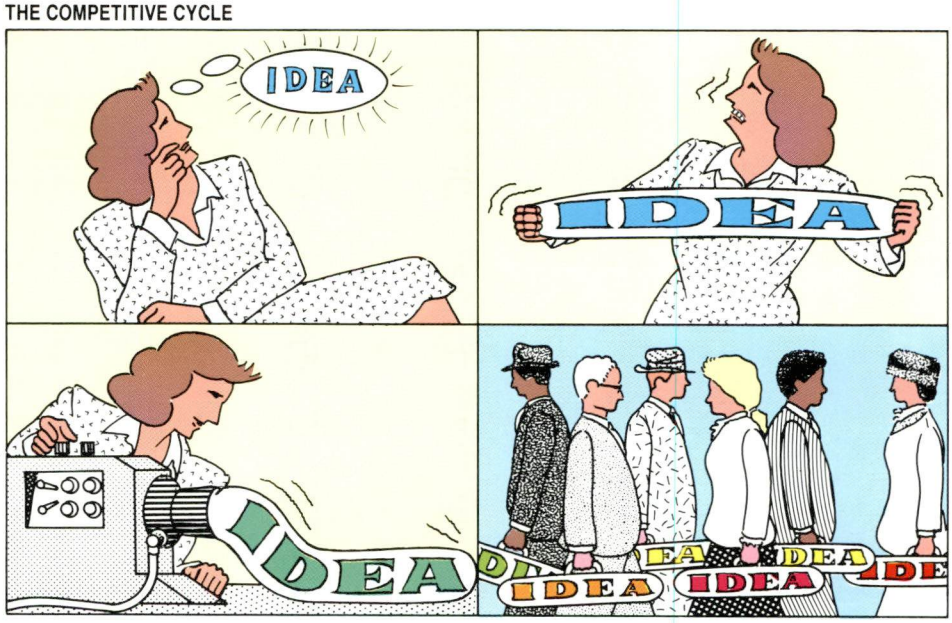
The strength of the American economic system has always been in the early phases of the competitive cycle. The United States has always been good at initial innovation, but less competitive in the production phase. Not surprisingly, the nation's learning system demonstrates parallel strengths and weaknesses. The elementary and secondary schools are good at providing academic preparation for the college bound, but less good at educating and training noncollege-bound youth.

Occupational preparation for noncollege-bound youth has less standing than academic preparation in the American education system. As a result, academic learning suffers from not being more applied, and applied learning does not meet basic academic standards. The postsecondary education system is strongest in the four-year institutions that produce professional, managerial, and technical elites critical to initial innovations. Except for a scattering of excellent junior colleges, technical schools, and some training in the military, postsecondary education and training for noncollege youth is often weak or nonexistent. Unfortunately, however, it is the noncollege youth who eventually work at the point of production or service delivery. Their lack of preparation makes us less competitive in the production and delivery of products and services and the development of new applications.

Employers' strengths and weaknesses in connecting learning to the competitive cycle are parallel to those of the educational system. In general, the American employer relies on external R&D for new strategies, technologies, products, and services. To the extent that employers do have R&D systems, they tend to focus on the discovery and design phases of the competitive cycle and rely heavily on managerial and technical elites. Relatively few American employers have systems for using production, service delivery, or customer service workers to improve efficiency, improve quality, or develop new applications.

Employers' training systems mirror these tendencies. Only a third of the nation's employees get any formal training at all after they go to work. Informal training, such as coaching, is three to six times as common as formal training. Training and development is concentrated among white-collar and technical elites, with production and service delivery personnel receiving much less training.[12]

THE COMPETITIVE CYCLE



PART II

A Map of "The Learning Enterprise"

Any attempt at mapping the American learning enterprise needs to begin with a warning: The American learning enterprise is a crazy quilt of institutions and programs that serve varied purposes. There is no *best* institution, no *best* education or training practice, or no *single* education and training objective that dominates all others. Everything seems to work somewhere, and nothing works everywhere.

The following map is an attempt at a rough ordering of the learning enterprise. It begins with a description of the process by which changes on the job accumulate into new training and education requirements, followed by a thumbnail sketch of the various institutions on the education and training landscape. The final section in Part II takes a closer look at workplace learning in small and large employer institutions.

Changing Skill Requirements

It is difficult to unravel the complex set of forces that result in skill change in the workplace. As with so many processes in the real world, causes and effects are so tightly tangled that they are difficult to separate from one another. Choosing a strand to begin loosening and unraveling the knot of economic change is largely a matter of taste. It is useful to begin with technology because it is the most obvious strand. Technology tends to be tangible. Moreover, in recent years, technology has been primary among the various forces that have led to changes in work requirements.

The most obvious result of new technology is that people need more and better skills. In general, employees need good reading skills to read operating manuals. In manufacturing, they need better computational skills in order to set the specs and sizes of particular product runs, as well as to provide some statistical control over quality. The new information technology allows a service deliverer to access, use, and contribute to the employer's entire information base, so service employees require computational skills to use and record quantitative information accurately and effectively, especially in mathematically-based industries, such as finance, insurance, and real estate.

A related effect of new technologies is that they make individual employees and working teams more autonomous. Production and service delivery employees are able to control the overall shape and quality of their products or services. Also, products and services can be tailored for individual customers. Moreover, technology tends to diversify product offerings. For example, the financial services industry now offers a panoply of financial services, rather than relying almost exclusively on checking. And the communications industry no longer relies so heavily on telephones.

Many employers have recognized the importance of the autonomous employee for efficiency, quality, customer relations, and the development of innovations and new applications for existing products and services. These employers have concluded that traditional top-down authority structures frustrate the autonomous work team and reduce efficiency and quality, thwart good customer service, and do not take advantage of the ability of either the autonomous worker or the autonomous work team to develop new applications and innovations. The result has been experimentation with decentralized institutional structures that push

authority and resources toward the point of production and service delivery. Managers maintain control by flattening hierarchies to improve communications between managers and front-line employees. Because it is difficult to manage the autonomous employee or the autonomous work team, managers focus on the outcomes of work efforts and not on the control of work processes. They rely on outcome measures of efficiency and quality and, if outcomes prove unsatisfactory, they intervene to provide resources for improvement.

The autonomous employees in the brave new workplace require substantially greater skill than their predecessors. They need self-management skills. They need teamwork skills to be effective members of the working team. They need interpersonal and communication skills to interact with customers, superiors, and teammates successfully. And they need organizational skills to be successful in the flattened, more flexible organizational structure.

Technical changes affect skill and learning requirements by changing the nature of jobs. Sometimes technical change can eliminate whole job categories. The internal combustion engine eliminated the buggy whip maker. The automatic elevator eliminated the elevator operator. Usually, changes accumulate in small doses, altering occupations over time through informal learning on the job. In some cases, skill changes accumulate to the point where they recombine several labor-intensive jobs into fewer jobs for more highly skilled employees who use more technology. This has been the case with much of the recent technical change.

Over the past decade, the most prominent example of this process has taken place on the factory floor. At one time, the machinist was the leader and central figure on the working team, whose job was to apply various technologies to shape individual parts of a final product. Career advancement depended on sharpening the essential job skill of hand-to-eye coordination. Eventually, when the machinist's hand-to-eye coordination skills were good enough, he or she became a tool and die maker. Enter the robot, with more consistent hand-to-eye coordination than the machinist. The robot took the machinist's place.

At the same time, the technology of advanced automated manufacturing began doing the jobs of other members of the shop floor team, including the laborer, the materials handler, the operator-assembler, and the maintenance person. Ultimately, all these jobs became one job for a single employee, the manufacturing technician. Although the new job may not require the same depth of skill in each of the more narrow jobs it absorbed, it does require a wider variety of basic skills than any one of the other jobs.

The expanding range of tasks and responsibilities in the manufacturing technician's job demands higher levels of reading, writing, and computation than the old factory jobs. Generally more autonomous than the machinist, the technician must have more personal management skills. Also responsible for trouble-shooting, maintaining, updating, and exercising quality control over highly complex, mathematically-based machinery, the technician must have better computational skills and be able to read and to comprehend technical manuals. In addition, these new tasks demand the skills to adapt successfully to the job—learning to learn, creative thinking, and problem solving.

There are other current examples of the same phenomenon in other industries. In services, the secretary is evolving into the information manager, and the bank teller is becoming the financial services portfolio consultant for individual customers.

Translating Skill Change Requirements Into Education and Training

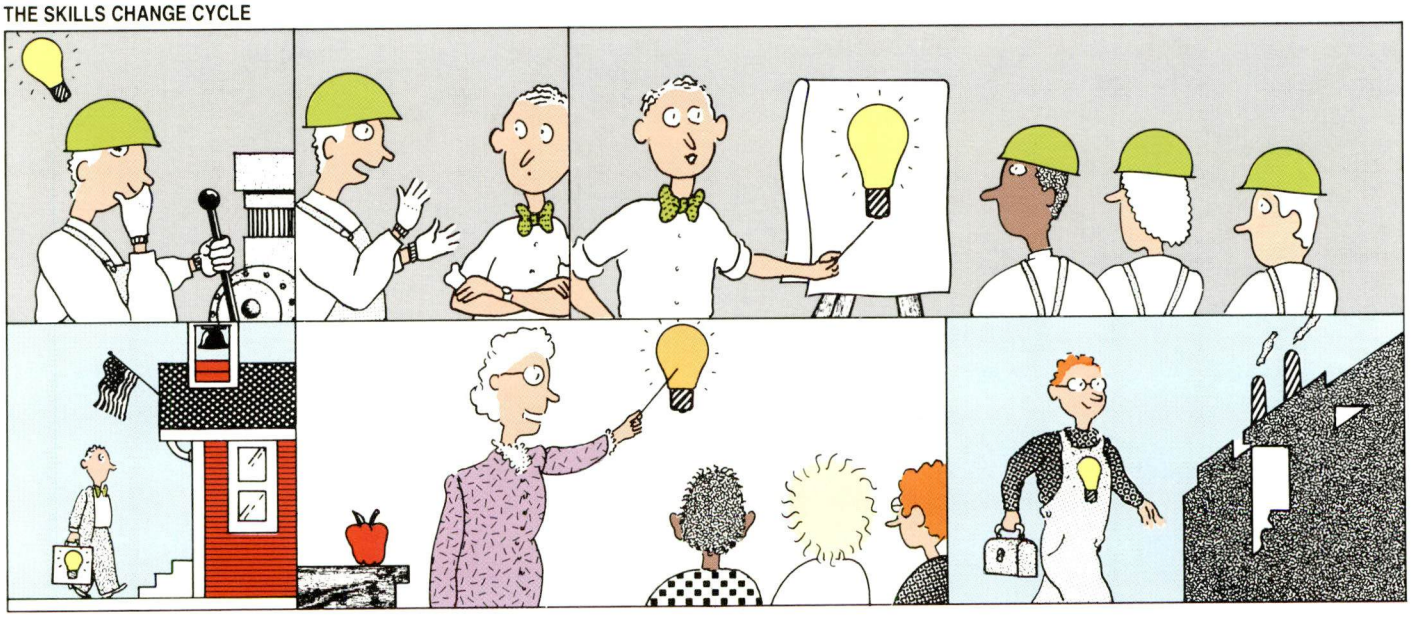
Technical, strategic, and other factors that change skill requirements give rise to new learning needs. In broad terms, the learning response to changing skill requirements moves through a regenerative cycle that begins with the need for informal training to satisfy new job requirements. As the requirements become more wide spread, the institutional learning emphasis shifts to the external providers of formal education and training. The learning cycle comes full circle when graduates and completers of formal training enter the work force and, in turn, create new learning requirements which begin the cycle all over again.

The initial phases of a major innovative change are highly unstructured. Job assignments are broad and overlapping.[13] The implications of the innovation for individual jobs and skill requirements are unknown. New learning tends to be experimental, informal, and on the job. The novelty of training needs precludes buying training from external providers. Moreover, at this stage, many employers view their new knowledge as a competitive advantage and, therefore, proprietary.

Eventually, the employer institution integrates the innovation into the production or service delivery system, and new skill requirements become known and stabilized. Job assignments become more specific, and production or service delivery more routine. At this juncture, new training needs can become more formalized, and if they extend to a sufficient number of people, formal courses become cost-effective. Depending on the number of employees involved, employers will either provide their own training or buy customized training from outside providers who can customize training tailored to particular employer needs.

Job-specific skill changes can accumulate to the point where they affect the occupational and professional education system, located primarily in secondary and postsecondary voca-

THE SKILLS CHANGE CYCLE



tional schools. Skill changes may even create whole new occupations and professions. Manufacturing engineering is a recent case in point. Initially, employers developed their own manufacturing engineers by upgrading the skills of supervisors and machine operators with informal on-the-job training (OJT) and, later, formal training. Eventually, the noncollege occupational training system began to offer more generic training programs, and when sufficient theory accumulated to complement applied knowledge, academic courses began to appear in college and university engineering programs. In the end, manufacturing engineering became a professional specialty in the engineering community.

When accumulating skill changes increase basic educational requirements, elementary and secondary schools are affected, too. For example, as discussed earlier, today's new mathematically-based technologies require better computational and literacy skills, and the structures require employees with more interpersonal and organizational skills. The increased importance of the working team suggests the need for better communications and teamwork skills.

Of course, not every skill change evolves directly into a major new skill requirement, a whole new occupation, or a new basic skill requirement. In many cases, the need for incremental skill changes that occur after a particular innovation require less and less upskilling as time goes by.[14] The skill requirements of a job may actually become less for a time, as tasks are automated and human responsibilities become fewer and more routine. At some point, however, jobs with limited and routine responsibilities are automated out of existence or integrated into other jobs, adding both machine capital and responsibility into those jobs and increasing skill requirements.

The Institutional Landscape

Whether for upgrading current employees or preparing entry-level workers, employers and external education and training institutions are partners in the learning enterprise. This section describes briefly the various institutions involved.

Elementary and Secondary Schools

The elementary and secondary school system is the largest component of the nation's education and training system. The nation's public and private elementary and secondary schools currently serve 40 million students at a cost of $150 billion per year.

Schools serve three masters: American culture, the political system, and the economy. American culture values individualism above all else, and the American political system is predicated on participation. Thus, the schools are responsible for developing autonomous individuals who can contribute to the American community and participate in the American political system.

The economic role of the schools is pivotal. The schools are charged with husbanding and disseminating knowledge that will create the next technology and the next set of employers, jobs, and employees. In the short term, however, the quantity and quality of jobs are essentially given, and education has only a marginal effect in creating jobs by making high-quality labor a better investment than machine capital. The schools' short-term mission, therefore, is to educate for existing jobs. They do so by providing generic basic skills to make people ready for work and for learning on the job. In addition, the nation's secondary schools provide occupational education to about 5.5 million students at a cost of about $6.5 billion per year.

The school system's ability to prepare people for work is the keystone to its cultural and political roles. American society is based on work. A job is the symbol of personal worth and the price of admission into the mainstream of the American community. Persons unprepared for work disappear from the community, drop out of the political system, and fall into the underground cultures and economies outside the mainstream of American life. The United States' huge investments in schooling reflect the nation's faith that education creates an autonomous and economically independent citizenry ready to participate in culture and polity.

Arguably, the nation's schools are its most effective institution. As of October 1985, 86.5 percent of whites, 82.5 percent of blacks, and 70 percent of Hispanics had received a high school education. Overall, 86 percent of young adults ages 25 to 29 were high school graduates, twice the percentage for 1940. The annual dropout rate fell from 6.3 percent in 1973 to 5.2 percent in 1983, with young black men showing the most improvement.[15]

Despite these gains, there are considerable educational attainment gaps, particularly that remain among race and ethnic groups and various economic strata. Black and Hispanic teenagers are far more likely to leave school before graduating than are white youths, and poor youths, regardless of race or ethnic group, are three to four times more likely to drop out than students from higher income families. In 1985, only 56 percent of black and 53 percent of white 18- to 21-year-olds from poor families had earned a high school degree. Hispanics at all economic levels are especially at risk for leaving school early.[16]

Concern for the quality of schooling has moved beyond the traditional focus of the economically and educationally disadvantaged to concern for the schooling of all the nation's children. This broader interest was best expressed in a report by the U.S. Department of Education, which warned dramatically that the educational foundations of American society are presently being eroded by a rising tide of mediocrity that threatens the nation's future.[17]

Educational reform has become a top priority for politicians and policymakers concerned about national competitiveness. While there is still a job to be done in eliminating dropouts and providing access for special populations, the schools have performed a remarkable feat in their improvement in the rate of high school graduation. However, elementary and secondary schools must contribute to the nation's productive capacity by continuing to make focused quality improvements. So far, reforms have been on the right track by putting greater emphasis on improving basic academic skills (reading, mathematics, and the sciences); expanding the traditional curriculum so it now includes the interpersonal, teamwork, and organizational skills needed in the workplace; improving the quality of teaching/training; and testing both teachers and students for subject competency attainment.

Of particular concern to education reformers is the quality of education available to general and vocational education students, who together make up about 61 percent of the high school student population. This "other half" of the high school graduating class appears to be receiving a poor basic skills education and outdated occupational preparation that ultimately limits their opportunities and effectiveness in the workplace. Reformers tend to agree that this population requires new curricula that integrate the basics with job-related learning.

Colleges and Universities

The college and university system prepares the nation's white-collar and technical elites, including managers and professional specialists (e.g., teachers, scientists, engineers, doctors, lawyers, accountants). The United States supports 156 universities and 1,853 colleges with a combined enrollment of almost 8 million students. These institutions spend almost $80 billion annually, or roughly $13,000 per student.

Twenty-two percent of all 25- to 29-year-olds have completed four years of college, nearly double the figure for 1963 and four times the percentage in 1940. Long-term relative educational gains for black youth have been even more dramatic than for white youth. The pro-

portions of both high school and college graduates among black youth have risen sevenfold since 1940.

College and university graduates tend to keep their skills current, whether to meet certification or licensing requirements or to meet self-imposed standards of their professions or occupations. They rely more heavily on schooling to prepare for work than do other Americans. Their upgrading after employment comes from a mix of postgraduate education, the offerings of professional societies, and employer-sponsored training. Compared with other Americans, college and university graduates get the most preparation before they go to work and the most formal and informal training while they are on the job.

Colleges and universities provide more qualifying and upgrading training for Americans than all other schools combined. They provided qualifying training for 16.1 million persons and upgrading for 5.5 million persons in 1985.[18]

But their economic importance is not limited to their ability to teach and retrain Americans. The four-year institutions are also a principal source of the nation's R&D, which ultimately drives new innovations, skill change, and education and training requirements.

The importance of college education is not likely to decrease any time soon, given the importance of R&D and the fact that, with the exception of teachers, occupations requiring college degrees are the fastest growing. Moreover, as high school completion rates continue to increase, quality improvements in high school education, college, and other forms of postsecondary education will be the principal means for leveraging the economic contributions of education in the United States.

The principal challenge for American colleges and universities will be to find ways to deliver education less expensively to students in order to reach a wider student population. The need to reduce costs will be compounded by the fact that as more and more jobs require college education and more and more workers have college degrees, the competitive advantage of college degrees will decline, driving down the value of the degree relative to cost. The relative costs and returns may encourage many people to attend two-year schools and other kinds of postsecondary institutions. Evidence suggests these dynamics have already begun.[19] To reduce college costs to American families, people are calling for a mix of cost-cutting in the colleges and larger public subsidies to families with children in school and to students.

Increasing college enrollments are due not only to the large number of young people of college age, but also to an increase in the number of older students. Between 1972 and 1976, the proportion of students age 25 and older in four-year institutions rose from 28 to 33 percent of the total college population. Much of the increase is attributable to female college students over age 35. Their number climbed from 418,000 in 1972 to 700,000 in 1976, a 67.5 percent increase. Enrollments for all persons age 25 and over increased 44.6 percent during this same period.[20]

Although colleges and universities have long been involved in the education of adults through their continuing education and extension departments, the shift to an older student population has led to (or perhaps been partially caused by) a need for new options to accommodate their changing requirements. Admissions and formal entry qualifications have been eased, classes are scheduled at times and places more convenient to working adults, radio and TV have been used to transmit course material, and independent study has been encouraged. A few colleges and universities also provide credit for nontraditional learning experiences in various external degree programs. As the United States' population continues to age, colleges and universities will undoubtedly face an even greater challenge in adapting to the needs and expectations of an older citizen.

Postsecondary Occupational Education

The postsecondary occupational education system is the principal system for preparing and upgrading the half of high school graduates who do not go on to college and who ultimately populate the nonsupervisory work force as

technicians, technologists, and craft and skilled workers. Vocational schools, junior colleges and technical schools, the military, and employers are the principal providers of occupational education after high school.

The junior colleges and technical institutes are the foremost providers of qualifying training and upgrading in this system. According to the Bureau of Labor Statistics, junior colleges and technical institutes provided qualifying training for about 5 million workers and upgrading for 3.3 million workers in 1985.[21] These schools tend to provide job-related education for a highly motivated group of noncollege students (nurses, health technicians, electricians, computer technicians, etc.).

Junior colleges and technical institutes have become an increasingly important source of occupational training in communities across the Unites States. In 1933–34, there were only 532 two-year colleges nationwide, with an enrollment of just over 110,000; in 1983–84, the number of two-year institutions had risen to 1,219, and full-year enrollments to nearly 5 million. About 55 percent of all college freshmen were enrolled in community, technical, and junior colleges. Counting the estimated 4.5 million noncredit enrollees, total enrollments in junior colleges and other two-year institutions reached nearly 10 million in 1983–84. Reflecting the attraction of community colleges to adult learners, the average age of the student body is 29.[22]

The appeal of these institutions to adult learners derives from a variety of factors, including affordable tuition and fees,[23] liberal admission policies, accessibility (courses are frequently offered on-site at businesses, union halls, and other off-campus areas), a wide range of course offerings, and flexibility of class scheduling (most schools are open from early morning to late evening). Flexible scheduling is especially important because a large percentage of both full-time and part-time students at these schools are employed while attending classes.[24]

In addition to the junior colleges and technical institutes, there are noncollegiate vocational schools. They provide job-related training in many of the same areas as the junior colleges, but tend to specialize in less technical fields, such as barbering, hair dressing, and truck driving. These institutions provided qualifying training for 3.7 million workers and upgrading for 1.6 million workers in 1985.

Vocational institutions are the likely training vehicle for the growing mass of technicians in manufacturing and service industries, especially health care and financial services. These schools offer a relatively cheap alternative for human capital development beyond high school. The major challenge that confronts them is the quality of their offerings and their ability to provide access to four-year schools for graduates who want to move to full professional status.

Military training, also part of the postsecondary occupational education system, accounts for the largest share of government training expenditures. For fiscal year (FY) 1989, $17.6 billion was appropriated to provide 249,168 "man years" of training to persons in all service branches.[25] The types of instruction offered included basic recruit training, officer preparation (Reserve Officers Training Corp (ROTC), military academies, Officers Candidate School (OCS), etc.), medical training, professional development, and reserve training.

In addition to the basic and specialized training offered by the military, each service branch has developed cooperative arrangements with civilian schools to enable service personnel to earn high school diplomas or work toward college degrees. Several credit-by-examination and correspondence programs are offered, also. Finally, the Army, Navy, and Marine Corps have developed registered apprenticeship programs, which enable enrollees to receive credit for their service experience in civilian apprenticeship programs.

According to the Bureau of Labor Statistics, the military has provided qualifying training to almost 2 million Americans currently in the workforce. Job-related training in the military is concentrated in electronics, computers, and aircraft engine repair.[26]

The military uses distinctive training technologies and methods of delivery. Its principal

contribution is to develop training practices and technologies and disseminate them to the civilian education and training institutions.

Formal Apprenticeship Programs

Formal apprenticeship programs, which now apply to some 415 trades, include both classroom instruction (a minimum of 144 hours a year) and hands-on learning (a minimum of 2,000 hours, or one year of OJT). Under the National Apprenticeship (Fitzgerald) Act of 1937, unions and employers determine their own requirements and administer their own training programs within the framework of basic standards laid down by State Apprenticeship Councils or the Bureau of Apprenticeship and Training, U.S. Department of Labor. If an apprenticeship program meets these standards, it is "registered," and persons who successfully complete the training receive certificates of completion that entitle them to the perquisites of skilled craft workers.

Training periods range from one to six years, depending on the degree of skill involved, with most trades requiring from three to four years of instruction. While they train on the job, apprentices are paid at progressive wage rates, starting at about half the journey level rate and reaching up to 95 percent of full pay near the end of the apprenticeship period. Persons who complete programs are usually among the highest paid skilled workers.

Usually, apprenticeship programs accept applications for only a few weeks each year, and the number of openings is limited. Application to an apprenticeship program generally requires a high school diploma or its equivalent, a written examination, and an oral interview. Despite efforts to lower perceived barriers to training for women and minorities, such as the Targeted Outreach Program, which was funded under the Comprehensive Employment and Training Act of 1972, the proportion of minorities and women enrolled in apprenticeships has never been high.

Technical instruction as a part of apprenticeship training is given in local vocational schools and junior colleges and, in some cases, home study courses may also be accepted. Provisions of the Smith-Hughes (1917) and George-Barden (1946) Vocational Acts, as well as the Vocational Education Act of 1963, have permitted states with approved apprenticeship programs to receive partial reimbursement from federal funds for salaries of teachers and vocational administrators.

In 1988, there were 303,000 registered apprentices receiving training. More than 38,819 apprentices completed required training in 1988, and 100,440 were newly indentured (i.e., formally accepted as apprentices). Slightly more than 60 percent of the registered apprentices in the country were in building trade occupations, nearly all of them in the unionized sector. Programs in three construction trades—carpentry, electrical, and the pipe trades—contained almost 40 percent of all registered apprentices.[27]

In concept, apprenticeship is the ideal job-related training program. It mixes academic and applied learning, allowing learners to support themselves while they learn. It is a way for employed workers to upgrade their skills and occupational standing while still on the job. It allows for an applied evaluation of curricula by testing or observing job performance.

The principal difficulty with apprenticeship is its limited application among the nation's occupations and industries. Proponents of apprenticeship have suggested extending the model through third parties, such as professional, trade, employee, and other interested associations.

Second Chance Training

The second chance training system is composed of both public and not-for-profit institutions that offer federally funded, locally delivered public programs to persons who are not receiving training from either the public schools or employers. It provides assistance for dropouts, persons who have failed or are likely to fail the transition from school to work, the underemployed, the working poor, and persons

who have been dislocated from their jobs with dim prospects for reemployment. Almost 40 million Americans currently fall into one or more of these categories. The second chance system performs a brokering function between its clients and employers, using small doses of education, training, and job search assistance to help the disadvantaged find work and access to learning on the job.

The history of the second chance system demonstrates a steadily increasing involvement of employers. Because early experience showed that learning outside the context of a job or a real job prospect had little positive effect on improving employment opportunities, legislative changes have progressively attempted to strengthen the relationship between the second chance system and employers.

The current demography has created a window of opportunity for the second chance system. The declining quantity of entry-level employees has created common cause between the second chance system and employers. As entry-level employees become more and more scarce, more and better jobs become available to the disadvantaged and dislocated workers who are clients of the second chance system. The emerging strength of this system stems from the fact that its goals of opportunity and social justice are increasingly consistent with the public and private pursuit of the nation's economic competitiveness.

The principal programs that make up the second chance system are funded primarily under the Federal Job Training Partnership Act (JTPA) passed in 1982, and also under the Work Incentive (WIN) Program, part of the Aid to Families with Dependent Children (AFDC) Act. The JTPA has now been in operation for several years and emphasizes:

- public-private partnerships;
- performance standards;
- coordination of training services with other human service agencies;
- state and local administrative control; and
- access to work and career development rather than welfare.

Most observers agree that all these programmatic emphases should be continued and strengthened.

The Career Support System

The emerging career support system is a set of experimental policies and programs that are loosely connected by a common intention to give employees and their families more control over their working lives. On the whole, this system represents a profound shift in the focus of the national dialogue on human resource development; the public interest in developing human capital has moved beyond an exclusive concern for the disadvantaged to a new focus on the mainstream working population.

From the demoralizing example of dislocated workers, Americans are learning that competition intensifies economic and technical change, requiring a more flexible work force and loosening the ties between employer and employee. Most Americans believe that they now have diminished job security and must take more responsibility for their own career development. They also believe that in order to shoulder this new responsibility, they will need a bag of new tools, including advance notification of plant shutdowns; involvement in economic and technical changes that affect them at work; access to retraining to help them keep pace with economic and technical change; and portable health care, day care, parental leave and pensions to sustain them and their families on and off the job.

Thus far, the emerging career support system is more dream than reality. It consists of (1) training and other labor market services in collective bargaining agreements and (2) limited public experimentation with training provisions for employed adults.

It is difficult to judge the future of the career support system. The services involved are expensive, and the federal government has insufficient resources to afford them. If costs are foisted on private employers, they will have less investment capital available, and individual jobs will be so expensive that employers will be unable to hire as many full-time workers as

they otherwise might. The public seems unwilling to tax itself to pay for these services. In the end, a mix of governmental, employer, and individual contributions will have to be negotiated, and benefits of this kind will be affordable only if they are expanded gradually.

The Training Industry

The training industry provides training tailored to the needs of specific employers. Large companies buy almost 40 percent of their formal training from outside providers, mid-sized employers buy an even larger share of their training outside, and small employers go outside for nearly all their formal training.

Higher education institutions, private, for-profit companies, professional societies, and a host of individual consultants provide training for managerial and technical elites. Training for technicians and craft and skill workers is available from junior colleges, postsecondary technical schools, and private providers. Vendors and consultants provide most sales training. Industry and trade associations provide a full range of managerial, technical, and sales and marketing training.

Employer-Based Training and Development

Employer-based training and development, along with selection, appraisal, and rewards, is one of the human resource management systems usually found in employer institutions. The principal objective of the employer-based training system is to serve the strategic goals of the employer institution through two different kinds of training: formal course work and informal on-the-job training. Currently, employers spend about $30 billion for formal training and anywhere from $90 billion to $180 billion for informal training.[28] Informal training is the principal means by which technical, economic, strategic, and regulatory changes are gradually integrated into the workplace, especially among the nation's small employers. Employers either provide their own formal training or buy it from outsiders.

Lately, there has been a growing public interest in employer-based training, both to avoid employee dislocation and to encourage competitiveness. Dislocated employees rarely end up better off, even after sincere public efforts to help them. Many observers, therefore, have concluded that policies for dislocated employees provide too little, too late. They think training on the job would discourage dislocation, or at least provide the kind of job-related learning that would be most helpful in the event dislocation is unavoidable. Other people assert there is a public interest in employer-based training in order to improve the nation's competitiveness or the development prospects of state and local economies. Their principal interest is in improving the performance of employer institutions.

Most states now have "customized training" programs in which public institutions provide training tailored to the needs of individual employers. Many states are experimenting with programs that encourage employers to do their own training or buy training from public or private suppliers. In addition, federal job training programs allow a small amount of available funds for economic development to be used to minimize dislocation and create jobs for the disadvantaged and dislocated. More extensive policies that have been proposed would use public and vocational schools, internships, apprenticeships, and tax incentives to employers to increase the quantity and quality of employer-based training.

Employer-Based Training and Development: A Closer Look

Learning on the job is nothing new. Most people learn their jobs on the job. Most get ahead by leveraging what they learn in the current job into a new and better job. Moreover, for many people, a job is the best teacher. Relatively few people excel in academic settings, but almost everyone is able to learn on the job, either by doing the job, by being coached by peers or bosses, or by attending formal courses provided by the employer. Applied learning, learning done in the context of a task, has inherent advantages as a pedagogy for both employers and employees. Individuals can learn at their own pace on the job and they are encouraged to use, rather than lose, new knowledge. Finally, individuals are motivated to learn on the job because increased proficiency brings immediate rewards, in terms of achievement, status, and earnings.

The employer's interest in learning tailored for the workplace, as distinct from more general academic preparation, stems from the fact that on-the-job learning is directly supportive of the employer's institutional culture and strategic goals. Such training occurs in the context of the employee's working team, encouraging efficiency in the work group. In addition, employer-based training occurs in the context of the employer's strategy, products, and market niche, thereby encouraging new efficiencies, quality improvements, and innovations.

The national interest in employer-based training stems from the fact that learning systems in the workplace are the first line of defense against economic and technical changes. The ability of the nation's employers and employees to respond expeditiously to these changes determines, in large part, the nation's adaptability and competitiveness.

Although employees have always learned on the job, the training process has changed substantially in form. The fundamental dynamic has been a consistent shift from informal toward formal learning. As the pace of economic and technical change has accelerated over the past half-century, employers have tried to assure the efficiency and quality of learning by formalizing informal learning processes. Employers have managed to maintain the link between learning and real jobs by applying a careful methodology that translates real-world learning needs into structured learning programs. This methodology, called "instructional systems design," is an applied approach to learning. The strength of this applied approach is that it strays as little as possible from the workaday reality of the job and the employee. It begins with with a careful analysis of the gap between job requirements and the employee's skills and ends with an evaluation of the employee's performance on the job.

Employer-based training is not lacking in importance, size, or scope, but lacks cohesiveness and presence and is largely invisible. This shadow education system is delivered by no single institution, is the subject of no law or policy, and functions quietly and efficiently, growing invisibly, a silent postscript to the employee's formal education. Even now, executives, managers, supervisors, and others train without the direction or assistance of training professionals. Most people involved in employer-based training do not recognize that they are part of a training system. Most trainers see themselves as managers, engineers, marketers, chemists, or sales managers, for example. They tend to be rewarded and recognized by their peers on the basis of their professional expertise, rather than their ability to train and develop employees. It is only recently that training has finally taken its place as an institutional function and professional discipline in the consciousness of institutional leaders, in business school curriculums, in the business press, and

in the thinking of business leaders, theorists, economists, and politicians.

The current organization and delivery of learning in the workplace reflects its roots at the worksite. Most learning on the job is still located as closely as possible to the job itself. Even in large employer institutions, training departments tend to supply less than half of the formal training and development the employees receive. There are exceptions to this rule, however. Training intended to provide skills beyond the needs of the current job tends to be centralized at the corporate or divisional level. Developmental programs for certain occupations, such as scientists, engineers, and executives, and the developmental aspects of the training of senior managers are also centralized.

Some kinds of training and development are centralized because they are new. A new product, strategy, or technology may require training large groups of employees as quickly and consistently as possible. Employers, therefore, tend to provide centrally controlled training in the initial stages of innovations. Once innovations are in place, however, training tends to become decentralized to fit the specific purposes of divisions and individual job categories. Some training is organized around specific institutional purposes, product lines, or strategies. The training of sales, marketing, and customer service personnel, for instance, tends to be organized around specific products or strategic units at the division level.

Most training is, and ought to be, provided at the worksite, where changes in learning requirements have their first impact. Individual plants or branch offices direct most supervisory training, skill training, and supplier training.

How do the nation's employers apportion their training investment? Employers spend about $30 billion per year in direct costs for formal training courses that they either provide themselves or buy from outside suppliers. The current average expenditure is about 1 percent of payroll, but expenditures of 2 percent of payroll are not uncommon. Expenditures of 3 and 4 percent of payroll are more rare, but not uncommon among training-intensive employers.

Table 1 shows the distribution of formal

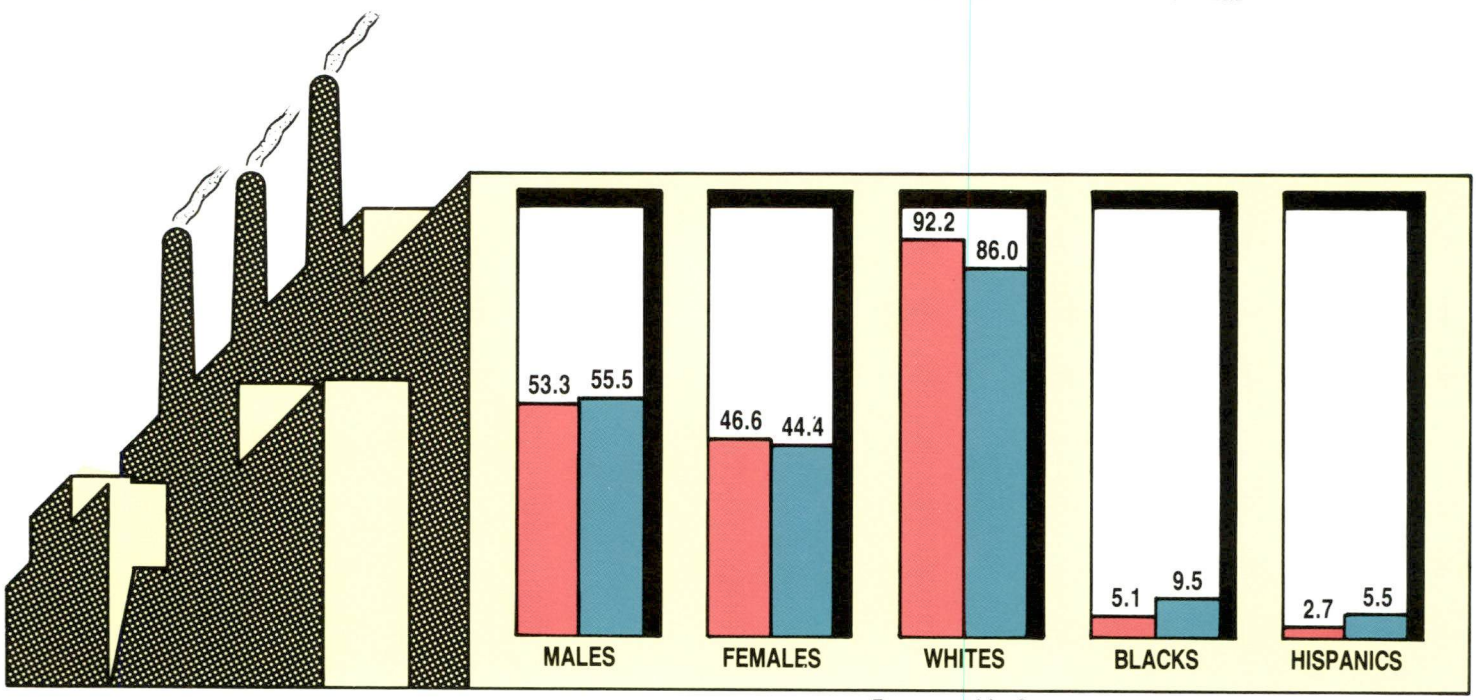


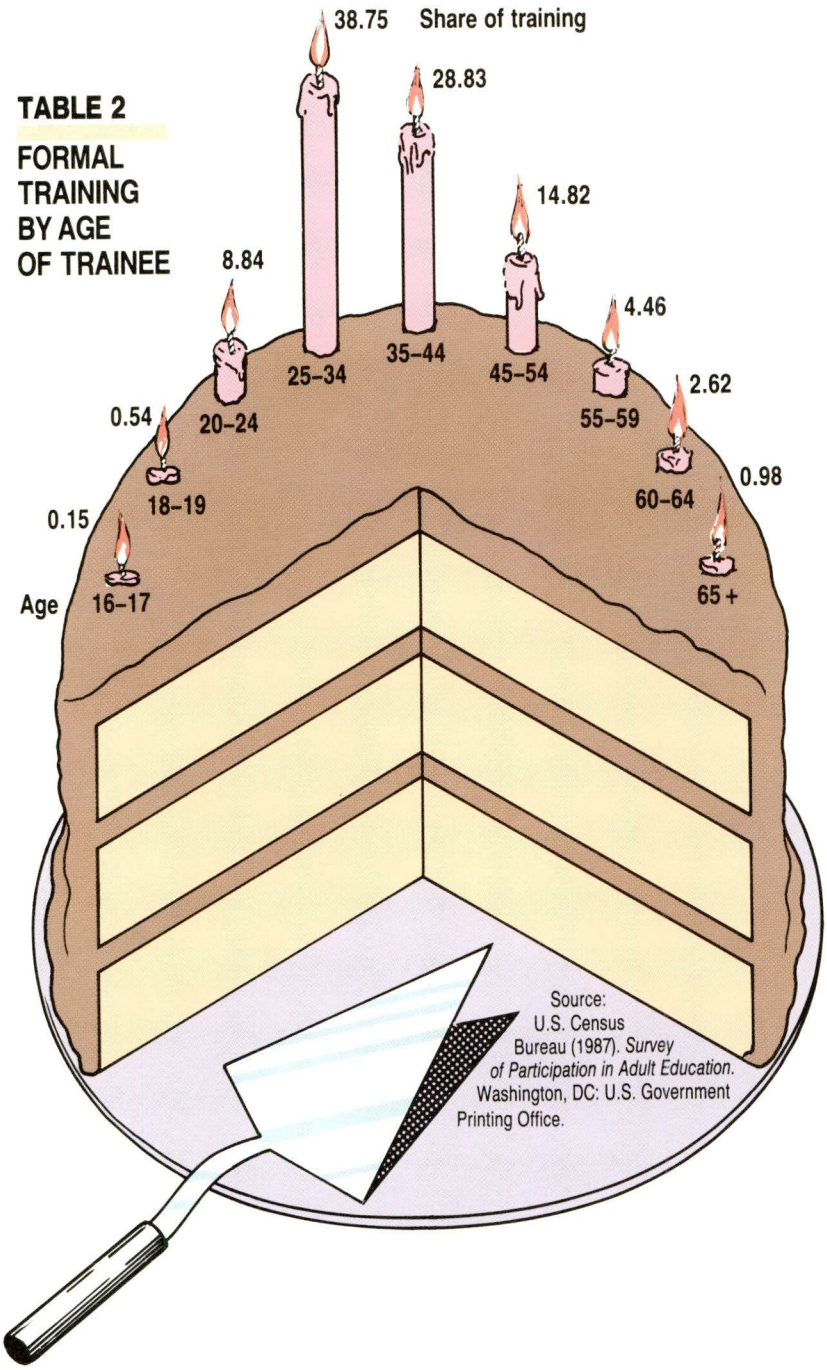
TABLE 1

FORMAL TRAINING BY SEX AND RACE OF TRAINEE

Source: U.S. Census Bureau (1987). *Survey of Participation in Adult Education.* Washington, DC: U.S. Government Printing Office.

TABLE 2

FORMAL TRAINING BY AGE OF TRAINEE



employer-based training by sex and race. Women receive a slightly disproportionately large share of training relative to their share of employment. Whites receive a disproportionately large share compared with Blacks and Hispanics.

Most formal employer-based training—68 percent—is provided to employees between the ages of 25 and 44 (Table 2).

Employers provide 69 percent of their formal training themselves and buy 31 percent of their formal training from outside providers.[29] Table 3 outlines the relative importance of the various outside providers.

How extensively formal employer-based training is used varies significantly by industry (Table 4). Industries which use formal training the most are those with high concentrations of personnel who can benefit the most from such training—managers, professionals, technicians, and sales personnel. Regulation and certification requirements typical of industries such as mining and health care also encourage formal training.

Small Versus Large Employers

Small employers (fewer than 500 employees) account for roughly half of all jobs in the American economy and 40 percent of new jobs being created.[30] Small employers are important trainers because they create so many new jobs, and because they tend to draw their employees from populations and industries that need employer-based training most. As Table 5 shows, employees in small businesses tend to be younger and less well educated than employees in larger businesses. Small businesses also tend to hire more Hispanic employees (but fewer Black employees) than larger employers. In addition, low-productivity service jobs tend to be concentrated in small businesses (Table 6).

Small employers tend to operate in relatively small markets and, therefore, tend to have jobs characterized by broad assignments of responsibility. Technologies also tend to be less specialized than in larger businesses. The lack of specialization makes both the employees and the employers flexible and provides a general-

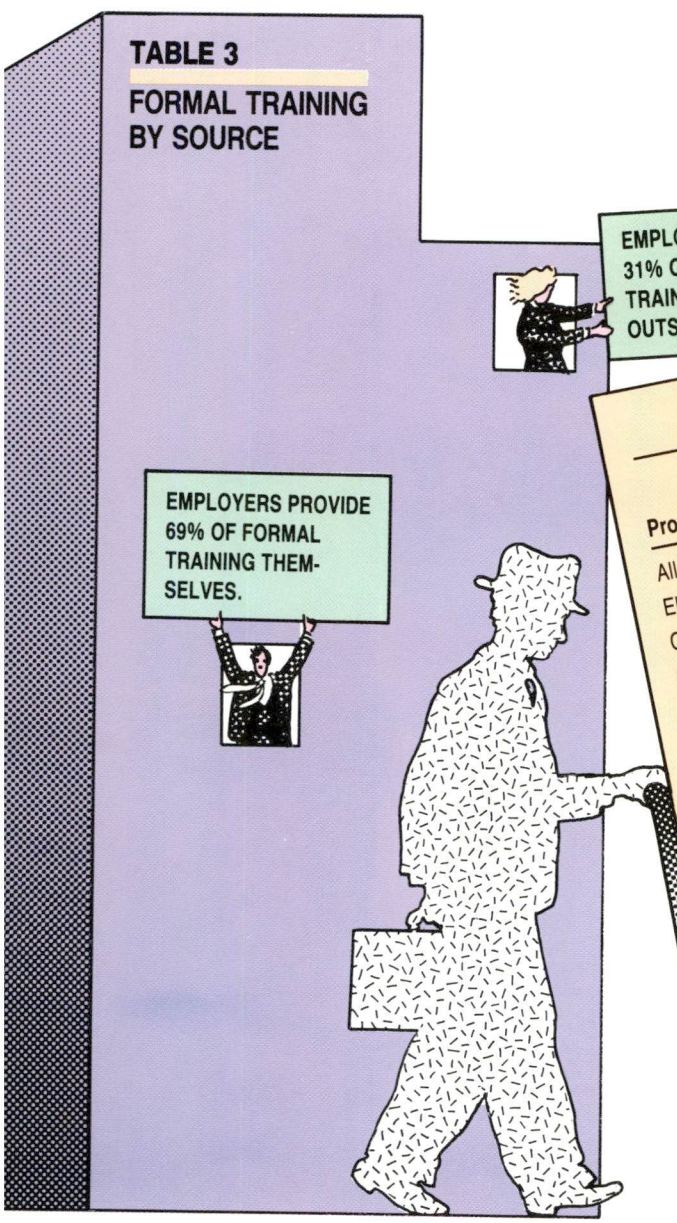
ized learning experience that aids in career transitions. At the same time, however, small employers do not have enough employees to afford the lost time from work required for training during working hours. As a result, employees in small businesses tend to get less formal training than employees in larger businesses (Table 7).

As demonstrated in Table 8, persons who work for small employers tend to get their training off the job. Other data from the U.S. Small Business Administration show that in firms with fewer than 100 employees, three quarters of employees who receive training are trained off the job, compared with 58 percent of employees in larger firms.[31]

The relative importance of employer-based training increases dramatically with the size of the firm. Large employers tend to pay for more of the training taken by their employees outside the workplace. Other data indicate that employers with fewer than 100 workers pay for 23 percent of the training taken outside the workplace. Employers with more than 100 workers pay for 32 percent of the training taken outside the workplace.

TABLE 3

FORMAL TRAINING BY SOURCE



Provider	Share of purchased training (%)	Dollar value
All Schools	(56.4)	($5,245,200,000)
Elementary and secondary schools	1.5	$ 139,500,000
Community colleges and technical institutes	15.5	$1,441,500,000
Colleges and universities	31.2	$2,901,600,000
Vocational schools	7.0	$ 651,000,000
Other schools	1.2	$ 111,600,000
Professional, trade, and labor organizations	14.2	$1,320,000,000
Training industry	15.7	$1,460,000,000
Community organizations	3.2	$ 297,600,000
Tutors and private instructors	1.2	$ 111,600,000
Government	5.6	$ 520,000,000
Other	3.5	$ 325,500,000

Source: U.S. Census Bureau (1987). Survey of Participation in Adult Education. Washington, DC: U.S. Government Printing Office.

TABLE 4

FORMAL EMPLOYER-BASED TRAINING BY INDUSTRY, 1984

Industry	Share of total training (%)	Training intensity (courses/employee)
Agriculture	0.7	0.2
Mining	1.6	1.8
Construction	2.2	0.4
Manufacturing	18.7	0.9
Lumber	0.3	0.4
Furniture	0.2	0.3
Stone, clay, glass products	0.4	0.6
Primary metals	0.5	0.6
Fabricated metal products	0.9	0.7
Machinery, except electrical	4.2	1.7
Electrical machinery	3.2	1.5
Motor vehicles	1.4	1.3
Aircraft	0.8	1.4
Other transportation	0.9	0.4
Instruments, toys	1.0	0.9
Food	0.9	0.6
Tobacco	0.1	1.0
Textiles	0.2	0.2
Apparel	0.1	0.04
Paper	0.3	0.6
Printing	0.7	0.4
Chemicals	1.7	1.6
Petroleum	0.2	1.3
Rubber, plastics, leather	0.7	0.7
Transportation, communications, utilities	7.8	1.1
Transportation	2.4	0.7
Communications	2.6	1.8
Utilities	2.8	2.0
Trade	8.5	0.4
Wholesale	2.9	0.7
Retail	5.6	0.3
Finance, insurance, real estate	9.4	1.5
Banking, finance	5.2	1.8
Insurance, real estate	4.2	1.2
Private household services	0.1	0.1
Services (miscellaneous)	41.3	1.4
Business	2.7	0.7
Repair	0.7	0.5
Personal	1.1	0.4
Entertainment, recreational	0.4	0.4
Medical, except hospital	5.7	1.6
Hospital	10.9	2.7
Welfare, religious	2.8	1.3
Educational	10.8	1.4
Other professional	6.0	2.1
Forestry, fishery	0.2	1.5
Public administration	9.7	2.1

Source: Calculated from U.S. Census Bureau (1987). *Survey of Participation in Adult Education.* Washington, DC: U.S. Government Printing Office.

TOP 16

INDUSTRIES IN TRAINING INTENSITY

(COURSES/EMPLOYEE)

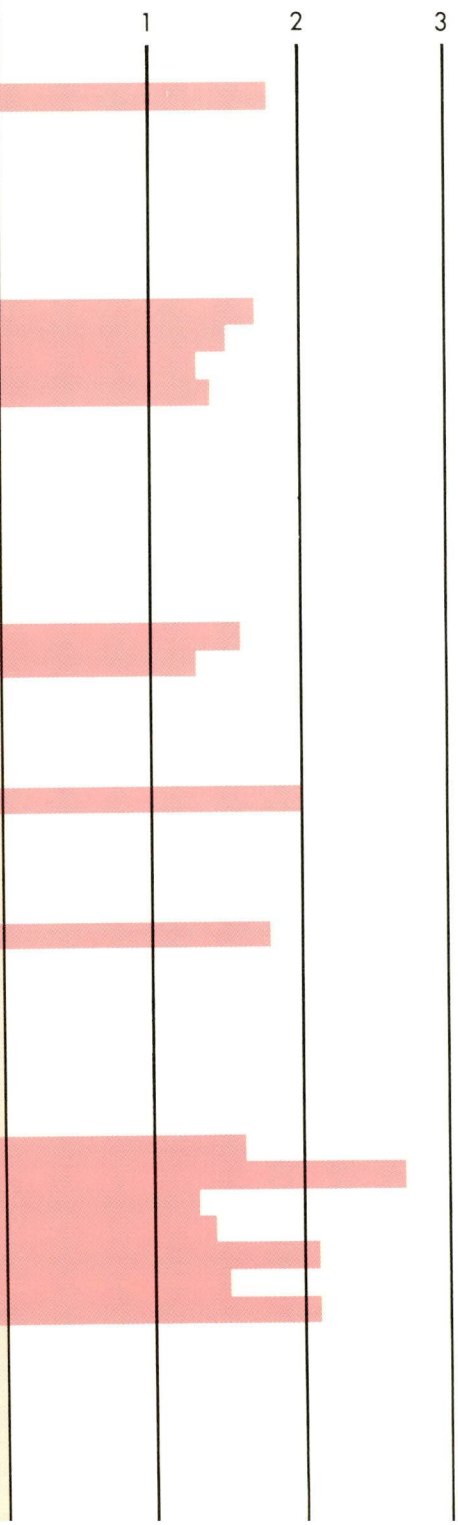
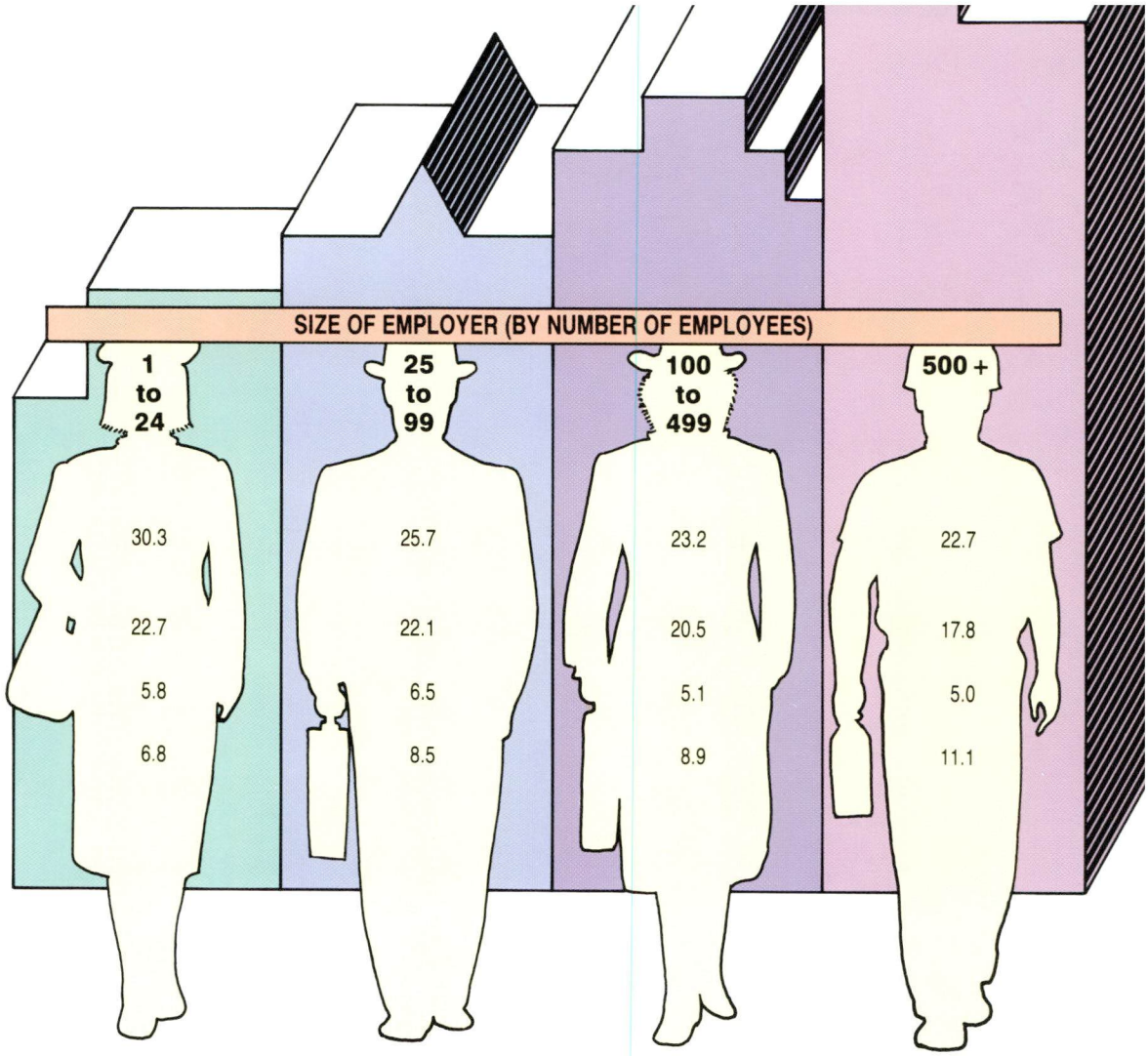


TABLE 5

DEMOGRAPHIC CHARACTERISTICS OF EMPLOYEES BY SIZE OF EMPLOYER (% OF EMPLOYEES)

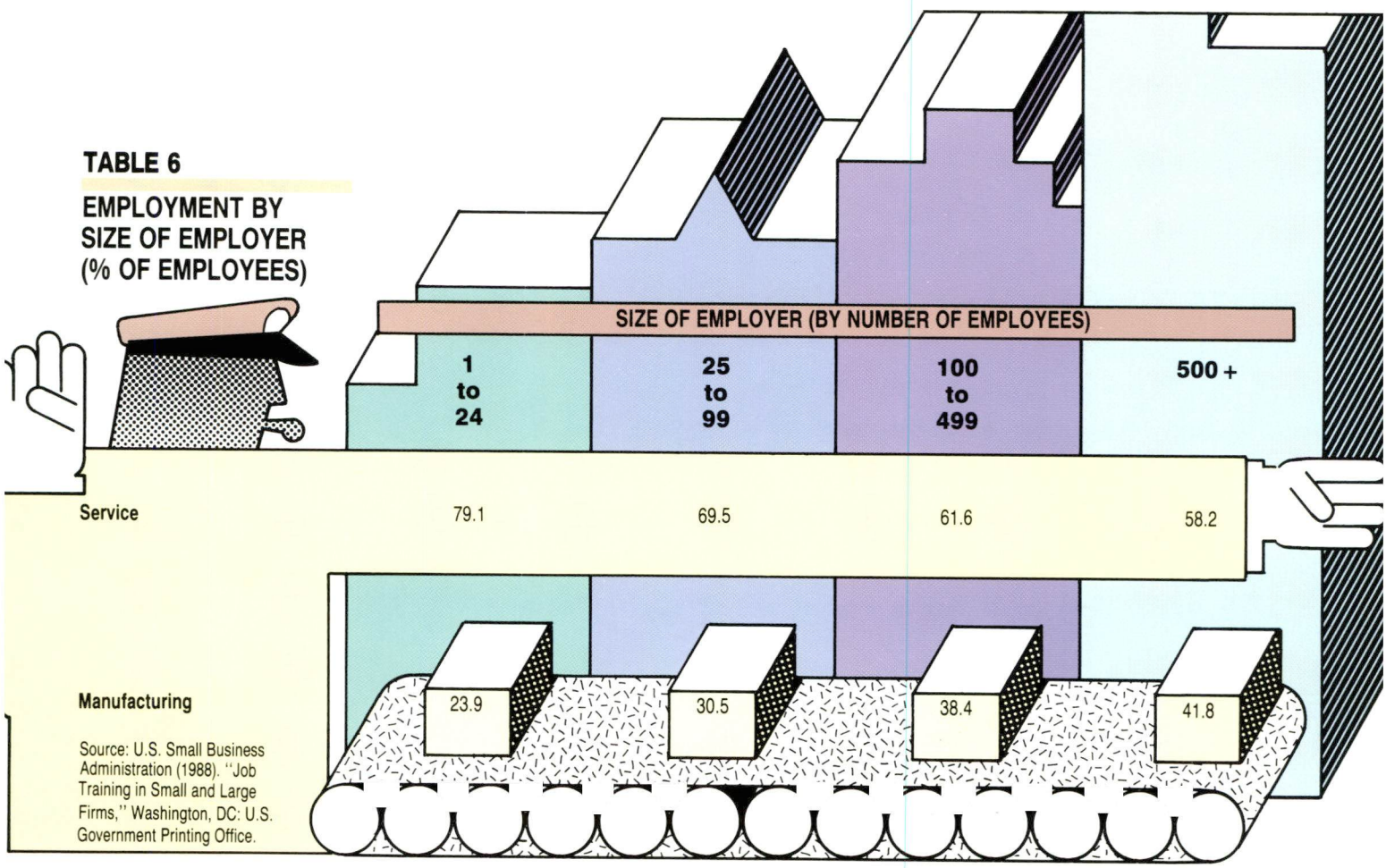


	1 to 24	25 to 99	100 to 499	500 +
Age 16–24	30.3	25.7	23.2	22.7
Less than 12 years of education	22.7	22.1	20.5	17.8
Hispanic	5.8	6.5	5.1	5.0
Black	6.8	8.5	8.9	11.1

Source: U.S. Small Business Administration (1988). "Job Training in Small and Large Firms," Washington, DC: U.S. Government Printing Office.

TABLE 6

EMPLOYMENT BY SIZE OF EMPLOYER (% OF EMPLOYEES)



	1 to 24	25 to 99	100 to 499	500 +
Service	79.1	69.5	61.6	58.2
Manufacturing	23.9	30.5	38.4	41.8

Source: U.S. Small Business Administration (1988). "Job Training in Small and Large Firms," Washington, DC: U.S. Government Printing Office.

TABLE 7

AVERAGE NUMBER OF HOURS SPENT IN TRAINING ACTIVITIES IN THE FIRST THREE MONTHS ON THE JOB, BY SIZE OF EMPLOYER (% OF HOURS)

	SIZE OF EMPLOYER BY NUMBER OF EMPLOYEES				
	1–49	50–99	100–499	500–2M	2M +
Formal training programs	11.8	8.8	10.3	29.2	22.1
Watching other workers do the job	45.0	50.3	45.1	55.4	69.5
Informal training by management	76.0	67.0	76.2	75.7	70.1
Informal training by co-workers	44.7	45.8	51.4	74.6	45.0

Source: Bishop, J. (1982). *On the Job Training in Small Business*, Washington, DC: Small Business Administration.

TABLE 8

SOURCES OF JOB-SPECIFIC TRAINING BY SIZE OF EMPLOYER (% OF EMPLOYEES)

	SIZE OF EMPLOYER BY NUMBER OF EMPLOYEES			
	1–24	25–99	100–499	500 +
Apprenticeship program	5.8	8.3	3.8	4.7
Business, commercial, or vocational school; junior or community college	32.9	25.6	28.3	23.2
Program at a college or university	4.3	4.0	5.7	3.6
High school vocational program	9.4	6.3	6.5	5.0
Military	4.8	5.9	4.2	4.3
Previous or current employer	27.0	36.8	38.1	48.5
Other	15.7	13.1	13.4	10.7

Source: U.S. Small Business Administration, (1988). "Job Training in Small and Large Firms," Washington, DC: U.S Government Printing Office.

PART III

The Trainees: An Occupational Perspective

The first thing that comes to mind when one looks at the scope of job-related education and training in the United States is that there is not enough of it. As shown in Table 9, only 55 percent of Americans have preparation for their jobs, and only 35 percent receive any upgrading once they are on the job.

The table also shows that human capital in the United States is unevenly distributed. Professionals are the most highly trained group, followed by technicians, management support specialists (e.g., accounting managers and personnel managers), general managers, mechanics and repairers, precision production workers, and craft workers. In these occupational categories, 61 percent to 94 percent of employees get training to qualify for their jobs, and 26 percent to 63 percent are upgraded once they are on the job. Among clerical workers, sales employees, and extractive workers (e.g., miners and oil workers), roughly half of employees get qualifying training and a third receive upgrading. The least educated and trained employees are machine operators, service workers, transportation workers, and laborers. In these categories, 18 percent to 37 percent of employees have qualifying training and 14 percent to 25 percent receive upgrading.

Table 9 reveals other general characteristics of job-related training in the United States:

- Preparation to qualify for a job is more common than upgrading once on the job.
- Qualifying training more often involves formal education and informal learning on the job than formal learning on the job. For upgrading, however, the three sources of training are usually of more equal importance.
- Employer-based training—formal and informal combined—is a more important source of qualifying training and upgrading than is schooling. Moreover, employers pay for a substantial share of job-related education. Among Americans who used education to qualify for their jobs, about 8 percent had their courses paid for by employers, and employers paid for the courses of 41 percent of those who used education for upgrading.

Managerial Personnel

Executives

There are roughly 2.5 million executives and senior managers in the United States. They represent the top decision makers in a work force approaching 120 million people.[32] Executives ride atop the managerial ladder, making policy decisions, shouldering overall profit-loss responsibility, and setting organizational objectives. The major difference between their current jobs as executives and their previous jobs as managers is that now they are required to make more decisions in general and more risky decisions in particular. And the decisions they make while executives are more likely to have far-reaching consequences.

Executives must also have more contacts with groups outside the corporation, including government agencies, other corporations, other countries, and the general public. When the executives and other leaders set a new corporate direction, the executives must lead, as well as manage.

By the time employees reach the executive ranks, they have already benefited from extensive human capital development. They have been trained for specific jobs, as they moved through the managerial ranks. They have also received substantial developmental training

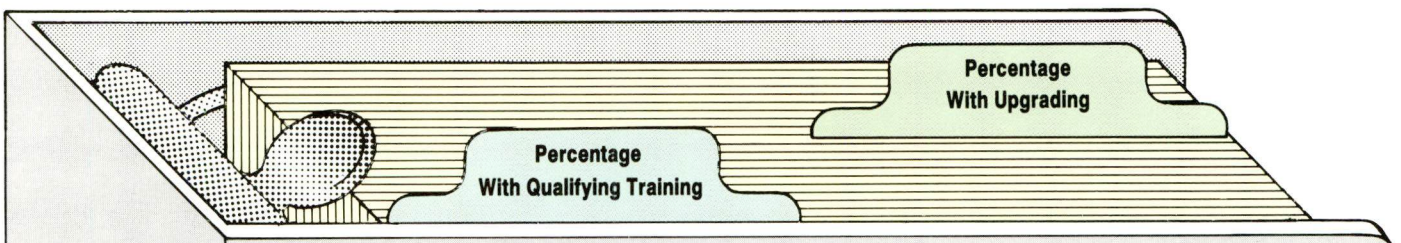


TABLE 9

SOURCES OF QUALIFYING AND UPGRADING TRAINING: ALL EMPLOYEES

	Percentage With Qualifying Training				Percentage With Upgrading			
	Total	From school	Employer-Based Formal	Employer-Based Informal	Total	From school	Employer-Based Formal	Employer-Based Informal
All employees	55	29	10	26	35	12	11	14
Nontechnical professionals	92	87	6	16	47	47	10	11
Management support specialists	77	52	11	38	52	20	20	17
General managers	71	43	12	39	47	18	17	16
Clerical	57	33	7	31	32	10	10	15
Sales	43	15	12	28	32	7	13	15
Service	36	13	9	18	25	7	8	12
Transportation	36	2	8	26	18	2	6	9
Machine operators	37	6	6	26	22	3	4	16
Laborers	18	2	2	13	14	2	2	10
Technical professionals	94	83	14	23	63	25	23	17
Technicians	85	58	14	32	52	20	18	19
Craft	66	11	16	44	26	7	7	13
Precision production	61	17	15	38	36	8	13	18
Mechanics & repairers	68	19	18	39	44	7	22	17
Extractive	56	4	13	48	34	6	13	18

Note: Individual percentages can add up to more than the totals because some employees received training from more than one kind of source.

Source: Bureau of Labor Statistics (1985). "How Workers Get Their Training," Washington, DC: U.S. Government Printing Office.

that prepared them for "succession" to higher management, for example, traditional schooling and training, as well as job rotation and mentoring.

Once they break into the rank of upper management, executives continue to receive training—an average of 36.3 hours of formal training per year.[33] Participation on corporate task forces, on-the-job coaching, and mentoring provide executives with significant informal training in leadership roles as well.

About 70 percent of large U.S. companies have some ongoing effort for educating executives, even though executive education involves only about 0.75 percent of the total employee population.[34] Large, successful manufacturing firms have the most extensive and institutionalized executive development programs, and the banking and transportation industries seem to invest the least in executive training. A 1987 survey indicated that executive training absorbs 12 percent of the total training budget in Fortune 500 companies.[35]

Executive training and development tends to be centrally managed and delivered by training professionals. Most employers, especially in manufacturing, routinely charge back all costs of executive education to the operational departments, but in 40 percent of companies, the overall corporation pays. In 81 percent of large corporations, executive education is administered centrally, usually one or two levels below the chief executive officer. The executive education staff typically consists of one or two people who collect and broker program information (usually about specialized university and consultant programs) and counsel the executives to be trained.[36]

At least two thirds of companies that have executive education describe it as "individual development"—the building of leaders. Typical executive development programs focus on leadership, communication and motivation, and strategic planning.

Historically, the most common delivery method for executive training has been the seminar, usually provided by a university. Executive training has been unique in its reliance on sources outside the organization. Roughly half of all executive training involves special programs developed by universities, professional associations, and highly specialized consultant groups, either commercial or nonprofit. Anecdotal evidence, however, suggests a more recent trend toward executive development programs provided internally or bought outside but tailored to the individual employer's needs. The trend toward bringing executive development inside the employer institution reflects a felt need to provide a context that is specific to each employer's institutional culture and strategic niche, as well as conducive to the development of the working team.



In general, the success of executive training is subjectively measured, in part because executive performance is rarely subject to formalized performance review. Where formal evaluation is conducted, the most common practice is for the executive or the executive's superior to evaluate the transfer of training to daily activities. In-house trainers (or consultants, who provide the training in many situations) are not routinely involved in following up on training.

Managers

There are more than 5 million managers in the United States.[37] Managers are the fifth most highly trained occupational group in the American work force, after technical professionals, nontechnical professionals, technicians, and management support personnel (Table 9). The pattern of training for managers is typical of most Americans. As shown in Table 10, most management training is provided in order to qualify managers for their jobs. Formal education and informal training are the dominant sources of qualifying training, but for upgrading, managers rely on formal employer programs as much as on education and informal training.

Managers in financial jobs get more qualifying training from their employers than do other managers. Public managers and managers in medicine and health care get the most retraining from their employers. In general, public and private managers are about as likely to receive formal and informal qualifying training, but more public managers than private managers

get formal and informal upgrading.

Most working adults spend half their non-sleeping lives being directed by managers.[38] Unlike an executive, a manager executes policy rather than sets it. A manager frequently directs supervisors, generally has concrete data to work with when undertaking a task, and (among management staff) often has the most frequent interaction with others in the organization. The manager is the "translator" who conveys policy and motivates the work force toward achieving corporate goals.

Senior managers in major corporations generally have a large number of people reporting to them through other managers; they have considerable influence with executives on policy decisions. Middle managers are responsible for fewer employees, direct workers with supervisory responsibilities, and influence policy through senior managers.



Manager training, particularly for middle managers, is common among American employers. Although new managers usually begin with a good educational base—college degrees are the rule rather than the exception—they often have little training in motivating and managing people. As managers move from their areas of technical expertise, taking on the responsibilities of coordinating resources and people, they need a wider array of skills. The traditional response of American employers, therefore, has been to "make" managers through extensive training, including on-the-job training and mentoring.

In large employer institutions, senior managers are responsible for the training and development of the managers who work for them. Therefore, the delivery system for training most managers is highly decentralized. Management development programs are often developed and controlled centrally, however. The professional training staff supports senior management by providing advice and creating and delivering programs for training and developing managers. Judgement of the superior(s) is the most common vehicle for determining training needs of individual senior managers or selecting more general development programs.

New managers are most often trained in employee selection, decision making, team building, strategic planning, and budgeting. Experienced managers receive developmental training in subject areas that will make them more effective in groups, institutions, and the external community. Developmental training includes subject matters such as interpersonal skills, negotiation, teamwork, organizational development, and leadership. Most large companies promote understanding of social and political issues through training seminars and conferences.

Middle managers are a prime target of formal corporate training activity. Training for middle managers has been the most uniformly applied training effort of American companies over the past decade. Approximately three quarters (73.8 percent) of all private companies provide some formal training for their middle managers.[39] In 1987, such training represented 22.4 percent of the Fortune 500 human resource development (HRD) budget—the largest share devoted to any occupational grouping.[40] On average, each company that trains middle managers provides about 37 hours of training a year to each of 17 middle managers.

About half of American companies train senior managers. Each such company provides an average of 10 senior managers 34 hours of training a year.[41] Employers also support both job-related and non-job-related courses for managers through tuition assistance programs.

As a manager's responsibility and salary increase, mentoring, job rotation, and outside seminars tend to replace formal in-house training. Training delivery for time-conscious managers is often through small groups and sometimes deliberately held off-site to avoid telephones and other distractions.

The in-house training staff is the most frequent provider in 65 percent of Fortune 500 companies, supplemented by outside consultants, coaching, and mentoring.[42] At the beginning and middle manager level, more companies rely exclusively on in-house sources than at the senior level. In contrast, at the senior level, more companies use outside vendors and consultants alone than at lower levels.

Smaller companies rely more on outside suppliers and informal methods than larger companies. Large companies have enough re-

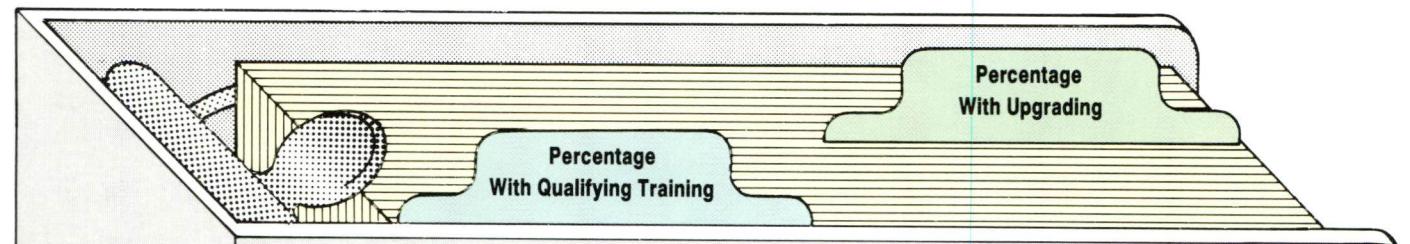


TABLE 10

SOURCES OF QUALIFYING AND UPGRADING TRAINING: MANAGERS

	Percentage With Qualifying Training				Percentage With Upgrading			
	Total	From school	Employer-Based Formal	Employer-Based Informal	Total	From school	Employer-Based Formal	Employer-Based Informal
All managers	71	43	12	39	47	18	17	16
Public	70	47	14	35	65	23	32	27
Private								
Financial	83	54	17	46	57	22	21	19
Personnel	76	41	7	39	55	15	23	17
Sales	74	44	21	46	52	16	24	21
Health	78	61	18	30	64	24	32	6

Note: Individual percentages can add up to more than the totals because some employees received training from more than one kind of source.

Source: Bureau of Labor Statistics (1985). "How Workers Get Their Training," Washington, DC: U.S. Government Printing Office.

sources to develop customized programs and enough managers to make the costs of developing and maintaining an in-house training department worthwhile.

Training for managers is evaluated more often than training for executives, but evaluation is still largely subjective. Large companies most often evaluate developmental programs using trainees' opinions (31 percent) and supervisors' opinions (29 percent). In the Fortune 500 alone, 54 percent of companies frequently use the superior's opinion to evaluate whether the training changed job performance, and 46 percent ask trainees.[43]

Quantitative evaluations are rare. If there is a return on investment (ROI) evaluation, it is usually done at the conclusion of the program or course. Six-month follow-up evaluations are infrequent among the Fortune 500 companies.

Supervisors



The supervisory work force includes close to 5 million American employees. More than half of these are in retail sales occupations. Roughly 2 million more supervise blue-collar employees in American industry. Another 700,000 are supervisors in office settings. The remainder are scattered throughout the nation's industries.[44]

As shown in Table 11, supervisory training follows a pattern similar to management training, but at reduced levels. In general, supervisors are slightly less likely to get employer-based training than managers. They tend to have substantially less formal education for job preparation or upgrading. With the exception of police and fire and office supervisors, in all other categories of supervisors, less than 20 percent of supervisors use job-related education to prepare for their jobs, and only 10 percent use formal education for upgrading.

In contrast to a manager, a first-line supervisor directs workers who make goods or perform services and who, as a general rule, do not supervise others. A supervisor implements new corporate directions at the point of production or service delivery and trains other workers, whether as an overt part of the job or through subtle behavioral cues that signal the supervisor's preferred methods of operation.

Almost no one moves directly into a supervisory position. Even if the new employee is academically well prepared for a management role, there is typically a period of two to three years on the job before the supervisory assignment. If a supervisor is new to the company, usually he or she has been a supervisor somewhere else. Often, skilled technical workers become supervisors, and strong technical skill is essential to maintaining the respect of production workers. However, new supervisors soon find that technical expertise is not enough and that a range of interpersonal and managerial skills is required to be a successful supervisor.

The content of the training for first-line supervisors reflects the employer's culture—including the extent to which employees are to be involved in decision making and the methods used to maintain a productive, informed, and satisfied work force. Most companies emphasize traditional management skills in training first-line supervisors. Employer-sponsored courses cover topics ranging from communications and leadership to company policies and how to conduct performance evaluations.

Technological changes have dramatically affected the first-line supervisor's job. Computerized information systems now allow top management to dip directly into the ranks for information. At the same time, new technologies and a greater reliance on working teams at the point of production and service delivery have made the working team more autonomous. The supervisor has had to assume a less aggressive role in managing work processes and a more supportive role in facilitating the work of front-line teams. In some industries, the demise of middle management's role as information organizer and gatekeeper has propelled first-line supervisors to assume new linkage and information-gathering roles. In some cases, hierarchical levels have collapsed; middle and first-line management have combined into teams that work on all aspects of operations with nonsupervisory personnel. This new participative management requires the first-line supervisor to spend more time dealing with conceptual and human resource issues than previously.

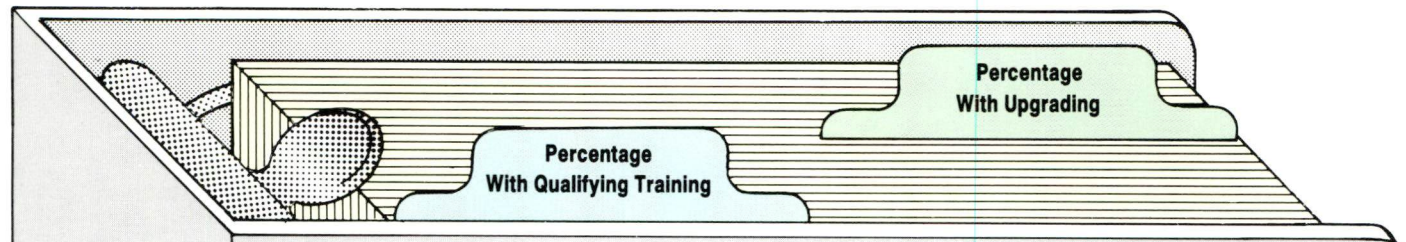


TABLE 11

SOURCES OF QUALIFYING AND UPGRADING TRAINING: SUPERVISORS

	Percentage With Qualifying Training				Percentage With Upgrading			
	Total	From school	Employer-Based Formal	Employer-Based Informal	Total	From school	Employer-Based Formal	Employer-Based Informal
Mechanics & repair personnel	68	15	22	43	58	5	38	22
Police & fire	58	24	26	34	78	39	35	33
Extractive	56	7	14	55	34	12	20	21
Office	59	25	13	37	50	16	24	16
Craft	70	17	13	55	25	8	6	11
Production	56	16	12	39	44	12	18	19
Sales	50	18	11	34	34	7	13	14
Food preparation	53	13	11	33	31	9	5	19
Cleaning services	41	7	7	30	25	4	12	10
Agricultural	32	9	7	27	34	3	8	28

Note: Individual percentages can add up to more than the totals because some employees received training from more than one kind of source.

Source: Bureau of Labor Statistics (1985). "How Workers Get Their Training," Washington, DC: U.S. Government Printing Office.

TABLE 12

SOURCES OF QUALIFYING AND UPGRADING TRAINING: MANAGEMENT SUPPORT SPECIALISTS

	Percentage With Qualifying Training				Percentage With Upgrading			
	Total	From school	Employer-Based Formal	Employer-Based Informal	Total	From school	Employer-Based Formal	Employer-Based Informal
All management support specialists	77	52	11	38	52	20	20	17
Financial	79	49	16	43	58	23	28	21
Human resources	74	38	11	43	60	18	26	23

Note: Individual percentages can add up to more than the totals because some employees received training from more than one kind of source.

Source: Bureau of Labor Statistics (1985). "How Workers Get Their Training," Washington, DC: U.S. Government Printing Office.

In 1987, about 59 percent of all the large private companies offered some formal training for first-line supervisors, and those that did provided an average of 33 hours per supervisor.[45] Fortune 500 companies allocated about 22 percent of their HRD budgets to supervisor training in 1987.[46]

In-house training departments are the major agents of supervisor training. For example, 81 percent of Fortune 500 companies responding to a survey indicated that the in-house department is "always or frequently" used for supervisor training, and this training is the "primary charge" of the HRD department in 11 percent of these companies. Exclusive use of the in-house source is more common for supervisors (25 percent of companies with formal training) than for other levels of management personnel (17 percent and 10 percent for middle and senior management, respectively). Most companies (64 percent) use both inside and outside providers. Only 11 percent use vendors alone.[47]

On-the-job coaching is almost universally available, and in companies that do not provide formal training for first-line supervisors, coaching may be the sole source of training. Overall, coaching is generally considered to be the most common delivery method, with the immediate superior as provider.

The supervisor's superior usually evaluates whether the skills targeted in training actually transfer to the workplace. Self-evaluation occurs in 40 percent of Fortune 500 companies, a slightly smaller percentage than for the middle and executive management levels. Evaluation by in-house trainers is almost as common as self-evaluation.

Management Support Specialists



Apart from technical professionals, nontechnical professionals, and technicians, management support specialists are the most highly trained employees in American employer institutions. There are more than 3 million employees who provide management support in staff functions such as accounting, underwriting, personnel, labor relations, and training.[48] The training pattern for these workers tends to parallel the training pattern for managers (Table 12). Qualifying training for support professionals tends to emphasize schooling and informal OJT. In general, there is less upgrading than initial training, even though there is more formal employer-based training for upgrading than for job preparation.

Nontechnical Professionals

There are close to 9 million nontechnical professionals in the United States, including roughly 5 million teachers, librarians, and counselors and more than 3.5 million other professional specialists, such as lawyers, artists, designers, writers, and photographers.[49] Individuals in these occupations get more qualifying training than any other occupational group except technical professionals. They are unique in terms of the large amount of qualifying training and upgrading they receive from schools. In fact, no occupational group relies more on schooling for preparing for their jobs and upgrading after they are on the job than teachers. Lawyers and teachers are the most highly educated and trained nontechnical professionals. Photographers and artists get substantially less

education and training (Table 13).

Nontechnical professionals are generally defined as degreed workers who have attained specialized expertise in a given area other than the physical or natural sciences or mathematics and who have their careers focused in that area. They are usually workers who are salaried but exempt from receiving overtime pay when their workweek extends beyond 40 hours, according to the U.S. Fair Labor Standards Act.

Nontechnical professionals can be found throughout modern companies, working as members of the management staff and in specialized support divisions—as patent and tax attorneys; writers and editors; personnel, labor relations, and training specialists; and librarians who perform information searches and maintain specialized corporate libraries.

Nontechnical professionals generally have a great deal of autonomy in their jobs and are expected to work with a minimum of direct supervision. They make decisions related to their own areas of expertise and create their own methods for achieving major goals, often in concert with technical professionals. They are also expected to be motivated and able to set and meet objectives that contribute to achieving the larger corporate goal.

Professionals often have considerable latitude in working hours—and frequently choose longer hours than required, perhaps because of a strong work ethic, intellectual interest, or belief in the significance of a particular project to their profession.

Significant projects, special benefits, training, contact with respected peers, access to expensive facilities, and individual freedom are incentives for a nontechnical professional to continue in a job. Excessive management requirements, lack of recognition, and limited opportunities for learning are among the most frequent causes for departure. Thus, quality of worklife and potential for growth, as well as increased income are important criteria in employment decisions. Therefore, many corporations encourage professional growth through participation in professional societies, university teaching, or consulting. Corporations also create learning opportunities and other options—including high-salaried but nonmanagerial jobs—to retain professionals.

The main reasons that corporations invest in training for professionals are:

- to maintain expertise (update professional knowledge);
- to meet needs arising from new projects;
- to orient professionals to corporate goals and culture;
- to provide an incentive for hiring and retention; and
- to help employees manage stress and improve their health.

There is little information available on the training courses provided specifically for professionals, probably because much of this training is technical (and is measured in that arena) or comes from the general corporate training curriculum available to all managerial, technical, sales, and professional employees (time management, stress management, writing, etc.). However, professionals and corporate training executives interviewed for this study cited the following topics as frequent focuses of training:

- specialty skills (professionals frequently choose updating in their fields when training is elective);
- computer literacy;
- time management and project scheduling;
- report writing and English (writing is a primary function of most professionals);
- speaking and presentation skills;
- interpersonal skills, such as negotiation techniques;
- health and stress management;
- orientation to the company's goals and strategies;
- opportunities for career and professional development; and
- topics related to social concerns, such as the company's equal employment opportunity policy and employee safety programs.



According to the 1987 Lakewood survey, 48 percent of large corporations have training for their professionals, who receive an annual average of 36 hours of training per person. Of companies providing professional training, 64 percent use a combination of in-house and outside sources, 27 percent use outside vendors only, and 10 percent use in-house providers only.[50]

According to interviews conducted for this study, evaluation of professional training is most often subjective and ROI is rarely calculated.

Clerical Personnel

There are more than 20 million clerical personnel who provide administrative support in the United States. More than 5 million process financial records, and more than 4 million are secretaries. The remainder are clerks or dispatchers or have other information management functions.[51] As shown in Table 9, a little more than half of clerical personnel have qualifying training and less than a third get upgrading. These workers fall in the middle range of American employees in terms of the proportion who have qualifying training and upgrading.



There is mounting evidence that a growing share of clerical employees are undertrained. Information-based technology is increasing the importance of and skill requirements for clerical employees. The clerical worker of today usually operates a computer—over 82 percent of companies with more than 10,000 employees use computers for word processing.[52] The average clerical worker has learned computer operation or a new word processing program within the past five years and now uses a personal computer for preparing letters, keeping records, and scheduling office events. Clerical personnel may also be responsible for training new clerical workers or even the professional staff on new office equipment.

Some clerical employees, such as executive secretaries, have the responsibilities of power and confidentiality. Such workers usually need top-flight clerical skills, good social skills, supervisory skills to manage other administrative support personnel, good appearance, and the ability to stay calm under pressure.

Clerical time saves management time. In many instances, clerical employees have assumed tasks previously done by managers and other specialists. And with computer power, clerical workers can do more in less time. They have time for more editing, processing, drafting, and accounting-type functions, and can assume more administrative tasks, meaning that professionals and supervisors can delegate more of their duties to clerical personnel. This "skill migration" from managers, professionals, and other specialists is fueling debates on compensation and may push wage scales up.

Clerical positions are unique in their consistency from organization to organization; their core duties tend to be similar across all industries. These jobs are also unique in that they tend to have a limited career track that flows to executive assistant and stops. To move up significantly in salary, the clerical worker has to acquire a different job title and shift tracks to administrative or supervisory positions like office manager or purchasing director. Alternatively, he or she can change companies, leveraging skills into more pay.

Turnover is high in prosperous regions, where the supply of qualified clerical workers tends to be small and companies compete for good clerical personnel. In recent years, the opening of other career paths to women has affected the availability of good clerical personnel. Largely a female-dominated field (99 percent of clerical workers are women),[53] clerical work, with its limited career path, has suffered the loss of many people who would have seen it as a viable career option in the past.

In general, the investment in formal employer-provided training for clerical workers is low because they usually enter the work force with most of the basic skills (typing, shorthand, filing procedures) that enable them to do their job. High school vocational programs, community colleges, and trade and business schools usually provide this preparation. Increasingly, however, shortages in qualified clerical personnel are driving employers to create their own

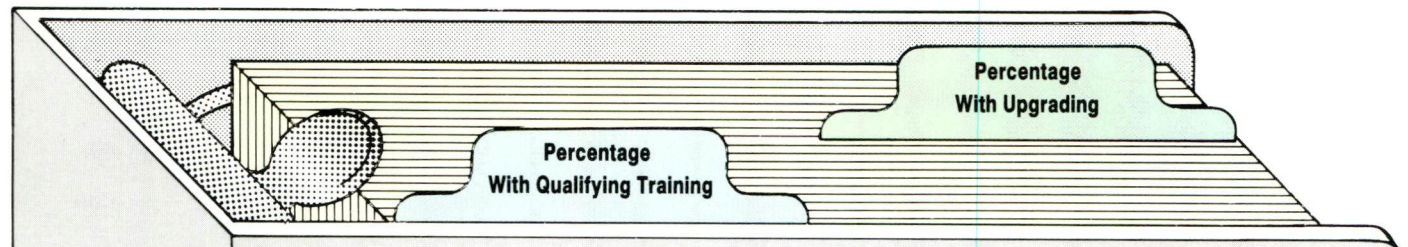


TABLE 13

SOURCES OF QUALIFYING AND UPGRADING TRAINING: NONTECHNICAL PROFESSIONALS

	Percentage With Qualifying Training				Percentage With Upgrading			
	Total	From school	Employer-Based Formal	Employer-Based Informal	Total	From school	Employer-Based Formal	Employer-Based Informal
All nontechnical professionals	92	87	6	16	47	47	10	11
Teacher	95	96	6	12	70	57	9	9
Librarian	78	68	2	26	53	30	9	9
Lawyer	95	92	3	17	55	15	9	10
Writer/editor	84	61	7	53	32	14	6	13
Photographer	81	41	13	42	48	19	6	20
Artist	83	67	5	33	32	20	1	7

Note: Individual percentages can add up to more than the totals because some employees received training from more than one kind of source.

Source: Bureau of Labor Statistics (1985). "How Workers Get Their Training," Washington, DC: U.S. Government Printing Office.

TABLE 14

SOURCES OF QUALIFYING AND UPGRADING TRAINING: SALES PERSONNEL

	Percentage With Qualifying Training				Percentage With Upgrading			
	Total	From school	Employer-Based Formal	Employer-Based Informal	Total	From school	Employer-Based Formal	Employer-Based Informal
All sales personnel	43	15	12	28	32	7	13	15
Finance & business services	75	34	33	35	58	17	27	19
Commodities	55	24	12	38	40	9	21	17
Retail & personal services	27	5	5	20	20	3	5	13

Note: Individual percentages can add up to more than the totals because some employees received training from more than one kind of source.

Source: Bureau of Labor Statistics (1985). "How Workers Get Their Training," Washington, DC: U.S. Government Printing Office.

clerical workers rather than buy them, and frequently, clerical workers with strong basic clerical skills need upskilling, particularly when computers are introduced into the office or a new word processor or information management software is brought on line. In fact, as employers have aggressively invested in word processing and other computerized office technology, they have increasingly found that clerical workers are the key to its efficient use. Thus, clerical training courses include orientation to the employer's chosen software for word processing, mailing lists, information management, and other functions. Other clerical training courses include telephone communications, spelling, time management, business writing, language and interpersonal skills, and career development.

According to interviews conducted for this study, employers rarely or never conduct needs assessments for clerical training. Faced with a training challenge whenever new machinery is introduced into the office, many companies elect to send their clerical workers to outside courses, often provided by the equipment vendors. However, training needs are often more extensive than those addressed in the vendors' overviews, and manuals designed to facilitate the integration of machinery are often complex. Consequently, more in-depth outside training, usually in the form of seminars, is needed. Frequently, however, even this opportunity is offered selectively—only one member of the clerical staff may go for training and, on returning, train fellow workers.

Fifty-three percent of all companies have formal secretarial-clerical training. The average company provided 26 clerical workers with 16.9 hours of formal training each in 1987.[54] Also in 1987, Fortune 500 companies spent roughly 6 percent of their training budgets on clerical training.[55]

Interviews conducted for this study reveal that only about 10 percent of clerical training is formal. The in-house seminar is the most common format for formal training, but 35 percent of all companies now use some computer-based training, mainly to teach computer-related skills such as word processing and spreadsheeting.[56]

Interviews also reveal that the usual practice is to use both in-house and outside providers for clerical training (44.5 percent of companies). Sole use of the in-house training staff is more common than sole use of outside vendors (36.5 percent vs. 18.9 percent, respectively). Training purchased from vendors is often noncustomized, but 50 percent of companies that have clerical training use customized vendor training for clerical personnel.[57] The prime responsibility for clerical training is usually at the corporate level, with major responsibility co-located at the plant, department, office, or store.

Evaluation of clerical training in technical skills is frequently experiential. The worker goes to training and then is expected to apply the skills on the job. Manpower, Inc. (a prime trainer of clerical personnel placed as temporary workers in offices) tests workers extensively, maintaining "the only true method of testing lies in assessing an operator's ability to apply skills and knowledge to a realistic work sample."[58] To test for office automation skills, Manpower requires the trainee to create a document from handwritten draft through proofreading and final printed copy.

Training in the "softer" side of clerical work (interpersonal skills, time management, etc.) is infrequently evaluated. When it is, evaluation is generally subjective, gauging the participant's reaction to the training.

Sales Personnel

There are almost 13 million marketing and sales employees in the United States. Most are concentrated in retail sales. More than 2 million of the nation's sales workers are cashiers, another 4 million are retail sales workers, and another million are stock clerks. The remainder sell commodities, business services, real estate, securities, and insurance.[59] Sales workers rely less on education than on employers for the training necessary to qualify for their jobs and to upgrade their skills once they are working (Table 14). The extent of training varies substantially among sales representatives. Those who sell insurance, real estate, securities, business services, and commodities have substantially more job-related education and employer-based training than those who sell retail products and personal services.

The success of current business strategies and the development of innovations frequently hinge on the skills of the sales force. "Customer service" strategies are impossible unless the sales force is well trained in this arena. Innovation strategies depend heavily on the ability of sales employees to recognize customers' needs for new applications of existing products. Sales personnel also need to be carefully integrated into the culture and structure of the company if they are to communicate new applications and other innovations up the line. Sales personnel are in a unique position to feed such information back to product development departments, along with information on what the competition is offering. If the sales operation is in tune with the rest of the organization, it can be the company's "investigative" division.

Sales managers tend to agree that employers can develop successful salespersons with careful selection and training. According to a recent survey, the typical sales training manager thinks that the superstar's success stems 48 percent from attitude, 25 percent from selling skills, 13 percent from product knowledge, 11 percent from experience (the previous sales record), and 4 percent from work effort and good assignments.[60] Attitude, selling skills, and product knowledge can be learned through training on the job. Careful selection is also important. The skills and knowledge that a salesperson brings to the job should generally fit the industry, company, product, or group of customers. For example, a salesperson who sells technical products or services requires a technical background; a person selling financial services requires a financial background.

Sales training focuses on new product orientation, product updates, attitudes and interpersonal sales skills, negotiation, and procedures (paperwork). Common courses include general selling skills, presentation skills, business writing, telephone skills, customer service, account management, planning, time management, goal setting, problem solving, stress management, and technical training specific to a product or industry.[61]



Data from two recent surveys indicate that product knowledge and selling skills are two of the most common focuses of corporate sales training.[62] But at least one study has shown that investment in selling skills can have a huge payoff; improving sales technique alone provided returns as much as 1,660 percent.[63]

Sales training accounts for roughly 16 percent of the training budget in Fortune 500 companies.[64] Virtually all companies train new hires, and more than half of large companies have formal policy statements outlining the number of sales training hours required, the courses to be taken, and the deadlines for completion. A company usually provides at least 48 to 80 hours of initial sales training, with some companies requiring 160 hours or more. Established salespersons receive about 43 hours of training per year.[65] About 16 percent of employer-based professional development for salespeople is through formal training; about 75 percent is through coaching by the sales manager.[66]

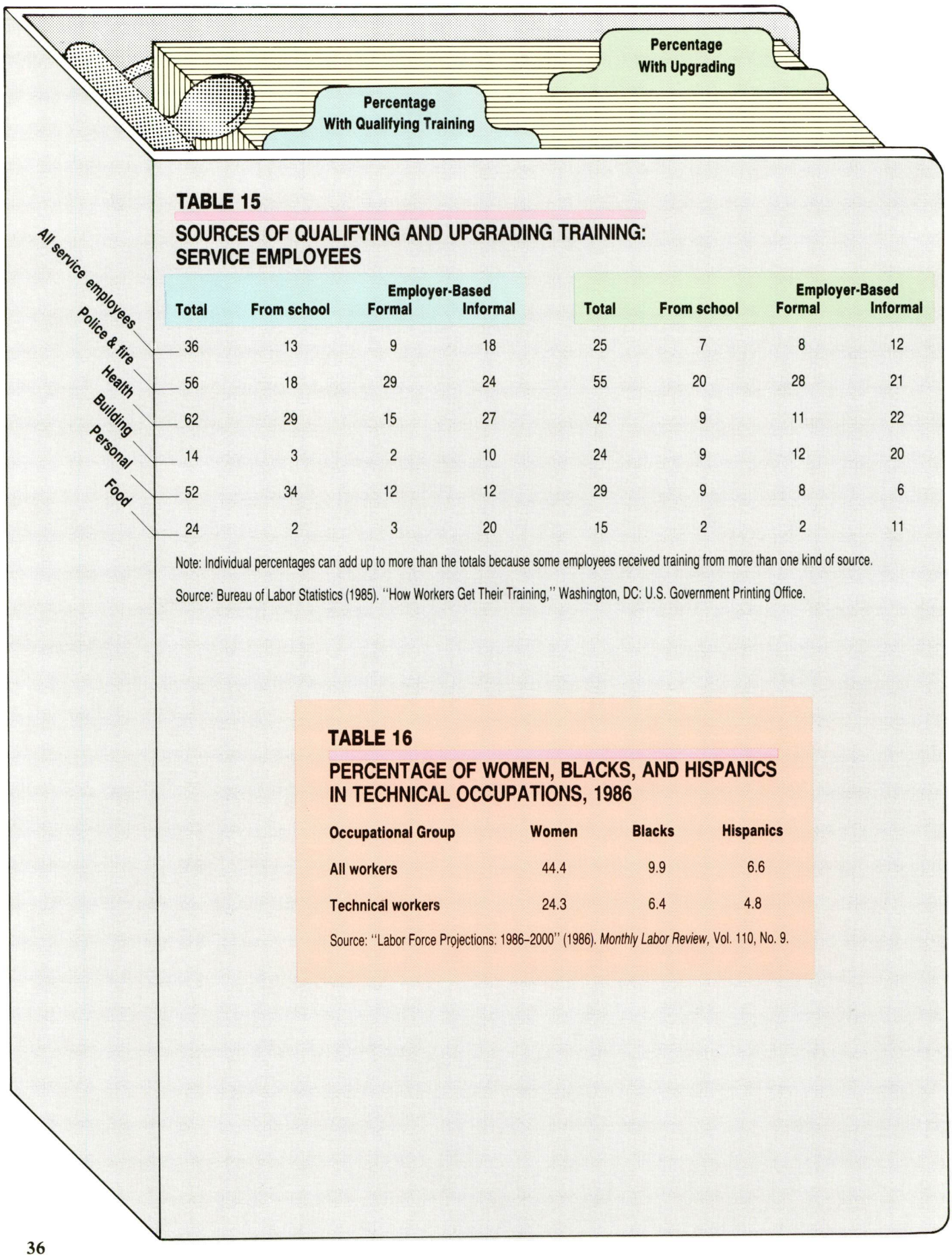


TABLE 15

SOURCES OF QUALIFYING AND UPGRADING TRAINING: SERVICE EMPLOYEES

	Percentage With Qualifying Training				Percentage With Upgrading			
	Total	From school	Employer-Based Formal	Employer-Based Informal	Total	From school	Employer-Based Formal	Employer-Based Informal
All service employees	36	13	9	18	25	7	8	12
Police & fire	56	18	29	24	55	20	28	21
Health	62	29	15	27	42	9	11	22
Building	14	3	2	10	24	9	12	20
Personal	52	34	12	12	29	9	8	6
Food	24	2	3	20	15	2	2	11

Note: Individual percentages can add up to more than the totals because some employees received training from more than one kind of source.

Source: Bureau of Labor Statistics (1985). "How Workers Get Their Training," Washington, DC: U.S. Government Printing Office.

TABLE 16

PERCENTAGE OF WOMEN, BLACKS, AND HISPANICS IN TECHNICAL OCCUPATIONS, 1986

Occupational Group	Women	Blacks	Hispanics
All workers	44.4	9.9	6.6
Technical workers	24.3	6.4	4.8

Source: "Labor Force Projections: 1986–2000" (1986). *Monthly Labor Review*, Vol. 110, No. 9.

Training provided by in-house sources is the most productive type of training, according to sales training managers and vice presidents responding to a 1987 survey.[67] But such training does not necessarily involve the in-house training department. A wide variety of people and organizations, ranging from the in-house training department to sales managers to outside consultants, universities and colleges, provide sales training. In fact, in most Fortune 500 companies, sales training is usually provided by someone other than the in-house training department.

Sales training managers, vice presidents of sales, and, to a somewhat lesser extent, chief executive officers are responsible for tying the goals for professional development of the sales force to the corporate goals. Objective training goals (e.g., trainee increases number of calls made by 5 percent within the next six months) are used by 84 to 90 percent of companies. Training managers or sales managers usually assist designated trainers in setting training goals, with salespersons involved in only 28 percent of companies.[68]

Lectures are still the most common delivery method for sales training, and less than 50 percent of training programs for salespeople are "canned" (standardized), meaning that the same program is delivered regardless of company, industry, product, or kind of customer.[69] Canned programs tend to cover generic sales skills, whereas more tailored training programs focus on product knowledge and other company-specific subject matters.

Videotaped presentation is popular because of its flexibility. It enables training to be conducted immediately after hiring, introduces new products without bringing all salespersons to one location, and demonstrates products consistently to everyone. Custom video is expensive but cost-effective compared with using untrained salespersons in the field.

Videotaping the salesperson in action is also useful for showing how he or she comes across to customers; videotaped role play is increasingly becoming a standard tactic in sales training.[70] (Computer-based and interactive video training are not yet used extensively, probably because of high development costs.)

The most common means of evaluating sales training courses is to solicit the trainee's opinions; the "smile test." Sales training is more carefully evaluated than management training, in part because the sales process is more easily quantified. Tests for learning retention are administered less than 35 percent of the time, and less than 25 percent of companies use cost-benefit analysis; about 50 percent of companies use customer evaluation as an indicator of a salesperson's performance and thus an indirect indicator of training's effectiveness.[71]

Customer Service Personnel

As the nation's service sector grows, so grows the importance of high-quality customer service. Many kinds of workers share the challenge of providing high-quality customer service, but none are more directly involved than the direct customer service workers. They are the link between the company, the product, and the consumer. Advertising may make promises, but customer service workers must deliver.

Although business willingly acknowledges the important role of the customer service worker, compensation has not kept pace with praise. Many workers are in low-pay categories, have minimal (if any) benefits, or work only part time. Entry-level positions and minimum wages are common.

The "baby bust" of the 1960s and 1970s may affect customer service jobs more than other jobs. It was the demographic forces of the 1970s that spawned so many service enterprises whose profitability depended on minimizing

wages, training costs, and capital investments. This trend could be reversed in the 1980s and 1990s. The worker shortage has already become a major problem in the fast-food industry.[72] Of the 3.5 million people who work in this industry, 70 percent are age 20 or less. Usually, this job is their first job, and it serves as a transition between home and school.[73] In retail, the employees are mainly part-timers and the problem is turnover. According to Alice McCord of the National Retailers Association, "The industry faces a young, poor-quality applicant".[74]



Customer service training, therefore, will become increasingly important. One survey noted it as second in importance only to management training in projections for 1988 and beyond.[75] Interviews conducted for this study reveal that customer service training usually involves courses in interpersonal skills and customer relations. Because so many customer service workers are first-time employees, they need basic orientation to workplace customs. Also, much of their training comes under the general rubric of sales training. Customer service training courses cover topics such as product and service orientation, problem solving, negotiation, selling, customer-interaction skills, stress management, basic clerical skills, and computer keyboarding.

Despite its growing importance, there are few available data on customer service training per se. The 39.6 percent of employers that train their customer service personnel provide about 26.8 hours of training annually per person trained. Overall, 5.86 million customer service workers were trained in 1987, for a total of 157 million hours of training.[76]

Only 13.3 percent of companies that provide formal training rely on outside sources alone; 42.7 percent use a combination of in-house staff and outside providers and 44 percent provide formal training using in-house staff only.[77] Prime responsibility for training customer service workers rests at the divisional, group, or subsidiary level.

Companies conduct very little evaluation of customer service training. However, in many cases, supervisors observe the interactions of employees with customers and make subjective evaluations of the training's effectiveness. In some cases, such as telephone sales, phone calls to customers may be monitored and used by supervisors as an evaluation tool.

Service Employees



There are 18 million service employees in the United States—7 million in food preparation, 3 million in building services, and roughly 2 million each in health, personal, household, and police and fire services.[78] Overall, service employees are among the least educated and trained American workers, because of the low rates of education and training among food service workers and cleaning personnel. Health service employees, police and fire employees, and people in personal service occupations, such as barbers and child care workers, get much more training (Table 15).

Technical Workers

Technical workers use theoretical principles from the mathematical or natural sciences in their work. They also tend to utilize substantial amounts of technical machinery or processes in their work and work in industries that produce technical machinery or other products derived from the application of mathematical or scientific theory. Technical workers are especially important to American competitiveness because they tend to work in industries that produce the lion's share of internationally traded products and services. Technical workers are also important because they invent and produce the technologies that result in the upskilling of all workers. Ultimately, the continuous integration of new technologies with more highly skilled labor is the engine of American competitiveness.

Attempts at defining technical training and the technical work force are always somewhat arbitrary. The definition used here—that technical employees use theoretical principles from mathematics or the natural sciences in their work—is no exception. In general, this definition includes technical professionals (e.g., scientists, doctors, and engineers); technicians and technologists, concentrated in both manufacturing and health care; craft workers, concentrated in the construction trades; and skilled workers concentrated in manufacturing. By this definition there were 20.3 million technical workers in the United States in 1986, amounting to 18.2 percent of the American work force.[79]

Table 9 shows that of all occupational groups, technical professionals, who number almost 4.8 million (24 percent of the technical work force), get the most education and training in preparing for their jobs and the most upgrading. The nation's 3.5 million technicians, who make up 18 percent of the technical work force, get more education and training in preparation for their jobs and more upgrading once they are on the job than any occupational group except technical and nontechnical professionals. There are almost 11.8 million blue-collar technical workers (58 percent of the technical work force), including precision production workers, mechanics and repairers, extractive workers, and craft workers.[80] Blue-collar technical workers get only slightly more preemployment education and training and upgrading than the average American worker. Moreover, they rely much more on informal learning on the job than other technical workers.

The nation's almost 7 million machine operators and assembly workers are not included in the figures just given even though their jobs are increasingly technical in content. As discussed earlier, automated manufacturing is increasing the depth and range of skills required in these jobs; many are being consolidated and upgraded into technical jobs. Although they are difficult to count, it is clear that many operators and assembly workers have already become technical workers, including as many as 2 million who work in high-tech industries.

As shown in Table 9, operators and assemblers get relatively little preparation for work or training once they are on the job.

Although the workers in some technical occupations, especially in health care, are predominantly women, men dominate the technical work force, totaling 76 percent of all technical workers. As shown in Table 16, women, Blacks, and Hispanics are generally underrepresented in the technical work force.

Technical workers are distributed unevenly throughout the economy. About 1.5 million are self-employed, principally as doctors, engineers, carpenters, mechanics, and repair workers. The largest number of technical workers is found in the service sector, mostly in health care. Manufacturing employs about 14 percent of all technical workers.

The construction industry has the highest concentration of technical workers; one third of all workers in the construction industry are technical employees. Mining, transportation,

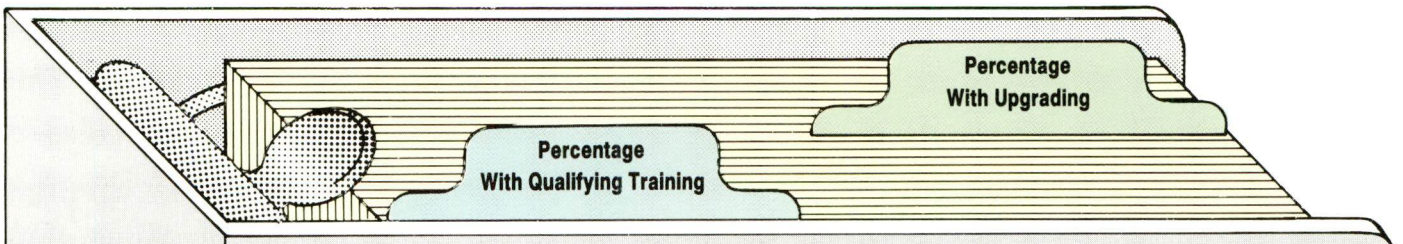


TABLE 17

MEDIAN WEEKLY EARNINGS BY SEX, 1986 (DOLLARS)

Occupational Group	Both sexes	Men	Women	Ratio
All workers	358	419	290	.69
Technical workers	482	501	420	.84

Source: "Labor Force Projections: 1986–2000" (1986). *Monthly Labor Review*, Vol. 110, No.9.

TABLE 18

SOURCES OF QUALIFYING AND UPGRADING TRAINING: TECHNICAL PROFESSIONALS

	Percentage With Qualifying Training				Percentage With Upgrading			
	Total	From school	Employer-Based Formal	Employer-Based Informal	Total	From school	Employer-Based Formal	Employer-Based Informal
All technical professionals	94	83	14	23	63	25	23	17
Architect	94	91	13	31	41	10	7	23
Engineer	90	73	14	33	57	23	28	18
Health	96	96	10	7	72	33	8	8
Mathematical & computer scientist	90	66	26	41	65	21	36	24
Natural scientist	97	91	9	26	59	30	25	15

Note: Individual percentages can add up to more than the totals because some employees received training from more than one kind of source.

Source: Bureau of Labor Statistics (1985). "How Workers Get Their Training," Washington, DC: U.S. Government Printing Office.

and utilities have the next highest concentration, with nearly one fifth of their employees in technical occupations. In manufacturing, services, and government, about one worker in six is a technical worker.

Technical workers earn well above the average for all workers (Table 17). Male technical workers earn more than their female colleagues, but the disparity is less in technical occupations than in the economy as a whole. In technical occupations, female workers earn 84 percent of what male workers earn; in the economy as a whole, female workers earn 69 percent of what male workers earn.

Technical Professionals

Technical professionals are educated and trained to make broad judgments, to invent, and to apply a particular intellectual discipline to problem solving. In health care, technical professionals include employees responsible for making diagnoses and prescribing treatment to be provided by others. In other industries, technical professionals are responsible for developing new products and designs, enhancing existing products, and conducting research, but not necessarily responsible for formal management or exercising direct authority over subordinates. Technical professionals are most critical in the overall design and development phase of the competitive cycle and the diagnostic phase in the provision of health care services.

Technical professionals include the nation's 2.5 million health professionals, 1.5 million engineers, and 800,000 natural, mathematical, biological, and computer scientists.

Technical professionals' jobs most frequently require at least a four-year college degree and often require formal schooling beyond the undergraduate level. As shown in Table 9, technical professionals are the most highly educated and trained of the nation's employees. Relative to other employees, they tend to receive substantial amounts of both education and employer-provided training—formal and informal—both to qualify for their jobs and to upgrade skills once they are on the job.

All technical professionals rely heavily on schools to prepare them for their jobs. However, relative to other technical professionals, engineers and mathematical and computer scientists rely less on schools and more on employers for qualifying training (Table 18). This suggests that engineering, mathematical, and computer jobs are more tailored to a particular employer and the employer's product, resulting in less carryover of academic training into the workplace.

Health professionals get the most upgrading of all technical professionals and rely on schools more than their employers for both qualifying and upgrading training, suggesting that skill needs are not employer specific and that health care professionals have a stronger bond with their profession than with specific employers.

Technical professionals usually receive training in subject matter that applies broadly to a specific area of expertise. Because of the breadth of potential application, organizations have, in the past, played a relatively passive role in training their technical professionals, most often providing only general guidance and funding. However, in recent years, the pressures of competitiveness have encouraged companies to integrate the development and design of innovations with production and marketing. The attempt to build more integrated R&D structures has encouraged more institutional control over the training and development of technical professionals.



Technical professionals, however, are still relatively autonomous in their professional development. Although most of their training is intended to update skills or knowledge in the face of new technology, the exact application of these skills and knowledge is usually left to the individual. For example, a seminar might introduce a new synthetic material and explain its development, properties, and uses. The design engineer who will use the material in new products will use the information much differently than the engineer who will test the products, once developed.

The technical professional's ability to glean diverse applications from generic material makes seminars and symposia, such as those

offered by colleges and universities, professional organizations, and other public providers, a good alternative to in-house training curricula. In 1987, companies in all sectors spent approximately $117 million to send their technical professionals to seminars. Colleges and universities are the most frequent source of outside seminars, drawing $41.1 million per year in revenues to train technical professionals from private industry.

Vendors are another major source of training for technical professionals. Vendors supplied approximately $175 million worth of off-the-shelf training materials, custom materials, and other training support services to technical professionals in 1987. Other sources of training (both in-house and outside) for technical professionals account for an additional $1.4 billion per year.



A growing number of manufacturing companies are presenting training in integrated manufacturing to their technical professionals. Integrated manufacturing covers all phases of manufacturing from concept development, through design and development, to producing the finished project. The root principle of the integrated manufacturing perspective is to bring elite technical professionals together with production workers, sales and marketing personnel, and other members of the institutional team. The ultimate purpose is to reduce the cycle time required to integrate new technologies and to get innovations to market, to improve efficiencies and quality, and to encourage new applications. In addition, with such training, technical professionals can be responsible for more than one job or process, rather than a single function or process, as had previously been the case. This technique parallels the technique of cross-training, which is becoming increasingly common among technicians and craft workers and resulting in a more knowledgeable and more versatile work force that is more responsive to organizational, technological, or industrial shifts.

Technicians

There are approximately 3.5 million technicians in the United States—more than 1.5 million health technicians, almost 1.3 million technicians in engineering and the sciences, and another 800,000 broadcast, computer, and air traffic technicians. Next to professionals, technicians are the most highly educated and well trained employees in the American work force (Table 9).

A technician is an employee whose primary expertise lies in a particular specialty area. Although technicians have considerable depth of knowledge and highly developed skills in their specific areas of expertise, they lack the breadth of knowledge in the theoretical aspects of their specialties that is required of technical professionals. And although many technicians are graduates of four-year colleges, many have developed their skills and knowledge at technical or vocational schools or community colleges, or, on occasion, through on-the-job training.

Many workers in the health care field, including nurses, physical therapists, x-ray technicians, and other operators of diagnostic equipment, are good examples of service sector technicians. Technicians from manufacturing include circuit board assemblers and quality control technicians who oversee laser equipment in automobile assembly plants.

Technicians usually receive training that applies directly to their jobs. The training has its basis in theory, but is focused more directly on the application of theory to the job than is training for technical professionals.

Because technician training has a mixed focus of theory and application, a mix of instructional methods is necessary to ensure adequate skill acquisition and transfer. Most technician training includes three phases of instruction:

1. Introduction of the theories or principles behind the technology;
2. Demonstration of the application of the theories, principles, and processes in a job environment; and

3. Hands-on practice of the skills and knowledge application in a simulated work setting.

Like training for technical professionals, technician training includes generic courses. Unlike much training for technical professionals, however, most technician training is sequential and job specific and includes principles of new technologies (primarily equipment and processing techniques) and new applications for existing technologies. Technicians also take special courses required for licensing or certification, or "refresher" courses required for license renewal or recertification. Virtually all technician training is directed toward upgrading or updating skills.

Because of the hands-on nature of the technician's work, courses in safety and hazards are required. Technicians also receive specific training in procedures required for successful job operation, especially if the procedures are mandated by a government agency. For example, technicians in a drug company receive training in clean room operation and maintenance; laboratory technicians in a hospital receive training in maintaining sterile equipment and recording patients' test results properly; and technicians in a nuclear power facility receive training in emergency shutdown and evacuation procedures.

Of the more than $3.28 billion spent by employers each year for outside training and training support services, approximately $103.2 million is for technician training.

Because of the nature of technician training, programs sponsored by colleges (including two-year colleges), universities and professional associations are a frequent source of training outside the organization itself. Of the $68.9 million provided technicians each year to attend outside seminars and conferences, university-sponsored programs account for $24.1 million. Vendors, especially "original equipment manufacturers" (OEM), also supply a considerable amount of technician training and related support materials.[81]

The amount of time technicians spend in training varies widely according to the job held, the company's support for training, and state and local certification (or licensing) requirements. There are few data available concerning the length of training specifically for technicians.

Blue-Collar Technical Employees

The nation's blue-collar workers number almost 30 million craft workers and operations personnel: construction workers, repair persons, precision production workers, extractive workers, machine operators, assembly workers, transportation workers, and laborers.[82] According to the definition used here, only the precision production, craft, extractive workers, mechanics, repairers, some of the machine operators, and some assembly workers are technical workers. The remainder of the blue-collar work force is the labor pool from which new technical workers evolve.

With the exception of extractive workers and machine operators, roughly two thirds of blue-collar technical workers get some kind of formal or informal preparation for their jobs, substantially less than the proportion of workers who get qualifying training in the white-collar and technical elite populations (Table 9). Blue-collar technical workers tend to rely on informal training on the job more than other occupations for the qualifying training and upgrading they do get.



Equipment manufacturers are a vital source of training when the training goal is skill update. The rationale behind OEM training is that the manufacturer has a better understanding of equipment, processes, and procedures than any other source and is, therefore, most qualified to conduct training. Many companies that use OEM training purchase it as a part of the acquisition cost of new equipment. Unfortunately, no funding figures are currently available for OEM training.

When recertification or relicensing is the training goal, corporate training strategy often specifies two tracks: high-tech and low-tech. Craft and operations workers in high-tech jobs are likely to attend training sponsored by local colleges, vocational-technical schools, and professional groups. (This is especially true for jobs requiring a specific number of hours of

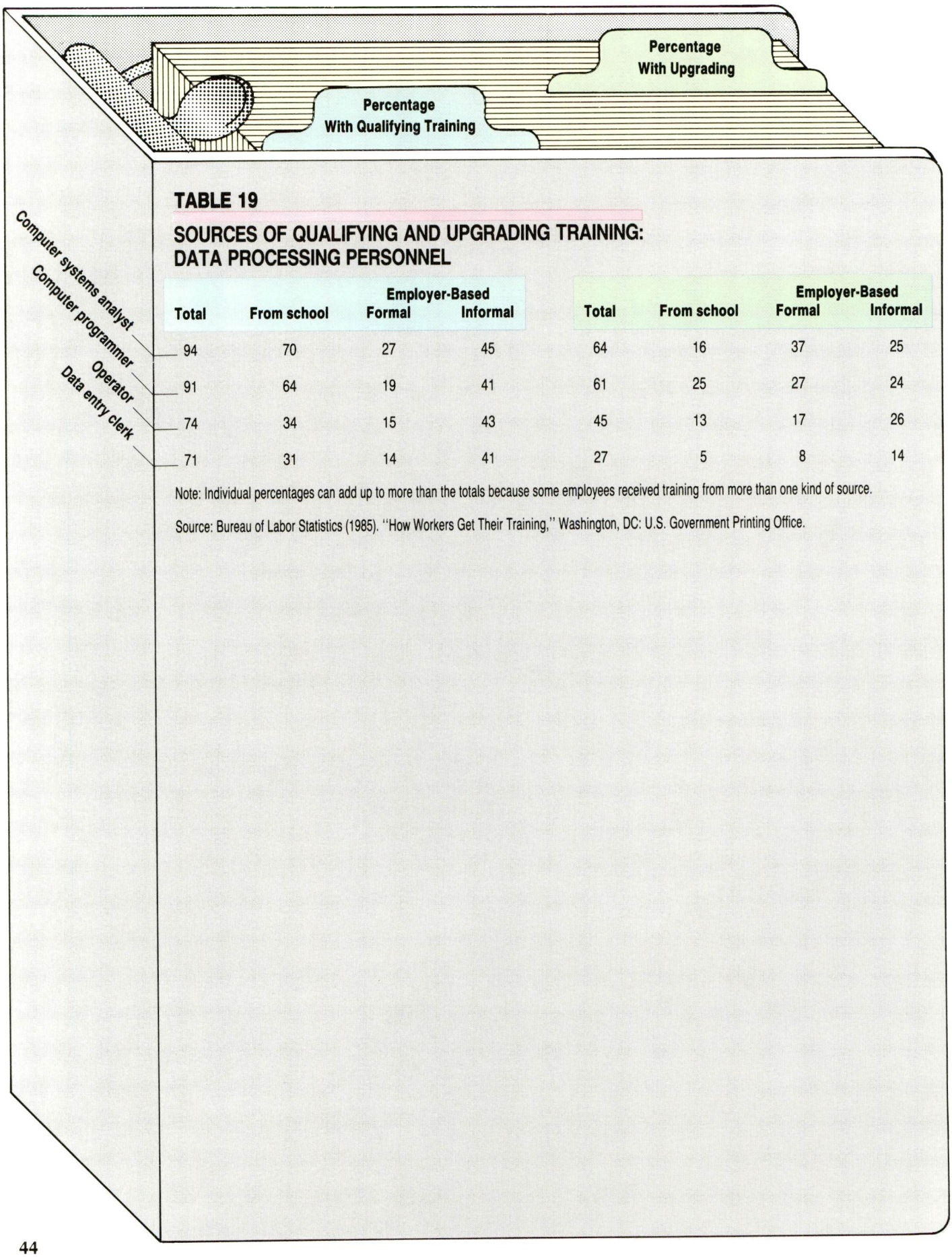


TABLE 19

SOURCES OF QUALIFYING AND UPGRADING TRAINING: DATA PROCESSING PERSONNEL

Percentage With Qualifying Training				Percentage With Upgrading			
		Employer-Based				Employer-Based	
Total	From school	Formal	Informal	Total	From school	Formal	Informal
94	70	27	45	64	16	37	25
91	64	19	41	61	25	27	24
74	34	15	43	45	13	17	26
71	31	14	41	27	5	8	14

Note: Individual percentages can add up to more than the totals because some employees received training from more than one kind of source.

Source: Bureau of Labor Statistics (1985). "How Workers Get Their Training," Washington, DC: U.S. Government Printing Office.

training or continuing education units for recertification or certification at a higher level of proficiency.) Employees in low-tech operations jobs are more likely to receive their recertification training through in-house programs, which are provided locally to minimize time lost from the job and to allow for tailoring to fit local needs.

A number of different sources can provide cross-training and retraining, depending on the specific kind of training needed. Training by the equipment manufacturer is appropriate if operation, maintenance, or repair of new or complex equipment is involved. Local colleges or vocational-technical schools are good providers when training must cover basic principles and will involve laboratories, or when the company would incur a great expense for equipment that would be used only in training. Much cross-training also takes place, formally or informally, on the job.

Data Processing Personnel

The growing importance of data processing has created a distinctive population for training. Although individual categories of workers might seem to more rightly belong in other occupational categories, the industry which they serve (data processing) makes it more appropriate to treat them as a separate cohesive occupational group.

There are more than 1.5 million data processing personnel in the United States, including information managers. This encompasses more than 300,000 computer systems analysts (computer scientists are also in this category), almost 500,000 programmers, more than 300,000 operators, and roughly 400,000 data entry clerks; the rest are information managers.[83] Systems analysts (including computer scientists) are technical professionals and information managers are in the category of managers. Programmers fall somewhere between professionals and technicians, depending on their responsibilities. Operators and data entry clerks use the computer as a job aid and neither create nor manipulate technology. Since they do not use theory in their work, they cannot be considered technical workers according to the definition used in this discussion and would probably normally fall into the category of clerical personnel.

Data processing personnel are among the most highly educated and trained occupational groups in the American work force. As Table 19 shows, both systems analysts and programmers receive about as much education and training to qualify for their jobs as any of the major occupational categories, and operators and data entry personnel get more qualifying training than all but a few of the occupational categories. The proportion of systems analysts and programmers who get upgrading compares with the figure for technical professionals, the most intensively upgraded group; computer operators get about as much upgrading training as general managers. Data entry personnel, however, get much less upgrading than qualifying training.

Systems analysts get substantial schooling, usually in colleges or universities, to prepare for their jobs, but rely on formal and informal employer-based training for upgrading. For the most part, programmers use a combination of schooling from colleges and junior colleges, employer-based formal training, and informal OJT both to qualify for their jobs and to upgrade their skills on the job. Operators use a similar mix of schooling and training on the job.

With the exception of data entry clerks, data processing personnel get more formal and informal employer-provided upgrading than any of the major occupational groupings.

Data processing personnel are a product of the information age. They build information

systems and programs. They operate computers, compile and structure data, and input data into computers. Their primary product—information—may be sold to external sources or may be used internally as the raw material of institutional efficiency.

The structure of data processing operations in an employer institution is similar to the structure of most technical functions. The systems analysts and computer scientists perform research, development, and design functions outside the line structure of the institution. Information managers are in charge of daily operations and the work of programmers and operators. In many cases, a substantial number of operators and data entry clerks are in departments outside of computer departments, creating a highly decentralized network of customers for the data processing operation.



With the downsizing of computer hardware through the miniaturization of circuitry and the spread of user-friendly technology, data processing operations are ever more dispersed. As a result, data processing personnel are serving multiple roles in R&D centers and line departments, and as service and training providers for the rest of the institution. In order to cope with dispersion, some employers have established a new staff department, the information center, which is an intermediary between database managers and end users. The center is charged with providing training, applications, and support to the computerized departments throughout a given company. Even with user-friendly programs, communicating with the computer means learning a foreign language. Information centers perform a coordination and training function, helping end users produce spreadsheets and graphs and integrating applications and hardware between departments.

Advances in information-based technology have been the major source of changing skill requirements in most American jobs. Data processing occupations continue to be hardest hit by the whirlwind of changing skill requirements that emanate from the ever new information technologies. This fact explains why data processing employees receive so much qualifying training and upgrading. It also explains why so much of their training is employer provided. The technology is simply moving too fast to wait for schools to catch up.

Ironically, computer programs sometimes replace their creators. Jobs that originate with new technology are eventually simplified. For example, general-solution business applications like VISICALC and LOTUS 1-2-3 are reducing the demand for computer programmers. Moreover, it is no longer necessary for programmers to understand hardware architecture or design separate data structures for each application—two skills that distinguish a program analyst from a programmer.

Interviews conducted for this study indicate that, with the exception of data entry clerks, data processing personnel generally have college degrees or have attended structured programs at technical schools and received certification. Frequently, courses include managing information systems, computer design and analysis, auditing (of both systems and procedures, including security measures), and programming in specific computer languages, such as BASIC, FORTRAN, and COBOL.

Armed with basic education or certification, the aspiring data processing worker usually enters the work force as a development specialist or a beginning programmer. Hands-on experience and OJT are then the keys to professional development.

Expertise in a particular kind of information system is gained through experience and is essential to career mobility. Data processing personnel often market themselves to employers on the basis of knowledge of a particular system and its programming requirements. From the employer's perspective, information managers who already know the essential elements of the employer's computer system can adjust rapidly to their new jobs. Hiring experienced people is simply the most cost-effective approach to hiring what is usually high-priced technical talent.

Information systems are highly tailored to the specific structures and products of employer institutions, encouraging formalized training for new data processing personnel to ensure speed, consistency, and quality of learning. The most common delivery method for for-

mal training is the seminar. Information managers spend an estimated 100 hours or more per year in formal computer-related training.

The rapidly changing technology of the computer field drives data processing personnel to keep their knowledge current by reading trade journals, attending conferences, interacting with vendors, and networking with colleagues through professional societies. User groups of data processing personnel who use the same technology are a regular tool for problem solving and training. Information managers who manage other computer professionals, as well as computer systems, reported in interviews conducted for this study that although a college degree may be essential for movement into management in this field, support and mentoring from supervisors are often the most important ingredients for success on the job. This accounts for the relatively high level of informal OJT among data processing personnel.

PART IV

Conclusions and Recommendations

The data discussed in this report, the full body of our research not discussed here, and our prior experience with employer-based training lead to three principal conclusions concerning job-related education and training in the United States:

1. It is critically important to individual opportunity and the competitiveness of the nation's employers.
2. There is not enough of it.
3. It is unevenly distributed among the American population.

Our research in this document and elsewhere has given us a rough sense of what might be done to improve the American job-related education and training system. We offer some preliminary recommendations here, a full year prior to final publication of our reports. We offer these recommendations, even though the nation's institutions are hard pressed for resources and cannot afford much of what we recommend because we believe resources should not govern our conclusions.

Employers

The principal challenge in improving the nation's job-related learning system is for American employers.

1. Employers currently spend about $30 billion, 1.4 percent of the national payroll, on formal training and development. Currently, 1 in 10 American employees gets some formal training from his or her employer. Many of the nation's large companies spend 2 percent of payroll on training and development, and employers with the most substantial commitments to training and development spend 4 percent.

   How much employer-based training is enough? We don't know. But our research suggests to us that these current commitments are probably insufficient. In previous studies, the American Society for Training and Development had recommended a commitment of up to 2 percent of payroll, but even the 2 percent target is not sufficient. The following are more appropriate goals:

   • an interim target of 2 percent of payroll nationwide—an increase from the current $30 billion to $44 billion. The $14 billion increase would be sufficient to increase coverage from the current 10 percent of employees to almost 15 percent of employees; and
   • an ultimate goal of 4 percent of payroll nationwide—an increase from the current $30 billion to $88 billion. This $58 billion increase would be sufficient to increase coverage from the current 10 percent of employees to almost 30 percent of employees.

2. In addition to increasing resource commitments, employers will need to integrate their human resource development structures into institutional culture and structure to:
   • accelerate and cushion the impact of change;
   • encourage learning that drives efficiencies, quality improvements, new applications, and innovations;
   • reduce the time it takes to get innovations to market;
   • encourage flexibility rather than resistance to change; and
   • provide products and services tailored to customers' needs, as well as good customer service.
3. Moreover, employers will need to push the

human resource development activity as close as possible to the point of production and service delivery, and to the interface between the institution and its suppliers and customers. Technical changes affect production and service delivery employees most. As a result, they have much to learn. They also have much to teach. Their hands-on experience with the product and customer contact make them prime experts and the front-line listening post for new efficiencies, quality improvements, new applications, and innovations. The people who use a product or service, the customers, know most about its strengths and weaknesses and should be listened to carefully.

4. Employers should work to improve the integration of human resource development into the institution by taking these steps:
   - the chief executive officer must make training a priority;
   - the training and development executive must be a full member of the senior management team;
   - line managers throughout the institution must be responsible for training and developing their subordinates; and
   - training must be available to all employees, not just white-collar and technical elites.
5. Accountability between schools and employers is a two-way street. The schools cannot deliver unless the nation's employers become full partners in American education by:
   - communicating new knowledge and changing skill requirements as they accumulate in the workplace;
   - embedding schooling in the career development process by giving more weight to educational attainment and achievement in hiring decisions; and
   - working with educators to develop and provide "learning and earning" curriculums that combine academic and applied learning experiences.
6. The state of the art in employer-based learning far exceeds the state of practice. Employers need to:
   - create an institutional environment that encourages the proactive use of human resource development as a tool to encourage efficiencies, quality improvements, new applications, and innovations;
   - use selection and appraisal procedures that assess job-related training needs;
   - use reward systems that provide compensation based on skill;
   - build training-related performance-based requirements into management and supervisory job descriptions and work objectives;
   - treat training as an investment with the same payoff as R&D; and
   - work together, sharing development and delivery costs of training materials, technologies, and basic research on applied learning among adults.



Educators

Employers depend on educators to provide job-ready and training-ready entry-level employees.

Employers also turn to educators for most of the training they buy from outside sources.

1. Educators need to change some of their basic strategies. They need to:
   - work with employers to strengthen the link between learning in school and learning on the job;
   - hire better prepared teachers, pay them what they are worth, and measure learning outcomes;
   - link the teaching of academic subjects to real-world applications; and
   - teach future employees how to make decisions, how to solve problems, how to learn, how to think a job through from start to finish, and how to work with people to get the job done.
2. High school graduates who do not go on to postsecondary education will require spe-



cial attention. The United States is competitive in the educational preparation of white-collar and technical elites, but less good at providing basic education and occupational training to non-college-bound youth. The 43 percent of American high school students who are tracked into the watered down "general curriculum" and the 19 percent who are in vocational courses need a new curriculum that mixes solid academic basics and applied learning, preferably in work settings.

Government

Given current demographic and economic trends, the education and training needs of the traditional public clientele—the disadvantaged and dislocated—are urgent. Further, mainstream employees and employers are also now appropriate targets of public education and training policy. The United States must expand its original public policy goals in education and training beyond the established concern for social justice for the disadvantaged and dislocated to a broader concern for the employment security of the mass of American employees and for the competitiveness of the nation's employers.

1. The disadvantaged have the first claim on public attention and public resources. The nation is already past due on its commitment to provide equal opportunity for participation in the American culture, polity, and economy. The litmus test of this commitment to opportunity is willingness to commit public resources to make every American capable of getting and holding a job. A job is the price of admission to this individualistic culture and participatory political system. Persons unable to get work disappear from the community, drop out of the political system, and fall into the underground economy.

   Providing human capital development for the disadvantaged would do more than honor American commitments to equal opportunity. It would also pay off in dollars and cents. Investments that endow the disadvantaged with the necessary skills to make them economically independent will reduce the costs of public dependency. In addition, with the decline in the number of entry-level workers, the nation now needs all of its young people on the job to remain economically competitive.

   Preparing the disadvantaged for jobs with a future will require a mix of family support, basic education, and job training. Programs should be predicated on the principles that the best social welfare agency is a family, the best educator is experience, and the best trainer is a job. With these principles in mind, we recommend the following features for programs targeted to the disadvantaged:
   - responsibility for programs for the disadvantaged should reside with the state and local governments;
   - employers should be assigned a substantial role in the planning and oversight of these programs;
   - programs should emphasize human capital development through work and learning rather than income maintenance;
   - performance standards should be a key operational component; and
   - programs should emphasize the coordination of human services at the state and local levels.

2. Experienced employees who become unemployed after several years on the job also have an important claim on federal resources. The same destructive processes are at work for the dislocated as for the disadvantaged. The disadvantaged tend to start out and end up at the bottom of the economic heap. The dislocated experience an economic loss that rarely results in persistent poverty but probably involves an equal amount of suffering. Dislocated employees

are hurt not so much by where they land as by how far they fall.

Dislocation is here to stay. The harsh reality is that a fair trading system and new technology will inevitably benefit all Americans in the long term, but some will be hurt in the immediate future. In the end, practical necessity and compassion suggest the need for policies to address the immediate problems of job dislocation.

Policies for the dislocated need not be expensive. Fewer than 1 million experienced American employees are dislocated each year. The current proposal for expanding the $30 billion unemployment insurance system beyond its current emphasis on income maintenance is worthy of consideration. There are three important principles in crafting programs for the dislocated:

- the government should ratchet up the safety net for dislocated employees and should help them avoid a free fall from middle-class status to official poverty;
- prior notification of layoff is needed and counseling, job search assistance, and outplacement should be encouraged while employees are still on the job; and
- the government should provide dislocated employees counseling and job search assistance, and then give them training. Training outside the context of a job or job commitment is usually folly. Training does not create jobs. Jobs create the need for training.

3. A policy to improve access to training for adult Americans should include six components:
   - loans that individuals could cash in as they choose with employers or other education and training providers;
   - incentives for employers to provide more training, preferably investment incentives delivered through the tax code;
   - state and local experimentation with policies to encourage employer-based training;
   - publicly funded R&D and the dissemination of best practices in employer-based training;
   - a "third party" strategy that would use institutions outside government and industry, such as unions and professional, occupational, and trade associations, to develop standards, training, and internship/apprenticeship experiences in particular occupations; and
   - grants to employers and the full range of public and private training suppliers for "capacity building" for delivering more effective job-related training.
4. The vast majority of Americans who are neither disadvantaged nor dislocated are becoming new claimants for public resources. The pace of technical and economic change has increased entry-level skill requirements and the need for skill upgrading after employees are on the job. The pace of change has also reduced the commitment between employer and employee, forcing employees to take responsibility for their own employment security and career development. If employees are going to take responsibility for their own careers and the security of their families, they are going to need some new tools, such as access to retraining, portable pensions and portable health care coverage, day care, and parental leave. Government will have to help employees and employers pay for these new services.



America's 120 million job seekers and employees who are not disadvantaged or dislocated need job-specific training to get their jobs and upgrading to keep their jobs and get better ones. Most Americans learn what they need to know to get a job and keep it either in school or on the job. According to the Bureau of Labor Statistics, 54 million Americans, 55 percent of the work force, say they needed some kind of job-related learning to get their job.[84]

Growing concern with the nation's economic competitiveness has resulted in a new public interest in the quantity and quality of the nation's employer-based training because of its economic importance. Between 1929 and 1982, training on the job accounted for more than half the growth in the nation's productive capacity. The other principal contributors to improved economic performance were education and machine capital, which contributed 26 and 20 percent, respectively.

Policies to encourage more and better employer-based training are conspicuously absent in the nation's investment portfolio. In addition, the absence of learning infrastructure on the job is the missing link in the partnership between schools and employers. To the extent learning is embedded in the economy, the economic importance and the leverage of preemployment education and training will increase. To the extent learning becomes more connected to job performance and economic rewards, students and trainees will be more interested in their own development.

Moreover, to the extent employers rely more on training as a strategic tool, partnerships between employers and the education and training community outside the workplace will be strengthened. Employers will be more interested in well-prepared entry-level employees who are ready to be trained. Employers who upgrade their employees more would find more use for external educational and training institutions. Large employers already buy 30 percent of their upgrading, more than $10 billion worth, from outside suppliers. Smaller employers buy almost all their training outside. The ideal device for expanding employer-based training would be some form of investment incentive for new training.

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