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International Notes

Update: Progress Toward Eradicating Poliomyelitis from the Americas

In May 1985, the Pan American Health Organization (PAHO) established a plan for eradicating the indigenous transmission of wild poliovirus from the Region of the Americas by the end of 1990 (*1*). In response to this initiative, PAHO's Expanded Program on Immunization (EPI) implemented a program strategy that included 1) achievement and maintenance of high poliomyelitis immunization levels through accelerated immunization efforts, including national immunization days held twice a year at least 4 weeks apart; 2) surveillance to detect all new cases of acute flaccid paralysis (AFP); and 3) a rapid, vigorous response, including containment measures, to all new cases of paralysis (*2*). This report updates efforts through 1989 toward the polio eradication initiative and provides preliminary laboratory surveillance data for 1990.

Through 1989, rates of reported paralytic poliomyelitis continued to decline substantially, coincident with a doubling in oral poliovirus vaccine (OPV) coverage in young children (Figure 1). In 1988, regional estimates of OPV coverage with three doses of vaccine in children by 1 year of age were >70%; in 1989, this estimate reached an all-time high of 73%. Although polio vaccination levels should be interpreted with caution because of changes over time in the methodology for assessing coverage (*3*), results such as these are encouraging for the rest of the world.

The intensification of surveillance activities in 1986 resulted in a nearly twofold increase in the number of AFP cases that were investigated and reported, from 1100 in 1985 to 2094 in 1989 (Figure 2). Despite yearly increases since 1986 in reported AFP cases, however, the number of AFP cases confirmed* as poliomyelitis decreased to 130 in 1989, representing an 86% decline from the 930 cases confirmed in 1986 and a 62% decline from the 340 cases confirmed in 1988. These polio cases were located in 99 (0.7%) of the 14,372 counties in Latin America.

*Before 1990, a case of AFP was "confirmed" as poliomyelitis if there was: 1) laboratory confirmation (wild-type poliovirus isolated from the stool), 2) epidemiologic linkage to another case of AFP or confirmed case, 3) residual paralysis 60 days after onset, 4) death, or 5) lack of follow-up of a case. Cases of AFP were "discarded" if they did not meet these criteria. In July 1989, routine serologic testing was discontinued in favor of efforts to obtain laboratory confirmation by isolating wild poliovirus from stool.

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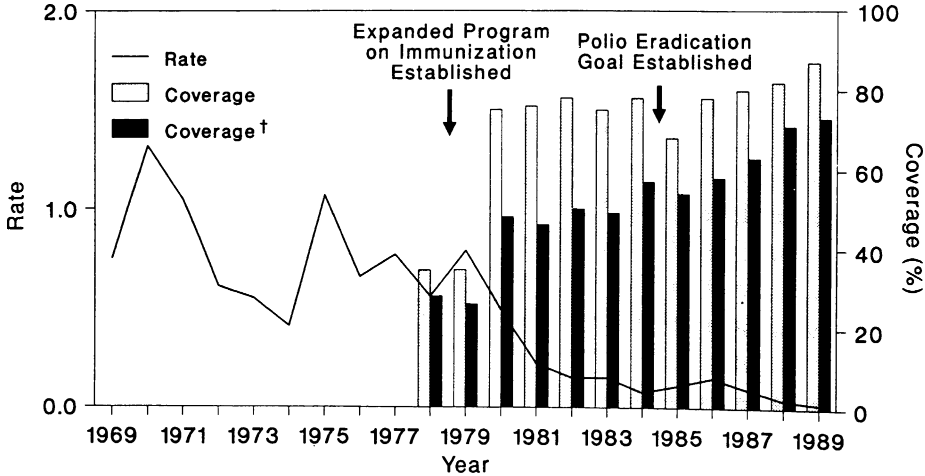
For 1989, of the 2094 reported AFP cases in the Region of the Americas, 1964 were determined not to be polio. For 703 of these cases determined not to be polio, a final diagnosis was submitted to the regional PAHO office and was available for this analysis. The most common known alternative diagnosis was Guillain-Barré syndrome (43%), followed by trauma (3%), transverse myelitis (2%), neoplasms (2%), and other diagnoses (50%).

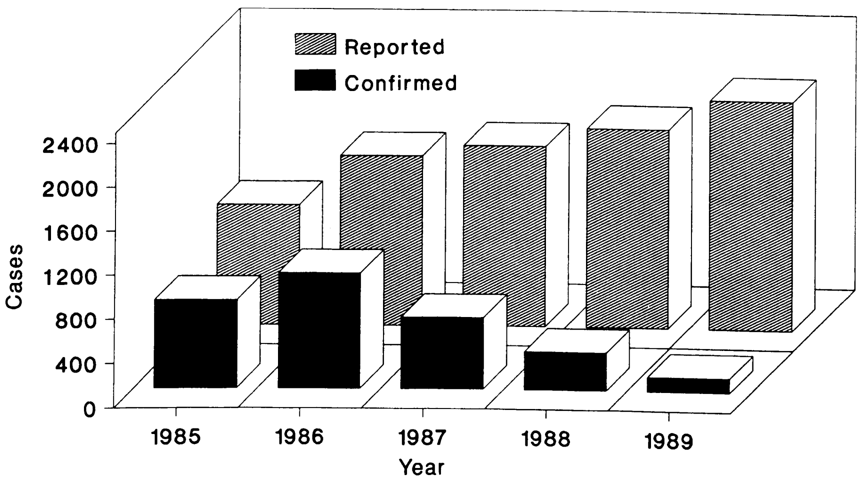
Of the 130 confirmed cases, 24 were caused by culture-confirmed wild poliovirus, and eight were vaccine-related. Of the remaining 98 patients who either died

FIGURE 1. Oral polio vaccine coverage in children 1 year of age and rate* of reported paralytic poliomyelitis, by year — the Americas, 1969–1989



*Per 100,000 population.
†Excludes Brazil, Cuba, Mexico, and Paraguay, which use only two doses.

FIGURE 2. Reported and confirmed polio cases, by year — the Americas, 1985–1989



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(18 patients), had residual paralysis (61), or were lost to follow-up (19), 36 (37%) had no stool sample taken for virus isolation, and 15 (15%) with negative stools had their stool specimens obtained >2 weeks after paralysis onset. (Because the likelihood of virus isolation diminishes with increasing duration between paralysis onset and collection of stool sample, patients for whom stool samples were not taken and patients for whom isolates were negative and stool specimens were taken >2 weeks after paralysis onset both should be monitored.)

When the characteristics of cases caused by wild poliovirus were compared with those of cases in the other categories, patients with wild poliovirus were more likely than patients who died to be <5 years of age (82% vs. 27%; $p<0.01$).

Of the 24 wild poliovirus cases confirmed in 1989, 16 were type 3 and eight were type 1. These cases were limited to six countries in three geographic regions in the Americas: northwestern Mexico, northern Andean subregion, and northeastern Brazil. During 1989, 13 wild type 3 cases occurred in Mexico. In the northern Andean subregion, type 1 wild polioviruses were isolated in Colombia (two cases), Ecuador (two cases), Peru (one case), and Venezuela (one case); type 3 wild polioviruses were isolated in Colombia (three cases). In northeastern Brazil, type 1 wild polioviruses were isolated from two patients.

As of the first 32 weeks of 1990, wild polioviruses had been isolated from three patients with AFP, including type 3 virus from a patient from northwestern Mexico with paralysis onset on February 19, 1990, and type 1 virus from two patients in the northern Andean subregion (one in Ecuador and one in Peru) with respective dates of paralysis onset of March 26 and April 25, 1990.

Reported by: Expanded Programme on Immunization, Pan American Health Organization, Washington, DC.[†]

Editorial Note: As efforts to eradicate polio from the Western Hemisphere proceed, the surveillance of paralytic poliomyelitis has shifted to focus on the surveillance of wild poliovirus. Accordingly, EPI has been using surveillance indicators, such as those assessing the quality of stool collection, to maximize detection of wild poliovirus in persons with suspected polio. Of cases that were confirmed as paralytic poliomyelitis (because of either loss to follow-up, presence of residual paralysis, or death), half were inadequately investigated because stool samples were not obtained or were negative but obtained >2 weeks after paralysis onset. The difference in age distribution between persons with culture-confirmed wild poliovirus and fatal cases provides additional indirect evidence that polio may be overdiagnosed among patients from whom wild poliovirus is not isolated.

During the initial stages of the PAHO eradication effort, surveillance of paralytic poliomyelitis was designed to be highly sensitive; consequently, many reported AFP cases ultimately were determined not to be caused by wild poliovirus. This aggressive approach to case detection by a sensitive surveillance system, combined with immediate action to control outbreaks, has contributed to the containment of wild poliovirus within the two remaining areas of risk: northwestern Mexico and the northern Andean subregion.

A large number of suspected cases are ultimately classified as "confirmed" because adequate diagnostic specimens were not collected or tested or because the patients were lost to follow-up or died (98 [75%] of the 130 confirmed cases in 1989). Consequently, at PAHO's most recent Technical Advisory Group (TAG) Meeting on

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the EPI and Polio Eradication, held in March 1990 in Mexico City, TAG members recommended the following changes in classification of AFP in the Region of the Americas (*4*):

1. *Confirmed poliomyelitis.* Acute paralytic illness associated with the isolation of wild poliovirus, irrespective of residual paralysis.
2. *Vaccine-associated poliomyelitis.* Acute paralytic illness in which vaccine-like poliovirus is isolated and is believed to be the cause of the disease. Vaccine-associated cases should be reported separately. They are considered as a category separate from confirmed polio with wild poliovirus isolates.
3. *Polio compatible.* Acute paralytic illness with compatible residual paralysis at 60 days or death or loss to follow-up in which at least two adequate stool specimens were not obtained within 2 weeks after onset of paralysis and examined in three different laboratories. These cases can neither be confirmed nor discarded. This should be a very small proportion of the cases.
4. *Not poliomyelitis.* Acute paralytic illness in which at least two adequate stool specimens were obtained within 2 weeks after onset of symptoms and were negative for poliovirus. Aliquots of the original samples should be held at the laboratory for possible future use. To ensure the accuracy of this categorization, any patient who dies, is lost to follow-up, or has residual paralysis at 60 days should have aliquots of the original specimens examined in two other laboratories in the PAHO network, using all appropriate techniques. If the specimens were adequate and all were negative, these cases should be considered "not polio" and "discarded." This classification represents a major change from the previous system.

Use of the new classification of AFP has been implemented for all patients with dates of paralysis onset since January 1, 1990.

In July 1990, the International Certification Commission of Poliomyelitis Eradication in the Americas[§] (*5*), convened by PAHO, met for the first time to develop the methodology to certify countries that are polio-free. Although the criteria are not finalized, many of the same procedures that PAHO uses to evaluate polio eradication efforts will also be used by the Commission. The burden of diagnosis and, ultimately, the proof that eradication of transmission of wild poliovirus has been achieved rests with the laboratories. Accordingly, countries need to continue to investigate properly all cases of AFP, and stool specimens obtained from persons with suspected polio must be submitted to the laboratory in adequate condition. The current level of effort must be sustained if polio is to be eradicated from the Americas by the end of 1990 and from the world by the year 2000 (*6*).

References

1. Pan American Health Organization. Director announces campaign to eradicate poliomyelitis from the Americas by 1990. Bull Pan Am Health Organ 1985;19:213–5.

[§]The Commission members are: Waldyr Arcoverde, M.D., National Health Foundation, Ministry of Health, Brazil; Isao Arita, M.D., Kumamoto National Hospital, Japan; Rodrigo Guerrero, M.D., Carbajal Foundation, Colombia; Dorothy Horstmann, M.D., Yale University School of Medicine, United States; Jan Kostrzewski, M.D., Polish Academy of Science, Poland; Maureen Law, M.D., International Development Research Center, Canada; Elsa Moreno, M.D., University of Tucumän, Argentina; V. Ramalangaswami, M.D., Nehru University, India; Olikoye Ransome-Kuti, M.D., Ministry of Health, Nigeria; Frederick Robbins, M.D., Case Western Reserve University School of Medicine, United States; Guillermo Soberón, Mexican Foundation for Health, Mexico; and Kenneth Standard, M.D., Caribbean Public Health Association, West Indies.

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2. de Quadros CA, Andrus JA, Olive J-M, et al. The eradication of poliomyelitis: progress in the Americas. Pediatr Infect Dis J (in press).
3. CDC. Progress toward eradicating poliomyelitis from the Americas. MMWR 1989;38:532–5.
4. Pan American Health Organization. Final report of the Technical Advisory Group. Presented at the VIII Meeting of the Technical Advisory Group on EPI and the Eradication of Poliomyelitis in the Americas. Mexico City, March 1990.
5. Pan American Health Organization. Final report of the first meeting of the International Certification Commission of Poliomyelitis Eradication in the Americas. Washington, DC: Pan American Health Organization, July 1990; reference document no. EPI 21,105.
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Tuberculosis in Developing Countries

Since 1988, The World Bank has supported a series of studies ("Health Sector Priorities Review") on the public health importance of clusters of certain diseases in the developing world and on the costs and effectiveness of technologies for prevention and management of these diseases. Since the 1940s, the number of cases and deaths from tuberculosis (TB) has been decreasing in most developed countries; in developing countries, however, TB remains a major problem. This report summarizes findings of The World Bank's evaluation of TB in developing countries (*1*).

Because reporting of cases and deaths in developing countries is incomplete, for this analysis the burden of TB was estimated indirectly using data on the average annual risk of TB infection (ARI)* (i.e., the probability that any person will be infected or reinfected with *Mycobacterium tuberculosis* in 1 year), the incidence of sputum smear-positive pulmonary TB, the proportion of all cases of TB that are smear-positive, and case-fatality rates for smear-positive TB and other TB. The ARI is highest in sub-Saharan Africa (1.5%–2.5%) and Asia (1.0%–2.0%) (*2*). In comparison, the ARI in the Netherlands in 1985 was estimated at 0.012% (*3*).

Incidence

A regression analysis of data from several countries in which both ARI and the incidence of sputum smear-positive pulmonary TB were known indicated 49 cases of smear-positive TB per 100,000 population for every 1% ARI (*1*) (95% confidence interval: 39–59). Based on these estimates and the observed ARIs from different regions of the world, >3,000,000 new cases of smear-positive TB occur annually in developing countries (Table 1, page 567). Because an estimated 1.2 cases of smear-negative pulmonary TB and extrapulmonary TB occur for every case of smear-positive pulmonary TB (*1*), the total number of new TB cases occurring annually in developing countries is >7,000,000 (Table 2, page 567).

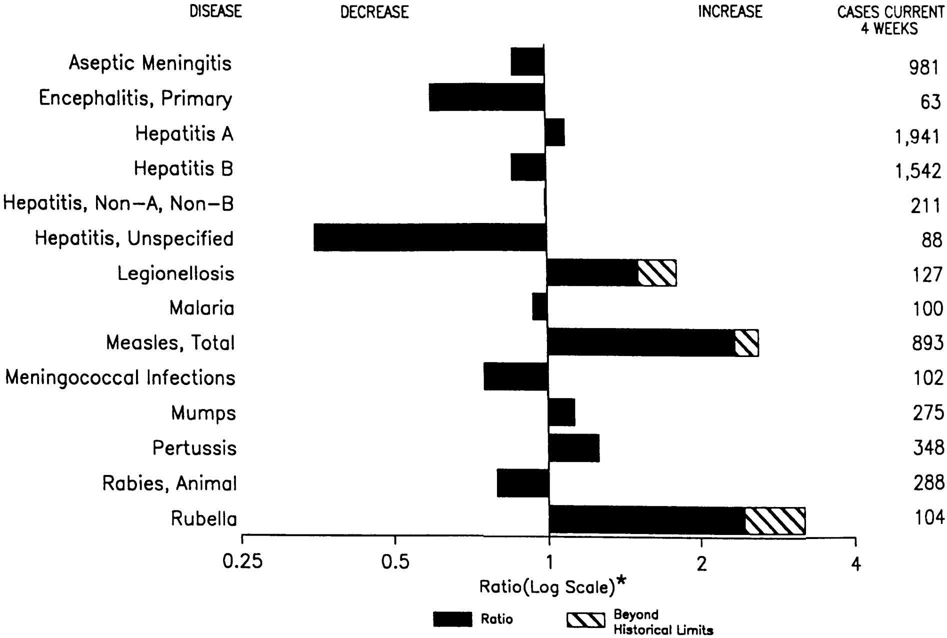
Mortality

Without appropriate chemotherapy, the death rate from TB is approximately 50% (*4*). For persons enrolled in a typical national treatment program and treated with isoniazid, thiacetazone, and/or streptomycin, the death rate is approximately 20% (*1*).

(Continued on page 567)

*ARIs are calculated from tuberculin skin test surveys of representative samples of non–BCG-vaccinated persons (e.g., if a sample of nonvaccinated 6-year-olds had a prevalence of TB infection of 6%, the annual risk of infection would be 1%).

FIGURE I. Notifiable disease reports, comparison of 4-week totals ending August 18, 1990, with historical data — United States



*Ratio of current 4-week total to mean of 15 4-week totals (from comparable, previous, and subsequent 4-week periods for past 5 years).

TABLE I. Summary — cases of specified notifiable diseases, United States, cumulative, week ending August 18, 1990 (33rd Week)

	Cum. 1990		Cum. 1990
AIDS	26,232	Plague	1
Anthrax	-	Poliomyelitis, Paralytic*	-
Botulism: Foodborne	7	Psittacosis	77
Infant	38	Rabies, human	1
Other	5	Syphilis: civilian	30,186
Brucellosis	45	military	165
Cholera	3	Syphilis, congenital, age < 1 year	45
Congenital rubella syndrome	3	Tetanus	35
Diphtheria	2	Toxic shock syndrome	207
Encephalitis, post-infectious	65	Trichinosis	19
Gonorrhea: civilian	415,409	Tuberculosis	13,604
military	5,809	Tularemia	70
Leprosy	133	Typhoid fever	256
Leptospirosis	28	Typhus fever, tickborne (RMSF)	354
Measles: imported	868		
indigenous	16,822		

*Three cases of suspected poliomyelitis have been reported in 1990; five of 13 suspected cases in 1989 were confirmed and all were vaccine-associated.

TABLE II. Cases of specified notifiable diseases, United States, weeks ending August 18, 1990, and August 19, 1989 (33rd Week)

Reporting Area	AIDS	Aseptic Menin-gitis	Encephalitis		Gonorrhea (Civilian)		Hepatitis (Viral), by type				Legionel-losis	Leprosy
			Primary	Post-in-fectious			A	B	NA,NB	Unspeci-fied		
	Cum. 1990	Cum. 1990	Cum. 1990	Cum. 1990	Cum. 1990	Cum. 1989	Cum. 1990	Cum. 1990	Cum. 1990	Cum. 1990	Cum. 1990	Cum. 1990
UNITED STATES	26,232	4,286	443	65	415,409	432,259	18,099	12,703	1,366	1,061	728	133
NEW ENGLAND	1,000	164	15	-	11,627	12,286	375	674	44	43	32	9
Maine	40	6	1	-	124	169	5	25	4	1	3	-
N.H.	44	14	-	-	119	113	6	29	3	2	3	-
Vt.	10	16	2	-	35	43	4	37	4	-	5	-
Mass.	563	50	6	-	4,795	4,795	259	418	23	38	15	8
R.I.	53	55	1	-	710	895	38	31	-	2	6	1
Conn.	290	23	5	-	5,844	6,271	63	134	10	-	-	-
MID. ATLANTIC	7,700	434	34	4	55,871	64,624	2,593	1,773	149	75	223	17
Upstate N.Y.	997	220	28	1	8,579	9,799	711	463	40	20	87	1
N.Y. City	4,304	97	3	1	22,930	25,973	336	490	22	38	45	12
N.J.	1,596	-	1	-	9,613	9,670	249	384	31	-	36	3
Pa.	803	117	2	2	14,749	19,182	1,297	436	56	17	55	1
E.N. CENTRAL	1,816	705	105	11	79,948	78,275	1,392	1,519	107	66	167	2
Ohio	440	160	30	3	24,270	20,165	139	276	43	10	57	-
Ind.	153	108	2	6	6,793	5,480	75	284	5	14	30	-
Ill.	743	106	30	2	25,863	25,752	684	279	27	15	8	1
Mich.	330	302	38	-	18,200	20,249	257	440	23	27	52	1
Wis.	150	29	5	-	4,822	6,629	237	240	9	-	20	-
W.N. CENTRAL	606	199	38	1	21,886	19,224	1,061	583	95	24	36	-
Minn.	93	12	11	1	2,678	2,109	156	76	21	-	-	-
Iowa	25	23	5	-	1,599	1,653	202	45	8	2	3	-
Mo.	360	116	5	-	13,166	11,656	331	356	42	18	22	-
N. Dak.	2	9	-	-	55	89	10	4	2	1	-	-
S. Dak.	2	5	2	-	138	162	144	5	3	-	-	-
Nebr.	29	14	7	-	1,103	890	62	23	4	-	6	-
Kans.	95	20	8	-	3,147	2,665	156	74	15	3	5	-
S. ATLANTIC	5,598	924	100	19	119,561	116,511	2,175	2,441	207	163	116	4
Del.	58	27	3	-	1,940	1,943	86	66	6	1	6	-
Md.	558	107	14	1	13,417	13,042	767	350	26	8	49	2
D.C.	484	2	-	-	8,370	7,797	12	28	4	-	-	-
Va.	498	142	35	2	11,153	9,722	183	156	29	119	8	-
W. Va.	38	29	14	-	751	903	12	57	4	4	3	-
N.C.	372	88	23	-	18,319	17,290	488	684	82	-	15	1
S.C.	233	12	1	-	9,340	10,674	28	387	13	8	15	-
Ga.	772	184	4	1	26,406	22,502	229	279	7	7	12	-
Fla.	2,585	333	6	15	29,865	32,638	370	434	36	16	8	1
E.S. CENTRAL	644	394	37	1	35,263	33,729	250	957	102	5	45	-
Ky.	111	96	13	-	3,779	3,249	65	331	34	4	18	-
Tenn.	193	59	18	1	10,893	11,071	116	518	52	-	15	-
Ala.	144	164	6	-	11,801	10,901	68	104	14	-	12	-
Miss.	196	75	-	-	8,790	8,508	1	4	2	1	-	-
W.S. CENTRAL	2,972	431	21	6	42,343	44,771	1,860	1,324	62	174	38	29
Ark.	140	8	1	-	5,400	5,174	317	53	6	13	7	-
La.	456	57	6	-	8,071	9,461	121	201	3	6	12	-
Okla.	148	39	2	5	3,829	3,902	365	105	19	17	13	-
Tex.	2,228	327	12	1	25,043	26,234	1,057	965	34	138	6	29
MOUNTAIN	700	205	17	2	8,015	9,187	2,967	975	130	82	29	-
Mont.	10	3	-	-	113	127	88	48	4	4	2	-
Idaho	17	-	-	-	86	123	56	60	8	-	3	-
Wyo.	2	1	1	-	100	60	43	12	5	1	-	-
Colo.	218	47	3	-	1,562	1,989	189	104	29	29	5	-
N. Mex.	70	9	-	-	793	881	583	127	9	3	2	-
Ariz.	213	103	7	-	3,412	3,493	1,472	341	48	31	9	-
Utah	68	24	2	-	264	285	305	69	17	5	3	-
Nev.	102	18	4	2	1,685	2,229	231	214	10	9	5	-
PACIFIC	5,196	830	76	21	40,895	53,652	5,426	2,457	470	429	42	72
Wash.	381	-	5	1	3,394	4,228	920	385	82	19	10	4
Oreg.	192	-	-	-	1,651	1,956	556	271	36	7	-	-
Calif.	4,509	698	66	19	34,860	46,544	3,753	1,720	340	397	31	58
Alaska	22	73	4	-	673	601	135	40	3	1	-	-
Hawaii	92	59	1	1	317	323	62	41	9	5	1	10
Guam	1	2	-	-	149	105	9	1	-	8	-	-
P.R.	902	45	6	-	460	681	113	184	2	19	-	-
V.I.	10	-	-	-	249	437	1	8	-	-	-	-
Amer. Samoa	-	1	-	-	44	30	21	-	-	-	-	10
C.N.M.I.	-	-	-	-	113	64	9	6	-	15	-	3

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

TABLE II. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending August 18, 1990, and August 19, 1989 (33rd Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported*		Total									
	Cum. 1990	1990	Cum. 1990	1990	Cum. 1990	Cum. 1989	Cum. 1990	1990	Cum. 1990	1990	Cum. 1990	Cum. 1989	1990	Cum. 1990	Cum. 1989
UNITED STATES	712	158	16,822	2	868	11,019	1,663	45	3,724	71	2,055	2,005	74	766	287
NEW ENGLAND	60	-	236	-	24	309	124	-	36	9	256	247	1	8	6
Maine	1	-	27	-	2	-	10	-	-	-	10	6	1	1	-
N.H.	4	-	-	-	8	9	5	-	8	-	31	5	-	1	4
Vt.	5	-	-	-	1	3	10	-	1	-	6	6	-	-	1
Mass.	31	-	17	-	7	44	58	-	11	8	192	207	-	2	1
R.I.	5	-	27	-	3	41	12	-	5	-	2	11	-	1	-
Conn.	14	-	165	-	3	212	29	-	11	1	15	12	-	3	-
MID. ATLANTIC	156	1	946	-	149	894	247	-	237	-	341	110	-	5	29
Upstate N.Y.	31	1	200	-	109	138	93	-	105	-	268	43	-	4	12
N.Y. City	51	-	211	-	21	85	34	-	-	-	-	3	-	-	15
N.J.	53	-	173	-	10	420	56	-	54	-	13	25	-	-	2
Pa.	21	-	362	-	9	251	64	-	78	-	60	39	-	1	-
E.N. CENTRAL	35	101	3,187	-	143	3,500	222	2	383	4	433	289	-	31	24
Ohio	5	100	549	-	3	743	72	-	89	2	128	45	-	1	3
Ind.	2	-	317	-	1	78	23	-	15	-	75	18	-	-	-
Ill.	12	1	1,230	-	10	2,176	55	-	116	-	97	97	-	18	19
Mich.	12	-	348	-	125	299	51	2	125	2	56	26	-	9	1
Wis.	4	-	743	-	4	204	21	-	38	-	77	103	-	3	1
W.N. CENTRAL	10	2	770	-	13	635	58	2	108	8	102	130	-	14	6
Minn.	1	-	314	-	3	15	11	-	7	-	17	28	-	9	-
Iowa	2	2	25	-	1	7	1	-	16	4	15	13	-	4	1
Mo.	6	-	96	-	-	367	23	2	49	3	58	80	-	-	4
N. Dak.	-	-	-	-	-	-	1	-	-	-	1	1	-	1	-
S. Dak.	-	-	15	-	8	-	2	-	-	-	1	1	-	-	-
Nebr.	-	-	97	-	1	113	5	-	3	1	3	4	-	-	-
Kans.	1	-	223	-	-	133	15	-	33	-	7	3	-	-	1
S. ATLANTIC	147	4	828	-	208	521	300	26	1,548	7	176	162	1	16	9
Del.	2	-	8	-	3	39	2	-	4	-	5	1	-	-	-
Md.	42	3	193	-	18	61	34	19	896	5	47	16	-	2	2
D.C.	10	-	15	-	7	34	11	1	32	-	14	-	-	1	-
Va.	36	-	70	-	2	21	38	3	90	1	15	9	-	1	-
W. Va.	2	-	6	-	-	51	12	-	40	-	14	20	-	-	-
N.C.	10	-	9	-	15	168	42	-	220	-	39	40	-	-	1
S.C.	-	-	4	-	-	2	21	-	33	-	5	-	-	-	-
Ga.	14	-	80	-	103	2	54	2	80	1	24	21	-	-	-
Fla.	31	1	443	-	60	143	86	1	153	-	13	55	1	12	6
E.S. CENTRAL	15	1	147	-	2	208	96	2	82	3	109	146	1	3	2
Ky.	2	-	31	-	-	31	31	-	-	-	-	1	-	-	-
Tenn.	8	-	70	-	-	132	35	2	46	-	45	89	1	3	2
Ala.	5	1	20	-	2	45	28	-	12	3	59	47	-	-	-
Miss.	-	-	26	-	-	-	2	-	24	-	5	9	-	-	-
W.S. CENTRAL	36	34	3,923	-	86	3,108	111	6	583	31	80	160	62	66	36
Ark.	2	-	12	-	28	5	16	1	131	1	3	17	-	3	-
La.	2	-	10	-	-	9	26	1	98	2	19	11	-	-	5
Okla.	8	1	175	-	-	105	15	1	105	-	30	25	-	1	1
Tex.	24	33	3,726	-	58	2,989	54	3	249	28	28	107	62	62	30
MOUNTAIN	17	12	747	2	91	363	52	3	294	3	186	480	2	105	35
Mont.	1	-	-	-	1	13	10	-	1	-	26	26	-	13	1
Idaho	3	1	16	-	10	2	5	-	141	1	36	64	-	49	32
Wyo.	-	-	-	-	11	-	-	-	2	-	-	-	-	-	1
Colo.	2	-	89	-	42	72	16	-	21	2	62	43	-	4	-
N. Mex.	2	-	81	2§	12	31	6	N	N	-	14	20	-	-	-
Ariz.	8	-	274	-	12	130	4	3	106	-	34	313	-	30	-
Utah	-	7	78	-	-	113	5	-	8	-	10	13	-	1	-
Nev.	1	4	209	-	3	2	6	-	15	-	4	1	2	8	1
PACIFIC	236	3	6,038	-	152	1,481	453	4	453	6	372	281	7	518	140
Wash.	17	-	202	-	69	51	57	1	41	1	88	111	-	-	-
Oreg.	12	3	168	-	44	28	52	N	N	3	41	7	-	10	2
Calif.	202	-	5,582	-	33	1,375	332	3	397	2	209	158	7	498	117
Alaska	2	-	78	-	2	1	8	-	3	-	4	-	-	-	-
Hawaii	3	-	8	-	4	29	4	-	12	-	30	5	-	10	21
Guam	3	U	-	U	1	2	-	U	3	U	-	1	U	-	-
P.R.	2	-	808	-	-	459	9	-	7	1	6	4	-	-	7
V.I.	-	U	21	U	3	4	-	U	7	U	-	-	U	-	-
Amer. Samoa	35	U	180	U	-	-	-	U	17	U	-	-	U	-	-
C.N.M.I.	-	U	-	U	-	-	-	U	7	U	4	-	U	-	-

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

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

TABLE II. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending August 18, 1990, and August 19, 1989 (33rd Week)

Reporting Area	Syphilis (Civilian) (Primary & Secondary)		Toxic-shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1990	Cum. 1989	Cum. 1990	Cum. 1990	Cum. 1989	Cum. 1990	Cum. 1990	Cum. 1990	Cum. 1990
UNITED STATES	30,186	27,116	207	13,604	13,185	70	256	354	2,652
NEW ENGLAND	1,142	1,068	16	397	345	2	20	16	4
Maine	5	8	5	-	12	-	-	-	-
N.H.	40	10	1	3	16	-	-	-	2
Vt.	1	-	-	7	5	-	-	-	-
Mass.	446	327	8	172	179	2	19	15	-
R.I.	11	20	1	119	37	-	-	-	-
Conn.	639	703	1	96	96	-	1	1	2
MID. ATLANTIC	6,227	5,567	21	3,461	2,497	1	64	16	597
Upstate N.Y.	550	582	7	276	209	-	13	8	70
N.Y. City	2,872	2,450	5	2,161	1,391	-	36	-	-
N.J.	1,013	864	-	575	448	1	13	5	183
Pa.	1,792	1,671	9	449	449	-	2	3	344
E.N. CENTRAL	2,111	1,110	48	1,377	1,399	1	22	33	102
Ohio	345	85	17	236	251	1	5	27	5
Ind.	51	43	1	105	131	-	1	-	4
Ill.	865	507	7	701	628	-	11	-	21
Mich.	642	380	23	276	305	-	4	6	28
Wis.	208	95	-	59	84	-	1	-	44
W.N. CENTRAL	287	209	21	361	334	24	3	38	432
Minn.	54	31	1	65	68	-	-	-	159
Iowa	39	22	5	38	28	-	-	-	17
Mo.	159	108	8	175	152	18	3	27	18
N. Dak.	1	3	-	14	11	-	-	-	60
S. Dak.	1	-	-	9	18	3	-	2	139
Nebr.	8	17	3	14	14	1	-	-	4
Kans.	25	28	4	46	43	2	-	9	35
S. ATLANTIC	9,867	9,945	20	2,698	2,803	3	28	141	751
Del.	109	108	1	24	27	-	-	1	14
Md.	730	494	1	214	233	-	7	13	277
D.C.	649	588	1	96	131	-	-	-	-
Va.	563	341	2	234	223	1	2	14	128
W. Va.	34	11	-	48	51	-	-	-	27
N.C.	1,125	635	10	353	336	1	2	73	4
S.C.	640	537	2	301	321	1	1	33	91
Ga.	2,523	2,541	1	439	427	-	1	7	147
Fla.	3,494	4,690	2	989	1,054	-	15	-	63
E.S. CENTRAL	2,705	1,710	11	1,041	1,079	6	2	46	119
Ky.	54	36	2	259	254	1	1	5	32
Tenn.	1,104	724	7	277	315	5	-	34	27
Ala.	818	540	2	322	306	-	1	7	60
Miss.	729	410	-	183	204	-	-	-	-
W.S. CENTRAL	4,627	3,661	11	1,740	1,574	21	8	52	320
Ark.	329	233	-	223	161	14	-	10	36
La.	1,150	861	1	150	212	-	-	1	16
Okla.	144	60	7	124	137	7	2	38	93
Tex.	3,004	2,507	3	1,243	1,064	-	6	3	175
MOUNTAIN	548	467	24	329	296	10	18	9	133
Mont.	-	1	-	22	11	-	-	4	34
Idaho	6	1	2	9	19	-	-	-	1
Wyo.	-	3	2	3	-	3	-	-	43
Colo.	25	53	7	14	20	2	-	1	8
N. Mex.	29	20	3	78	54	3	-	1	6
Ariz.	398	145	7	146	138	-	16	1	25
Utah	6	12	3	18	26	2	-	2	6
Nev.	84	232	-	39	28	-	2	-	10
PACIFIC	2,672	3,379	35	2,200	2,858	2	91	3	194
Wash.	229	282	4	173	152	1	2	-	-
Oreg.	94	160	-	81	95	-	4	1	1
Calif.	2,331	2,925	30	1,794	2,459	-	81	2	171
Alaska	10	3	-	28	43	1	-	-	22
Hawaii	8	9	1	124	109	-	4	-	-
Guam	2	4	-	29	54	-	-	-	-
P.R.	204	360	-	66	200	-	-	-	30
V.I.	3	8	-	4	4	-	-	-	-
Amer. Samoa	-	-	-	8	2	-	1	-	-
C.N.M.I.	1	7	-	31	15	-	4	-	-

U: Unavailable

TABLE III. Deaths in 121 U.S. cities,* week ending August 18, 1990 (33rd Week)

Reporting Area	All Causes, By Age (Years)						P&I**
	All Ages	≥65	45-64	25-44	1-24	<1	Total
NEW ENGLAND	565	371	117	44	13	20	45
Boston, Mass.	168	98	45	12	3	10	12
Bridgeport, Conn.	44	31	7	5	1	-	3
Cambridge, Mass.	18	18	-	-	-	-	-
Fall River, Mass.	17	13	4	-	-	-	-
Hartford, Conn.	46	20	13	8	5	-	6
Lowell, Mass.	23	15	6	1	-	1	-
Lynn, Mass.	9	6	-	2	1	-	-
New Bedford, Mass.	16	12	3	1	-	-	1
New Haven, Conn.	37	30	5	-	1	1	5
Providence, R.I.	54	44	6	3	-	1	5
Somerville, Mass.	6	3	1	1	-	1	-
Springfield, Mass.	44	27	11	2	2	2	1
Waterbury, Conn.	32	22	8	2	-	-	3
Worcester, Mass.	51	32	8	7	-	4	9
MID. ATLANTIC	2,818	1,799	556	320	69	71	142
Albany, N.Y.	35	21	7	3	1	3	1
Allentown, Pa.	22	17	4	1	-	-	-
Buffalo, N.Y.	100	70	20	6	1	3	2
Camden, N.J.	36	24	6	4	-	2	-
Elizabeth, N.J.	21	14	6	-	1	-	2
Erie, Pa.†	43	31	10	1	1	-	3
Jersey City, N.J.	56	35	15	5	-	1	2
N.Y. City, N.Y.	1,384	852	259	210	34	29	65
Newark, N.J.	72	24	21	16	1	8	7
Paterson, N.J.	27	23	4	-	-	-	3
Philadelphia, Pa.	603	391	143	44	11	13	36
Pittsburgh, Pa.†	91	62	17	6	1	5	6
Reading, Pa.	31	23	4	2	-	2	8
Rochester, N.Y.	80	60	11	5	1	3	4
Schenectady, N.Y.	24	17	5	1	1	-	-
Scranton, Pa.†	23	19	3	1	-	-	-
Syracuse, N.Y.	85	57	7	5	15	1	1
Trenton, N.J.	42	30	5	6	-	1	2
Utica, N.Y.	17	8	7	1	1	-	-
Yonkers, N.Y.	26	21	2	3	-	-	-
E.N. CENTRAL	2,178	1,435	445	165	58	75	80
Akron, Ohio	69	48	16	4	-	1	4
Canton, Ohio	33	24	8	1	-	-	6
Chicago, Ill.§	564	362	125	45	10	22	16
Cincinnati, Ohio	93	67	19	3	1	3	8
Cleveland, Ohio	135	77	33	10	7	8	2
Columbus, Ohio	153	97	29	14	5	8	5
Dayton, Ohio	104	66	28	8	2	-	-
Detroit, Mich.	208	118	40	32	9	9	6
Evansville, Ind.	54	44	3	2	2	3	2
Fort Wayne, Ind.	61	40	11	6	4	-	8
Gary, Ind.	15	9	4	1	1	-	-
Grand Rapids, Mich.	65	44	14	2	1	4	4
Indianapolis, Ind.	162	113	30	9	6	4	2
Madison, Wis.	39	26	7	5	-	1	1
Milwaukee, Wis.	122	92	18	8	2	2	4
Peoria, Ill.	42	30	9	1	-	2	3
Rockford, Ill.	49	32	8	2	3	4	-
South Bend, Ind.	62	43	7	5	4	3	5
Toledo, Ohio	92	65	22	4	-	1	3
Youngstown, Ohio	56	38	14	3	1	-	1
W.N. CENTRAL	726	520	125	44	19	17	32
Des Moines, Iowa	52	42	7	1	1	1	5
Duluth, Minn.	30	20	8	1	1	-	4
Kansas City, Kans.	20	12	6	1	1	-	1
Kansas City, Mo.	99	63	18	10	4	4	5
Lincoln, Nebr.	33	21	7	3	-	1	3
Minneapolis, Minn.	195	138	37	11	4	5	7
Omaha, Nebr.	70	52	10	4	4	-	3
St. Louis, Mo.	130	97	17	7	3	6	-
St. Paul, Minn.	60	48	9	3	-	-	3
Wichita, Kans.	37	27	6	3	1	-	1

Reporting Area	All Causes, By Age (Years)						P&I**
	All Ages	≥65	45-64	25-44	1-24	<1	Total
S. ATLANTIC	1,177	693	250	124	35	59	54
Atlanta, Ga.	148	77	37	19	4	11	3
Baltimore, Md.	235	140	59	21	7	8	9
Charlotte, N.C.	72	43	19	6	2	2	5
Jacksonville, Fla.	98	58	24	11	2	3	9
Miami, Fla.	121	72	18	21	5	5	2
Norfolk, Va.	66	33	9	2	7	15	2
Richmond, Va.	79	45	27	7	-	-	13
Savannah, Ga.	45	29	9	3	1	3	2
St. Petersburg, Fla.§	65	53	7	2	1	2	6
Tampa, Fla.	72	51	7	9	2	3	1
Washington, D.C.	154	72	33	22	4	7	2
Wilmington, Del.	22	20	1	1	-	-	-
E.S. CENTRAL	790	530	137	70	31	22	41
Birmingham, Ala.	99	71	17	4	2	5	2
Chattanooga, Tenn.	59	39	5	13	2	-	3
Knoxville, Tenn.	82	51	17	7	3	4	3
Louisville, Ky.	105	70	20	6	6	3	3
Memphis, Tenn.	181	123	32	17	7	2	13
Mobile, Ala.	85	63	9	7	5	1	5
Montgomery, Ala.	47	30	11	3	-	3	5
Nashville, Tenn.	132	83	26	13	6	4	7
W.S. CENTRAL	1,668	982	377	188	73	48	63
Austin, Tex.	72	47	11	9	3	2	8
Baton Rouge, La.	47	29	11	3	1	3	3
Corpus Christi, Tex.	57	39	12	5	-	1	6
Dallas, Tex.	191	86	54	30	14	7	3
El Paso, Tex.	49	34	9	1	3	2	5
Fort Worth, Tex	76	48	18	6	2	2	1
Houston, Tex.§	734	436	169	89	24	16	18
Little Rock, Ark.	58	41	8	2	1	6	6
New Orleans, La.	124	68	25	14	13	4	-
San Antonio, Tex.	152	85	36	21	9	1	11
Shreveport, La.	20	9	5	2	2	2	-
Tulsa, Okla.	88	60	19	6	1	2	2
MOUNTAIN	698	433	146	68	31	20	43
Albuquerque, N. Mex.	82	46	16	14	5	1	9
Colo. Springs, Colo.	48	33	9	3	2	1	9
Denver, Colo.	127	89	19	9	2	8	6
Las Vegas, Nev.	119	63	31	15	6	4	5
Ogden, Utah	19	14	3	2	-	-	5
Phoenix, Ariz.	136	83	33	10	5	5	2
Pueblo, Colo.	11	9	1	1	-	-	1
Salt Lake City, Utah	41	24	7	2	7	1	-
Tucson, Ariz.	115	72	27	12	4	-	6
PACIFIC	1,941	1,268	350	203	63	45	111
Berkeley, Calif.	18	15	2	1	-	-	1
Fresno, Calif.§	71	49	10	6	3	3	7
Glendale, Calif.	23	19	2	1	-	-	4
Honolulu, Hawaii	76	50	13	8	-	4	11
Long Beach, Calif.	75	38	19	9	4	5	7
Los Angeles Calif.	399	239	76	54	22	5	17
Oakland, Calif.	85	55	16	8	5	1	4
Pasadena, Calif.	24	20	3	1	-	-	1
Portland, Oreg.	147	96	27	17	5	2	4
Sacramento, Calif.	139	100	21	11	4	-	10
San Diego, Calif.	315	218	53	24	7	12	21
San Francisco, Calif.	145	85	29	23	4	2	4
San Jose, Calif.	172	112	31	18	3	7	10
Seattle, Wash.	153	101	32	15	3	2	2
Spokane, Wash.	55	41	8	3	2	1	5
Tacoma, Wash.	44	30	8	4	1	1	3
TOTAL	12,561††	8,031	2,503	1,226	392	377	611

*Mortality data in this table are voluntarily reported from 121 cities in the United States, most of which have populations of 100,000 or more. A death is reported by the place of its occurrence and by the week that the death certificate was filed. Fetal deaths are not included.

**Pneumonia and influenza.

†Because of changes in reporting methods in these 3 Pennsylvania cities, these numbers are partial counts for the current week. Complete counts will be available in 4 to 6 weeks.

††Total includes unknown ages.

§Data not available. Figures are estimates based on average of past available 4 weeks.

Tuberculosis – Continued

Based on these rates and estimates of the number of cases that remain undetected and untreated and the number that are detected and treated with standard chemotherapy regimens (World Health Organization [WHO], unpublished data), the estimated annual number of deaths from TB in the developing world is >2,500,000 (Table 3), or approximately 6.7% of all deaths (*5*) and, among persons 15–59 years of age, 18.5% of deaths and 26% of preventable deaths (*6*).

Prevention and Control

Three major strategies for controlling TB are BCG vaccination of children, chemoprophylaxis, and case-finding/treatment.

Total coverage with BCG can prevent 40%–70% of deaths from TB among children and reduce total TB mortality by approximately 6% (*1*). However, because the effect of BCG on TB mortality is limited in older age groups, expanded BCG coverage cannot be the sole means employed to control TB.

Although clinical TB can be secondarily prevented by treating persons with latent tuberculous infection, mass chemoprophylaxis of all such persons cannot be efficiently or economically accomplished. However, selective treatment of high-risk groups (e.g., close family contacts of smear-positive sources) may be feasible. If

TABLE 1. Estimated incidence* of smear-positive pulmonary tuberculosis (TB) — developing countries, 1990

	Estimated no. cases			
Area	Low	Midpoint	High	Rate†
Sub-Saharan Africa	296,000	521,000	745,000	103
East and South Asia	1,142,000	2,298,000	3,455,000	79
North Africa and West Asia	53,000	146,000	239,000	54
South America	57,000	160,000	263,000	54
Central America and Caribbean	30,000	83,000	136,000	54
Total	**1,578,000**	**3,208,000**	**4,838,000**	**77**

*Low, midpoint, and high estimates were derived by assuming there are 39, 49, and 59 cases of smear-positive TB per 100,000 population for every 1% average annual risk of tuberculous infection.
†Per 100,000 population.

TABLE 2. Estimated incidence* of all forms of tuberculosis (TB) — developing countries, 1990

	Estimated no. cases			
Area	Low	Midpoint	High	Rate†
Sub-Saharan Africa	656,000	1,156,000	1,655,000	229
East and South Asia	2,535,000	5,102,000	7,670,000	174
North Africa and West Asia	117,000	323,000	530,000	120
South America	129,000	356,000	584,000	120
Central America and Caribbean	66,000	185,000	302,000	120
Total	**3,503,000**	**7,122,000**	**10,741,000**	**171**

*Assumes 1.2 cases of smear-negative pulmonary TB and extrapulmonary TB for each case of smear-positive pulmonary TB.
†Per 100,000 population.

Tuberculosis — Continued

proven effective in clinical trials, chemoprophylaxis might also play an important role in preventing clinical TB in persons with dual human immunodeficiency virus (HIV) and tuberculous infections.

Treatment

The most effective means of reducing transmission of tuberculous infection, and thus the number of TB cases, is to treat and cure patients with smear-positive TB. Each person with undiagnosed and untreated smear-positive TB will cause 10–14 infections per year. Of these, 0.6–1.2 eventually will become new cases of TB (*1*).

Despite the availability of anti-TB drugs, TB treatment programs in most developing countries have not succeeded because of poor patient compliance with therapy, emergence of drug-resistant organisms, and failure to carefully control drug supplies and therapy. Cure rates in developing countries are frequently <50%; however, cure rates of >90% can be achieved when short-course chemotherapy regimens are given under supervision (*7*). A major obstacle to the more widespread use of these short-course treatment regimens is the higher cost of the drugs, especially rifampin and pyrazinamids.

Cost-Effectiveness

The estimated cost of treatment per patient in developing countries, in 1986 U.S. dollars, is $123 for standard 12-month chemotherapy and $168 for short-course chemotherapy. However, the cost per patient cured is $368 for standard 12-month chemotherapy and $314 for short-course. For standard 12-month chemotherapy, the estimated cost per death averted is $569 for standard therapy and $514 for short-course therapy. The estimated cost per death averted, including the effect of reducing one round of transmission by sputum smear-positive cases, is $275 for standard chemotherapy and $243 for short-course chemotherapy (*1*).

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Editorial Note: With the possible exception of measles (*8*), more persons in developing countries die from TB each year than from any other pathogen. Existing diagnostic technology and chemotherapeutic agents can prevent morbidity and mortality from TB in these countries. The National Tuberculosis Programs, assisted by the International Union Against Tuberculosis and Lung Disease (IUATLD), have shown that short-course chemotherapy can be applied on a national scale with excellent results (*1*). The analysis of the cost-effectiveness of both standard 12-month

TABLE 3. Estimated number of deaths and death rate* from all forms of tuberculosis — developing countries, 1990

Area	Estimated no. deaths			Death rate
	Low	Midpoint	High	
Sub-Saharan Africa	266,000	528,000	790,000	104
East and South Asia	771,000	1,709,000	2,646,000	58
Central America and Caribbean	28,000	88,000	148,000	57
South America	41,000	125,000	211,000	42
North Africa and West Asia	33,000	99,000	166,000	37
Total	**1,139,000**	**2,549,000**	**3,961,000**	**61**

*Per 100,000 population.

Tuberculosis — Continued

and short-course chemotherapy indicates that TB chemotherapy is as cost effective as other health interventions routinely applied in developing countries (e.g., immunizations and oral rehydration therapy) (*9*).

Recent findings indicate a marked increase in TB cases caused by an interaction of TB with HIV (*10*). The combination of the enormous public health burden, the existence of cost-effective interventions, and the demonstrated interaction between tuberculous and HIV infections make TB a high priority for action and research in international health. WHO and The World Bank, with assistance from IUATLD, CDC, and other organizations, are reassessing their approaches to the prevention and control of TB. Additionally, the International Task Force for Disease Eradication has recognized the public health burden of TB and has identified two requirements for reducing this burden: 1) improved diagnostic tests, chemotherapy, and vaccine; and 2) wider application of current therapy (*11*).

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