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Recommendations of the Public Health Service

Advisory Committee on Immunization Practices

Influenza Vaccine — Second Supplemental Statement

INTRODUCTION

Several issues of importance in the National Influenza Immunization Program regarding vaccination recommendations remain to be addressed: (1) immunization of normal infants, children, and adolescents up to age 18 years old, (2) the pending options for recommending a booster for young adults 18-24 years old who already have been given 1 dose, (3) immunization of children less than 3 years old at high risk of severe influenza, and (4) monovalent influenza B vaccine dosage in high-risk children.

The following discussion of these issues derives from the results of clinical field trials of current influenza vaccines which have been carried out during the spring, summer, and early fall of 1976 and from past experience with influenza vaccines.

SUMMARY OF VACCINE FIELD TRIALS

Field trials of swine influenza vaccines in children, adolescents, and young adults have now been essentially completed. Data on immunogenicity and reactogenicity of both whole-virus and split-virus vaccines given to approximately 3,300 persons 6 months through 23 years of age were reviewed on October 22, 1976, by scientists who conducted or supervised the trials and by representatives of the various immunization recommending groups in the country including the Advisory Committee on Immunization Practices (ACIP). Since that workshop meeting, additional discussions and evaluations have occurred in preparation for this statement.

The conclusions drawn from the field trials indicate the clear possibility for safely and effectively immunizing infants as young as 6 months of age, children, adolescents, and young adults against influenza. In essence, this would generally require giving 2 doses of *split-virus* vaccine in doses selected to minimize side effects — especially important at the younger ages where side effects are particularly common. The whole-virus vaccines, while quite immunogenic, were much more frequently associated with transient fever and systemic side effects and were not felt to be an alternative to the split-virus vaccines for childhood immunization at the present time.

However, the split-virus vaccines particularly suited to infant and childhood immunization are not and will not be available in sufficient supply in 1976 for timely protection of *all* normal children and adolescents less than 18 years of age against swine influenza — that is, prior to the 1976-77 influenza season — and priority should be given to older adults.

While the inability to recommend and implement a program of systematic immunization of children and adolescents less than 18 years of age will be disappointing to some, the field trials have provided a greatly expanded body of scientific data on influenza immunization. They clearly will influence future influenza vaccine formulations and recommendations on vaccine use in children. Furthermore, although influenza can be very common in children and adolescents, the number of severe and fatal illnesses in these groups is characteristically very small.

In brief summary, field trials of monovalent swine influenza vaccine containing A/New Jersey/76 and a bivalent vaccine containing both swine influenza and A/Victoria/75 viruses demonstrated:

(1) Split-virus influenza vaccines resulted in considerably fewer febrile and systemic side effects than whole-virus vaccines, especially in children.

(2) In the young age groups tested (6-36 months, 3-5 years, and 6-10 years) small, fractional doses of whole-virus vaccines induced fever (usually low grade and of less than 24-hours duration) in 10-50% of recipients, depending on age.

(3) Both whole-virus and split-virus vaccines, adjusted in dose to minimize side effects, required 2 doses at 4-week or greater intervals generally to induce seroconversion rates with final HI antibody titers of $\geq$ 1:20 in more than 85-90% of vaccinees and HI antibody titers of $\geq$ 1:40 in more than 80% of vaccinees.

(4) The 2 available split-virus vaccines were essentially equivalent in potency. Both of the split-virus vaccines required considerably more antigen than either of the whole-virus vaccines to produce com-

Influenza Recommendations – Continued

parable rates of seroconversion and levels of antibody.

(5) Now-completed trials of bivalent vaccine containing both A/New Jersey/76 (swine influenza virus) and A/Victoria/75 in children and adolescents extended but did not alter the already available data which formed the basis of recent recommendations for immunizing high-risk younger age groups.*

(6) Young adults 18-24 years old were regularly benefited by a second dose of either whole-virus or split-virus vaccine 4 weeks or more after the first dose. Seroconversion rates following 2 doses of monovalent swine influenza vaccine generally at HI antibody titers of ⩾ 1:20 occurred in more than 90% of vaccinees and at HI antibody titers of ⩾ 1:40 in more than 80% of vaccinees. (Single dose seroconversion rates were quite variable depending on whether whole-virus or split-virus vaccines were administered but generally involved production of HI antibody titers of ⩾ 1:20 in somewhat more than 50% of vaccinees and of HI antibody titers of ⩾ 1:40 in more than 40% of recipients.)

*Recommendations of the Committee on Infectious Diseases of the American Academy of Pediatrics: Immunization of Children at High Risk from Influenza Infection. MMWR 25 (36):285, September 17, 1976.

GENERAL RECOMMENDATIONS

Monovalent A/New Jersey/76 Vaccine

Normal infants and children less than 3 years old: No recommendaton.

Normal children and adolescents 3-17 years old: No recommendation for systematic, communitywide programs. To the extent vaccine is available, 2 doses of *split-virus* monovalent A vaccine containing 200 CCA units of A/New Jersey/76 (swine influenza virus) separated by at least 4 weeks.

Normal young adults 18-24 years old: A second dose of either whole-virus or split-virus monovalent A influenza vaccine containing 200 CCA units of A/New Jersey/76 (swine influenza virus) at least 4 weeks after the first dose. With regard to any side effects associated with this dose, available data suggest that the already very low rate of side effects from influenza vaccine might be even lower with the second dose.

Bivalent A/New Jersey/76 (Swine Influenza Virus) and A/Victoria/75 Vaccine

High-risk children 6-36 months old: The American Academy of Pediatrics Committee on Infectious Diseases

Table I. Summary—Cases of Specified Notifiable Diseases: United States

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

DISEASE	45th WEEK ENDING		MEDIAN 1971–1975	CUMULATIVE, FIRST 45 WEEKS		
	November 13, 1976	November 8, 1975		November 13, 1976	November 8, 1975	MEDIAN 1971–1975
Aseptic meningitis	69	80	106	2,808	3,569	3,706
Brucellosis	4	12	5	236	227	164
Chickenpox	1,735	1,651	---	154,495	123,782	---
Diphtheria	1	6	5	131	259	161
Encephalitis: Primary	27	158	37	1,250	2,261	1,340
Encephalitis: Post-Infectious	2	3	3	235	266	248
Hepatitis, Viral: Type B	217	237	172	12,697	10,085	7,818
Hepatitis, Viral: Type A	422	588	1,005	28,890	30,221	44,638
Hepatitis, Viral: Type unspecified	112	185		7,341	7,071	
Malaria	7	6	8	405	365	365
Measles (rubeola)	217	278	278	35,723	22,188	25,130
Meningococcal infections, total	25	35	26	1,323	1,257	1,197
Civilian	25	35	25	1,314	1,230	1,177
Military	-	-	-	9	27	28
Mumps	303	894	959	34,623	51,174	60,764
Pertussis	10	26	---	833	1,406	---
Rubella (German measles)	91	83	143	11,190	15,482	22,869
Tetanus	1	5	2	56	90	90
Tuberculosis	577	611	---	28,567	28,776	---
Tularemia	5	1	1	120	96	129
Typhoid fever	6	3	9	353	306	369
Typhus, tick-borne (Rky. Mt. spotted fever)	6	3	2	836	786	617
Venereal Diseases:						
Gonorrhea: Civilian	17,811	19,806	---	873,129	862,808	---
Gonorrhea: Military	472	651	---	25,499	25,290	---
Syphilis, primary and secondary: Civilian	392	478	---	20,891	22,216	---
Syphilis, primary and secondary: Military	4	5	---	299	307	---
Rabies in animals	45	38	47	2,565	2,141	3,004

Table II. Notifiable Diseases of Low Frequency: United States

	CUM.		CUM.
Anthrax:	2	Poliomyelitis, total:	8
Botulism:	27	Paralytic:	7
Congenital rubella syndrome: Calif 1	20	Psittacosis:	61
Leprosy: Calif. 1	119	Rabies in man:	2
Leptospirosis:	40	Trichinosis: Ups. NY. 1, Wash 1, Calif. 1	80
Plague:	15	Typhus, murine: N.C. 1	45

has reviewed the limited data which are available and recommends 2 intramuscular injections of the *split-virus* bivalent A influenza vaccine separated by at least 4 weeks. For these infants and young children a dose of 0.25 ml should be used. This volume represents 50% of the dose used in older children and adults and contains 100 CCA units each of A/New Jersey/76 (swine influenza virus) and A/Victoria/75.

High-risk children and adolescents 3-17 years old: See previous recommendation of the American Academy of Pediatrics Committee on Infectious Diseases, "Immunization of Children at High Risk from Influenza Infection," September 1976.

High-risk young adults 18-24 years old: A second dose of either whole-virus or split-virus bivalent A influenza vaccine containing 200 CCA units of A/New Jersey/76 (swine influenza virus) and 200 CCA units of A/Victoria/75 at least 4 weeks after the first dose.

Monovalent B/Hong Kong/72 Vaccine for High-Risk Children and Adolescents

Recommended dosages of influenza A vaccines for children have been derived in large part from the current field trials in relevant age groups and from clinical experience and judgment. Studies of influenza B vaccines have been much less extensive. In the absence of new data on which to base dosages of the monovalent B vaccine containing 500 CCA units of B/Hong Kong/72 generally recommended for children at risk of serious or fatal influenza, it is reasonable to employ dosage concepts used in past years. This has been for fractional doses of vaccine according to age group, derived, in part, empirically. It is represented in package literature for the monovalent B/Hong Kong influenza vaccine for use in 1976. A single dose of this vaccine is believed to be sufficient for high-risk children because of their likely prior natural exposures to related influenza B strains. The following single-dose schedules of monovalent B/Hong Kong influenza vaccine are recommended:

Infants and children less than 3 years old: No recommendation.

Children 3-5 years old: 0.05 ml to 0.1 ml (this volume represents 10-20% of the adult dose and contains 50-100 CCA units of antigen). (A second dose of the same volume 2 weeks or more later has sometimes been recommended to add to the initial antigenic stimulus.)

Children 6-9 years old: 0.25 ml (this volume represents 50% of the adult dose and contains 250 CCA units of antigen).

Children 10-17 years old: 0.5 ml (this volume is the same as that recommended for adults and contains 500 CCA units of antigen).

Measles Vaccine

INTRODUCTION

Measles is often a severe disease, frequently complicated by middle ear infection and bronchopneumonia. Encephalitis, which occurs with approximately 1 of every 1,000 reported cases of measles, often causes permanent brain damage and mental retardation. Death, predominantly from respiratory and neurologic causes, is associated with measles in 1 of every 1,000 reported cases.

With the highly effective, safe vaccines now available, measles could be completely controlled in the United States. Collaborative efforts of professional and voluntary medical and public health organizations in vaccination programs have resulted in a dramatic reduction in the incidence of measles. A continuing effort to vaccinate all susceptible children and to revaccinate those whose immunity is questioned is necessary if the goal of eradicating measles is to be reached.

MEASLES VIRUS VACCINE

Live measles virus vaccine* available in the United States is prepared in chick embryo cell culture. The current vaccine virus strain has been attenuated beyond that of the original Edmonston B strain, which is now rarely used. Measles vaccine produces a mild or inapparent, non-communicable infection. Fifteen percent of vaccinated children have fever (rectal temperature $\geq$ 103 F) beginning about the sixth day after vaccination and lasting up to 5 days. Transient, atypical rashes have been reported, but rarely. Most reports indicate that children with fevers are otherwise asymptomatic.

Measles antibodies develop in at least 95% of susceptible children vaccinated at about 15 months of age or older with the more attenuated measles vaccine. The titers of vaccine-induced antibody are lower than those following natural disease; but the conferred protection appears to be durable, judging from evidence now extending to 14-year follow-up.

Seroconversion rates following vaccination of children about 12 months of age are somewhat lower than at 15 months; rates in vaccinees 13-14 months old have not been as thoroughly evaluated but appear to be higher than in 12-month-olds. Children vaccinated prior to 12 months of age, particularly when only 6-9 months, generally have lower rates of seroconversion. Residual maternal antibody apparently can interfere with measles immunization up to about 1 year of age or more.

Experience with more than 80 million doses of vaccine distributed in the United States through 1975 indicates that live measles vaccine has an excellent record of safety. Adverse reactions temporally associated with measles vaccination, those of the central nervous system including encephalitis and encephalopathy, reportedly occur approximately once for every million doses.

Subacute sclerosing panencephalitis (SSPE) is a "slow virus" infection of the central nervous system associated with a measles-like virus. Preliminary results from a case-control study indicate that measles vaccine significantly reduces the chance of developing SSPE. However, there have been reports of SSPE in children who did not have a history of natural measles but did receive measles vaccine. Some of these cases may have resulted from unrecognized measles illness in the first year of life or possibly from the measles vaccination. Based on estimated nationwide measles morbidity data and nationwide measles vaccine distribution, the association of SSPE cases to measles vaccination is about 1 case per million vaccine doses distributed. This is

*Official name: Measles Virus Vaccine, Live, Attenuated.

Measles Vaccine — Continued

far less than the association with measles, 5-10 cases of SSPE per million cases of measles. Administering measles vaccine to children who have already had measles does not increase their risk of developing SSPE.

VACCINE USAGE

General Recommendations

All susceptible children — those who have not had natural measles or measles vaccine — should be vaccinated. It is particularly important to vaccinate them at about 15 months of age, *before* they encounter other susceptible children in day-care centers, nursery schools, kindergartens, or elementary schools. Unvaccinated preschool and elementary-school children are often responsible for transmitting measles to other children in the community.

Dosage: A single dose of live measles vaccine in volume specified by the manufacturer should be given subcutaneously. No booster is needed. Immune serum globulin (ISG) should *not* be given with the currently available measles vaccine.

Age: To achieve the maximum rate of seroconversion, measles vaccine preferably should be given when children are about 15 months of age or at least have passed their first birthday. However, whenever there is a likely exposure to natural measles at an earlier age, infants as young as 6 months old should be vaccinated. In such cases, it should be recognized that since the rate of seroconversion declines with diminishing age, the children may need to be revaccinated at an older age to assure continued protection.

With the recent shift in age distribution of reported measles cases to older groups, vaccination may be indicated for high school and college age persons in epidemics. Limited data show that adverse reactions to vaccine are no more common in adults than in children.

Revaccination: Children vaccinated before 12 months of age — particularly if vaccine was administered with ISG or measles immune globulin (MIG), a standardized globulin preparation — should be revaccinated with live measles vaccine at about 15 months of age to assure full protection. However, based on available evidence, there is no reason to systematically revaccinate all children originally vaccinated when 12-14 months of age. (See also "Prior Immunization with Inactivated Measles Virus Vaccine.")

High-risk groups: Immunization against measles is particularly important for children with illnesses such as heart disease, cystic fibrosis, and untreated tuberculosis and for children who are malnourished or are institutionalized. All these children are prone to have severe cases of measles and complications.

Use of Vaccine Following Exposure

Live measles vaccine given shortly after exposure to measles can provide protection. There is no contraindication to its use in exposed individuals. If the exposure does not result in infection, the vaccine should induce protection against subsequent infection.

Use of ISG Following Exposure

To prevent or modify measles in a susceptible person exposed less than 6 days before, ISG, 0.1 ml per pound of body weight, should be given. ISG may be especially indicated for susceptible household contacts of measles patients, particularly contacts under 1 year of age, for whom the risk of complications is highest. Live measles vaccine should be given about 3 months later, if the contact is at least 15 months old, when the passive measles antibody should have disappeared. ISG should *not* be used in an attempt to control measles epidemics.

Precautions and Contraindications

Altered immunity: Replication of the measles vaccine virus can be potentiated in patients with immune deficiency diseases and by the suppressed immune responses that occur with leukemia, lymphoma, or generalized malignancy or with therapy with corticosteroids, alkylating drugs, antimetabolites, or radiation. Patients with such conditions should not be given live, attenuated measles virus vaccine.

Severe febrile illness: Vaccination should be postponed until the patient has recovered. Minor respiratory illnesses with low grade fever do not necessarily preclude vaccination.

Tuberculosis: Exacerbation of tuberculosis is known to occur with natural measles infection. By analogy, exacerbation might be associated with vaccination with the live, attenuated measles virus. Therefore, an individual known to have active tuberculosis should be under treatment when vaccinated.

Although tuberculin skin testing is a desirable part of ideal health care, it need not be a prerequisite to vaccination in communitywide measles immunization programs. The value of protection against natural measles far outweighs the theoretical hazard of possible exacerbation of unsuspected tuberculosis. If there is a need for tuberculin skin testing, it can be done on the day of vaccination and read 48-72 hours later.

Recent administration of Immune Serum Globulin: Vaccination should be deferred for about 3 months because passively acquired antibody might interfere with the response to vaccine.

Pregnancy: On grounds of a theoretical risk to the developing fetus, live, attenuated virus vaccines are not generally given to pregnant women. If, however, there is a risk of exposure to measles, there is no evidence that the measles vaccine cannot be given safely and effectively.

Hypersensitivity: (See ACIP "General Recommendations on Immunization," MMWR 25(44):349, November 12, 1976.) Live measles vaccine is produced in chick embryo cell culture. It has not been reported to be associated with hypersensitivity reactions and can be given to all who need it. Vaccine should not be given to persons hypersensitive to vaccine components, such as trace amounts of particular antibiotics (see manufacturer's label).

Management of Patients with Contraindications

If immediate protection against measles is required for persons for whom live measles vaccine is contraindicated, passive immunization with ISG, 0.1 ml per pound of body weight, should be given as soon as possible after known exposure. It is important to note, however, that this dose of globulin, effective in preventing measles in normal children, may not be fully effective in children with acute leukemia. To decrease the risk of measles infection for such

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Table III
Cases of Specified Notifiable Diseases: United States
Weeks Ending November 13, 1976 and November 8, 1975 — 45th Week

AREA REPORTING	ASEPTIC MENINGITIS	BRUCELLOSIS	CHICKENPOX	DIPHTHERIA		ENCEPHALITIS			HEPATITIS, VIRAL			MALARIA	
						Primary: Arthropod-borne and Unspecified		Post Infectious	Type B	Type A	Type Unspecified		
	1976	1976	1976	1976	CUM. 1976	1976	1975	1976	1976	1976	1976	1976	CUM. 1976
UNITED STATES	69	4	1,735	1	131	27	158	2	217	422	112	7	405
NEW ENGLAND	1	1	193	-	-	2	1	-	4	9	6	-	18
Maine	-	-	13	-	-	-	-	-	-	-	-	-	-
New Hampshire	-	-	25	-	-	-	-	-	-	1	-	-	-
Vermont	-	-	11	-	-	-	-	-	-	1	-	-	-
Massachusetts	-	-	82	-	-	-	1	-	2	4	6	-	10
Rhode Island	-	-	13	-	-	-	-	-	1	2	-	-	3
Connecticut	1	1	49	-	-	2	-	-	1	1	-	-	5
MIDDLE ATLANTIC	7	-	154	-	-	1	8	-	35	82	21	1	89
Upstate New York	5	-	62	-	-	-	3	-	5	15	1	-	21
New York City	2	-	16	-	-	1	-	-	11	8	-	-	39
New Jersey	-	-	NN	-	-	-	-	-	9	26	19	-	14
Pennsylvania*	-	-	76	-	-	-	5	-	10	33	1	1	15
EAST NORTH CENTRAL	3	-	604	-	1	3	41	1	32	76	15	-	21
Ohio	-	-	35	-	1	-	7	-	7	13	-	-	7
Indiana	1	-	93	-	-	2	28	-	1	7	4	-	-
Illinois	1	-	62	-	-	1	-	1	10	35	4	-	3
Michigan*	1	-	186	-	-	-	6	-	8	12	7	-	9
Wisconsin	-	-	228	-	-	-	-	-	6	9	-	-	2
WEST NORTH CENTRAL	5	1	246	-	4	3	78	-	18	32	2	-	27
Minnesota	-	-	-	-	-	-	68	-	4	16	-	-	4
Iowa	-	-	160	-	-	-	7	-	3	3	2	-	-
Missouri	5	-	2	-	1	1	1	-	4	7	-	-	9
North Dakota	-	1	13	-	-	-	-	-	-	2	-	-	1
South Dakota	-	-	-	-	3	-	-	-	-	-	-	-	3
Nebraska	-	-	5	-	-	2	-	-	2	2	-	-	5
Kansas	-	-	66	-	-	-	2	-	5	2	-	-	5
SOUTH ATLANTIC	13	-	157	-	1	3	6	-	30	79	16	1	67
Delaware	-	-	-	-	-	-	-	-	-	1	-	-	-
Maryland	1	-	36	-	-	-	-	-	11	6	2	-	12
District of Columbia	-	-	1	-	-	-	-	-	1	3	-	-	9
Virginia*	4	-	4	-	-	3	1	-	4	4	2	1	10
West Virginia	4	-	93	-	1	-	-	-	1	4	-	-	3
North Carolina	-	-	NN	-	-	-	1	-	2	10	-	-	6
South Carolina	-	-	6	-	-	-	-	-	2	2	8	-	1
Georgia	-	-	-	-	-	-	-	-	-	22	-	-	5
Florida	4	-	17	-	-	-	4	-	9	27	4	-	21
EAST SOUTH CENTRAL	13	-	72	-	-	4	17	-	16	19	2	-	2
Kentucky	5	-	56	-	-	1	-	-	1	1	-	-	-
Tennessee*	-	-	NN	-	-	-	10	-	9	11	2	-	-
Alabama	8	-	16	-	-	3	-	-	6	1	-	-	1
Mississippi	-	-	-	-	-	-	7	-	-	6	-	-	1
WEST SOUTH CENTRAL	1	1	63	-	1	1	4	-	6	27	5	-	21
Arkansas*	-	-	-	-	-	-	-	-	1	12	1	-	2
Louisiana	1	-	NN	-	-	1	-	-	1	4	4	-	2
Oklahoma	-	-	6	-	-	-	-	-	3	5	-	-	3
Texas	-	1	57	-	1	-	4	-	1	6	-	-	14
MOUNTAIN	-	-	118	-	4	-	-	1	12	29	15	-	15
Montana	-	-	8	-	-	-	-	-	1	2	-	-	-
Idaho	-	-	26	-	-	-	-	-	-	2	2	-	-
Wyoming	-	-	-	-	-	-	-	-	1	-	-	-	-
Colorado	-	-	76	-	3	-	-	1	4	5	4	-	9
New Mexico	-	-	4	-	1	-	-	-	-	1	-	-	1
Arizona	-	-	NN	-	-	-	-	-	4	15	3	-	4
Utah	-	-	-	-	-	-	-	-	-	-	6	-	-
Nevada	-	-	4	-	-	-	-	-	2	4	-	-	1
PACIFIC	26	1	128	1	120	10	3	-	64	69	30	5	145
Washington	3	-	101	-	112	5	2	-	3	3	5	-	2
Oregon	1	-	-	-	-	-	-	-	5	12	3	1	6
California*	22	1	-	-	1	5	1	-	56	54	22	4	136
Alaska	-	-	13	1	6	-	-	-	-	-	-	-	-
Hawaii	-	-	14	-	1	-	-	-	-	-	-	-	1
Guam*	-	-	-	-	-	-	-	-	-	-	-	-	-
Puerto Rico	NA	NA	NA	NA	1	NA	-	-	NA	NA	NA	NA	1
Virgin Islands	-	-	-	-	-	-	-	-	-	-	-	-	-

NA: Not available
NN: Not notifiable
*Delayed reports: Asep. Meng.: Pa. delete 1; Chickenpox: Ark. add 50, Calif. add 4; Enceph.: Iowa add 1, Tenn. add 4; Hep. B: Va. delete 1; Hep. A: Guam add 1

Table III-Continued
Cases of Specified Notifiable Diseases: United States
Weeks Ending November 13, 1976 and November 8, 1975 — 45th Week

REPORTING AREA	MEASLES (Rubeola)			MENINGOCOCCAL INFECTIONS TOTAL			MUMPS		PERTUSSIS	RUBELLA		TETANUS
	1976	CUMULATIVE		1976	CUMULATIVE		1976	CUM. 1976	1976	1976	CUM. 1976	CUM. 1976
		1976	1975		1976	1975						
UNITED STATES	217	35,723	22,188	25	1,323	1,257	303	34,623	10	91	11,190	56
NEW ENGLAND	11	449	321	2	63	70	19	1,428	-	4	300	2
Maine	-	9	16	-	1	6	2	125	-	2	12	-
New Hampshire	-	9	22	-	5	3	-	27	-	-	11	-
Vermont	11	95	51	1	4	2	3	41	-	-	5	-
Massachusetts	-	38	111	-	18	26	1	167	-	1	142	1
Rhode Island	-	15	3	-	7	3	2	474	-	-	5	-
Connecticut	-	283	118	1	28	30	11	594	-	1	125	1
MIDDLE ATLANTIC	12	7,124	1,979	9	198	128	10	3,206	-	11	2,322	8
Upstate New York	4	2,955	752	5	74	40	-	404	-	1	610	4
New York City	1	477	163	2	51	32	10	1,702	-	-	151	3
New Jersey	5	618	473	-	29	20	-	526	-	5	1,351	-
Pennsylvania	2	3,074	591	2	44	36	-	574	-	5	210	1
EAST NORTH CENTRAL	127	15,216	6,644	2	168	186	99	14,119	5	41	4,222	4
Ohio	-	579	106	-	68	63	4	2,001	-	-	312	2
Indiana	46	3,492	458	-	8	10	11	1,517	-	27	861	-
Illinois	12	1,673	1,835	-	20	22	14	1,823	-	-	1,193	-
Michigan	1	5,885	3,108	2	61	69	25	5,031	3	3	1,412	2
Wisconsin	68	3,587	1,137	-	11	22	45	3,747	2	11	444	-
WEST NORTH CENTRAL	-	1,206	5,018	-	79	85	49	3,598	-	3	418	7
Minnesota	-	425	182	-	12	18	1	549	-	-	30	2
Iowa	-	37	606	-	10	7	27	1,379	-	-	85	-
Missouri*	-	24	271	-	32	44	5	353	-	-	43	2
North Dakota	-	3	1,061	-	3	2	-	127	-	-	3	1
South Dakota	-	4	356	-	3	1	-	9	-	-	21	1
Nebraska	-	55	395	-	5	2	2	106	-	-	3	-
Kansas	-	658	2,147	-	14	11	14	1,075	-	3	233	1
SOUTH ATLANTIC	4	2,183	387	4	252	251	21	2,645	1	-	1,310	9
Delaware	-	130	35	-	9	7	-	67	-	-	36	-
Maryland	-	715	54	1	22	29	2	699	-	-	3	3
District of Columbia	-	13	1	1	3	5	-	107	-	-	46	-
Virginia	3	777	38	1	30	21	-	207	-	-	237	1
West Virginia	-	202	179	-	8	5	7	800	-	-	318	-
North Carolina	-	17	2	1	50	45	1	385	1	-	18	-
South Carolina	-	4	-	-	36	36	-	45	-	-	590	-
Georgia	1	3	40	-	26	15	1	1	-	-	2	-
Florida	-	322	38	-	68	88	10	334	-	-	60	5
EAST SOUTH CENTRAL	1	891	304	1	121	176	45	2,913	1	1	381	9
Kentucky	1	753	95	-	23	74	7	983	1	1	173	2
Tennessee	-	121	178	-	50	57	27	1,567	-	-	196	6
Alabama	-	-	5	1	34	31	11	304	-	-	1	1
Mississippi	-	17	26	-	14	14	-	59	-	-	11	-
WEST SOUTH CENTRAL	54	813	356	-	195	189	12	2,496	-	11	563	10
Arkansas	1	1	-	-	11	10	-	81	-	-	190	-
Louisiana	53	280	2	-	37	36	-	26	-	-	89	2
Oklahoma	-	300	145	-	21	12	7	728	-	-	77	-
Texas	-	232	209	-	126	131	5	1,661	-	11	207	8
MOUNTAIN	3	5,174	1,485	-	46	37	7	1,165	-	-	484	1
Montana	3	284	50	-	5	7	-	22	-	-	235	-
Idaho	-	2,020	12	-	7	5	1	447	-	-	18	-
Wyoming	-	4	3	-	-	1	-	1	-	-	2	-
Colorado	-	320	1,158	-	12	9	6	250	-	-	24	-
New Mexico	-	16	15	-	4	4	-	127	-	-	31	-
Arizona	-	227	81	-	10	3	-	-	-	-	-	1
Utah	-	2,237	138	-	6	7	-	201	-	-	155	-
Nevada	-	66	28	-	2	1	-	117	-	-	19	-
PACIFIC	5	2,667	5,694	7	201	135	41	3,053	3	20	1,190	6
Washington	-	354	290	1	34	17	7	891	1	5	196	1
Oregon	-	173	199	-	17	8	5	388	-	-	136	1
California	5	2,128	5,141	6	125	101	28	1,710	2	15	835	4
Alaska	-	9	-	-	22	7	1	29	-	-	3	-
Hawaii	-	3	64	-	3	2	-	35	-	-	20	-
Guam*	-	15	33	-	1	3	-	21	-	-	6	-
Puerto Rico	NA	448	674	-	4	1	NA	752	NA	NA	10	7
Virgin Islands	2	17	8	-	1	-	2	38	-	-	8	2

NA: Not available
*Delayed reports: Measles: Guam add 1; Men. Inf. Mo. add 1; Mumps: Guam add 1

Table III-Continued
Cases of Specified Notifiable Diseases: United States
Weeks Ending November 13, 1976 and November 8, 1975 – 45th Week

REPORTING AREA	TUBERCULOSIS		TULAREMIA	TYPHOID FEVER		TYPHUS-FEVER TICK-BORNE (RMSF)		VENEREAL DISEASES (Civilian Cases Only)						RABIES IN ANIMALS
								GONORRHEA			SYPHILIS (Pri. & Sec.)			
									CUMULATIVE			CUMULATIVE		
	1976	CUM. 1976	CUM. 1976	1976	CUM. 1976	1976	CUM. 1976	1976	1976	1975	1976	1976	1975	CUM. 1976
UNITED STATES	577	28,567	120	6	353	6	836	17,811	873,129	862,808	392	20,891	22,216	2,565
NEW ENGLAND	15	978	1	–	24	–	9	588	24,859	23,907	15	717	790	73
Maine	1	69	–	–	–	–	–	50	2,102	1,918	1	21	30	35
New Hampshire	–	39	–	–	2	–	–	24	738	612	–	10	15	1
Vermont	–	26	–	–	–	–	–	10	611	600	–	9	7	–
Massachusetts	9	580	1	–	15	–	4	244	11,754	11,084	13	524	521	24
Rhode Island	1	73	–	–	–	–	3	69	1,762	1,866	–	17	20	5
Connecticut	4	191	–	–	7	–	2	191	7,892	7,827	1	136	197	8
MIDDLE ATLANTIC	70	5,276	3	1	63	2	62	1,902	100,630	99,237	63	3,445	4,025	69
Upstate New York	14	816	2	–	9	–	23	489	16,481	17,810	6	217	360	16
New York City	21	2,074	1	1	34	–	5	800	44,216	41,425	35	2,131	2,346	–
New Jersey	18	1,061	–	–	12	–	13	120	15,746	14,604	10	519	643	31
Pennsylvania	17	1,325	–	–	8	2	21	493	24,187	25,398	12	578	676	22
EAST NORTH CENTRAL	89	4,083	1	–	40	–	23	2,367	138,670	142,011	80	1,882	1,811	171
Ohio	10	765	–	–	12	–	18	518	34,638	39,298	6	433	442	34
Indiana	8	458	–	–	4	–	–	78	13,474	11,914	1	96	131	22
Illinois	44	1,434	1	–	12	–	–	925	47,796	49,675	63	1,046	867	26
Michigan*	16	1,196	–	–	9	–	5	591	29,841	27,355	8	209	302	7
Wisconsin	11	230	–	–	3	–	–	255	12,921	13,769	2	98	69	82
WEST NORTH CENTRAL	40	1,045	28	1	22	–	27	989	45,916	43,474	3	392	532	581
Minnesota	4	175	3	1	11	–	–	188	8,108	8,671	2	89	102	145
Iowa	1	101	1	–	1	–	3	108	5,740	6,171	–	37	46	120
Missouri*	32	524	20	–	6	–	14	436	18,405	15,906	1	161	241	59
North Dakota	–	31	–	–	–	–	–	11	716	665	–	–	5	121
South Dakota	1	49	1	–	1	–	3	40	1,364	1,676	–	5	5	57
Nebraska	2	46	–	–	2	–	–	81	3,848	3,869	–	33	18	15
Kansas	–	119	3	–	1	–	7	125	7,735	6,516	–	67	115	64
SOUTH ATLANTIC	143	6,053	10	–	45	2	415	4,205	210,611	212,050	89	5,997	6,859	405
Delaware	–	63	–	–	–	–	1	53	3,001	3,048	–	58	79	17
Maryland	17	835	1	–	5	–	21	674	27,812	26,097	11	482	501	11
District of Columbia	20	275	–	–	2	–	–	254	12,055	12,168	2	523	603	–
Virginia	21	897	3	–	5	–	98	375	22,081	20,854	10	608	536	55
West Virginia	3	234	–	–	5	–	8	85	2,700	2,716	–	22	53	14
North Carolina	28	1,123	3	–	2	2	179	681	31,180	30,430	13	1,087	886	14
South Carolina	7	448	–	–	4	–	50	318	19,683	19,825	4	324	486	5
Georgia	12	766	2	–	3	–	56	708	40,742	39,751	10	687	945	204
Florida	35	1,412	1	–	19	–	2	1,057	51,357	57,161	39	2,206	2,770	85
EAST SOUTH CENTRAL	31	2,442	18	1	15	1	156	1,762	77,660	73,259	24	818	1,016	119
Kentucky	10	512	1	–	6	–	34	351	10,275	9,570	–	113	153	57
Tennessee	10	794	17	1	8	–	89	656	31,086	28,943	6	279	381	41
Alabama	11	717	–	–	1	1	14	447	21,574	20,333	5	170	230	21
Mississippi	–	419	–	–	–	–	19	308	14,725	14,413	13	256	252	–
WEST SOUTH CENTRAL	76	3,427	43	2	17	1	134	1,772	109,834	106,268	46	2,503	1,969	581
Arkansas	4	423	24	–	4	–	20	72	10,145	11,283	–	91	59	138
Louisiana	18	551	3	–	3	–	–	233	16,095	18,713	12	522	462	7
Oklahoma	9	337	7	–	1	–	95	223	10,767	10,340	–	87	79	150
Texas	45	2,116	9	2	9	1	19	1,244	72,827	65,932	34	1,803	1,369	286
MOUNTAIN	15	804	5	–	20	–	4	887	33,899	34,921	8	684	508	192
Montana	–	42	2	–	2	–	1	48	1,780	1,821	–	12	5	84
Idaho	2	30	–	–	1	–	1	50	1,894	1,796	1	33	13	–
Wyoming	1	18	1	–	–	–	–	13	696	835	1	10	10	1
Colorado	–	129	1	–	5	–	1	230	8,981	9,372	1	138	90	53
New Mexico	7	155	–	–	2	–	1	76	6,429	6,132	2	257	136	4
Arizona	5	356	–	–	9	–	–	324	9,915	9,251	3	188	189	29
Utah	–	41	1	–	1	–	–	69	1,964	2,166	–	20	15	21
Nevada	–	33	–	–	–	–	–	77	2,240	3,548	–	26	50	–
PACIFIC	98	4,459	11	1	107	–	6	3,339	131,050	127,681	64	4,453	4,706	374
Washington	–	360	2	–	5	–	3	323	11,006	11,716	–	129	164	8
Oregon	3	174	1	–	–	–	–	132	9,231	9,738	–	98	125	11
California	77	3,289	8	1	96	–	3	2,739	104,182	100,930	64	4,119	4,360	314
Alaska	–	80	–	–	–	–	–	109	3,783	3,181	–	22	6	41
Hawaii	18	556	–	–	6	–	–	36	2,848	2,116	–	85	51	–
Guam*	–	37	–	–	1	–	–	–	267	358	–	2	17	–
Puerto Rico	NA	363	–	NA	1	NA	–	NA	2,316	2,558	NA	521	627	40
Virgin Islands	–	5	–	–	–	–	–	2	209	187	–	47	38	–

NA: Not available
*Delayed reports: TB: Mich. delete 2, Guam add 1; Typhoid fever: Mo. delete 1; RMSF: Mo. add 1; GC: Guam add 11

Table IV
Deaths in 121 United States Cities*
Week Ending November 13, 1976 – 45th Week

REPORTING AREA	ALL CAUSES					Pneumonia and Influenza
	ALL AGES	65 Years and Over	45-64 Years	25-44 Years	Under 1 Year	ALL AGES
NEW ENGLAND	609	376	162	34	18	34
Boston, Mass.	175	101	45	11	8	10
Bridgeport, Conn.	41	17	19	1	2	4
Cambridge, Mass.	25	23	2	–	–	2
Fall River, Mass.	27	18	6	3	–	–
Hartford, Conn.	43	23	15	2	2	1
Lowell, Mass.	31	17	9	3	–	3
Lynn, Mass.	24	15	8	1	–	–
New Bedford, Mass.	16	11	5	–	–	1
New Haven, Conn.	39	30	7	1	1	2
Providence, R.I.	70	45	14	7	2	5
Somerville, Mass.	6	1	2	1	–	–
Springfield, Mass.	45	32	9	3	1	4
Waterbury, Conn.	25	15	9	–	1	2
Worcester, Mass.	42	28	12	1	1	–
MIDDLE ATLANTIC	2,778	1,735	743	151	74	131
Albany, N. Y.	56	35	13	2	2	1
Allentown, Pa.	32	22	9	–	–	4
Buffalo, N. Y.	104	59	36	1	4	3
Camden, N. J.	20	12	6	1	–	1
Elizabeth, N. J.	24	13	9	2	–	–
Erie, Pa.	40	25	9	1	5	1
Jersey City, N. J.	60	41	14	3	–	3
Newark, N. J.	92	46	27	6	10	4
New York City, N. Y.**	1,389	878	355	85	33	61
Paterson, N. J.	34	19	9	2	3	1
Philadelphia, Pa.	409	237	119	30	9	23
Pittsburgh, Pa.	120	79	33	1	2	8
Reading, Pa.	36	29	5	2	–	3
Rochester, N. Y.	119	80	27	8	4	5
Schenectady, N. Y.	28	17	10	1	–	2
Scranton, Pa.	31	21	10	–	–	1
Syracuse, N. Y.	88	57	26	2	1	1
Trenton, N. J.	37	26	9	1	1	2
Utica, N. Y.	16	10	5	1	–	5
Yonkers, N. Y.	43	29	12	2	–	2
EAST NORTH CENTRAL	2,287	1,335	629	147	89	65
Akron, Ohio	46	27	10	4	3	–
Canton, Ohio	36	25	11	–	–	3
Chicago, Ill.	535	301	149	39	24	12
Cincinnati, Ohio	189	112	50	13	7	4
Cleveland, Ohio	184	91	68	9	5	3
Columbus, Ohio	139	77	36	15	7	6
Dayton, Ohio	120	68	34	7	5	1
Detroit, Mich.	273	150	83	21	8	4
Evansville, Ind.	53	33	14	1	3	2
Fort Wayne, Ind.	45	30	9	3	2	4
Gary, Ind.	26	9	13	2	–	3
Grand Rapids, Mich.	57	40	11	2	2	6
Indianapolis, Ind.	149	87	41	7	8	3
Madison, Wis.	33	23	4	2	2	1
Milwaukee, Wis.	136	93	33	7	3	2
Peoria, Ill.	35	22	7	2	3	1
Rockford, Ill.	44	23	14	2	4	5
South Bend, Ind.	33	23	7	2	–	2
Toledo, Ohio	98	61	24	7	2	2
Youngstown, Ohio	56	40	11	2	1	1
WEST NORTH CENTRAL	688	443	155	34	32	28
Des Moines, Iowa	80	50	16	3	7	1
Duluth, Minn.	25	14	7	2	2	1
Kansas City, Kans.	33	20	10	2	–	2
Kansas City, Mo.	107	80	14	3	7	2
Lincoln, Nebr.	27	16	5	3	–	1
Minneapolis, Minn.	69	43	16	5	2	5
Omaha, Nebr.	76	51	20	4	1	3
St. Louis, Mo.	149	88	35	8	11	8
St. Paul, Minn.	59	40	17	–	1	2
Wichita, Kans.	63	41	15	4	1	3

REPORTING AREA	ALL CAUSES					Pneumonia and Influenza
	ALL AGES	65 Years and Over	45–64 Years	25–44 Years	Under 1 Year	ALL AGES
SOUTH ATLANTIC	1,203	714	354	67	34	36
Atlanta, Ga.	108	65	26	9	2	1
Baltimore, Md.	213	131	60	14	5	3
Charlotte, N. C.	71	36	28	2	1	2
Jacksonville, Fla.	123	70	42	9	1	5
Miami, Fla.	120	80	27	6	5	2
Norfolk, Va.	41	16	18	3	2	2
Richmond, Va.	74	40	26	2	2	7
Savannah, Ga.	32	21	10	1	–	2
St. Petersburg, Fla.	67	55	10	2	–	2
Tampa, Fla.	59	33	18	3	2	6
Washington, D. C.	236	129	72	14	12	4
Wilmington, Del.	59	38	17	2	2	–
EAST SOUTH CENTRAL	669	393	175	40	28	23
Birmingham, Ala.	99	58	29	7	3	–
Chattanooga, Tenn.	39	19	14	2	1	3
Knoxville, Tenn.	28	16	9	–	–	1
Louisville, Ky.	151	86	37	12	9	12
Memphis, Tenn.	149	87	41	7	7	–
Mobile, Ala.	70	39	17	6	4	1
Montgomery, Ala.	38	24	7	2	2	3
Nashville, Tenn.	95	64	21	4	2	3
WEST SOUTH CENTRAL	1,048	590	288	74	49	31
Austin, Tex.	31	14	8	3	4	2
Baton Rouge, La.	31	20	7	3	–	2
Corpus Christi, Tex.	35	18	8	–	8	2
Dallas, Tex.	168	97	46	15	3	2
El Paso, Tex.	40	22	6	7	1	3
Fort Worth, Tex.	67	40	18	3	5	–
Houston, Tex.	258	120	81	25	11	1
Little Rock, Ark.	74	41	25	1	5	7
New Orleans, La.	56	44	8	2	1	–
San Antonio, Tex.	144	84	44	5	5	4
Shreveport, La.	66	38	18	6	3	2
Tulsa, Okla.	78	52	19	4	3	6
MOUNTAIN	495	297	121	24	20	26
Albuquerque, N. Mex.	49	30	10	5	–	8
Colorado Springs, Colo.	22	11	7	2	2	1
Denver, Colo.	137	88	29	2	5	5
Las Vegas, Nev.	30	14	12	4	–	1
Ogden, Utah	20	13	2	1	–	4
Phoenix, Ariz.	111	61	34	6	4	5
Pueblo, Colo.	17	12	3	–	–	1
Salt Lake City, Utah	54	27	14	2	7	–
Tucson, Ariz.	55	41	10	2	2	1
PACIFIC	1,438	896	364	83	44	34
Berkeley, Calif.	12	6	5	–	1	1
Fresno, Calif.	50	29	14	3	3	–
Glendale, Calif.	21	18	3	–	–	1
Honolulu, Hawaii	46	28	10	3	3	–
Long Beach, Calif.	90	58	28	1	2	–
Los Angeles, Calif.	420	245	112	37	11	10
Oakland, Calif.	56	36	14	1	3	2
Pasadena, Calif.	22	15	5	1	–	–
Portland, Oreg.	127	70	37	6	6	3
Sacramento, Calif.	81	50	22	5	2	2
San Diego, Calif.	107	69	24	2	6	2
San Francisco, Calif.	155	107	33	9	–	1
San Jose, Calif.	45	32	8	4	–	1
Seattle, Wash.	131	85	31	7	6	3
Spokane, Wash.	50	28	15	3	1	5
Tacoma, Wash.	25	20	3	1	–	3
TOTAL	11,215	6,779	2,991	654	388	408
Expected Number	11,513	6,954	3,001	743	404	389

* By place of occurrence and week of filing certificate. Excludes fetal deaths. **(NYC) Data not available. Estimate based on average percent of divisional total.

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Measles Vaccine—Continued

children, all their close contacts who are susceptible to measles should be immunized.

Prior Immunization with Inactivated Measles Virus Vaccine

On exposure to natural measles, some children previously inoculated with inactivated measles virus vaccine have had atypical measles, sometimes with severe symptoms. Adverse reactions, such as local induration and edema and fever, have at times been observed when live measles virus vaccine was administered to persons who had previously received inactivated vaccine.

Despite the risk of local reaction, children who have previously been given inactivated vaccine alone or followed by live vaccine within 3 months should be revaccinated with live vaccine to avoid the severe atypical form of natural measles and to provide full and lasting protection.

Simultaneous Administration of Certain Live Virus Vaccines

(See ACIP "General Recommendations on Immunization," MMWR 25(44):349, November 12, 1976.)

COMMUNITYWIDE IMMUNIZATION PROGRAMS

Ongoing Programs

Universal immunization as part of good health care should be accomplished through routine and intensive programs carried out in physicians' offices and public health clinics. Programs aimed at vaccinating children against measles at about 15 months of age should be established by all communities. In addition, all susceptible children who are mingling for the first time with other children either at day-care centers, nursery schools, kindergartens, or elementary schools should be given vaccine because of the role they can play in spreading natural measles.

Special Intensive Programs

Communitywide immunization programs are good ways to distribute measles vaccine rapidly. Such programs continue to be important where there are many susceptible children. Attention should be directed toward systematically vaccinating susceptible children in both urban and rural areas.

Control of Measles Epidemics

Measles epidemics can be controlled by promptly vaccinating appropriate groups of children. Initially, programs should be geared to reach those epidemiologically at highest risk of disease.

Preventing measles dissemination in outbreaks depends on rapidly vaccinating susceptibles in the outbreak area. Susceptibles must be identified quickly. During the control program, all persons who cannot give a documented past history of measles or of vaccination when more than 12 months of age should be vaccinated. In an outbreak, if a person's measles immunity status is in doubt, vaccinate.

SURVEILLANCE

Continued careful surveillance of measles and its complications is necessary to appraise nationwide and locally the effectiveness of measles immunization programs, particularly efforts to eradicate measles. Surveillance can delineate failure to achieve adequate levels of protection and define groups needing special attention.

Although more than 80 million doses of live measles vaccine have now been distributed in the United States, continuous and careful review of adverse reactions is important. All serious reactions or suspected cases of measles in vaccinated children should be evaluated and reported in detail to local and state health officials as well as to the manufacturer (called for on the label).

Current Trends

Parasitic Disease Drug Service — Pentamidine Releases for *Pneumocystis* Pneumonia

In November 1967, the Parasitic Disease Drug Service, CDC, became the sole supplier in the United States of pentamidine isethionate for the treatment of *Pneumocystis* pneumonia and the early stages of Gambian sleeping sickness. Since that time, clinical and laboratory information has been requested from physicians on all patients being treated with this drug.

The data gathered on patients with suspected or confirmed *Pneumocystis* pneumonia during the first 3 years after pentamidine was added to the drug service have been reported previously (*1,2*). Approximately 200 pentamidine requests per year were received from 1967 through 1970. In 193 or 33% of these cases, the diagnosis of *Pneumocystis* pneumonia was histologically or cytologically confirmed. Overall, 42% of patients treated with pentamidine recovered; cure rates were 63% in patients treated for 9 or more days. Adverse reactions occurred in 40% of patients.

The recent experience of the Parasitic Disease Drug Service with pentamidine requests has been similar. From July 1, 1971, to June 30, 1976, a total of 2,890 requests were received. The frequency of pentamidine requests has ranged from approximately 400 per year in 1971 and 1972 to a peak of 600 per year in 1975 and 1976. The diagnosis of *Pneumocystis* pneumonia was confirmed histologically or cytologically in approximately 45% of these cases.

Cure rates of 50-60% in patients with *Pneumocystis* pneumonia were noted between 1971 and 1976. Adverse reactions to pentamidine were common. Immediate reactions (hypotension, nausea, vomiting, flushing, etc.) occurred in 8-10% of cases; local reactions (pain, abscess, or necrosis at the injection site) in 10-20%; and systemic reactions (renal insufficiency, hypoglycemia, abnormal liver function tests, etc.) in 25-40% of cases.

Editorial Note: Pentamidine isethionate is generally considered the drug of choice for the treatment of *Pneumocystis* pneumonia, but the frequent adverse effects associated with its use have prompted a search for a less toxic alternative. A recent randomized controlled trial in children

Parasitic Disease -- Continued

with *Pneumocystis* pneumonia demonstrated that the oral combination antimicrobial agent, trimethoprim-sulfamethoxazole (commercially available under the brand names Septra and Bactrim), is equally effective and much less toxic than pentamidine (*3*). Eleven of 18 patients treated with pentamidine recovered compared with 13 of 19 treated with trimethoprim-sulfamethoxazole. Experience with trimethoprim-sulfamethoxazole for the treatment of *Pneumocystis* pneumonia in adults is limited, but 1 uncontrolled study showed cure rates equivalent to those obtained with pentamidine (*4*).

Reported by Parasitic Diseases Div, Bur of Epidemiology, CDC.

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Influenza — Worldwide

United States: A single isolate of an A/Victoria/75-like virus has been made from a California woman who became ill on October 11, the day she returned from a visit to the Far East.

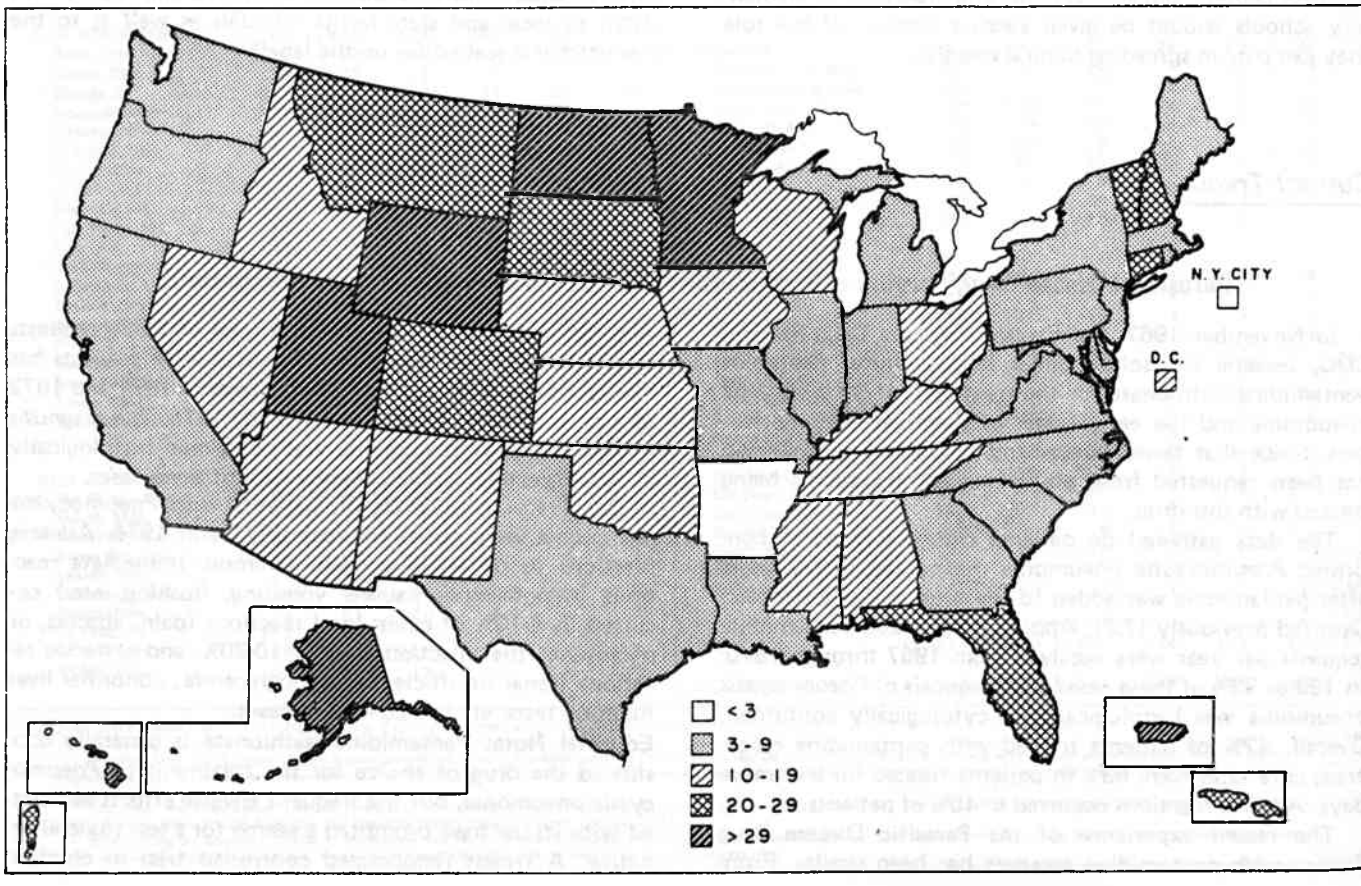
Since the beginning of the influenza immunization program a total of 14,182,152 inoculations have been given. The accompanying map illustrates the coverage rate (the number of doses administered divided by the population 18 years of age and older expressed as a percent) as of November 6, 1976. The highest 5 states or project areas are: Wyoming, 67.9%; Trust Territory, 58.3%; Alaska, 47.0%; Puerto Rico, 41.3%; and North Dakota, 37.7%.

Reported by J Chin, MD, State Epidemiologist, California Dept of Health; and National Influenza Immunization Program, CDC.

Worldwide: An outbreak of influenza occurred September 17-October 1 in an English boarding school. Fifteen of 250 students were affected with an influenza-like illness of moderate severity. The 4 strains of influenza B isolated showed some antigenic changes from B/Hong Kong/72 and were similar to other strains isolated the previous winter.

Reported by the World Health Organization in the Weekly Epidemiologic Record 51(44):344, 1976.

FIGURE 1. Influenza vaccination coverage by state, November 6, 1976



Epidemiologic Notes and Reports

Thelaziasis — California

A case of human eyeworm infestation, caused by *Thelazia californiensis*, was reported recently from California. Fewer than 20 cases of thelaziasis have been reported in the literature; of these, all cases caused by *T. californiensis* occurred in California.

The patient was a 64-year-old woman from Butte County, who had been fishing in previous months in the western Sierra foothills and at Mt. Lassen. She was referred to an ophthalmologist because of persistent lacrimation from 1 eye. Slit lamp examination revealed several active, threadlike, translucent, whitish-gray worms of 10 mm length.

Three worms were removed from the patient's conjunctival sac, and lacrimation stopped soon after. There was no evidence of corneal scarring. Worms were submitted to the State Microbial Disease Laboratory where they were confirmed as *T. californiensis.*

Editorial Note: Adult nematodes of the genus *Thelazia* are small worms which locally parasitize the conjunctival sac and lacrimal duct of certain birds and mammals in many parts of the world. Human infestation is rare. When it occurs, the disease is mild; symptoms are limited to excessive lacrimation, conjunctivitis, and a sensation of a foreign body in the eye. Unilateral involvement is the rule. The adult worms, which measure 10-15 mm in length, migrate freely in the conjunctival sac but are not tissue invasive. Symptoms clear rapidly and completely after all worms are removed, which is easily done with forceps or a moistened applicator. Corneal scarring and opacification are potential complications, but these are only found in animals with heavy worm burdens and prolonged infestation.

T. californiensis has been found in Arizona, California, New Mexico, Nevada, and Oregon. Adult worms have been recorded in bears, cats, coyotes, deer, dogs, foxes, jackrabbits, horses, sheep, and humans.

In California the principal reservoirs are probably deer and jackrabbits. The life cycle *T. californiensis,* which is widely distributed throughout the state, is not fully known, but muscoid flies appear to be the vectors and intermediate hosts. Developmental forms of the worm have been found in wild flies of the *Fannia* species, and laboratory infection of *F. canicularis* has been successful. Oak woodlands of the Sierra foothills and coastal mountains are a favored habitat of the *Fannia* species.

Humans are undoubtedly accidental hosts. From 1935-1970, 7 cases of *T. californiensis* in humans were reported in the literature; all occurred in California. Review of the 8 cases shows that all occurred in adults with such outdoor exposure as hunting, fishing, prospecting, and insect collecting. Six patients were exposed in the Sierra Nevada, 1 in the Mojave Desert, and 1 in rugged, brush-covered hills near San Diego. Few patients could recall exposure to flies or gnats. Most cases occurred in late summer or early fall. One patient indicated that the incubation period might be as short as 10 days.

The diagnosis of thelaziasis depends on recognition of the primary symptoms of lacrimation and conjunctivitis along with identification of the worms. Worm specimens should be placed in 10% formalin and submitted to a reference laboratory.

Reported by KJ Chiapella, MD, Chico, C Weinman, PhD, University of California at Berkeley, and R Roberto, MD, California Dept of Health, in California Morbidity, No. 23, June 18, 1976.

International Notes

Quarantine Measures

The following changes should be made in the Supplement — Health Information for International Travel, MMWR, Vol. 24, December 1975:

CHILE

Smallpox — Delete all information. Insert: Code II. A Certificate is ALSO required from travelers who, within the preceding 14 days, have been in:

Africa: Ethiopia

JAPAN

Smallpox — Delete all information. Insert: Code II. A Certificate is ALSO required from travelers arriving from all countries any part of which is infected. A Certificate is ALSO required from travelers arriving from:

Africa: Ethiopia
Asia: Bangladesh

Yellow Fever Vaccination Center:

VERMONT

Burlington: Medical Center Hospital of Vermont, change no fee charged to fee charged.

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