

Vaccination Coverage Levels for Children of Preschool Age

The federal Healthy People 2010 goal for childhood immunizations is that 90% of all 2-year-old children complete the schedule of vaccines recommended by the Advisory Committee on Immunization Practices and the American Academy of Pediatrics. How well 2-year-old children in Texas meet this goal is determined from two data sources: the National Immunization Survey (NIS) and the Texas Immunization Survey (TIS). For comparability and assessment of trends using these sources of data, this review of Texas data will focus on the minimal 4:3:1 series (4 DTP: 3 OPV/IPV: 1 measles-containing vaccine [MCV]).

The schedule of vaccinations for all children 15 to 18 months of age, recommended by ACIP and AAP, is as follows:

- 4 doses of diphtheria-tetanus-pertussis (DTP)
- 3 doses of either oral or inactivated polio vaccine (OPV/IPV)
- 1 dose of measles, mumps, and rubella vaccine (MMR)
- 3 or 4 doses of *Haemophilus influenzae* type b vaccine (Hib)
- 3 doses of hepatitis B vaccine
AND
- 1 dose of varicella vaccine

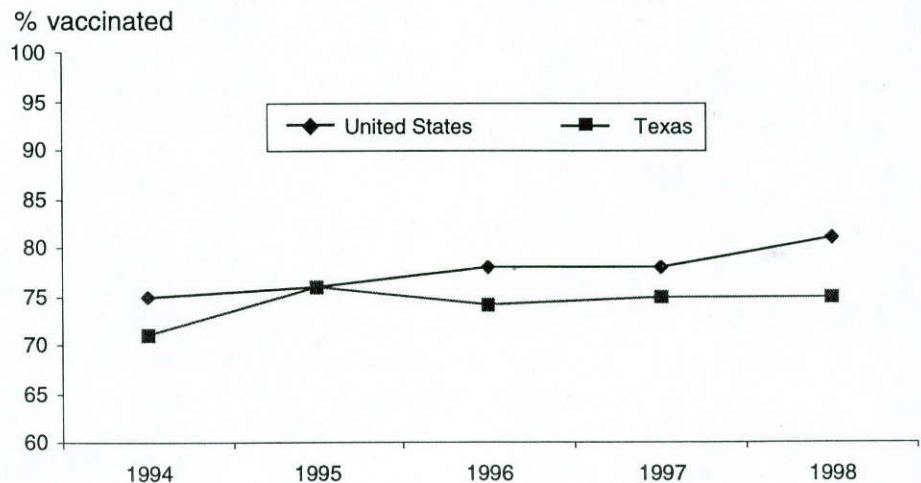
Although the national vaccination coverage level for the 4:3:1 series has been slowly increasing since 1994, the most recent annual measure level (1998) is still 9 percentage points below the 90% goal (Figure 1). Except in 1995, when Texas reached the national level (76%), Texas has always ranked below the national average. Moreover in 1996, when the US level increased to 78%, the Texas level actually decreased to 74% and has remained essentially unchanged since then. In 1998 there was a 6-percentage-point difference between the US and Texas coverage levels (81% and 75%).

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National Immunization Survey

In 1994 the Centers for Disease Control and Prevention (CDC) implemented the National Immunization Survey (NIS), a quarterly survey of vaccination coverage in all 50 states and 28 metropolitan areas. Its purpose is to assess the vaccination coverage level among children 19 through 35 months of age. NIS uses a random-digit-dial telephone survey to collect immunization information from households with eligible children. For completeness and verification, a proportion of immunization data is also requested from vaccination providers with consent of parents.

Figure 1: US and Texas 4:3:1 Vaccination Coverage Levels in Children 19-35 Months Old, 1994-1998



Also in this issue
Childhood Vaccination Coverage
and Physician Practices
Standards for Pediatric Immunization
Practices

Table 1: Vaccination Coverage Levels Among Children Aged 19-35 Months, by Selected Vaccines, 1998

	United States %	Texas %	Bexar County %	Dallas County %	El Paso County %	City of Houston %
DTP/DT						
≥3 doses	96	93	96	92	93	87
≥4 doses	84	78	83	76	81	65
Poliovirus						
≥3 doses	91	88	93	88	91	76
MCV						
≥1 dose	92	90	92	87	89	87
Combined Series 4DTP/3Polio/1MCV	81	75	80	73	79	61

Data on individual vaccines show that US 1998 levels for each vaccine are all above 90%, except for the fourth dose of DTP (DTP4) (84%) (Table 1). In Texas only the third dose of DTP (DTP3) and MCV meet the 90% goal. Since 1996 the DTP3 vaccination coverage level in Texas has always been at or above the 90% goal (CDC 1996, CDC 1997). As seen in Table 1, the underimmunization problem lies with DTP4 vaccine required at 15 through 18 months; almost one-quarter of Texas children fail to receive this fourth dose. This failure with the DTP4 is consistent across the four Texas areas assessed and is in line with the literature on primary reasons for low coverage levels.

Texas Immunization Survey

Conducted in 1994, 1996, and 1998, the Texas Immunization Survey (TIS) is a population-based statewide survey designed to assess vaccination coverage levels among Texas children 3 through 24 months of age. The Texas Department of Health commissioned these surveys to obtain coverage status not only on children younger than 19 months, but on important subpopulations not included by the NIS [Medicaid, Special Supplemental Program for Women, Infants, and Children (WIC)]. The TIS conducted in 1994 was an in-person survey and in 1996 and 1998, a random digit dial telephone survey. Survey protocols and instruments were modeled after the NIS.

To determine a child's immunization history, interviewers asked for dates of each vaccine including DTP, OPV/IPV, and MCV. For parents without their child's shot record, interviewers asked about each vaccine, whether the child had received the vaccine, how many doses, and at what age. A proportion of immunization histories were verified against providers' records.

The vaccination coverage levels for children 3 through 24 months in 1994, 1996 and 1998 were 62%, 68%, and 66% percent, respectively. Examination of the levels by race/ethnicity indicate that, compared with White and Hispanic children, African American children have lower coverage levels for all three years. Coverage levels in African American children have steadily risen, from 47% in 1994 to 63% in 1998. Levels among White and Hispanic children reached a peak in 1996 at 70% and 68%, but both dropped slightly in 1998 (66%).

Privately insured children are usually more completely vaccinated than Medicaid or uninsured children (Table 2). However, there are no consistent trends over time. In 1994 and 1996, children receiving WIC services had higher vaccination coverage levels than children not enrolled in WIC. However in 1998, the level among WIC children dipped below that of non-WIC children. In 1994 children receiving Aid to Families with

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Table 2: Vaccination Coverage Levels by Health Insurance Coverage and Public Assistance Factors

	1994		1996		1998	
	%	(N)	%	(N)	%	(N)
Health Insurance						
None	62	(1,415)	62	(382)	62	(63)
Medicaid	52	(1,110)	69	(1,063)	63	(134)
Private	67	(1,931)	69	(1,538)	69	(220)
Receiving AFDC						
Yes	48	(697)	67	(240)	-	
No	65	(3,757)	68	(2,737)	67	(393)
Enrolled in WIC program						
Yes	64	(2,146)	69	(1,187)	64	(169)
No	60	(2,310)	67	(1,791)	68	(247)

AFDC = Aid to Families with Dependent Children

WIC = Women, Infants and Children

- = Percentage was not calculated. Sample size was fewer than 25

Dependent Children (AFDC) had lower levels than did children not receiving AFDC (48% vs. 65%). Coverage levels for AFDC and non-AFDC were similar (67% and 68%) in 1996.

Summary

The Texas vaccination coverage levels for two-year-old children differ from the national experience. While the national 4:3:1 coverage level has been increasing since 1994, the Texas 4:3:1 coverage reached a plateau in 1996 at 74%. In 1998 levels among Texas two-year olds were six-percentage points below national levels (81%). Among Texas children surveyed, the most underimmunized are from Houston, are African American, receive Medicaid or AFDC, and are

uninsured. Finally, individual vaccine coverage data show that low coverage for the 4:3:1 series is due to the fourth dose of DTP not being received on schedule. Most children under 12 months of age are being vaccinated, but there is considerable loss in coverage in the second year of life.



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Childhood Vaccination Coverage and Physician Practices

The *Standards for Pediatric Immunization Practices* outline physician practices designed to raise childhood vaccination coverage levels (Page 4). A recently published article reports on a survey of the immunization practices of Texas physicians. Pediatricians, family practitioners, and general practitioners were asked about 8 of the 18 *Standards*. The results suggest that pediatricians and rural physicians most often adhere to the examined *Standards*. Few Texas physicians used reminder systems (less than 30%) or computerized vaccine records (15%). Less than half of physicians (43%) would routinely contact parents to reschedule missed appointments. See the following article for the full report: Roche RA, Simpson DM, Suarez L. Texas Physician Immunization Practices. *Med Care* 2000;38:686-92.



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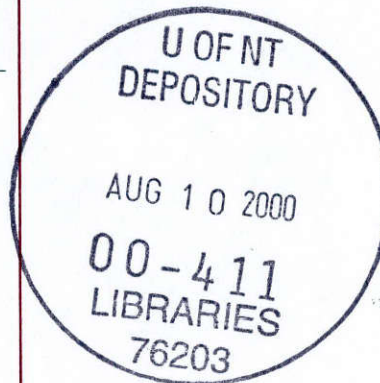
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Standards for Pediatric Immunization Practices

1. Immunization services are readily available.
2. There are no barriers or unnecessary prerequisites to the receipt of vaccines.
3. Immunization services are available free or for a minimal fee.
4. Providers utilize all clinical encounters to screen and, when indicated, immunize children.
5. Providers educate parents and guardians about immunization in general terms.
6. Providers question parents or guardians about contraindications and, before immunizing a child, inform them in specific terms about the risks and benefits of the immunizations the child is to receive.
7. Providers follow only true contraindications.
8. Providers administer simultaneously all vaccine doses for which a child is eligible at the time of each visit.
9. Providers use accurate and complete recording procedures.
10. Providers coschedule immunization appointments in conjunction with appointments for other child health services.
11. Providers report adverse events following immunization promptly, accurately, and completely.
12. Providers operate a tracking system.
13. Providers adhere to appropriate procedures for vaccine management.
14. Providers conduct semiannual audits to assess immunization coverage levels and to review immunization records in the patient populations they serve.
15. Providers maintain up-to-date, easily retrievable medical protocols at allocations where vaccines are administered.
16. Providers operate with patient-oriented and community-based approaches.
17. Vaccines are administered by properly trained individuals.
18. Providers receive ongoing education and training on current immunization recommendations.

Source: Centers for Disease Control and Prevention. Standards for pediatric immunization practices. *MMWR* 1993;42(No. RR-5):3.