



# Pediatric vaccine completion and compliance in the Military Health System, 2006–2016



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## Introduction

Few studies have reported on pediatric vaccination trends among military beneficiaries, although some evidence suggests military dependents have lower vaccination rates than their civilian counterparts. No prior work has examined timeliness of vaccinations in this population. Here, we assessed completion of and compliance with rotavirus; inactivated polio virus (IPV); and diphtheria, tetanus, and acellular-pertussis (DTaP) vaccination among military beneficiaries.

## Methods

Department of Defense Birth and Infant Health Research program data were used to identify infants born 2006-2016 who met the following inclusion criteria:

- Born at a military treatment facility (MTF)
- Enrolled in TRICARE within the first year of life and continuously enrolled through 2 years of age thereafter
- Have at least 1 immunization at an MTF by age 2
- Have at least 1 well-child visit annually by age 2

Immunization status was assessed using vaccine administered and Current Procedural Terminology codes from MTF immunization records and outpatient health care records, respectively. Completion of rotavirus (2 doses), IPV (3 doses), and DTaP (4 doses) vaccination was assessed by 2 years of age. Compliance was assessed by applying the childhood vaccination schedule.

**Table 1.** Criteria used to evaluate compliance with the childhood vaccination schedule and calculate days undervaccinated

Vaccination dose	Rec. age per ACIP* (months)	Min. acceptable age (days)	Min. acceptable interval between doses (days)	Age when undervaccination count initiated** (days)
<b>Rotavirus***</b>				
Dose 1	2	38		93
Dose 2	4	66	24	154
Dose 3	6	94	24	215
<b>IPV</b>				
Dose 1	2	38		93
Dose 2	4	66	24	154
Dose 3	6 - 18	94	24	580
<b>DTaP</b>				
Dose 1	2	38		93
Dose 2	4	66	24	154
Dose 3	6	94	24	215
Dose 4	15 - 18	361	179	580

\*Advisory Committee on Immunization Practices (ACIP)

\*\*The latest age a child can receive the first dose of Rotavirus, IPV, and DtaP vaccines on-time per the ACIP schedule is 92 days

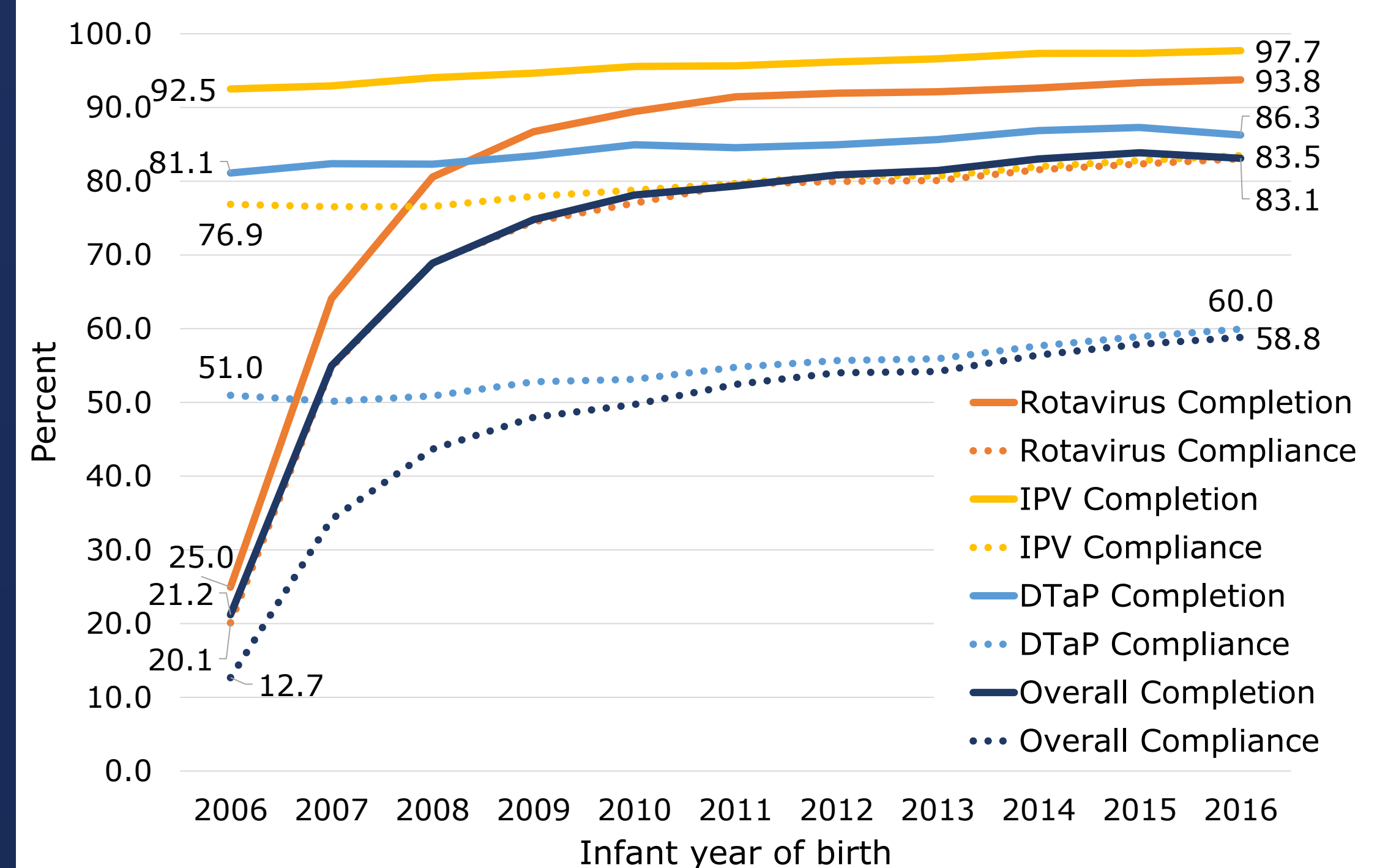
\*\*\*Rotavirus vaccine should not be administered past age 252 days.

## Results

**Table 2.** Frequency and percentage of infants with delayed and incomplete vaccination status at 2 years of age, by sponsor and healthcare characteristics, Department of Defense Birth and Infant Health Research program data, 2006-2016

Characteristic	Vaccination status, n (row %)			
	Total, n (col %)	Complete, non-delayed vaccination	Complete, delayed vaccination	Incomplete vaccination
<b>Overall</b>	318,365 (100.0)	167,915 (52.7)	88,888 (27.9)	61,562 (19.3)
<b>Age at infant birth</b>				
18–24 years	105,166 (33.0)	50,242 (47.8)	31,095 (29.6)	23,829 (22.7)
25–29 years	108,863 (34.2)	58,834 (54.0)	29,927 (27.5)	20,102 (18.5)
30–34 years	70,678 (22.2)	39,852 (56.4)	18,848 (26.7)	11,978 (16.9)
35+ years	33,658 (10.6)	18,987 (56.4)	9,018 (26.8)	5,653 (16.8)
<b>Race and ethnicity</b>				
American Indian/Alaskan Native	5,428 (1.7)	2,680 (49.4)	1,487 (27.4)	1,261 (23.2)
Asian American/Pacific Islander	21,069 (6.6)	12,040 (57.1)	5,537 (26.3)	3,492 (16.6)
Hispanic	44,179 (13.9)	23,145 (52.4)	12,805 (29.0)	8,229 (18.6)
Non-Hispanic Black	51,260 (16.1)	26,422 (51.5)	15,080 (29.4)	9,758 (19.0)
Non-Hispanic White	188,193 (59.1)	99,230 (52.7)	51,712 (27.5)	37,251 (19.8)
Other/Unknown	8,236 (2.6)	4,398 (53.4)	2,267 (27.5)	1,571 (19.1)
<b>Marital status</b>				
Married	27,115 (8.5)	13,912 (51.3)	7,856 (29.0)	5,347 (19.7)
Unmarried/Unknown	291,250 (91.5)	154,003 (52.9)	81,032 (27.8)	56,215 (19.3)
<b>Military rank</b>				
Enlisted	256,498 (80.6)	130,488 (50.9)	73,570 (28.7)	52,440 (20.4)
Officer	61,867 (19.4)	37,427 (60.5)	15,318 (24.8)	9,122 (14.7)
<b>Service branch</b>				
Air Force	56,448 (17.7)	30,368 (53.8)	17,505 (31.0)	8,575 (15.2)
Army	149,913 (47.1)	78,582 (52.4)	42,274 (28.2)	29,057 (19.4)
Coast Guard	2,975 (0.9)	1,554 (52.2)	699 (23.5)	722 (24.3)
Marine Corps	35,367 (11.1)	18,868 (53.3)	8,808 (24.9)	7,691 (21.7)
Navy	72,938 (22.9)	38,075 (52.2)	19,456 (26.7)	15,407 (21.1)
Other	724 (0.2)	468 (64.6)	146 (20.2)	110 (15.2)
<b>Plurality of well-child care location</b>				
Civilian facility	34,257 (10.8)	17,926 (52.3)	8,123 (23.7)	8,208 (24.0)
Military treatment facility	284,108 (89.2)	149,989 (52.8)	80,765 (28.4)	53,354 (18.8)
<b>Birth defects</b>				
No	309,643 (97.3)	163,491 (52.8)	86,398 (27.9)	59,754 (19.3)
Yes	8,722 (2.7)	4,424 (50.7)	2,490 (28.5)	1,808 (20.7)
<b>Preterm birth</b>				
No	294,617 (92.5)	155,701 (52.8)	82,427 (28.0)	56,489 (19.2)
Yes	23,748 (7.5)	12,214 (51.4)	6,461 (27.2)	5,073 (21.4)
<b>Low birthweight</b>				
No	306,639 (96.3)	161,963 (52.8)	85,760 (28.0)	58,916 (19.2)
Yes	11,726 (3.7)	5,952 (50.8)	3,128 (26.7)	2,646 (22.6)

**Figure.** Percent of infants born to active duty service members who complete and are compliant with vaccine recommendations, by vaccine series and overall



**Table 3.** Days undervaccinated during the first 2 years of life among infants born 2009-2016

	Rotavirus	IPV	DTaP	Overall
	No. of days, median (IQR)			
All children (n=228,930)	0 (0-0)	0 (0-0)	0 (0-70)	0 (0-124)
Children with delay (n=105,453)	0 (0-48)	0 (0-30)	89 (19-161)	151 (33-254)
<b>Children with delay, %</b>				
None	56.3	58.6	4.8	0
< 14 days	9.5	10.2	15.9	13.5
14–29 days	4.8	6.0	10.8	9.8
30–59 days	5.6	7.2	11.3	10.6
60–149 days	7.5	6.9	16.3	14.4
150–239 days	16.3	5.4	23.8	25.6
240+ days	0	5.8	17.1	26.1

## Conclusion

Rotavirus, IPV, and DTaP vaccine coverage appeared higher in this population of military children than what has been reported nationally, but gaps remain. Providers should ensure infants return for a care visit during the 15- to 18-month age window in order to remain compliant with the DTaP series and limit periods of undervaccination.



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