1.36, 1.49) greater than those targeting parental knowledge (RR = 1.23: 95% CI 1.21, 1.26). Conversely, vaccination reminders targeting parents increased vaccine coverage (RR = 1.53: 95% CI 1.49, 1.58) greater than reminders targeting providers (RR = 1.23: 95% CI 1.20, 1.27). Interventions targeting hospitals, clinics or ward processes had the weakest impact on coverage (RR = 1.15: 95% CI 1.13, 1.17).

***Conclusion:*** Interventions targeting parents, providers, and places individually have all shown to improve influenza vaccination in children with medical comorbidities. However, specifically targeting providers' vaccine knowledge and parental reminders appear to have the greatest impact on vaccine uptake.

***Disclosures.*** **All authors:** No reported disclosures.

**2762. A Cohort Analysis of Completion of the Pediatric Measles-Mumps-Rubella-Varicella Series in the United States**

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**Session:** 279. Vaccines: Viral Non Influenza

*Saturday, October 5, 2019: 12:15 PM*

***Background:*** Since 2006, the recommended US vaccination schedule has included combination Measles-Mumps-Rubella (MMR) vaccine and separate Varicella (V) vaccine administered as first dose between 12–15 months, and second dose between 4–6 years, administered either separately or as a combination MMRV vaccine. Vaccine coverage alone does not provide information on the timeliness of vaccine receipt, a critical step in ensuring optimal protection, thus, we sought to evaluate overall series completion rates and identify factors related to under-vaccination.

***Methods:*** A cohort of children born between 2006 and 2010, with continuous enrollment from birth to age 7 in the MarketScan® Commercial Claims and Encounters Database was studied. The administration of first and second doses of MMR- and V-containing vaccines was evaluated. Administration timeliness was categorized as recommended, acceptably early (prior to age 4 for the second dose), late (after the recommended time period), invalid, or missing at least one vaccine. A logistic regression analysis evaluated factors associated with under-vaccination.

***Results:*** Among the 104,999 children included, 55.9% were vaccinated within the recommended time periods for both first and second doses, with timeliness higher for the second dose (80.1%) than the first dose (63.5%). By age 4, 20.1% of children were missing the first dose of either MMR or V (or both) and by age 7, 26.6% of children were missing at least one dose, with 9.4% missing all required vaccines. Factors associated with missed or delayed vaccination included geographic region, vaccination by a provider other than a pediatrician, and, for the second dose, having missed or delayed the first dose. Having additional children in the family was associated with a higher likelihood of missed or delayed vaccination for the first dose, but with a lower likelihood of missed or delayed vaccination for the second dose.

***Conclusion:*** About one in four children were missing at least one dose of MMR or V by age 7, indicating vaccine coverage is below Healthy People 2020 95% target. Additionally, delays in administration of the first dose indicate a potential for the development of cohorts of susceptible children large enough to sustain outbreaks. Strategies for addressing timeliness of vaccine receipt should incorporate factors associated with under-vaccination.

**Figure 1. First dose of MMR or V (or both) by age 4**

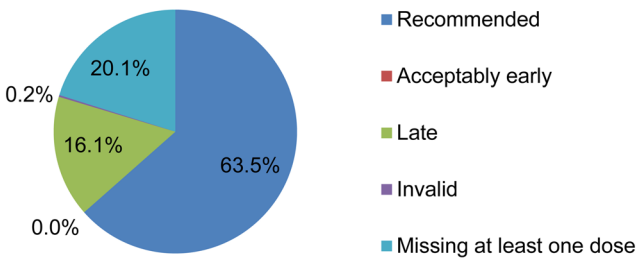



**Figure 2. Second dose of MMR or V (or both) by age 7**

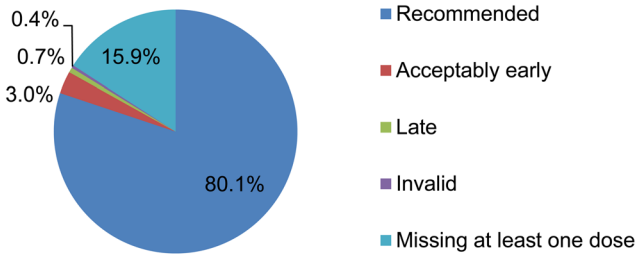
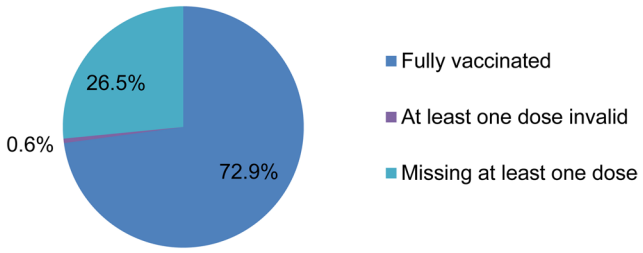



**Figure 3. Two doses of MMR or V (or both) by age 7**




***Disclosures.*** **All authors:** No reported disclosures.

**2763. Uptake and Safety of Measles-Mumps-Rubella (MMR) Vaccine in Adolescents and Adults in the Vaccine Safety Datalink**

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***Background:*** MMR vaccine is given routinely to young children but may be given at other ages. We described MMR use in adolescent and adult populations in the Vaccine Safety Datalink (VSD) and estimated the incidence of medically-attended outcomes after MMR to inform future studies estimating vaccine-associated risk.

***Methods:*** The study population included adolescents (9–17 years) and adults (≥18 years) in VSD who received at least one MMR vaccine from 2010 through 2016. Outcomes were pre-specified based on previous vaccine safety studies and categorized as clinically serious (anaphylaxis, encephalitis/myelitis, GBS, meningitis, seizure) or non-serious (allergic reaction, arthropathy, fever, injection site reaction, lymphadenopathy, nonspecific reaction, parotitis, rash, syncope). Outcomes were identified by searching for ICD-9 and ICD-10 diagnosis codes in post-vaccination exposure windows. Medical records were reviewed for all serious outcomes to verify incident diagnoses. Incidence and 95% confidence intervals were calculated for validated serious and all non-serious outcomes.

***Results:*** 146,503 adolescents and adults received 162,992 MMR vaccines during the study period. The mean age at vaccination was 33.7 years, 65% were female, and 53% received at least one other vaccine simultaneously. Demographic and vaccination characteristics varied across age groups (Table 1). The analysis of post-vaccination outcomes included 162,053 MMR vaccinations. The incidence of validated serious outcomes was low, ranging from 0 to 6.8 per 100,000 vaccinations. Only one serious outcome (anaphylaxis) was noted to be vaccine-associated in the medical record. Incidence of clinically non-serious outcomes varied from 0.4 to 56.0 per 10,000 vaccinations. Injection site reactions were more common among adolescents (118.1 per 10,000 vaccinations), who also had a higher frequency of simultaneous vaccination (80%).

***Conclusion:*** Clinically serious outcomes were rare following MMR vaccination. Rates of clinically non-serious outcomes varied but were similar to or lower than previous reports in children. This descriptive analysis did not evaluate the association between MMR and adverse events. Future analysis with an appropriate comparison group is needed for risk estimation.

**Table 1.** Descriptive Characteristics of Adolescent and Adult MMR Vaccine Recipients in the VSD, 2010-2016

| Characteristic | Overall (N=162,992) | | Age Group | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 9-17 Years (N=26,060) | | 18-25 Years (N=26,559) | | 26-64 Years (N=71,034) | | ≥45 Years (N=39,339) | |
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| Sex | | | | | | | | | | |
| Female | 106,135 | 65.1 | 13,002 | 49.9 | 18,763 | 70.7 | 50,267 | 70.8 | 24,103 | 61.3 |
| Male | 56,857 | 34.9 | 13,058 | 50.1 | 7,796 | 29.4 | 20,767 | 29.2 | 15,236 | 38.7 |
| Race/Ethnicity | | | | | | | | | | |
| White, Non-Hispanic | 64,715 | 39.7 | 9,203 | 35.3 | 9,065 | 34.1 | 26,257 | 37.0 | 20,190 | 51.3 |
| Black, Non-Hispanic | 10,352 | 6.4 | 2,236 | 8.6 | 1,394 | 5.3 | 3,966 | 5.6 | 2,756 | 7.0 |
| Asian, Non-Hispanic | 29,832 | 18.3 | 3,283 | 12.6 | 4,747 | 17.9 | 15,015 | 21.1 | 6,787 | 17.3 |
| Multiple Races, Non-Hispanic | 13,972 | 8.6 | 3,233 | 12.4 | 2,456 | 9.3 | 5,305 | 7.5 | 2,978 | 7.6 |
| Hispanic, Any Race | 41,174 | 25.3 | 7,490 | 28.7 | 8,371 | 31.5 | 19,252 | 27.1 | 6,061 | 15.4 |
| Other, Non-Hispanic | 2,947 | 1.8 | 615 | 2.4 | 526 | 2.0 | 1,239 | 1.7 | 567 | 1.4 |
| Received ≥1 Simultaneous Vaccine | | | | | | | | | | |
| Yes | 85,855 | 52.7 | 20,743 | 79.6 | 12,809 | 48.2 | 32,355 | 45.6 | 19,948 | 50.7 |
| No | 77,137 | 47.3 | 5,317 | 20.4 | 13,750 | 51.8 | 38,679 | 54.5 | 19,391 | 49.3 |
| Postpartum[1] | | | | | | | | | | |
| Yes | 20,025 | 18.9 | 269 | 2.1 | 5,104 | 27.2 | 14,620 | 29.1 | 32 | 0.1 |
| No | 86,109 | 81.1 | 12,733 | 97.9 | 13,659 | 72.8 | 35,646 | 70.9 | 24,071 | 99.9 |
| Vaccination Year | | | | | | | | | | |
| 2010 | 16,727 | 10.3 | 4,177 | 16.0 | 2,710 | 10.2 | 6,957 | 9.8 | 2,883 | 7.3 |
| 2011 | 20,162 | 12.4 | 5,401 | 20.7 | 3,278 | 12.3 | 7,850 | 11.1 | 3,633 | 9.2 |
| 2012 | 19,152 | 11.8 | 4,292 | 16.5 | 3,383 | 12.7 | 8,005 | 11.3 | 3,472 | 8.8 |
| 2013 | 17,956 | 11.0 | 2,850 | 10.9 | 3,516 | 13.2 | 7,932 | 11.2 | 3,658 | 9.3 |
| 2014 | 20,940 | 12.9 | 2,859 | 11.0 | 3,905 | 14.7 | 9,506 | 13.4 | 4,670 | 11.9 |
| 2015 | 38,344 | 23.5 | 3,910 | 15.0 | 5,252 | 19.8 | 16,784 | 23.6 | 12,398 | 31.5 |
| 2016 | 29,711 | 18.2 | 2,571 | 9.9 | 4,515 | 17.0 | 14,000 | 19.7 | 8,625 | 21.9 |
| Documented Dose Number[2] | | | | | | | | | | |
| 1 | 104,140 | 63.9 | 7,914 | 30.4 | 10,293 | 38.8 | 54,480 | 76.7 | 31,453 | 80.0 |
| 2 | 42,351 | 26.0 | 13,944 | 53.5 | 6,596 | 24.8 | 14,120 | 19.9 | 7,691 | 19.6 |
| 3 | 14,647 | 9.0 | 3,972 | 15.2 | 8,404 | 31.6 | 2,094 | 3.0 | 177 | 0.5 |
| ≥4 | 1,854 | 1.1 | 230 | 0.9 | 1,266 | 4.8 | 340 | 0.5 | 18 | 0.1 |

Abbreviations: N=sample size; No.=number; %=percentage; MMR=measles-mumps-rubella.
Percentages may not add to 100% due to rounding.
[1]Postpartum status is based on VSD automated data and only applies to female vaccine recipients.
[2]Dose number is based on all available VSD automated data on MMR-containing vaccines; full vaccination history may not be captured for all members.

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