

Trends in the Uptake of Pediatric Measles-Containing Vaccine in the US: A Disneyland Effect?

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INTRODUCTION

- Media attention can influence health-related behaviors¹⁻³
- Among recent outbreaks, the 2014-15 Disneyland measles outbreak received considerable media attention, with ~50% of U.S. parents aware of the outbreak^{1,4-5}

OBJECTIVE

- To examine the relationship between the Disneyland outbreak & the uptake of measles-containing vaccine (MCV) among U.S. children

METHODS

- Study population.** Nationally representative sample of U.S. children 19 months of age across 13 birth cohorts
 - Data source.** 2012-2017 National Immunization Survey-Child, which ascertains vaccinations via telephone recruitment + healthcare provider records among children 19-35 months old
 - Study design.** Difference-in-differences design, which included pneumococcal conjugate vaccine (PCV) as a negative control
 - Exposure.** Media coverage of the Disneyland measles outbreak characterized as a binary variable; birth cohorts with children <19 months of age as of Jan 2015 were defined as exposed
 - Outcomes.**
 - (i) ≥1-dose MCV coverage by 19 months of age, &
 - (ii) mean age at MCV administration by 19 months of age
 - Statistical analyses.**
 - Outcome (i): binomial regression with an identify-link function
 - Outcome (ii): linear regression
- Multivariable models were adjusted for: birth cohort, census region, race/ethnicity, maternal education, & an interaction term between the exposure & maternal education

WEIGHTED SAMPLE POPULATION

Table 1. Weighted participant characteristics by exposure status.

	Unexposed % (95% CI) N=19,307,598	Exposed % (95% CI) N=15,163,759
Parental income		
Above poverty, > \$75,000	26.9 (26.2, 27.6)	30.9 (30.1-31.8)
Above poverty, ≤ \$75,000	33.5 (32.7, 34.3)	32.5 (31.6-33.4)
Below poverty	34.3 (33.5, 35.2)	30.0 (29.0-31.0)
Unknown	5.2 (4.8, 5.7)	6.6 (6.0, 7.2)
Maternal education		
<12 years	18.2 (17.4, 19.0)	15.6 (14.7, 16.4)
12 years	26.0 (25.2, 26.8)	24.9 (23.9, 25.8)
>12 years, non-college graduate	22.6 (21.9-23.2)	23.0 (22.2, 23.9)
College graduate	33.2 (32.5, 34.0)	36.5 (35.6, 37.4)
Race/ Ethnicity		
Hispanic	26.9 (26.0, 27.7)	26.7 (25.7, 27.8)
Non-Hispanic White only	47.3 (46.4, 48.1)	47.2 (46.3, 48.2)
Non-Hispanic Black only	13.4 (12.8, 13.9)	12.7 (12.0, 13.3)
Non-Hispanic other and multiple race	12.5 (11.9, 13.1)	13.4 (12.7, 14.0)
Region		
Northeast	16.1 (15.7, 16.5)	15.8 (15.4, 16.3)
Midwest	20.9 (20.4, 21.3)	20.9 (20.3, 21.4)
South	38.4 (37.7, 39.1)	38.8 (38.0, 39.6)
West	24.6 (23.8, 25.4)	24.5 (23.5, 25.6)

The 2014-15 Disneyland measles outbreak was associated with an increase in measles vaccine coverage among U.S. children of college educated mothers + a decrease in age at measles vaccination among all U.S. children



RESULTS

Figure 1. Time trends of MCV + PCV: (A) ≥1-dose vaccine coverage and (B) age in days at administration. In each figure, the Disneyland exposure is characterized by a black line.

- In unadjusted models, the exposure was associated with a: (A) 1.0% (95% CI 0.2%, 1.8%) increase in MCV ≥1-dose vaccine coverage & (B) 6.1 (95% CI 3.7, 8.5) day decrease in age at MCV vaccination.

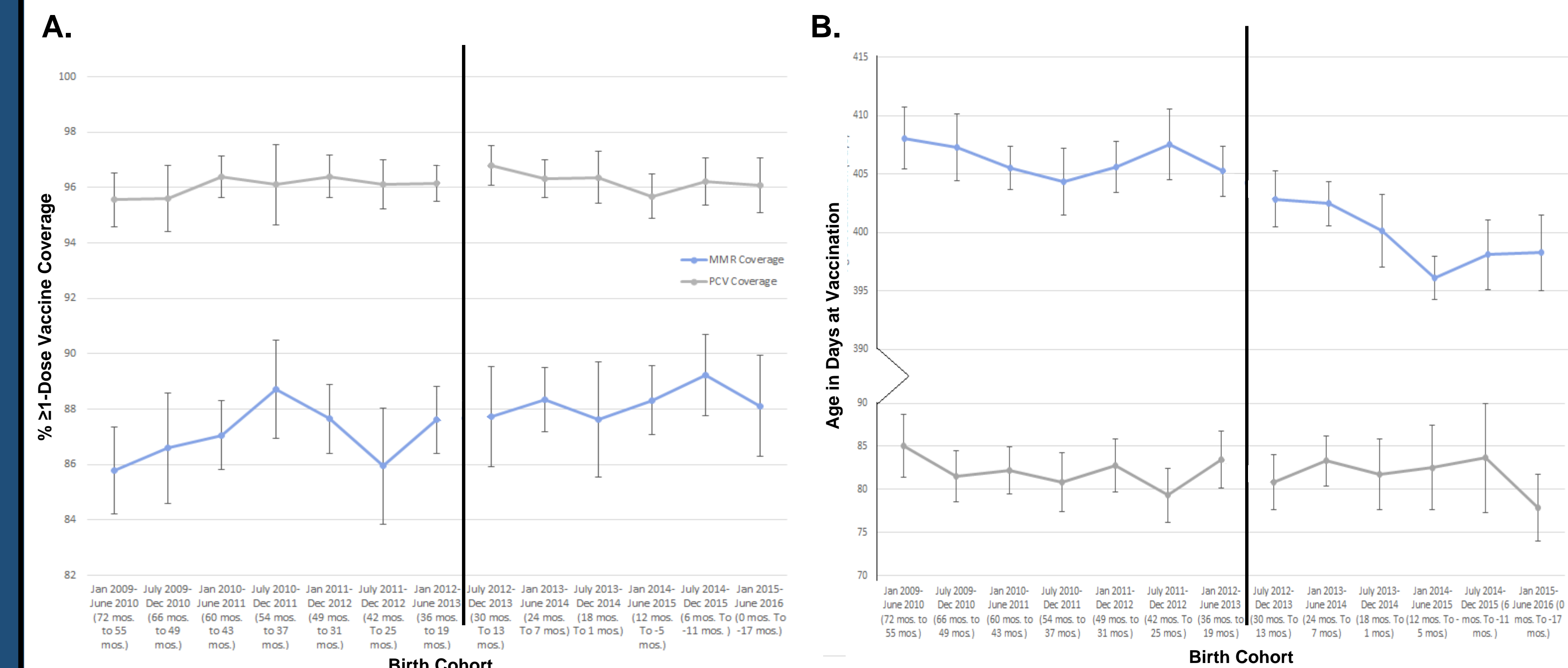
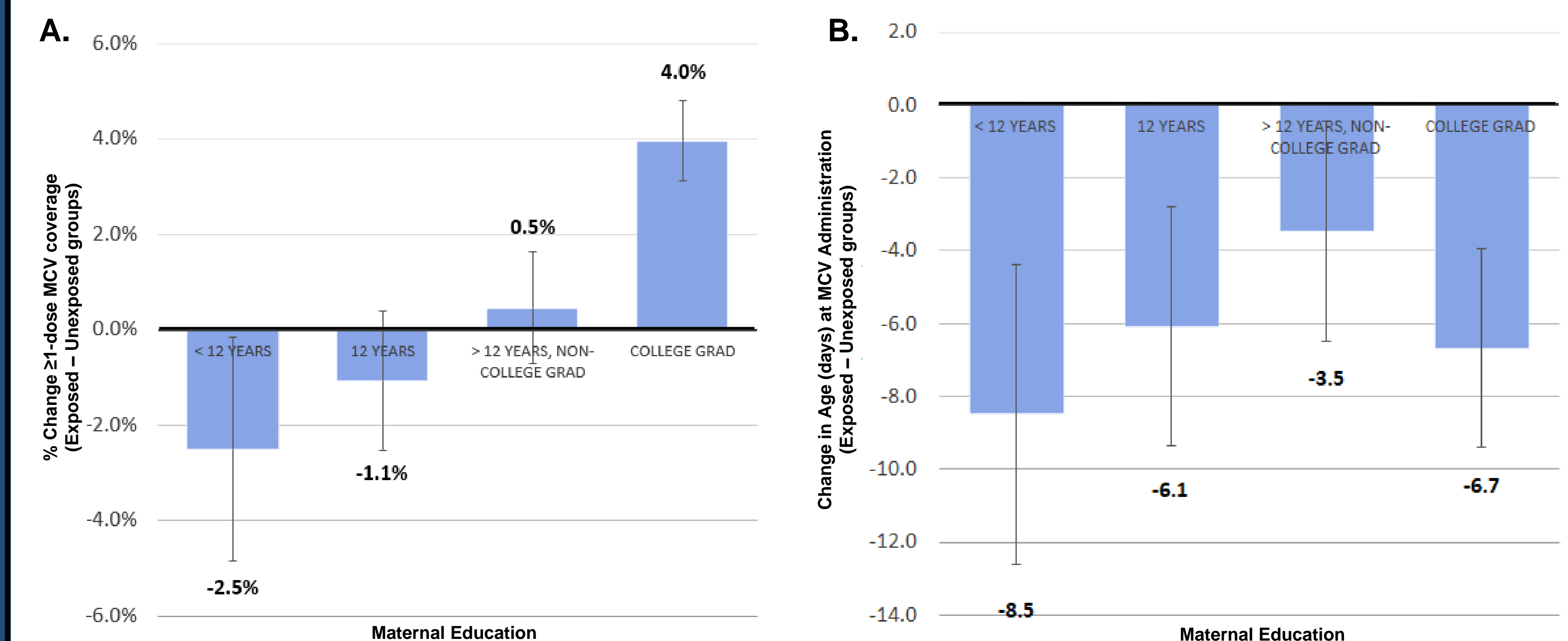


Figure 2. Absolute differences between exposed & unexposed cohorts in (A) ≥1-dose vaccine coverage and (B) age at vaccination in days, by maternal education.

- In adjusted models, the exposure was associated with a: (A) 4.0% (95% CI: 3.1%, 4.8%) increase in MCV ≥1-dose vaccine coverage among children of college-educated mothers & (B) 3.5 (95% CI: 0.4, 6.5) to 8.5 (95% CI: 4.4, 12.6) day decrease in MCV vaccine age, depending on maternal education



CONCLUSIONS

- The Disneyland outbreak was associated with an increase in ≥1-dose MCV coverage among U.S. children of college-educated mothers, + an overall decrease in MCV age at administration among U.S. children
- These data complement national surveys that report higher MCV support among parents aware of the outbreak,¹ + the creation of stricter office vaccination policies by healthcare providers following the outbreak⁶
- These data may provide meaningful insights to inform interventions to address vaccine hesitancy

FINANCIAL DISCLOSURE

- Funding for this project was provided by an ACPHS new faculty start up award

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