

Cover Page for Final Comprehensive Report

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Care Needs: A Secondary Data Analysis to Identify Disparities

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Introduction

Nature of the research problem

Immunization is one of the most beneficial and cost-effective methods for preventing disease, with an estimated 20 million prevented deaths worldwide over the last few decades. New recommendations for several vaccines (i.e., tetanus booster vaccine, meningococcal vaccine, and human papillomavirus [HPV] vaccine) have been issued by the Advisory Committee on Immunization Practices (ACIP) for adolescents since 2005. Given these new recommendations, it is important to examine and ensure vaccination among all youth, including youth with special health care needs (YSHCN). YSHCN suffer from many health disparities, yet data are lacking on uptake of recommended adolescent vaccines among this population.

Brief overview of relevant background literature

The Maternal and Child Health Bureau (MCHB) defines children with special health care needs as those who have or are at increased risk for a chronic physical, developmental, behavioral, or emotional condition and who also require health and related services of a type or amount beyond that required for children generally. The MCHB definition is a non-condition specific, consequences-based definition that allows for a more comprehensive assessment of health needs, compared to approaches that focus on specific diagnoses/disabilities. Although this definition is widely used, it is also important to acknowledge that youth with special health care needs (YSHCN) are not a homogenous group but instead are a heterogeneous group that vary in the number and type of services needed.

Overall, national estimates suggest that 1 out of 4 youth ages 11-17 (25%)—over 6.3 million young people in the US—has a special health care need (SHCN). Estimates also point to significant disparities in who experiences SHCN. For example, males and non-Hispanic Black children are disproportionately represented among YSHCN. YSHCN are more likely to have additional health issues (e.g., being overweight or obese) and have similar or greater engagement in risky behaviors (e.g., tobacco use) compared to children without SHCN. Many YSHCN also experience significant problems with the health care system. Although YSHCN are more likely to access the health care system and have consistent health insurance compared to other youth, their insurance is “less likely to meet their needs.” Indeed, over one-third of insured families of children with SHCN report that their child’s coverage is not adequate to pay for the services they need, and over 30% of parents of YSHCN report foregoing needed healthcare for their child in the past year. Among youth that do access care, YSHCN may be less likely to receive some routine preventive services, such as counseling and education about risk-behaviors, compared to youth without SHCN.

Since 2005, recommendations for routine administration of several vaccines to adolescents (i.e., tetanus booster vaccine [which protects against tetanus, diphtheria, and pertussis], meningococcal vaccine, and HPV vaccine) have been issued by the ACIP. In the US, more than 48,000 cases of pertussis were reported in 2012, an estimated 1,400-2,800 cases of invasive meningococcal disease occur annually with a case fatality ratio of 10%-14%, and HPV is a common sexually transmitted infection that causes over 25,000 cancers (e.g., cervical, anal, etc.) annually. Current vaccine recommendations state that all adolescents starting at age 11 should receive tetanus booster vaccine, meningococcal vaccine, and HPV vaccine. Catch-up

vaccination is recommended for adolescents who remain unvaccinated through age 18 (and also for young adults older than age 18 for certain vaccines).

Despite strong recommendations from the ACIP and multiple medical societies, including the American Academy of Pediatrics (AAP), adolescent vaccine coverage in the US is suboptimal. Further, relatively few adolescents have received all three of these recommended adolescent vaccines (the desired public health outcome). To increase vaccine coverage, it is important to identify populations with vaccine coverage disparities. Research to date has examined adolescent vaccine coverage disparities by socioeconomic status, race and ethnicity, geographical location, and sexual orientation. However, no research to our knowledge has yet examined uptake of these recommended adolescent vaccines among YSHCN. Most research examining vaccine coverage among children with SHCN has focused on vaccines recommended for early childhood (e.g., polio vaccine, etc.).

Summary of purpose, scope, and methods of the investigation

Our study generated robust data on current vaccine coverage among YSHCN through secondary analyses of data from the 2010-2012 North Carolina Child Health Assessment and Monitoring Program (CHAMP)(estimated n=2,156 adolescents ages 11-17). The CHAMP contained data on both immunization and special health care needs among a diverse sample of adolescents, making it an ideal dataset for this study. Analyses determined current vaccine coverage for the above recommended adolescent vaccines among YSHCN and made comparisons to youth without SHCN; identified determinants of adolescent vaccine coverage among YSHCN; and identified potential barriers to vaccination among parents of unvaccinated YSHCN. These analyses provide some of the most comprehensive data to date on vaccination among YSHCN.

Study Design and Methods

Brief description of study design

We conducted secondary analyses of data from the 2010-2012 North Carolina Child Health Assessment and Monitoring Program (CHAMP). The CHAMP is an annual survey conducted by the North Carolina State Center for Health Statistics to measure the health of children in North Carolina less than 18 years old. The CHAMP is an add-on to the Behavioral Risk Factor Surveillance System (BRFSS) in North Carolina.

Population studied

We examined vaccination among adolescents ages 11-17, as reported by their parents/caregivers (referred to hereafter as “parents”).

Sample selection, recruitment and enrollment

We analyzed existing data on all adolescents ages 11-17 (and their parents) from the 2010-2012 CHAMP. No recruitment or enrollment activities were conducted for this study.

Instruments

The CHAMP collected information from parents about the adolescents’ uptake of three recommended adolescent vaccines: a) tetanus booster vaccine; b) meningococcal vaccine; and c)

HPV vaccine. Using this information, we then classified adolescents as having received 0, 1, 2, or all 3 of these recommended vaccines.

To identify YSHCN, the CHAMP surveys included the Children with Special Health Care Needs (CSHCN) Screener. YSHCN were defined as children who meet at least one of the following five criteria due to any condition that has lasted or is expected to last 12 months or longer (yes or no, for each): a) functional (activity) limitations; b) ongoing need of prescription medications; c) ongoing need of specialized therapies; d) ongoing need of elevated health or education services; and e) presence of ongoing behavioral, emotional, or developmental conditions requiring treatment or counseling. We first classified each adolescent as having a special health care need or not.

Since YSHCN are a heterogeneous group, we then also created two types of subgroups based on those proposed for use with the CSHCN Screener. Quantitative subgroups were based on the number of CSHCN criteria met; we categorized youth as having met 0, 1, 2, or 3 or more criteria. Qualitative subgroups were based on the type of criteria met, categorized as having: no special health care needs; prescription medication needs only; elevated services needs only (i.e., met at least one of the above CSHCN criteria for specialized therapies, elevated health/education services, or treatment/counseling needs); both prescription medication and elevated services needs; and functional limitations (regardless of responses to the other criteria). We classified each adolescent into both a quantitative and a qualitative subgroup.

We examined several demographic and health characteristics of adolescents, parents, and households. Adolescent characteristics included sex, age, race/ethnicity, type of school attended, healthcare coverage, having a regular healthcare provider, usual source of care, and having a preventive check-up in the last year. Parent characteristics included sex, age, relationship status, and employment status. Household characteristics included annual household income, highest education, and geographic region of residence within North Carolina.

Statistical techniques

Combining data from the 2010–2012 surveys, we used separate logistic regression models to examine the relationship between special health care needs status and each vaccination outcome, which included receipt of: a) tetanus booster vaccine; b) meningococcal vaccine; c) HPV vaccine; and 4) all three vaccines. Primary analyses utilized a dichotomous version of YSHCN status (yes or no), while secondary analyses examined the subgroups defined above. For analyses identifying correlates of vaccination among YSHCN, we used a four-level outcome variable indicating how many of the three recommended vaccines YSHCN had received (0, 1, 2 or 3). We used ordinal logistic regression to identify correlates. All analyses were conducted in Stata SE 14.0 (Statacorp, College Station, TX) incorporating sample weights to account for the study design. All statistical tests were two-tailed with a critical alpha of 0.05.

Detailed findings

Overall, only 12% of youth had received all three vaccines, with greater coverage for individual vaccines (91% for tetanus booster, 32% for meningococcal, and 26% for HPV). Vaccination coverage was generally similar between youth with and without SHCN, except for HPV vaccination. In bivariate analyses, more YSHCN had received HPV vaccine than youth without

special needs (33% vs 23%; $P < .05$). In multivariable models controlling for demographic and health characteristics, YSHCN had greater odds of HPV vaccination than youth without special needs (odds ratio [OR] = 1.70, 95% confidence interval [CI] = 1.16-2.50).

Differences in vaccine coverage were found for quantitative subgroups. In multivariable models, YSHCN who met two screening criteria had over twice the odds of HPV vaccination as youth without special health care needs (OR = 2.66, 95% CI = 1.23-5.77). Similarly, analyses using the qualitative subgroups also showed differences for HPV vaccination. In multivariable models, YSHCN had greater odds of HPV vaccination if they had elevated services needs only (OR = 2.62, 95% CI = 1.30-5.28) or both prescription medication and elevated services needs (OR = 2.61, 95% CI = 1.29-5.29) compared with youth without special health care needs.

Several correlates of having received a greater number of the recommended vaccines were identified among YSHCN. In multivariable models, female adolescents had received a greater number of the three recommended vaccines (OR=2.59, 95% CI 1.57-4.24). Adolescents ages 16-17 (OR=2.06, 95% CI: 1.10-3.87; compared to those ages 11-12) and those who had a preventive check-up in the past year (OR=2.98, 95% CI: 1.24-7.21) had also received more of these vaccines. Adolescents had received fewer of these vaccines if they were from households that did not have an income reported (OR=0.30, 95% CI: 0.12-0.75) or contained a person with at least some college education (OR=0.57, 95% CI: 0.33-0.96).

Discussion and interpretation of findings

To our knowledge, this is the first study to examine receipt of three recommended adolescent vaccines among youth with special health care needs and compare them with other youth. Similar to research examining receipt of childhood vaccines, we found that YSHCN in this population-based sample generally had similar or greater vaccination coverage as other youth. However, only about 1 out of 10 adolescents, overall, had received all three recommended vaccines.

Interestingly, in contrast to previous research suggesting that parents and health care providers may perceive YSHCN to be at low risk of HPV and thus not need vaccination, YSHCN in our study had higher coverage with HPV vaccine than other youth, in both primary and secondary (subgroup) analyses. This could be due, at least in part, to greater health services use among this population. That youth in our study with ongoing needs for elevated services (whether alone or in combination with prescription medication needs) had greater odds of receiving HPV vaccine further supports the possibility that YSHCN are more likely to be immunized against HPV due to using health services more frequently.

One of the strongest correlates of vaccination among YSHCN was whether adolescents had a preventive check-up in the past year. Although not entirely clear from our data, a potential reason for this finding is that a healthcare provider recommended and administered one of more of these vaccines during the recent check-up. Provider recommendation is one of the most important determinants of adolescent vaccination. YSHCN who were male had received fewer recommended vaccines, which was due in large part to differences in HPV vaccine coverage between males and females (21% vs. 48%). The lower HPV vaccine coverage among males is logical since HPV vaccine was first recommended for routine administration only for females

(occurred in 2007). Vaccination also tended to be lower among younger adolescents (i.e., ages 11-12). This likely reflects the fact that older adolescents have simply had a longer period of time and more opportunities to receive these vaccines.

Conclusions to be drawn from findings

Our study represents an important early look at receipt of recommended adolescent vaccines among YSHCN. Findings suggest that YSHCN generally have similar or greater levels of vaccination coverage as youth without special health care needs. Findings also highlight subgroups of YSHCN that may have particularly low vaccine coverage and potential strategies for increasing vaccination. Future efforts are needed to continue to monitor adolescent vaccine coverage among YSHCN and to identify and implement evidence-based strategies to increase vaccination.

Explanation of study limitations

Limitations include a cross-sectional design and measures of vaccine receipt based on parental report. Point estimates for vaccine coverage are likely lower than current levels as data were collected during 2010-2012. The CHAMP did not include some constructs, such as provider recommendation and parental vaccination attitudes and beliefs, that may be important to adolescents' receipt of vaccines. Although the CSHCN Screener is a validated and widely-used tool that identifies most YSHCN, it may not identify all children who meet the MCHB definition of having special health care needs. Furthermore, the CSHCN Screener does not provide data on specific health conditions and, while uncommon, some vaccines may be contraindicated for youth with specific conditions (e.g., Guillain Barré syndrome). Finally, data are from a single geographic area and generalizability to YSHCN from other areas is not yet known.

Comparison with findings of other studies

Similar to research examining receipt of childhood vaccines, we found that YSHCN in this population-based sample generally had similar or greater vaccination coverage as other youth. Our study extends this pattern of findings to adolescent vaccines, as very little is known about adolescent vaccine coverage among YSHCN. Several of the correlates of vaccination among YSHCN were similar to those identified previously among other populations, including receipt of a preventive check-up in the past year, gender, and age.

Possible application of findings to actual MCH populations and health care delivery situations

Results of our study highlight subgroups of YSHCN with particularly low vaccine coverage and potential strategies for increasing vaccination among this population (e.g., reducing missed opportunities for vaccination at existing medical visits).

List of Products

Peer-reviewed articles

McRee AL, Maslow GR, Reiter PL. Receipt of recommended adolescent vaccines among youth with special health care needs. *Clinical Pediatrics* 2017; 56(5): 451-460.

Reiter PL, McRee AL. Correlates of receiving recommended adolescent vaccines among youth with special health care needs: findings from a statewide survey. *Vaccine* 2016; 34(27): 3125-3131.

Published abstracts

McRee AL, Reiter PL. Receipt of recommended adolescent vaccines among youth with special health care needs. *Journal of Adolescent Health* 2016; 58(2): S117. [Poster presented at the Society for Adolescent Health and Medicine Annual Meeting. Washington, DC. March 2016].

Additional conference presentations

McRee AL, Reiter PL. Are youth with special health care needs receiving recommended adolescent vaccines? Talk presented at the American Public Health Association Annual Meeting. Denver, CO. October 2016.

McRee AL, Reiter PL. Are youth with special health care needs receiving HPV vaccine? Findings from a statewide survey. Abstract will be included in a collection of abstracts from the National Conference on Increasing HPV Vaccination (Sponsored by the National HPV Vaccination Roundtable). Atlanta, GA. August 2016.

Dissemination Activities and Plans Beyond Peer-Reviewed Publications

In addition to the peer-reviewed publications and conference presentations, we expanded dissemination efforts in an attempt to reach healthcare providers and other stakeholders. We developed a non-technical issue brief/fact sheet that summarizes the study's findings and implications. We distributed this document to several organizations and stakeholders, including the North Carolina chapter of the Society for Adolescent Health and Medicine as well as to adolescent health professionals from across the country participating in the University of Minnesota's Summer Institute in Adolescent Health. We also have made the document available to state adolescent health and immunization coordinators. We will continue to disseminate this document in the future, as appropriate or as requested.

Plans to Continue Research Through Additional External Funding

A great deal of our research focuses on increasing vaccine coverage among all youth, and we regularly seek external funding in this area. Furthermore, we will continue to monitor vaccine coverage specifically among YSHCN. If disparities begin to emerge among this population (since vaccine coverage among YSHCN was mostly similar to or greater than coverage among other youth in the current study), we will be well-positioned to apply for additional external funding that would allow us to develop and test an intervention to increase vaccine coverage among YSHCN.