

Submission Type Breakout/Quick/Lightning/Poster
ID [7631](#)

Abstract Type Breakout

Abstract Title Abstract
A Pox on Both Your Prisons: Varicella Outbreak Response and Seroprevalence Study in 2 Rhode Island Prisons

BACKGROUND: In May and August 2016, Rhode Island Department of Health (RIDOH) responded to two outbreaks of varicella at two Rhode Island prisons (A and B). Each outbreak was initiated by a case of orofacial herpes zoster who had not been placed in isolation.

METHODS: In Prison A, all exposed inmates received one dose of post-exposure varicella vaccine, and were concurrently serologically assessed for IgG immunity. Seronegative inmates received a second dose of vaccine 41 days after the first dose. In Prison B, serologic screening was performed prior to vaccination, and only seronegative inmates were vaccinated. Exposed staff in both prisons were offered vaccine. RIDOH used Pearson chi-square analysis, Fisher's exact test, and pooled t-tests to investigate associations between varicella immunity and age, race, birth before 1980, and self-reported prior varicella infection.

RESULTS: RIDOH confirmed 5 cases of varicella in Prison A and 3 cases in Prison B. Cases ranged in age from 29-45 years, and all developed 50-249 lesions. None reported immunocompromising conditions or prior varicella infection. In Prison A, 432 inmates were exposed to varicella and 88.9% were IgG positive. Seropositive inmates were significantly older than seronegative inmates (mean 38.7 years vs 31.8 years, $p=0.0003$). Birth before 1980 was also associated with immunity. Seropositive inmates were more likely to self-report prior varicella disease than seronegative inmates (68% vs. 29%; $p<0.0001$). In Prison B, 46 inmates were exposed to varicella; 89.1% were IgG positive. Only 5 inmates required vaccination. There was no association between varicella immunity and age, race, or birth before 1980.

CONCLUSIONS: In each outbreak, a swift, coordinated response prevented further spread of varicella. In Prison A, due to the short timeframe for post-exposure prophylaxis, 374 immune inmates received vaccine before serologic results were available. In Prison B, serologic screening was conducted prior to post-exposure vaccination, and only 5 doses of varicella were needed. There is limited literature detailing varicella immunity among incarcerated populations. Eighty-nine percent (89%) of exposed inmates in both prisons were found to be immune to varicella. Serologic screening in Prison B reduced expenditure of time, money and staffing resources, as well as unnecessary vaccine administration. The window for post-exposure varicella vaccination is short, and there is not always time to wait for serology results before administering vaccine during an outbreak. Serologic screening upon intake into the correctional system can avert cost and excess vaccination in the event of a varicella outbreak.

Submission Complete? Yes

Committee Infectious Disease

Topic Vaccine-preventable Diseases

Keywords Special/Vulnerable Populations; Vaccine-Preventable Diseases; Outbreaks

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8218](#)

Abstract Type Breakout

Abstract Title An Unusual Outbreak of Mumps in Northwest Arkansas, August-December 2016
Abstract

BACKGROUND: Mumps is a viral infection spread by respiratory droplets, characterized by parotitis or inflammation of the salivary glands, and prevented by the Measles, Mumps, and Rubella (MMR) vaccine. In the past 15 years, the Arkansas Department of Health (ADH) investigated between 1 and 6 cases of mumps per year. Since August 2016, ADH has been investigating an outbreak of mumps primarily concentrated in Northwest Arkansas.

METHODS: Mumps cases are reported to ADH by healthcare providers, school nurses, and laboratories. ADH interviews all reported cases to determine exposure, travel, and vaccination history and to identify close contacts. Cases are confirmed through polymerase chain reaction (PCR) or virus isolation of buccal swabs.

RESULTS: As of January 3, 2017, ADH identified 2,416 cases associated with the outbreak, of which 1,416 were laboratory confirmed. The majority of cases are within the Marshallese (64%) who are believed to have common exposures within local churches. An estimated 6,000 to 12,000 Marshallese live in Northwest Arkansas, which is the largest population of Marshallese in the continental United States. Transmission has spread to 65 schools in 10 different school districts, 11 colleges/vocational schools, 8 private schools, 133 workplaces and 83 churches. Median age of cases is 14 years with an age range of 6 months-82 years. The majority of cases are 5-17 years old (60%). Approximately 91% of cases in children are up-to-date on vaccine. In contrast, only 46% of adult cases are up-to-date. Control measures have included offering MMR vaccines to get anyone up-to-date with the routine vaccination schedule. Offsite vaccination clinics have occurred in workplaces, churches, and housing. To date, approximately 6,737 doses of MMR have been given at 48 vaccination clinics and at our local health units. Eighteen 3rd dose MMR clinics in schools with ongoing transmission have occurred.

CONCLUSIONS: While multiple mumps outbreaks occurred across the United States in 2016, Arkansas accounted for more than half of the national cases, with a large percentage of cases being fully immunized. The challenges in Arkansas stem from the unique population of those affected. Culturally, the Marshallese are community-oriented, gathering in large settings and living in dense quarters where infections can easily spread. Language barriers as well as some vaccine hesitancy have been ongoing challenges. An evaluation of the efficacy of a 3rd dose is currently underway through a partnership with the Centers for Disease Control and Prevention (CDC).

Submission Complete? Yes

Committee Infectious Disease
Topic Vaccine-preventable Diseases
Keywords Outbreaks; Vaccine-Preventable Diseases

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8024](#)

Abstract Type Breakout

Abstract Title Census Tract Neighborhood Factors and Pertussis Infection in NM, 2012-2015
Abstract

BACKGROUND: Pertussis or “whooping cough” is a highly contagious respiratory disease frequently characterized by a paroxysmal cough, post-tussive vomiting and/or an inspiratory “whoop”. Though previous analyses have described individual-level characteristics associated with pertussis infection, there is limited knowledge of whether neighborhood socioeconomic factors are associated with risk of infection. We describe case-based demographic and neighborhood socioeconomic characteristics of pertussis cases in New Mexico.

METHODS: Probable and confirmed pertussis cases (n=2128) between 2012-2015 were linked by census tract (CT) with American Community Survey data and aggregated by socioeconomic factor (poverty, household crowding, and female head of household (HH)). Poverty level was categorized by percent of CT residents below poverty threshold ($\leq 9\%$, $10\leq 19.9\%$, $20\leq 29.9\%$, and $\geq 30\%$). Crowding and female HH were divided into quartiles. Incidence rates were calculated per 100,000 person years with 95% CIs by demographics (age, gender, race/ethnicity) and age-adjusted for socioeconomic factors, overall and stratified by ethnicity.

RESULTS: Incidence of pertussis decreased from 42.8 in 2012 to 11.7 in 2015 with infants and children (0-17) disproportionately affected compared to adults ($p < 0.05$). Hispanics had higher overall incidence rates compared to non-Hispanic whites (NHW) and American Indian/Alaskan Natives (AIAN), 32 (29.3-35.4) vs. 15.5 (14.2-16.9) and 18.6 (13.4-25.3), despite being more up-to-date on vaccination than non-Hispanics ($p < 0.05$). Residing in the lowest poverty CTs was associated with significantly higher rates of pertussis compared to the medium-low, medium-high and high poverty CTs, 29.6 (27.3-32.0) vs. 19.1 (17.7-20.6), 18.6 (16.9-20.4), and 17.2 (15.1-19.5), overall and stratified by ethnicity. Hispanics had rates 3-9 times greater than NHW regardless of poverty level. Residing in lowest crowding CTs was significantly associated with higher incidence compared to medium-low, medium-high and high crowding CTs, 29.4 (26.9-32.1) vs. 21.5 (19.7-23.3), 17.1 (15.6-18.8), and 18.1 (16.6-19.7); similar trends were observed for female HH. After stratifying by ethnicity, however, higher rates of pertussis among lowest crowding and female HH CTs were only significant among NHW. Upon further examination, cases residing in lowest poverty CTs vs. highest poverty CTs were more likely to be laboratory-confirmed (58% vs. 53%) and less likely to be hospitalized (4.4% vs 3.1%) and UTD on vaccinations (52% vs. 58%).

CONCLUSIONS: In contrast to previous respiratory disease neighborhood studies, pertussis incidence was highest among CTs with low poverty, low crowding, and low female HH; though this varied by ethnicity and CT variable. Our findings suggest that further study considering access to care, healthcare utilization, and provider testing practices is needed.

Submission Complete? Yes

Committee Infectious Disease
Topic Vaccine-preventable Diseases
Keywords Geocoding; Respiratory Diseases; Social Determinants

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8511](#)

Abstract Type Breakout

Abstract Title Abstract Large Mumps Outbreaks Associated with Four Universities in Indiana, 2016

BACKGROUND: Since 2006, mumps outbreaks on college campuses have occurred frequently. In 2016, the Indiana State Department of Health and local health departments investigated outbreaks of mumps at four universities in Indiana. Our study aims to characterize the outbreaks, community spillover, and control measures utilized by public health departments to mitigate spread.

METHODS: Reported mumps infections with onset between January 1 and September 10, 2016 were classified as probable or confirmed using the 2012 Council of State and Territorial Epidemiologists case definition. Case investigations were conducted to collect information about clinical presentation, vaccination status, and laboratory testing, and initiate control measures. To mitigate the impact of each outbreak, vaccination clinics were held and case detection activities were initiated, including increased testing at the state public health laboratory and public health messaging of testing recommendations, disease information, and outbreak updates.

RESULTS: A total of 281 confirmed and probable mumps cases were identified between January 1, 2016 and September 10, 2016. Of these, 179 cases (63.7%) occurred in students or staff affiliated with the four outbreak universities and 102 (36.3%) occurred in community members, of whom 26 (25.5%) had known epidemiological links to other cases. One case was hospitalized and 74 (26.3%) cases visited an emergency room. Complications, including orchitis and meningitis, were reported among 2.1% of cases. The state and local health departments disseminated 46 public health messaging documents to providers, partners, and the public. The ISDH Laboratory tested 504 specimens from 488 unique patients for confirmation by polymerase chain reaction (PCR) and 42.7% were positive. Among 19 cases who had PCR or culture positive tests and also had a serum immunoglobulin M (IgM) test, 11 cases were IgM negative and 8 cases were IgM positive. Documentation of two or more doses of mumps-containing vaccine was available for 84.9% of university cases and 52.0% of community cases. Seven vaccination clinics were held across three of the four universities, during which a total of 5,273 doses of measles-mumps-rubella (MMR) vaccine were administered.

CONCLUSIONS: These outbreaks occurred in highly vaccinated populations and resulted in community spillover of cases. Laboratory testing during this outbreak supports concerns around routine use of IgM testing in vaccinated persons previously described in the literature. Improved baseline mumps surveillance and interstate collaboration are needed to better understand mumps resurgence on college campuses and to share best practices for outbreak testing, communications, and management.

Submission Complete? Yes

Committee Infectious Disease

Topic Vaccine-preventable Diseases

Keywords Vaccine-Preventable Diseases; Outbreaks

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [7873](#)

Abstract Type Breakout

Abstract Title Perceptions Towards California's Elimination of Personal Belief Exemptions in a Community with High Personal Belief Exemption Rates—Marin County, California, 2015-2017
Abstract

BACKGROUND: Personal Belief Exemptions (PBEs) are non-medical exemptions from mandatory school immunizations. Marin County is an affluent community located in the San Francisco Bay Area that has historically had the highest PBE rate (6% in 2015-16) in the surrounding counties. In June 2015, California passed a state law, SB277, which prohibited new PBEs from mandatory school immunizations as of January 1, 2016. Concerns arose that medical exemptions might increase with the elimination of PBEs. We examined perceptions towards SB277 among kindergarten parents and the change in medical exemptions following the law's implementation to inform local immunization outreach.

METHODS: A survey was developed from existing vaccine beliefs survey instruments and input from local stakeholders. Topics included status of receiving school-required immunizations and SB277 attitudes and beliefs. The survey was sent after SB277 was passed but prior to the law's effective date, when PBEs were still permitted. Parents opting out of or delaying mandatory vaccines were asked what they would have done if the law were in effect that school year. The survey was disseminated in English and Spanish to all elementary schools in Marin County. Approximately 2,260 kindergarten households received the survey, representing about 80% of potential kindergarten households. Responses were stratified by immunization status and analyzed using proportions and Fisher's exact tests. The preliminary change in the medical exemption rate was obtained from mandatory immunization reporting data.

RESULTS: The response rate was approximately 33%. Of the 740 responses received, 93% (n=684) reported that their child was up-to-date on all required kindergarten immunizations and 5.8% (n=43) reported that their child had a PBE. Most (82%) respondents supported SB277; respondents with a PBE were significantly less likely to support SB277 ($p<0.001$) than respondents without a PBE. Among those who did not support SB277 (n=106), the majority worried the number of required vaccines would increase over time (65%) and believed it is unconstitutional to require vaccination (56%). Among parents reporting a PBE, 12% would have sought a medical exemption and 14% would have homeschooled their kindergartener if SB277 had gone into effect during the 2015-16 school year. Preliminary data suggest that the medical exemption rate increased in the 2016-17 school year.

CONCLUSIONS: Although there was a high level of support for the law prohibiting PBEs in Marin, some parents remained vaccine hesitant. California counties should continue tracking medical exemption rates and communicating with the vaccine hesitant community about their immunization concerns.

Submission Complete? Yes

Committee Infectious Disease
Topic Vaccine-preventable Diseases
Keywords Immunization; Vaccine-Preventable Diseases; Local Epidemiology

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [7671](#)

Abstract Type Breakout

Abstract Title Abstract
Pertussis Outbreak Among Members of a Religious Community – Brooklyn, New York, 2014-2016

BACKGROUND: A resurgence of pertussis has occurred in the United States in the last decade. In October 2014, an outbreak of pertussis began in an Orthodox Jewish community of Brooklyn, New York.

METHODS: The New York City Health Department interviewed patients and reviewed clinical, laboratory, and immunization records. Cases were considered part of the outbreak if they met the clinical case definition and had an epidemiologic link to the Orthodox Jewish community of Brooklyn. Exposed persons were identified. Control measures were implemented.

RESULTS: A total of 238 cases were reported in 4 neighborhoods of Brooklyn through May 5, 2016; the outbreak surged in summer due to transmission at camps. Median age of cases was 8 years (range 0-68 years); 198 (83%) were aged ≤ 18 years including 61 (26%) < 1 year of age. Among child cases, 55 (28%) were unvaccinated, 28 (14%) were vaccinated but not up-to-date with pertussis containing vaccine, 114 (58%) were up-to-date, and 1 ($< 1\%$) had unknown immunization history. Among mothers of infant cases, 54 (89%) had not received Tdap vaccine during pregnancy, 4 (7%) had received vaccine, and 3 (5%) were unknown. Five infant cases were hospitalized; no deaths occurred. Among cases, 215 (90%) received antibiotics treatment, and 201 (84%) were tested by PCR, 52% of which were positive. The median time from medical visit to report to public health was 4 days (range 0-137 days) and improved as the outbreak progressed. Outbreak control measures included alerts to providers, letters to schools and parents of school children, audits of schools and daycares for immunization compliance, exclusion of exposed students not up-to-date with vaccination, patient recall for vaccination, and advertisements in local papers. In total, 935 additional exposed persons were identified; exposures occurred within households and at camp, school, and other congregate settings.

CONCLUSIONS: Delays in vaccination among young children and limited Tdap vaccination among pregnant women contributed to the start of the outbreak. The outbreak was propagated by cases among vaccinated adolescents and adults; this highlights concerns around vaccine effectiveness and waning immunity. Delays in reporting to public health, particularly early in the outbreak, further hindered implementation of outbreak control measures.

Submission Complete? Yes

Committee Infectious Disease

Topic Vaccine-preventable Diseases

Keywords Outbreaks; Vaccine-Preventable Diseases; Epidemiology

Consider for Different Presentation? Yes

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Submission Type ID	Breakout/Quick/Lightning/Poster 7726
Abstract Type	Breakout
Abstract Title Abstract	Revised Guidelines for the Evaluation and Public Health Management of Suspected Outbreaks of Meningococcal Disease in the United States BACKGROUND: Guidelines for the investigation and management of suspected meningococcal disease outbreaks in the United States were initially published in 1997 when outbreaks were primarily due to serogroup C <i>Neisseria meningitidis</i>. Since that time, quadrivalent conjugate meningococcal vaccines (MenACWY) and protein-based serogroup B meningococcal vaccines (MenB) have been licensed in the United States. In addition, the epidemiology of meningococcal outbreaks has evolved, with recent outbreaks primarily involving serogroup B at universities and serogroup C among men who have sex with men. Thus, updated guidelines are needed to assist state and local health departments to investigate and manage meningococcal disease outbreaks. METHODS: A retrospective review of all meningococcal disease cases reported from January 1, 2009, through December 31, 2013, in the United States was performed by state health departments and CDC to identify and describe the epidemiology of meningococcal disease clusters. A meningococcal disease cluster was defined as at least two meningococcal disease cases of the same serogroup within three months. Clusters were classified as community-based if cases share no common affiliation other than a shared, geographically-defined community- or organization-based if cases are linked by a common affiliation other than a shared, geographically-defined community. A systematic review of the literature was undertaken to describe the use and impact of meningococcal vaccines and expanded chemoprophylaxis in outbreak settings from 1980 to present in all geographic areas except sub-Saharan Africa. During 2015–2016, teleconferences with an expert panel were held regularly to review current guidelines, and consider revision based on available published and unpublished data. RESULTS: Retrospective review of meningococcal disease cases identified 251 cluster-associated cases from 62 clusters. Among these 40 were community-based, 18 were organization-based and 4 were of unknown type. Ten (56%) organization-based clusters were due to serogroup B disease, of which five were associated with universities. Based on the results of this analysis of recent U.S. clusters, systematic literature review, and expert opinion, proposed revisions to meningococcal disease outbreak guidelines were drafted and will be presented to the Advisory Committee on Immunization Practices in February 2017. Updated recommendations cover defining a meningococcal disease outbreak, threshold for considering mass vaccination campaigns, and use of expanded chemoprophylaxis. CONCLUSIONS: Revised guidelines, taking in to account the evolving epidemiology of meningococcal disease and availability of vaccines against the most common meningococcal serogroups, have been drafted with an aim to assist state and local health departments investigate and manage meningococcal disease outbreaks.
Submission Complete?	Yes
Committee Topic Keywords	Infectious Disease Vaccine-preventable Diseases Outbreaks; Vaccine-Preventable Diseases
Consider for Different Presentation?	Yes
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Submission Type Breakout/Quick/Lightning/Poster
ID [7805](#)

Abstract Type Breakout

Abstract Title Abstract Risk Factors for Meningococcal Disease Among Adults Experiencing Homelessness in Boston — Massachusetts, 2016

BACKGROUND: Between January and March 2016, five cases of meningococcal disease were reported among adults experiencing homelessness in Boston. Reports of meningococcal disease in this population are rare. We aimed to evaluate factors contributing to increased risk for meningococcal disease among adults experiencing homelessness in Boston.

METHODS: We conducted a matched case-control evaluation. A case was defined as laboratory-confirmed *Neisseria meningitidis* with illness onset on or after May 1, 2015, in an adult experiencing homelessness in the Boston-metro area. Five controls were matched to each case by sex, age-group, and use of the same emergency shelter facility during the case's infectious period. Participants were interviewed and their medical records reviewed to identify risk factors. Univariate conditional logistic regression was used to calculate exact matched odds ratios (eMOR) and 95% confidence intervals (CI).

RESULTS: Five cases and 25 controls were enrolled. Compared to controls, a higher proportion of cases were black (80% vs. 44%) or experienced homelessness for less than one year (60% vs. 32%). During the infectious period, a higher proportion of cases had >1 kissing partner (60% vs. 32%) or slept in an emergency shelter room with ≥50 people (40% vs. 20%). None of these differences were statistically significant. The only factor significantly associated with disease was history of any immunosuppressive condition (HIV, lupus, or diabetes) (eMOR: 10.57; 95% CI: 1.79–∞; p = 0.02).

CONCLUSIONS: While history of immunosuppressive condition was significantly associated with meningococcal disease among adults experiencing homelessness, other typical risk factors such as crowding and kissing multiple partners were not. Sample size limited this analysis; enhancing meningococcal disease surveillance by collecting homeless status will allow for more robust evaluation.

Submission Complete? Yes

Committee Infectious Disease

Topic Vaccine-preventable Diseases

Keywords Risk Factors; Vaccine-Preventable Diseases; Outbreaks

Consider for Different Presentation? Yes

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Submission Type ID	Breakout/Quick/Lightning/Poster 8387
Abstract Type	Breakout
Abstract Title Abstract	Using GIS Technology to Assess the Correlation Between Demographic Variables and Vaccination Coverage Data Among Kindergartners – Arizona, 2014-2015

BACKGROUND: Demographic characteristics such as household income, race, and education have been shown to impact vaccination coverage and exemption rates among school-aged children. Immunization programs currently report state-aggregated kindergarten vaccination coverage and exemption data to the Centers for Disease Control and Prevention (CDC), but do not assess information related to demographic characteristics. The objective of this study was to use geographic information system (GIS) software to assess correlations between household income and vaccination coverage among kindergartners in Arizona.

METHODS: School-level kindergarten vaccination coverage and exemption assessment data for the 2014-15 school year was matched with National Center for Education Statistics (NCES) school attendance boundary areas for 687 Arizona public schools. Census block-level estimates for 2014 median household income were spatially joined to the school assessment data by calculating the mean of the median household income values among all Census blocks within each school attendance boundary. Correlation coefficients were calculated to assess statistical relationships between household income and the percent of kindergartners up to date (UTD) or exempt by vaccine under state requirements (diphtheria, tetanus, and acellular pertussis [DTaP], Polio, Measles, mumps and rubella [MMR], Hepatitis B, and Varicella).

RESULTS: Among 687 Arizona public schools during the 2014-15 school year, mean median household income was negatively correlated with the percent of kindergartners UTD for each of the state's required vaccines ($p < 0.0001$ for all): DTaP ($r = -0.25$); Polio ($r = -0.28$); MMR ($r = -0.28$); Hepatitis B ($r = -0.32$); and Varicella ($r = -0.27$). Household income was positively correlated with the percent of kindergartners exempt from each vaccine ($p < 0.0001$ for all): DTaP ($r = 0.36$); Polio ($r = 0.37$); MMR ($r = 0.38$); Hepatitis B ($r = 0.36$); and Varicella ($r = 0.32$).

CONCLUSIONS: High household income was associated with lower vaccination coverage and higher exemption rates among public school kindergartners in Arizona during the 2014-15 school year. While CDC reports consistently high vaccination coverage among kindergartners, there are clusters of undervaccinated subgroups that vary demographically. Geospatial analyses can help evaluate local correlations between demographic factors and vaccination coverage, allowing immunization programs to tailor evidence-based interventions to protect communities from vaccine preventable diseases.

Submission Complete? Yes

Committee	Infectious Disease
Topic	Vaccine-preventable Diseases
Keywords	Geographic Information Systems (GIS); Immunization; Children and Adolescents
Consider for Different Presentation?	Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [7599](#)

Abstract Type Lightning

Abstract Title Abstract
A Case of Postpartum Tetanus in Kentucky, 2016: An Opportunity to Educate and Vaccinate

BACKGROUND: Obstetric tetanus occurs during pregnancy or with onset within 6 weeks postpartum following contamination by *Clostridium tetani* spores in wounds or during unclean delivery or abortion.

METHODS: The Kentucky Department for Public Health and two local health departments (LHDs) received notification of a postpartum tetanus case in an unvaccinated 30-year-old multigravida Amish woman, on July 11, 2016. The state and the LHD in concert with local practitioners and community elders investigated this case to identify risk factors and offer vaccination recommendations to the community.

RESULTS: Due to the close relationship between the LHD and the Amish community, the LHD was able to use culturally and religious-sensitive educational approaches to reach and educate the community on vaccinations. These efforts led to vaccination of 47 persons from the Amish community including children and adults. The majority received age-specific tetanus antigen-containing vaccine (DTaP or Tdap) as per the Advisory Committee on Immunization Practices (ACIP) recommendations. However, given that the majority of the Amish community members had had prior exposure to pertussis, some people declined a pertussis antigen-containing vaccine.

CONCLUSIONS: The case investigated here presented an invaluable opportunity to reach the Amish community for vaccination recommendations. The investigation also underscored a unique trust and relationship built between an LHD and a local religious community that may be used to promote vaccination coverage in a culturally sensitive way.

Submission Complete? Yes

Committee Infectious Disease

Topic Vaccine-preventable Diseases

Keywords Vaccine-Preventable Diseases; Immunization; Prevention

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
 ID [8680](#)
 Abstract Type Lightning
 Abstract Title Contextualizing Colorado Immunization Data By School and Community Characteristics
 Abstract

BACKGROUND: In 2014, Colorado schools became legally required to disclose their immunization and exemption rates upon request. Rates from the 30 largest school districts have been published by Chalkbeat.org, an education news site. Despite being the only compiled source of Colorado school immunization data, little analysis has been done. This study correlated immunization data with school and community characteristics, and suggested new avenues of investigation.

METHODS: This ecologic study comprised 1166 schools and their respective school districts and counties from the 2015-2016 school year. Schools with <80% of students submitting immunization records, <15 students enrolled, or missing data were excluded. Immunization and exemption rates from the Chalkbeat database were compared with whether schools had full-time nurses or school-based healthcare centers using Wilcoxon two-sample tests. Rates were aggregated by district to compare with socioeconomic and healthcare access indicators at the school district- or county-level using Spearman's rank correlations.

RESULTS: After correcting for multiple comparisons, school nurse presence was significantly associated with higher immunization and lower exemption rates ($p < 0.0001$ for both). White or Hispanic race and the percentage of children in poverty in the school district were significantly correlated with mean exemption rates only ($\rho = 0.76105$, $p < 0.0001$; $\rho = -0.71764$, $p < 0.0001$; $\rho = -0.6411$, $p < 0.0001$, respectively).

CONCLUSIONS: The results support previous studies showing high exemption rates associated with white race and high income. Immunization rates may have been diluted by parents underreporting vaccine records. Further studies should examine Hispanic race and school exemptions at the individual level, and the role of a school nurse in influencing exemption rates.

Submission Complete? Yes

Committee Infectious Disease
 Topic Vaccine-preventable Diseases
 Keywords Immunization; Indicators; School Health

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8025](#)

Abstract Type Lightning

Abstract Title Outbreak of Varicella at Dekalb County Board of Health Refugee Clinic, 2016
Abstract

BACKGROUND: An outbreak of varicella occurred at the DeKalb County Board of Health (DCBOH) Refugee clinic. Regular protocol for varicella follow up was used in response to the initial case in a recently arrived refugee from Nepal, but a total of four related cases were confirmed.

METHODS: Varicella was confirmed by RT-PCR testing of vesicular fluid. Assessment of susceptibility of household contacts and waiting room exposures was determined based on VZV IgM serology results. As part of standard refugee screening adults have serology to determine immunity and children of appropriate age are vaccinated. With the assistance of an interpreter parents of cases were educated about exclusion, signs and symptoms, and how to seek care if needed.

RESULTS: On May 28th, DCBOH was notified of two children, recently arrived from Nepal on May 11th, presenting to the Refugee Clinic with signs and symptoms consistent with varicella. For each case a specimen of vesicular fluid was collected, and as per protocol for single cases of varicella, only close household contacts were assessed for susceptibility. It was determined the two cases had arrived on the same day and from the same refugee camp, where two other children had recently resolved cases of varicella. This suggested that these cases had a common exposure prior to entering the United States. The refugee resettlement agencies were contacted to ensure case managers working closely with the families had immunity to varicella. Clinic employees were also questioned to determine susceptibility. A sibling of one case experienced mild breakthrough-type varicella. On June 14, a fourth case presented to the clinic after having been exposed during their screening visit on May 27th. The parents had refused routine immunizations. This case prompted more thorough investigation of waiting room exposures. Of the 85 waiting room exposures assessed for susceptibility, one 14-week old infant was identified for follow up. Daily follow up with this vulnerable exposure and close contacts continued. At the end of the 21-day incubation period no new cases were identified.

CONCLUSIONS: This outbreak highlights the importance of considering the specific population exposed when planning follow up to an infectious disease exposure. Investigation of waiting room exposure would not normally be considered standard in the event of an isolated case of varicella, but given the unique population seen in the refugee clinic future cases may prompt more thorough consideration of follow up for susceptible waiting room exposures.

Submission Complete? Yes

Committee Infectious Disease
Topic Vaccine-preventable Diseases
Keywords Vaccine-Preventable Diseases; Outbreaks

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8534](#)

Abstract Type Lightning

Abstract Title Risk Factors for Mumps Infection on a College Campus – Indiana, 2016
Abstract

BACKGROUND: Since 2006, mumps cases and outbreaks have been increasingly associated with university students and college campuses. Most cases are occurring in students who have completed the two-dose measles-mumps-rubella (MMR) vaccine series appropriately. Further understanding of exposures and risk factors for mumps infection in this population is needed to identify potential target areas for messaging and intervention.

METHODS: Data were collected on students who attended two outbreak vaccination clinics and those who were cases during an outbreak of mumps at a small, private university in Indiana in 2016. Clinic attendees who were not known outbreak cases were surveyed about known exposures (defined as direct contact with or notification of exposure from a confirmed or probable case), living conditions, extracurricular activities, and vaccination status. Data for mumps cases was abstracted from investigations in the Indiana National Electronic Disease Surveillance System. Associations were analyzed using chi-square and Fisher's exact tests, and measured using odds ratios.

RESULTS: Completed survey information or case data was collected for 1,427 individuals. Of these, 25 (1.8%) individuals were identified as confirmed or probable cases of mumps. Responders were aged from 17 years to 66 years (mean: 23 years; median: 20 years). A history of two or more doses of mumps-containing vaccine was self-reported by 1100 (77.1%) individuals. Thirty (2.1%) respondents reported mumps infection during childhood. Of 1,427 individuals studied, 48.9% reported sorority or fraternity affiliation, 22.0% reported dormitory residence, 23.0% reported participation in an athletic team or group, and 29.9% reported participation in another club or group. Known exposure to a confirmed or probable case was significantly associated with becoming a mumps case (OR: 28.8; 95%CI: 11.8-70.3) as was sorority or fraternity affiliation (OR: 2.7; 95% CI: 1.1-6.6). One particular fraternity was identified as a possible source by 56% of cases, independent of membership in that organization. Participation in college athletics, number of MMR vaccine doses, residence in a dormitory, and other club participation were not significantly associated with developing mumps in this population.

CONCLUSIONS: This university outbreak occurred in a highly vaccinated population. Sorority or fraternity affiliation was significantly associated with developing mumps in this outbreak, however, much of this association may be accounted for by the large involvement of one fraternity. These results indicate a continued need to focus on control measure strengthening and enforcement for known contacts of cases and groups for whom risk is high in collegiate mumps outbreaks.

Submission Complete? Yes

Committee Infectious Disease

Topic Vaccine-preventable Diseases

Keywords Vaccine-Preventable Diseases; Outbreaks; Risk Factors

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
 ID [8665](#)
 Abstract Type Lightning
 Abstract Title Abstract
 Varicella Outbreak Potential Among Foreign Workers in Seasonal Industry Jobs in Alaska

BACKGROUND: In Alaska, cases of varicella must be reported to the Alaska Section of Epidemiology (AK-SOE) within 5 days after being suspected or diagnosed. Varicella is a highly infectious disease that can be more serious among adults than children. Foreign-born individuals living in the United States may be more susceptible to infection as childhood varicella is less common in some countries. Unimmunized populations and close living quarters are factors known to facilitate disease transmission. Several industries in Alaska including those associated with salmon fishing, seafood and salmon processing, and hospitality, primarily use seasonal staff for entry-level type jobs that are labor intensive but have relatively high earning potential given long work hours. Seasonal employers in Alaska mainly utilize dormitory-style housing facilities for workers with shared bedrooms and shower accommodations. Employees are not required to provide any immunization documentation to work and/or live in housing facilities. These factors can contribute to vaccine-preventable disease outbreaks among workers.

METHODS: We reviewed 2012-2016 varicella case-reports to the AK-SOE to identify clusters or outbreaks of disease.

RESULTS: During 2012-2016, four events involving confirmed cases of varicella at remote, seafood and salmon processing facilities were reported to AK-SOE. Each event involved foreign-born individuals with no evidence of immunity to varicella and exposure potential to a number of other individuals in either the work and/or living quarter environment(s). One event was epi-linked to an index case of herpes zoster in a dorm room-mate. Prompt public health notification and immediate case-patient isolation control measures helped in averting outbreaks. Employers in each of the events were very cooperative with public health and local health care providers in both the investigation and response efforts. They assisted in administering a screening questionnaire to help identify individuals at high risk to serious complications of varicella including pregnant women and immunocompromised persons; and, voluntarily purchased vaccine which was offered and administered to susceptible individuals as part of the outbreak response.

CONCLUSIONS: Lack of pre-employment screening and readily available information about immunity hampered the efficiency with which public health decisions could be made. Vaccine availability and storage and handling requirements impacted the speed of response, so timely assessment is critical. Hygiene and infection control practices are paramount in any close quarter living situation. Vaccination uptake may not be optimal, if not mandatory. Other challenges include getting specimens collected and tested from remote locations and enhanced surveillance when self-reporting might impact an individual's salary compensation.

Submission Complete? Yes

Committee Infectious Disease
 Topic Vaccine-preventable Diseases
 Keywords Outbreaks; Vaccine-Preventable Diseases; Immunization

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8490](#)

Abstract Type Poster

Abstract Title Abstract
Clinical Characteristics of Patients with Positive Pertussis Serology, Georgia, 2014-2016

BACKGROUND: Serology testing is increasingly used to diagnose pertussis, despite the lack of a US Food and Drug Administration (FDA)-approved, commercially available assay. Positive results are not confirmatory for pertussis nor included in the Council for State and Territorial Epidemiologists (CSTE) pertussis case definition, and therefore do not prompt investigation in many states. We examined the clinical characteristics of patients with positive pertussis serology reported to the Georgia Department of Public Health (DPH) to determine how many met the clinical case definition necessary to be considered a probable pertussis case.

METHODS: All suspect cases with positive serology (pertussis IgM, IgA, or IgG antibodies) and cough onset between January 1, 2014 and September 1, 2016 were identified in surveillance data. Clinical characteristics, demographics, and vaccination histories were captured via patient and physician interviews. Patients that met the CSTE pertussis clinical case definition and were serologically positive, but not culture or PCR positive, were classified as probable; serology positive patients that did not meet the clinical case definition were considered not-a-case. Chi-square test was used to compare proportions; $p < 0.05$ was considered significant.

RESULTS: During the study period, 214 serology positive patients were reported to DPH; 127 (59.3%) met the pertussis clinical case definition and were classified as probable cases. Of these, 71 (55.9%) were IgM positive, 65 (51.2%) IgG positive and 50 (39.4%) IgA positive – with some having multiple serology results. Most cases were among adults, with 110 (86.6%) ≥ 20 years of age. Thirty-eight (29.9%) cases reported whoop, 112 (88.2%) reported paroxysms, and 51 (40.2%) reported post-tussive vomiting. The proportion that reported paroxysms was significant among IgG positive cases compared to IgM positive cases ($p=0.03$). IgM positive cases were more likely to report a whoop compared to IgA positive cases ($p=0.01$). There was no significant difference in symptomology between IgG and IgA positive cases. Of the 127 cases, 32 (25.2%) had serum collected within 2 weeks of cough onset; 38 (29.9%) 2-4 weeks after cough onset; and 57 (44.9%) > 4 weeks after cough onset.

CONCLUSIONS: Physicians may be unaware of the appropriate laboratory tests required to confirm pertussis, especially in adults. However, the use of serology testing indicates that pertussis was a suspected etiology. Our findings suggest that positive serology results for pertussis may be useful in the identification of patients warranting public health investigation and deserves further study.

Submission Complete? Yes

Committee Infectious Disease
Topic Vaccine-preventable Diseases
Keywords Surveillance; Infectious Diseases; Epidemiology

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [7587](#)

Abstract Type Poster

Abstract Title Abstract
Current Epidemiology of Serogroup W Meningococcal Disease—United States, 2010–2015

BACKGROUND: Serogroup W meningococcal disease, caused by the bacterium *Neisseria meningitidis*, is a rare but severe infection. Following a serogroup W outbreak after the Hajj in 2000, serogroup W disease, predominantly caused by sequence type-11 clonal complex, has rapidly increased in South Africa, South America, and the United Kingdom. We describe the epidemiology of serogroup W meningococcal disease in the United States during 2010–2015.

METHODS: Data were collected from the National Notifiable Disease Surveillance System, Active Bacterial Core surveillance, and state health departments. Isolates were serogrouped via slide agglutination and real-time polymerase chain reaction. For cases lacking a serogroup result at CDC, the state result was used. Case-fatality ratios (CFR) were calculated using the proportion of cases with known outcomes as the denominator. Clonal complex (cc) and sequence type (ST) were determined using multilocus sequence typing (MLST).

RESULTS: From 2010–2015, 3,504 meningococcal disease cases were reported to CDC; 2,976 (85%) had a serogroup result, of which 290 (10%) were serogroup W. While the number of serogroup W cases reported annually remained fairly stable (range: 40–57), the total number of reported meningococcal disease cases decreased by 60%, and the proportion of cases due to serogroup W increased from 6% (42/830) in 2010 to 12% (40/332) in 2015. The majority of serogroup W cases were reported from five states: Florida (n=106), California (n=31), New York (n=25), Georgia (n=19), and Oregon (n=11). Half (50%) of people with serogroup W disease were male, 185 (64%) were white, and 84 (29%) were Hispanic. Median age was 51 years (interquartile range: 26–70). Overall, 20% (52/259) of serogroup W cases were fatal, as compared to CFRs for serogroups B (15%), Y (18%), or C (24%). Serogroup W CFR was highest among adults aged 50–59 years (38%). MLST results were available for 119 (41%) of serogroup W cases: 76 (64%) were cc11, 40 (34%) were cc22, and 1 each were cc23, cc32, and an unassigned cc. cc appeared to be geographically-associated: cc11 was concentrated in Florida and Georgia, while cc22 predominated on the West coast. Within cc11, the majority of isolates (86%) were ST-11, and within cc22 the majority (73%) were ST-22.

CONCLUSIONS: A rapid increase in serogroup W disease has not been observed in the United States. The majority of serogroup W cases were reported in a limited number of states, with geographic differences in clonal complex.

Submission Complete? Yes

Committee Infectious Disease

Topic Vaccine-preventable Diseases

Keywords Epidemiology; Infectious Diseases; Vaccine-Preventable Diseases

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [7735](#)

Abstract Type Poster

Abstract Title Effect of Medicaid Status on up-to-Date Vaccination Rates Among Two-Year-Old Children in Georgia, 2015
Abstract

BACKGROUND: The annual Georgia Immunization Study (GIS) employs a retrospective cohort design to determine the up-to-date (UTD) immunization rate of 24-month-old children in Georgia. Previous GIS results have shown lower vaccination rates for vaccines typically administered in the second year of life, particularly for DTaP. We sought to determine if a discontinuation of Medicaid coverage after the infant year (less than one years old) contributed to lower immunization rates in the second year of life.

METHODS: A stratified random sample of 2,002 Georgia children born in January 2013 was drawn from electronic birth records. Immunization history and Medicaid status were obtained from the Georgia Registry of Immunization Transactions and Services (GRITS). Parents and providers of children inadequately immunized according to the Advisory Committee on Immunization Practices' (ACIP) immunization schedule, were contacted for additional information regarding the lack of vaccination(s). UTD immunization rates were compared among participants based on Medicaid status (Medicaid both years, first year only, second year only, never on Medicaid). The relationship between Medicaid status and specific immunizations was also explored. Reasons for loss of Medicaid among children who were not UTD were sought via parent interview. Significance testing was performed using Chi-Square tests in SAS version 9.4.

RESULTS: Children covered by Medicaid both years or never covered by Medicaid were more likely to be UTD by 24 months (90.4% and 84.5% respectively) than children who only had Medicaid coverage during the infant year (49.2%). These children also demonstrated a significantly lower immunization rate for the 4th DTaP dose ($p < 0.0001$).

CONCLUSIONS: A discontinuation of Medicaid coverage after the first year of life was associated with a lower UTD immunization rate among 24 month old children, particularly the 4th DTaP dose. Although reasons for discontinuation of Medicaid coverage were beyond the scope of this study, lower vaccination levels among this group may present an opportunity to intervene before the end of the infant year to increase vaccination rates, and deserves further examination. The annual Georgia Immunization Study (GIS) employs a retrospective cohort design to determine the up-to-date (UTD) immunization rate of 24-month-old children in Georgia. Previous GIS results have shown lower vaccination rates for vaccines typically administered in the second year of life, particularly for DTaP. We sought to determine if a discontinuation of Medicaid coverage after the infant year (less than one years old) contributed to lower immunization rates in the second year of life.

Submission Complete? Yes

Committee Infectious Disease
Topic Vaccine-preventable Diseases
Keywords Vaccine-Preventable Diseases; Immunization

Consider for Different Presentation? No

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Submission Type Breakout/Quick/Lightning/Poster
ID [7975](#)

Abstract Type Poster

Abstract Title Emergence of Serogroup W As a Major Cause of Meningococcal Disease in Georgia, 2006-2016
Abstract

BACKGROUND: *Neisseria meningitidis* serogroup W (MenW) generally accounts for <5% of invasive meningococcal disease cases nationally. From 2006-2016, the Georgia Department of Public Health (DPH) confirmed 156 reports of invasive meningococcal disease (IMD). During 2006-2013, 3% of cases were MenW; however, from 2014-2016, 34% of cases were MenW, a substantial increase. Geographically, most of these recent MenW cases occurred in north Georgia and were not part of known outbreaks. DPH sought to further characterize MenW cases by demographics and molecular testing of isolates and compare them to non-MenW cases.

METHODS: DPH collected demographic, clinical, and exposure data on each MenW case in a standard case report form. Serogroup identification was performed at the Georgia Public Health Laboratory, and confirmatory and Whole Genome Sequence (WGS) testing were performed at the Centers for Disease Control and Prevention Meningitis Laboratory. Chi-square and Student's T-Test were used to compare MenW and non-MenW case characteristics, and results were considered significant at the $p < 0.05$ level.

RESULTS: During 2014-2016, 61% of MenW cases were male, 65% were white and 5% were Hispanic. Non-MenW cases were 50% male, 65% white and 15% Hispanic; differences in gender, race and ethnicity were not significant. Mean MenW case age was 35 years (range: 8 months-84 years) compared to 32 years among non-MenW cases (range: 13 days-91 years); age differences were not statistically significant. Twenty-two percent of MenW cases died compared to 17% of non-MenW cases. Bacteremia was the most common clinical presentation among both MenW and non-MenW cases, with meningitis accounting for less than 20% of infections. MenW cases exhibited gastrointestinal symptoms 41% of the time, but this information was not consistently collected among all IMD cases. Only 1 IMD case in this analysis had documented MenACWY vaccine. WGS of 10 representative MenW GA isolates from 2012-2016 demonstrated they all belonged to the same clonal complex, CC11. The GA isolates formed their own phylogenetic group compared to other isolates from around the United States.

CONCLUSIONS: MenW is emerging as a significant cause of IMD in GA, with a 350% percent increase in recent years. Initial analysis did not find any differences in demographics or clinical presentations, however; laboratory analysis indicates that the strains circulating in GA are unique compared to isolates from around the country. Further evaluation of epidemiologic and clinical characteristics of these cases is warranted. Vaccination strategies should be reviewed.

Submission Complete? Yes

Committee Infectious Disease

Topic Vaccine-preventable Diseases

Keywords Epidemiology; Infectious Diseases; Vaccine-Preventable Diseases

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [7479](#)

Abstract Type Poster

Abstract Title Evaluation of Age and Bar Socialization Risk Factors in a University Mumps Outbreak and Community Mumps Cases--Bloomington, Indiana 2016
Abstract

BACKGROUND: Recently, mumps outbreaks have increased in many communities in the United States, especially among universities. Major contributing factors to this increase include age and close contact settings as seen in university outbreaks. An outbreak of mumps occurred at Indiana University Bloomington beginning in January, 2016. Mumps cases were also identified in the community among persons not directly affiliated with the university.

METHODS: State and local health departments and the University Health Center launched a collaborative response to the outbreak. Reported mumps cases were interviewed to gather demographic data, clinical symptoms, onset dates, vaccination status, lab data and potential contacts. Data obtained from case interviews was entered into the Indiana National Electronic Disease Surveillance System (I-NEDSS). Cases residing outside of the county or state were evaluated to determine if potential exposures occurred within the university or community during appropriate incubation periods and added to the case count. Risk factor data, including age and bar socialization, was collected from information obtained during the interview. Data was evaluated on 105 confirmed and probable cases having an association with the university and/or Bloomington community.

RESULTS: The first confirmed case was reported in January, 2016 and the last case in July, 2016. Among confirmed and probable cases (n=105), 13.3% were under the age of 21, 82% were age 21 – 27 and 4.8% were over 27 years old. The mean and median ages were 23.1 and 22 years, respectively. Of the 105 cases, 60 (57.1%) had indicated socializing at a local community bar either during their exposure period or during their infectious period. When factoring out the 22 investigations in which bar history was not available, the percentage of bar socialization was 72.3% among 83 remaining cases.

CONCLUSIONS: The population in this study had two very distinct but related risk factors involving the age of the case and socializing in bars. Bars in this university town are a popular attraction for those of legal drinking age, 21 years and older. Crowded bars provide optimal conditions for close contact and consequently disease transmission. A community and university mumps awareness campaign should be implemented during outbreaks to emphasize preventive measures including respiratory hygiene, avoidance of sharing items by mouth, and self-isolation if symptoms develop.

Submission Complete? Yes

Committee Infectious Disease

Topic Vaccine-preventable Diseases

Keywords Vaccine-Preventable Diseases; Outbreaks

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8061](#)

Abstract Type Poster

Abstract Title Evaluation of Varicella Surveillance in Arkansas
Abstract

BACKGROUND: Varicella (chickenpox) is an acute infectious disease caused by the varicella zoster virus. Suspect cases are reported to the Arkansas Department of Health (ADH) and entered into the National Electronic Disease Surveillance System (NEDSS) Base System (NBS). Cases are investigated by the ADH Central Office and local health unit staff, managed and stored through NEDSS. An evaluation of the varicella surveillance system was conducted to determine areas that can be improved to ensure cases are reported and investigated in a timely and detailed manner.

METHODS: The varicella surveillance system was evaluated using the 2001 *Updated Guidelines for Evaluating Public Health Surveillance Systems* published by the Centers for Disease Control and Prevention (CDC) in 2001. The percentage of hospitalized cases, present in the Arkansas' Hospital Discharge Database, that were detected by the surveillance system was used to calculate sensitivity. Data quality was measured by determining the percentage of case investigations with variables marked as 'unknown' or missing. Acceptability was assessed by determining the median number of days it took a source to report a case after diagnosis. To evaluate timeliness, median number of days an investigation was completed and then reported to CDC were calculated, respectively. Surveillance system attributes were discussed with staff who actively participate in varicella surveillance activities.

RESULTS: From 2006 to 2014, a total of 4,601 confirmed or probable cases were reported to ADH, with a dramatic decrease in case numbers over time. Only 13% of hospitalized patients with an ICD-9 code indicative of varicella were reported to ADH. Data quality improved as percentage of case investigations with variables marked as 'unknown' or missing decreased. From 2009 to 2014, cases of varicella were consistently reported to ADH at a median of 3 to 4 days after diagnosis. Case investigation completion improved from a median of 28 days in 2009 to 7 days in 2014. Additionally, reporting to CDC substantially improved from a median of 146 days in 2009 to 12 days in 2014.

CONCLUSIONS: Surveillance of varicella in Arkansas has several strengths as well as opportunities for improvement. Overall, the varicella surveillance system is simple and flexible, allowing for changes and adaptations to reporting and investigation processes. Data quality and timeliness of reporting and closing out investigations have greatly improved over time. Reporting from patients and providers remains a challenge, though efforts are being made to encourage more individuals to report.

Submission Complete? Yes

Committee Infectious Disease

Topic Vaccine-preventable Diseases

Keywords Evaluation; Surveillance; Vaccine-Preventable Diseases

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8280](#)

Abstract Type Poster

Abstract Title Abstract
Fever Among Pertussis Cases Reported through Enhanced Pertussis Surveillance, 2015–2016

BACKGROUND: Fever historically has not been considered a typical presentation of pertussis, but data from other countries indicate that fever may accompany some pertussis infections. With no recent studies assessing fever among U.S. pertussis surveillance cases, we undertook an evaluation of its prevalence.

METHODS: Cases with cough onset from January 1, 2015–June 30, 2016 that met the Council of State and Territorial Epidemiologists (CSTE) confirmed or probable definition of pertussis were identified through surveillance in seven sites participating in the Emerging Infections Program’s Enhanced Pertussis Surveillance (EPS). Patient clinical characteristics, demographics, and vaccination histories were captured via patient and physician interview; presence of fever from 2 weeks prior to cough onset through the start of the case investigation was ascertained. Cases with known fever status, including no fever or fever with documented temperature $\geq 100.4^{\circ}$ Fahrenheit, were included in the analysis; those with subjective (no temperature provided) or unknown fever history were excluded. Chi-square test was used to compare proportions and one-way ANOVA was used to compare means; $p < 0.05$ was considered significant.

RESULTS: During the study period, 2,497 pertussis cases were reported in the seven participating EPS sites; 82% were classified as confirmed and 18% as probable. Of the total, 1955 (78%) reported no fever, 204 (8%) had documented fever, 181 (7%) reported subjective fever and 157 (6%) had unknown fever status. Among cases with known fever status, documented fever was reported in 7 (9%) of 77 cases aged < 1 year, 36 (17%) of 205 cases aged 1–3 years, 47 (9%) of 529 cases aged 4–10 years, 57 (7%) of 864 cases aged 11–19 years, and 57 (12%) of 484 cases aged ≥ 20 years. Documented temperatures among febrile patients ranged from 100.4° to 104.2° with a mean of 101.7° ; mean temperature did not differ by age group ($p = 0.57$). Overall, documented fever was associated with age group ($p < 0.001$), probable case status ($p = 0.006$), whoop ($p = 0.01$), post-tussive vomiting ($p = 0.003$), apnea ($p = 0.01$), chest x-ray indicating pneumonia ($p = 0.01$), and hospitalization ($p = 0.009$).

CONCLUSIONS: Documented fever occurs among a minor proportion of reported pertussis cases. These findings suggest that presence of fever should not rule out pertussis as a cause of cough illness, and underscore the need to better understand the association of fever with key pertussis case demographic and clinical characteristics.

Submission Complete? Yes

Committee Infectious Disease

Topic Vaccine-preventable Diseases

Keywords Surveillance; Vaccine-Preventable Diseases

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8236](#)

Abstract Type Poster

Abstract Title Outbreak of Mumps on a College Campus in Cambridge, Massachusetts: The Local Perspective
Abstract

BACKGROUND: In February 2016, the Cambridge Public Health Department (CPHD) received notification of two confirmed cases of mumps in students at a local university. In collaboration with the Massachusetts Department of Public Health (MDPH) and the university, CPHD facilitated suspect case investigation, contact tracing, and risk communication.

METHODS: Suspect cases were placed into isolation for five days following the onset of parotid swelling. Vaccination status was obtained through the university's health record. CPHD staff followed up with suspect cases by email and phone to investigate exposure patterns and identify close contacts during the infectious period. CPHD provided close contacts with educational information, verified their vaccination status, and ensured they were monitoring themselves for mumps symptoms for the duration of their potential incubation period. Unvaccinated or undervaccinated close contacts were encouraged to begin the vaccination series or be quarantined starting 12 days after the suspect case's first infectious day through 25 days after the suspect case's last infectious day. Standard operating procedures from the university were written in consultation with MDPH and CPHD so that all university medical and administrative personnel followed the same diagnosis, specimen collection, and isolation protocols. Regulatory authority granted by the Code of Massachusetts Regulations assisted CPHD in enforcing isolation and quarantine requirements as well as conducting necessarily surveillance.

RESULTS: The university's undergraduate and graduate populations had vaccination rates between 98-99%. Despite this, throughout 2016, CPHD received notification of and attempted to interview more than 150 suspect cases, almost all of whom were fully vaccinated, and follow up with more than 200 close contacts. Many suspect cases were members of athletic teams, social clubs, and other extracurricular activities. CPHD coordinated with coaches and club leaders to provide educational information to a wider audience. Due to the unique characteristics of college students, CPHD had higher success reaching individuals through email rather than over the phone. CPHD's efforts in enforcing isolation and quarantine requirements and in encouraging vaccination were supported by university staff. Despite two peaks, the outbreak subsided after the semester ended and many students left campus.

CONCLUSIONS: Although mumps is a vaccine-preventable disease and the university had high vaccination coverage, the close living conditions and highly social nature of college students facilitated the virus' spread. However, with clear protocols in place and a thorough understanding of students' communication preferences, case investigation can be conducted and isolation and quarantine protocols can be enforced with greater ease and efficiency.

Submission Complete? Yes

Committee Infectious Disease

Topic Vaccine-preventable Diseases

Keywords Communication; Local Epidemiology; Outbreaks

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8687](#)

Abstract Type Poster

Abstract Title Parental Attitudes, Beliefs, and Behaviors Regarding Childhood Vaccinations in Santa Cruz County, California
Abstract

BACKGROUND: Anti-vaccine sentiment has been spreading throughout California for decades. Previously, parents had been able to opt out of required vaccinations for children by filing personal belief exemptions (PBE). In 2015, Santa Cruz County had the highest kindergarten PBE rate among all San Francisco Bay Area counties and was three times higher than the state's rate. In January 2016, California Senate Bill (SB) 277 took effect, no longer allowing PBE. Santa Cruz County Public Health Division conducted a survey of parents of the first kindergarten cohort affected by SB 277. The objective was to learn about local parents' current attitudes, beliefs, and behaviors regarding vaccinations, vaccine-preventable diseases, and recent legislation.

METHODS: A self-administered survey was sent out to a representative sample of 1,950 parents of the 2016-17 kindergarten cohort - the first group to reach the kindergarten "vaccination checkpoint" following SB 277. The survey was conducted March – June 2016 in both English and Spanish. Surveys were distributed to parents via child care centers and providers, preschools, and homeschooling groups. Parents were stratified by previous vaccination status and responses were compared using Pearson's chi-square and Fisher's exact tests.

RESULTS: The survey was completed by 397 parents resulting in a response rate of 20%. Sixty-four percent of respondents reported their children were previously up-to-date on required vaccinations while 25% reported previously filing a PBE. Compared to parents who fully vaccinated their children, parents who opted out of vaccines were older, more educated, wealthier, English-speaking, and non-Hispanic/Latino. At the time of the survey, a majority of PBE parents (55%) were undecided about their plans for the upcoming kindergarten checkpoint. Interestingly, many PBE parents (37%) reported plans to acquire a personal medical exemption, completed by a physician, for the vaccinations required to begin kindergarten.

CONCLUSIONS: The survey revealed that parents who previously filed PBE in Santa Cruz County are demographically similar to those described in similar studies of other communities. Since many PBE parents reported planning to acquire a medical exemption, many children may remain vaccine-naïve throughout Santa Cruz County. The study shows there may be a strong demand on local doctors to provide medical exemptions for children who previously had personal belief exemptions.

Submission Complete? Yes

Committee Infectious Disease

Topic Vaccine-preventable Diseases

Keywords Policy / Policy Development; Public Health Law; Vaccine-Preventable Diseases

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8293](#)

Abstract Type Poster

Abstract Title Pure Spatial and Space-Time Analysis of Pertussis Infections in Houston, 2005 -2015
Abstract

BACKGROUND: From 2005 through 2015, a total of 881 (confirmed and probable) pertussis cases in Houston jurisdiction were reported to Texas NEDSS Based System (NBS), and the annual average was roughly 80 cases. Respectively in 2009 and 2013, two peaks of pertussis cases (147 and 196) were observed. Among the 881 cases, number of female patients was higher than males, but the differences were statistically insignificant. Most of the patients were under 5 and the two peaks of cases were observed in almost all age groups. Moreover, a statistically significant trend was found. The main objective is to apply scan statistics to the pertussis surveillance data and determine geographic clusters.

METHODS: The case data were extracted from NBS, and the census tract data were downloaded from the US Census Bureau's website. Eighteen pertussis cases with invalid/incomplete addresses were excluded. The annual number of pertussis cases is considered to follow a Poisson distribution, and the census tract is used as the basic geographic unit. The estimated number of pertussis cases adjusted for age in each tract is obtained by direct standardization. The observed and expected number of cases in each tract is also stratified by reporting year. In the analysis, first, taking the 863 cases as a whole and not adjusting for time, a pure spatial analysis is performed. Then, same analysis is repeated on cases reported in 2013. In the next step, pure temporal and space-time analysis are conducted on the date stratified by year. The SaTScan v9.4.2 is used for the analysis.

RESULTS: Not adjusting for time, three significant clusters of pertussis cases are detected. The pure spatial analysis on the 2013 cases doesn't generate any significant clusters, but two clusters from the 2013 data overlap with the significant clusters from the overall pure spatial analysis not adjusted for time. Though only one statistically significant cluster is generated, the clusters from stratified data overlap well with clusters from non-stratified data. The space-time analysis doesn't generate any statistically insignificant cluster.

CONCLUSIONS: After adjusting for time and population age, and based on patient addresses, the scan statistics does not render any statistically significant clusters of pertussis cases. We could either conclude that pertussis infections in Houston are geographically independent, or that the analysis based on available sample doesn't have enough power to detect statistically significant clusters.

Submission Complete? Yes

Committee Infectious Disease

Topic Vaccine-preventable Diseases

Keywords Surveillance; Geographic Information Systems (GIS); Infectious Diseases

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8400](#)

Abstract Type Poster

Abstract Title Abstract
Reasons for and Characteristics of Inadequately Immunized Two-Year-Old Children in Georgia, 2014-2015

BACKGROUND: The annual Georgia Immunization Study (GIS) employs a retrospective cohort research design to determine the up-to-date (UTD) immunization rate for 24-month-old children born in Georgia. We used the annual GIS data from 2014 and 2015 to quantitatively determine the reasons GA two-year-olds were not age-appropriately UTD, and to examine demographic characteristics.

METHODS: Each year the GIS utilizes a stratified random sample of children born in Georgia who become 24 months old in January. Demographic information is obtained from electronic birth records, and immunization data is obtained from the Georgia Registry of Immunization Transactions and Services. For children inadequately immunized (4:3:1:3:3:1:4 level) based on Advisory Committee on Immunization Practices recommendations, health department staff contact parents and providers to verify information and determine reasons for inadequate immunization. We compared maternal race, ethnicity, age, education level, marital status, and metro Atlanta residence variables among children who were UTD at 24 months with those of children who remained inadequately immunized six months later. Reasons for inadequate immunization were also quantified and stratified by maternal demographics. Fischer's Exact test was used to compare proportions; $p < 0.05$ was considered significant.

RESULTS: A total of 3500 children sampled in 2014 and 2015 were UTD by 24 months; 306 children remained inadequately immunized after follow-up. Mothers of children inadequately immunized were significantly more likely to be non-Hispanic than those who were UTD, but maternal age, race, education, marital status and metro residence were similar. Vaccine hesitancy, measured by combining religious exemption, parental refusal, and parental delay accounted for 44% of inadequate immunizations; 28% were due to missed appointments/convenience issues; 7% were for medical reasons (only 0.3% were due to medical exemption); and 21% were "other". When stratified by maternal demographics, vaccine hesitancy was significantly more likely among two-year-old children with mothers of white race, non-Hispanic ethnicity, college-level education, age > 25 years, married status, and/or non-metro Atlanta residence. Missed appointments/lack of convenience as a reason for inadequate vaccination was significantly associated with children of mothers who were without college education, < 25 years of age, unmarried, and/or with non-metro Atlanta residence.

CONCLUSIONS: Vaccine hesitancy may account for 44% of inadequately vaccinated two-year-olds in GA. The identification of specific maternal demographics associated with vaccine hesitancy and missed appointments/convenience issues as reasons for inadequate vaccination of Georgia's two-year-olds may be useful in targeting efforts to improve vaccination rates in this population.

Submission Complete? Yes

Committee Infectious Disease
Topic Vaccine-preventable Diseases
Keywords Immunization; Vaccine-Preventable Diseases; Disease Prevention

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [7968](#)

Abstract Type Poster

Abstract Title Varicella Cluster Epidemiology in Georgia, 2012-2016
Abstract

BACKGROUND: Since the licensure of varicella vaccine in 1995 and implementation of a routine 2-dose vaccination program in 2006, varicella morbidity and mortality has decreased substantially in the United States. Case-based varicella reporting was implemented in Georgia in July 2011, and since then, varicella clusters continue to be reported among household, childcare, school, and prison settings. The objective of this analysis was to describe varicella cluster epidemiology and inform prevention and control measures by comparing cluster and non-cluster (sporadic) varicella cases occurring in Georgia during 2012-2016.

METHODS: Clinical characteristics, demographics, and vaccination history of varicella cases occurring from January 1, 2012 through November 30, 2016 were captured via case-patient and physician interviews. A cluster was defined as ≥ 3 epidemiologically-linked varicella cases occurring in a 21-day period. Cluster and non-cluster cases were compared using two-sample t-tests and Chi-square testing at a 5% significance level.

RESULTS: Of 715 reported varicella cases, 553 (77%) were non-cluster, 110 (15%) were cluster-associated, and 52 (7%) had unknown cluster status. Twenty-five varicella clusters were reported; four (16%) in schools or daycares, four (16%) in prisons or detention centers, 16 (64%) in households, and one (4%) at a university. Clusters ranged from 3 to 11 cases (mean: 4.20). The mean age among cluster cases (13.20 years) was significantly higher ($p < 0.001$) than non-cluster cases (9.34 years). The proportion of cluster cases reported as White was significantly lower ($p < 0.04$) than among non-cluster cases. The proportion of cases reported to have Hispanic ethnicity was not significantly different based on cluster status. Cluster cases were significantly less likely to have a history of varicella vaccination; the odds of vaccination among cluster cases were 0.39 [95% confidence interval (CI): (0.25, 0.60)] times those of non-cluster cases. Additionally, the odds of having a moderate or severe rash (250-500 lesions or > 500 lesions) among cluster cases were 2.75 [95%CI: (1.52, 4.97)] times that of a non-cluster case.

CONCLUSIONS: In Georgia, varicella epidemiology differed between cluster-associated and sporadic cases. Clusters were more likely to involve unvaccinated individuals. Additionally, cluster-associated cases were more likely to be older and more severe than non-cluster cases. More data is needed to fully explain these differences, including the role of transmission setting on varicella epidemiology. Case-based reporting remains an important strategy for identifying varicella clusters and informing prevention and control measures.

Submission Complete? Yes

Committee Infectious Disease

Topic Vaccine-preventable Diseases

Keywords Epidemiology; Vaccine-Preventable Diseases; Outbreaks

Consider for Different Presentation? Yes

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Submission Type ID	Breakout/Quick/Lightning/Poster 8106
Abstract Type	Quick
Abstract Title Abstract	A Tale of Two Outbreaks: Serogroup C Meningococcal Disease Among Men Who Have Sex with Men in Southern California — 2012-2016

BACKGROUND: Invasive meningococcal disease (IMD) is a potentially life-threatening illness, transmitted through respiratory secretions. Multiple outbreaks of serogroup C IMD (NmC) have occurred among men who have sex with men (MSM), including in Los Angeles County (LAC) during 2012–2014. During outbreaks, HIV infection, dating application (app) use, cigarette sharing, visiting specific bars, and recreational drug use were commonly reported among cases. In 2016, another NmC outbreak among MSM occurred in Southern California, including LAC. We compared case characteristics, risk behaviors, and clinical data from both LAC outbreaks to guide prevention efforts.

METHODS: Cases were defined as confirmed NmC in a resident of Southern California during an outbreak period. Risk behaviors were obtained from standardized patient interviews. Clinical data was abstracted from hospital records. Fisher’s exact and Wilcoxon rank sum tests were used to compare characteristics of the two outbreaks.

RESULTS: In 2016, we identified 27 outbreak-associated cases, of which 21 (78%) occurred in MSM; in 2012–2014, all 10 (100%) outbreak-associated cases occurred in MSM. Among MSM, median ages were 30 and 28 years, respectively, and proportions of persons with HIV were similar (14% in 2016 and 20% in 2012–2014). No common risk behaviors were identified in 2016, with 70% reporting infrequent social activity and 91% reporting ≤1 sex partner in the 3 months before illness. However, 33% smoked tobacco, 24% met intimate partners through websites, apps, bars, or bathhouses, and 25% used illicit drugs. In 2012–2014, proportions of patients who smoked tobacco (44%) and those who met intimate partners through websites, apps, bars, or bathhouses (40%) were similar to 2016; however, a larger proportion of patients used illicit drugs (80%, $P < 0.01$). Clinical presentations were comparable in both outbreaks, with 78% and 50% presenting with nausea or vomiting, respectively, and 11% and 20% presenting with the triad of fever, stiff neck, and altered sensorium. The case-fatality ratio was lower in 2016 (9.5% versus 40%, $P = 0.07$), but average length of hospital stay among survivors was longer (25 days, range: 6–95, versus 6.25 days range: 3–9, $P = 0.07$).

CONCLUSIONS: The 2016 outbreak is the largest reported NmC outbreak among MSM in the United States. Unlike the previous outbreak, few common risk behaviors were reported. Vaccination for meningococcal disease among MSM, regardless of risk behaviors, is currently recommended. Given recurrent outbreaks, routine vaccination policy for all MSM in LAC is under consideration.

Submission Complete? Yes

Committee	Infectious Disease
Topic	Vaccine-preventable Diseases
Keywords	Minority Health; Outbreaks; Vaccine-Preventable Diseases
Consider for Different Presentation?	Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [7820](#)

Abstract Type Quick

Abstract Title Epidemiology and Trends of Pertussis Among Infants — United States, 2000–2015
Abstract

BACKGROUND: Pertussis, a cyclic disease, causes greatest morbidity and mortality among infants, particularly those too young to be vaccinated. In the context of a recent resurgence of pertussis and a 2012 recommendation to vaccinate for pertussis during every pregnancy to prevent infant disease, we describe US infant pertussis trends between 2000 and 2015.

METHODS: We analyzed infant pertussis cases (age groups: <2, 2–<4, 4–<6, and 6–<12 months) that were reported through the National Notifiable Diseases Surveillance System, using the Council of State and Territorial Epidemiologists case definition, with cough onset between 2000 and 2015. Incidence (per 100,000) was calculated using National Center for Health Statistics population estimates as denominators. Proportion of affected infants hospitalized and case-fatality ratios (CFRs) were calculated using cases with known outcomes; relative percent changes were calculated. Linear trends were assessed using negative binomial regression; $p < .05$ was significant.

RESULTS: From 2000–2015, 48,909 infant pertussis cases were reported, including 255 deaths; infants aged <2 months accounted for 38.7% of cases. Overall, annual incidence was highest among infants aged <2 months (range: 112.7–282.1 per 100,000) and was lowest among infants aged 6–<12 months (range: 10.0–62.1 per 100,000). The proportion of infants hospitalized decreased 47.6% overall, from 64.5% in 2000 to 33.8% in 2015 ($p < .0001$); cases among 4–<6 and 6–<12 months old had the largest annual relative decreases (-5.1% and -5.9%, respectively), while <2 month olds had the smallest relative decline (-1.5%) ($p < .0001$ for all). Although the CFR was highest among <2 month olds (1.6%), CFRs decreased significantly over time among <2 and 2–<4 month olds ($p < .05$).

CONCLUSIONS: Pertussis incidence remains highest among infants aged <2 months. While declines in hospitalization and case fatality may represent a decrease in disease severity, these changes may also reflect increased reporting of non-severe cases. Ongoing monitoring of infant pertussis is needed to better understand the impact of new prevention strategies.

Submission Complete? Yes

Committee Infectious Disease
Topic Vaccine-preventable Diseases
Keywords NNDSS; Vaccine-Preventable Diseases

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [7761](#)

Abstract Type Quick

Abstract Title Evaluating Completeness of Meningococcal Disease Reporting – California, 2010-2014
Abstract

BACKGROUND: Meningococcal disease, caused by the bacteria *Neisseria meningitidis*, is a severe infection most often characterized by meningitis and septicemia. Rates of meningococcal disease in the United States have been declining since 2000, and are currently at a historic low. Because of the seriousness of meningococcal disease and need for prompt public health follow-up for all cases, completeness of meningococcal disease reporting is presumed to be high. However, questions regarding the completeness of reporting remain. During 2010-2014, approximately 16% of all meningococcal disease cases in the United States were reported from California, making it an ideal place to evaluate the completeness and accuracy of meningococcal disease reporting.

METHODS: We evaluated the completeness and accuracy of meningococcal disease reporting in California from 2010 to 2014 by comparing California inpatient hospital discharge (OSHPD) data to state surveillance data. Hospitalizations with meningococcal ICD-9 codes (036.0-036.9) were identified in the OSHPD database and matched with confirmed and probable meningococcal disease cases in California residents reported to the state surveillance system. Matching was performed using age, birthdate, date of disease onset or hospitalization, hospital discharge date, sex, hospital name, race/ethnicity, and residence (zip code and county). Medical records of cases found in only one of the two databases were reviewed to identify patterns for non-reporting.

RESULTS: Between 2010 and 2014, a total of 486 confirmed meningococcal disease cases were reported to the California state surveillance system. Of these, 442 (90.9%) cases were matched to the OSHPD database. Among the 44 cases identified in the state surveillance system that were not matched to a case in the OSHPD database, 16 (36.4%) died prior to hospitalization, 8 (18.2%) were hospitalized in a federal facility, 11 (25.0%) were not hospitalized, 4 (9.1%) were hospitalized outside of California, and 5 (11.4%) had incomplete hospital discharge data. There were a total of 250 hospitalization records identified in the OSHPD database that did not match with cases in the state surveillance database. Preliminary review of a subset of 15 medical records from unmatched hospitalizations revealed that all but one of the unmatched cases with meningococcal codes in the OSHPD data lacked laboratory results to indicate *N. meningitidis* infection, thus were not confirmed cases.

CONCLUSIONS: Accurately characterizing the burden of meningococcal disease in United States is critical for vaccine policy decisions and for monitoring changes in epidemiology. Preliminary analyses suggest that meningococcal disease reporting in California is accurate.

Submission Complete? Yes

Committee Infectious Disease
Topic Vaccine-preventable Diseases
Keywords Infectious Diseases; Vaccine-Preventable Diseases; Surveillance

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [7916](#)

Abstract Type Quick

Abstract Title Factors Associated with Hepatitis B Vaccine Receipt at Birth — West Virginia, 2015
Abstract

BACKGROUND: Hepatitis B virus (HBV) is a bloodborne pathogen and can be transmitted through sexual contact, injection drug use, or perinatally. West Virginia has the highest HBV infection rate in the United States, and it has increased since 2010. An effective vaccine is available to prevent HBV infection; the first dose is recommended at birth. We sought to identify maternal and birth-event factors associated with Hepatitis B (HepB) vaccine birth-dose receipt.

METHODS: We matched immunization registry records with West Virginia vital records for live births in 2015. The dependent variable was timely HepB vaccine birth-dose receipt (i.e. <3 days postdelivery). We performed multivariate logistic regression analysis by using SAS® 9.3 and calculated adjusted odds ratios (AORs) and 95% confidence intervals (CIs).

RESULTS: We matched 17,458 (99.8%) immunization records to vital records. Birth-dose receipt was timely for 14,006 (80.2%) newborns. Factors associated with timely receipt included hospital (versus nonhospital) birth (AOR: 14.95; CI: 9.63–23.43), medical (versus nonmedical) birth attendant certification (AOR: 1.68; CI: 1.42–1.98), weekday (versus weekend) birth (AOR: 1.16; CI: 1.05–1.29), maternal age <35 years (AOR: 1.26; CI: 1.11–1.43), and breastfeeding (AOR: 1.25; CI: 1.15–1.36). Medicaid (versus any other or none) as primary insurance type (AOR 0.86; CI: 0.79–0.94) and white (versus any other) race (AOR: 0.75; CI: 0.64–0.89) were negatively associated with timely receipt.

CONCLUSIONS: We identified maternal and birth-event factors associated with HepB birth-dose receipt. Identification of specific barriers (such as HepB vaccination recommendation knowledge deficit) to timely receipt for mothers who are ≥35 years, white, and use Medicaid, particularly in nonhospital birth settings or with nonmedical birth attendants are needed to improve vaccine-related HBV prevention.

Submission Complete? Yes

Committee Infectious Disease

Topic Vaccine-preventable Diseases

Keywords Hepatitis; Vaccine-Preventable Diseases; Evidence Based Practice

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8074](#)

Abstract Type Quick

Abstract Title Identifying Socio-Economic Characteristics Linked to Pertussis Incidence in Pennsylvania Using Census Tract Data
Abstract

BACKGROUND: Pertussis, or whooping cough, is a vaccine preventable disease caused by the bacterium *Bordetella pertussis*. Pertussis infection causes violent coughing and can be life-threatening to infants. Pertussis cases have been increasing in the United States since the 1980s. Pennsylvania has reported 600-1900 pertussis cases annually over the past 5 years. Pennsylvania pertussis cases reported between 2011 and 2015 were compared to socio-economic characteristics of the census tracts in which they live to determine which characteristics are more highly linked to increased pertussis morbidity.

METHODS: In Pennsylvania, pertussis cases are investigated and entered into an electronic disease data entry system, PA-NEDSS. PA-NEDSS geocodes cases' home addresses and assigns them to a census tract. Census tract socio-economic data were obtained from census.gov. The data were analyzed using SAS software. Percentages of persons exhibiting specific socio-economic characteristics in each census tract were compared to pertussis incidence rates in the census tract using Pearson correlation to determine significance of association.

RESULTS: Several socio-economic characteristics were found to be significantly associated with higher incidence of pertussis cases with a p -value of 0.05 or lower including: low poverty levels, high percentages of college graduates, higher levels of children in kindergarten through twelfth grades attending private schools, higher rates of private medical insurance, and higher rates of persons aged 5 to 14 in the population. Socio-economic characteristics significantly associated with lower incidences of pertussis cases included: high poverty levels, low percentages of college graduates, higher levels of children in kindergarten through twelfth grades attending public schools, and higher rates of public health insurance. Characteristics unrelated to pertussis incidence included: rates of persons speaking limited English in the household, rates of children under 5 years of age and rates of persons over 65 years of age.

CONCLUSIONS: In Pennsylvania, areas in which wealthier, more highly educated persons live tend to have a higher incidence of pertussis. Conversely, census tracts which have higher rates of persons living below the poverty level, more persons attending public schools and on public medical insurance have lower incidences of pertussis. It is important to identify social and economic characteristics of communities with an increased incidence of disease to determine the best means of disease prevention and outreach in these communities.

Submission Complete? Yes

Committee Infectious Disease

Topic Vaccine-preventable Diseases

Keywords Population; Social Determinants; Vaccine-Preventable Diseases

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8118](#)
Abstract Type Quick
Abstract Title Mumps, 2016: A National Overview
Abstract

BACKGROUND: Mumps is an acute viral illness that classically presents with parotitis. Other presentations may include non-specific respiratory symptoms or asymptomatic infection. Mumps is transmitted by respiratory droplets and secretions, and requires close contact to spread from person-to-person. People are most contagious 2 days before until 5 days after parotitis onset; those with only non-specific respiratory symptoms or asymptomatic infections can still transmit disease. In recent years, mumps cases and incidence rates have increased, with most cases occurring among young adults (18-25 years) in close contact settings such as universities. In 2016, multiple university and close-knit community outbreaks all contributed to the high case count.

METHODS: The Centers for Disease Control and Prevention (CDC) assessed reports of confirmed and probable mumps cases transmitted from state health departments. We calculated overall and age-specific incidence rates (IR) by dividing the annual number of mumps cases by the corresponding U.S. Census Bureau’s Bridged Race population estimates.

RESULTS: From January – December 31st, 2016, 5,151 mumps cases from 47 states were reported to the Nationally Notifiable Disease Surveillance System (overall incidence rate = 16.15 per 1,000,000 persons). Two states, Arkansas and Iowa, contributed 53% of all reported cases. At least 20 states had mumps outbreaks in 2016 (defined as 3 or more cases linked by time and space); reported outbreak cases accounted for 72%. There was no difference in gender (51% male and 48% female) and most case-patients were white (52%) or Asian (41%). Of the 79% who reported vaccination status, 88% had at least one dose and 65% had two doses or more of the measles mumps rubella (MMR) vaccine. The median age was 20 years (range: <1 – 88 years). Incidence rates in all age groups increased, especially in young adults, where the IR has increased dramatically from 0.5 to 52 per 1,000,000 persons in the past five years.

CONCLUSIONS: Large outbreaks in close-contact settings contributed to the dramatic increase in the incidence of mumps in 2016. The limited spread of these outbreaks to surrounding communities emphasizes the role close contact plays in the transmission of mumps. Mumps control efforts depend on continuous infection control messaging and comprehensive, nationwide two-dose MMR coverage.

Submission Complete? Yes

Committee Infectious Disease
Topic Vaccine-preventable Diseases
Keywords Vaccine-Preventable Diseases; Outbreaks

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [7801](#)

Abstract Type Quick

Abstract Title Nationwide Varicella Outbreak Surveillance, 2015-2016
Abstract

BACKGROUND: During 2012-2015 10 sentinel jurisdictions conducted surveillance for varicella outbreaks in school settings to assess feasibility of outbreak surveillance and monitor impact of the 2-dose varicella vaccination recommendation for children implemented in 2007. Varicella outbreak surveillance was determined to be feasible and expanded nationwide to increase robustness of findings.

METHODS: Starting in August 2015, through CDC's Epidemiology Laboratory Capacity funding, participating jurisdictions conducted surveillance for clusters and outbreaks of varicella; clusters were defined as 3-4 varicella cases and outbreaks as ≥ 5 varicella cases in a defined setting within at least one incubation period (21 days). Health department staff collected case-based data on: outbreak setting, age, vaccination status, number of varicella vaccine doses, number of lesions, laboratory testing, and whether cases resulted in hospitalizations and/or had complications. Characteristics of cases associated with clusters and outbreaks did not differ; therefore, we present descriptive analyses of combined data.

RESULTS: During 8/1/2015-6/30/2016, 48 jurisdictions reported 124 clusters (416 cases) and 77 outbreaks (892 cases). Median size and duration of outbreaks was 7 cases (range, 5-212 cases) and 24 days (0-119 days), respectively. Twenty-eight percent (57) of clusters/outbreaks occurred in schools and 16% (33) in daycares. Of cluster- or outbreak-associated cases, 64% (818/1,287) were among children aged 1-9 years; the majority were in unvaccinated patients (71%; 866/1,223). Among vaccinated cases with information on number of doses received, 57% (188/327) were in one dose varicella vaccine recipients. Among 1,018 cases with information on number of lesions, 56% (570) had ≥ 50 lesions, of whom 78% were unvaccinated. For vaccinated patients, of the 160 cases with 1 dose of varicella vaccine, 66% (105) had < 50 lesions while of the 111 cases with 2 doses of varicella vaccine, 72% (80) had < 50 lesions ($p=0.26$). Four patients were hospitalized, all unvaccinated; an additional 13 had complications (1 vaccinated with 2 doses, 3 vaccinated with 1 dose). Only 7% (77) of cases were laboratory confirmed as varicella.

CONCLUSIONS: The first year of nationwide varicella outbreak surveillance provided data informing that clusters and outbreaks continue to occur most often in school-aged children. A majority of cases were unvaccinated. Vaccinated patients were more likely to have mild disease (< 50 lesions) with few complications and no hospitalizations; number of lesions was not significantly different among 1- vs 2-dose vaccinees. Continued varicella outbreak surveillance is important to monitor trends in characteristics of varicella outbreaks and understand varicella epidemiology during the 2-dose varicella vaccination era.

Submission Complete? Yes

Committee Infectious Disease

Topic Vaccine-preventable Diseases

Keywords Surveillance; Vaccine-Preventable Diseases

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8409](#)

Abstract Type Quick

Abstract Title Tdap Vaccination Status Among Teen Mothers in Washington State, 2005-2015
Abstract

BACKGROUND: Pertussis is the most commonly reported vaccine preventable disease in children younger than 5 years in the United States. Newborns and infants too young to be vaccinated (<2 months) against pertussis are at the highest risk for severe morbidity and death from pertussis. With several recent pertussis outbreaks and a rise in the proportion of incident pertussis among adolescents in Washington State, there is a need to evaluate whether teen mothers are receiving recommended pregnancy-related Tdap vaccinations to protect both themselves and their child from the disease.

METHODS: This analysis linked Washington State birth certificate data and Washington Immunization Information System (WIIS) records. All mothers of babies born in Washington State between July 1, 2005 and June 30, 2015 that were 18 or under at time of delivery were included in the study. Receipt of Tdap by the mother according to the Advisory Committee on Immunization Practices (ACIP) Tdap recommendation in place at the time of birth was examined for all babies born during the study period.

RESULTS: A total of 30,578 mothers <18 gave birth to 32,504 babies during the 10 year period. Maternal ages ranged from 11 to 18 years with an average age of 17 years. About three quarters of the mothers (24,004 or 78.5%) could be matched to WIIS records. Of those, 15,471 (64.5%) had received at least 1 Tdap. Of mothers with any Tdap receipt, just under a third (4,558 or 29.4%) met the ACIP Tdap recommendation in place at the time of birth for one or more of their children. Among 28.3% of all births during the study period, the delivering mother met the ACIP Tdap recommendation in place at the time.

CONCLUSIONS: This analysis examined receipt of Tdap vaccine according to ACIP recommendations for pregnant women in a population for whom all childhood and adolescent vaccines are universally provided. Although Tdap doses may not be reflected in WIIS for those born or raised outside of Washington, the results of this study suggest that additional efforts to reach the special population of young women who become pregnant during their teens may be indicated.

Submission Complete? Yes

Committee Infectious Disease

Topic Vaccine-preventable Diseases

Keywords Epidemiology; Vaccine-Preventable Diseases; Maternal and Child Health

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [7825](#)

Abstract Type Quick

Abstract Title Abstract
Times They Are a Changin': Shifts in the Epidemiology of Haemophilus Influenzae in Colorado

BACKGROUND: Following the introduction of the Haemophilus influenzae serotype b (Hib) vaccine in 1985, Hib disease has decreased by >99% in the United States, though cases of invasive disease caused by other serotypes persist. Antibiotic prophylaxis is only indicated for Hib invasive disease and in Colorado, is dependent on obtaining serotype results from the state public health laboratory which can be delayed by long transport times and the need for re-culturing. Decisions about recommending antibiotic prophylaxis surrounding cases of invasive H. influenzae (Hi) can be difficult in the absence of serotype information or identifying clinical and epidemiological features of Hib in the post-vaccination era.

METHODS: We describe age and serotype distribution of reported cases of Hi in Colorado between 2007-2016 and discuss results from a survey of 13 Colorado public health agencies throughout the state about steps they take following an initial report of Hi prior to the availability of serotype information.

RESULTS: Of 709 cases of Hi reported from 2007-2016 in Colorado, 488 (68.8%) were non-typeable, 182 (25.7%) were serotypes a,c,d,e, or f and 25 (3.5%) were unknown. Only 14 (2.0%) cases of Hib were reported from 2007-2016; 6 of these (42.9%) were aged <5 years. Among cases <5, the predominant encapsulated serotype was a, which accounted for 17.9% of the total cases of Hi <5 years of age, or 26.3% of cases <5 when excluding neonates <30 days of age. Serotype b made up only 1.3% of cases ≥5 and 6.0% of cases <5. Of the 13 public health agencies surveyed, 6 (46%) said they initiated an investigation prior to obtaining serotype results while 4 (30%) said in the absence of serotype information, they consider factors such as age to determine how likely a case is to be Hib before deciding whether or not to start an investigation.

CONCLUSIONS: While Hi is prevalent, Hib is rare and most cases in Colorado are among adults. Other serotypes, in particular, Hia, are a more common cause of Hi among children <5 than serotype b. Public health agencies often consider factors such as age when making decisions about initiating an investigation in the absence of serotype but this is not supported by data. However, initiating an investigation surrounding all Hi cases in the rare event the case could be Hib may not be the best use of public health resources. Identification of Hib risk factors could assist in this decision making.

Submission Complete? Yes

Committee Infectious Disease
Topic Vaccine-preventable Diseases
Keywords Epidemiology; Surveillance; Vaccine-Preventable Diseases

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8235](#)

Abstract Type Quick

Abstract Title Trends and Current Landscape of Diphtheria Prevention and Treatment in the United States
Abstract

BACKGROUND: Diphtheria is a vaccine-preventable disease caused by toxigenic *Corynebacterium diphtheriae*. Treatment with equine diphtheria antitoxin (DAT) is effective against disease progression and complications but globally, availability of DAT is tenuous. Although vaccination has led to substantial declines in diphtheria incidence worldwide, diphtheria continues to be endemic in some non-industrialized countries. Additionally, indigenous diphtheria cases were recently reported from developed Western European countries despite high vaccination coverage. In the United States, respiratory diphtheria, fulfilling the CSTE case definition for diphtheria, is a notifiable disease. Since 1996, an unlicensed DAT product is available from CDC under an FDA-approved Investigational New Drug protocol. We evaluated trends in reported diphtheria cases, vaccination coverage, and characterization of isolates submitted to CDC, and assessed sources of DAT manufacture globally.

METHODS: We identified diphtheria cases reported to the National Notifiable Diseases Surveillance System (NNDSS) from 1996–2016. Cases reported to NNDSS with incomplete laboratory results were cross-checked with specimens sent to CDC for culture and toxigenicity testing. Data from National Immunization Surveys conducted from 1996 were reviewed to determine diphtheria vaccine coverage trends. Toxigenicity of *C. diphtheriae* isolates submitted to CDC during this time period (including isolates from non-reportable cases and non-human sources) was evaluated. Current global manufacturers and exporters of DAT were identified through web searches and direct communication with manufacturers.

RESULTS: Thirteen respiratory diphtheria cases were reported to NNDSS from 1996–2016; two of these were reported since 2004. Specimens from eleven reported cases were sent to CDC for testing. *C. diphtheriae* was cultured from four specimens; only one isolate, from a case in 1996, was toxigenic. Seven specimens with negative culture results were positive by PCR testing for diphtheria tox gene. Toxigenic *C. diphtheriae* was also isolated from specimens submitted from ten non-reportable respiratory illnesses and one cutaneous case with recent international travel history. Additionally, six equine *C. diphtheriae* isolates sent to CDC, the most recent in 2016, were confirmed as toxigenic. Childhood vaccination with the primary series of a diphtheria vaccine has remained above 90% since 1996. Globally, DAT is currently only exported by one manufacturer.

CONCLUSIONS: Diphtheria is rare in the United States as a result of high vaccination coverage, but human and nonhuman circulation of toxigenic *C. diphtheriae* is still occurring. Given the possibility of importation of diphtheria from endemic countries, it is important to ensure continued high immunization coverage for herd protection and DAT availability for treatment.

Submission Complete? Yes

Committee Infectious Disease
Topic Vaccine-preventable Diseases
Keywords Prevention; Surveillance; Vaccine-Preventable Diseases

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [7813](#)

Abstract Type Quick

Abstract Title Understanding Utah's Kindergarten Vaccine Exemption Rate
Abstract

BACKGROUND: According to the 2014 MMWR report, *Vaccination Coverage among Children in Kindergarten -United States*, Utah had a measles, mumps, and rubella (MMR) coverage rate of 98.5% despite having an exemption rate of 4.4%. To better understand this discrepancy, the Utah Department of Health (UDOH) conducted an evaluation of the processes and accuracy of Utah's data as published in this report.

METHODS: Utah's data originates from a census of schools representing 100% of students' vaccine status upon kindergarten enrollment. Students are classified as: adequately immunized, non-compliant, exempt, or conditionally enrolled. School data is reported to UDOH which then calculates vaccine exemption and coverage rates and submits aggregate data to the Centers for Disease Control and Prevention (CDC) for publication. Schools' exemption data were validated by collecting personal exemption forms for kindergartners in the 2013-2014 school year from local health departments (LHDs) and schools. Exemption forms were cross-referenced by matching name and birth date with Utah's Immunization information system (USIIS) to obtain vaccine histories. Data were analyzed to determine if kindergarten students received a vaccine despite claiming a personal exemption. To evaluate the accuracy of data supplied to the CDC, investigators recalculated the MMR coverage rate by using a formula established by Utah's Immunization Program.

RESULTS: Utah schools reported 2,406 kindergarten personal exemptions for the 2013-2014 school year. Investigators were able to collect 1,792 exemption forms. 63% (n=1,132) of kindergartners who claimed an exemption reported a vaccine on their USIIS record. 23% (n=416) of students who were granted an exemption received a vaccine they opted out of on or after the exemption form date. Furthermore, a calculation error was found with the formula UDOH used for the 2014 MMWR report. After validating students' exemption status and updating coverage levels, the estimated MMR coverage rate decreased to 95.4% and the estimated exemption rate decreased to 3.6%. Investigators observed that there are not standardized collection or storage procedures in place for LHDs regarding exemptions. It was also observed that there may be confusion about a student's vaccine status at the time of enrollment, which can artificially inflate Utah's exemption rate.

CONCLUSIONS: Utah's vaccine coverage and exemption rates are reliant on accurate school data and calculations of coverage rates. Conducting an annual vaccine exemption validation study may increase the accuracy of Utah's exemption rate. Findings from this evaluation will help investigators educate schools, providers, and LHDs on appropriate collection, storage, and reporting of exemptions granted to students.

Submission Complete? Yes

Committee Infectious Disease
Topic Vaccine-preventable Diseases
Keywords Immunization

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [7590](#)

Abstract Type Quick

Abstract Title Validation of Vaccine-Preventable Disease (VPD) Death Reports: July, 2012 – December, 2015
Abstract

BACKGROUND: Accurate ascertainment of cause of death (COD) is needed to ensure validity of published data. Two systems in the US collect data on deaths related to vaccine-preventable diseases (VPD): the National Center for Health Statistics (NCHS) and the National Notifiable Disease Surveillance System. CSTE has endorsed validation of VPD-related rare deaths (01-ID-09, “Validation of Data Representing Deaths Due to Vaccine-Preventable Diseases”).

METHODS: The National Center for Immunization and Respiratory Diseases (NCIRD) and NCHS established protocols in 2012 for validation of rare cause VPD death reports, changing to an “opt-out” design in 2014, with no states currently opting out. Under this protocol, once NCHS receives the death record from the state and codes the COD, reports of specified rare VPD deaths are provided to NCIRD for investigation with the appropriate state epidemiology and/or immunization offices. Rare VPD identified as underlying or contributing COD are included in the validation protocol, but only underlying COD are used in standard NCHS reports. Data for this report includes deaths occurring July 15, 2012, through December 31, 2015.

RESULTS: Death reports were received for this validation process from 36 jurisdictions. To date, of 127 death reports received, 54 (38 underlying COD) were validated by NCIRD and state epidemiology/immunization programs; 64 (23 underlying COD) were identified by NCIRD as having a cause of death (COD) other than the VPD; and 9 (7 underlying) could not be investigated. Among 56 varicella deaths reported, 7 were validated as varicella, 41 were determined to have another COD, and 8 were not investigated. Among 23 pertussis reports, 19 were validated as pertussis and 4 were determined to have another COD. Of 9 mumps deaths reported, 1 was validated, 7 were determined to have another COD, and 1 was not investigated. Of 7 deaths reported as measles, 1 was validated as measles and 6 were determined to have another COD. The 4 rubella, 1 polio, and 1 diphtheria death(s) reported were all found to have another COD. All 26 Congenital Rubella Syndrome (CRS) death reports were validated.

CONCLUSIONS: Rare-cause validation process requires cooperation of state vital records offices, COD certifiers, and NCHS staff who quickly identify deaths from rare causes. In addition, investigation of death reports by NCIRD and state epidemiology and/or immunization programs is required to make the national death surveillance system more accurate and usable for monitoring rare deaths due to VPDs.

Submission Complete? Yes

Committee Infectious Disease

Topic Vaccine-preventable Diseases

Keywords Evaluation; Surveillance; Vaccine-Preventable Diseases

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8153](#)

Abstract Type Quick

Abstract Title Varicella Outbreak in Williamsburg Orthodox Jewish Community, 2016
Abstract

BACKGROUND: Providers are not required to report individual cases of varicella in New York City (NYC), but varicella outbreaks are reportable. Within the last decade, Orthodox Jewish populations in Brooklyn, NYC have experienced several outbreaks of vaccine preventable diseases. On May 2, 2016, a large medical practice in the Williamsburg neighborhood of Brooklyn notified the NYC Department of Health and Mental Hygiene (DOHMH) of an increase in varicella cases among the Orthodox Jewish community.

METHODS: DOHMH contacted all providers known to serve the Orthodox community in NYC to request that they report cases of varicella to DOHMH. Case investigation included patient interview and medical record review. Children were considered up-to-date (UTD) with varicella vaccination if they were aged 1-3 years with 1 dose and >4 years with 2 doses. Cases were classified using Council of State and Territorial Epidemiologists criteria. The number of varicella vaccine doses administered by age group during the outbreak was determined using the Citywide Immunization Registry (CIR).

RESULTS: The outbreak included 257 varicella cases, of which 99% (254) were Orthodox. Rash onset dates ranged from February 27 through August 5, 2016. Median age of cases was 3 years (range 2 months-33 years), of which 88% (226) were <5 years old. Of the 251 cases for whom vaccination records were available, 73% (182) were unvaccinated, 12% (29) were vaccinated but not UTD, and 16% (40) were vaccinated and UTD. Control measures included meetings with Orthodox community leaders and providers, notifications to providers citywide, and an Epi-X notification. DOHMH required exclusions of non-immune children from schools and child care facilities serving the affected community through the duration of the outbreak. DOHMH also placed advertisements in local papers and disseminated information at a community event with >10,000 attendees. Using the CIR, DOHMH sent 2,852 recall letters and 266 text messages to patients not UTD with vaccination from 9 practices that serve the community. The number of varicella vaccine doses administered to children aged 12 months-<5 years and 5-18 years in these 9 practices during the outbreak was 1784 and 730, respectively, representing a 5.2% and 7.3% increase from the corresponding months in 2015.

CONCLUSIONS: The outbreak was driven by delayed vaccination among young children with little spread beyond the Orthodox Jewish community. DOHMH implemented multiple control measures and identified an apparent increase in vaccine administration in the affected community during the time of the outbreak.

Submission Complete? Yes

Committee Infectious Disease

Topic Vaccine-preventable Diseases

Keywords Vaccine-Preventable Diseases; Surveillance; Outbreaks

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [7969](#)

Abstract Type Quick

Abstract Title Varicella Outbreak Investigation and Response in a Contract Prison in Georgia, 2016
Abstract

BACKGROUND: Varicella-zoster-virus (VZV) is a highly contagious virus with secondary attack rates of 65%-90%. Susceptible individuals in congregate settings, including prisons, are at increased risk of VZV infection due to close contact. We describe the epidemiology, control measures, and challenges of a varicella outbreak in a contract prison in Georgia.

METHODS: In January, 2016, the Georgia Department of Public Health (DPH) conducted a varicella outbreak investigation in a contract (privately-run federal) prison with a population of 2,600 primarily foreign-born inmates (Prison A). A varicella case was defined as a generalized, maculopapular rash that developed in an inmate or staff member between December 20, 2015 and February 28, 2016. DPH collected information regarding clinical characteristics and demographics of case-patients, and immunity of exposed persons. Laboratory testing to confirm varicella infection, isolation of cases, and vaccination of exposed, susceptible inmates was recommended. Active surveillance for secondary cases was conducted through two incubation periods (42 days) after onset of the last case-patient.

RESULTS: Eleven foreign-born case-patients (median age: 33 years) were identified in Prison A. All case-patients had unknown varicella vaccination status, and 9 (82%) had fewer than 50 lesions. Of 93 inmates exposed, nine of the 10 determined to be non-immune developed varicella. DPH offered varicella vaccine to the exposed, susceptible individuals for post-exposure prophylaxis (PEP). However, Prison A did not have a freezer appropriate for storage. Alternatively, DPH recommended obtaining local vaccine and following the Centers for Disease Control's (CDC) guidance on vaccine storage, handling, and transport. Prison A declined, and instead continued to isolate new cases and sequester exposed inmates until 21 days after their last exposure (totaling over three incubation periods). No cases were laboratory-confirmed. DPH discussed the management of varicella outbreaks in contract prisons with the Federal Bureau of Prisons (BOP), who noted that due to contract prison limitations, PEP is not typically incorporated into varicella response efforts, and such outbreaks, which are common, often persist through multiple incubation cycles and involve extended isolation of inmates.

CONCLUSIONS: Identifying and controlling varicella outbreaks in contract prisons present unique challenges. These challenges often result in sub-optimal implementation of published CDC and BOP varicella outbreak guidelines, which include using PEP to prevent transmission. This outbreak highlights the need for collaboration between contract prisons, BOP, and state public health personnel to develop a more effective varicella outbreak protocol for these facilities.

Submission Complete? Yes

Committee Infectious Disease

Topic Vaccine-preventable Diseases

Keywords Outbreaks; Vaccine-Preventable Diseases; Special/Vulnerable Populations

Consider for Different Presentation? Yes

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