

and of those, 43% (16/37) sought healthcare. Four were hospitalized, including one in intensive care, for a median of 7 days (range 3–12). Only six (6%) had previously heard of coccidioidomycosis. One-third (32%, 24/75) tested LFA positive, 10 (13%, 10/75) EIA positive, and eight (11%, 8/75) ID positive. Seventy-one percent (17/24) with positive LFA reported symptoms, compared with 83% (10/12) with positive EIA, 100% with positive ID (8/8), and 31% (16/51) with negative LFA. Of 51 travelers with negative LFA, we observed one positive EIA and no positive ID.

Conclusion. In this outbreak that resulted in a high attack rate and prolonged hospitalizations, the rapid one-hour LFA appeared as a useful screening tool compared with send-out testing, which took at least 7 days to return. The proportion of symptomatic LFA-positive travelers was nearly as high as for those with positive EIA, and we observed agreement with EIA and ID-negative results. Whether 12 people with positive LFA but negative EIA and ID truly had infection is unclear. Further evaluation to examine sensitivity and specificity of LFA are needed. Additionally, greater education is needed for groups traveling to coccidioidomycosis-endemic areas.

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1610. Implementation of Clinical Care Pathway Reduces Measles Exposures During Outbreak in New York

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Background. The United States is currently experiencing the largest measles outbreak since 1994. The New York outbreak started in October 2018 in several communities with low immunization rates for measles. Our institution is a referral center for the Hudson Valley and New York City. Failure to immediately recognize the disease early in the outbreak resulted in several exposure investigations and significant expenditure of time and resources. With evidence of ongoing transmission in local communities, we initiated a multi-pronged approach to recognize and limit potential measles exposures.

Methods. We developed a clinical pathway to alert Emergency Department (ED) staff and local Emergency Medical Service (EMS) agencies to the signs and symptoms of measles and provided steps for isolation, care, and testing for patients with possible measles. The ED staff and EMS personnel were educated in meetings and by posters, emails, and huddles. Reports of cases were made to infection control in real time, and local Departments of Health (DOH) were subsequently notified of suspected cases and exposures. We describe data pre and post-intervention. Chi-square was used to compare the number of patients requiring contact investigations for staff and patient exposures pre- and post-pathway implementation.

Results. From October 2018 through April 2019, 31 patients were evaluated for measles. Measles was diagnosed in 15 patients (1 adult, 14 children). Eight patients were admitted to the hospital, 3 required Pediatric ICU care. Pre-pathway implementation, 2 out of 9 (22%) evaluated patients resulted in exposure investigations; post implementation, 1 out of 22 (4.5%) evaluated patients required an exposure investigation ($P = 0.18$). The investigations conducted by our infection control department included 153 patients, 141 pre-implementation vs. 12 post-implementation. Nine patients required prophylaxis with immunoglobulin, and 10 patients received MMR vaccine as prophylaxis. No exposures resulted in clinical cases of measles.

Conclusion. Implementation of a clinical pathway to recognize and isolate suspected measles patients with ED staff and EMS personnel resulted in reduced exposures and improvement in communication with Infection Control and local DOH.

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1611. Interventions to Decrease the Absolute Number of Individuals Not Immune to Measles at Princeton University (PU)

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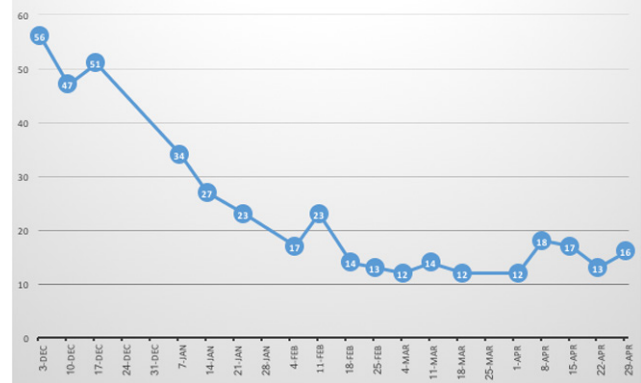
Background. PU's dormitories house ~100% of undergraduate and ~70% of graduate students. MMR is required for all students by NJ law, allowing for medical and religious exemptions (RE). Information on immunization requirements is widely available and accessible. If a student is found not compliant, measures include monetary fines, class registration holds, and contact by residential staff. Visiting short-term students should submit immunization records, but, due to rolling matriculation dates, enforcement measures may not be applicable. In the fall of 2018, a measles outbreak was reported close to campus. We sought to engage all students not immune to measles with proactive messaging.

Methods. Starting on December 3, 2018, the electronic health record (EHR) was used to generate a weekly report of active students not immune to measles following the CDC's immunity criteria. Notifications and education material were sent via secure messaging and/or email. Students with no immunization data were provided instructions on record submission. Reminders were sent to those due for second MMR. Students with RE were offered blood tests for measles immunity. Alerts were placed in the EHR of all non-immune students so every encounter would serve as reminder. Student travelers on PU sponsored trips were informed about measles outbreaks and, often, MMR became a trip requirement.

Results. On December 3, 2018, 84 students were measles non-immune: 2 with medical and 23 with RE; 59 lacking second MMR or with no immunization data. The 23 RE became 24 when a student in absentia returned. Since, 3 of the students with RE had blood tests revealing measles immunity; 2 received MMR to travel; 3 decided that their RE was not current. On 4/22/19, there were 18 students lacking second MMR or with no immunization data, most of them new visiting students. Overall, 57% reduction of absolute number of measles nonimmune students.

Conclusion. This community intervention shows that students who remained measles non-immune despite the regular immunization compliance activities, could become compliant through active messaging, education and continued engagement. Importantly, 8 of 24 students with RE, when engaged and provided with information and potential consequences of unimmunized status, were found either already immunized or not opposed to receiving immunizations.

Table 1. Students Not Immune to Measles Without Exemptions to Immunizations, Princeton University, December 2018 through April 2019



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1612. Listeriosis in Mainland China: A Systematic Review

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Background. The aim of present study is to conduct a systematic review to better understand the epidemiological and clinical characteristics of listeriosis cases in mainland China.

Methods. The six most widely used Chinese and English databases were searched. Records on cases of listeriosis in mainland China reported from 2011 to 2017 were extracted. Clinical data of patients and information on clinical isolates of *Listeria* were collected and analyzed.

Results. A total of 136 records and 562 listeriosis cases were reported. The number of cases was much higher than that reported in the past decade. The 227 included non-perinatal listeriosis cases had a mortality rate of 23.78%. Of the 231 perinatal listeriosis cases, 32.68% resulted in abortion and/or newborn death. All listeriosis cases were reported as sporadic cases. Only 3 cases were traced to a meat product, while 33.12% were healthcare-associated cases.

Conclusion. The number of listeriosis cases in China may have previously been underestimated. Perinatal cases in mainland China took a much higher proportion compared with what is usually described. Considering the high number of listeriosis patients in China, a comprehensive monitoring system for listeria is urgently needed in China.

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1613. Rates of Hospitalization for Community-Acquired Pneumonia Among US Adults: A Systematic Review

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Background. Community-acquired pneumonia (CAP) develops in persons outside of a healthcare facility and is associated with significant morbidity and mortality. Estimating the incidence of CAP is challenging because it lacks a standardized case definition and because study designs and selection criteria vary. Reconciling these differences across studies is critical for understanding the true burden of CAP which, in turn, informs prevention strategies, including vaccination.

Methods. We performed a systemic literature review of studies describing the incidence of hospitalized CAP among adults in the United States. Specifically, we examined the impact of the following study characteristics on estimates of incidence: (i) study population, (ii) study type and data source, and (iii) diagnostic criteria for pneumonia.