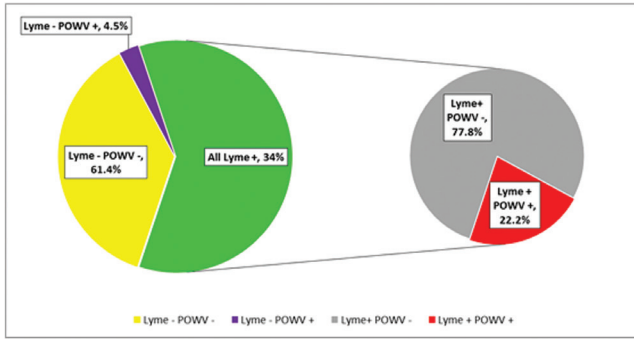


indistinguishable from those of Lyme disease, requiring laboratory testing for proper TBD diagnosis and avoidance of unnecessary antibiotic use. The high rate of POWV co-occurrence with Lyme disease may have relevance for patient outcomes and warrants further investigation.



Disclosures. S. Kehl, Coppe Laboratories: Consultant, Consulting fee. A. Thomm, Coppe Laboratory: Employee, Salary. P. Pratt, Coppe Laboratory: Employee, Salary. K. Knox, Coppe Laboratory: Owner, Equity as compensation.

669. Changing Epidemiology of Murine Typhus in Texas

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Background. Murine (also known as flea-borne) typhus is uncommon in the United States, but it is considered endemic in certain parts of Texas, especially the southernmost region. It is caused by *Rickettsia typhi*, which is transmitted to humans by rat and cat fleas. Murine typhus is often a mild illness with nonspecific clinical findings, though delayed treatment may result in severe disease and increased risk of complications. Diagnostic tests have low sensitivity in early disease. Therefore, correctly diagnosing patients with murine typhus is challenging unless clinical suspicion is high. In endemic regions, physicians are aware of the disease and diagnose it readily. However, in areas that have not historically been affected, physicians may be less familiar with the presentation of this rickettsial infection, impacting their ability to diagnose and treat it effectively.

Methods. Probable and confirmed murine typhus cases reported in Texas were collected for 1944–2017. Cases were mapped by county for each of the last 5 years. Cases reported over the last 5 years were also geocoded by residence for spatial cluster analysis by year.

Results. There has been an overall rise in the number of murine typhus cases reported per year over the last 13 years (Figure 1). The distribution of reported cases throughout Texas has changed over the last 5 years. There continues to be a high number of reported cases in South Texas and Central Texas, while reported cases are increasing in the Harris County/Houston area, Tarrant County/Ft. Worth area, and Dallas County/Dallas area. Spatial cluster (hot spot) analysis of typhus cases in Texas over the last 5 years shows areas of increased risk of murine typhus in South Texas that have persisted over time, while other areas of increased risk have appeared more recently in North Texas and Central Texas (Figures 2 and 3).

Conclusion. Murine typhus can be a difficult diagnosis to make based on clinical presentation, and physician awareness of its epidemiology is important. The gradual increase in case counts and the changing distribution of cases within Texas may put patients at risk of missed diagnoses. Recognizing the changing epidemiology of typhus in Texas may help inform public health education and control efforts.

Figure 1:

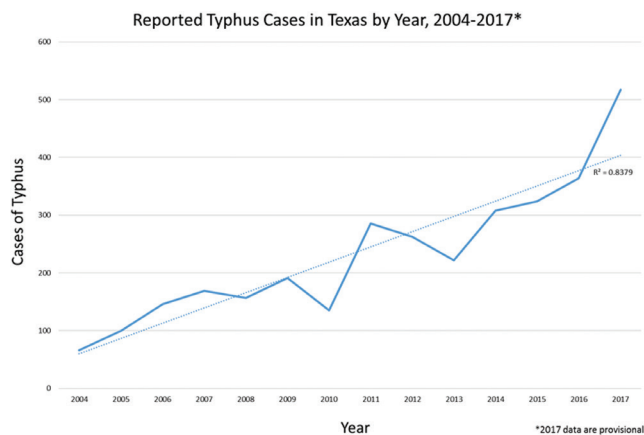


Figure 2:

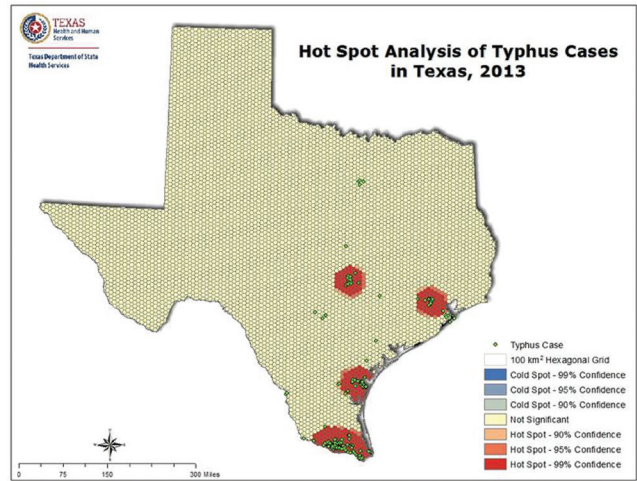
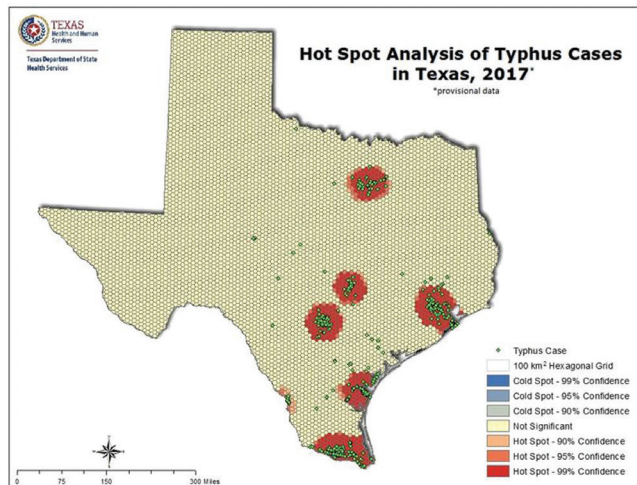


Figure 3:



Disclosures. All authors: No reported disclosures.

670. Estimating *Bordetella pertussis* Seroprevalence in Persons Aged 10–25 Years in Mexico Using the 2012 National Health and Nutrition Survey (ENSANUT): Challenges and Lessons Learned

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Background. Low vaccination rates and under-detection of cases in adolescents and young adults have been implicated in the transmission of Pertussis to children. In this study, the proportion of adolescents and young adults with anti *Bordetella pertussis* IgG antibodies was estimated in a population-based survey in Mexico.

Methods. Frozen sera and data from 1,581 subjects—1,102 adolescents and 479 young adults (10–19 and 20–25 years old, respectively)—56% female were randomly selected from the Mexico's National Health and Nutrition Survey (ENSANUT) 2012. CDC/FDA validated PT ELISA test was used to detect anti-pertussis toxin (PT) antibodies. A subset of 300 samples was also tested with *Bp*-IgG PT ELISA kit (Euroimmun AG, Lubeck, Germany), both tests used international standards. Threshold values were established to identify vaccination or infection within the previous year, according to a US survey (Baughman et al.). Population-weighted estimates of seroprevalence were calculated.

Results. Overall *Bp* seroprevalence was 3.9% (95% CI: 2.3, 6.3); 3.1% (1.9, 5.0) in adolescents, and 4.9% (2.2, 11) in young adults. Seroprevalence did not significantly vary by gender, socioeconomic status, region or rural/urban location. Compared with the CDC/FDA PT ELISA, the Euroimmun test showed 76% sensitivity, 88% specificity.

Conclusion. Booster vaccination to *Bp* after toddlerhood is not in the Mexican national policy; therefore, anti-PT IgG seropositivity may reasonably be attributed to recent *Bp* infection. Our weighted estimates of recent *Bp* infection, which are based on

a national population-based serosurvey and a standardized serological test, represent a considerable burden of infections in adolescents and young adults that sharply contrast with the official surveillance reports. Also, the Bp-IgG PT ELISA commercial kit lower sensitivity than the CDC/FDA PT ELISA may lead underestimation of recent infections. In conclusion, assessing pertussis seroprevalence requires careful consideration of the right tests and epidemiological model for interpretation.

Disclosures. All authors: No reported disclosures.

671. Increased Disease Severity and Larger Household Size Among Hispanic Infants With Pertussis: Chicago, IL, 2010–2016

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Background. Infants experience higher pertussis incidence and mortality compared with other age groups and 85% of infant cases are acquired from a household member. The Chicago Department of Public Health (CDPH) noted increased pertussis incidence among Hispanics from 2014 (5.3 cases per 100,000 population) to 2016 (12.3 cases per 100,000 population) while other ethnicities remained stable.

Methods. All pertussis cases reported to CDPH through the Illinois National Electronic Disease Surveillance System with onsets from January 1, 2010 to December 31, 2016 were included in the analyses. Variables of interest were age, race/ethnicity, household size, disease severity, healthcare location of diagnosis, and hospitalization. To assess differences in demographic and care-related indicators between Hispanic and non-Hispanic White (NHW) infants, chi-square tests were performed; risk ratios and 95% confidence intervals were estimated.

Results. From 2010–2016, 1,036 pertussis cases were reported to CDPH including 276 infants aged <1 year. Among infant cases, 187(68%) were <4 months of age, 143(52%) male, 151(55%) were Hispanic and 54(20%) were NHW. Median household size for infants of all ethnicities was four members (range: 0–15). Of all infants with household member size of ≥4 persons (157), 64% were Hispanic. 185 (67%) of infants had ≥1 severe symptom (apnea, cyanosis, pneumonia, seizure, encephalopathy) and 133 (48%) were hospitalized. Diagnosis occurred in the emergency room (ER) for 199 (72%) infants. Hispanics were more likely than NHW to have household member size ≥4 (RR 1.9, $P < 0.05$), severe symptoms (RR 1.6, $P < 0.05$), hospitalization (RR 2.3, $P < 0.05$), and diagnosis in the ER (RR 2.8, $P < 0.05$) (Table 1).

Conclusion. Among Chicago infant pertussis cases, Hispanic infants have larger household sizes and more severe disease at time of diagnosis compared with NHW.

Table 1: Chicago Hispanic Infant Pertussis Case Characteristics Compared with Non-Hispanic Whites (NHW), 2010–2016

Infant Characteristics	Race/Ethnicity	N (%)	RR (95% CI)
Household size ≥4	NHW	19 (35.2)	Ref.
	Hispanic	100 (66.2)	1.9 (1.3–2.8)*
Severe symptoms	NHW	25 (46.3)	Ref.
	Hispanic†	113 (75.3)	1.6 (1.2–2.2)*
Hospitalization	NHW	14 (25.9)	Ref.
	Hispanic	90 (59.6)	2.3 (1.4–3.7)*
Diagnosis in ER	NHW	16 (29.6)	Ref.
	Hispanic	124 (82.1)	2.8 (1.8–4.2)*

* Significant at $P < 0.05$.

† population = 150, one patient missing data.

Disclosures. All authors: No reported disclosures.

672. The Impact on Humans of Treating Dogs with Amoxicillin/Clavulanate

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Background. It has been shown that the use of antibiotics promotes resistance to that antibiotic, and that colonization with resistant pathogens can be transmitted from companion animals to their human owners. There is an evolving concern that use of medically important antibiotics in pets can confer colonization by resistant organisms in their human owners.

Methods. In dogs receiving amoxicillin/clavulanate for 14 days for a diagnosed infection, we screened stool both at the time of antibiotic initiation and at the end of the course for the dog taking antibiotics and their human owner. Owners had to meet a closeness score of 3 or 4, meaning living in same household with frequent contact,

with or without oral contact, and have no recent antibiotic exposure. Stool samples were quantitatively cultured for enteric flora and incubated on selective media for ampicillin/sulbactam resistance (A/S-r), ciprofloxacin resistance (CIP-r), ESBL, MRSA, and VRE.

Results. We enrolled eight dog-human pairs. All had enteric flora present at the time of antibiotic initiation (Day 1), whereas two of the seven dog samples that could be analyzed had no detectable enteric flora by the end of antibiotics (Day 14). No humans or dogs acquired MRSA or VRE. One human lost colonization with CIP-r flora, whereas two dogs acquired CIP-r during antibiotic treatment that did not transmit to their owners. One dog and one unrelated human acquired ESBL colonization by day 14 that was not present at Day 1. There were three humans colonized with A/S-r on Day 1 which persisted through the treatment period. Of their three dogs, one had no A/S-r at either time point, one newly acquired high counts of A/S-r flora, and one did not provide enough stool at Day 14 for A/S-r testing. There was one other dog that acquired A/S-r flora and one dog that had increasing counts of A/S-r, both of which had human owners with no A/S-r on Day 1 or 14.

Conclusion. In this pilot study, we identified that use of amoxicillin-clavulanate, a common antibiotic prescribed to both humans and dogs, can lead to resistant colonization in the dog taking antibiotics, and may have some impact on their close human owners who may share or transmit colonization. Further study is under way to better understand this relationship.

Disclosures. L. A. McDermott, CytisPharma Inc.: Research Contractor, Contractual agreement with Tufts Medical Center.

673. Syphilis Outbreak in Women Who Have Sex with Men in Japan: A Case-Control Study in Tokyo, 2017–2018

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Background. In Japan, syphilis notifications have increased sharply, with Tokyo accounting for a third of all cases. Importantly, the increase in women has been remarkable, with the majority being women who have sex with men. We therefore conducted a prospective case-control study to evaluate correlates of recent syphilis infection among women in Tokyo.

Methods. We employed a test-negative design case-control study among women who sought a syphilis test at a women's health clinic in Tokyo, comparing socio-economic status, medical history, and recent sexual behaviors/partnerships, between those who were diagnosed with recent syphilis infection based on clinical signs and serological test results (cases) vs. those who were nonreactive for the nontreponemal test (controls). Participants aged ≥20 years and sexually active in the past 6 months were recruited from June 2017 to March 2018 and completed a self-administered questionnaire. We described cases and assessed for correlates of recent syphilis infection based on odds ratios (ORs) and 95% confidence intervals (CIs).

Results. A total of 524 women, composed of 60 cases and 464 controls, were enrolled. The median age was 23 years (range = 20–54) among cases and 26 years (range = 20–59) among controls. Of the 60 cases, 10 (17%) were current students and three (5%) had a history of syphilis; in the past 6 months, while 35 (58%) had engaged in commercial exchange of sexual practices, 14 (23%) had only one sex partner. Having lower educational attainment (OR = 4.1; 95% CI = 2.1–8.1), not being employed full-time (OR = 3.1; 95% CI = 1.8–5.5), and commercial exchange of sexual practices (OR = 3.4; 95% CI = 2.0–5.9) were associated with case status in univariate analysis. The association between case status and inconsistent condom use (relative to consistent condom use) during vaginal/anal sex in the past 6 months (OR = 2.0; 95% CI = 0.9–4.3) became stronger when restricted to women engaged in commercial exchange of sexual practices (OR = 4.0; 95% CI = 1.4–10.9).

Conclusion. This was the first study to evaluate potential risk factors for recent syphilis infection among women in Japan. In light of these findings, we may need a multi-pronged approach to prevent and control syphilis, for both those engaged in commercial exchange of sexual practices and the general population.

Disclosures. All authors: No reported disclosures.

674. Epidemiology of Diphtheria and Antimicrobial Resistance Among Diphtheria Cases, Bijapur District, Karnataka, India, 2012–2015

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Background. India contributes to 80% of diphtheria cases. Many diphtheria outbreaks were reported from Bijapur district of Karnataka state, India. Analysis of burden and drug sensitivity pattern might help to identify risk groups and to provide guidelines for treatment of diphtheria cases. Our objectives were to describe epidemiology and drug susceptibility of diphtheria cases in Bijapur district.

Methods. We did cross-sectional study between 2012 and 2015. We defined a probable case as inflammation of upper respiratory tract with adherent membranes.