Sensitivity and timeliness of CDC'S Global Disease Detection Operations Center (GDDOC) event-based surveillance (EBS) system: a pilot study

N.D. Bustamante, K.A. Coggeshall, J.A. Fuller, C. Hercik, C. Blanton, A. Couture, D. Bensyl, R. Arthur. Emergency Response and Recovery Branch, Centers for Disease Control and Prevention, Atlanta, GA

Purpose: CDC's GDDOC EBS system uses official and unofficial reports to rapidly detect rare and emerging public health events of international importance (PHEII). The system's sensitivity of detection and timeliness of communication was examined for four representative diseases: Ebola virus disease (EVD), yellow fever (YF), measles and cholera.
Methods: Data of PHEIIs of representative diseases occurring January 1, 2013 - December 31, 2017 was extracted from GDDOC's EBS database. Diseases were chosen given their global annual number of cases, transmission mode, and mean case fatality ratio (CFR). Sensitivity of detection was defined as the number of disease cases detected by GDDOC divided by cumulative global annual number of cases reported within the study period. Timeliness of communication was defined as the number of days from event detection to dissemination of information in GDDOC's Daily Report.
Results: From 2013 to 2017, the cumulative global annual number of cases was 28,864 (EVD), 2,450 (YF), 1,077,859 (measles), and 13,250,000 (cholera). Mean CFR ranged from 1.8% for cholera to 50% for Ebola. Sensitivity of event detection was 99.6% (EVD), 78.6% (YF), 37.3% (measles), and 13.5% (cholera). 66 (56%) and 92 (76%) PHEIIs were detected and reported within 24 hours and one week, respectively.
Conclusion: With the exception of EVD, sensitivity was lower for diseases with high cumulative annual number of cases and lower CFR. EVD and YF showed good sensitivity; indicating detection that could initiate a rapid response. Timely communication occurred for all four diseases. Analysis of all diseases monitored by GDDOC should be completed to confirm trends and evaluate exceptions.

Patterns of prescription opioid misuse among young people who inject drugs

B. Boodram, M. Kaufmann, M. Mackesy-Amiti. School of Public Health, University of Illinois at Chicago, Chicago, IL

Purpose: To examine the role of prescription opioid (PO) misuse pre- and post-injection drug use (IDU) initiation among young people who inject drugs (PWID) from a Chicago, Illinois and surrounding areas.
Methods: We present socio-demographic, biological, personal network, and geographic data from an on-going longitudinal study of PWID and their network members. Baseline visit data from October 1, 2018 - June 15, 2019 (n=128, ongoing) were analyzed using logistic regression adjusting for age, gender, and residential status (urban, suburban, out-of-state).
Results: Participants were mostly male (73%), non-Hispanic white (62%) or Hispanic (all races) (26%), with a mean age of 30 (range 18-44). Two-thirds (66%) reported PO misuse pre-IDU initiation, 61% of whom reported being "hooked" on PO; 20% reported PO misuse post-IDU initiation. The most common first source of POs was a friend/family member (40%), 26% bought them off the street, and 20% had a prescription. Compared to all non-whites, non-Hispanic whites were more likely to be "hooked" on PO pre-IDU initiation (adjusted odds ratio [aOR]=2.77 [1.20-6.36]). Among all non-whites, the number of non-Hispanic white injection network members was associated with being "hooked" on PO pre-IDU initiation (aOR=1.22 [1.02-1.45]). Those who reported PO misuse post-IDU initiation were slightly less likely to report daily IDU compared to those who reported PO misuse pre-IDU (p=.07). Overall, 35% were HCV-positive and differed by residential status (p=0.004). HCV status was not associated with PO misuse.
Conclusion: Most PWID reported PO misuse pre-IDU initiation, with fewer initiating post-IDU. Consideration of differences between these two groups is warranted to inform future interventions.

Safety of quadrivalent meningococcal conjugate vaccine in infants and toddlers 2 to 23-months old

T.A. Becerra-Culqui, L.S. Sy, B.K. Ackerson, J.M. Slezak, Yi Luo, C.A. Fischetti, Y.U. Ohadike, C. Curina, M. Pellegrini, Z. Solano, S.Y. Tartof, H.F. Tseng. Kaiser Permanente Southern California, Pasadena, CA

Introduction: While clinical trials of the quadrivalent meningococcal conjugate vaccine MenACWY-CRM were conducted in healthy infants/toddlers, MenACWY-CRM was recommended in high-risk infants/toddlers post-licensure. Thus, it is important to evaluate the safety of the vaccine when used in clinical care among the high-risk populations for which it is recommended.
Methods: Kaiser Permanente Southern California members aged 2-23 months who received MenACWY-CRM between July 2014 and June 2017 were included. Electronic health records were searched for emergency department (ED) and hospitalization encounters, and diagnoses associated with these visits up to 6 months after each dose.
Results: There were 138 infants/toddlers who received MenACWY-CRM, with 59.4% being African American and 66.7% receiving only one dose. Most infants either had a high-risk condition (i.e., anatomic/functional asplenia or DiGeorge syndrome) (42.0%), or a travel indication (54.3%). The median follow-up time from vaccination was 6.0 months (interquartile range 6.0 to 9.2 months). Most (84%) completed the 6-month observation period following their last dose. The incidence rate of ED visits was 0.6/person-year (95% confidence interval [CI]: 0.5-0.8), 0.4/person-year (CI: 0.3-0.5) for hospitalizations, and 0.1/person-year (CI: 0.1-0.3) for ED to hospital transfers. Overall, 29.0% of recipients had an incident diagnosis in the ED or hospital setting. Fever and acute upper respiratory infections were the most common diagnoses, with 46 out of 47 diagnoses occurring among infants with high-risk conditions.
Conclusions: Data from this descriptive observational study do not suggest safety concerns associated with MenACWY-CRM when used as part of clinical care of 2-23 month-old infants/toddlers indicated for vaccination.

Associations between maternal serum and urinary metal concentrations and birthweight

K. Antoniak, C. Stein, A. Deierlein. Icahn School of Medicine at Mount Sinai, New York, NY

Purpose: To understand the complicated relationship between metals and fetal growth, we explored associations between prenatal metal concentrations and infant birthweight in the National Children's Study (2009–2014).
Methods: Using linear regression, we estimated associations between quartiles (Q1–Q4) of prenatal (gestational weeks 5–27) serum selenium, mercury, cadmium, and manganese (n=255) and urinary total inorganic arsenic (n=176) concentrations and birthweight (g) among term births (gestational age ≥37 weeks). Models were adjusted for maternal age, race/ethnicity, BMI, and cigarette use and infant sex and gestational age at birth. Metal concentrations below the limit of detection (LOD) were replaced with LOD divided by square root of 2.
Results: Selenium and manganese were 100% detectable; detectability rates varied for mercury (91.6%), lead (84.7%), and cadmium (60%). Dimethylarsinic acid was the only urinary arsenic component detectable in the majority of samples. Geometric mean concentrations were comparable to NHANES. With the exception of mercury, we observed no meaningful association between metal concentration and birthweight. For mercury, there was a pattern of decreasing birthweight with increasing concentration quartile (p=0.06). Compared to Q1 (0.11–0.29 ug/L), birthweight decreased by 107 g (95% CI: -256, 42) in Q2 (0.30–0.56 ug/L), 152 g (95% CI: -300, -5) in Q3 (0.57–0.98 ug/L), and 201 g (95% CI: -351, -51) in Q4 (0.99–5.33 ug/L).
Conclusions: In this small birth cohort we observed an inverse association between maternal prenatal mercury concentration and infant birthweight. Longitudinal investigation is needed to determine whether associations with reduced birthweight have developmental consequences.