Infectious Diseases, Maternal and Child Health

Minnesota Department of Health, Infectious Disease Epidemiology Prevention and Control

St. Paul, Minnesota

Assignment Description

The Fellow will be mentored by the unit lead for Epidemiology Field Services and by the co-lead of two congenital review boards (HIV/congenital syphilis). The Fellow will be engaged in STD/HIV/TB Section activities, including surveillance, outbreak investigation, and special projects. Within the Cross-cutting Epidemiology Section, the Fellow will have the opportunity to engage with local public health and participate in emergency preparedness exercises and response activities. The overall vision for the proposed position is to leverage the diversity of MDH and local expertise to develop and advance strategies to prevent congenital infections, particularly congenital syphilis.

Daily activities led by the Fellow will include convening an MDH team of infectious disease subject matter experts (SMEs) in the form of a perinatal communicable diseases workgroup and working with these SMEs to investigate, review and report congenital infections including viral hepatitis, HIV, and syphilis. Additionally, the Fellow will work with IT staff to enhance and maintain data systems for the monitoring and reporting of pregnancies, births, and infants exposed to relevant infections. Through the perinatal communicable diseases workgroup, the Fellow will also be expected to promote collaborative efforts to share prevention messages through health education materials or at conferences, local or regional meetings or disseminated directly to targeted audiences.

In addition to these broader goals, the Fellow will lead specific projects related to congenital syphilis including an evaluation of syphilis surveillance either on the completeness of collected risk factor data or using novel methods to determine completeness of congenital syphilis case reporting. The Fellow’s major project will expand on the Congenital Syphilis Maternal Morbidity and Mortality review panel to collect additional data on mothers and infants in whom congenital syphilis was averted (e.g. mothers successfully treated during pregnancy). These data will provide a comparison group for untreated or inadequately treated mothers so we can identify systems-level gaps to address, a first step on a path toward congenital syphilis elimination. In addition to the proposed projects, the STD/HIV/TB Section epidemiologists have a keen interest in developing a spatial representation of syphilis cases and understanding the relatedness of these cases through a social network lens. A fellow with an interest or skills in this area would be a valued addition to these efforts.

In sum, this position presents an exciting opportunity for a fellow to work with experienced public health professionals to respond to an important emerging public health issue in Minnesota.

Day-to-Day Activities

The Fellow will attend internal and external meetings, including those for all infectious disease staff (e.g. morning report), will develop protocols and guidelines, and present work products at local, state, and national scientific conferences. Specifically, the Fellow will attend relevant syphilis work group meetings
The Fellow will contribute to Minnesota Electronic Disease Surveillance System work flows and documentation and will participate in the development of variables or modules for overall congenital infection case management and follow-up. Therefore, the Fellow will attend meetings with IT, MEDSS User groups and other IDEPC staff to facilitate this work. Routine daily work will also include reviewing medical records, reviewing surveillance data, troubleshooting SAS code, and using multiple databases to extract relevant information for projects.

**Potential Projects**

**Surveillance Activity**  **Enhanced Efforts to Collaborate on Congenital Infections**

The Fellow will convene an MDH team of infectious disease subject matter experts (SMEs) in the form of a perinatal communicable diseases workgroup and will work with these SMEs to investigate, review and report congenital infections including viral hepatitis, HIV, and syphilis. Additionally, the Fellow will work with IT staff to enhance and maintain data systems for the monitoring and reporting of pregnancies, births, and infants exposed to relevant infections. Through the perinatal communicable diseases workgroup, the Fellow will also be expected to promote collaborative efforts to share prevention messages through health education materials or at conferences, local or regional meetings or disseminated directly to targeted audiences.

**Surveillance Evaluation**  **Completeness of Risk Factor Information in Minnesota Syphilis Surveillance**

Minnesota Department of Health routinely conducts case investigation and partner follow up of persons reported to MDH through routine syphilis surveillance. While specific questions related to drug use, incarceration, unstable housing and mental health disorders are asked during interviews, interviews may be brief, and patients may refuse to answer questions or deny risk factors even when present. As a result, risk factor data is incomplete. The CSTE Fellow will be tasked with assessing the completeness of relevant risk factor variables and creating a consensus of risk factor variable that accurately represents categories of risk that are known obstacles to receiving medical care or that may contribute to an increased risk of exposure to syphilis (e.g. evidence of substance use, incarceration, homelessness or unstable housing, mental health disorders). This surveillance evaluation project will produce a tool (risk factor consensus variable) that will contribute to our understanding of the changing epidemiology of syphilis in Minnesota, particularly as cases emerge in new areas of the State. This better understanding can be used to identify partnerships and strategies for more effective interventions to reduce syphilis transmission.

**Major Project**  **An Analysis of Factors Associated with Prevention of Congenital Syphilis**

Over the last five years Minnesota has experienced a concerning increase in the number of early syphilis cases among females of reproductive age. There has been a concomitant increase in reported congenital syphilis cases, particularly from 2017 - 2019. This is a critical moment to focus efforts on congenital
syphilis elimination in Minnesota. To this end the Minnesota Department of Health has initiated a congenital syphilis morbidity and mortality case review panel to identify and understand the patterns of missed opportunities among cases of congenital syphilis and to inform systems-level interventions in community provider practices, support services, and/or public health response that could prevent future cases of congenital syphilis.

As an expansion of this review process, the CSTE Fellow will be tasked with reviewing congenital syphilis cases averted due to timely and appropriate treatment of pregnant women with syphilis. The Fellow will identify appropriately treated pregnant women from routine surveillance data and through enhanced methods (birth certificate matching to identify pregnancy where incomplete in surveillance data) and will review prenatal care, case investigation records, and birth records for the mothers and infants. Using the congenital syphilis prevention cascade as a framework, key variables (e.g. number of prenatal visits, syphilis screening, syphilis stage, treatment, demographics, health system, co-morbidities) will be compared between mothers of averted cases and mothers of congenital syphilis cases. Meaningful differences will be used to inform congenital syphilis elimination efforts.

**Additional Project  Syphilis Screening Among Pregnant Women in Minnesota**

Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics, and the American College of Obstetricians and Gynecologists all recommend universal syphilis screening for all pregnant women at the first prenatal visit. In addition, for women who are at high risk for syphilis or live in areas of high syphilis morbidity, these organizations recommend repeat screening early in the third trimester and again at birth.

It is not known how Minnesota medical providers are implementing syphilis screening recommendations, particularly the risk-based guidance for screening in the early third trimester and at birth. Congenital syphilis cases have been identified in Northwestern Minnesota and in the Twin Cities Metropolitan Area. A subset of infants and moms independent of syphilis status will be sampled from the birth data restricted to this geography, and testing histories will be reviewed for syphilis testing dates and results. The percent screened at first visit, early third trimester and at birth will be calculated. This project could be accomplished by partnering with healthcare facilities with whom MDH has an established relationship or by working with testing laboratories to obtain negative and positive laboratory testing results.

**Additional Project  Enhanced surveillance for pregnant women with syphilis**

Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics, and the American College of Obstetricians and Gynecologists all recommend universal syphilis screening for all pregnant women at the first prenatal visit. In addition, for women who are at high risk for syphilis or live in areas of high syphilis morbidity, these organizations recommend repeat screening early in the third trimester and again at delivery.

The proportion of pregnant women screened late in pregnancy or at birth is not known but may be inadequate if providers have incomplete information on the maternal risk of syphilis (e.g. risk behaviors
are not endorsed by the patient, no information solicited about partner). In addition, while public health attempts to interview all patients with early syphilis, not all patients identify partners for public health to perform follow-up. Therefore, we propose to evaluate completeness of syphilis case identification among pregnant females and their infants by matching males identified by routine STD surveillance as infected with syphilis with the ‘father of infant’ field in the Minnesota Vital Statistics birth data for 2018 and 2019. All matching records for mother and infant will be reviewed to determine whether syphilis testing and treatment, if indicated, occurred and whether additional investigative steps are needed.

**Preparedness Role**

The Fellow will have the opportunity to participate in emergency preparedness exercises either at the state or local level. Additionally, the Fellow will serve as an additional resource for a Division-level outbreak response. In the past five years Minnesota has responded to Ebola, measles, acute flaccid myelitis, hepatitis A, and syphilis.

**Additional Activities**

Clusters and outbreaks of syphilis have occurred in various parts of Minnesota and it is not known how travel and overlapping social networks may play role in connecting geographically disparate clusters. We propose that the CSTE Fellow explore the application of social networking software and spatial analysis of syphilis case and contact data. This additional activity could involve discussing software options with other states or CDC and reviewing the benefits of each. A goal of this project would be to develop a recommendation for surveillance data analysis to better detect syphilis spread and outbreak-related syphilis cases.

**Mentors**

**Primary**
Jennifer Zipprich PhD, MPhil, MS
Epidemiology Supervisor

**Secondary**
Gina Liverseed DNP, MS, BS
HIV Nurse Specialist