Maternal and Child Health

North Carolina Division of Public Health, Women's and Children's Health Section

Raleigh, North Carolina

Assignment Description

The WCHS is one of seven sections/centers that compose the Division of Public Health (DPH) which is housed in the NC DHHS. The mission of DPH is to promote and contribute to the highest possible level of health for all North Carolinians. DPH partners with the state's 85 local health departments and with the other divisions within the NC DHHS including Medicaid, Mental Health/Developmental Disabilities/ Substance Abuse Services, and Social Services/Child Welfare programs.

The Fellow will be placed in the WCHS. The mission of the WCHS is to is to assure, promote and protect the health and development of families with emphasis on women, infants, children and youth. WCHS programs place a major emphasis on the provision of preventive health services beginning in the pre-pregnancy period and extending throughout childhood. The Section also administers several programs serving individuals who are developmentally disabled or chronically ill.

The NC Title V Maternal and Child Health Program is housed in the WCHS, and the WCHS Chief is responsible for administering both the Title V Program and the other federal and state programs located in the five Branches such as Title X (Family Planning); Vaccines for Children; Maternal, Infant, and Early Childhood Home Visiting Program; Management of Special Supplemental Nutrition Program for Women, Infants, and Children (WIC); Early Hearing Detection and Intervention Services; Newborn Screening Services; and Children and Youth with Special Health Care Needs. Through the Section Management Team weekly meetings, the Title V Director is updated on plans and activities of the Branches to work with partners. The weekly Division Management Team meetings provide an avenue for the Section Chief to partner with administrators of other programs and other programs within the NC DPH (e.g., chronic disease, vital records, injury prevention, etc.). The NC Association of Local Health Directors (NCALHD) meets monthly, and, on the day prior to each of these meetings, committee meetings (including the Maternal and Child Health Committee) are held which include staff members from WCHS and other DPH Sections which enable the Title V Program to work collaboratively with NCALHD on matters that pertain to all LHDs. WCHS staff members, particularly the Regional Nurse, Social Work, Immunization, and Nutrition Services Consultants, also visit the LHDs regularly to perform monitoring and consulting duties and to provide technical assistance.

Mentors will work with the Fellow to choose projects within the Maternal and Child Health program area which are of interest to the Fellow and which will help support the work of the WCHS. Being placed in the Section office, the Fellow will have opportunities to interact with program staff throughout the entire Section.

Day-to-Day Activities

Day to day activities of the Fellow will be tailored to the given project. In general, the Fellow will be responsible for understanding the current state of the literature, the public health relevance of the project, and the methodological approach required to inform public health initiatives. This will involve reviewing current publications and state level data, ascertaining data from appropriate sources, coding data, designing epidemiological studies, learning and implementing appropriate statistical analyses, and participating in section/branch/unit staff meetings. Initially, the Fellow will spend a large portion of time with both their Primary and Secondary Mentor with the goal for the fellow to work independently with other Section staff members. This will allow the fellow to gain a broader perspective of all Maternal and Child Health program areas.

Potential Projects

Surveillance Activity **Surveillance of Loss to Follow Up Children in the NC Early Hearing Detection and Intervention and Infant Toddler Programs**

This surveillance project activity will focus on evaluating loss to follow up as part of two programs: The Early Hearing Detection and Intervention Program (EHDI) and the North Carolina Infant Toddler Program (ITP).

Two to three infants per 1,000 live births in the United States are born with hearing loss and are at an increased risk for delays in speech, language, and social/emotional development. Early treatment of children with a hearing impairment is important to lessen the potential for development delay. The Centers for Disease Control and Prevention (CDC) established the Early Hearing Detection and Intervention Program (EHDI) to identify children with a diagnostic hearing loss by three months of age with subsequent enrollment into early intervention services by six months of age. Improvements have been made to increase the percentage of all live births that are screened, yet in NC, between 2011-2014, 30% of children who screened positive were loss to diagnostic follow up (LTF). This project will allow the fellow an opportunity to evaluate phenotypical patterns of both infant and maternal characteristics that were associated with lack of an audiological diagnostic evaluation and enrollment into early intervention services among those infants with an indication of hearing loss on the initial newborn screen. This work addresses the national performance measure of improving the percent of newborns who screen positive and have a timely follow up to definitive diagnosis and clinical management for conditions mandated by their state-sponsored newborn screening programs. Identifying clusters of where children are being LTF in North Carolina may help to focus public health interventions to improve the process of providing needed resources to families of children with hearing impairments.

The North Carolina ITP provides services to families and children from birth through age three who have special needs under Part C of the Individuals with Disabilities Education Act. Children in this program receive an Individualized Family Services Plan with family centered therapy through the age of three. Once the child reaches their third birthday, children transition into Part B under IDEA which provides services to school age children with a special need that impedes their educational performance. The Early Intervention Branch is currently creating a data sharing agreement with Part B to now track children as they transition from Part B to Part C services. The fellow will have the opportunity to evaluate the percentage of children with part C who qualify for part B and patterns of LTF between part B and part C services including how this may vary by the child's eligibility category.

The fellow will have the opportunity to use Classification and Regression Trees (CART) to evaluate how maternal, demographic, and health service characteristics are associated with LTF among children who screen positive for hearing loss and who transition from Part B to Part C services. Recursive partitioning is a non-parametric classification and regression tree method which is commonly used in clinical medicine and genetics. This approach analyzes large numbers of predictor variables and complex interactions to create regression trees. The method partitions the data into

subgroups which show the greatest homogeneity with respect to the outcome. The method is objective and data driven, therefore the groupings will be automatically generated by the software package. The subgroups are objective and mutually exclusive.

This project will require learning classification and regression tree analytical methods. There will also be the potential for collaboration with the NC State Center for Health Statistics to create geospatial mapping of LTF and distance to pediatric audiology providers across the state.

Surveillance Evaluation **Maternal Mortality Surveillance Evaluation**

Surveillance of pregnancy associated maternal deaths in North Carolina has changed since 2014. Prior to 2014, cases of maternal deaths were ascertained by death certificates, from the matching of livebirth to fetal death certificates, by hospital discharge diagnostic and procedure codes, and autopsies including investigative summaries from the medical examiner system. However, in 2014, due to underreporting of deaths in the National Vital Statistics System, a pregnancy check box was added to the death certificate indicating if the decedent was not pregnant within the past year, pregnant at the time of death, not pregnant-but pregnant within 42 days of death, not pregnant-but pregnant within 43 days to 1 year before death, or unknown if pregnant within the past year. In addition to the check box, in 2015, the state legislature passed HB 465 mandating review of pregnancy associated deaths by a pregnancy associated mortality review committee.

Currently cases are entered into the Maternal Mortality Review Application (MMRIA), yet the criteria for case entry has not been consistent over time in North Carolina nor nationally. The Centers for Disease Control and Prevention is currently working with states to standardize case ascertainment to include all pregnancy associated maternal deaths into MMRIA.

The fellow will have the opportunity to evaluate the methods of case ascertainment of pregnancy associated maternal deaths to understand how the changes in methods of ascertainment affect the prevalence rate over time. The fellow will conduct a sensitivity analysis predicting trends in the prevalence of maternal mortality using methods of ascertainment before and after the new additions in 2014. Moreover, the fellow will consider how these results compare nationally as well as implications for policy.

Major Project **Phenotypical Patterns and Temporal Trends in Health Disparities in Infant Mortality**

In 2015, North Carolina had the 7th highest infant mortality rate in the United States. The rate of infant deaths in North Carolina has declined by 22% since 1997, yet this decline has plateaued with little change since 2010. Despite the decline in the overall infant mortality rate, North Carolina continues to have a health disparity with African American infants having a two-fold increased risk of death within the first year of life. This disparity has remained relatively unchanged despite the decline in the overall mortality rate.

This project will focus on understanding the structure of risk factors associated with infant mortality to guide both public health and clinical interventions to narrow the disparity gap. The fellow will have the opportunity to work with two novel methods including classification and regression tree (CART) analysis as well as geospatial methods. CART analysis will be used to explore patterns of risk factors that are associated with the predicted probability of infant mortality. CART is a tree based method that is non-parametric. The data are partitioned into subgroups with homogenous responses with respect to the outcome. This method is data driven providing risk profiles based on infant and maternal characteristics associated with infant mortality considering both linear and non-linear relationships. The results of this method will provide risk profiles of the predicted probability of infant mortality given characteristics of the mother, infant, and environment. Potential data sources of data for this work include birth certificates, death certificates, hospital discharge data, and census data.

This project will also provide the fellow with the opportunity to employ spatial thinking in the context of Maternal and Child Health. The fellow will work with both the Primary Mentor as well as staff members from the NC State Center for Health Statistics to explore the use of geospatial methods such as geographically weighted regression. This work is based on the theory that the relationship between the disparity in infant mortality in North Carolina most likely varies by place and over time. Both individual levels measures (maternal age, maternal education, Medicaid status, maternal smoking, parity, and history of preterm birth) as well as area level factors associated with chronic stress (neighborhood deprivation index, percent of female headed households, % violent crime, proximity to major hospital systems, proximity to health food sources, and racism) may be considered when exploring this relationship.

This project will be guided methodologically by the current work of Michael Kramer at Emory University who specializes in spatial statistics and maternal and child health. The fellow will present the results of this work to program leaders and the section chief to discuss the context of these data for program planning and will help guide the work of the Perinatal Health Strategic Plan.

Preparedness Role

The WCHS works with the Office of Public Health Preparedness and Response and the Epidemiology Section as needed, and the Fellow will certainly have a chance to work on short-term projects with that office in the event of a natural disaster or communicable disease outbreak, including vaccine-preventable diseases. The NC Office on Disability and Health, which is located in the Children and Youth Branch, works hard to educate all families, but particularly those with children or youth with special health care needs, about the importance of emergency preparedness. As of June 30, 2017, all child care facilities in North Carolina must have one employee trained in emergency preparedness and have an emergency preparedness plan in place. The Fellow will be able to audit the Train the Trainer course on emergency preparedness as well as participate in an onsite training at a child care center. The Fellow could potentially also help evaluate the impact of these trainings and plans. Lastly, the Fellow will be trained on Incident Command using federal FEMA curriculum.

Additional Activities

The Fellow will be encouraged to participate in DPH's Epidemiology and Evaluation Team (EET) which meets monthly and holds an annual poster day. The primary purpose of the EET is to provide a forum for epidemiology and evaluation staff members to share works in progress in a friendly, respectful atmosphere and to obtain constructive feedback and assistance with project challenges. In addition, the Fellow will have opportunities to present their research findings at various state and national conferences, allowing them to improve their presentation skills.

Depending on the Fellow's interests, additional projects and activities within the WCHS might include:

Children and Youth

- Interpretation of the National Performance and Outcome Measures from the National Survey of Children's Health and use for program planning.
- Evaluation of the State Child Fatality Prevention Team policy recommendation scoring system.

Nutrition Services Branch

- Evaluation of the predictors of the decline in WIC enrollment in NC, particularly in the 1-5 year age group.
- Evaluation of breastfeeding initiation rates over time from the NC Birth Certificate.

Women's Health Branch

- Program evaluation, particularly around the Perinatal Health Strategic Plan.
- Health Equity Impact Assessment tool evaluation.

Immunization Branch

- Evaluation of NC Immunization Registry.

Early Intervention

• Evaluate Part C service utilization among children with a diagnostic hearing loss including if the child met IFSP goals, percentage of children who exited Part C before the age of three, and socioemotional development (COSF rating scale) at the time of exit from services.

Mentors

Primary	Stephanie Watkins PhD, MSPH, MSPT MCH Epidemiologist
Secondary	Kelly Kimple MD, MPH Section Chief