Assignment Description

The Fellow will be assigned to the Bureau of Infectious Disease Control and will be embedded with other staff epidemiologists. NH has a small but talented and enthusiastic infectious disease epidemiology team with whom the Fellow will collaborate. While epidemiology staff are assigned to programmatic areas for routine work (HIV, foodborne, vaccine preventable diseases, healthcare associated infections, etc.), when outbreaks or incidents occur, all staff epidemiologists are called upon to support the response. This inclusion will allow for a diverse training opportunity for the Fellow, who is expected to work on projects and outbreaks in all infectious disease program areas. The Fellow will have assigned projects to work on as described but will also be called upon to participate in outbreaks and other incidents as they arise. Due to New Hampshire’s small size, there is significant opportunity to be exposed to all areas of public health and the health department as a whole during the time period assigned to the agency.

Day-to-Day Activities

The Fellow will sit in the same work area as other infectious disease epidemiologists. Upon the Fellow’s initial arrival, they will spend time meeting with various programs within the Division of Public Health Services to learn about the work we do as well as look for partnership and collaborations, depending on the Fellow’s areas of interest. In general, the Fellow will likely spend much of their time working on data analysis and document and report creation as well as attending project-related meetings and performing outreach to stakeholders relevant to the Fellows projects. As a member of our Outbreak Team, the Fellow will attend weekly Outbreak Team meetings and conduct investigations (patient interviews, field work, site visits) as the need arises.

Potential Projects

Surveillance Activity  Tracking Changes in Antibiotic Resistance by Time and Geographic Location

Beginning in 2016, the New Hampshire Department of Health and Human Services, Division of Public Health Services began working with hospital laboratories around the state to collect microbiology laboratory reported antibiotic resistance data for various bacteria-antibiotic (bug-drug) combinations in order to combine the individual laboratory data into a single state-wide antibiogram (https://www.dhhs.nh.gov/dphs/cdcs/hai/publications.htm). The purpose of the state-wide antibiogram was to serve as a surveillance tool for tracking changes in resistance patterns over time, and also to utilize the data for clinical messaging to promote appropriate antibiotic prescribing (i.e. an antibiotic stewardship resource). We have now collected several years of data and need to develop a process for evaluating trends in antibiotic resistance over time and by geographic location. Using the last few years of data, the CSTE Applied Epidemiology Fellow (Fellow) will review the data and help to:
• Develop a quality assurance process for evaluating changes in antibiotic resistance patterns for each bug-drug combination with each new year’s collection of data.
• Identify antibiotic resistance threats of both public health and clinical import and use the last few years of data to begin looking for changes in antibiotic resistance patterns over time.
• Evaluate for differences in antibiotic resistance patterns by sub-state geographic areas (e.g. county, hospital service area, etc.).

This work will help to establish our ability to use the state-wide antibiogram data to more effectively conduct antibiotic resistance surveillance over time and by geography. As part of this work, the Fellow will have the opportunity to exercise leadership skills and engage with external stakeholders through our Antimicrobial Resistance Advisory Workgroup

**Surveillance Evaluation**

**Evaluating Reporting of New Diagnoses of Hepatitis C Virus (HCV) Infection**

In 2016, New Hampshire became the last state in the country to make hepatitis C virus (HCV) infection reportable to public health. In order to be able to manage the volume of reports, and to identify potential recent infection of HCV from injection drug use requiring public health investigation, only new diagnoses of HCV infection were mandated to be reported to public health from providers only (i.e. no laboratory reporting because the laboratory is unable to identify new vs. old infection). The CSTE Applied Epidemiology Fellow (Fellow) will use CDC’s Updated Guidelines for Evaluating Public Health Surveillance Systems to assess surveillance system attributes, including simplicity, flexibility, data quality, acceptability, sensitivity, predictive value positive, representativeness, timeliness, and stability. In particular, the Fellow will focus on evaluating the completeness of the new HCV reporting process by identifying areas with disproportionately high or low reporting and will help to assess barriers to reporting in order to provide recommendations for how to improve HCV reporting (including both potential policy changes, but also identify ways to facilitate provider reporting).

**Major Project**

**Implementing Antibiotic Stewardship at Points of Outpatient Triage**

The CSTE Applied Epidemiology Fellow (Fellow) will begin by performing a literature review to identify existing evidence-based best practices and tools for appropriate outpatient antibiotic prescribing (esp. for respiratory tract infections). From this literature search, the Fellow will help create (with clinical support) an outpatient antibiotic stewardship (AS) toolkit that includes: 1) a phone algorithm decision tree to assist in recommending an outpatient visit, empiric antibiotics or watchful waiting; 2) standard recommendations with a communication aide for comfort measures to alleviate symptoms of a viral illness; 3) the most recent statewide antibiogram with clinical summary/recommendations for use of antibiotics are determined to be necessary by a healthcare provider; 4) readily available clinical support; and 5) summary documentation of recommendations for inclusion in a patient’s medical record.

While helping to develop an AS toolkit, the Fellow will also work with our State Antibiotic Resistance Advisory Workgroup (a multidisciplinary work-group of human and veterinary medicine clinicians, pharmacists, nurses, infection preventionists and other public health stakeholders) to identify outpatient health care facilities with stewardship programs that would be willing to pilot the AS toolkit. The Fellow will work with a select few facilities and AS leads/champions to collect and report outpatient
antibiotic prescriptions for respiratory infections on a routine bases both prior to implementation of the AS toolkit and for a period of time after to assess impact of the AS toolkit on outpatient antibiotic prescribing for respiratory infections. We will compare outpatient antibiotic prescribing before-and-after AS toolkit implementation at each facility and also potentially compare to facilities that are able to track outpatient antibiotic prescribing but did not implement the AS toolkit (as a control against seasonal variation in antibiotic prescribing). We will also evaluate triage nurse and primary care provider knowledge, attitudes and beliefs and we will provide opportunity for feedback on the toolkit with suggestions for improvement. We will also attempt to measure patient satisfaction and outcome measures.

If time and ability permit, the Fellow will also work with our Division of Medicaid Services to evaluate outpatient antibiotic prescriptions for respiratory illnesses using our All-payer Claims Database (APCD) to evaluate for the ability of the APCD to track outpatient antibiotic prescribing compared with facility level data (sensitivity analysis). This work will not only help develop resources for implementation of antibiotic stewardship initiatives but will also further public health’s ability to track/measure outpatient antibiotic prescribing by facility and enhance our ability to utilize the APCD.

In summary, this project presents the Fellow with opportunities to take leadership of implementing a new public health program that is driven by epidemiologic data, gain experience in program evaluation to assess the effectiveness and impact of the program, and conduct analysis of all-payer claims data.

**Major Project  Tracking Inpatient Antibiotic Usage at Acute Care Hospitals**

With the development of our state-wide antibiogram, we have the ability to track antibiotic resistance trends throughout the state; however, we would like to be able to also track antibiotic use to evaluate if changes in antibiotic use or prescribing are impacting antibiotic resistance. New Hampshire has 26 acute care hospitals, and half are critical-access hospitals with limited resources to be able to implement the NHSN Antibiotic Use Module to assist with antibiotic use measurement and tracking. The Applied CSTE Epi Fellow (Fellow) will identify and work with a select number of hospitals based on our pre-established relationships through our State Antibiotic Resistance Advisory Workgroup and hospital antibiotic stewardship leadership networks to identify facilities that are able to consistently track days of therapy for select antibiotics administered in inpatient settings. The Fellow will evaluate hospital ability to track and report antibiotic use for local and state level coordinated antibiotic stewardship initiatives. The Fellow will also help develop a plan with the hospital antibiotic stewardship leads for use and dissemination of antibiotic use findings. This work will serve as a pilot and it is anticipated that this work will help demonstrate the usefulness of being able to monitor facility-level antibiotic use data in order to implement facility level stewardship efforts. The outcome of this project can then be used to work with other hospitals (esp. critical access hospitals) to help evaluate their ability to monitor antibiotic use data or bring on third-party vendor systems to begin reporting into the NHSN AU module.

**Surveillance Activity  Mapping School Vaccination Rates to Assess Hot-Spots of Low Vaccination Rates**

New Hampshire law allows for public health to require childhood vaccination for child-care or school entry. New Hampshire does not have a philosophical exemption but does have both a medical and religious exemption. The CSTE Applied Epi Fellow (Fellow) can help to evaluate school vaccination rates geographically to identify hot-spots of low vaccination rates (by vaccine) to inform potential outbreak
response and proactively perform community and school outreach to these communities. The Fellow will also help to evaluate for differences in vaccination rates by exemption (medical vs. religious) and potentially collect additional information from schools to inform our pro-vaccination efforts. There is also the opportunity to assess adolescent vaccination rates throughout the state (e.g. meningococcal, HPV, TDap).

**Preparedness Role**

As a member of the Outbreak Team, the Fellow will attend weekly Outbreak Team meetings and participate in and eventually lead outbreak investigations. Outbreak investigation would include developing hypotheses, selecting investigation methods, making investigatory site visits, developing survey instruments, administering surveys to patients, creating a data entry database, analyzing survey data, drafting the final outbreak report, and sharing results and recommendations to stakeholders. The Fellow will be offered Incident Command System training as it is available (on-line and in-person) and will be invited to observe and participate in Incident Management Team activations for public health incidents in order to become familiar with incident command and the phases of activation, response, demobilization, and recovery. The Fellow will be invited to quarterly meetings of the team of employees funded under the Public Health Emergency Preparedness grant to work on Capability 13 (Surveillance and Epidemiology).

**Additional Activities**

Our Hospital Associated Infections (HAI) program is active in pursuing new and innovative solutions to prevent antibiotic resistance and promote coordinated antibiotic stewardship efforts through public health. As part of our strategy, we have been hosting an annual Antimicrobial Stewardship Symposium which brings together One Health stakeholders, including clinicians in human medicine, veterinary medicine, and environmental health. This symposium is intended to focus on local New Hampshire antibiotic stewardship work and promote discussion and sharing of ideas. The CSTE Applied Epi Fellow will participate in planning and implementing our annual symposium.

**Mentors**

**Primary**  
Benjamin Chan MD, MPH  
State Epidemiologist

**Secondary**  
Elizabeth Daly DrPH(c), MPH  
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