Host site: Hawaii State Department of Health Disease Outbreak Control Division

Assignment Location: Honolulu, HI

Primary Mentor: Jonathan Johnson, Bachelor’s in Computer Science

Secondary Mentor: Hua He, Ph.D in Economics

Agency Description:

The mission of the Department of Health is to protect and improve the health and environment for all people in Hawai‘i. HDOH supports a diverse multicultural workforce that reflects the community, promotes equal opportunity at all levels, and creates an inclusive work environment, free from discrimination. The Disease Outbreak Control Division (DOCD), managed by the State Epidemiologist, is comprised of the Disease Investigation and Immunization Branches. DOCD leads the coordination and management of infectious disease and other outbreak or cluster investigations statewide. DOCD also plays a leading role in data modernization for HDOH. Our Data Science team has expanded in recent years with support from the Center for Disease Control and Prevention Epidemiology and Laboratory Capacity cooperative agreement, and seeks to promote interoperability, standardization of data elements, and a data-driven culture within our organization.

The purpose of interoperability in relation to HDOH is to further create seamless workflows between teams that might appear to be outwardly disparate in function. During our ever-current push towards data modernization, data flow becomes the bridge between all aspects of both health systems and informatic data systems. It is with this understanding that a large component of collaboration is based in creating a more encompassing understanding of role and group interactions. This continues to provide us the means to establish standardization where necessary as a base groundwork, while tackling unique issues inherent to specific arenas that might challenge only specific groups and/or teams within the DOCD. The purpose of this approach is to fashion the ability to move swiftly in assessment of future crises as they occur, while maintaining long-term support for other critical workflows.

Current events have also shown the necessity to reach out, even more than before, to community organizations to deal in collaborative approaches. This also pushes the DOCD to think in new and more inclusive ways about which how we involve communal systems. This has and will continue to manifest itself centered around cultivating collaborations with universities across the state but also independent entities such as the Hawaii Data Collective. Following lessons learned through the COVID-19 pandemic, we hope to explore other ways of engaging the larger community in conversations about data modernization, such as through townhalls for interested parties outside of the Hawaii State Department of Health.
**Assignment Description:**

This fellowship will be within the Disease Outbreak Control Division (DOCD). There the fellow will be working in tandem with our Electronic Lab Reporting (ELR) Team, which contains IT Specialists, Informatic Epidemiologists and Data Specialists. The ELR Team is directly responsible for the complete electronic disease data ingestion from labs for the State of Hawaii. In addition to ingesting data, they also work to clean, validate and perform analysis on data via their data lake and integration engine. A secondary role of the ELR Team is supporting the Data Team in data retrieval amongst other data specific tasks. This means the fellowship will also be in concert with the Data Team, which houses a Biostatistician, Epidemiologists and works primarily in data analysis as it relates to surveillance as well as data visualization for both internal and outwardly facing data dashboards. The fellow will also work in other areas as interoperability dictates. The fellow may also work with the Hawaii Immunization Registry (HIR) and the data systems inherent therein.

The expected day-to-day activities would be centered around developing streamlined processes for data retrieval and analysis between teams. Working primarily with the DOCD Data Team to understand their workflows, generating reports and analysis using programs such as SAS, an analytics software and R code. Fellows will also support our Electronic Case Reporting (eCR) and Syndromic Surveillance teams in a limited capacity.

**Preferred Background & Skills:**

The fellow will be expected to have a competent understanding of data science in a broad sense. As there are many new systems in place or being updated, the primary goal will be developing an initial understanding of how these systems interplay as well as extracting data insights from a wealth of information received through multiple channels. This can include the marrying of data sets in addition to providing actionable insights from the data retrieved.

**What can the fellow expect to gain from 2 years at this host site?**

We expect that over the course of the fellowship, that they have garnered skills centered around interoperability, especially as it relates to inter-team dependence. A more encompassing understandings of both the strengths and challenges a State entity may have regarding data collection, retrieval and analysis as well as significant actionable growth in these areas. The fellow will be able to move dynamically between multiple systems and ascertain points of failure as well as high-level expectations and minimum standards across data systems. This will also include key understandings of data visualization, accuracy and validity.

**Potential Projects include:**
Host sites have listed up to 5 projects

Project 1: Electronic Test Order and Results (ETOR) Assessment Tool for Public Health Laboratories

Final roll-out of the ETORs System and Integration into current Electronic Lab Reporting Standards. The fellow will work from a conceptual level to implementation, both within HDOH and with iConnect (ETORs Vendor). Replacing the current Influenza and Sexually Transmitted Disease (STD) portals. This will require specific coordination of the fellow between HDOH and iConnect. Communication will involve weekly meetings identifying the needs of the HDOH and conveying these concepts to iConnect, which will then update specifications explicitly. The fellow will be responsible for creating testing documentation, inclusive of feature validation, and distributing the information to the rest of the ETORs Teams.

Currently the State Lab Division (SLD) transference of laboratory test data that is received from outside organizations (providers, etc.) goes through a complex data transport process. This is characterized by multiple translations of said data as well as transports among often redundant routes to maintain data integrity. The dissolution of this former process in favor of utilizing the ETORs platform, is the ability to streamline not only the way SLD receives and sends data but removing unique specifics to data conversion allowing a wider range of data received. This will be most obviously seen in widening the scope of ingested data such as the inclusion of clinical information not specific to laboratory testing across all interconnected data platforms. In a general sense, the way surveillance systems used to capture data relied on two different methodologies. Previously, surveillance systems would ingest data through data routes and rely on physical or mechanical conversions to import clinical data. ETORs allows for the combination of these two steps through a simplified and direct process. This also means in the future data expansions are more readily achieved cutting down on onboarding time and providing access to growth.

Project 2: MMG (Message Mapping Guides) Cohort Onboarding of Production Messages

Streamline current approach for implementation as well as helping various disease teams create self-sustaining methodologies for future MMG Reporting. Work with multiple teams to understand their specific needs regarding MMG reportables. Assist with coordination of efforts for matching implementation spread sheets. Validating implementation spreadsheets for the ELR Team in relation to development and programming. Confirm development validation messages are accurate with expected testing results. Ensure production validation messages are received to CDC, by ensuring Maven’s ability to send and confirm receipt of data.

MMGs are utilized in the National Notifiable Disease Surveillance System (NNDSS) as reported to the CDC. As such they are a major part of interjurisdictional surveillance and are a necessity to reporting. Keeping this program up to standard, as well as interoperable, is in accordance with CDC messaging for standardization and analysis. This provides more accurate information on prospective disease impact as it relates to real-time analysis. This is especially important for monitoring disease trends as they pertain to specific populations within jurisdiction.
Project 3: Epidemiological Data Approach to Hawaii Electronic Disease Surveillance System (HI-EDSS) 
Whole-Genome-Sequencing (WGS) Data Automation

Build a denormalized database in HI-combine which includes administrative, demographic, and clinical variables. Extract whole-genome-sequencing antibody(ab) test data from the State Laboratory Division’s dashboard site. Merge the above by either person identifier or encounter identifier. Using SAS to clean the merged data and generate whole-genome-sequencing statistics.

Hawai`i is a major travel destination. Many of the visitors arrive from overseas increasing the possibility that variants present overseas may be introduced into Hawai`i. Whole-genome sequencing (WGS) has become an essential tool for public health surveillance and molecular epidemiology of infectious diseases. Data automation of Hawaii Electronic Disease Surveillance System (HI-EDSS) and Whole-Genome-Sequencing(WGS) Data will enable Hawaii to detect mutations quickly to prevent the spread of new strain types and track the transmission routes of the virus globally.

Project 4: Advancing health equity through FHIR

The APHIF would work with the electronic case reporting (eCR) team to explore implementation of FHIR detailed race/ethnicity codes for standardized collection of disaggregated race/ethnicity from electronic health records.

The COVID-19 pandemic has underscored pre-existing disparities in access to care and health literacy among various racial and ethnic groups in Hawaii. The pandemic has highlighted the critical need to collect accurate and timely information on race/ethnicity, disaggregated to a level that defines meaningful and discreet cultural experiences within the state. HDOH published an MMWR in February of 2021 that illustrated how aggregate reporting of “Native Hawaiian and Pacific Islander” categories based on established national reporting requirements obscured important differential disease trends occurring among specific pacific islander populations. HDOH is committed to setting a statewide standard for collection of disaggregated race/ethnicity, and recognizes the crucial role of implementing standardized and interoperable processes to capture high quality race/ethnicity data at the time of medical encounter. Collection of high quality data is the first step in providing evidence of inequities and understanding how to better address them.

Additional information about the placement:

The state of Hawaii offers a unique and diverse living environment and community. Outdoor enthusiasts, ocean lovers, hikers, gardeners will all find plenty to occupy their non-working hours. We strongly encourage a healthy work-life balance and have many team members happy to make introductions to a wide array of favorite hobbies and activities.