Host site: WA State Department of Health Office of Innovation & Technology

Assignment Location: Tumwater, WA

**Primary Mentor:** Bryant Thomas Karras, MD Biomedical Engineering (University of California San Diego), Medicine and Internal Medicine (University of Wisconsin) and Medical Informatics (Yale)

**Secondary Mentor:** Chris Baumgartner, BS, Computer Engineering (University of Idaho)

**Agency Description:**

Washington State Department of Health programs and services help prevent illness and injury, promote healthy places to live and work, provide information to help people make good health decisions and ensure our state is prepared for emergencies. To accomplish all of these, we collaborate with many partners every day. We help ensure a safer and healthier Washington by: working to improve health through disease and injury prevention, immunization, and newborn screening, providing health and safety information, education and training so people can make healthy choices, promoting a health and wellness system where we live, learn, work, play and worship, addressing environmental health hazards associated with drinking water, food, air quality and pesticide exposure, and protecting you and your family by licensing healthcare professionals, investigating disease outbreaks and preparing for emergencies.

Our agency has centralized services under the Secretary’s office for many things like: information technology, budget, contracts, grants, human resources and facilities. Most of the programmatic work is performed in our four divisions: Environmental Public Health, Health System Quality Assurance, Prevention and Community Health and Disease Control and Health Statistics.

Our agency mission is equity and optimal health for all. Our mission is “The Department of Health works with others to protect and improve the health of all people in Washington state.” Our values are:

**Human-centered:** We see others as people who matter like we do and take into account their needs, challenges, contributions, and objectives.

**Equity:** We are committed to fairness and justice to ensure access to services, programs, opportunities, and information for all.

**Collaboration:** We seek partnership and collaboration to maximize our collective impact. We cannot achieve our vision alone.

**Seven Generations:** Inspired by Native American culture, we seek wisdom from those who came before us to ensure our current work protects those who will come after us.

**Excellence:** We strive to demonstrate best practices, high performance, and compelling value in our work every day.
Our current agency strategic plan focuses our leadership’s intention on the following transformational areas: outward mindset; funding; data, information, and technology innovations; and equity, diversity, and inclusion.

Assignment Description:

For the last twenty one years, Washington State and DOH have been leaders in the field of Public Health Informatics (PHI), providing contributions to the Council of State and Territorial Epidemiologists (CSTE) Surveillance and Informatics Committee, Association of State and Territorial Officials (ASTHO) eHealth Informatics Policy Committee, and CDC’s Public Health Informatics Competencies. We are well positioned to provide a fellow with a broad range of informatics experiences along with connections to many national experts in their field.

We currently plan to place the fellow in the reformed Informatics Program at the agency level (new Office of Innovation and Technology). This office helps coordinate data, informatics, innovation and technology across the agency. The vision of the office is to exemplify a culture of curiosity that fuels a passion for innovation, critical thinking and data driven decisions to make health a reality for all Washingtonians. This vantage point will allow the fellow to be involved with not only DMI activities that impact the entire agency but to also participate in projects within our divisions.

On a day-to-day basis we see the fellow shadowing mentors in DMI and other strategic meetings. Regular 1 on 1s each week will be provided to ensure projects are on track, to answer questions, to ensure resources are provided and to remove any barriers possible that the fellow may be experiencing. Other day to day activities will be participating directly in the projects we have identified for the fellow to be involved with.

Preferred Background & Skills:

For the projects we have identified our preferred background and skill would be: HL7 experience, REDCap, R/Python, Microsoft Azure Cloud Analytic Tools, Power BI, Tableau, Rhapsody, experience with vital statistics data, electronic lab and case reporting and use of disease surveillance systems.

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

We envision the following: how to automate data extracts from public health registries into cloud environments and to automate dashboard updates in Tableau or Power BI; how to FHIR-enable an existing public health registry, how to partner with local health partners to develop tools or reports to meet their needs; how to integrate eCR data into a disease surveillance system; and How to create/maintain eCR dashboards for data quality.

Potential Projects include:

Host sites have listed up to 5 projects
Project 1: Integration of Electronic Case Reports into Disease Surveillance Systems

This project’s goals is to fully integrate electronic case reports into the primary disease surveillance system at WA DOH (Maven). The deliverables include: working with the eCR team to implement core data elements into Maven; building out data quality dashboards using Power BI to assist in onboarding healthcare organization; assessing interoperability for case reports between our case investigation system and Sara Alert (https://saraalert.org/); assessing the integration of data from REDCap Survey tools into case records; and to assess the capabilities to leverage EMSA/Epitrax as a possible replacement for Maven.

Case reports have the ability to not only provide much better demographic and medical information for case investigation and surveillance (health equity) but to fill in missing gaps where electronic lab reporting does not identify a case for public health investigation. This project should greatly enhance WA DOH’s ability to support our LHJ and Tribal partners in preventing and controlling disease outbreaks and in better surveillance via the additional data available. It also provides more timely data from our clinics and hospitals vs. faxing case reports.

Project 2: Communicating Wastewater-Based Epidemiology to Stakeholders; Visual Presentation Of SARS-Cov-2 Enumeration to Allow Disease Studies and Response

This project supports the new Washington State DOH Wastewater-Based Epidemiology (WAWBE) program, monitoring for SARS-CoV-2 and other public health concerns through wastewater. The project’s goals is to integrate wastewater disease monitoring results, electronic case reports, and other pertinent COVID-19 disease data into an online dashboard for participating counties, tribes, and local health jurisdictions. The role of the fellow will be to lead the effort to develop a dashboard that will be used by DOH and local health jurisdictions participating in the program. Although initial efforts focus on COVID-19, the program is expected to expand to other public health concerns including enteric viruses and multiple drug resistant organisms (MDROs). The deliverables include:

1) working with the WAWBE team to identify key data elements and informatics as public health response tools using detection in wastewater

2) leading the development of visual presentation of data;

3) working with local health jurisdictions to identify data they require for disease study and response; and

4) building out data presentation dashboards using Tableau (leveraging the current WA Tracking Network - https://www.doh.wa.gov/DataandStatisticalReports/WashingtonTrackingNetworkWTN), Power BI, or R.

Wastewater disease monitoring (WDM) supplements clinical testing for understanding disease spread in a community. Since WDM relies on wastewater (and everybody “poops”) it can be particularly helpful for communities where access to testing is limited, or in communities reluctant to engage in government-sponsored programs for testing. Substantial work over the course of the COVID-19 pandemic has established similar trends in case counts and SARS-CoV-2 concentrations in wastewater; this project will advance the work of understanding how to use the data to study the disease spread in
communities and develop robust communication and response tools. As home testing for COVID-19 increases, WDM becomes more important for understanding the true prevalence of disease in a community. This project should greatly enhance WA DOH’s ability to support our LHJ and Tribal partners in monitoring disease prevalence in underserved communities, communicating public health messages to local health officers and the community, and preventing or controlling disease outbreaks.

Project 3: Leveraging COVID Negative Labs for Smart Health Cards

The goal of this project is to work with our Data Science Support Unit (DSSU) to pull negative lab results from our disease surveillance suite into our cloud infrastructure to support our WA-Verify Initiative (https://waverify.doh.wa.gov/). This is a FHIR based HL7 SMART Health Card app that allows an individual to port a QR Code with their COVID Vaccine verification information onto their smartphone. This in turn allows an individual to show proof of vaccination for travel, events or other activities that require such proof. A next phase of the project is to also allow the same HL7 SMART Health Card to show a recent (72 hours or less) negative lab result for the patient. The goal is to leverage data bricks in Azure for creating a transactional data lake for this purpose.

With Omicron posing a new threat the state may need to take additional measures to control the spread of COVID. Negative test results in a HL7 SMART Health Card can allow critical events and travel to occur while minimizing the spread of disease. It provides an interoperable, patient-focused way to empower individuals to share their vaccine and lab results for important events or travel.

Project 4: FHIR-enabling a Vital Statistics System

There are currently two Implementation Guides (IGs) for FHIR based transfer of 1) Birth and Fetal Death Reporting and 2) Death Reporting. Currently, Washington DOH’s Center for Health Statistics (CHS) delivers this information to CDC/NCHS in a fixed width file format. This project will describe how the extract, transform, and load (ETL) process will need to change in order to implement a FHIR-based transfer of data. For this project, the fellow will 1) Identify what data elements are extracted from the Washington Health and Life Events System (WHALES) database 2) Describe how these data elements are transformed for the current transfer process 3) Identify any additional data transformations that may be required to comply with the new FHIR IG’s 4) assist in developing test records to be used in the development/testing of a FHIR transfer. This is a requirement for WA DOH under the ELC DMI Tier 3 Grant from CDC.

FHIR-enabling our reporting to the NVSS will ensure crucial information for national surveillance is delivered in a more timely, efficient manner with better data quality by leveraging the newest version of HL7 – FHIR. This work will also allow WA DOH to assess beginning to accept this data from hospitals via FHIR and the HIE. This would be a huge benefit in collecting the data for WA DOH and reduce the burden on clinical partners who currently enter the information twice (once in their EMR and once into the WA DOH system).

Project 5: Automating the Collection of Situational Awareness Data from Hospitals

Currently vital information from hospitals regarding their ability to respond to pandemics (bed availability, PPE, active cases, etc…) has to be manually entered by staff into a system maintained by the state. In WA State this system is called WA-Health (https://www.doh.wa.gov/ForPublicHealthandHealthcareProviders/WAHealth) and is built on the
Microsoft Dynamics Platform. To enable better interoperability, WA DOH would like to be able to automate this using the new FHIR IG for this called SANER (https://build.fhir.org/ig/HL7/fhir-saner/). The informatics fellow will read through and understand the documentation related with current WA Health infrastructure as well as the SANER Implementation Guide. He/she will participate in creating the business requirements for automation of WA Health via SANER. This will include the analysis of the current data stream design and identification of the steps required for switching from the current Phase 1 plan of transforming a FHIR bundle into Comma Separated Value (CSV) format to a FHIR native database and dashboard. They will have meetings with the WA Health Business Analyst and IT support to understand the implications of the ‘upgrade’ in terms of Level of Effort (LOE) and document them.

Expected outputs will be: layout of existing WA Health system components i.e. data input, process and output; mention the components and processes being added in Phase 1; write up of a comparative analysis of Phase 1 processes with Phase 2 plan under the following headings: Strengths, weaknesses, opportunities and threats; improving data automation for this vital information with at least 1 healthcare organization; and helping WA DOH demo our work at HIMSS - https://www.himss.org/global-conference.

Additional information about the placement:

We have strong ties with the University of Washington’s School of Public Health in Departments of Epidemiology and Environmental Health Sciences, and with the UW School of Medicine’s Department of Biomedical and Health Informatics for many of our current and future projects. The applicant will be able to take advantage of these partners expertise, experience for personal growth as well as assistance with many of these projects. WA DOH is currently working remotely and may still be due to the pandemic. The applicant should anticipate needing to work remotely from their home. WA DOH will ship all the equipment needed for their assignment and software needed for virtual work.