

# Building a More Diverse Public Health Informatics Workforce: Preliminary Results

Susan H FENTON<sup>a,1</sup> and Gabriela MUSTATA WILSON<sup>b</sup>

<sup>a</sup>*The University of Texas Health Science Center at Houston, Houston, Texas, USA*

<sup>b</sup>*Multi-Interprofessional Center for Health Informatics, The University of Texas at Arlington, Arlington, TX, USA*

ORCID ID: Susan H. Fenton <https://orcid.org/0000-0003-2943-311X>, Gabriela Mustata Wilson <https://orcid.org/0000-0003-3090-9242>

**Abstract.** The US public health infrastructure has been historically underfunded, a condition that was exacerbated by the COVID-19 pandemic. This was especially noted in the area of public health informatics. It was also acknowledged that the lack of a diverse public health workforce made it more difficult to address biases and disparities effectively. In 2021 the Office of the National Coordinator awarded \$73 million to 10 awardees to develop public health informatics and technology (PHIT) workforce training. The Gaining Equity in Training for Public Health Informatics and Technology (GET PHIT) award utilizes various methods to train and engage minority and underserved populations in the field of public health informatics. Evaluations of the bootcamps and internships to date have shown generally positive results, both in terms of skills acquired and overall experiences. These results indicate that integrating the fields of public health and data science in non-degree, short-term experiences can have positive outcomes.

**Keywords.** Public health informatics, workforce development, diversity

## 1. Introduction

According to a recent study conducted by the Yale Global Health Justice Partnership, significant investments are needed urgently and immediately to repair the underfunded public health infrastructure in the United States, which was further eroded by the COVID-19 pandemic [1]. The availability of a skilled workforce is critical to facilitating the implementation and support of modernized public health infrastructure and needed to support public health systems and offices at the local, state, federal, and global levels. The current public health workforce is not fully prepared to build and support a more robust public health infrastructure with data and technology to adequately respond to public health crises and address racial/ethnic health inequities.

Studies on the many health workforce disciplines report that 30-70 percent lack adequate training and background to fully use and engage with digital technology and information [2,3]. Without a well-trained and diverse public health informatics workforce, we lack the ability to use the data to create more timely and actionable intelligence. We risk perpetuating biases and disparities by misinterpreting data and misusing technologies. As a result, the US Department of Health and Human Services

---

<sup>1</sup> Corresponding Author: Susan Fenton, email: [susan.h.fenton@uth.tmc.edu](mailto:susan.h.fenton@uth.tmc.edu); Tel: +1-210-332-3525.

(HHS) Office of the National Coordinator for Health Information Technology (ONC) in September 2021 awarded \$73 million in cooperative agreements as part of its Public Health Informatics & Technology Workforce Development Program (PHIT Workforce Program). Funded through the American Rescue Plan, the program aims to strengthen US public health information technology (IT) efforts, improve COVID-19 data collection, and increase the representation of underrepresented communities within the public health IT workforce. The University of Texas Health Science Center at Houston (UTHealth-Houston) is leading the Gaining Equity in Training for Public Health Informatics and Technology (GET PHIT) Consortium, one of the ten consortiums funded through the ONC to improve public health information technology and COVID-19 data gathering and to increase representation among underrepresented groups in the public health IT workforce.

The GET PHIT Consortium is training a minimum of 1,400 students predominantly (greater than 75%) from underrepresented groups and 500 public health, clinic, and academic professionals while placing 400 students in internships. The GET PHIT Consortium includes Huston-Tillotson University (Historically Black College or University (HBCU)); Prairie View A&M University (HBCU); Texas A&M International University (Hispanic-Serving Institution (HSI)); Texas Tech University Health Science Center; The University of Texas at Arlington (HSI); The University of Texas at El Paso (HSI); The University of Texas Permian Basin (HSI); and The University of Texas Rio Grande Valley (HSI). GET PHIT is committed to the sustainability of the curriculum, utilizing commonly available and open-source tools and publicly available datasets for all hands-on training activities. GET PHIT is developing a competency-based curriculum in 16 different topic areas, requested by consortium members. The GET PHIT Consortium has already begun delivering the training with a combination of intensive bootcamps and integration into the existing curriculum of members. The professional development is available at no cost, on-demand, online, until September 2025. A needs assessment at 10 public health agencies in the state of Texas informed the professional development. Students from participating institutions apply for and are accepted to internships each semester after confirmation that they have completed training.

## **2. Methods**

The GET PHIT Consortium developed the bootcamp curriculum collaboratively. The high-level topics included an Introduction to Public Health Informatics, Epidemiology, Privacy & Security, Public Health Analytics, Surveillance, Health Data Science, Health Equity, Racism & Bias in Data Use, as well as Bias in Machine Learning and Artificial Intelligence. The 2-week face-to-face bootcamps were held at undergraduate institutions, using a learning management system (LMS) for the materials and exercises. The 8-week online bootcamp was managed entirely on the LMS. Two instructional developers supported the creation and management of the LMS. At the end of each session, a survey was sent out to students to gather feedback on the experience. The team analyzed survey data to assess the effectiveness and identify improvement areas for the future.

### 3. Results

#### 3.1 Bootcamp

In the summer of 2022, the GET PHIT Consortium delivered 3 in-person, 2-week bootcamps and 1 8-week virtual bootcamp to a total of 95 participants.

The demographics were as follows:

- Race
  - African-American: 22.1%
  - White: 73.7%
  - Am Indian/Alaska Native: 1%
  - Asian: 3.2%
- Ethnicity
  - Hispanic: 73.7% (95.7% of Whites)
  - Non-Hispanic: 26.2%
- Gender
  - Male: 28.4%
  - Female: 69.5%
  - Non-binary 2.1%

A majority (52.6%) are the first in their family to go to college, and 68.4% are the first in their family to work in health care. Thirty-five point eight percent (35.8%) were juniors in college, followed by senior (27.4%), sophomore (16.8%), freshman (8.4%), and other (11.6%).

An abbreviated summary of the bootcamp evaluations were extremely positive as detailed in Table 1. When asked whether they would recommend this course to others, 98.9% indicated it was “somewhat or very likely,” while only 1.1% responded “not likely.”

**Table 1.** Abbreviated summary of GET PHIT bootcamp evaluations in percentages.

Item	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
Understand subject matter	47.4	47.4	4.2	--	1.0
Enhanced PHI knowledge	50.5	46.3	1.1	2.1	--
Acquired tangible work skills	40.0	51.6	5.3	1.0	2.1
Helped develop professional skills	42.1	50.5	5.3	--	2.1
Modules on race & ethnicity were culturally competent	46.3	46.3	6.3	--	1.1

Comments included:

- “One of the best learning experiences of my life.”
- “I enjoyed every bit of the bootcamp.”
- “I feel I learned new things I can take with me to the future.”
- “I enjoyed this bootcamp as it equipped me with communication, teamwork and technical skills.”

To track the impact of the bootcamp over time, we are collecting data 3 months after the bootcamp and 6 months after the bootcamp. So far, 35, or 36.8%, of the participants have responded. We asked them about their adoption of the skills and competencies included in the bootcamp. The results are in Table 2.

**Table 2.** Three-month post bootcamp evaluation of skill/competency preparedness in percentages.\*

Skill/competency	Extremely well	Very well	Moderately well	Not well at all
Informatics skills	20.0	34.3	28.6	2.9
Critical thinking	20.0	37.1	25.7	2.9
Verbal comm skills	22.9	34.4	17.1	11.4
Professional competence	28.6	31.4	25.7	--

\*May not total 100% due to missing responses

### Internship Evaluation

The demographic data for the 29 interns are as follows:

- Race
  - African-American: 17%
  - Am Indian/Alaskan Native: 3.5%
  - Asian/Pacific Islander: 28%
  - Bi/Multi-Racial: 7%
  - Mestizo: 3.5%
  - White: 41%
- Ethnicity
  - Hispanic/Latino: 28%
  - Non-Hispanic: 72%
- Gender
  - Female: 83%
  - Male: 17%
- First-Generation College Student
  - No 69%
  - Yes 31%
- Student Classification
  - Graduate level:100%
  - Undergraduate level: 0%

A total of 24 students participated in the summer internship evaluation by completing a pre and post survey. Over 50% of students reported that the internship experience met their expectations and rated their overall experience as either very good or excellent. Over 50% of students reported an increase in their informatics competency level and indicated to be at a moderate level following their internship experience. Over 40% of students reporting an increase in their workforce preparedness and indicated to be somewhat prepared following their internship experience. Over 50% of students developed the following skills during their internship experience:

- Principles and Strategy (54%) - Applying informatics principles and strategic thinking to public health information needs, ensuring organizational strategic alignment.
- Project Management (67%): Practicing project management techniques to engage stakeholders and achieve needs and expectations.
- Communication (71%): Practicing active, effective communication between IT, public health, and other relevant stakeholders.
- Analysis, Visualization, and Reporting (75%): Translating data to information and knowledge that leads to action.

A total of 15 host sites also participated in the summer internship evaluation by completing a post survey. Over 90% of host sites rated their intern's performance as very good or excellent. Sixty percent of host sites reported students' workforce preparedness as very prepared and their competency level as moderate following the internship experience. Based on their experience with the students, over 80% of host sites indicated that they were either likely or very likely to offer them a position.

Comments from interns and host sites included:

- "I loved the internship experience. It was a unique experience that really helped me understand public health departments and how they operate"
- "AXXXXX created a wonderful manual of procedures for our wastewater surveillance pilot project, which is being used this fall by a new intern and a Fellow to learn how to perform weekly surveillance updates"
- "CXXXXX was a valuable asset to the THCIC team. She participated in weekly team meetings and added critical insight and opinion for someone who was brand new to our process."

#### **4. Discussion**

Public health workers, social workers, healthcare administrators, nurses, and computer science graduates need additional analytical training specific to healthcare data that is in-depth. Such training is not currently part of the typical curricula of public health, social work, healthcare administration, nursing, and computer science programs. Although the health informatics field of study existed before the current pandemic, public health informatics training is in its infancy, with very limited training available. Through interactions with public health departments across the state and the US, it is evident that the current public health workforce is not fully prepared to build and support a more robust public health infrastructure with data and technology that allows us adequately to respond to public health crises and address racial and ethnic health inequities, as well as large population health data sets to improve and support public health efforts.

#### **5. Conclusions**

The GET PHIT Consortium is a clear example of how to successfully connect public health and data science educational programs to data analytics to improve public health services regionally, state-wide, nationally, and globally.

#### **References**

- [1] Eger W, Herman D, House M, Robinson L, Williams C. Confronting a Legacy of Scarcity: A Plan for America's Re-investment in Public Health. Yale Global Health Justice Partnership. 2021. Available from: [https://law.yale.edu/sites/default/files/area/center/ghjp/documents/publichealthfunding\\_final\\_6.7.21.pdf](https://law.yale.edu/sites/default/files/area/center/ghjp/documents/publichealthfunding_final_6.7.21.pdf)
- [2] Public Health Informatics Institute. Defining Public Health Informatics. PHII. [cited 2022 Nov 27]. Available from: <https://phii.org/how-we-do-it/defining-public-health-informatics/>
- [3] The MITRE Corporation. A National Strategy for Digital Health [Internet]. MITRE. 2022 [cited 2022 Nov 27]. Available from: <https://www.mitre.org/news-insights/publication/national-strategy-digital-health>