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ROLE OF THE PUBLIC HEALTH LABORATORY

When considering health, typically it is examined from an individual perspective. Public health, however, is a profession dedicated to the prevention of disease within a population. At its core, public health is a science grounded in social justice to solve problems and helps others, not just locally, but globally. By preventing disease in a population, public health practice ensures not only the promotion of health for an individual, but also health protection within a community, the places where citizens live, learn, work, or play (American Public Health Association, 2021). Public health practice is a multidisciplinary profession that ranges from delivering health education to conducting research to public health laboratory science, all while emphasizing prevention strategies to the greatest extent possible. Additional benefits include, but are not limited to: improved quality of life and improved economic outcomes.

Public health laboratories are critical for public health practice, generating data and providing services that are used to assure health in a population. The Association of Public Health Laboratories (APHL) defines the 11 core functions of a public health laboratory (APHL, 2014). Some routine functions include surveillance, specialized testing and laboratory improvement. Other important functions are more nebulous. Examples include policy development, research, training and education. The functions of a public health laboratory are diverse, as are the laboratories that perform them. However, there are some infrastructure needs that are universal and present opportunities to strengthen public health labs and subsequently the public health system overall. This statement will briefly review recruitment and retention of a

diverse, qualified public health workforce as well as data modernization opportunities. Both address current needs and prepare a public health laboratory for future practice.

RECRUITMENT AND RETENTION OF A DIVERSE, QUALIFIED WORKFORCE

APHL'S 2018 Workforce Survey Report reviews the status of the public health laboratory workforce. While it investigates the demographics of the current workforce, it further delves into tenure, leadership, salaries, job satisfaction and the reasons why employees intend to leave or plan to remain in the field (APHL, 2018). A few key findings are presented here. The demographics of the workforce indicate that most employees (77%) are Caucasian and female; yet, men employed in this setting possess higher salaries and employees of Hispanic descent make substantially less money than their Caucasian counterparts. These statistics highlight a need to increase the employment of males and people of color, while also concentrating on equitable compensation when stratified by gender, ethnicity and in some cases job role and education. The survey respondents expressed a high level of job satisfaction dependent upon the role of their job and also job security, while a large number employees were dissatisfied with compensation (APHL, 2018).

The survey confirmed weaknesses related to attrition and projected that 16-25% of the workforce may leave, impacting the ability of public health laboratories to address core functions and fulfill their missions. One factor affecting attrition was an aging workforce. Additionally, intent to leave within five years was associated with dissatisfaction and pay. Regardless of the reason for leaving, the largest percentages of those leaving were employees near retirement and employees classified as millennials. Attrition due to retirement can be alleviated by effective succession planning and training new laboratorians that are primed to resume the responsibilities of those who exit the profession. There is further opportunity to attempt to retain personnel with

fewer years of experience by addressing the reasons for attrition in this particular age group – job satisfaction, compensation, job security. More education was also positively correlated with increased pay and increased pay positively linked to job satisfaction (APHL, 2018).

There are strategies that can be used to address some of the weaknesses discussed above. A bulleted list of suggestions follows.

- Funding education in technical or non-technical specialties that is relevant to public health laboratory practice is one way to address the issues. This could be accomplished by funding schools to create programs or providing financial assistance (i.e. scholarships, grants, reimbursements) to students who matriculate in applicable courses of study. A review of nationwide collegiate programs with programs in public health laboratory science found that options are few. There were no programs at the baccalaureate level. There were only three graduate-level and one post baccalaureate certificate programs identified countrywide, and one was no longer accepting applications.
- Another way to address attrition is to promote development of online education, certification or training programs to address the needs of mid-career professionals desirous of additional skill building that may be used to attain promotion and increased pay.
- Laws could be established that would support the recruitment of a diverse workforce and incentivize laboratories or other businesses that successfully accomplish the task.
- Mandating increased research and data analytics to forecast the gaps in the public health laboratory workforce over the next 5-10 years would combat attrition.
- Finally the establishment of a task force of subject matter experts in public health laboratory science, economics, statistics, civil engineering, etc. that review workforce

research findings and propose activities to address any identified gaps would help the public health community better understand the issue of attrition .

DATA MODERINIZATION IN A PUBLIC HEALTH LABORATORY

Previous data management strategies no longer effectively address the expanding needs of public health laboratories. Therefore, it is imperative to transition from historical ways of collecting, managing and analyzing data to more innovative and modern technological applications (NTT Data, 2015). The challenges are numerous and are described below. One weakness is that antiquated systems are unable to effectively manage the demands of modern data applications. Such applications include mobile computing options, cloud-based computing, and the storage, management and analysis of big data sets (NTT Data, 2015).

A current example to demonstrate the need can be found in the ongoing COVID-19 pandemic, where the urgency for genetic sequencing and variant analysis is limited in the public health laboratory setting. Experts agree that sequencing technology and data analysis are needed to support more prompt disease detection and outbreak identification. Both of these activities assist with addressing emergent disease more promptly to promote the health of a population (ASM & APHL, n.d.). Since there are limitations associated with next generation sequencing capabilities (i.e. lack of equipment, inability to store large data sets or store them at a realistic cost, lack of bioinformatics), public health laboratories have been forced to establish public-private partnerships to address the gaps. These collaborations are beneficial, but they also can be challenging due to competing priorities between public health and private industry. The best course of action is to equip public health laboratories with fiscal, physical and human resources to accomplish sequencing and analysis independently and without the need for these partnerships. It should also be noted that a number of public health laboratories are unable to

establish these partnerships at all. The reasons are varied and exceed what can realistically be covered within this written statement. In March of 2020, DCLS became the **third state** public health laboratory in the United States capable of sequencing the virus that causes COVID-19. There are **110 public health laboratories** (federal, state, territorial and local public health laboratories) in the United States (APHL, n.d.). These counts show that in March of 2020, **3%** of all public health laboratories in the country were capable of the performing the advanced molecular detection tests needed to combat COVID-19.

Antiquated data management systems must be replaced. While an option exists to potentially update legacy data systems to immediately address the needs of public health laboratories, it is not advised because it is not a long-term solution. As legacy systems become obsolete, maintenance expenses increase. The increased expense results from a number of factors. There are fewer professionals with the experience to adequately provide ongoing support for aging information systems (NTT Data, 2015). Since the demand for the service is low, the cost of the service increases. Fewer professionals to support the legacy system may also result in slower modifications that require increased effort. The paradox is that the increased cost to support an antiquated system actually drives data modernization aggressively forward (NTT Data, 2015). Stated differently, holding on to an antiquated system actually widens the information technology gap, making the goal of data modernization more difficult to achieve over time. Eventually, vendors will no longer support an older data system, forcing public health laboratories to transition immediately to an upgraded option, likely resulting in business disruption and unplanned expenditures.

Effective, incrementally-staged modernization efforts have a number of implicit benefits to public health laboratory practice and patient outcomes. Laboratories remain adaptable and

needed technology updates are easier, more rapidly completed and less costly, leading to increased business productivity (NTT Data, 2015) by freeing time for new projects. Modernized data capability supports improved and more rapid public health reporting and monitoring, fewer errors, and reduced paperwork by way of electronic medical records or electronic result reporting (ONC, 2019), supporting mandates of the Paperwork Reduction Act (OIRA, n.d.).

CONCLUSION

Public health laboratories provide critical testing services. While the needs of these laboratories are many, this statement outlines two that require immediate intervention. First, the recruitment and retention of a diverse, qualified workforce to alleviate attrition due to retirement or resignation ensures that knowledge not only enters the field but also remains here. Also, productivity and performance are amplified when the workforce is composed of diverse talent. Secondly, data modernization is a mainstay of every business model and public health laboratory practice is no exception. The previous discussion supports data modernization as a crucial component to support productivity, flexibility/adaptability, and scalability within a public health laboratory setting, ultimately fostering health promotion and protection.

Stable funding, or decreased funding, as seen in recent years, does not effectively support the progressive needs of public health laboratories. Decreased funding is not frequently accompanied by a reduction in public health laboratory services. Likewise, it is not uncommon for funding to remain stable but the demands on the laboratory to increase, recognizing that stable funding over time is equivalent to decreasing funding since there will always be inflation of supplies, reagents and equipment combined with cost of living increases for personnel. Large influxes of fiscal resources to respond to a crisis are immensely helpful, but yearly intentional

evaluation of appropriations to a public health laboratories is preferred to allow a staged, well-defined approach to laboratory improvement.

Financial returns on investments in public health potentially can be significant. The World Health Organization researched the cost-benefit of investing in public health and found that quick returns (one to two years) are possible when investments to services that address social determinants of health and laboratory screening are made. Your willingness to consider public health infrastructure needs during this hearing represents an opportunity to improve the interconnected and equitable health outcomes for all citizens in the United States.

I would be remiss if I did not thank you for the unparalleled support for public health laboratories in two critical areas. Because of your efforts, the CDC data modernization initiative has now received $600 million of the $1 billion recommended level, and significant progress is being made. Also, the federal fiscal year 2021 appropriations bill passed by the House included, for the first time ever, $1 billion for improvements to state and local public health laboratories. Had those funds been included in the final appropriations, I would be able to report on improvements underway. For now, I will just say we remain hopeful that the funding can be provided in the next fiscal year and I can return to detail those improvements. In the meantime, thank you for your strong expression of support.

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