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PUBLIC HEALTH LABORATORY FACILITY NEEDS

The COVID-19 pandemic heightened an already existing and significant vulnerability of public health laboratories to carry out their mission. With the unimaginable volume of testing required in the pandemic, public health laboratories adapted to high-throughput testing with sustained levels for over two years, while also maintaining a diverse and complex level of other essential services.[1] Because of this added pressure, the condition issues and space constraints of many public health laboratory facilities have become mission critical, and major renovations or the construction of new facilities are now urgently necessary.

A laboratory scientist conducts testing at the Virginia Division of Consolidated Laboratory Services, the state's public health laboratory. (Photo: APHL, 2019)

FACILITY NEEDS

Long-term underfunding of the public health infrastructure has resulted in facilities that are obsolete at best, and unsafe at worst. Many public health laboratories were designed and constructed in the middle of the last century and are in dire need of replacement. A survey of 72 laboratory directors performed by APHL in 2021 summarizes the critical state of their facilities with 68% that need either new construction or expansion/modernization, with some public health laboratories needing both to accommodate principal and regional laboratory facilities. The average age of the principal laboratory was 28 years, 36 years and 48 years, for state, territorial and local public health laboratories, respectively. Of those surveyed, only 25% of these laboratories were built within the past fifteen years, while some date back as far as 1948 and even further to 1932.

These historical structures—designed before computers were widespread and essential for the support of sophisticated instruments—are impossible or prohibitively expensive to support IT networks. They do not have the air handling capacity, critical laboratory design or security infrastructure required for safe handling of many pathogens and dangerous toxins. This lack of infrastructure puts laboratory scientists at risk as well as exposing the surrounding community to the potential release of public health threats. In addition, the facility limitations reduce the ability of the laboratories to perform some of the more sensitive analytical techniques, and are prohibitive to advance workforce training and development. Of those laboratories surveyed, 54% also need new or updated security systems and 78% need investment in new capital equipment* to replace aging instrumentation and outdated technology.

Age of Principal Public Health Laboratory (PHL) Building in Years

	Max	Min	Avg
State PHLs, including DC	73	1	28
Territorial PHLs	51	16	36
Local PHLs	89	7	48

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RECOMMENDATIONS

- **Provide $4.5 billion for new construction and expansion/modernization of current laboratory space and $65 million in annual maintenance.** Laboratory design must ensure the safety of scientists performing the work and multilayered systems must exist to prevent community release of public health threats. To meet on-going demands, sufficient space must be available to support expansion of testing capacity when needed for pandemics or outbreaks, and laboratory space must be flexible to allow adaptation for use with multiple technological platforms and changing workflows. Annual maintenance is required to ensure integrity, safety and security, and maximize efficiency.

- **Assure critical and essential laboratory services[1] with $150 million in new capital equipment* and $25 million for annual replacement.** Provide $14 million in new equipment maintenance/service contracts and $42 million in annual renewals. The ability for public health laboratories to rapidly detect, monitor, control and prevent diseases of public health significance is not only dependent on a diverse and skilled workforce, but also in ready access to sophisticated emerging technologies. Rapidly adding sensitive molecular assays for novel pathogens, adapting to high throughput and employing methods such as whole genome sequencing requires sophisticated equipment and instrumentation, with controlled environmental conditions to meet sensitivity and specificity requirements. Service contracts are also needed to support essential maintenance and repairs to extend the life of equipment.

- **Provide $6 million for new and updated security of laboratory facilities with $2 million in annual maintenance.** Security systems must accommodate known and recognized threats, through use of physical, electronic, operational and information security.[2] The use of physical barriers, controlled access, alarms, video surveillance and authorization procedures are needed, often with redundancy. These measures assure the safety of laboratory scientists and the protection of facilities, reagents and supplies, computers and equipment, and control of biological, chemical and radiological samples.

1 US Centers for Disease Control and Prevention. 10 Essential Public Health Services. 2021. Access from: https://www.cdc.gov/publichealthgateway/publichealthservices/essentialhealthservices.html

2 National Research Council. Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards: Updated Version. Chapter 10 Laboratory Security. 2011. Access from: https://www.ncbi.nlm.nih.gov/books/NBK55881/

* Capital equipment is defined as non-disposable property with a cost of $5,000 or more.

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