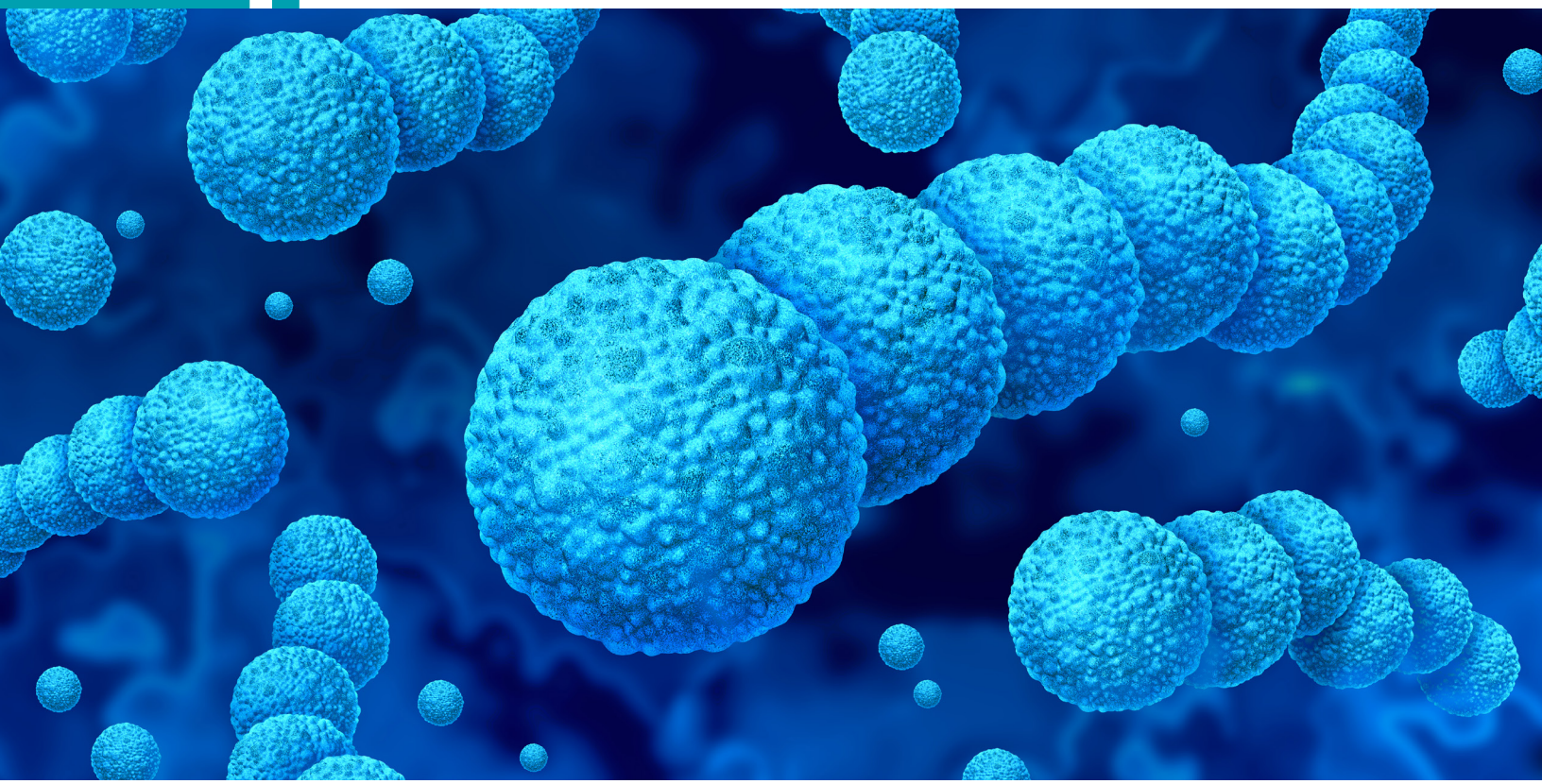
2023 Invasive Group A *Streptococcus* Laboratory Testing Survey Report



JUNE 2024

APHL ASSOCIATION OF PUBLIC HEALTH LABORATORIES®

Contents

BACKGROUND AND PURPOSE

Group A *Streptococcus* (GAS) bacteria are commonly found in the throat and on the skin, often causing mild infections like strep throat and impetigo. However, in some cases, GAS bacteria can invade other parts of the body such as the blood, deep muscle, fat tissue and lungs. Invasive GAS (iGAS) can lead to severe and potentially life-threatening conditions, such as cellulitis, pneumonia, necrotizing fasciitis and Streptococcal Toxic Shock Syndrome (STSS).

The US Centers for Disease Control and Prevention (CDC) reports that in the United States, there are approximately 14,000 to 25,000 cases of iGAS disease each year, resulting in 1,500 to 2,300 annual deaths. CDC closely monitors these infections through Active Bacterial Core (ABC) surveillance, involving ten state health departments and laboratories to identify and report cases. Currently, only STSS is nationally reportable, but healthcare providers and laboratories are encouraged to report all iGAS cases to the appropriate health departments, which then report them to CDC through the National Notifiable Diseases Surveillance System.

There are a variety of laboratory methods used for identification and characterization of GAS, including bacteriology, antimicrobial susceptibility testing (AST), PCR for species identification, toxin testing or *emm* typing and next generation sequencing (NGS). The M protein, encoded by the *emm* gene, is a major GAS virulence factor and determining the *emm* type of iGAS isolates can aid epidemiological and outbreak investigations.

This survey aimed to assess the landscape of iGAS testing and characterization at public health laboratories in the US and gather relevant information regarding GAS testing and training needs.

METHODOLOGY

Sample

A total of 112 APHL member laboratories—56 state or territorial laboratories and 56 local laboratories—were invited to participate in this survey. For the purposes of this report, state and territorial public health laboratories will be referred to as “state” public health laboratories. This category includes all 50 states and the District of Columbia, as well as Guam, Northern Mariana Islands, Puerto Rico, American Samoa and the US Virgin Islands.

Survey Development and Administration

This survey was launched via email on July 25, 2023 to the directors of APHL member laboratories. Reminders were emailed to non-respondents on August 14 and 21, 2023 and included a second relevant contact within the laboratory (i.e., microbiology supervisors). The survey was programmed using Qualtrics and data was collected from July 25 through August 25, 2023.

RESULTS

Overall, 54 public health laboratories (48.2%, n=112) completed the survey, including 41 state and 13 local laboratories. State public health laboratories had a higher response rate (73%) compared to local public health laboratories (23%).

GAS Testing Methods

All respondents were requested to report the testing methods they currently use for GAS and were able to select multiple methods (**Figure 1**).

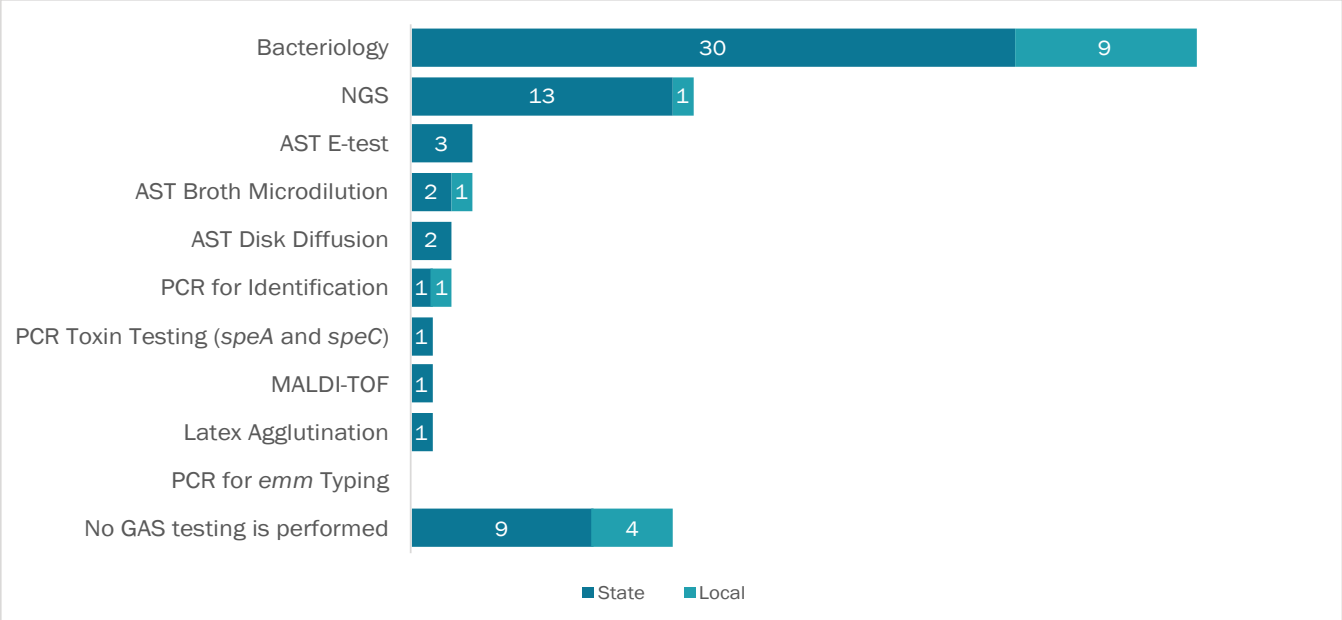
Forty-one (75.9%) respondents currently conduct at least one test method for GAS. The most commonly reported method, performed by 39 public health laboratories (95%), was bacteriology (i.e., culture, species ID, etc.) followed by NGS which was performed by 14 laboratories (34.1%). Other methods performed by public health laboratories included:

- Six (14.6%) public health laboratories conduct AST, some of which use multiple AST methods.
- PCR for identification by two responding laboratories (4.9%).
- PCR toxin testing for *speA* and *speC* genes, as well as serogrouping by latex agglutination and MALDI-TOF by one responding laboratory each.

No respondents were performing PCR *emm* typing.

Thirteen (24.1%) respondents reported that they are not performing any GAS testing. Of those, six do not receive any specimens or isolates for streptococcal testing, two refer specimens to the CDC Streptococcus Laboratory, two refer specimens to another public health laboratory, two forward specimens to a commercial laboratory and one does not perform routine testing but could perform culture if requested.

Figure 1. Types of GAS Testing Currently Performed (n=54, 79 responses)

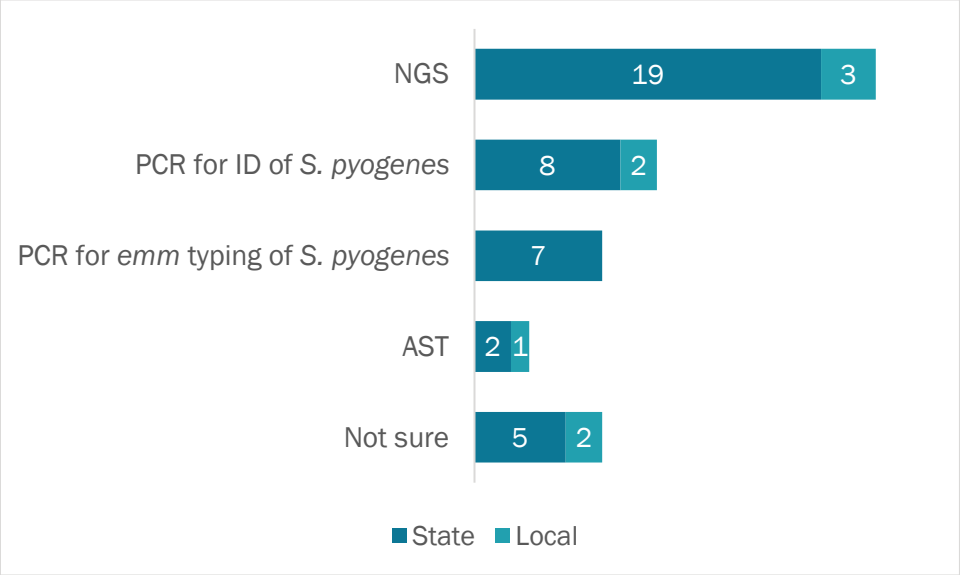


Expanding GAS Testing Capability

To gain a better understanding of the future direction public health laboratories are considering with regards to GAS testing, respondents were asked to indicate whether they were interested (41%, 22/54), unsure (24.1%, 13/54) or not interested (35.2%, 19/54) in expanding their GAS testing capabilities at this time (**Figure 2**).

The 35 respondents that were interested in or unsure of implementing or expanding testing for GAS also indicated which methods they were interested in bringing on or expanding. Laboratories were able to select more than one method and there was a total of 49 responses. The most common test method PHLs were interested in was NGS (63%) followed by PCR for identification (28.5%) and PCR for emm typing (20%). Three (8.6%) public health laboratories were interested in bringing on or expanding AST and seven (20%) were not sure what testing method they would want to implement.

Figure 2. Types of GAS Testing That Laboratories are Interested in Implementing (n=35, 49 responses)



iGAS Investigations

Twenty-seven (50%) public health laboratories indicated that they participate in iGAS investigations through testing and/or consultation, although some reported that only healthcare associated infection (HAI) iGAS cases are fully investigated (**Table 1**). Of the laboratories that responded "No," some indicated that they had not been asked to participate in iGAS outbreak investigations in the recent past but were prepared to assist as needed. Additionally, one laboratory that does not routinely participate in investigations has assisted the state epidemiologist to coordinate testing at local facilities and has provided collection supplies to facilities.

Table 1. Participation in iGAS Investigations

	Total (n=54) n (%)	State (n=41) n (%)	Local (n=13 n (%)
Yes	27 (50.0%)	25 (61.0%)	2 (15.4%)
No	27 (50.0%)	16 (39.0%)	11 (84.6%)

Among the 27 public health laboratories that participate in iGAS investigations, 12 reported conducting iGAS investigations in 2022, with the number of investigations ranging from 1-20. Eight laboratories did not conduct any investigations in 2022 and seven were unsure how many investigations had been conducted (**Figure 3**).

Of the laboratories that reported actively participating in investigations in 2022 or were unsure how many investigations they participated in, 18 (17 state, 1 local) reported receiving and testing iGAS isolates in 2022. The number of isolates tested ranged from 3-1,000 (**Figure 4**). Many respondents remarked that the number of investigations and isolates tested appeared to be higher in 2023 as compared to 2022.

Figure 3. Number of iGAS Investigations Conducted in 2022

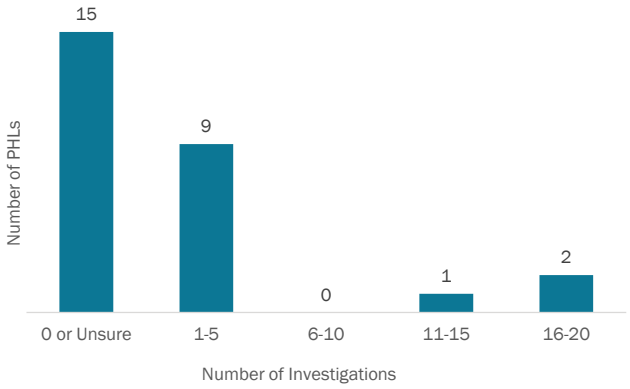
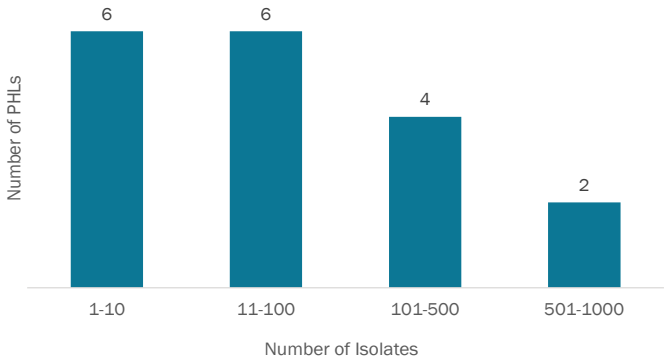


Figure 4. Number of GAS Isolates Tested in 2022



CONCLUSIONS

The laboratory testing landscape for GAS varies widely in terms of current testing capabilities, number of investigations performed and number of isolates tested. Among the public health laboratories that responded, 75.9% currently perform any type of GAS testing and 41% were interested in implementing or expanding GAS testing capability. Of the potential expansions or implementations of testing there was strong interest in NGS testing methods which may reflect of the current funding landscape with many public health laboratories receiving funding for advanced molecular detection.

While this survey only asked about data from 2022, a number of respondents reported anecdotally that they have had an increase in the number of iGAS investigations they have participated in and/or an increase in isolate submission in 2023. Given these anecdotal increases and the interest in implementing or expanding GAS testing, APHL and CDC will use this survey data to explore additional assistance that can be provided to assist public health laboratories achieve their testing and public health objectives.

Association of Public Health Laboratories

The Association of Public Health Laboratories (APHL) works to strengthen laboratory systems serving the public's health in the US and globally. APHL's member laboratories protect the public's health by monitoring and detecting infectious and foodborne diseases, environmental contaminants, terrorist agents, genetic disorders in newborns and other diverse health threats.

This project was 100% funded with federal funds from a federal program of $130,000. This publication was supported by Cooperative Agreement # NU60OE000104 from the US Centers for Disease Control and Prevention (CDC). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of CDC.

7700 Wisconsin Avenue, Suite 1000
Bethesda, MD 20814

Phone: 240.485.2745

Fax: 240.485.2700

www.aphl.org