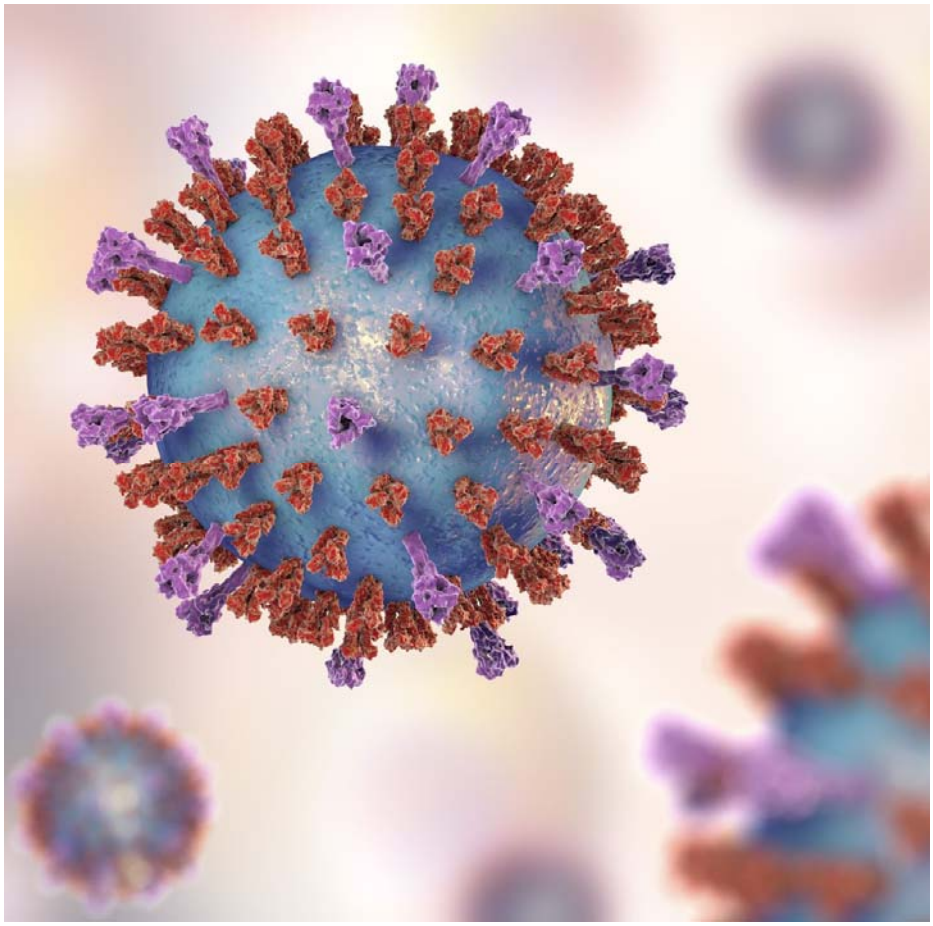
Wisconsin State Laboratory of Hygiene
UNIVERSITY OF WISCONSIN–MADISON

Laboratory-Based Surveillance Plan 2024-2025



Surveillance program overviews, submission instructions and 2023-24 data summaries

Welcome to the 2024-25 Season!

Thank you for participating in laboratory-based surveillance in Wisconsin! The participation of clinical laboratories across the state has helped Wisconsin develop one of the most robust surveillance networks in the country!

Supplies for collecting and shipping surveillance specimens, transport to the WSLH, and testing of surveillance specimens is available at **NO COST** when you send specimens using Purple Mountain Solutions. This booklet contains detailed information about the submission of clinical laboratory data and specimens for surveillance.

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Updates for the 2024-25 Season

Table 1. Updates to Data and Specimen Submission Requests for the 2024-25 Season

Pathogen	Surveillance Type	What is Requested
Updated Requests		
Clostridioides difficile	Data	Number tested and number positive (pg 4)
Legionella species	Specimens—Respiratory Pathogens	• Sputum or BAL from Urine Antigen positive patients (NOT URINE) • Isolates (pg 12)
***Cronobacter* spp.**	Specimens - Invasive Pathogens	Isolates from infants <12mo (pg 22)
Enterovirus	Specimens - Invasive Pathogens	All enterovirus positive CSF specimens (pg 22)
Streptococcus pneumoniae	Specimens- Invasive Pathogens	Change in isolate submission requirements and testing. (pg 21)
Blastomyces	Specimens- Invasive Pathogens	Species Identification. (pg 22)
No Longer Requested		
Aeromonas species	Specimens - Enteric Pathogens	Isolates or stools
Plesiomonas shigelloides	Specimens - Enteric Pathogens	Isolates or stools

Biosafety Considerations

<u>Evaluate biosafety at your testing site using a risk assessment</u>:

Review your testing practices and lab environment and consider performing a risk assessment to minimize potential staff exposures when performing testing.

- Use personal protective equipment (e.g. safety glasses, gloves, lab coat)
- An online laboratory risk assessment tool is available here: www.cdc.gov/safelabs/resources-tools/biosafety-resources-and-tools.html

Laboratory Testing Data Submissions

In collaboration with other public health partners, the WSLH has developed data-driven statewide respiratory and gastrointestinal pathogen surveillance programs in Wisconsin. Weekly reporting of diagnostic testing data to WSLH is important so that public health partners know what communicable diseases are impacting community health in Wisconsin.

Wisconsin Respiratory Surveillance Program:

The aim of this program is to gain situational awareness of the respiratory pathogens circulating in Wisconsin, including geographic spread and positivity rates. **All Sites** in Wisconsin performing PCR/molecular and/or antigen testing for respiratory pathogens are asked to submit their testing data on a **weekly basis** (number tested, number positive) **all year round**. Refer to Table 2 for a list of pathogens for which testing data is requested.

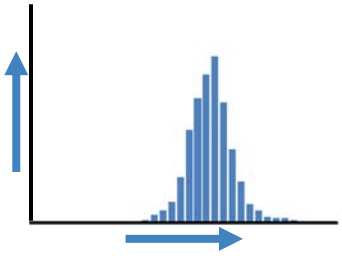
Wisconsin Acute Diarrheal Illness Surveillance Program:

The aim of this program is to gain awareness of the gastrointestinal pathogens effecting community health in Wisconsin. The WSLH requests that clinical labs submit gastropathogen PCR testing data for bacterial, parasitic and viral pathogens on a **weekly basis** (number tested, number positive), **all year round**. Refer to Table 2 for a list of pathogens for which testing data is requested.

Why Submit Data?

To determine geographic spread:

Testing numbers from around the state are broken down by region to monitor trends for respiratory pathogens in each part of the state. Regional graphs are updated weekly and can be found on the WSLH website.
www.slh.wisc.edu/wcln-surveillance/surveillance/virology-surveillance/



To provide situational awareness:

Testing data is used to determine when the season begins, peaks and ends for a variety of pathogens. The data can be used to identify outbreaks, detect an issue with test methods, inform medical provider differential diagnosis, and inform clinical lab staffing needs for seasonal and outbreak testing. Graphs of surveillance data are updated weekly and can be found on the WSLH website.
www.slh.wisc.edu/wcln-surveillance/surveillance/

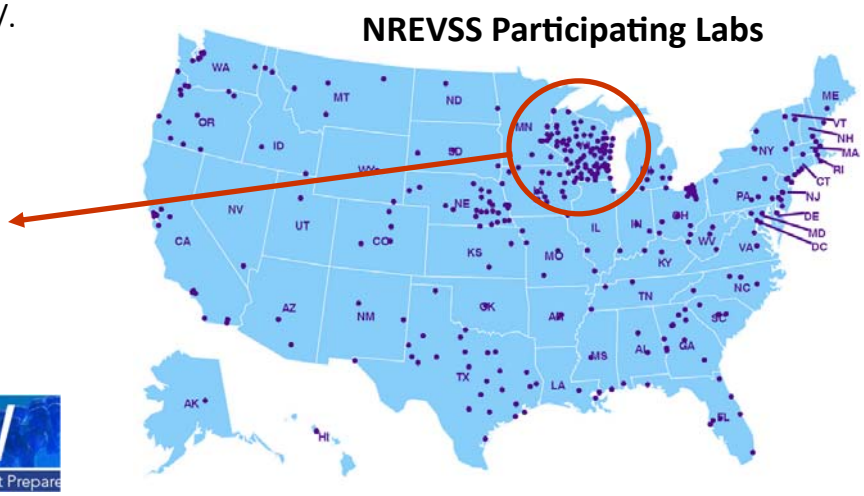
Why Submit Data?

To participate in the National Respiratory and Enteric Virus Surveillance System (NREVSS)

WSLH collates all testing data collected from Wisconsin and submits it to NREVSS on a weekly basis. NREVSS is a laboratory-based system that monitors temporal and geographic circulation of a variety of viral pathogens. NREVSS data can be viewed on the CDC website at: www.cdc.gov/surveillance/nrevss/.

NREVSS Participating Labs

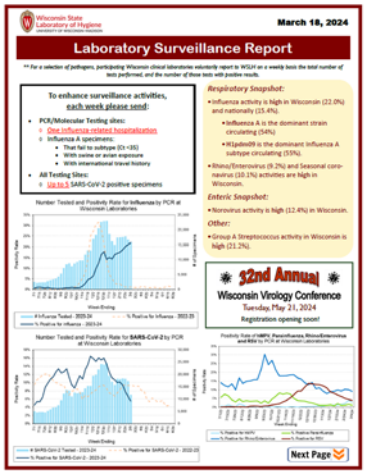
Wisconsin leads the country for the number of labs participating in surveillance activities.



To participate in national influenza surveillance:

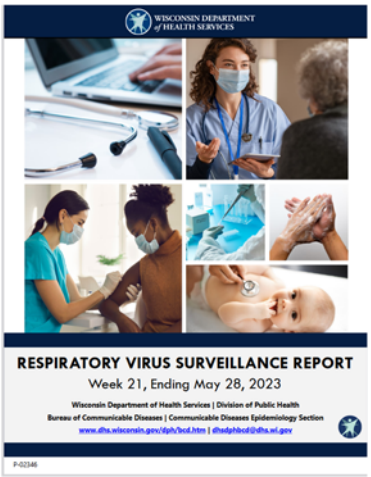
PCR/molecular and antigenic testing data for influenza is submitted to the CDC for inclusion into the national influenza surveillance program. Influenza data can be found on CDC's FLUVIEW website at: https://www.cdc.gov/flu/weekly/index.htm.

Wisconsin Surveillance Data Distribution:



WSLH Website:
Aggregate data for a variety of pathogens can be found on the WSLH website at: www.slh.wisc.edu/wcln-surveillance/surveillance/

WSLH Bi-Weekly Surveillance Report:
The WSLH aggregates all respiratory and enteric pathogen data and provides summary reports in the bi-weekly Laboratory Surveillance Report, which is distributed to over 600 recipients across the state. Email WCLN@slh.wisc.edu to sign up for this report.



WDHS Respiratory Report and Dashboard
A data summary of respiratory pathogens is also sent to the Wisconsin Department of Health Services for inclusion into their **Weekly Respiratory Report** and their interactive **Respiratory Illness Dashboard.** These can be found on the WDHS website.
www.dhs.wisconsin.gov/disease/respiratory-data.htm

Data Submission Requests

The WSLH requests that **all clinical labs** in Wisconsin performing PCR/molecular and/or rapid antigen testing for the following bacterial, parasitic and viral pathogens submit testing data (number tested and number positive) on a **weekly basis, all year round**.

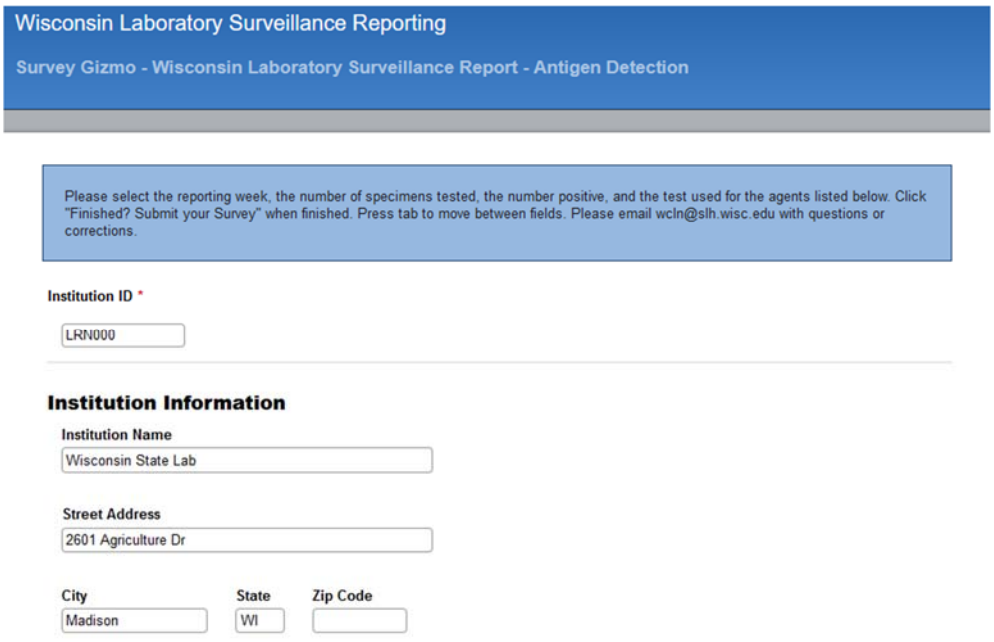
Table 2. Laboratory Testing Data Requests		
Antigen Detection		
Influenza A/B	**SARS-CoV-2**	**RSV**
Rotavirus	**Rapid Strep (Group A *Streptococcus*)**	
Respiratory Pathogens - PCR/Molecular Detection		
Influenza A/B	**SARS-CoV-2**	**RSV**
Seasonal Coronaviruses	**Human Metapneumovirus**	**Human Parainfluenza virus**
Rhinovirus/Enterovirus	**Adenovirus**	***B. pertussis* and *parapertussis***
Group A *Streptococcus*		
Gastrointestinal Pathogens - PCR/Molecular Detection		
Aeromonas	***Campylobacter***	***Clostridioides difficile***
E. coli O157	***Plesiomonas shigelloides***	***Salmonella***
Shigella*/ Enteroinvasive *E.coli (EIEC)	**Shiga-like toxin-producing *E. coli (STEC)***	***Vibrio***
Yersinia enterocolitica	**Adenovirus 40/41**	**Astrovirus**
Norovirus	**Rotavirus**	**Sapovirus**
Cryptosporidium	***Cyclospora cayetanensis***	***Entamoeba histolytica***
Giardia lamblia		

Submission of Laboratory Testing Data

- **Access** the web reporting webpage:
  - Go to the WSLH website **http://www.slh.wisc.edu/wcln-surveillance/surveillance/** then click on **"*Click here to report Wisconsin Test Data*"** in the center of the page.

  - Go directly to **http://www.surveygizmo.com/s3/389222/Wisconsin-Laboratory-Surveillance-Reporting**

- **Enter** your laboratory's identification number ("**Institution ID**"); ***this is a required field***.
  - Your "**Institution ID**" is a series of letters (must be capitalized) and numbers (eg. LRN789). It has been added to your customized requisition form that is included with this mailing.
    - If you cannot find your "**Institution ID**", please contact us at WCLN@slh.wisc.edu or call 800-862-1013.
  - Your institution's name, address, city and telephone number will be entered automatically.
- **Review** the institution name, address and telephone number for accuracy.
  - If any of the information is not accurate, enter the correct information and check the box at the bottom of the form "***Check here if any pre-filled information on this page was changed***".

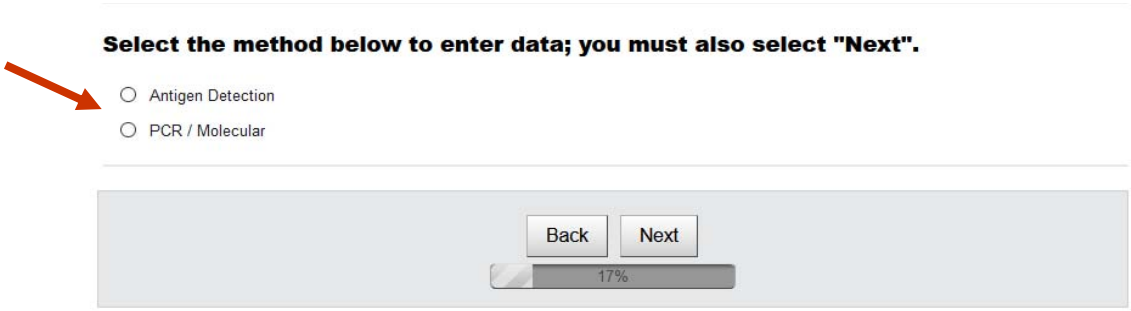


Submission of Laboratory Testing Data (cont'd)

- **Select** the "***Week Ending Date***" for which you wish to report data.
  - Click on the date in the drop-down list. ***This is a required field.***

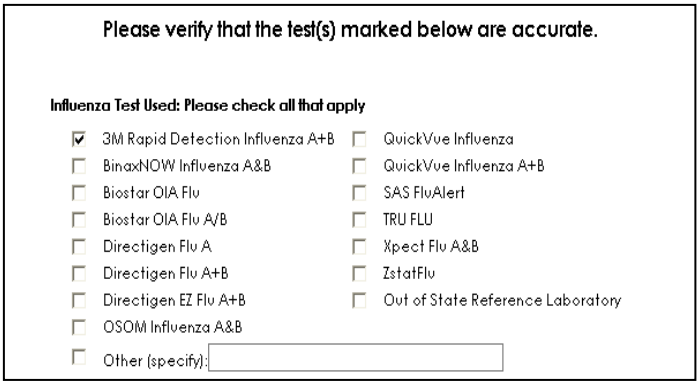
    It is critical that you select the correct week ending date!

- **Check** either "Antigen Detection" or "PCR / Molecular" for the testing method for the data you would like to enter and click "**Next**".



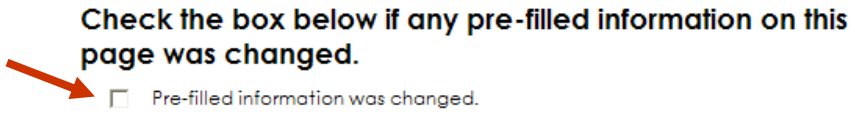
If you chose Antigen Detection:

- **Report** the number tested and number positive for each of the listed agents for which you perform testing on-site.
- ***If you do not perform a test on-site and/or refer specimens to another laboratory***, skip that agent/test section *without entering any data*.
- ***If you normally perform that testing on site, but did not test any specimens*** that week, *enter zero "0" for the number tested*. If the "number tested" is "0", you can skip the "number positive" field.
  - ***If you discontinue testing for a season (summer), please notify us so that our data accurately reflects testing in Wisconsin.***
- ***Review*** *for accuracy the test(s) that have been pre-marked for your institution.*

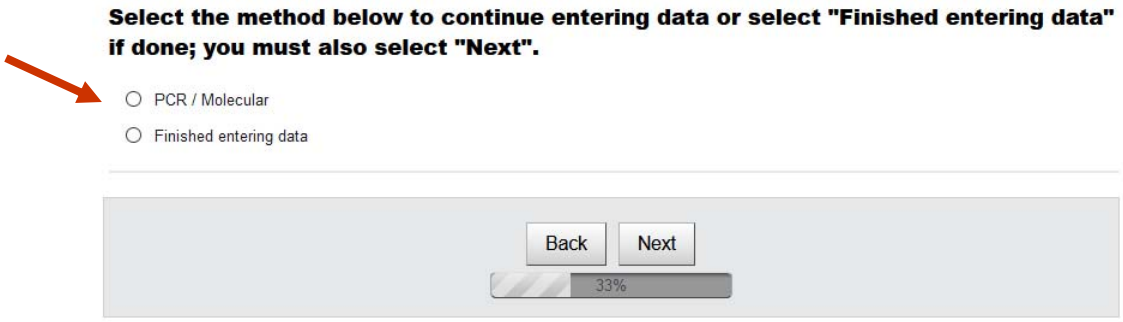


Submission of Laboratory Testing Data (cont'd)

- If the marked test is **NOT** the test your facility used, click on the marked test to "un-check" it, then click on the correct test.
    - Please check the box at the bottom of the form "**Check the box below if any pre-filled information on this page was changed.**

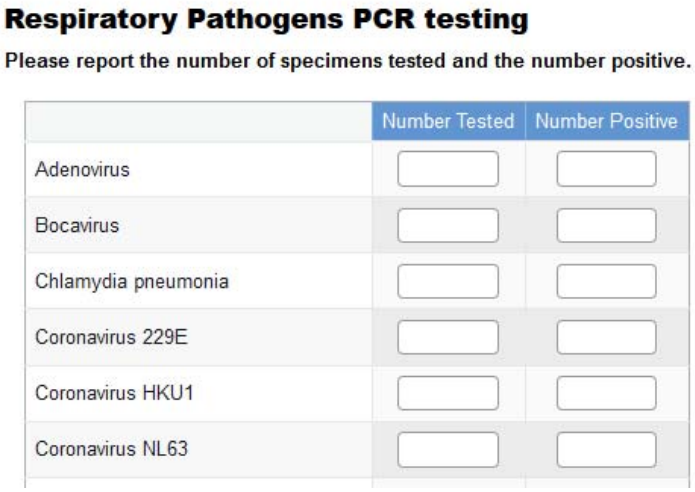


- **Check "**PCR / Molecular" to enter more data or check "Finished entering data" to finish, and then click "**Next**".



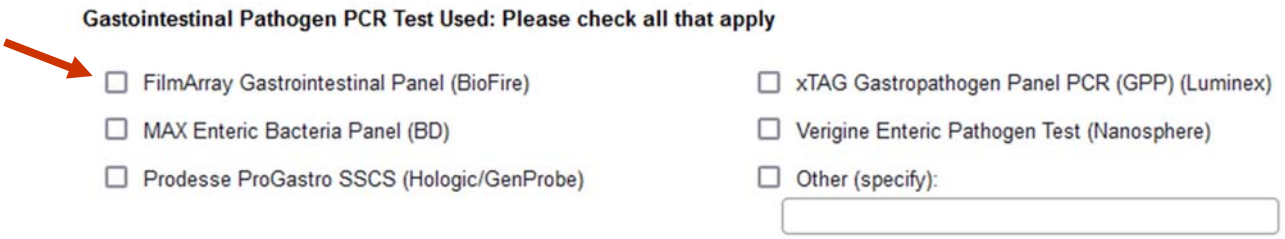
If you chose PCR/Molecular :

- **Report** the number tested and number positive for each of the listed agents for which you provide testing on-site.
- ***If you do not perform a test on-site and/or refer specimens to another laboratory***, skip that agent/test section *without entering any data*.
- ***If you normally perform that testing on site, but did not test any specimens*** that week, *enter zero "0" for the number tested*. If the "number tested" is "0", you can skip the "number positive" field.

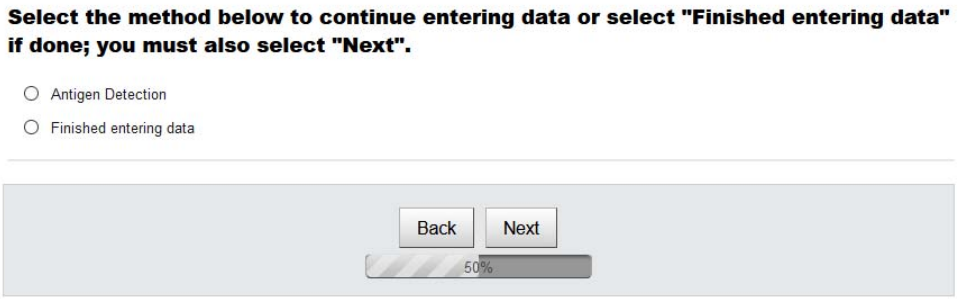


Submission of Laboratory Testing Data (cont'd)

- For each molecular/PCR testing that your laboratory performs, **"check"** the test(s) your laboratory used.

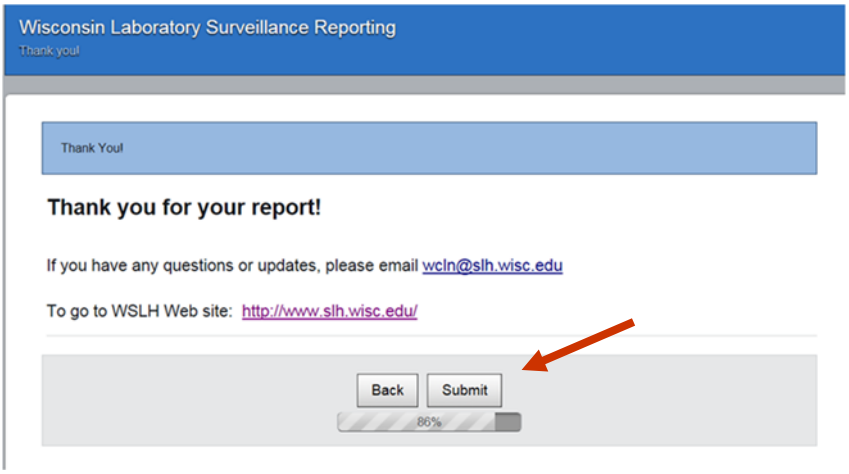


- Check "Antigen Detection" to enter more data or check "Finished entering data" to finish.
  - Click "Next".



If you chose "Finished entering data":

- To save and submit your data, click on "Submit". The data you entered will not be saved or transmitted until you click "Submit".



- If you want to report data for another week, return to **http://www.slh.wisc.edu/wcln-surveillance/surveillance/** and repeat the data entry process for the new week, starting with entering your Institution ID.

If you have questions please email WCLN@slh.wisc.edu or call WSLH customer service at 800-862-1013

Respiratory Pathogen Surveillance

Laboratory-based surveillance for influenza, SARS-CoV-2 and other respiratory pathogens is coordinated by the Wisconsin State Laboratory of Hygiene (WSLH), in collaboration with the Wisconsin Division of Public Health and the Centers for Disease Control and Prevention (CDC). This surveillance network utilizes a combination of laboratory testing data along with respiratory specimens submitted to the WSLH for additional surveillance testing and characterization. Requests for influenza positive specimens are modified as the level of influenza activity changes and as other circumstances require. These changes will be communicated in the bi-weekly "Laboratory Surveillance Report" which is posted at the WSLH website (http://www.slh.wisc.edu/wcln-surveillance/surveillance/). Requests for other respiratory pathogens are static throughout the year and can be found in Table 3 on page 12.

The following is a description of the contributing elements of the laboratory-based respiratory surveillance plan for Wisconsin:

Data Submissions:

All Sites in Wisconsin performing PCR/molecular or rapid antigen testing for respiratory pathogens are asked to submit their testing data on a weekly basis (number tested, number positive) as described in Table 2 found on page 4.

Specimen Submissions:

All Sites: Any Clinical Laboratory in Wisconsin performing testing for respiratory pathogens is requested to submit influenza, SARS-CoV-2 and *Legionella* positive specimens to the WSLH! The WSLH requests influenza and SARS-CoV-2 positive specimens from clinical laboratories performing testing using antigen and/or molecu- PCR methods as described in Table 3. In addition, these sites are asked to submit isolates or lower respiratory specimens (BAL, Sputum) from patients that test positive for *Legionella* by culture or urine antigen testing. Please also notify WSLH of any suspected performance issues with commercial test kits (e.g. False Positives/Negatives).

Enrolled Sentinel Surveillance Sites: 17 labs throughout the 5 public health regions of Wisconsin are enrolled as Sentinel Surveillance sites. This surveillance network is designed to provide a consistent and randomized supply of respiratory specimens from all areas of the state. These sites provide the first 3 specimens per week from patients presenting with respiratory symptoms (regardless of initial test results) as described in Table 3 (page 12).

University Health Clinics: This surveillance program is used to monitor respiratory pathogens impacting student health, including influenza, SARS-CoV-2, and adenovirus. University Health sites are requested to submit the first 3 specimens per week from patients presenting with respiratory symptoms (regardless of initial test results) as described in Table 3 (page 12). These specimens are tested at WSLH with an enhanced respiratory pathogen panel.

What Do We Do With These Specimens?

Respiratory surveillance specimens submitted to the WSLH for viral surveillance are tested with the CDC Influenza SARS-CoV-2 multiplex RT-PCR assay.

Influenza Positive Specimens:

- WSLH performs the CDC influenza A subtyping and CDC B lineage PCRs on all influenza positive specimens received. Subtyping of influenza specimens from around Wisconsin monitors for the emergence of avian and novel influenza in humans.
- Whole genome sequencing is performed on a selection of influenza positive specimens received at the WSLH.
- WSLH submits a selection of influenza positive specimens from around the state to the national influenza surveillance pipeline. Viral culture and whole genome sequencing is performed on these specimens before they are submitted to the CDC.

Detect novel influenza viruses!

Subtyping is important for the detection of any variant or emerging influenza viruses with pandemic potential.

Participate in national influenza surveillance!

CDC uses influenza positive specimens to inform vaccine strain selection and provide vaccine candidates.

SARS-CoV-2 Positive Specimens:

- Whole genome sequencing is performed on a selection of SARS-CoV-2 positive specimens received at the WSLH.
- WSLH also submits specimens to the National SARS-CoV-2 Strain Surveillance (NS3) program to enhance national surveillance efforts. This program is designed to provide information that can guide anti-viral recommendations and vaccine selection.

Perform genomic surveillance!

Sequencing is useful to detect novel viral variants, monitor antiviral resistance, and aid in outbreak investigations.

Specimens Negative for Influenza and SARS-CoV-2:

- An enhanced 22-target respiratory pathogen panel is performed on a selection of surveillance specimens. This data is submitted to NREVSS and can aid public health personnel in determining which respiratory pathogens are circulating throughout the year.

Monitor for other respiratory pathogens!

Testing with an enhanced respiratory panel provides positivity data for less-commonly tested for respiratory pathogens.

Respiratory Specimens or Isolates from Patients with Legionella:

- These specimens/isolates are cultured and their identity confirmed with PCR. Confirmed positive isolates are forwarded to the CDC for whole genome sequencing that can help identify the source of the outbreak.

Respiratory Specimen Submission Instructions:

For each viral surveillance specimen submitted, fill out a copy of your customized respiratory surveillance requisition form (included with your mailing packet). Please be sure to check the appropriate reason for submission on the requisition form.

For Legionella submissions, please fill out a WSLH Req form A, request MP00420—Legionella culture and check "surveillance".

Specimen Collection:

All upper and lower respiratory specimens are acceptable for viral surveillance testing. Upper respiratory specimens should be collected with Dacron or polyester tipped plastic shafted swabs and placed in virus transport medium (VTM).

- If the swab was placed in virus transport medium or saline before a portion was removed for testing, submit remaining swab in virus transport medium.
- If the swab was collected and immersed in test reagent, collect a second sample for surveillance testing.

When selecting specimens to submit for influenza surveillance, please prioritize specimens from patients who are hospitalized, have international travel history or have had recent contact with cattle, swine or poultry. Please also submit any Influenza A specimens that are unsubtypable (Ct <35) (additional information can be found on page 15).

CATTLE/BOVINE CONTACT	SWINE/PIG CONTACT	AVIAN/POULTRY CONTACT	INTERNATIONAL TRAVEL	HOSPITALIZED PATIENTS	INFLUENZA A UNSUBTYPABLE
					

Order:

Additional specimen requisition forms and supplies for collecting and shipping surveillance specimens are provided at **NO COST** and can be requested at 800-862-1088 or HMspecimenreceivingclinicalordersstaff@slh.wisc.edu.

Ship:

Transport to the WSLH, and testing of surveillance specimens is available at **NO COST** when you send specimens using **Purple Mountain Solutions** (PH: 800-990-9668). Detailed shipping instructions can be found on pages 23-24 of this packet.

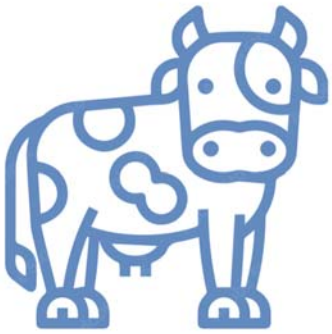
Respiratory Pathogen Submission Table

Table 3: Respiratory Specimen Submission Requests

Pathogen Specific Respiratory Surveillance		
Influenza Surveillance		
Submitter Testing Method:	**Season**	
	Off Season (June-October)	**Influenza Season (Winter/Spring*)**
PCR/Molecular	ALL influenza positives	One influenza-related hospitalization per week AND Unsubtypable influenza A positives (Ct < 35) AND Influenza A positive specimens with: • International travel history • Bovine, swine or avian exposure
Antigen	ALL influenza positives	Influenza A positive specimens with: • International travel history • Bovine, swine or avian exposure
SARS-CoV-2 Surveillance		
PCR/Molecular OR Antigen	Five positive SARS-CoV-2 samples per week for genomic surveillance	
***Legionella* Surveillance**		
Culture, PCR OR Urine Antigen	**Specimens from all *Legionella* positive patients:** • Sputum or BAL from Urine Antigen positive patients (NOT URINE) • Isolates	
Site Specific Respiratory Surveillance		
University Health	The first 3 respiratory specimens per week from symptomatic patients (regardless of initial test results, all year round)	
Sentinel Surveillance	The first 3 respiratory specimens per week from symptomatic patients (regardless of initial test results, all year round)	

*Please refer to the bi-weekly "Laboratory Surveillance Report" for current influenza activity in Wisconsin

Avian Influenza Update



In the spring of 2022, H5N1 avian influenza emerged in wild birds worldwide, including in North America. This outbreak continues, and has affected many wild birds and poultry farms in Wisconsin and across the US.

On March 25, 2024, H5N1 avian influenza was detected in a dairy cow in Texas. As of June 2024, H5N1 avian influenza has been detected in 101 cattle herds across 12 states. The CDC has also identified H5N1 avian influenza in a total of 3 humans (1 in Texas and 2 in Michigan) in association with the ongoing outbreak in dairy cattle. All three human cases were instances of probable cow-to-person spread, and the first two cases exhibited only conjunctivitis, while the third case also reported symptoms of acute respiratory illness.

Although CDC's Risk Assessment for the general population remains LOW, additional precautions are being taken to enhance influenza surveillance across the country. In Wisconsin, there have been no documented dairy cattle or human cases of avian influenza. People who have close contact with poultry or dairy cattle infected with H5N1 avian influenza are at increased risk for infection.

If a symptomatic patient is at increased risk of being infected with Avian Influenza notify the

Wisconsin Division of Public Health (WDPH)

***7:45 AM - 4:30 PM Monday - Friday,* call 608-266-5326**

***After-hours,* call 608-258-0099**
and ask for "the communicable disease epidemiologist on-call"

Specimen Collection and Submission:

- Collect **one nasopharyngeal (NP) swab**; and place in a tube of viral transport medium (VTM).
- For patients with **conjunctivitis**, additionally, obtain a conjunctival swab and place in a tube of VTM.
    - Use swabs with a Dacron or polyester tip with an aluminum or plastic shaft.
- For patients with lower respiratory illness, collect a lower respiratory tract specimen (e.g. BAL).
- After gaining approval from WDPH, an "Enhanced Surveillance" requisition form should be requested from the WSLH, and filled out for each submitted specimen.
    - **Please check "Avian Influenza Suspect" under reason for submission.**

Avian Influenza Update

Shipping of Avian Influenza Suspect Specimens to WSLH

- Arrange transport so that specimens arrive at the WSLH within 24 hours of collection.
    - Avian influenza suspects can be shipped Category B.
    - Specimens can be transported to the WSLH by a carrier of your choice, or at NO COST when using Purple Mountain Solutions (PH: 800-990-9668).
    - Detailed shipping instructions can be found on pages 23-24 of this packet.
- Testing is usually completed within 1-2 business days of the specimen receipt at WSLH. There is no charge for this testing.
- Please contact the **WSLH Customer Service Department** at 800-862-1013 if you have questions regarding laboratory testing.

Suspect Avian Influenza Testing at the WSLH

- Suspect avian influenza specimens that are submitted to the WSLH for testing **will first be tested with the CDC influenza A/influenza B/SARS-CoV-2 multiplex PCR assay.**
- If a specimen is positive for influenza A, it will also be **tested with a seasonal influenza A subtyping PCR.**
- If a specimen is **positive for influenza A and "unable to subtype"** with the seasonal influenza A subtyping PCR, then it will be tested with the **influenza A – H5 specific subtyping PCR**.

Influenza Surveillance Updates:

- In response to the outbreaks in dairy cattle across the US, the CDC is implementing increased influenza surveillance across the country to monitor for influenza A/H5N1 infections in humans. Please aid in influenza surveillance efforts by continuing to submit influenza positive specimens year-round!
    - Commercially available antigen and molecular-based influenza tests are expected to detect the strain of influenza A/H5N1 that is currently circulating in dairy cattle.
    - We are especially interested in receiving surveillance specimens from persons with travel history, or influenza A specimens that you are unable to get to subtype, with a Ct value <35 (if subtyping is attempted).

Additional Information:

- Wisconsin Department of Health Services, Avian Influenza A Virus. https://www.dhs.wisconsin.gov/influenza/avian.htm.
- CDC's Flu Surveillance Systems Can Detect Avian Influenza A (H5N1) Virus Infections https://www.cdc.gov/ncird/whats-new/flu-surveillance-avian-influenza-a-H5N1.html
- The CDC has many guidance documents and information pertaining to avian influenza on its website. https://www.cdc.gov/flu/avianflu/index.htm.

Influenza A Unsubtypable (by PCR)

Any clinical specimen that produces a positive result for influenza A by PCR, but fails to subtype as H3 or (H1N1)pdm09, has the potential to be a novel strain of influenza virus. **Repeat Testing is recommended in these situations.**

If the influenza A specimen fails to subtype after repeat testing **AND** the influenza A Ct is <35, please send the sample to the WSLH for further testing, according to guidelines on pages 23-24.

Influenza A Swine Variant Virus Testing

Influenza viruses normally circulate in pigs and are referred to as swine influenza viruses. Influenza viruses from swine normally do not infect humans; however, cases do occur sporadically in humans and are typically associated with close contact with infected pigs. The majority of cases have occurred in children. When one of these swine influenza viruses infects a human it is termed a **variant** influenza virus. These variant viruses are denoted with a "v" at the end of the name (e.g. H1N1v, H1N2v and H3N2v). There have been no reports of sustained human transmission of these variant viruses as of June 2024. Public health officials are closely monitoring the current situation through enhanced surveillance activities.

The CDC has many guidance documents and information pertaining to variant influenza viruses on its website: http://www.cdc.gov/flu/swineflu/variant.htm

Laboratory Diagnostic Testing:

While commercially available antigen and molecular diagnostic assays for influenza can usually reliably detect variant influenza A viruses, they cannot differentiate variant influenza A viruses from human influenza A viruses. **Clinicians who suspect influenza virus infection in patients with close contact to swine should contact the Wisconsin Division of Public Health at 608-258-0099 for subtype-specific PCR testing at WSLH.**

Specimen Submission:

- Specimen requirements for Influenza A swine variant suspects are the same as described on page 11.
- After gaining approval from WDPH, an "Enhanced Surveillance" requisition form should be requested from the WSLH, and filled out for each submitted specimen.
    - **Please check "Swine Contact" under reason for submission.**
    - Please contact the **WSLH Customer Service Department** at 800-862-1013 if you have any questions.

Vector-borne Pathogen Surveillance

The WSLH works with WDPH to monitor cases of vector-borne diseases in our state. WSLH will confirm species identification of key blood borne pathogens and submit specimens to CDC to monitor for drug resistance and emergence of novel pathogens. Please submit the organisms listed in Table 4 **As Detected**.

Specimen Submission instructions:

- Please fill out a WSLH requisition A with each specimen submitted.
    - Indicate the pathogen detected in the "Other Tests" field in the bottom right.
- Specimen requisition forms and supplies for shipping surveillance specimens are provided at **NO COST** and can be requested at 800-862-1088.
- Transport to the WSLH is available at **NO COST** when you send specimens using **Purple Mountain Solutions**. Detailed shipping instructions can be found on pages 23-24.

Table 4. Vector-borne Pathogen Specimen Submission Requests

Pathogen	Specimen Type	Testing Performed at WSLH
Malaria	Positive thick and thin blood smears or residual EDTA blood	Species confirmation via microscopy and PCR. Residual EDTA forwarded to CDC for Malarial Drug Resistance Surveillance in *Plasmodium falciparum*
Babesia	Positive thick and thin blood smears or residual EDTA blood	Confirmation of *B. microti* by PCR. Unknown species forwarded to CDC for confirmation
Ehrlichia (species unknown)	Residual blood and/ or nucleic acid	Forwarded to CDC for species identification (if speciation not available at your lab)

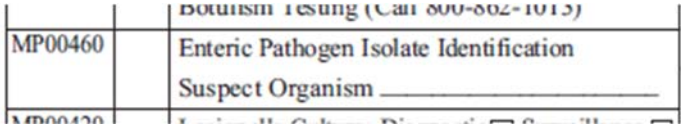
Wisconsin Enteric Pathogen Surveillance

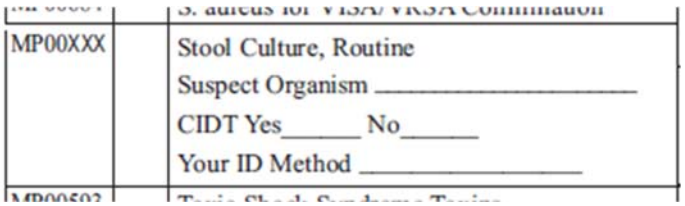
The WSLH requests that clinical laboratories submit isolates, enrichment broths, or stools in enteric transport medium that were positive using a culture-independent diagnostic test (CIDT). These isolates and samples undergo testing such as whole-genome sequencing at the WSLH to generate data that is critical to the ability to recognize and respond to clusters and outbreaks of gastropathogens in Wisconsin. The resulting laboratory data is used by epidemiologists at the WDPH to rapidly determine linkage to potential food and environmental point sources.

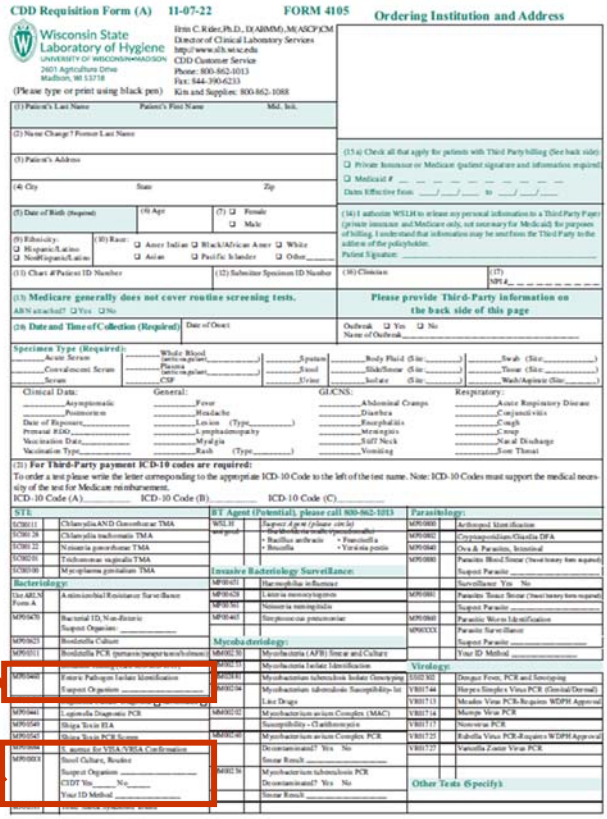
Specimen submission instructions:

WSLH requests that clinical laboratories submit the pathogens listed in Table 5 **As Detected**.

- Fill out a WSLH requisition form A with each specimen submitted:
  - For Isolates: Select test MP00460, and indicate the pathogen(s) isolated
  - For Stool: Select test MP00XXX and indicate the pathogen(s) detected and the ID method performed.
- Specimen requisition forms and supplies for shipping surveillance specimens are provided at **NO COST** and can be requested at 800-862-1088.
- Transport to the WSLH, is available at **NO COST** when you send specimens using **Purple Mountain Solutions** (PH: 800-990-9668). Detailed shipping instructions can be found on pages 23-24.







Wisconsin Enteric Pathogen Surveillance Submissions

Table 5. Enteric Pathogen Specimen Submissions*		
Pathogen	**Specimen Type**	**Testing Performed at WSLH**
***Campylobacter* species**	Isolates or stool	Identification, antimicrobial susceptibility testing and molecular subtyping (WGS) will be performed as necessary
Enterohemorrhagic/Shiga Toxin-Producing *E. coli* (EHEC/STEC)	Isolates, stool or enrichment broth	Identification, serotyping and molecular subtyping (WGS)
***Salmonella* species**	Isolates or stool	Identification, serotyping, antimicrobial susceptibility testing and molecular subtyping (WGS)
***Shigella* species and *Enteroinvasive E.coli* (EIEC)**	Isolates or stool	*Shigella* identification, serogrouping, antimicrobial susceptibility testing; and molecular subtyping
***Vibrio* Species**	Isolates or stool	Identification and referral to CDC
***Yersinia* species**	Isolates or stool	Identification
***Cryptosporidium* species**	Stool	Identification** and genotyping (and/or referral to CDC) and WGS
Cyclospora cayetanensis	Stool	Molecular subtyping and/or referral to CDC
Rotavirus	Stool	One positive per week for molecular subtyping/genotyping (performed at CDC)

*Consult with the Wisconsin Division of Public Health Foodborne Disease Epidemiologists to inquire about testing of any other organisms that are suspected of being in a cluster or outbreak of public health significance.

**Stool specimens positive for *Cryptosporidium* by PCR-based methods will not be confirmed.

Antimicrobial Resistance Monitoring

Antimicrobial resistance is increasingly becoming a public health concern as multi-drug resistant pathogens become more common. The WSLH is the Midwest Regional Laboratory for the CDC-coordinated Antimicrobial Resistance Laboratory Network (AR Lab Network). The overarching goal of AR Lab Network testing is rapid identification and containment of resistant pathogens. Data compiled from the AR Lab Network is presented to partners at Wisconsin Clinical Laboratory Network regional meetings and a summary can be found in the back of this booklet, pages 33-36.

Specimen Submission instructions:

WSLH requests that clinical laboratories submit the isolated pathogens listed in Table 6 **As Detected.**

- Please fill out a **WSLH ARLN Requisition form** (included with your mailing packet) with each isolate submitted and include:
  - AST results
  - Any relevant phenotypic or molecular test results.
- Specimen requisition forms and supplies for shipping surveillance specimens are provided at **NO COST** and can be requested at 800-862-1088.
- Transport to the WSLH, is available at **NO COST** when you send specimens using **Purple Mountain Solutions** (PH: 800-990-9668). Detailed shipping instructions can be found on pages 23-24.

Antimicrobial Resistant Isolate Characterization Req. rev. 4/2019

WSLH WISCONSIN STATE LABORATORY OF HYGIENE 2601 Agriculture Dr Madison, WI 53718 800-862-1013

Patient Information			Submitter Information
Name (Last, First):			
Address:			
City:	State:	Zip:	
Date of Birth:	Gender: M F		(Telephone Number)
Your Patient ID Number:			Laboratory Contact Name
Your Specimen ID Number:			Submitter CLIA or NPI Number (facility):
CC Result Report to:			*WSLH Use Only* Study: **ARLN CRE/CRPA/CANDIDA**

Originating Facility (where specimen was collected if different than Submitter above):

Name: _____

City and Zip Code _____

Results and Tests Performed in Your Laboratory:

[ ] Carba NP	☐ Negative	☐ Positive	[ ] OXA	☐ Negative	☐ Positive
[ ] IMP	☐ Negative	☐ Positive	[ ] VIM	☐ Negative	☐ Positive
[ ] KPC	☐ Negative	☐ Positive			
[ ] mCIM	☐ Negative	☐ Positive	[ ] Other (specify):_____		
[ ] NDM	☐ Negative	☐ Positive	☐ Negative	☐ Positive	
[ ] ESBL (MCR-1) – *Targeted Surveillance*	☐ Negative	☐ Positive			

Organism (Your Test Results):

[ ] Acinetobacter baumannii – *Targeted Surveillance*	[ ] Klebsiella pneumoniae
[ ] Candida (species: _____)	[ ] Klebsiella oxytoca
[ ] Enterobacter (species:)	[ ] Pseudomonas aeruginosa
[ ] Escherichia coli	[ ] Other (specify):_____

Date Collected:	**Specimen Type:**
Time Collected:	☐ Isolate, source: _____

Please include AST Results performed at your laboratory with the specimen

WSLH Test Request:

[ ] MP00580 Bacterial Characterization	[ ] MP00900 Fungal Characterization
[ ] MP00696 AR Expanded AST Panel 1 *(Prior approval required)*	

WISCONSIN STATE LABORATORY OF HYGIENE USE ONLY

Antimicrobial Resistance Specimen Submissions

Table 6. Antimicrobial Resistance Specimen Submissions		
Pathogen	**Resistance Traits**	**Testing Performed at WSLH**
Pan-resistant organisms	Resistant to all drugs tested in your laboratory	Identification, antimicrobial susceptibility testing, AR-targeted PCR and referral to CDC as necessary
Candida auris	N/A	Identification, antimicrobial susceptibility testing and molecular subtyping.
Enterobacterales	Resistant to any carbapenems **(CRE)****	Identification, antimicrobial susceptibility testing, carbapenemase screen, AR-targeted PCR and molecular subtyping
Staphylococcus aureus	Non-susceptible to vancomycin **(VRSA)**	Identification, antimicrobial susceptibility testing and referral to CDC as necessary
Pseudomonas aeruginosa ***	• Resistant to carbapenems other than ertapenem **AND** • Non-susceptible to cefepime and/or ceftazadime	Identification, antimicrobial susceptibility testing, carbapenemase screen, AR-targeted PCR and molecular subtyping
Acinetobacter baumanii	Resistant to any carbapenems **(CRAB)**	Identification, antimicrobial susceptibility testing, AR-targeted PCR and molecular subtyping
Aspergillus fumigatus isolates from invasive infections	N/A	Isolates will be forwarded to the Maryland Department of Health for surveillance of azole resistance

** Exception: Proteus spp., Providencia spp., and Morganella spp., that are resistant to imipenem only but are not resistant to meropenem or doripenem. These isolates may have elevated imipenem MICs by mechanisms other than production of carbapenemases. These isolates will also be susceptible to other beta-lactams.

***Exception: Do not submit resistant Pseudomonas aeruginosa isolates from cystic fibrosis patients. These isolates can be highly resistant but are most likely due to other factors than the presence of a carbapenemase.

Wisconsin Invasive Pathogen Surveillance

The Wisconsin Invasive Pathogen Surveillance program is a partnership between WSLH and other public health and clinical partners, and monitors invasive infections in the state. The WSLH requests the submission of isolates and specimens of invasive pathogens listed in Table 7 **As Detected.**

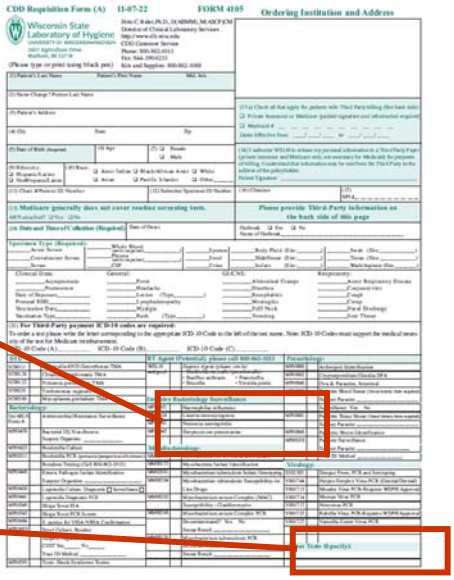
Specimen submission instructions:

- Isolates should be from **sterile body sites** (CSF, Blood, etc…).
    - In the absence of an isolate, please submit CSF specimens which have been determined to contain these pathogens by a culture-independent diagnostic test (CIDT).
- Please fill out a WSLH requisition A with each specimen submitted and indicate the pathogen isolated/detected.
    - For **invasive bacterial** submissions, place a check mark next to the pathogen detected or isolated.

Invasive Bacteriology Surveillance:		
MP00651		Haemophilus influenzae
MP00628		Listeria monocytogenes
MP00561		Neisseria meningitidis

    - For **other invasive pathogen** submissions, indicate the pathogen detected or isolated in the "Other box"

Other Tests (Specify):



- For ***Streptococcus pneumoniae*** specimens, please fill out the *Streptococcus pneumoniae* Requisition form (included with your mailing packet). Attach a copy of the susceptibility results if available.
    - CSF specimens - Check MP00461
    - CSF Isolates - Check MP00689
    - Non-CSF Isolate from a sterile body site -
        - Select one or more criteria for testing

Criteria for testing (must meet one of the following):
☐ CSF (identification only)
☐ CSF isolate

Invasive isolates that are:
☐ Resistant to clinically relevant antibiotic*
☐ Suspected vaccine failure
☐ Suspected treatment failure*
☐ Suspected outbreak

Attach copy of susceptibility results if available

Wisconsin Invasive Pathogen Surveillance Submissions

- Specimen requisition forms and supplies for shipping surveillance specimens are provided at **NO COST** and can be requested at 800-862-1088 .
- Transport to the WSLH, is available at **NO COST** when you send specimens using **Purple Mountain Solutions**. Detailed shipping instructions can be found on pages 23-24.

Table 7. Invasive Pathogen Specimen Submission Requests

Pathogen	Specimen Type	Testing Performed at WSLH
Haemophilus influenzae	Isolates or CSF	Identification and serotyping
Listeria monocytogenes	Isolates	Identification and molecular subtyping (WGS)
Neisseria meningitidis	Isolates or CSF	Identification, antimicrobial susceptibility testing and serogrouping

Streptococcus pneumoniae	Isolates or CSF	Identification, antimicrobial susceptibility testing and serotyping performed on:
		• CSF (Identification PCR only)
		• CSF isolates
		• Non-CSF isolates that are:
		  • Non-susceptible to clinically relevant antibiotics
		  • Suspected vaccine failure
		  • Suspected treatment failure
		  • Outbreak related isolates

***Cronobacter* spp.**	Isolates from infants	Identification and molecular subtyping (WGS)
Enterovirus	CSF	Molecular typing (NGS)
Blastomyces	Isolates	Species identification
Other organisms suspected of being part of a cluster or outbreak of public health significance	Isolates or specimens	Consult with Wisconsin Division of Public Health Epidemiologists to inquire about testing
Gram negative isolates from sterile body sites that are unidentifiable using commercial systems	Isolates	Phenotypic and sequenced based identification will be performed

Shipment of Specimens

Order Supplies:

Specimen collection and shipping supplies including:

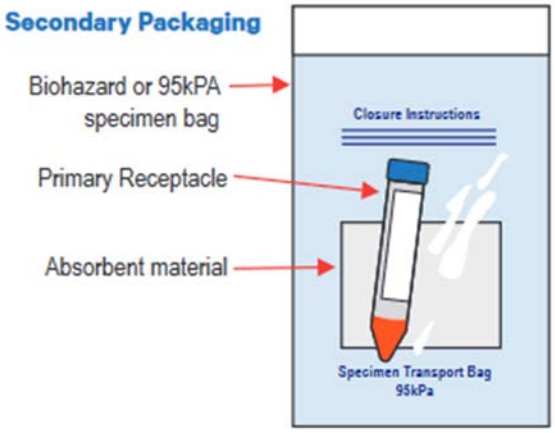
- Requisition sheets
- Specimen collection kits
- Mailers and ice packs

Supplies are available at **NO COST** for surveillance submissions. Please contact the WSLH Clinical Orders department at **800-862-1088** or email HMspecimenreceivingclinicalordersstaff@slh.wisc.edu to order supplies.

Specimen Packaging:

Triple package specimens as ***"Biological substance, Category B / UN 3373"*** if classified as Category B.

- Label each specimen with patient name (First and Last) and date of birth, and the specimen source.
- Ensure the specimen cap is on tight and the specimen is not leaking.
- Securely tape the cap of the specimen container, and wrap specimen with absorbent material.
- Place the specimen vial into a biohazard bag.
- Place the completed requisition form into the **outer** sleeve of the bag.
- Place the bagged specimen and form in the Styrofoam mailer with a **frozen** cold pack and cushioning.

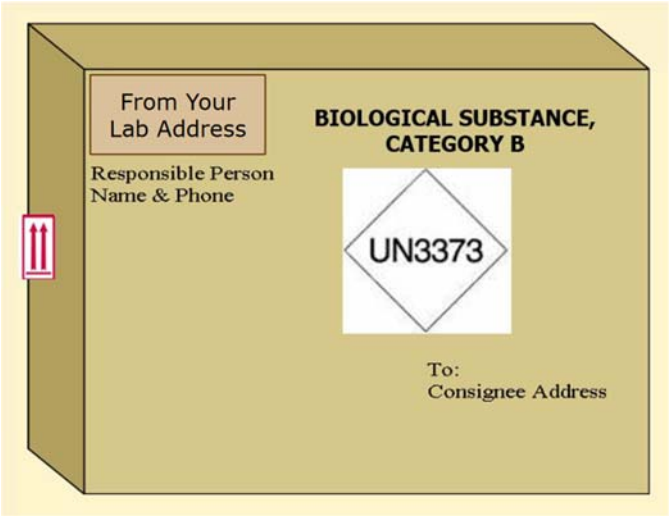


- Replace lid on the Styrofoam box. Close and securely tape the cardboard box shut.
- Attach the WSLH address label to the package:

Wisconsin State Lab of Hygiene
Specimen Receiving, Communicable Disease Division
2601 Agriculture Drive
Madison, WI 53718

Shipment of Specimens (Cont'd)

- Attach the "*Biological substance, Category B / UN 3373*" label to the package.
- Attach your return address label
- **Include the name and telephone number** of the person who knows the content of the package **(REQUIRED)**



Shipping Resources

Additional guidance and training materials for the shipping of category B biological substances can be found on the WSLH website:
https://www.slh.wisc.edu/clinical/diseases/packaging-and-shipping/

Shipping Arrangements:

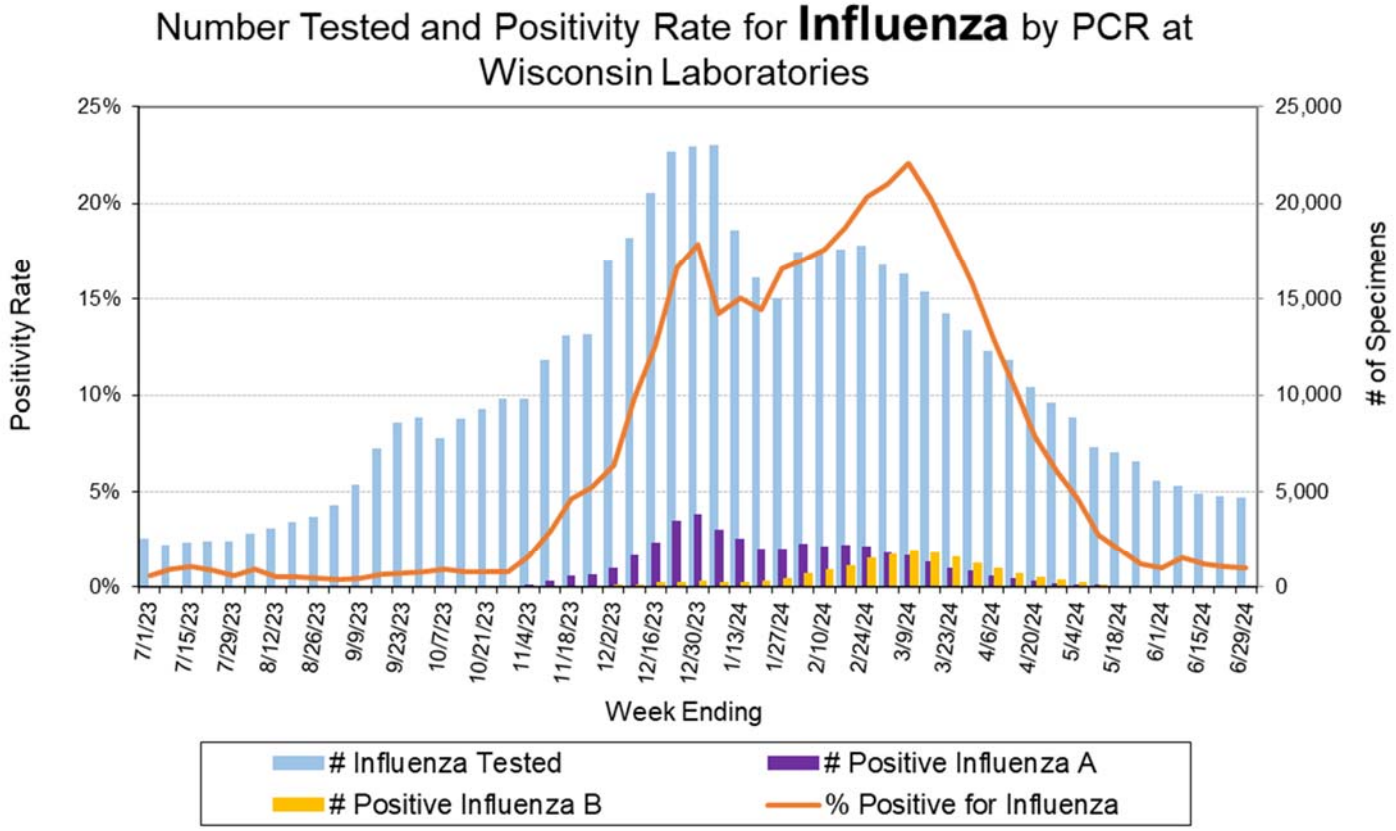
Transport of surveillance specimens or other specimens requested by WSLH is available at **NO COST** when you send specimens using **Purple Mountain Solutions** (https://purplemountainsolutions.com/)

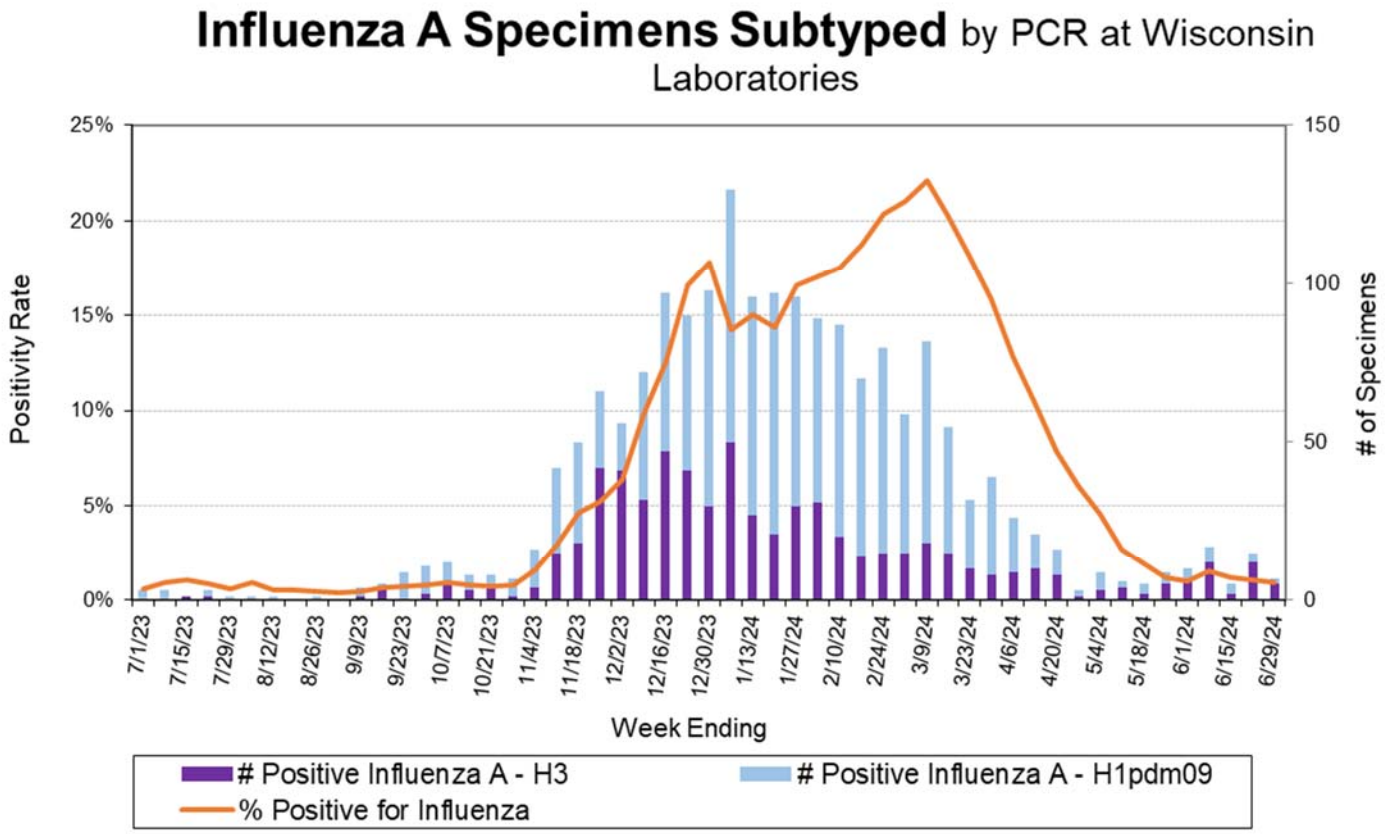
- The WSLH has a contract with Purple Mountain Solutions for shipment of specimens to the WSLH, with charges billed to the WSLH.
- This account is for surveillance specimens or others requested by WSLH. Funding is not available for transport of other samples.
- You are not required to ship via Purple Mountain Solutions, only if you wish to have the transport charges billed to the WSLH.
- Specimens will be picked up during regular working hours, but you must confirm the time with Purple Mountain Solutions.
- Specimens will be delivered to the WSLH the following day. **If you must ship on Fridays or on the day before a holiday, please include extra coolant**.
- All package preparation should be completed before the courier arrives.
- Contact Purple Mountain Solutions directly to arrange for a pick-up. Orders must be placed by noon for same day pickup.

Phone #: 800-990-9668 Purple Mountain Solutions, Inc.

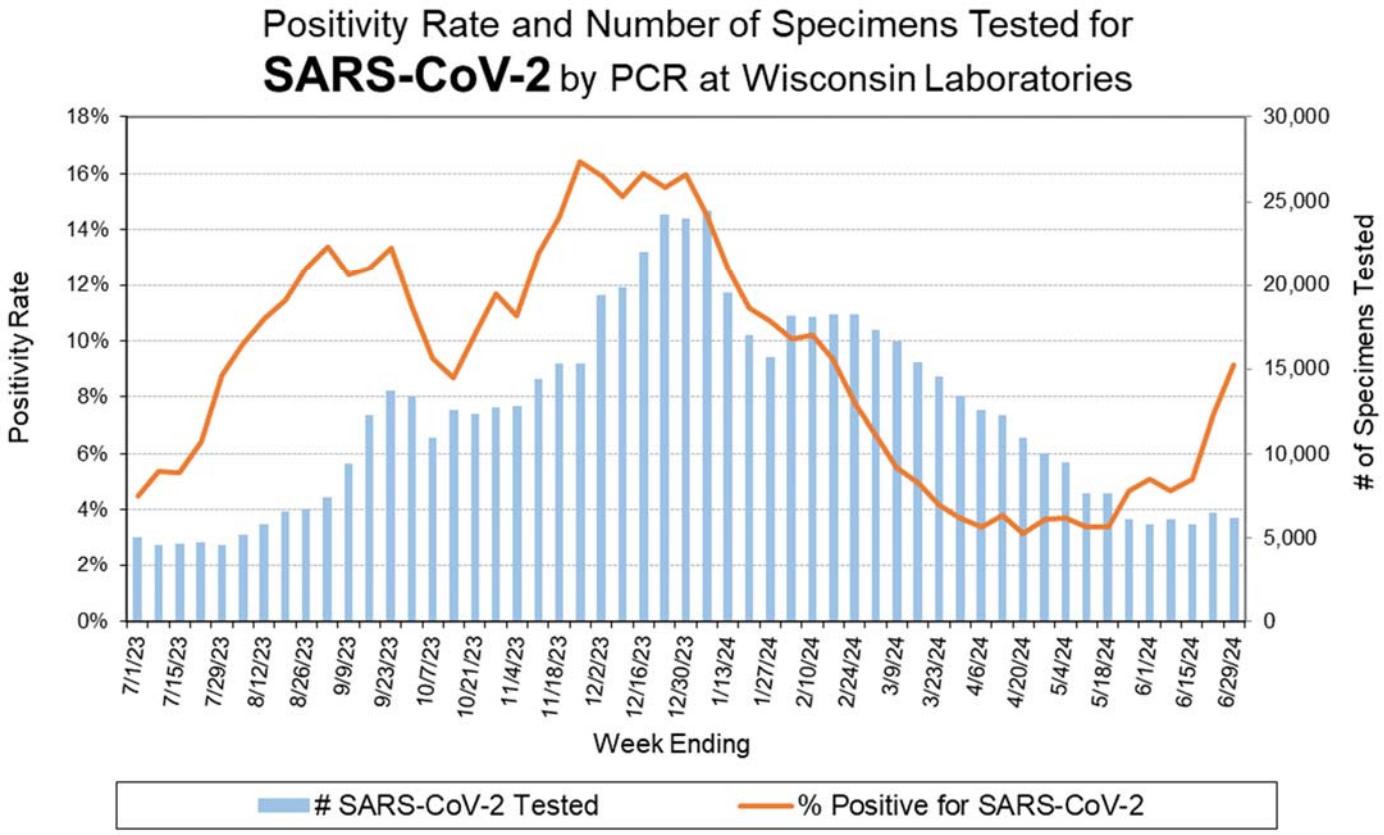
- Same day delivery may be available for specific high priority specimens. However, **pre-approval from WSLH is necessary.**

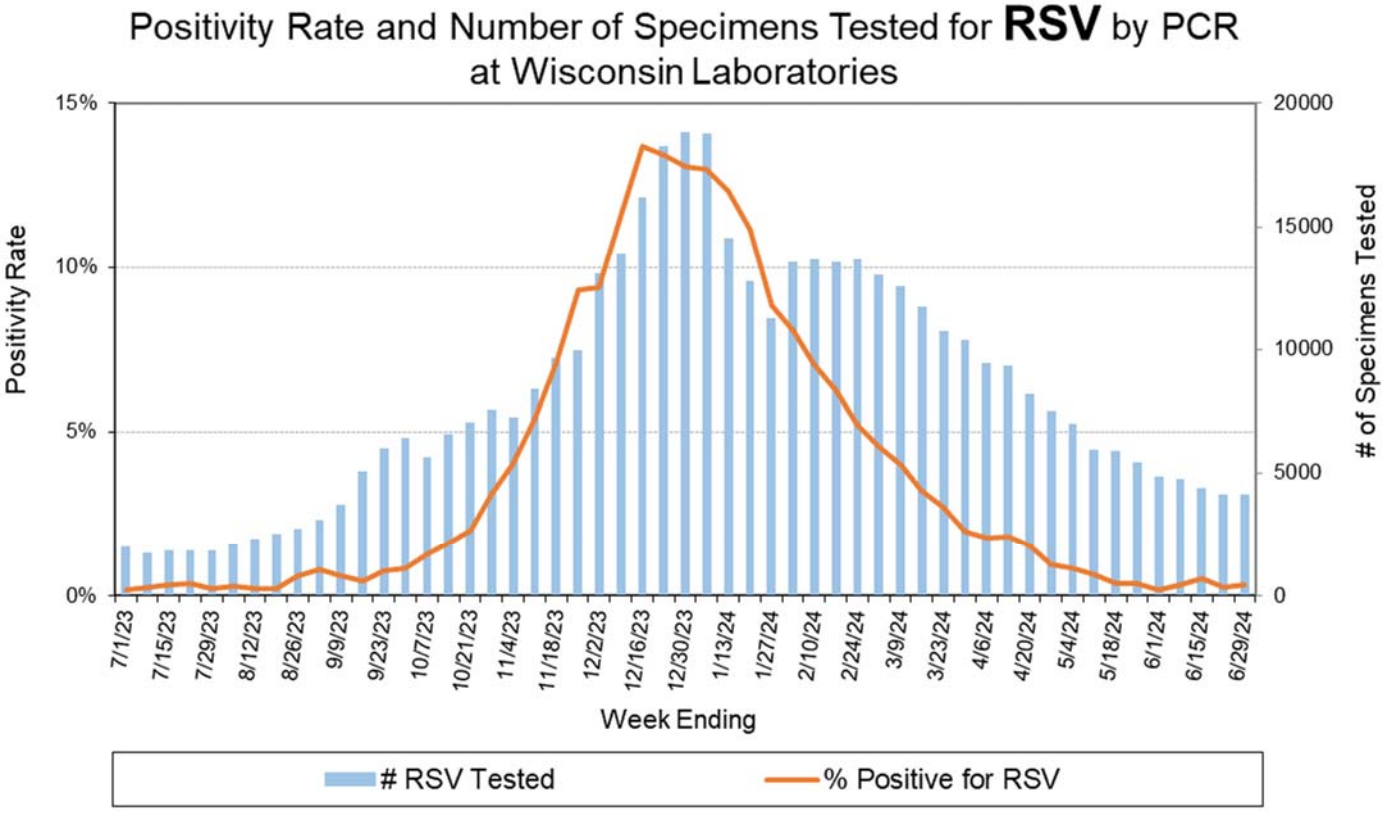
Surveillance Graphs for 2023-24 Season



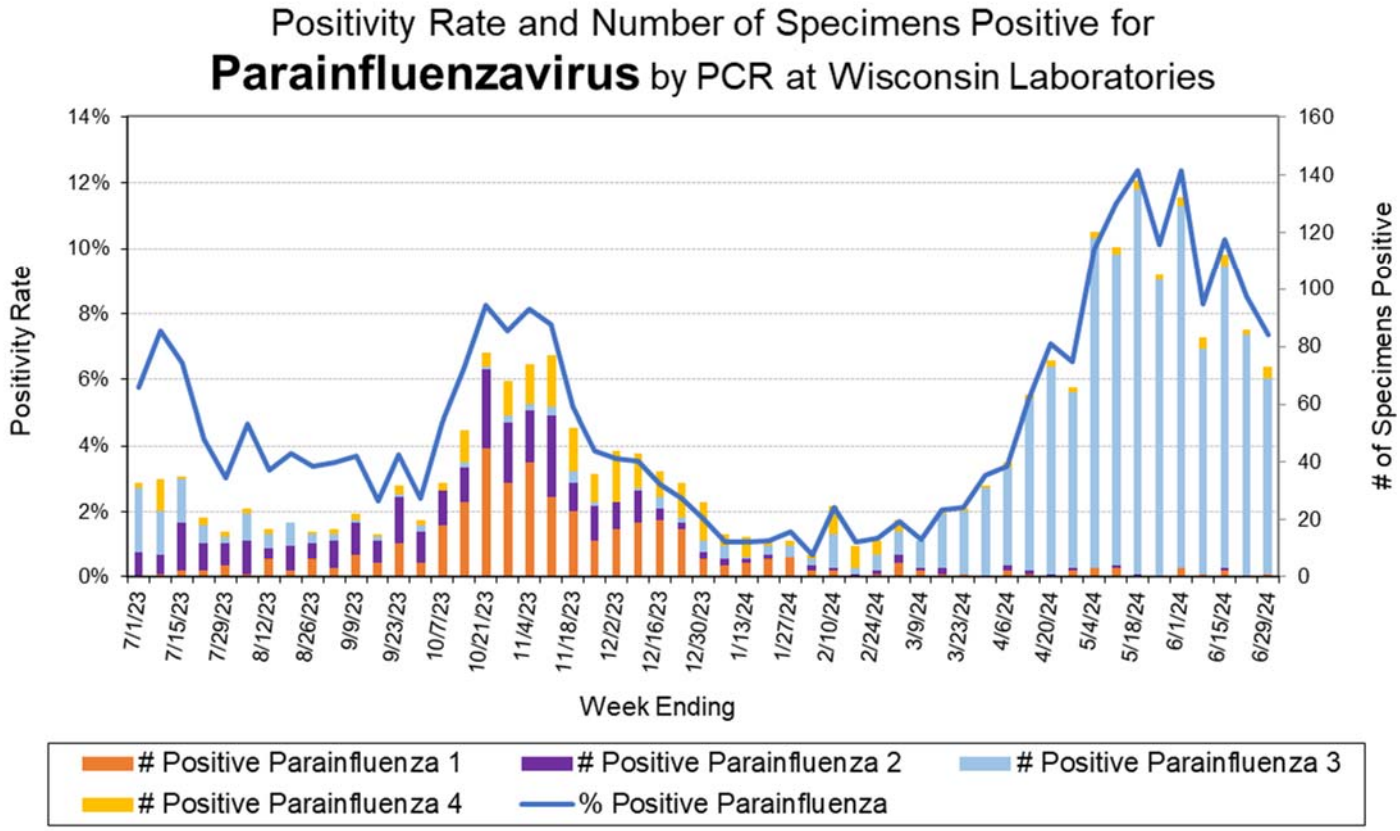


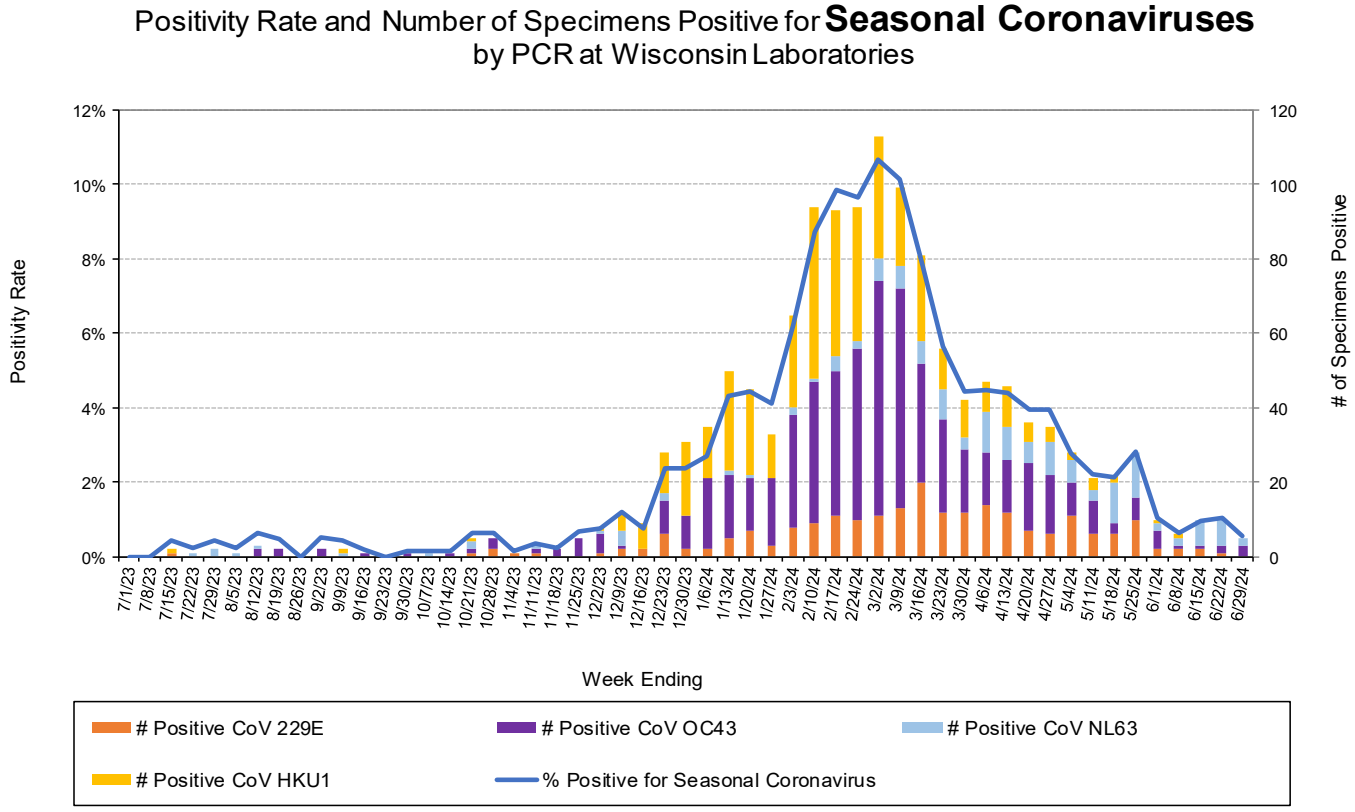
Surveillance Graphs for 2023-24 Season



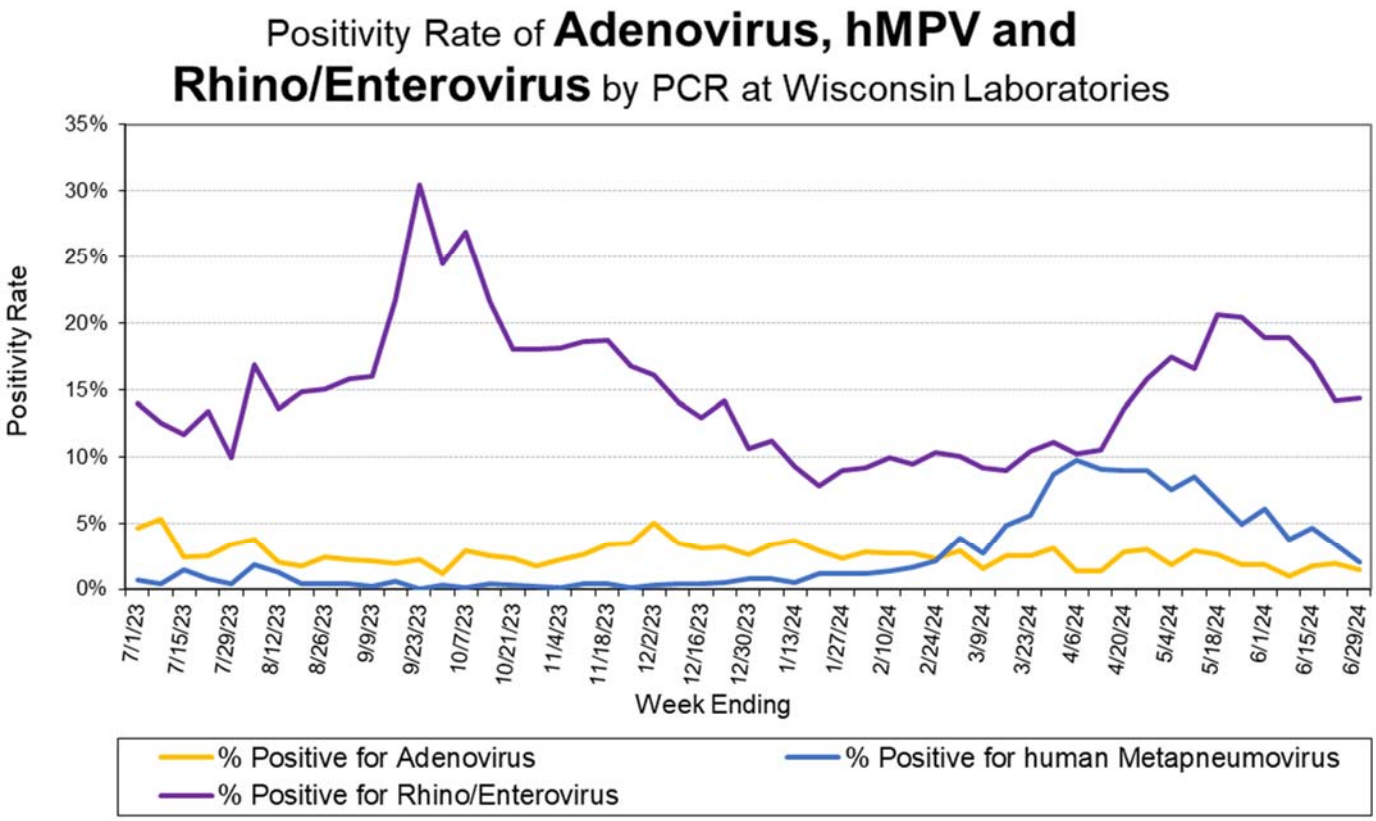


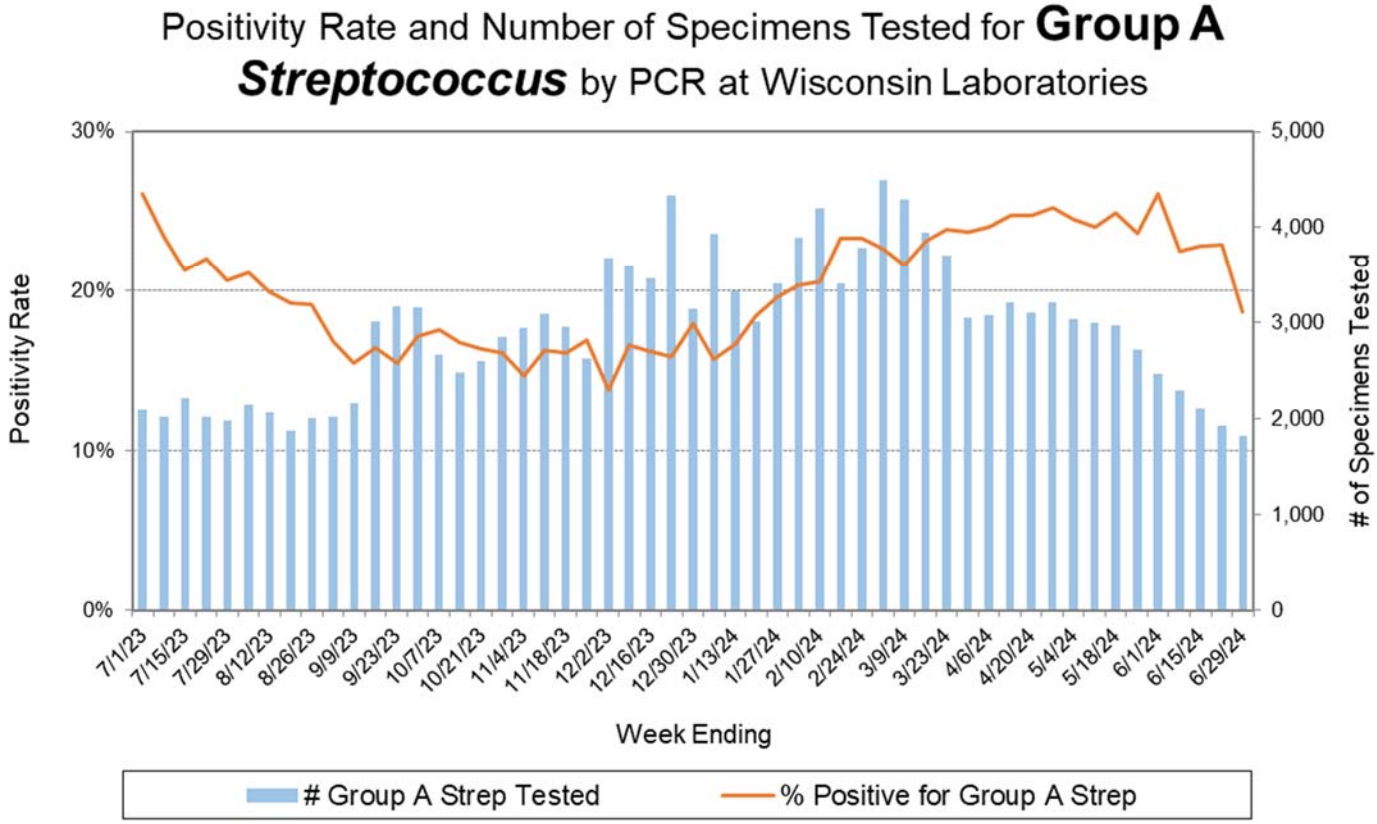
Surveillance Graphs for 2023-24 Season



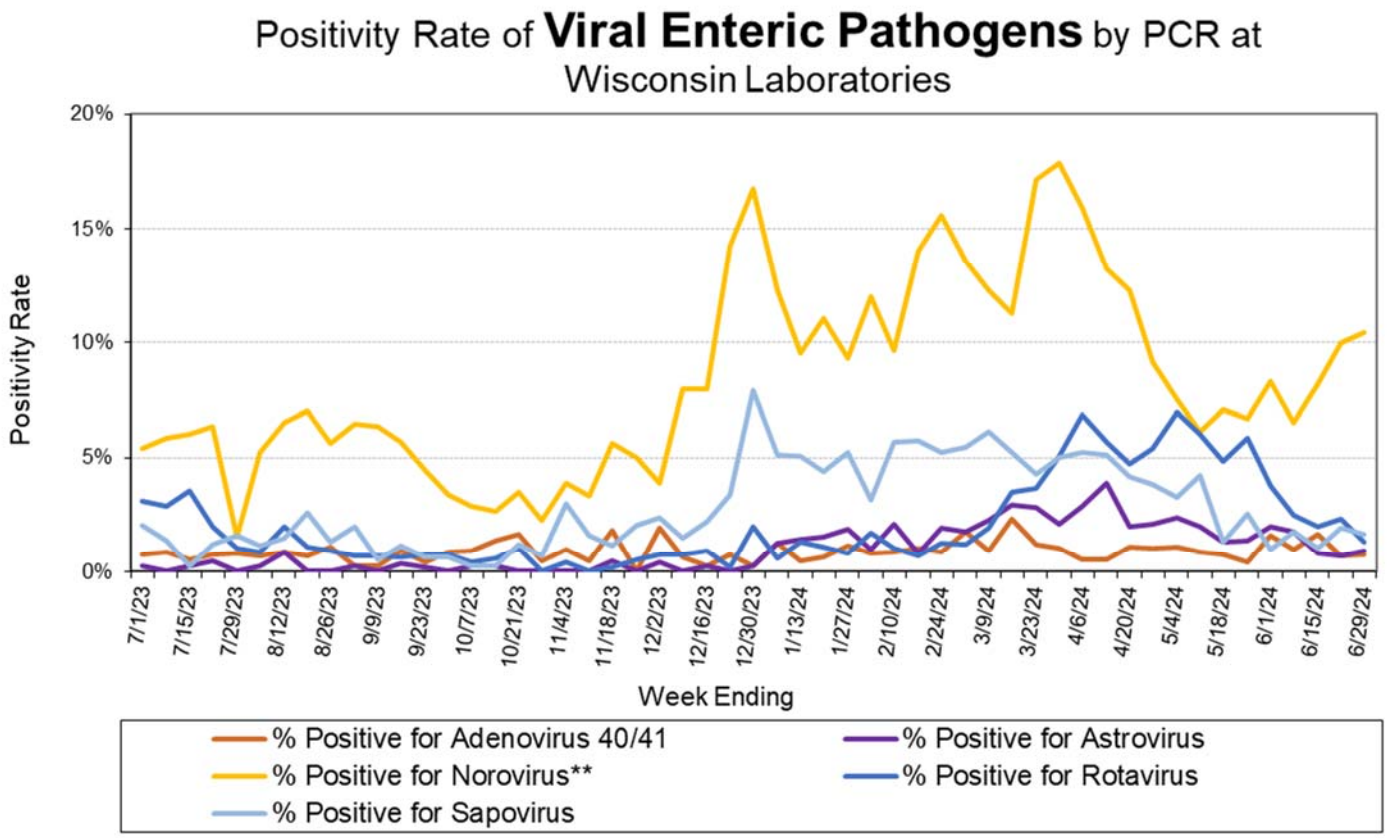


Surveillance Graphs for 2023-24 Season

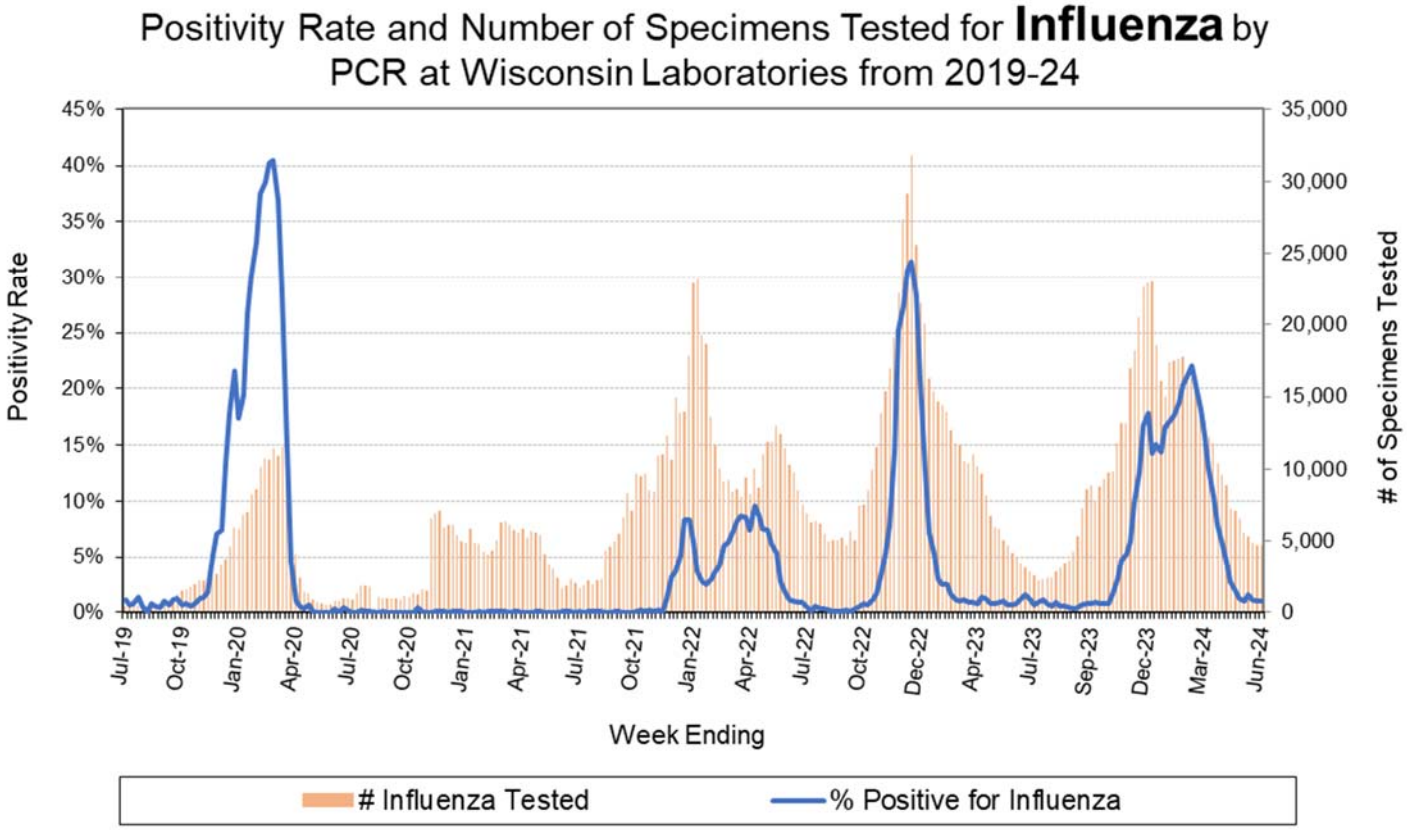


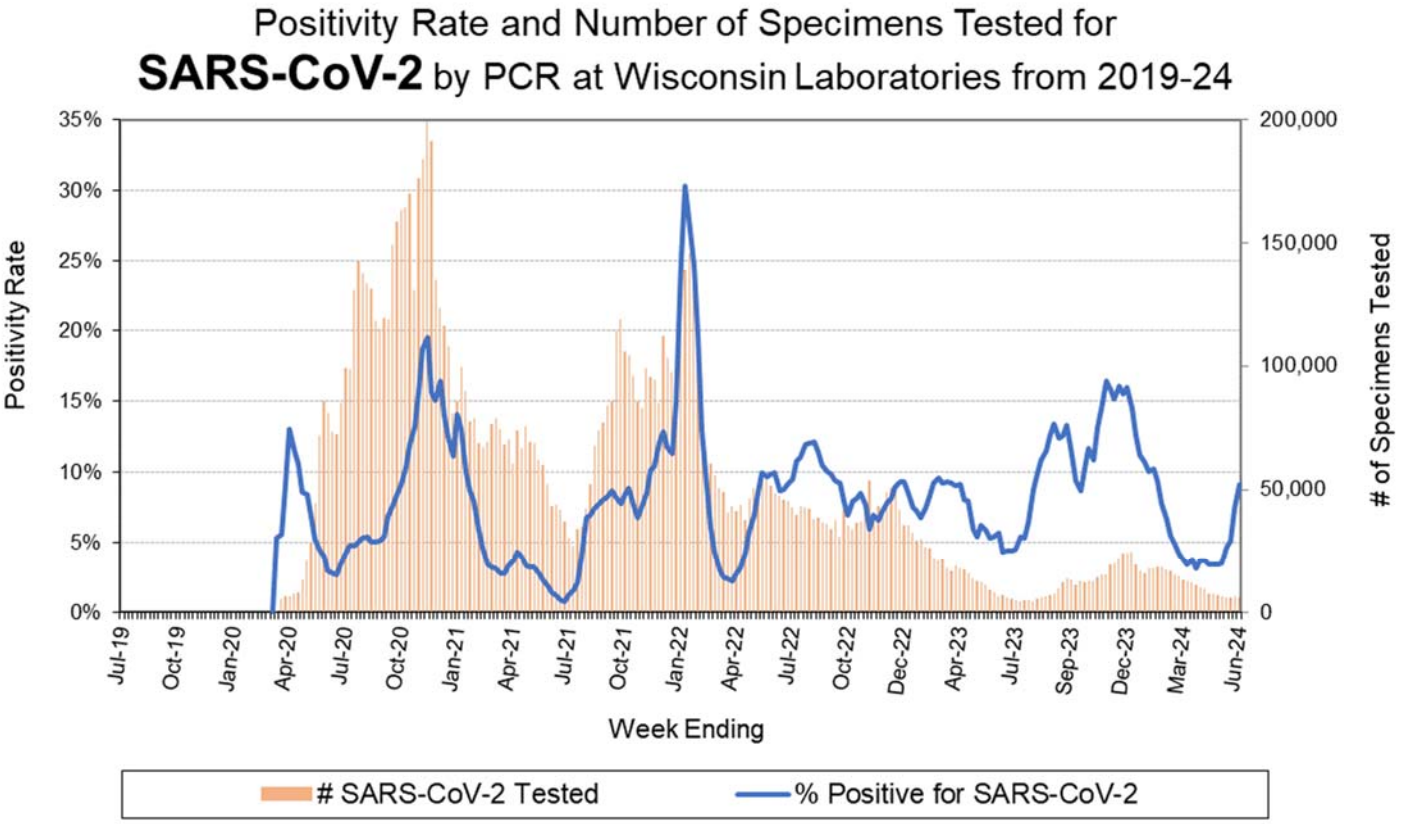


Surveillance Graphs for 2023-24 Season

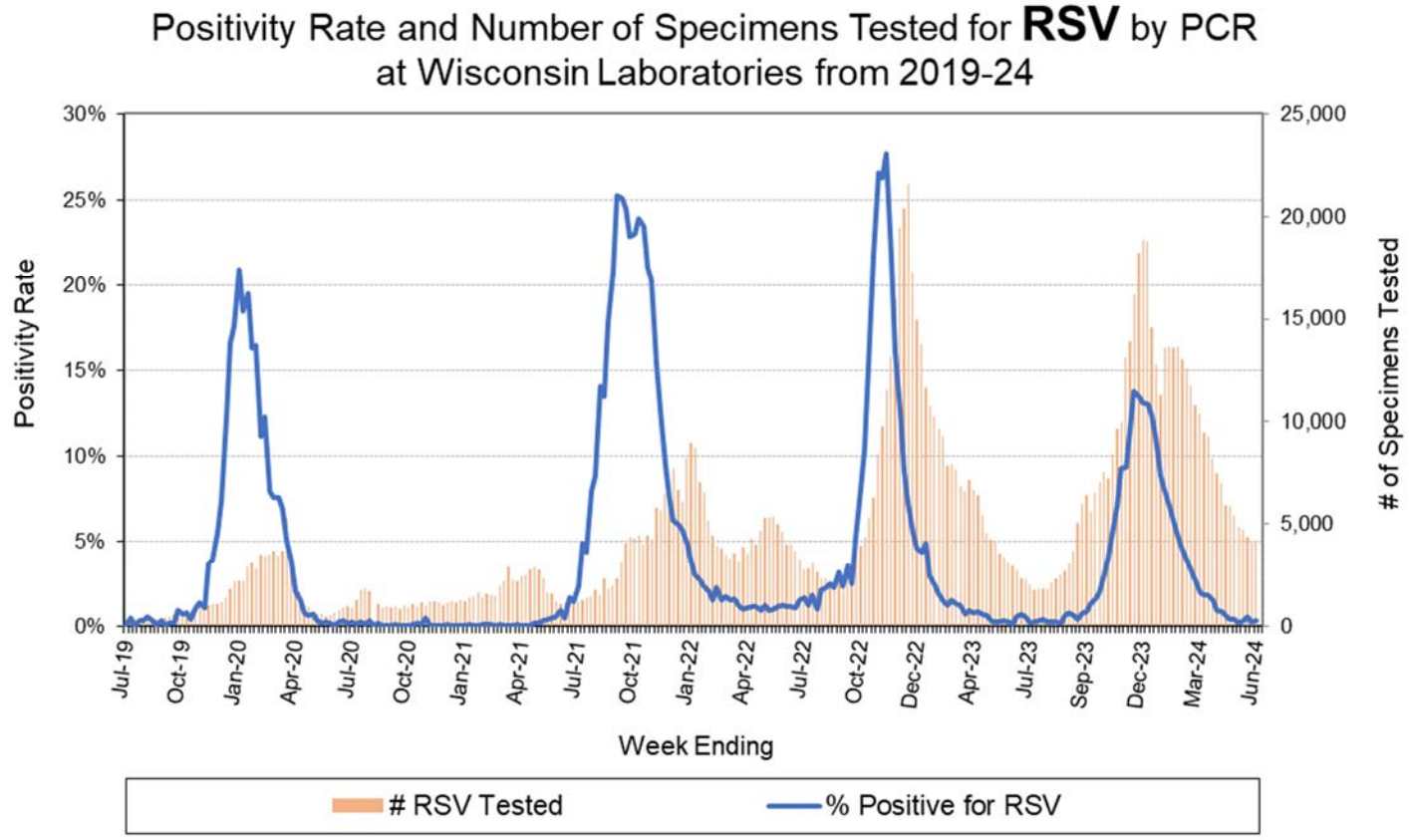


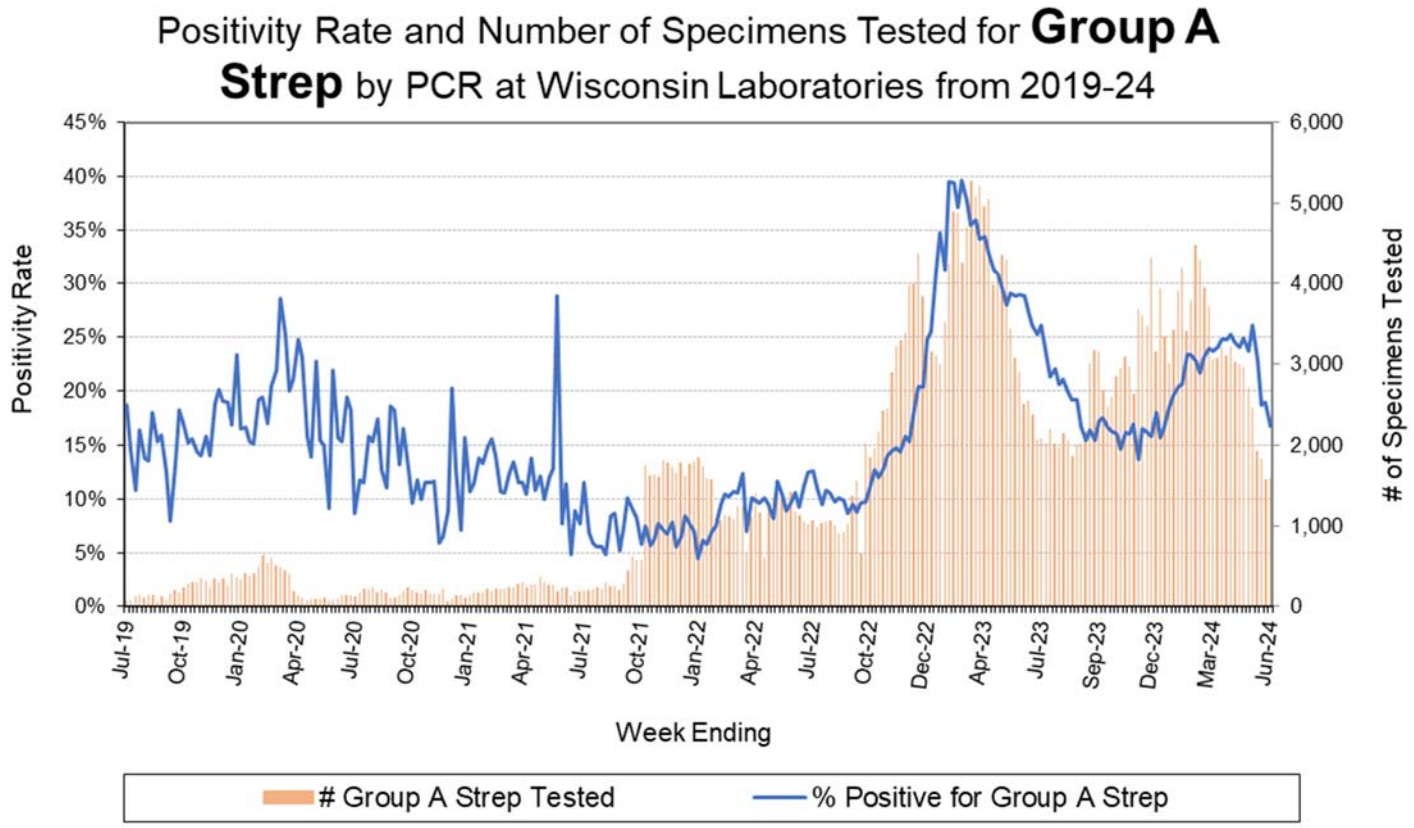
Surveillance Graphs - 5 Year Summary





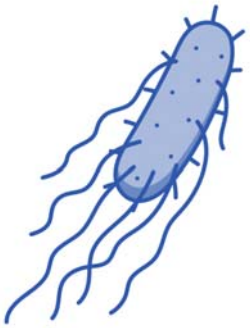
Surveillance Graphs - 5 Year Summary





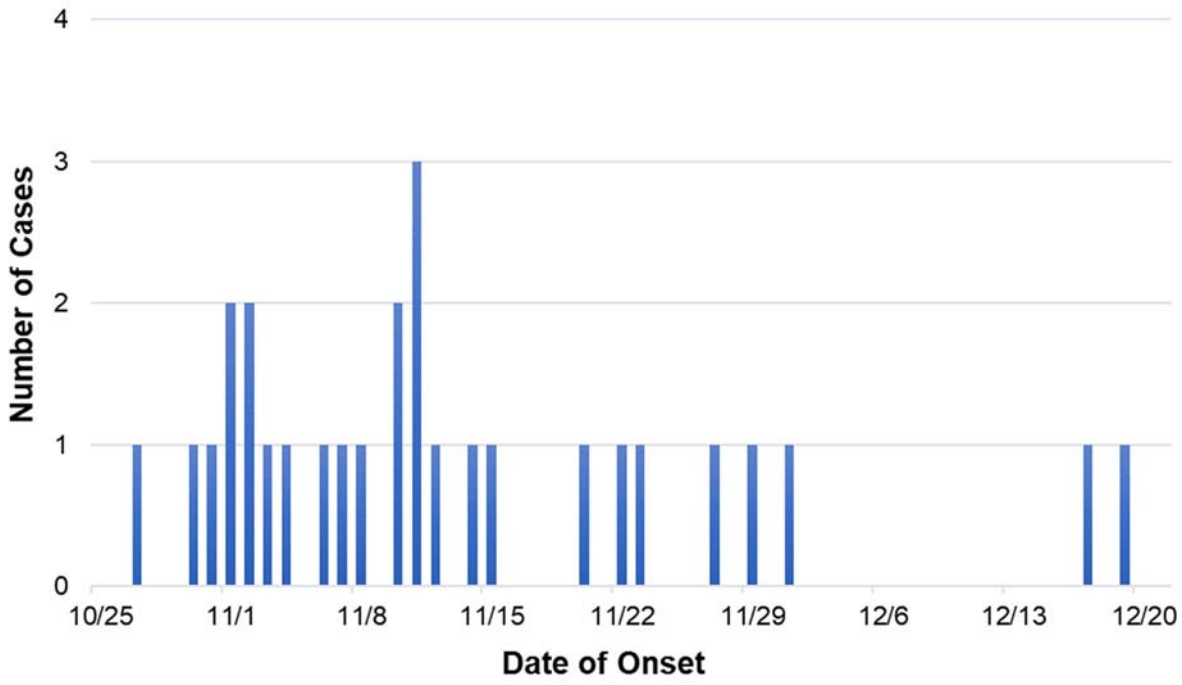
2023 *Salmonella* Outbreak Investigation

In November 2023, the Wisconsin Department of Health Services (DHS) worked to investigate a multistate outbreak of *Salmonella* Sundsvall and *Salmonella* Oranienburg infections linked to cantaloupe. Ultimately, 407 people in 44 states were infected with one of the two outbreak strains. Twenty-nine of those illnesses occurred in Wisconsin residents across 17 counties.



Salmonella Sundsvall had never been identified in a Wisconsin resident prior to this outbreak. Because the WSLH performs serotyping on all referred *Salmonella* isolates and positive specimens, DHS and local health departments were able to quickly gather more detailed information about melons that case-patients consumed before illness. This resulted in faster removal of contaminated produce from store shelves and prevention of further illness. The multistate investigation led to several recalls, at least four of which involved products distributed to Wisconsin.

Cases of *Salmonella* Sundvall and *Salmonella* Oranienburg linked to cantaloupe by date of onset, Wisconsin residents, October 2023 – December 2023 (N=28)



AR Lab Network State-wide Surveillance

Carbapenem Resistant *Acinetobacter baumannii*

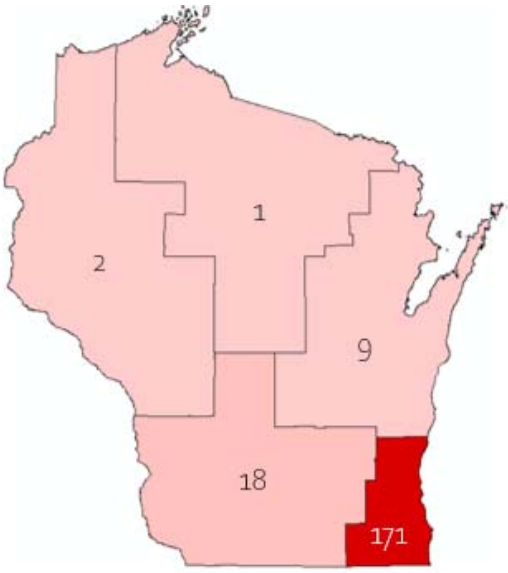
Nearly all carbapenem-resistant *Acinetobacter baumannii* (CRAB) infections occur in patients who recently received care in a healthcare facility. In 2017 CRAB infections attributed to $281 million in healthcare costs (2019 AR Threats Report; https://www.cdc.gov/antimicrobial-resistance/media/pdfs/2019-ar-threats-report-508.pdf). CRAB can survive in the environment for a long time and some CRAB isolates are resistant to nearly all antibiotics available, with few new drugs in development. CRAB can carry carbapenemases, which are encoded on mobile genetic elements and are easily shared between bacteria. 96% of all CRAB isolates submitted from Wisconsin carried a carbapenamase.

WSLH requests isolates of *Acinetobacter baumannii* that are resistant to any carbapenems to be submitted for surveillance testing. Testing performed at the WSLH includes identification, antimicrobial susceptibility testing, AR-targeted PCR and molecular subtyping. AR-targeted RT-PCR includes testing for 8 unique carbapenamase genes.

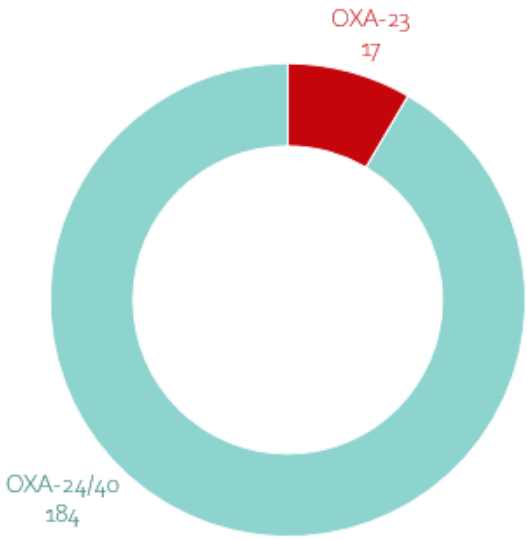
2023:

- WSLH received 210 CRAB isolates from Wisconsin laboratories in 2023.
    - Carbapenemase genes were detected by AR-targeted RT-PCR in 201 isolates (95.7%).
    - 43 CRAB isolates were non-susceptible to all antibiotics tested (20.7%).

Carbapenemases detected at WSLH in clinical CRAB isolates from Wisconsin laboratories in 2023



Carbapenamase detections in CRAB isolates, by region of the state.



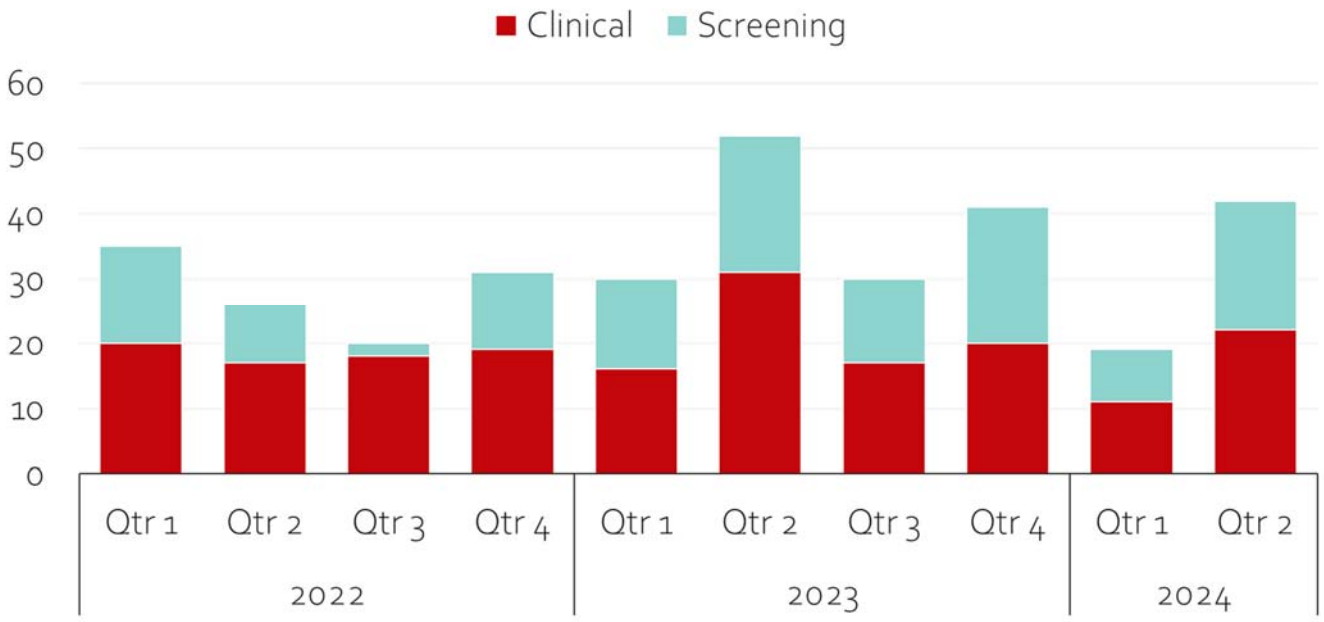
Carbapenamase genes detected in CRAB isolates by AR-targeted RT-PCR.

AR Lab Network State-wide Surveillance (Cont'd)

Colonization Testing for CRAB in Wisconsin

- WSLH performed screening on 1537 specimens in 2023 from 16 Wisconsin facilities.
  - CRAB was detected in 69 screening specimens (4.5%).

CRAB Cases Detected in Wisconsin from Clinical Cases (Infections) and Colonization Screenings



Carbapenem-Resistant *Pseudomonas aeruginosa* (CRPA)

Pseudomonas aeruginosa causes many types of healthcare-associated infections. Some *P. aeruginosa* are resistant to nearly all antibiotics, including carbapenems, and are known as multidrug-resistant (MDR) *P. aeruginosa*. In 2017, MDR *P. aeruginosa* caused an estimated 32,600 infections among hospitalized patients and 2,700 estimated deaths in the United States (2019 AR Threats Report).

WSLH requests *Pseudomonas aeruginosa* isolates that are resistant to carbapenems other than ertapenem AND non-susceptible to cefepime and/or ceftazadime. Testing performed at the WSLH includes identification, antimicrobial susceptibility testing, carbapenemase screening, AR-targeted PCR and molecular subtyping.

2023:

- WSLH received a total of 529 *P. aeruginosa* isolates from Wisconsin Laboratories in 2023.
  - Carbapenemase genes were detected by AR-targeted RT-PCR in 3 isolates (0.6%).
  - 14 CRPA isolates were non-susceptible to all antibiotics tested (2.6%).

AR Lab Network State-wide Surveillance (Cont'd)

Carbapenem-Resistant *Enterobacterales*

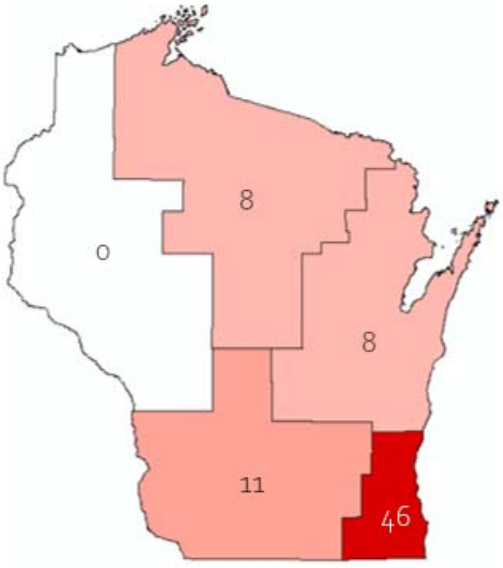
Carbapenem-resistant *Enterobacterales* (CRE) are a major concern for patients in healthcare facilities. In 2017, CRE caused an estimated 13,100 infections in hospitalized patients and about 1,100 deaths in the United States (2019 AR Threats Report). CRE can carry carbapenemases, an antibiotic resistance mechanism which makes carbapenam antibiotics ineffective. Carbapenamases are encoded on mobile genetic elements that are easily shared between bacteria. This increases the risk that antibiotic resistance will spread to other bacteria and/or other patients.

WSLH requests isolates of *Enterobacterales* that are resistant to any carbapenems to be submitted for surveillance testing. Testing performed at the WSLH includes identification, antimicrobial susceptibility testing, carbapenemase screening, AR-targeted PCR and molecular subtyping. AR-targeted RT-PCR includes testing for 5 unique carbapenamase genes.

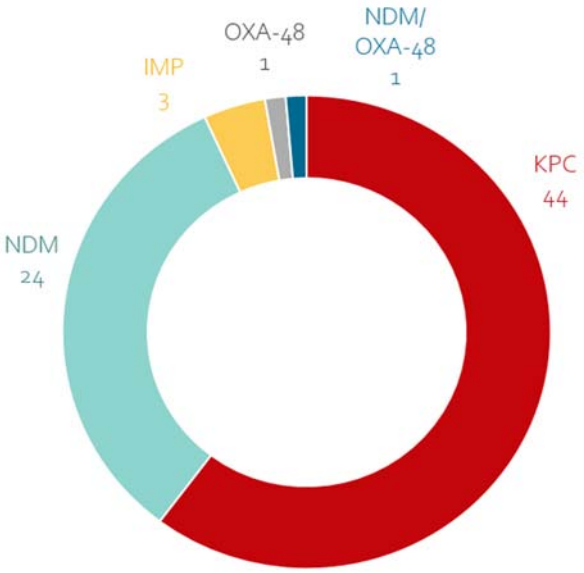
2023:

- WSLH received 400 CRE isolates from Wisconsin laboratories in 2023.
- Carbapenemase genes were detected by AR-targeted RT-PCR in 73 isolates (18.3%).
- 1 CRE isolate was non-susceptible to all antibiotics tested.

Carbapenemases detected at WSLH in CRE Isolates from Wisconsin laboratories in 2023



Carbapenamase detections in CRE isolates, by region of the state.



Carbapenamase genes detected in CRE isolates by AR-targeted RT-PCR.

AR Lab Network State-wide Surveillance (Cont'd)

Candida auris

Candida auris is an emerging multi-drug resistant yeast that can cause severe, life-threatening infections. *C. auris* affects ill or immunocompromised patients and is highly transmissible in healthcare settings. Patients can also be colonized with *C. auris* without having symptoms. Colonized patients can easily spread *C. auris* to other patients, and once a patient is colonized with *C. auris*, they are considered colonized for life! Early detection of clinical and colonized cases, followed by measures like colonization screening and infection control, can limit the spread of *C. auris*. The first Wisconsin resident with a *C. auris* infection was identified in 2021.

WSLH requests all *C. auris* isolates for identification, antimicrobial susceptibility testing and molecular subtyping. WSLH also performs *C. auris* colonization screening in response to positive cases or outbreaks at the discretion of the DPH.

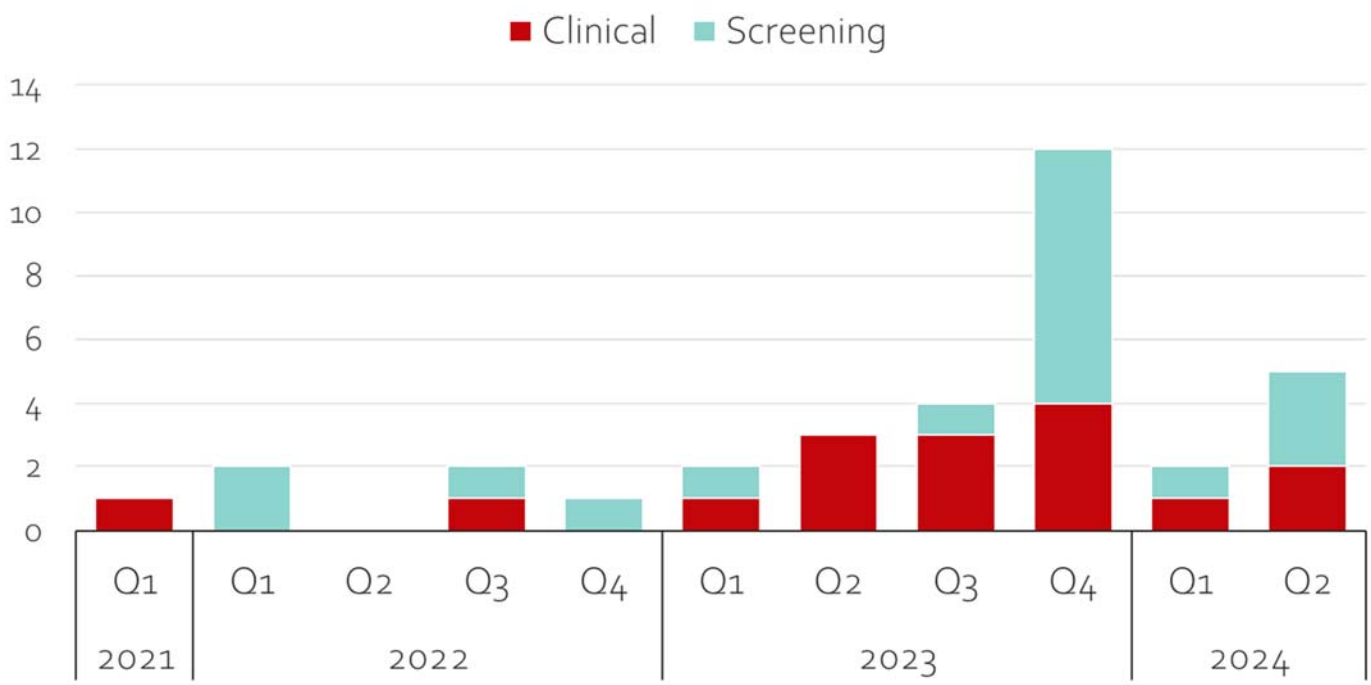
2023:

- WSLH received a total of 11 *C. auris* clinical isolates from Wisconsin Laboratories in 2023.
    - All isolates were susceptible to echinocandins and Amphotericin B
    - 53.3% of C. auris isolates from Wisconsin were resistant to azole antifungals.

Colonization Testing for *C. auris* in Wisconsin

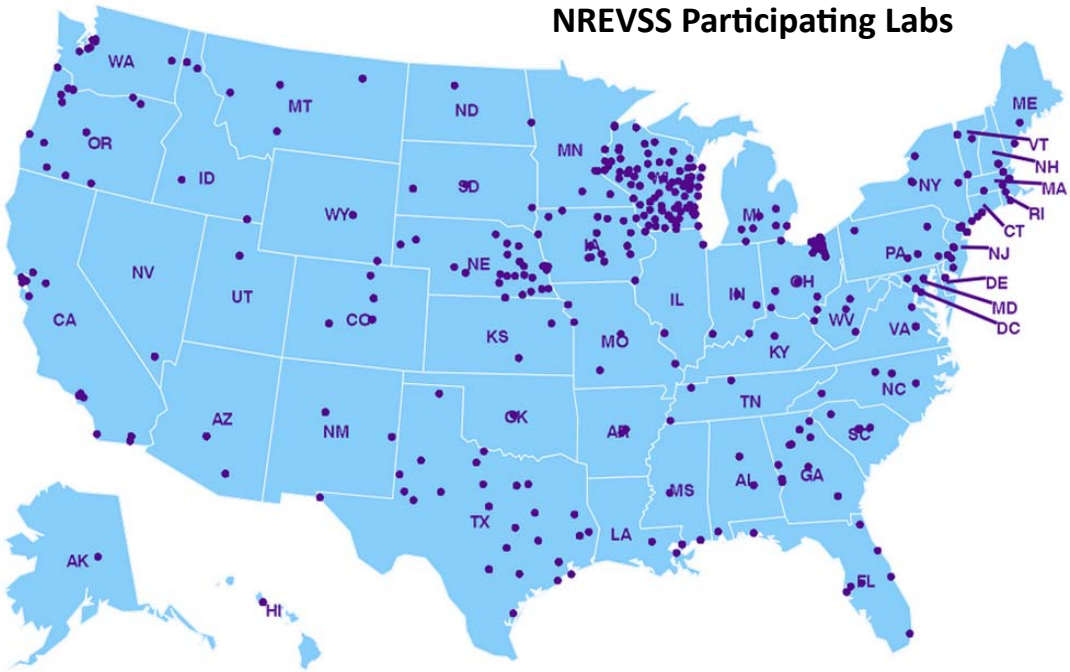
- WSLH performed screening on 1025 specimens in 2023 from 11 Wisconsin facilities.
    - *C. auris* was detected in 9 screening specimens (0.9%).

Candida auris Cases Detected in Wisconsin from Clinical Cases (Infections) and Colonization Screenings



THANK YOU FOR YOUR PARTICIPATION IN LABORATORY-BASED SURVELLANCE!!

NREVSS Participating Labs



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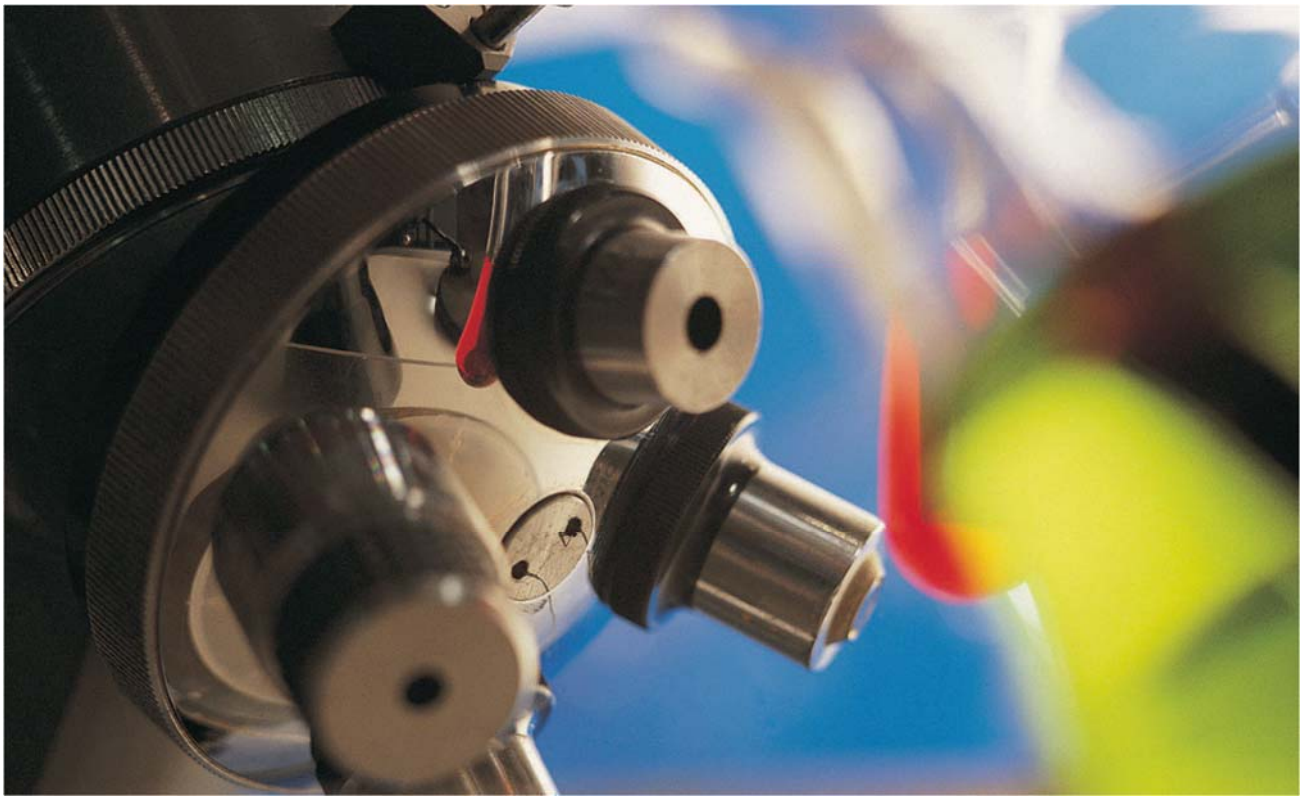

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