Recommended diagnostic lab tests and related specimens for confirmation of selected vaccine-preventable diseases (VPD)

Many VPDs are now rare due to strong vaccination programs. However, with the recent declines in vaccination rates, recognizing a VPD case may be more difficult, but incredibly important to trigger public health mitigation measures. Therefore, when uncommon diseases are suspected (e.g., measles or mumps), it is critical to promptly collect specimens **at the time of the visit**. Please notify the local health department of residence within 24 hours to report the case, coordinate specimen submission, and approval. Many VPD diagnostic lab tests are available through MDHHS Bureau of Laboratories (BOL) for purposes of public health actions and follow-up. Contact MDHHS Division of Immunization to discuss or arrange: 517-335-8159. If unable to reach someone, contact MDHHS Communicable Disease Division at 517-335-8165 or BOL, Division of Infectious Disease at 517-335-8067. More information on diagnostic testing offered via MDHHS BOL is available in the MDHHS A-Z Testing.

Note: VPD lab services indicated here are for diagnostic and public health-related activities. MDHHS BOL offers separate immune status testing on a fee-for-service basis for health care workers and medical/nursing/allied health students; call 517-241-5583 for more information.

Disease	Epidemiology in the US	Recommended Test(s)	Specimen(s)	Timing for specimen collection	Testing logistics & considerations	Comments
Diphtheria	Less than 1 per year	Culture and PCR	Throat, Nasopharyngeal (NP), or Diphtheritic membrane Swabs	As soon as possible	Specimens should be sent to MDHHS, for forwarding to CDC. CDC should be consulted prior to sending specimens for forwarding	Testing done via CDC
***Haemophilus influenzae* (Hib) disease**	Among children younger than 5 years of age in 2018, the rate of invasive H. influenzae disease was 0.08 per 100,000 population	Culture	Isolates from normally sterile sites	At time of symptom onset to until 24-48 hours after antimicrobial therapy	Send isolates from sterile sites to MDHHS BOL for serotyping, specifically those isolates from individuals <15 years of age	Vaccination prevents only serotype B *Haemophilus influenzae* infections

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Hepatitis A (HAV)	From 2016-2021, over 37,000 outbreak-associated cases reported from 35 states	Serology (HAV IgM)	Serum sample	As soon as possible after symptom onset	HAV IgM will be undetectable 6 months after illness onset. Forward any positive samples to MDHHS BOL for sequencing, see line below for additional details. HAV IgG or HAV Total tests only indicate prior infection or immunization. Test ALTs at the time of serologic specimen collection	MDHHS BOL performs this test to confirm results of testing performed at another laboratory or as part of an outbreak investigation. Obtain prior approval from MDHHS Communicable Disease Division or BOL Virology Section Manager
		NAAT, PCR, or Genotyping	Serum sample	As soon as possible after symptom onset	MDHHS BOL does not offer official reports directly to submitters, genotyping is performed to determine viral genotype and strain identification for epidemiologic purposes.	Obtain prior approval from MDHHS Communicable Disease Division or BOL Virology Section Manager

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Hepatitis B (HBV)	1.0 cases per 100,000 population in 2018	Serology (HBsAg or IgM Anti-HBc)	Serum sample	As soon as possible after symptom onset	MDHHS BOL performs HBsAg testing weekly; IgM Anti-HBc available via commercial laboratories	Case's pregnancy status and exposure to a known HBV infected individual must be noted on MDHHS BOL form; Test ALTs at the time of serologic specimen collection.
		NAAT, PCR, or Genotyping	Serum sample	As soon as possible after symptom onset	MDHHS BOL does not perform this test; available via most commercial laboratories	Viral presence is an indicator of Acute HBV infection
Influenza	9.3 to 45 million people experience symptomatic illness annually	PCR or Viral Culture	Nasopharyngeal swabs, Oropharyngeal swabs, Nasal aspirates, Throat swabs, Bronchoalveolar lavage, bronchial wash, sputum, lung tissue and viral isolates	Adults up to 5 days after onset, Children and infants up to 10 days after onset	MDHHS BOL performs testing weekly during Influenza Season (September – May), and as needed during off-season months.	Testing is performed for surveillance purposes only; Confirmatory influenza testing is encouraged for cases of public health interest (ICU hospitalized patients, severely ill pregnant women, patients with unusual or severe presentations, death) and for congregate setting outbreak/cluster investigations

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Measles	In 2019, 13 outbreaks reported; under-immunized communities accounted for 88% of cases	Serology (Measles IgM)	Serum sample	3-30 days after rash onset	False positive measles IgM results have been observed in persons with rash-illness caused by parvovirus B19, rubella, roseola, or dengue; IgM antibodies should be confirmed by performing PCR testing	Obtain prior approval from MDHHS.
		PCR/Viral Isolation	Throat or Nasopharyngeal (NP) swabs	Up to 7 days after rash onset, ideally within 3 days of rash onset	Refer to BOL Measles Specimen Collection Instructions. Refrigerate specimens after collection; Transport with refrigerant packs; If delay in shipping, keep sample frozen at -70°C and ship on dry ice	Obtain prior approval from MDHHS.
		PCR/Viral Isolation	Urine	Within first week after rash onset, maximum 9 days after rash onset	Collection of urine may enhance the likelihood of successful measles viral RNA or viral isolation and may be advisable in some situations such as when more than 5 days have elapsed since rash onset	Throat or NP swabs are preferred over urine specimens. Obtain prior approval from MDHHS. MDHHS will forward urine specimens to CDC or Wisconsin State Laboratory of Hygiene for testing.

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Meningococcal Disease	In 2018, 329 total cases reported (0.10 per 100,000 population)	PCR	CSF and blood	Prior to the start of antibiotic therapy	MALDI-TOF used for identification at MDHHS BOL	
		Culture Isolate	CSF and blood isolates	Prior to the start of antibiotic therapy	*N. meningitidis* cultures will be serogrouped only on isolates recovered from blood or cerebral spinal fluid	Vaccination only protects against serogroups A, B, C, W, and Y
Mpox/Orthopox	During the 2022 Clade 2 IIb outbreak over 30,000 cases were reported	PCR	Dry swab of lesion	While rash lesions are present	No more than 3 sites/swabs per patient will be tested	Refrigerated specimens can be stored for up to 7 days and frozen specimens may be stored for up to a month.
Mumps	During January 2016 - June 2017, 150 outbreaks were reported in 37 states, accounting for more than 9,000 cases	Serology (Mumps IgM)	Serum	3-30 days after parotitis onset	Separate serum from blood by centrifugation and pour into PLASTIC serum tube refrigerate, or freeze serum if it cannot be shipped and received in MDHHS lab within 3 days	Obtain prior approval from MDHHS Immunization Division
		PCR	Buccal/parotoid duct swab	0-9 days after parotitis onset	Use only Dacron-tipped swabs with an aluminum or a plastic shaft; place in vial of viral transport medium	Obtain prior approval from MDHHS Immunization Division

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Novel Coronavirus SARS-CoV-2 (COVID-19)	From March 2020 – April 2023 there were over 104 million COVID-19 cases reported in the US	PCR	Nasopharyngeal, nasal, midturbinate, or Oropharyngeal swabs. Nasal aspirates	5 days after exposure or at time of symptom onset up to 90 days after onset	Swabs should be shipped in viral transport medium or PBS	Swabs with calcium alginate or cotton tips and wooden shafts are unacceptable
Pertussis	In 2018, pertussis incidence per 100,000 was 72.3 in infants younger than 6 months of age and 32.7 in infants age 6 to 12 months	Culture or PCR	Nasopharyngeal swab	Generally first 1- 2 weeks of cough up to 21 days after onset, or until 5th day of antibiotic treatment	Dacron swabs (on aluminum or plastic shafts) are recommended	Swabs can be sent in dry transport tube

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Polio	In 2022 there was a case of polio in an unvaccinated individual reported from a New York resident	Serology	Serum	Acute phase specimen: collect as soon after onset of paralysis as possible Convalescent phase specimen: collect at least 3 weeks after acute specimen	Separate serum from blood by centrifugation and pour into PLASTIC serum tube refrigerate, or freeze serum if it cannot be shipped and received by MDHHS BOL within 3 days	These tests are by special request and arrangement only; advance notification and arrangement necessary - contact MDHHS Immunizations Division
		PCR	2 or more stool specimens 2 or more throat swab specimens	First specimens should be obtained as soon as possible, but ideally within the first 15 days after onset of paralytic disease; Second specimen should be obtained 24 hours after the first specimen	Stool specimens collected >2 months after the onset of paralytic manifestations are unlikely to yield poliovirus. Throat swabs are less often positive than stool samples, and virus is rarely detected in CSF	These tests are by special request, performed either at MDHHS or CDC; advance arrangement required - contact MDHHS Immunizations Division

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Respiratory Syncytial Virus (RSV)	Each year in the US, RSV leads to approximately, 2.1 million outpatient (non-hospitalization) visits among children younger than 5 years old	PCR	Nasopharyngeal swab	While symptoms are present	Specimens must be tested within 4 hours if stored at room temperature, within 3 days if stored refrigerated or within 30 days if stored frozen	Obtain prior approval from MDHHS Communicable Disease Division Swabs with calcium alginate or cotton tips and wooden shafts are unacceptable

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Rubella	In 2004, endemic rubella was declared eliminated in the United States, with fewer than 10 cases reported annually and less than one Congenital Rubella Syndrome case per year	Serology	Serum	Serum for IgM 3-30 days after rash onset If serum collected <5 days after rash onset is negative, collect a new specimen 5+ days after rash onset.	Separate serum from blood by centrifugation and pour into PLASTIC serum tube refrigerate or freeze serum if it cannot be shipped and received in MDHHS Laboratory within 3 days	Obtain prior approval from MDHHS Communicable Disease Division or Immunizations Division
		Viral Culture/ PCR	Throat swabs 50-100 ml of Urine	Collect during acute illness, ideally within 4 days of rash onset Collect within 4 days of rash onset with first morning void	Swab should be placed and viral transport media and refrigerated or frozen if not able to ship within 48 hours Centrifuge if possible, ship resuspended sediment in viral culture or cell culture medium and freeze. If unable to centrifuge refrigerate	Obtain prior approval from MDHHS Communicable Disease Division or Immunizations Division

Disease	Epidemiology in the US	Recommended Test(s)	Specimen(s)	Timing for specimen collection	Testing logistics & considerations	Comments
Varicella (Chickenpox)	Fewer than 150,000 cases, 1,400 hospitalizations, and 30 deaths each year	PCR	Swabs of fluid from unroofed vesicles and/or crusts	As long as vesicles are present	Use synthetic swabs (e.g., polyester) and place in a sterile, empty tube (do not place transport medium in the tube); Crusts or scabs can be collected with a tweezer; placed into a sterile dry container	Varicella diagnostic testing is not available at MDHHS, but arrangements can be made for testing at CDC; Commercial laboratories also offer varicella-zoster virus testing
		DFA	Scraping or swab from the base of open vesicles	As long as vesicles are present	DFA tests are an alternate method of confirmation; these are not as sensitive as PCR	Varicella diagnostic testing is not available at MDHHS, but arrangements can be made for testing at CDC; Commercial laboratories also offer varicella-zoster virus testing