Norovirus and Norovirus-Like Illness (NLI) in Michigan

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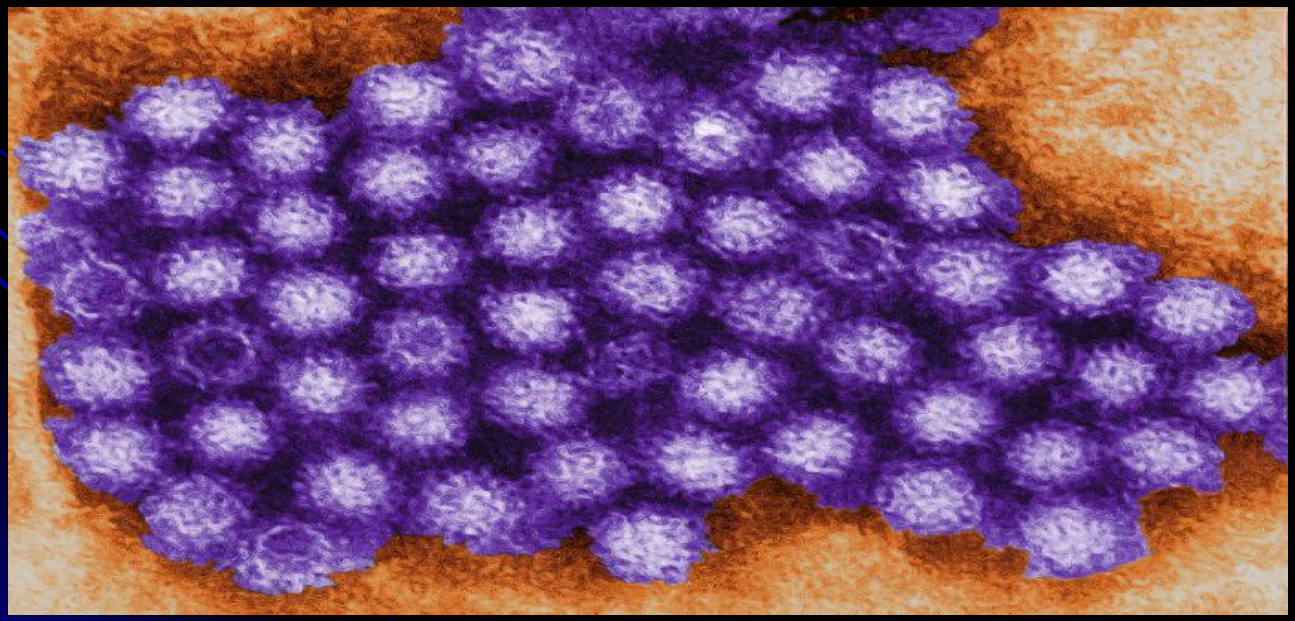
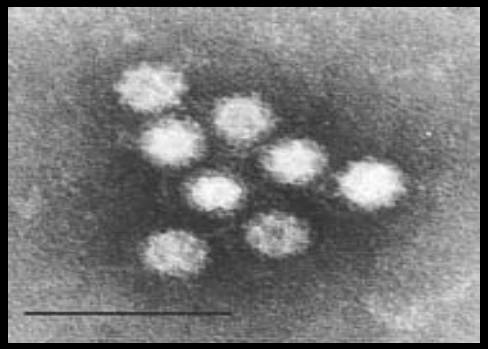
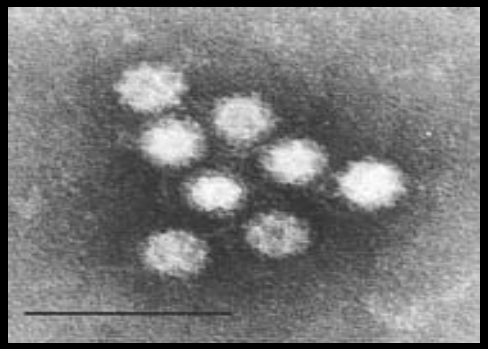




Norovirus

- **Incubation: 12–48 hours (median 33–36 hours)**
- **Duration: 12–60 hours**
- **Symptoms: diarrhea, vomiting, nausea, abdominal cramping, low grade fever**
- **Survival on surfaces:**
  - **40°F, >60 days**
  - **68°F (room temp), 21-28 days**
  - **98.6°F, less than 1 day**



Norovirus

- Viral shedding: up to 2–3 weeks (peaks at 4 days)
- 10^{10} viral particles per gram of feces
- Infectious dose: 18–1,000 virus particles
  - Less than 20 virons (virus particles) can be infectious
  - Virons can stick together like Velcro and form a clump (usually containing 20–30 virons)
- Short-term immunity: <6–12 months

Disease Burden Estimates per Year, United States

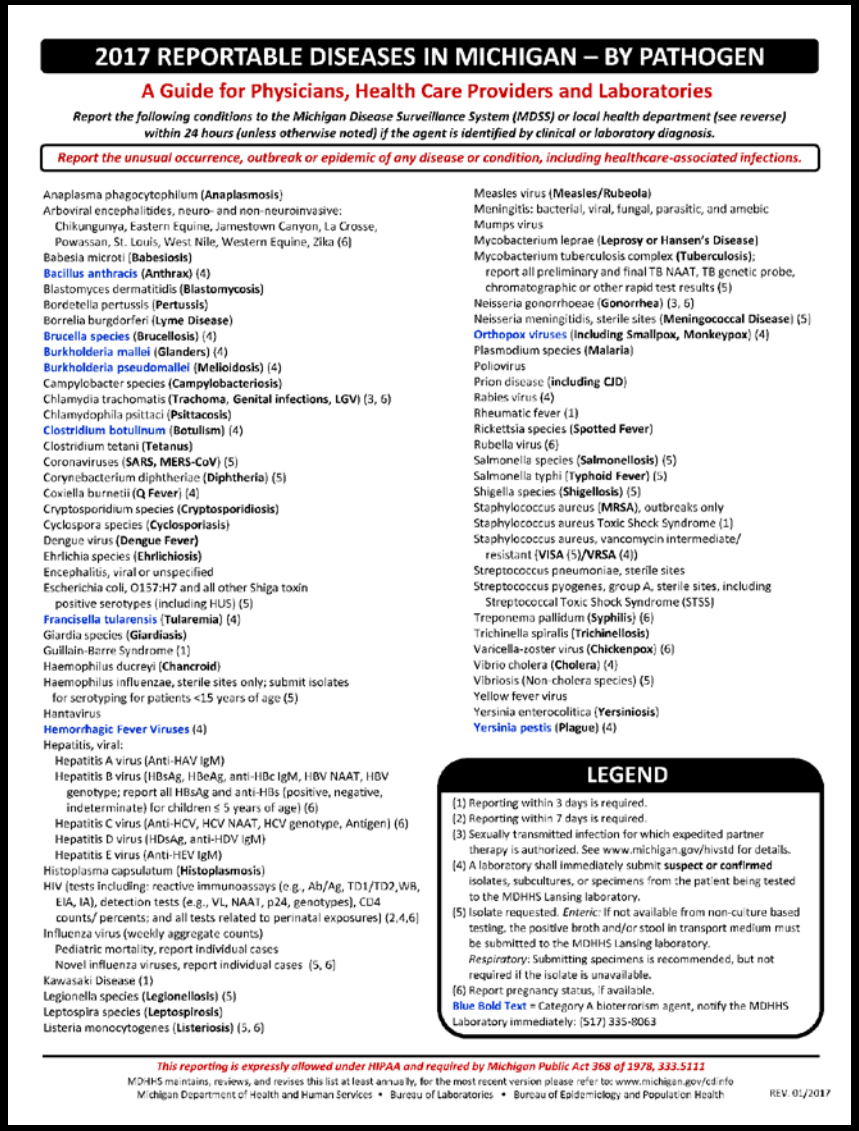
- 21 million cases
- 1.7 million outpatient visits
- 414,000 ED visits
- 71,000 hospitalizations
- 800 deaths

Required Outbreak Reporting: Public Health

- **R 325.173 Details the reporting requirements for health care providers, health care facilities, and clinical laboratories**
- **R 325.174 Gives local and state public health officials the authority to investigate possible cases of illness**
- **www.michigan.gov/orr**

Disease Reporting

- "…report any unusual occurrence, outbreak, or epidemic of any disease or condition including healthcare-associated infections."
- Report within 24 hours of outbreak detection
- Report to LHD or MDCH
- Any information pertinent to the outbreak should be reported
  - E.g., Number ill, onset, incubation, duration, organism, control measures



2017 REPORTABLE DISEASES IN MICHIGAN – BY PATHOGEN

A Guide for Physicians, Health Care Providers and Laboratories

Report the following conditions to the Michigan Disease Surveillance System (MDSS) or local health department (see reverse) within 24 hours (unless otherwise noted) if the agent is identified by clinical or laboratory diagnosis.

Report the unusual occurrence, outbreak or epidemic of any disease or condition, including healthcare-associated infections.

Anaplasma phagocytophilum (**Anaplasmosis**)
Arboviral encephalitides, neuro- and non-neuroinvasive:
Chikungunya, Eastern Equine, Jamestown Canyon, La Crosse, Powassan, St. Louis, West Nile, Western Equine, Zika (6)
Babesia microti (**Babesiosis**)
Bacillus anthracis (**Anthrax**) (4)
Blastomyces dermatitidis (**Blastomycosis**)
Bordetella pertussis (**Pertussis**)
Borrelia burgdorferi (**Lyme Disease**)
Brucella species (**Brucellosis**) (4)
Burkholderia mallei (**Glanders**) (4)
Burkholderia pseudomallei (**Melioidosis**) (4)
Campylobacter species (**Campylobacteriosis**)
Chlamydia trachomatis (**Trachoma, Genital infections, LGV**) (3, 6)
Chlamydophila psittaci (**Psittacosis**)
Clostridium botulinum (**Botulism**) (4)
Clostridium tetani (**Tetanus**)
Coronaviruses (**SARS, MERS-CoV**) (5)
Corynebacterium diphtheriae (**Diphtheria**) (5)
Coxiella burnetii (**Q Fever**) (4)
Cryptosporidium species (**Cryptosporidiosis**)
Cyclospora species (**Cyclosporiasis**)
Dengue virus (**Dengue Fever**)
Ehrlichia species (**Ehrlichiosis**)
Encephalitis, viral or unspecified
Escherichia coli, O157:H7 and all other Shiga toxin positive serotypes (including HUS) (5)
Francisella tularensis (**Tularemia**) (4)
Giardia species (**Giardiasis**)
Guillain-Barre Syndrome (1)
Haemophilus ducreyi (**Chancroid**)
Haemophilus influenzae, sterile sites only; submit isolates for serotyping for patients <15 years of age (5)
Hantavirus
Hemorrhagic Fever Viruses (4)
Hepatitis, viral:
Hepatitis A virus (Anti-HAV IgM)
Hepatitis B virus (HBsAg, HBeAg, anti-HBc IgM, HBV NAAT, HBV genotype; report all HBsAg and anti-HBs (positive, negative, indeterminate) for children ≤ 5 years of age) (6)
Hepatitis C virus (Anti-HCV, HCV NAAT, HCV genotype, Antigen) (6)
Hepatitis D virus (HDsAg, anti-HDV IgM)
Hepatitis E virus (Anti-HEV IgM)
Histoplasma capsulatum (**Histoplasmosis**)
HIV (tests including: reactive immunoassays (e.g., Ab/Ag, TD1/TD2,WB, EIA, IA), detection tests (e.g., VL, NAAT, p24, genotypes), CD4 counts/ percents; and all tests related to perinatal exposures) (2,4,6)
Influenza virus (weekly aggregate counts)
Pediatric mortality, report individual cases
Novel influenza viruses, report individual cases (5, 6)
Kawasaki Disease (1)
Legionella species (**Legionellosis**) (5)
Leptospira species (**Leptospirosis**)
Listeria monocytogenes (**Listeriosis**) (5, 6)
Measles virus (**Measles/Rubeola**)
Meningitis: bacterial, viral, fungal, parasitic, and amebic
Mumps virus
Mycobacterium leprae (**Leprosy or Hansen's Disease**)
Mycobacterium tuberculosis complex (**Tuberculosis**):
report all preliminary and final TB NAAT, TB genetic probe, chromatographic or other rapid test results (5)
Neisseria gonorrhoeae (**Gonorrhea**) (3, 6)
Neisseria meningitidis, sterile sites (**Meningococcal Disease**) (5)
Orthopox viruses (**Including Smallpox, Monkeypox**) (4)
Plasmodium species (**Malaria**)
Poliovirus
Prion disease (**including CJD**)
Rabies virus (4)
Rheumatic fever (1)
Rickettsia species (**Spotted Fever**)
Rubella virus (6)
Salmonella species (**Salmonellosis**) (5)
Salmonella typhi (**Typhoid Fever**) (5)
Shigella species (**Shigellosis**) (5)
Staphylococcus aureus (**MRSA**), outbreaks only
Staphylococcus aureus Toxic Shock Syndrome (1)
Staphylococcus aureus, vancomycin intermediate/ resistant (**VISA** (5)/**VRSA** (4))
Streptococcus pneumoniae, sterile sites
Streptococcus pyogenes, group A, sterile sites, including Streptococcal Toxic Shock Syndrome (STSS)
Treponema pallidum (**Syphilis**) (6)
Trichinella spiralis (**Trichinellosis**)
Varicella-zoster virus (**Chickenpox**) (6)
Vibrio cholera (**Cholera**) (4)
Vibriosis (Non-cholera species) (5)
Yellow fever virus
Yersinia enterocolitica (**Yersiniosis**)
Yersinia pestis (**Plague**) (4)

LEGEND

(1) Reporting within 3 days is required.
(2) Reporting within 7 days is required.
(3) Sexually transmitted infection for which expedited partner therapy is authorized. See www.michigan.gov/hivstd for details.
(4) A laboratory shall immediately submit **suspect or confirmed** isolates, subcultures, or specimens from the patient being tested to the MDHHS Lansing laboratory.
(5) Isolate requested. *Enteric:* If not available from non-culture based testing, the positive broth and/or stool in transport medium must be submitted to the MDHHS Lansing laboratory.
Respiratory: Submitting specimens is recommended, but not required if the isolate is unavailable.
(6) Report pregnancy status, if available.
Blue Bold Text = Category A bioterrorism agent, notify the MDHHS Laboratory immediately: (517) 335-8063

This reporting is expressly allowed under HIPAA and required by Michigan Public Act 368 of 1978, 333.5111

MDHHS maintains, reviews, and revises this list at least annually, for the most recent version please refer to: www.michigan.gov/cdinfo
Michigan Department of Health and Human Services • Bureau of Laboratories • Bureau of Epidemiology and Population Health

REV. 01/2017

Disinfection

- Virus is viable up to 7 days on inanimate objects
- Must remove visible contaminants of vomitus and diarrhea prior to disinfection
- Use dilute bleach (inexpensive and effective)
- Alternatives:
  - EPA-registered disinfectants
  - Accelerated Hydrogen Peroxide
  - Glutaraldehyde (0.5%)
  - Iodine (0.8%)
  - Lysol® or Pinesol® (2–4x manufacturer's recommended concentration)

Disinfection Concentrations

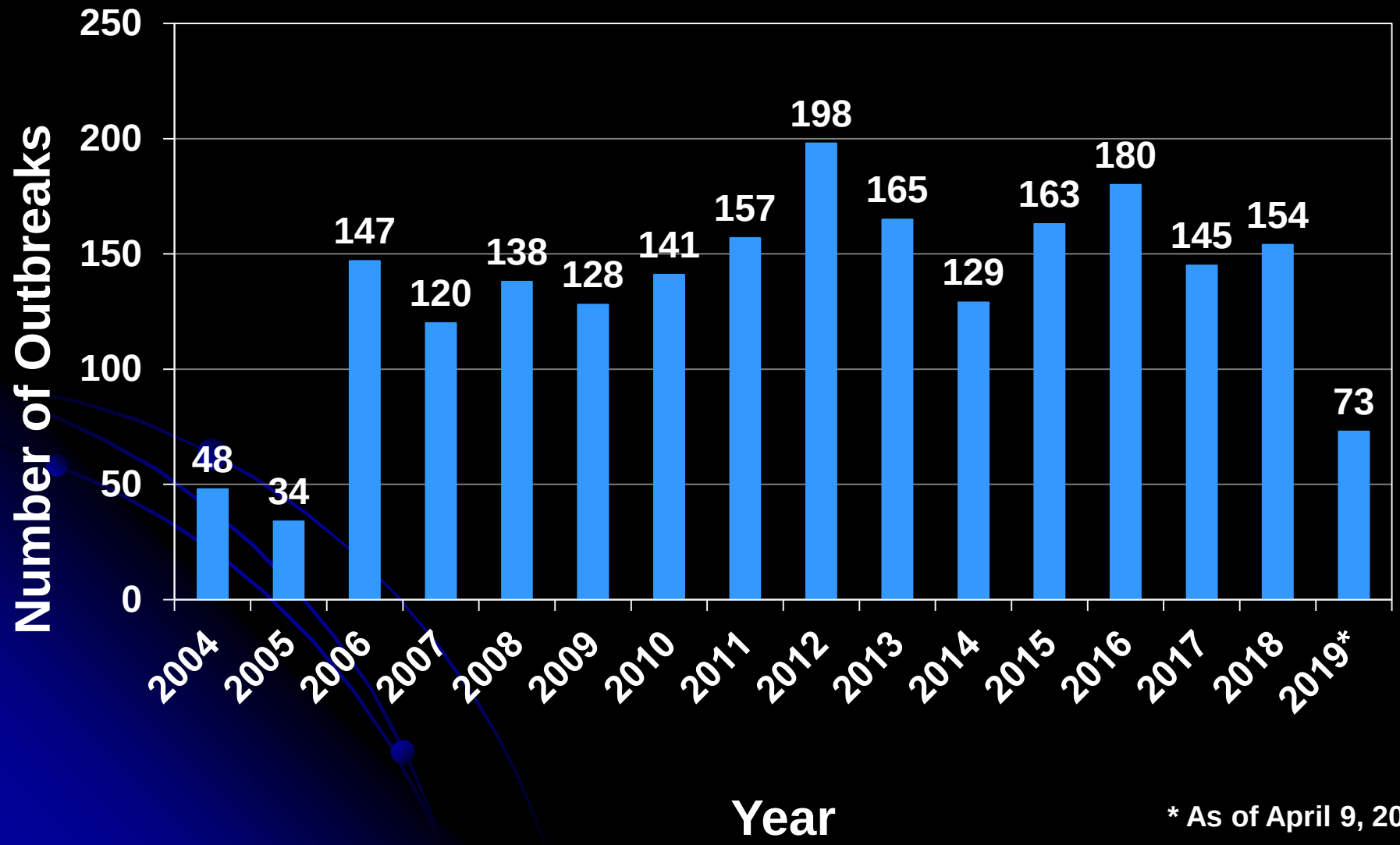
- Stainless steel, food/mouth items, toys
  - 200ppm
  - 1 tablespoon of bleach to 1 gallon of water
- Non-porous surfaces, tile floors, counter-tops, sinks, toilets
  - 1000ppm
  - 1/3 cup bleach to 1 gallon of water
- Porous surfaces, wooden floors
  - 5000ppm
  - 1 and 1/2 cup bleach to 1 gallon water

Norovirus-Like Illness (NLI) Outbreak Definition

Gastrointestinal illness (GI) clusters are defined as NLI outbreaks when:

- **Cases present with signs and symptoms consistent with norovirus infection**
- **Are not laboratory confirmed as norovirus**
- **For facilities (e.g., hospitals, schools, daycares, prisons), GI activity is above normal baseline**

NLI Outbreaks per Year, Michigan 2004–2019*



* As of April 9, 2019

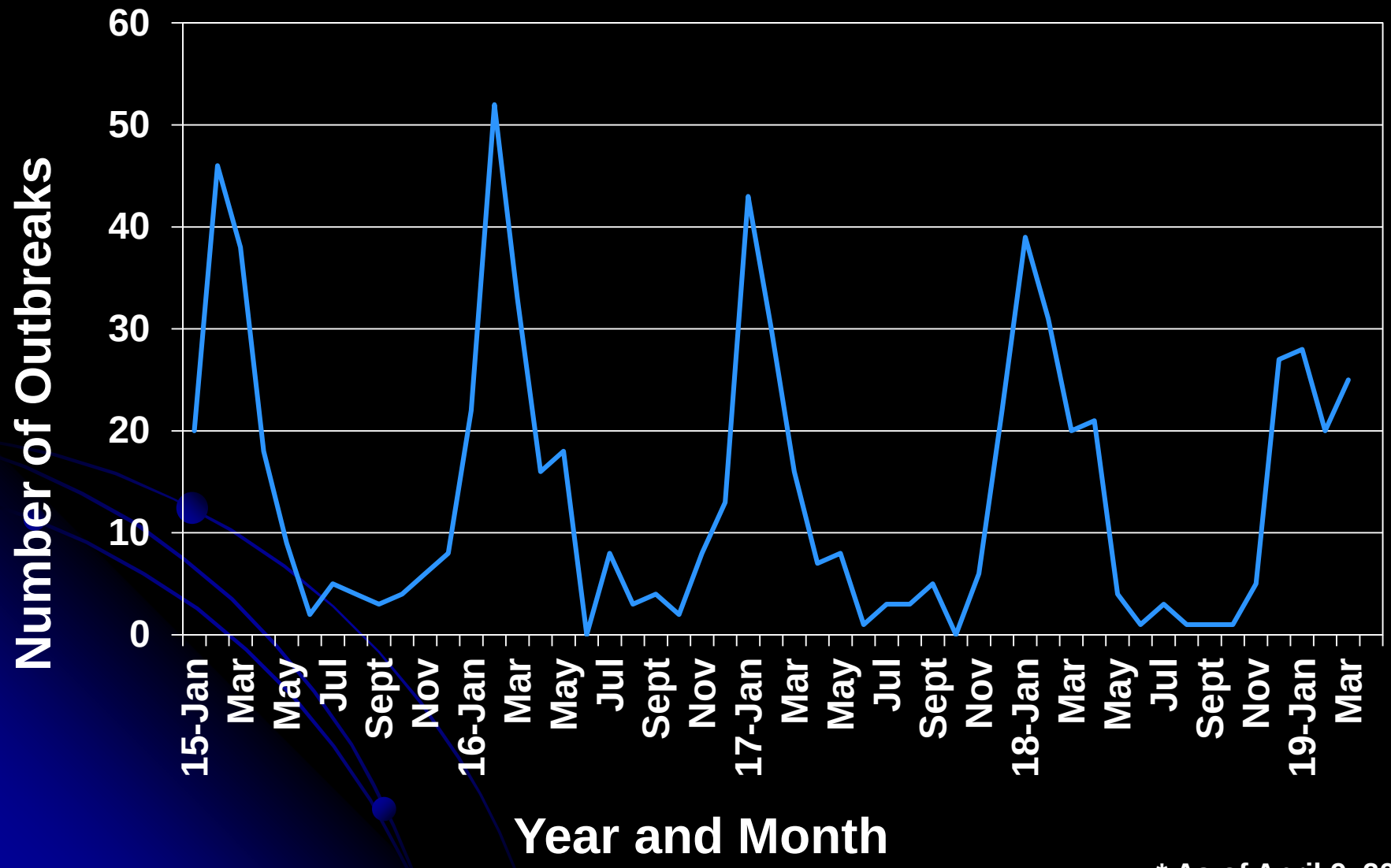
NLI Outbreaks and Case Counts[1], Michigan 2014–2019*

Year	Total Outbreaks	Cases
2014	129	3,292
2015	163	3,820
2016	180	3,924
2017	145	4,543
2018	154	2,513
2019*	73	1,128

[1] Case counts based on initial report

* As of April 9, 2019

NLI Outbreaks by Onset Date per Month, Michigan Jan 2015–April 2019*



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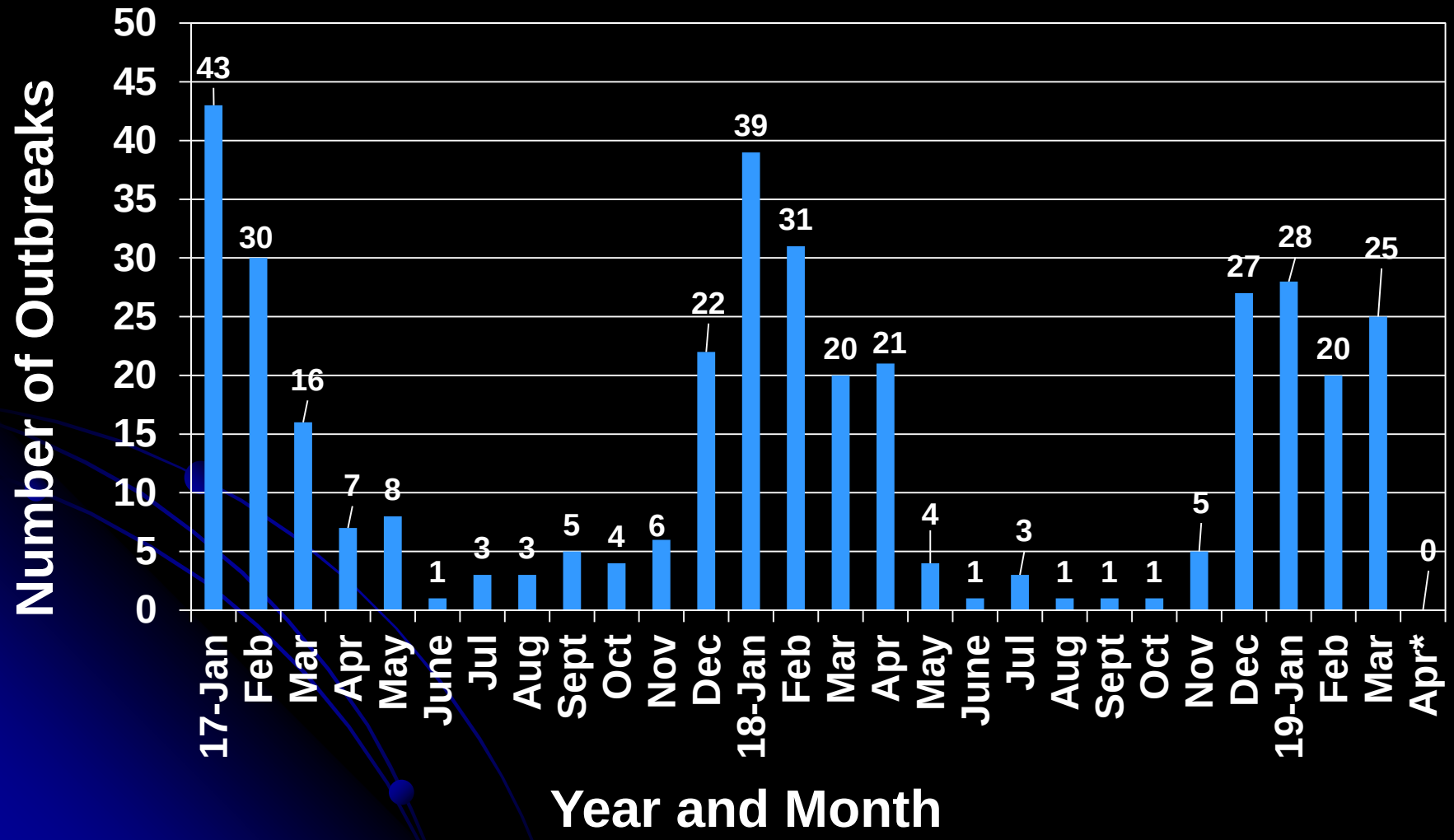
NLI Outbreaks by Onset Date per Month, Michigan Jan 2017–April 2019*



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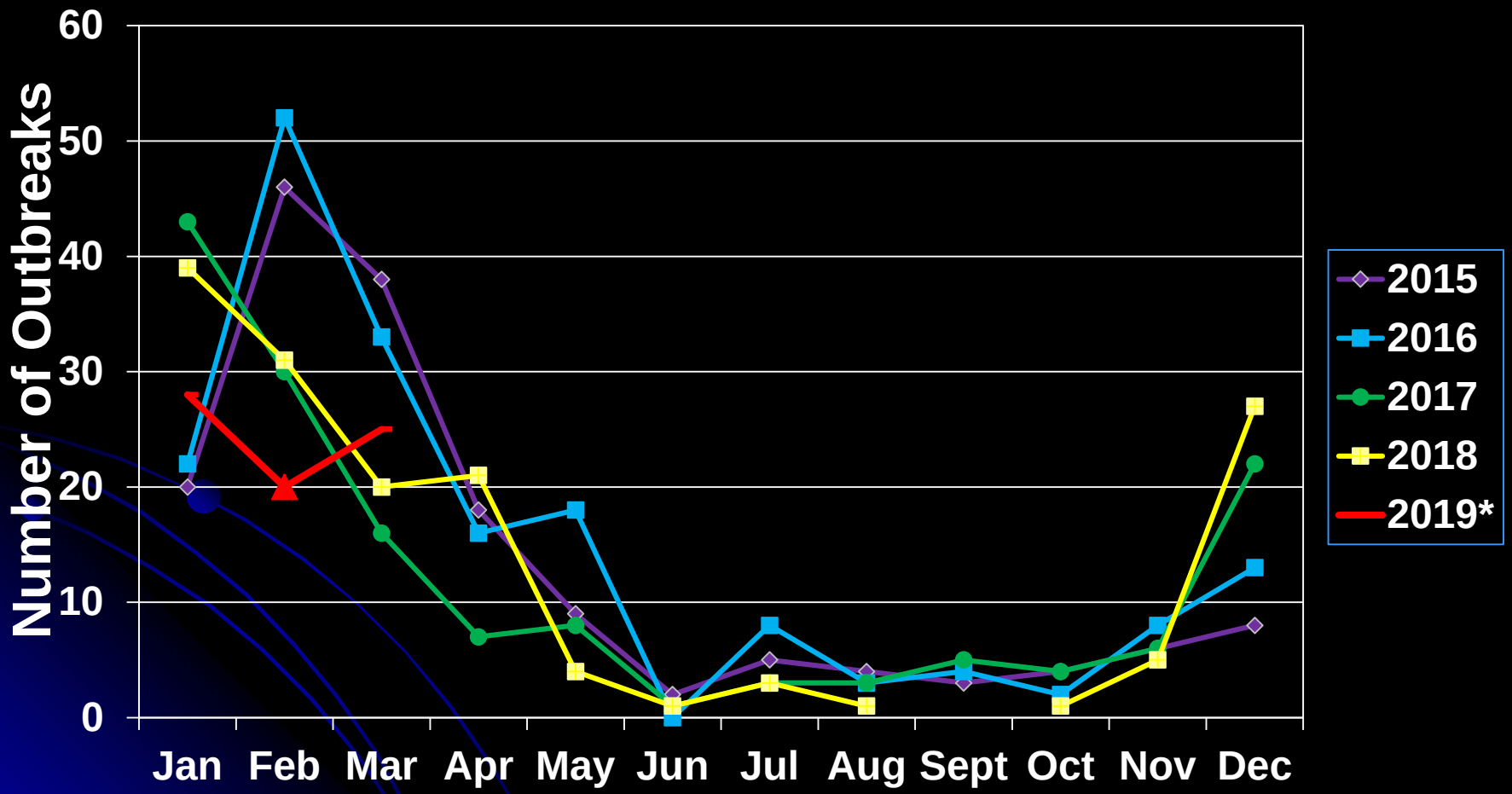
NLI Outbreaks by Onset Date per Month, Michigan 2015–2019*



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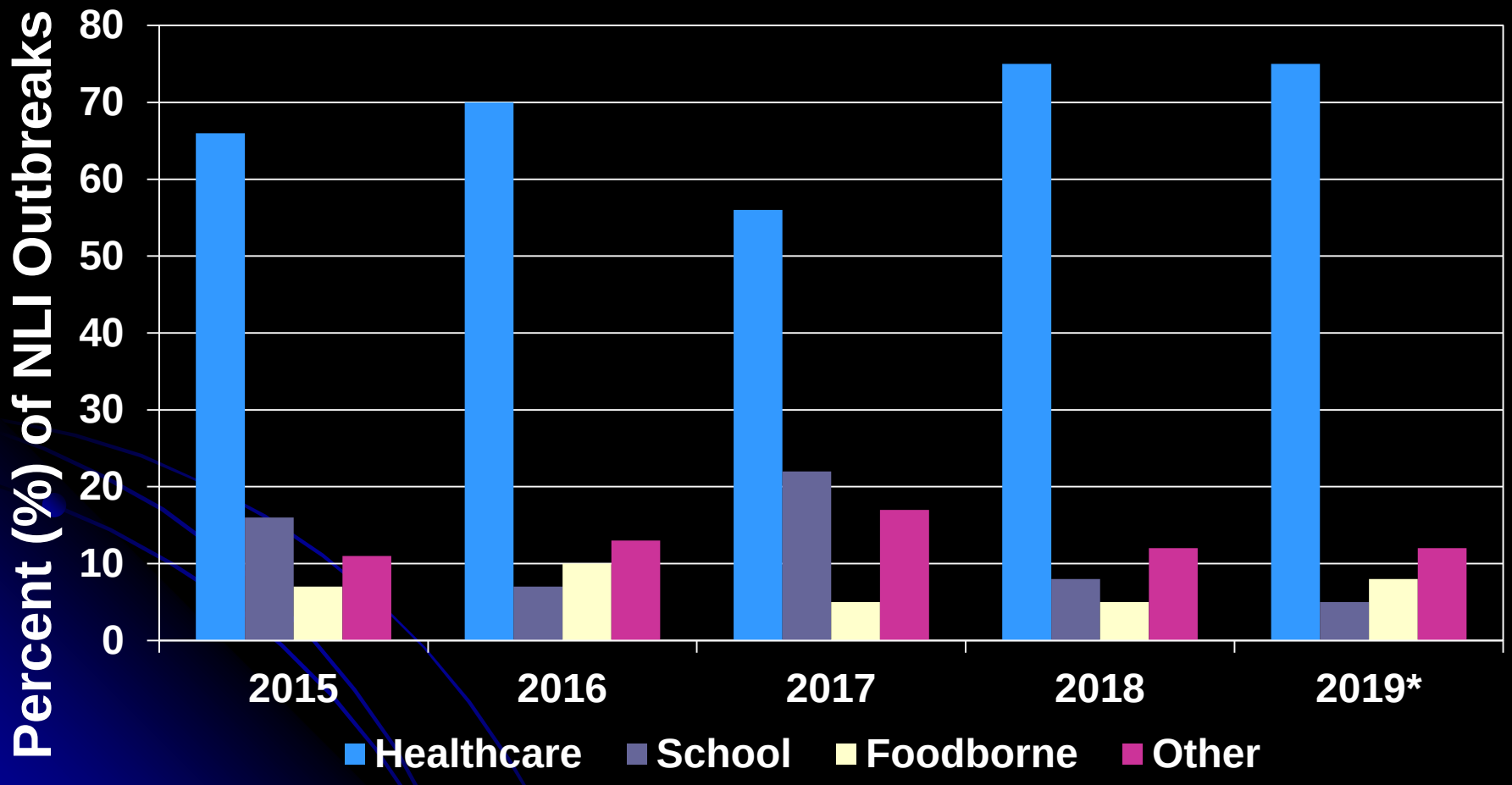
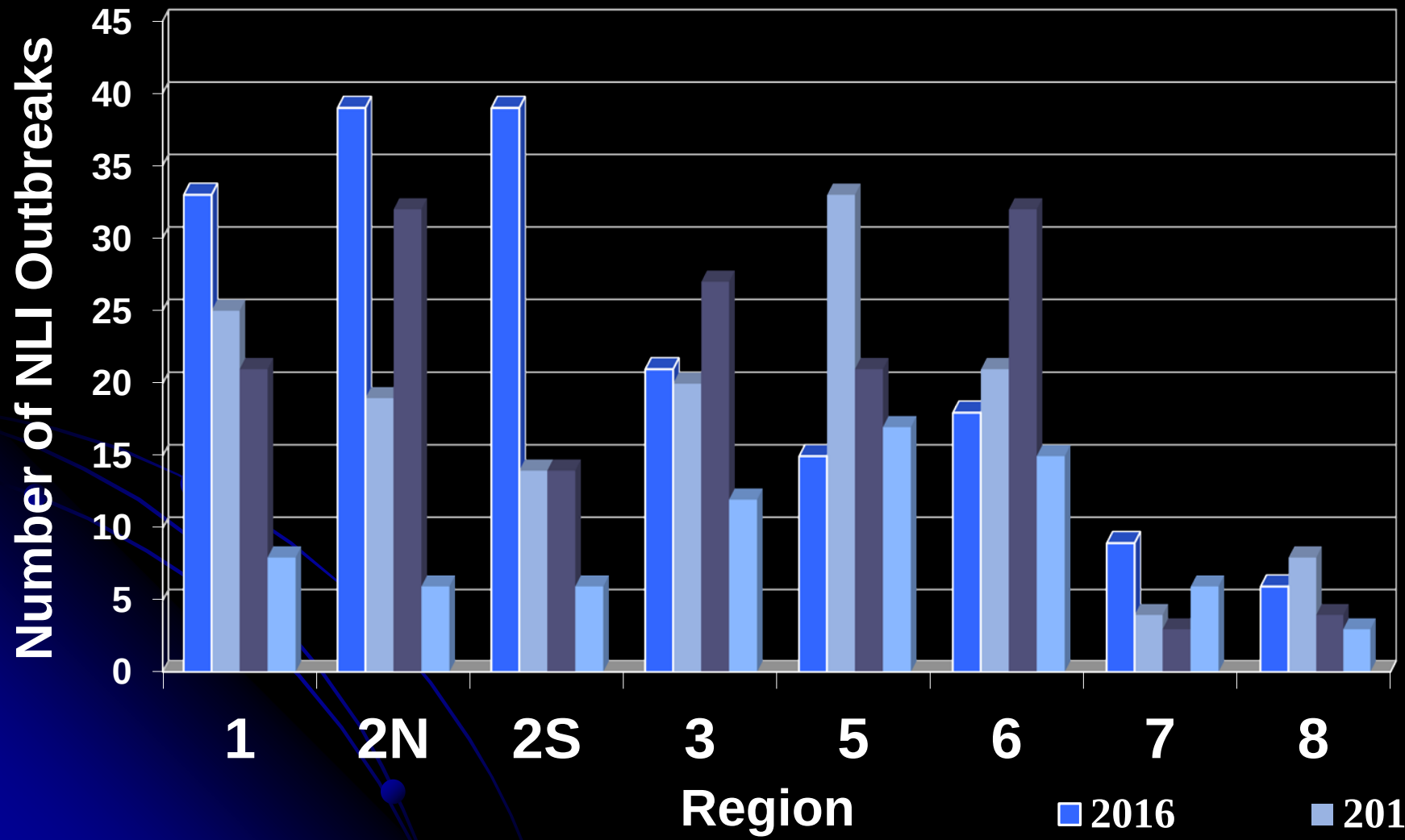
Percentage of NLI Associated Settings, Michigan 2015–2019*



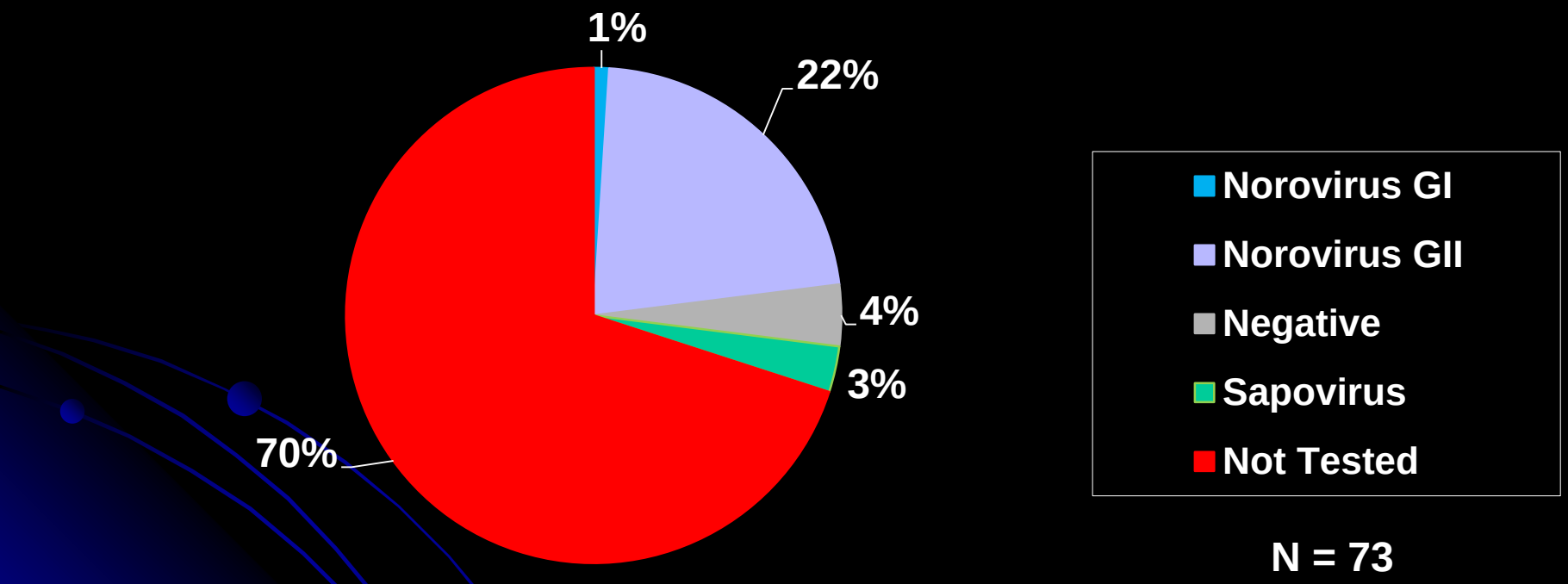
* As of April 9, 2019

NLI Outbreaks by Region, Michigan 2016–2019*



* As of April 9, 2019

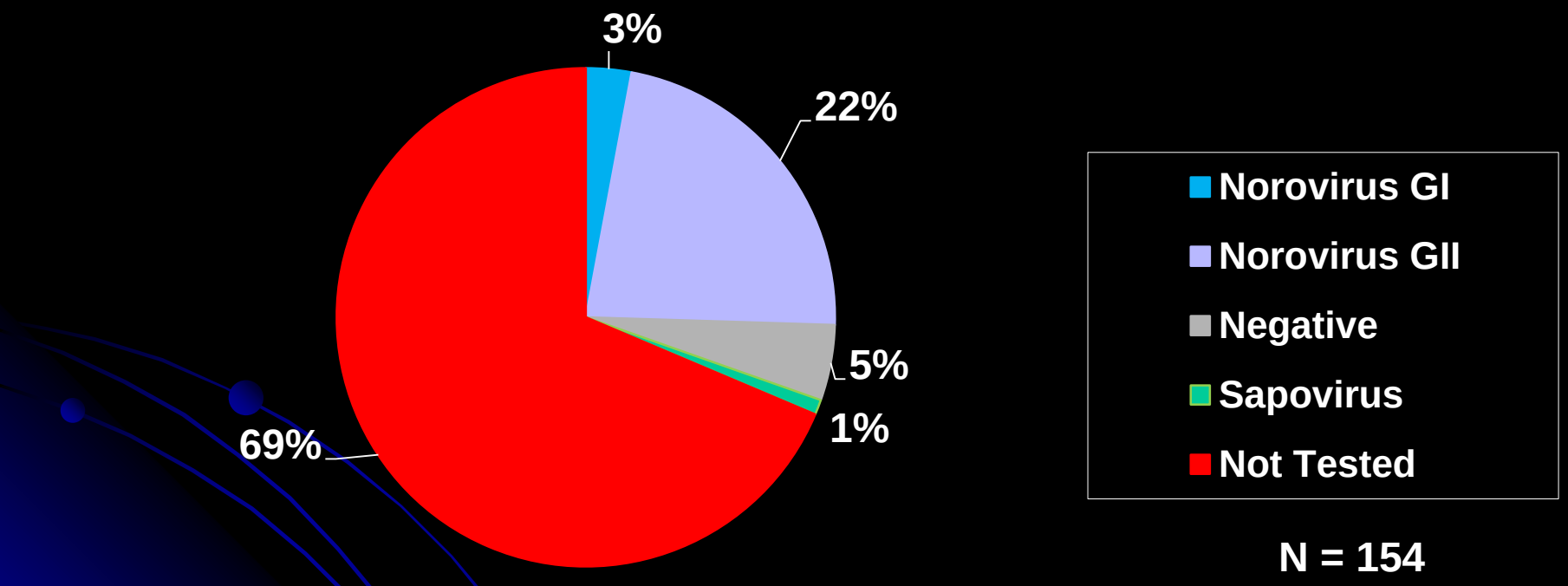
Percentage of PCR Confirmed Norovirus Outbreaks, Michigan 2019*



N = 73

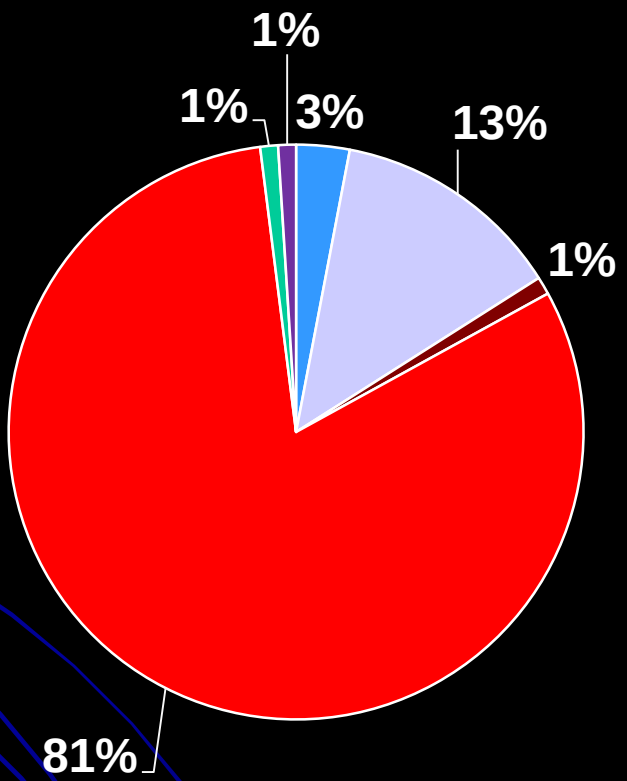
* As of April 9, 2019

Percentage of PCR Confirmed Norovirus Outbreaks, Michigan 2018



N = 154

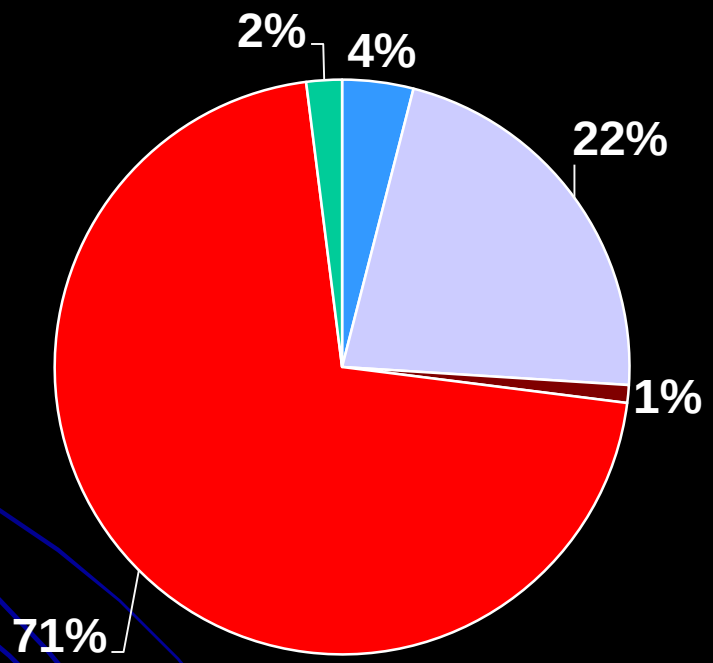
Percentage of PCR Confirmed Norovirus Outbreaks, Michigan 2017



- Norovirus GI
- Norovirus GII
- Norovirus GI and GII
- Not Tested
- Norovirus Negative
- Astrovirus

N = 145

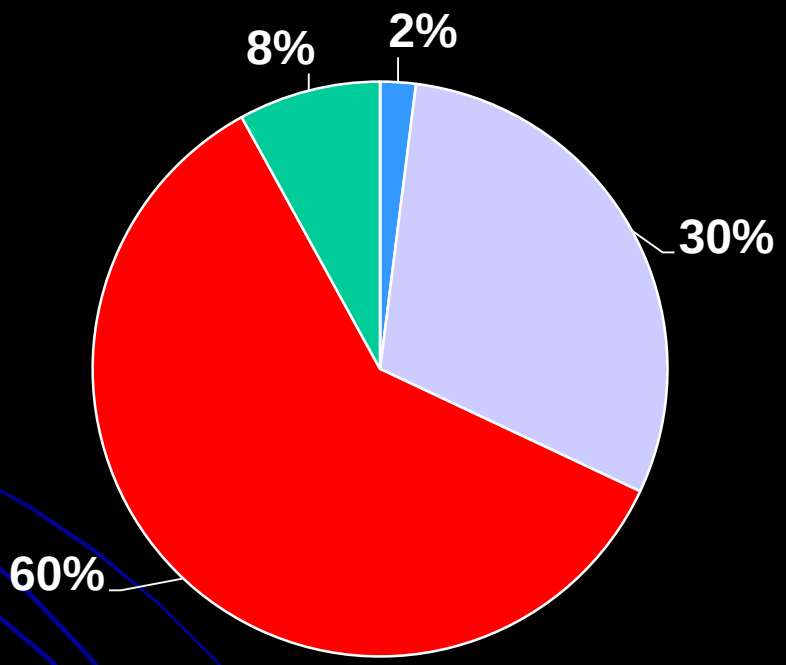
Percentage of PCR Confirmed Norovirus Outbreaks, Michigan 2016



- Norovirus GI
- Norovirus GII
- Norovirus GI and GII
- Not Tested
- Norovirus Negative

N = 180

Percentage of PCR Confirmed Norovirus Outbreaks, Michigan 2015



- Norovirus GI
- Norovirus GII
- Not Tested
- Norovirus Negative

N = 163

NLI Outbreak Laboratory Results, Michigan 2016–2019*

Result:	2016 Count	2017 Count	2018 Count	2019* Count
Norovirus GI and GII	1	1	0	0
Norovirus GI	7	5	4	1
Norovirus GII	41	19	35	16
Sapo/Astro Virus[1]	0	1	1	2
Noro, Astro, Sapovirus Negative	5	2	8	3
Pending	0	0	0	0
Not Tested	126	117	106	51
Total	180	145	154	73

[1]Outbreaks that test negative for norovirus are then tested for astrovirus and sapovirus.

* As of April 9, 2019

Sequences Identified, Michigan 2016-2018

2018

- GI.3
- GI.5
- GII.1
- GII.2
- GII.3
- GII.4 New Orleans
- GII.4 Sydney
- GII.4 untypeable
- GII.6
- GII.7

2017

- GI.1
- GI.6
- GI.7
- GII.1
- GII.2
- GII.4 New Orleans
- GII.4 Sydney
- GII.4 untypeable

2016

- GI.3b
- GI.5
- GI.6
- GII.3
- GII.4 Sydney
- GII.4 untypeable
- GII.7

Norovirus Resources

www.michigan.gov/cdinfo

- General Norovirus Fact Sheet
- Guidelines for Environmental Cleaning and Disinfection of Norovirus
- Guidelines for the Control of a Suspected or Confirmed Outbreak of Viral Gastroenteritis in a Nursing Home
- Norovirus Investigations in Long Term Care Facilities: Things to Consider

Questions

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