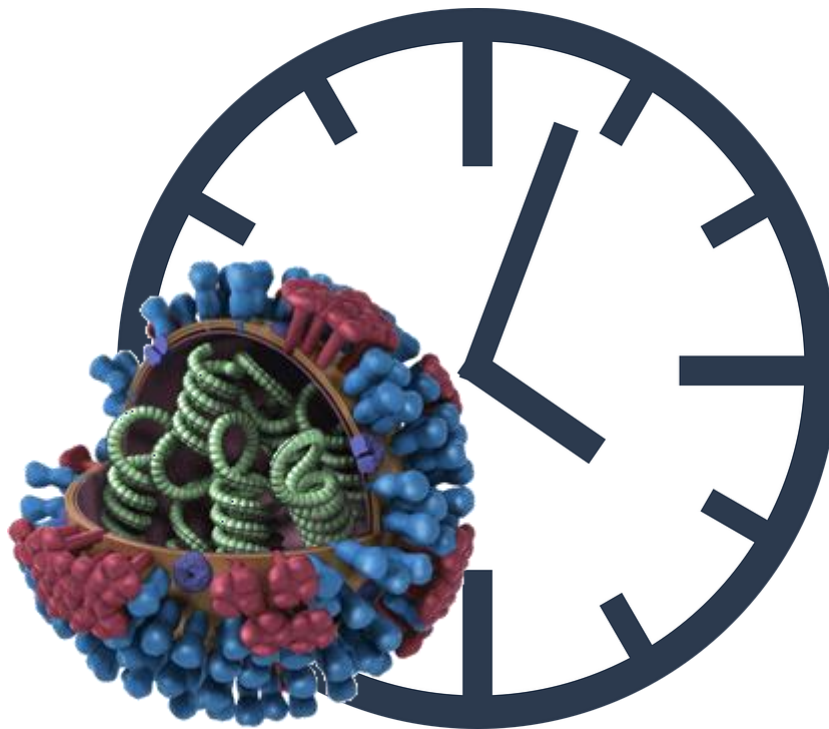


ENHANCING INFLUENZA SURVEILLANCE FOR REAL-TIME BURDEN OF DISEASE ASSESSMENT

**IOWA DEPARTMENT OF PUBLIC HEALTH (IDPH)
STATE HYGIENIC LABORATORY (SHL)**



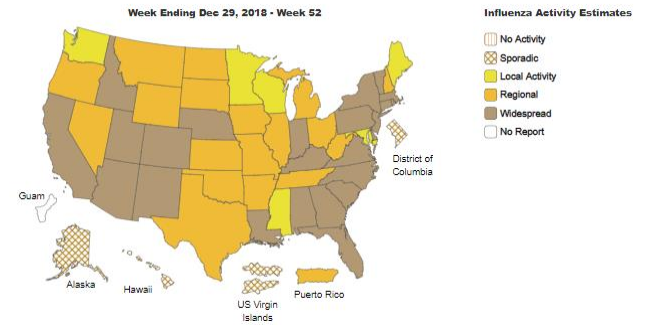
Presentation Overview



- ❑ Iowa influenza surveillance measures
- ❑ Overview of flu testing
- ❑ Review recent flu seasons in Iowa
- ❑ Gaps in surveillance
- ❑ Current efforts to improve Iowa flu surveillance
- ❑ Q & A

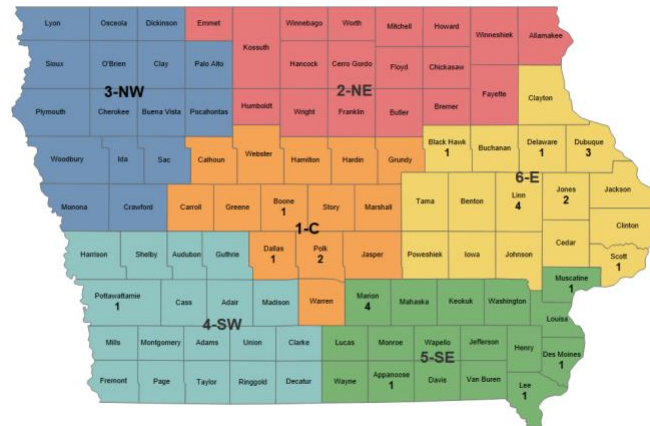
Raise Your Hand If You Used ... During the 2018-19 Season

□ CDC Fluview



□ Iowa Influenza Surveillance Report

Iowa Influenza Region Map



Iowa Influenza Surveillance Network (IISN) Overview

- The IISN is a collaborative effort between IDPH, SHL and many other partners
- Some surveillance is seasonal and some is throughout the year
- Objectives of the surveillance are:
 - ▣ Establish when and where influenza is present in Iowa
 - ▣ Monitor severity and prevalence of influenza
 - ▣ Determine characteristics of, and changes in, the virus
 - ▣ Provide timely information to providers and the public

IISN Program Components



- Outpatient influenza-like illness (ILINet)
- Influenza-associated hospitalizations
- Public health and clinical laboratories
- Long-term care facility outbreaks
- Influenza-related mortality
- School absences due to illness
- Non-influenza respiratory testing

IISN Weekly Report



Iowa Influenza Surveillance Network (IISN)

Influenza-like Illness (ILI) and Other Respiratory Viruses

Weekly Activity Report

For the week ending May 19, 2018 - Week 20

All data presented in this report are provisional and may change as additional reports are received



Iowa Influenza Geographic Spread

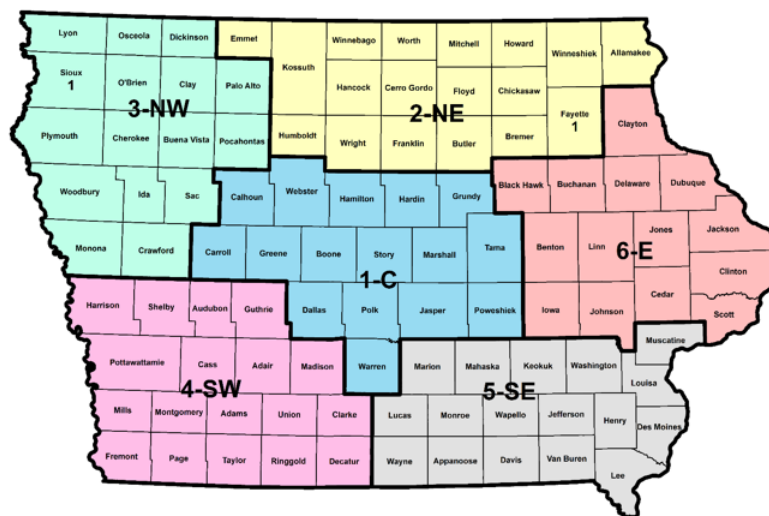
No Activity	Sporadic	Local	Regional	Widespread
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Note: See CDC activity estimates for definition www.cdc.gov/flu/weekly/overview.htm

Quick Stats

Percent of influenza rapid test positive	4% (17/396)
Percent of RSV rapid tests positive	5% (2/43)
Influenza-associated hospitalizations	2/2754 inpatients
Percent of outpatient visits for ILI	0.36% (baseline 1.9%)
Percent school absence due to illness	1.40%
Number of long-term care influenza outbreaks	0
Number of schools with $\geq 10\%$ absence due to illness	2
Influenza-associated mortality -all ages (Cumulative)	270
Influenza-associated pediatric mortality (Cumulative)	0

Number of schools with at least 10 percent of students absent, by county and region



idph.iowa.gov/influenza/reports

Flu Testing at the State Hygienic Laboratory

- Influenza Testing at SHL contributes to state, national and global surveillance goals
- Determine when and where influenza is circulating in the state
- Provides virus strains for further characterization to determine if the current vaccine is a good match to what is circulating
 - ▣ Subset are sent to regional lab for Next Generation Sequencing for sequence typing which can also identify changes to antibody recognition and virulence

Flu Testing and the State Hygienic Laboratory

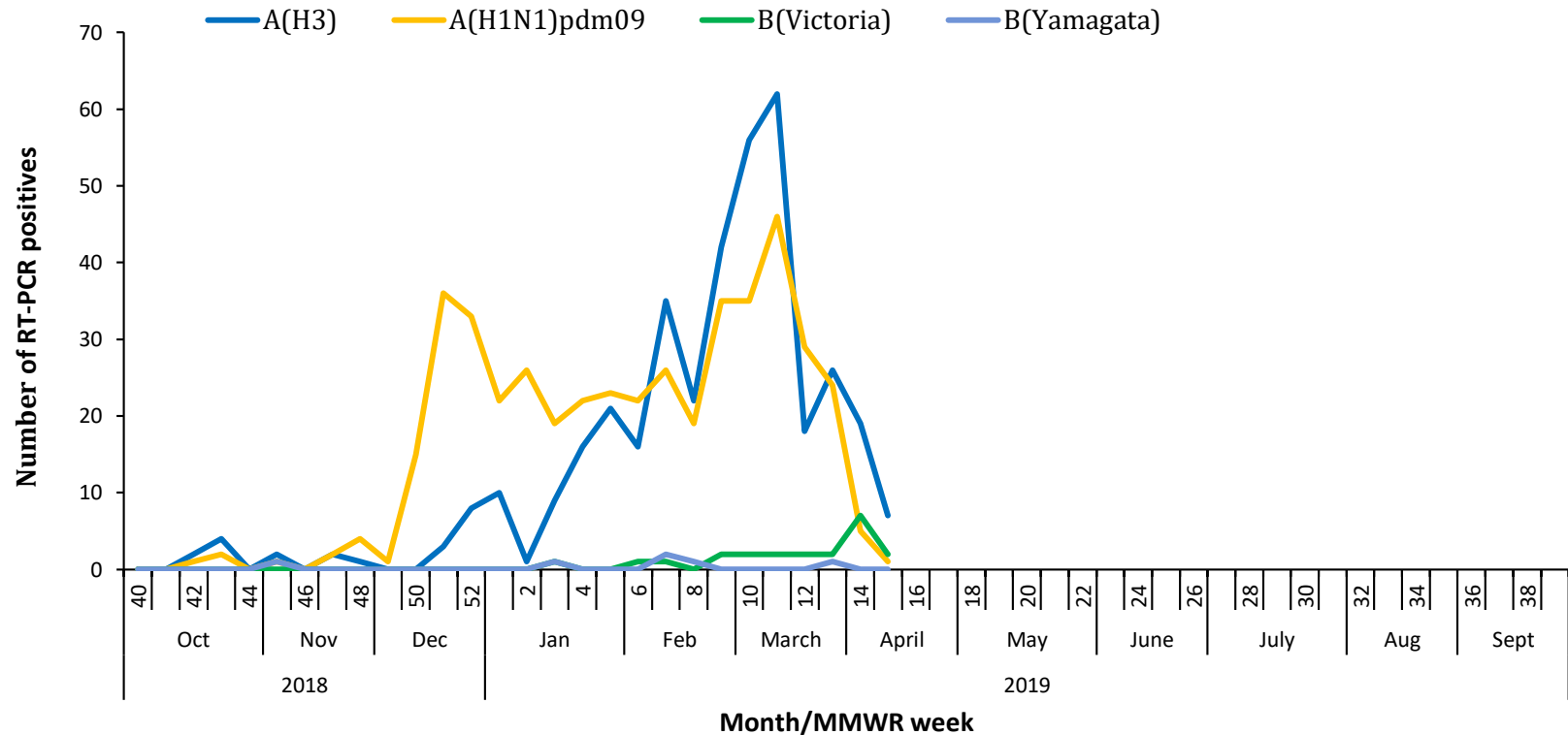
- Contributes to determination of next year's vaccine selection
- Identify novel strains and zoonotic transmissions
 - ▣ Influenza strains that circulate in pigs or birds that can occasionally make people sick
- Monitor for resistance to influenza drugs
 - ▣ Subset sent for sequencing to identify if resistance genes are present that make antiviral drugs ineffective
- SHL performs CDC assay using RT-PCR including subtyping for pdm2009H1, H3, B genotypes Yamagata and Victoria, H5, H7

Flu Testing and the State Hygienic Laboratory

- Last year was a high severity influenza season in Iowa and most of the United States, with a long period of very high activity
- Influenza A (H3N2) was the predominant strain circulating
 - ▣ Typically, in years that influenza A (H3N2) circulates vaccine effectiveness is low and severity of illness and deaths are high
 - ▣ Also, a relatively high level of influenza A (H1N1)pmd09 and influenza B co-circulated last season.

Flu Testing and the State Hygienic Laboratory

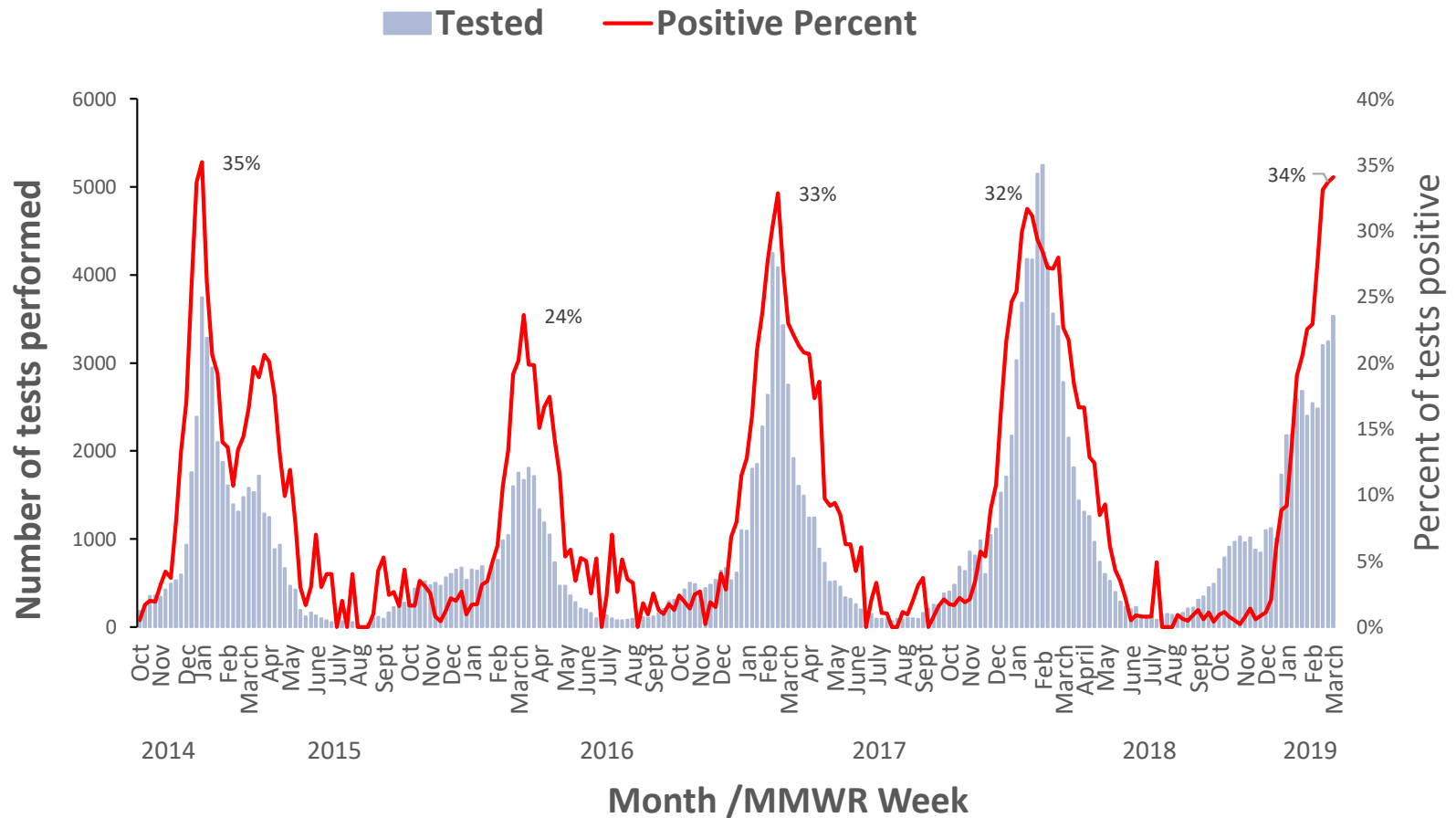
Comparison of influenza type and strain



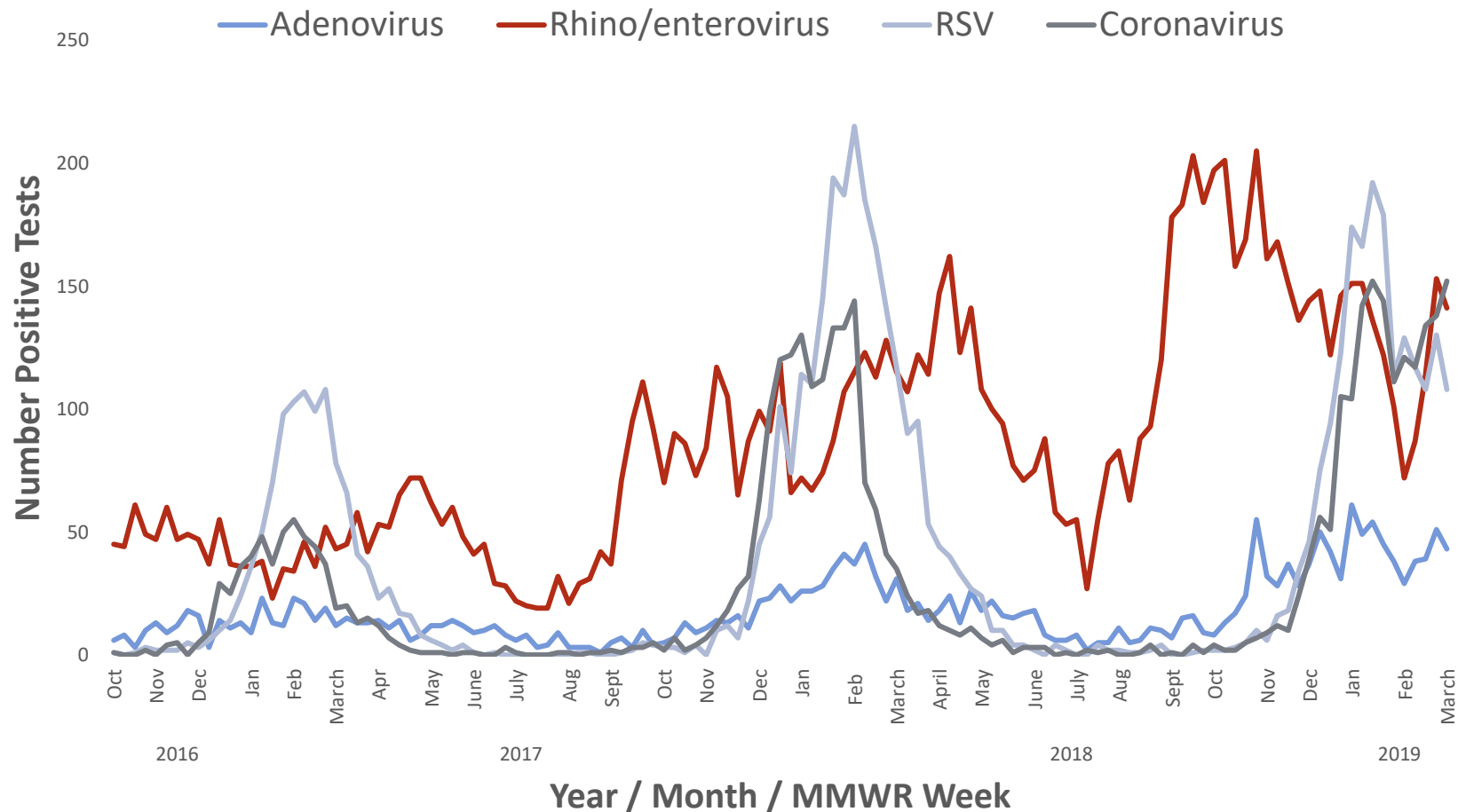
SHL Respiratory Survey

- ❑ SHL also collects supplemental respiratory data via an online survey tool
- ❑ Surveys over 100 sentinel laboratories throughout Iowa weekly, rapid and PCR based
- ❑ Additional respiratory pathogens, including respiratory syncytial virus (RSV) test results
- ❑ A statewide summary of previous week's survey results are reported back to submitters and are included in the weekly Iowa Department of Health (IDPH) Influenza Surveillance Report.

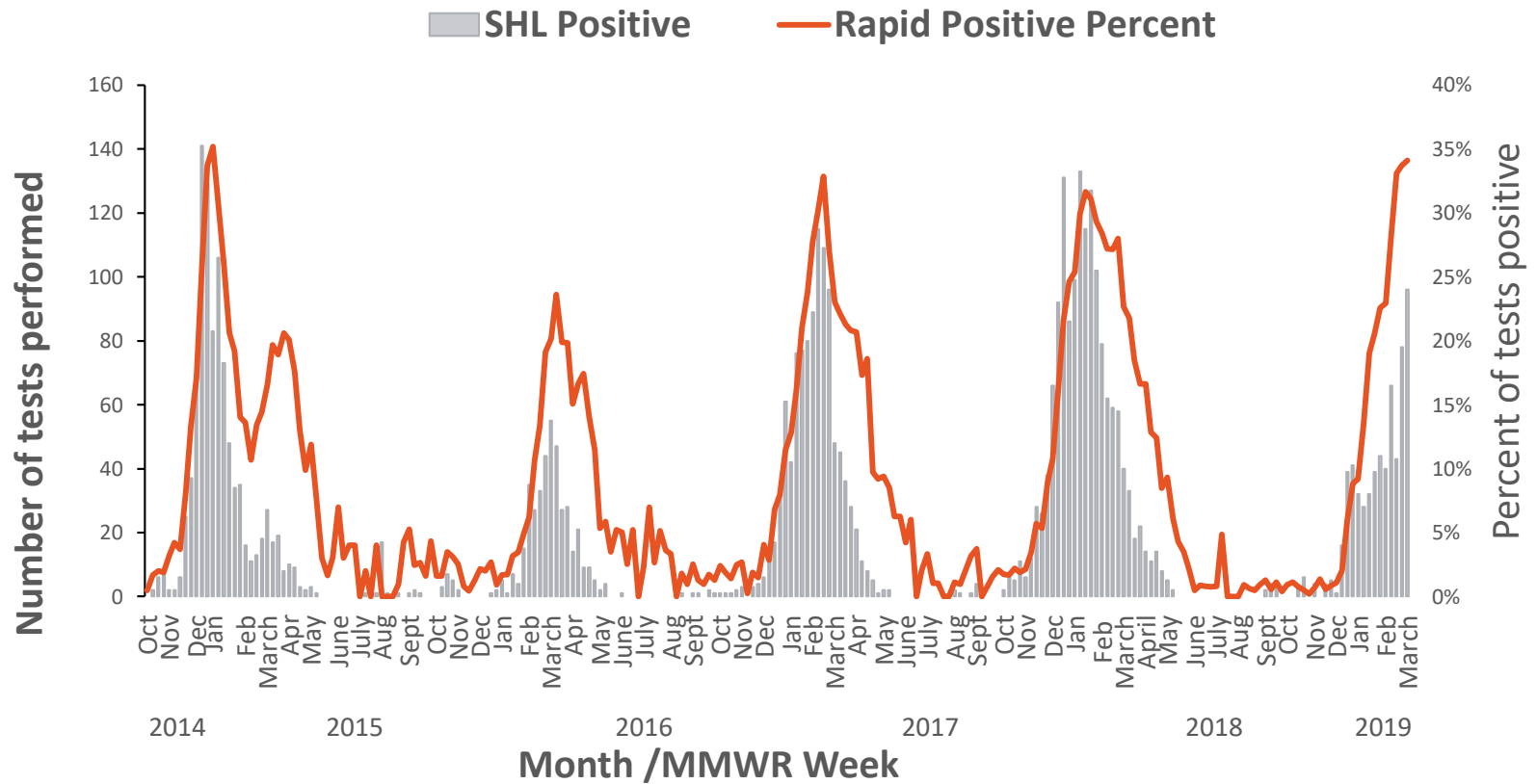
Clinical Labs Rapid Flu Testing



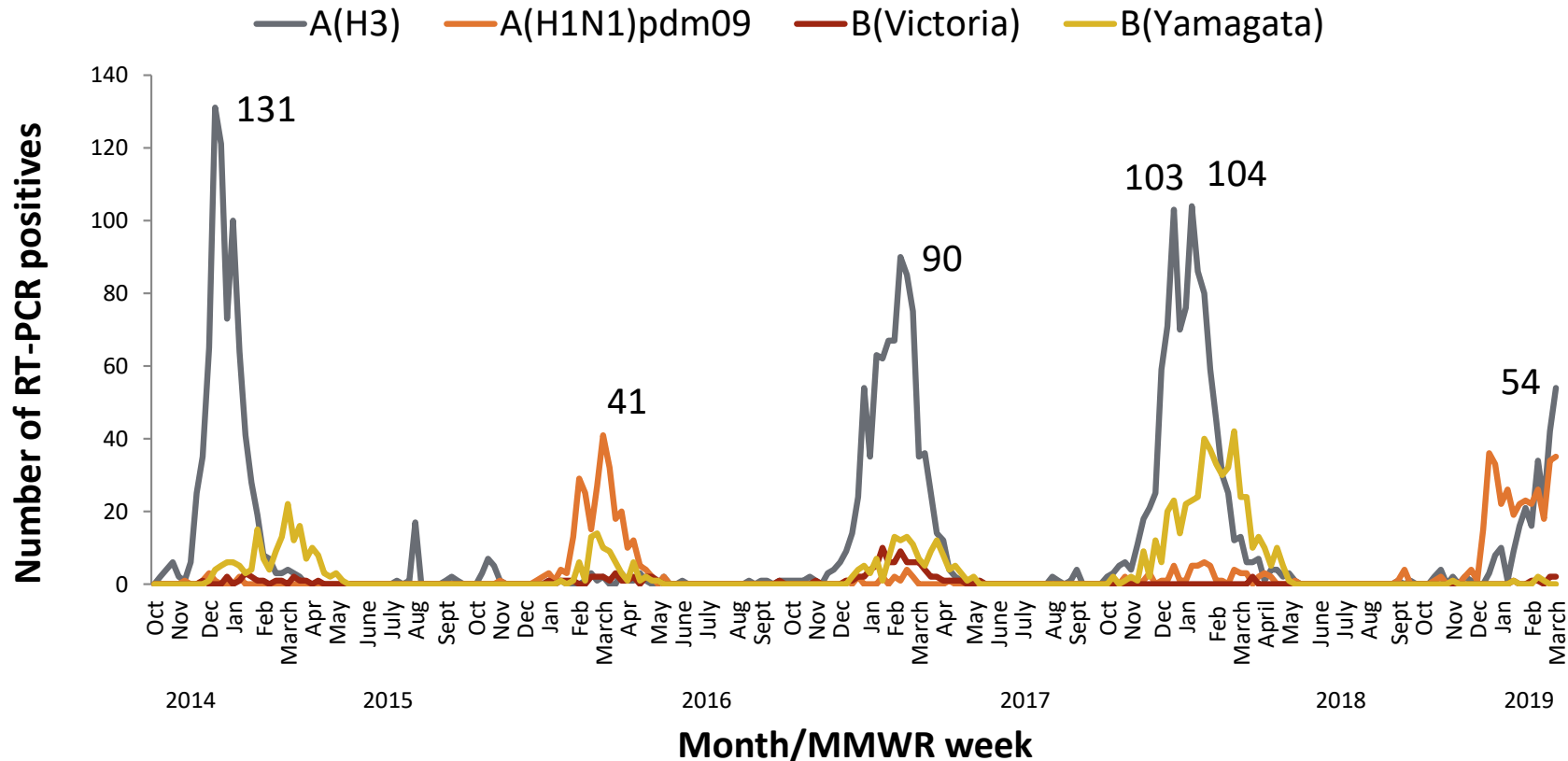
Non-Influenza Testing



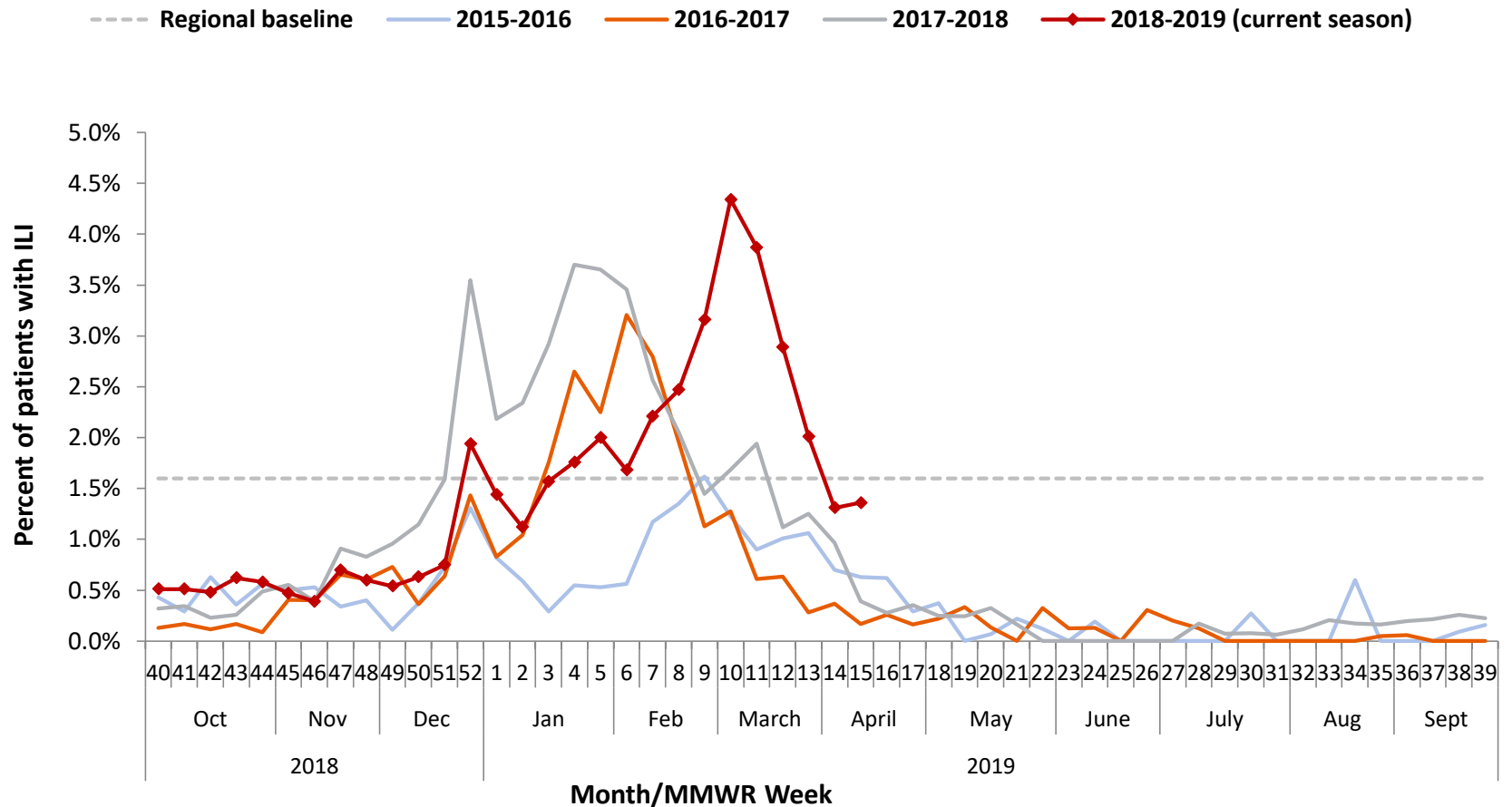
Positives at SHL vs Clinical Labs



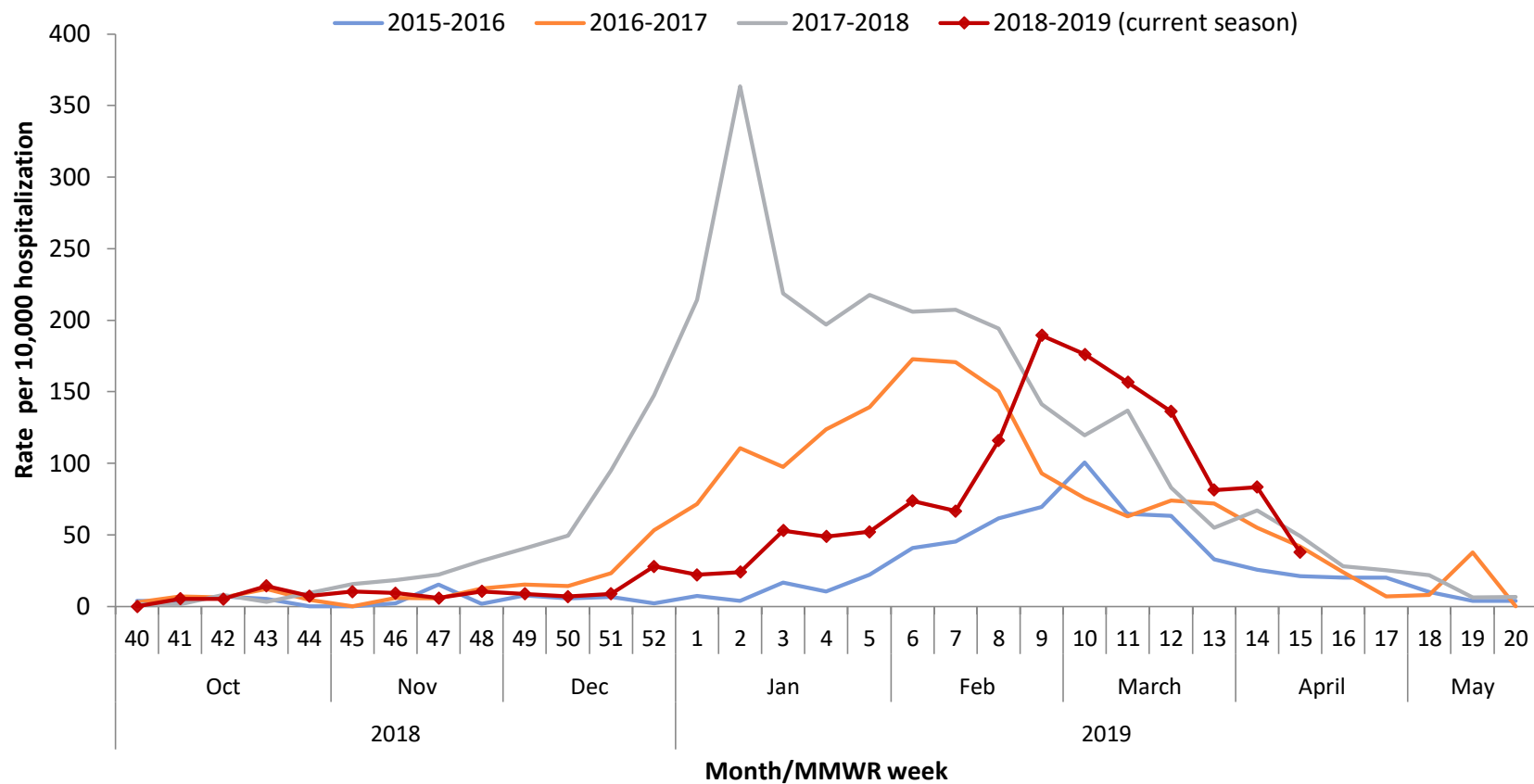
Influenza Detected at SHL by Subtype



Outpatient Influenza-Like illness



Flu Hospitalizations



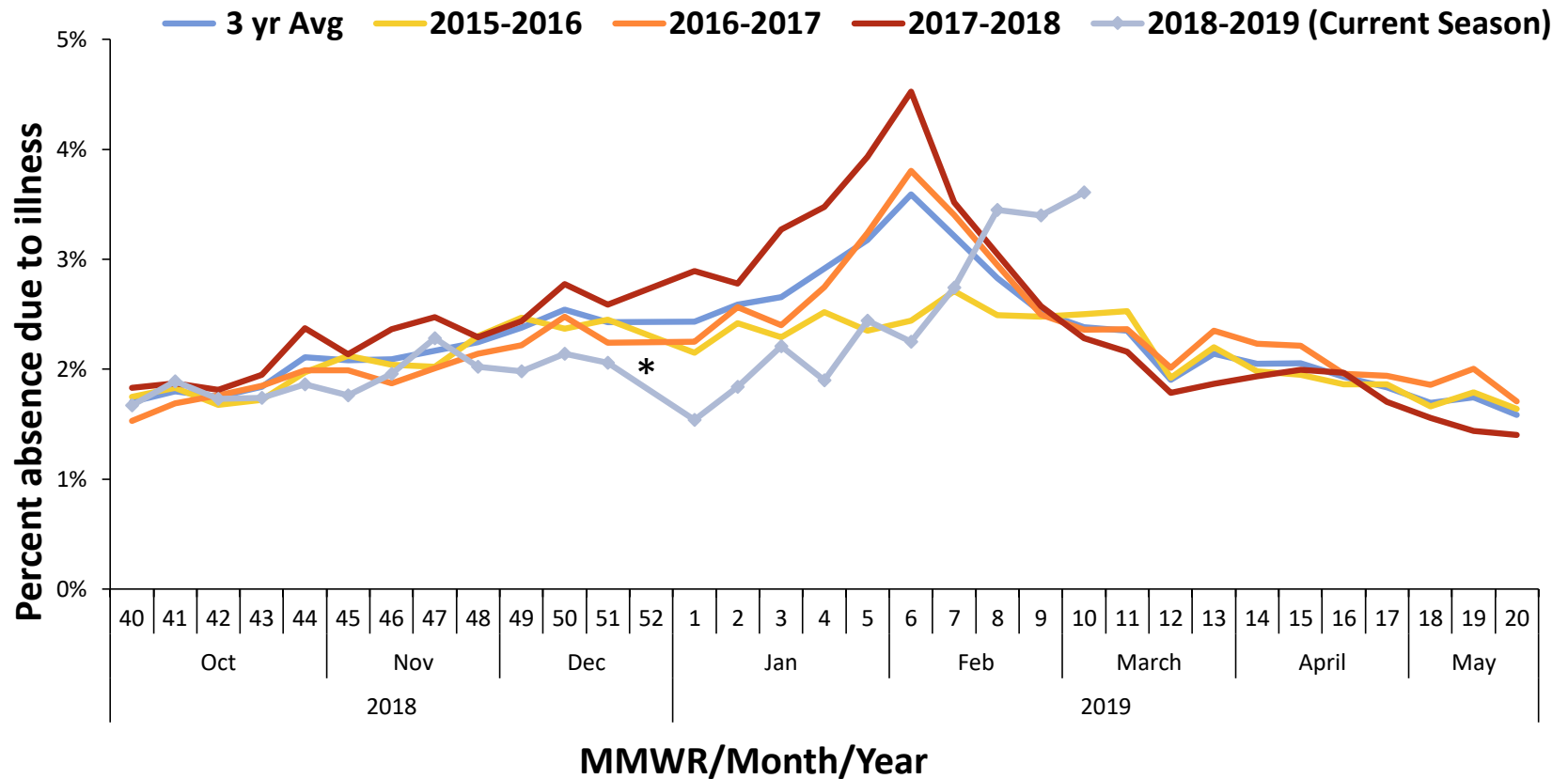
Long-term Care Flu Outbreaks

Season	Number of outbreaks
2014-15	63
2015-16	7
2016-17	56
2017-18	90
2018-19 through week 10	37

Influenza Mortality

Ages	2014-15	2015-16	2016-17	2017-18
0-60	11	18	14	28
61-80	30	15	32	81
81 and over	134	11	89	161
Total	175	44	135	270

School Illness Reported by Year



*School absences data not reported for week 52 due to holiday break

Season Comparison

Season	Predominate strain	ILI > baseline	Cumulative Hospital	Deaths	LTCF Outbreaks
2014-15	AH3		1191 6(71/10K)	175	63
2015-16	A(H1N1)pdm09		352 1(21/10K)	44	7
2016-17	AH3		1078 5(63/10K)	135	57
2017-18	AH3		1889 10(96/10K)	259	91
2018-19	A(H1N1)pdm09		841		
	A H3		11(52/10K)	69	52

What Are the Gaps in Surveillance?

- How much outpatient and hospitalization ILI as well as school illness is due to influenza?
- What causes the differences in severity among various persons with influenza?
- How can we compare different influenza seasons accurately?
- What about underrepresented areas of the state or age groups?

CSTE Enhanced Influenza Surveillance Project

- SHL and Iowa Department of Public Health (IDPH) are collaborating on a new Influenza project
- Funded by the Council of State and Territorial Epidemiologists (CSTE)
- Partially utilized some of our current sentinel influenza surveillance sites
- Utilized SHL Information Technology (IT) personnel to add new data sent to the CDC electronically
 - ▣ Added hospitalized inpatient or outpatient
 - ▣ Could link severity to sequence changes

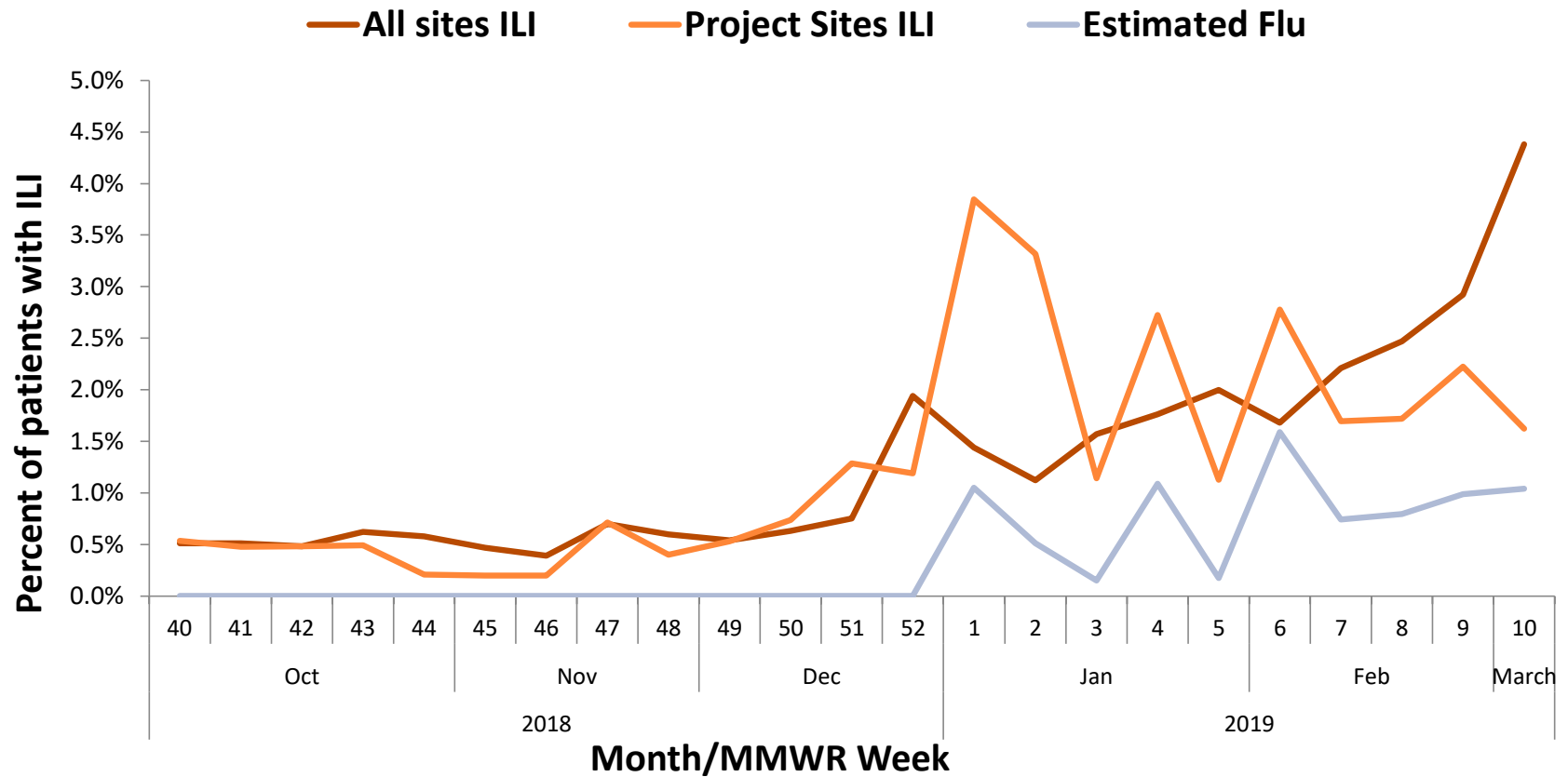
CSTE Enhanced Influenza Surveillance Project

- The goals of the project are to:
 - ▣ better estimate the burden of disease in real-time by determining how much respiratory illness is caused by flu versus other respiratory pathogens
 - ▣ determine the level of care associated with influenza positive specimens tested at SHL (which could identify a more virulent strain rapidly)
 - ▣ provide better estimates of population based rates of influenza

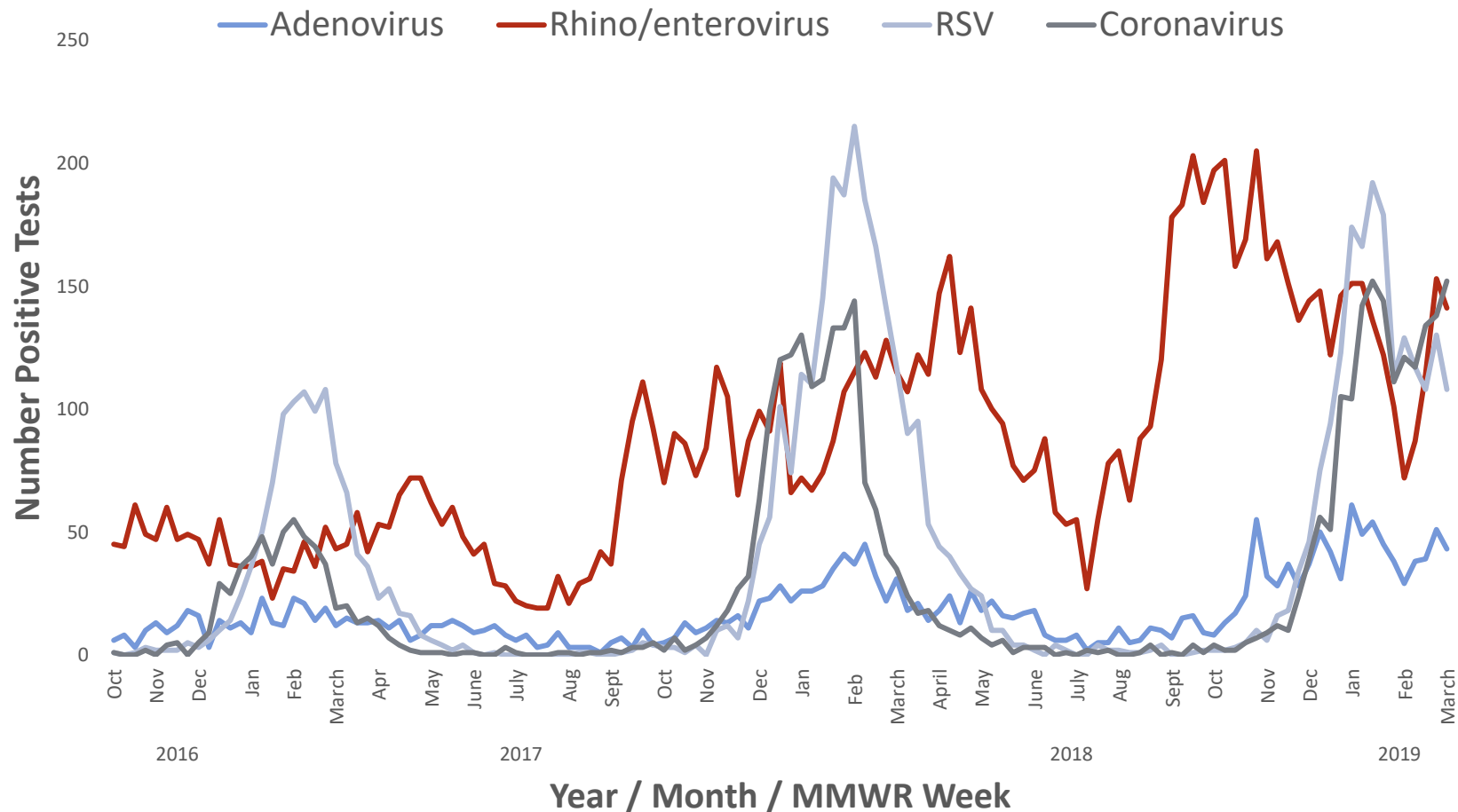
Inpatient/ Outpatient Reporting

- IDPH/SHL held annual state-wide Influenza webinar
 - ▣ Solicited labs who send specimens to SHL for testing fill out Hospitalized (inpatient) yes/no boxes on the SHL test request form
 - ▣ Amazing compliance to fill out this request
 - ▣ As of week 10, ending March 9, 2019 there were 572 inpatient specimens and 676 outpatient specimens tested at SHL and data transmitted electronically to the CDC.

ILI Attributable to Influenza



Non-Influenza Testing



Hospitalization Status and Influenza Subtype 2018-2019

Subtype	Outpatient	Hospitalized	Total
A (H1N1)pdm09	134	83	217
A(H3)	76	43	119
B(Victoria or Yamagata lineage)	6	0	6
Total	216	116	342

Hospitalization Status, Influenza Subtype and Age, 2018-2019

Subtype	0-4	5-24	25-49	50-64	65 Plus	Total
A (H1N1)pdm09	11	1	13	29	29	83
A(H3)	1	0	1	15	26	43
Total	12	1	14	44	55	126

Future Directions



- Age rates for ILI and hospitalization
- Real-time severity assessment based on historic thresholds
- Compare illness and severity with antigenic and genetic characterization
- Rapid identification of mismatch to vaccine especially if contributing to hospitalization

IDPH Contact Information

To learn more about our influenza surveillance Programs, to become a participant, or to sign up for the surveillance report email list, please contact

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