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# **Respiratory Syncytial Virus (RSV) Surveillance**

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**Texas Department of State Health Services**

**October 30, 2023**

# DISCLAIMER

The information presented today is based in current preliminary data and on CDC's recent guidance. Information is subject to change.

October 30, 2023



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# **RSV Surveillance & Seasonality**

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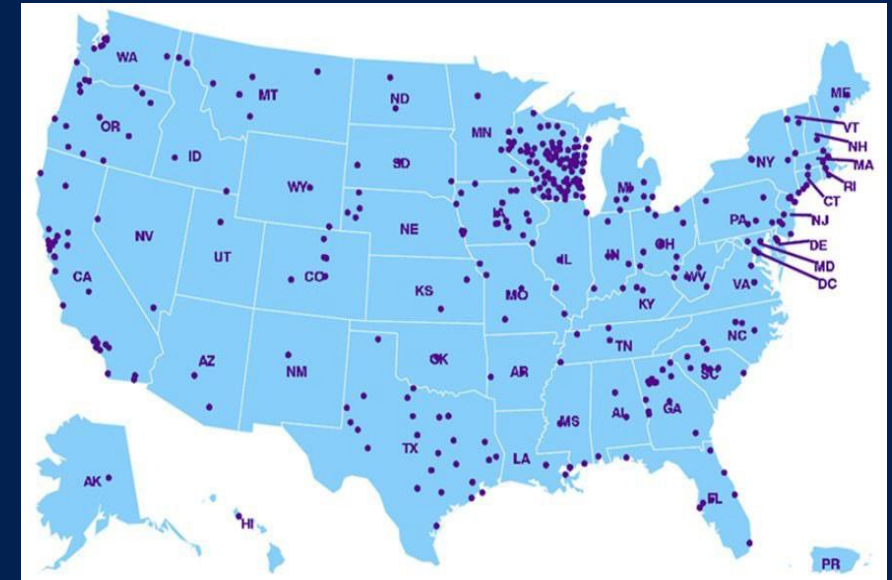
# RSV Surveillance U.S.



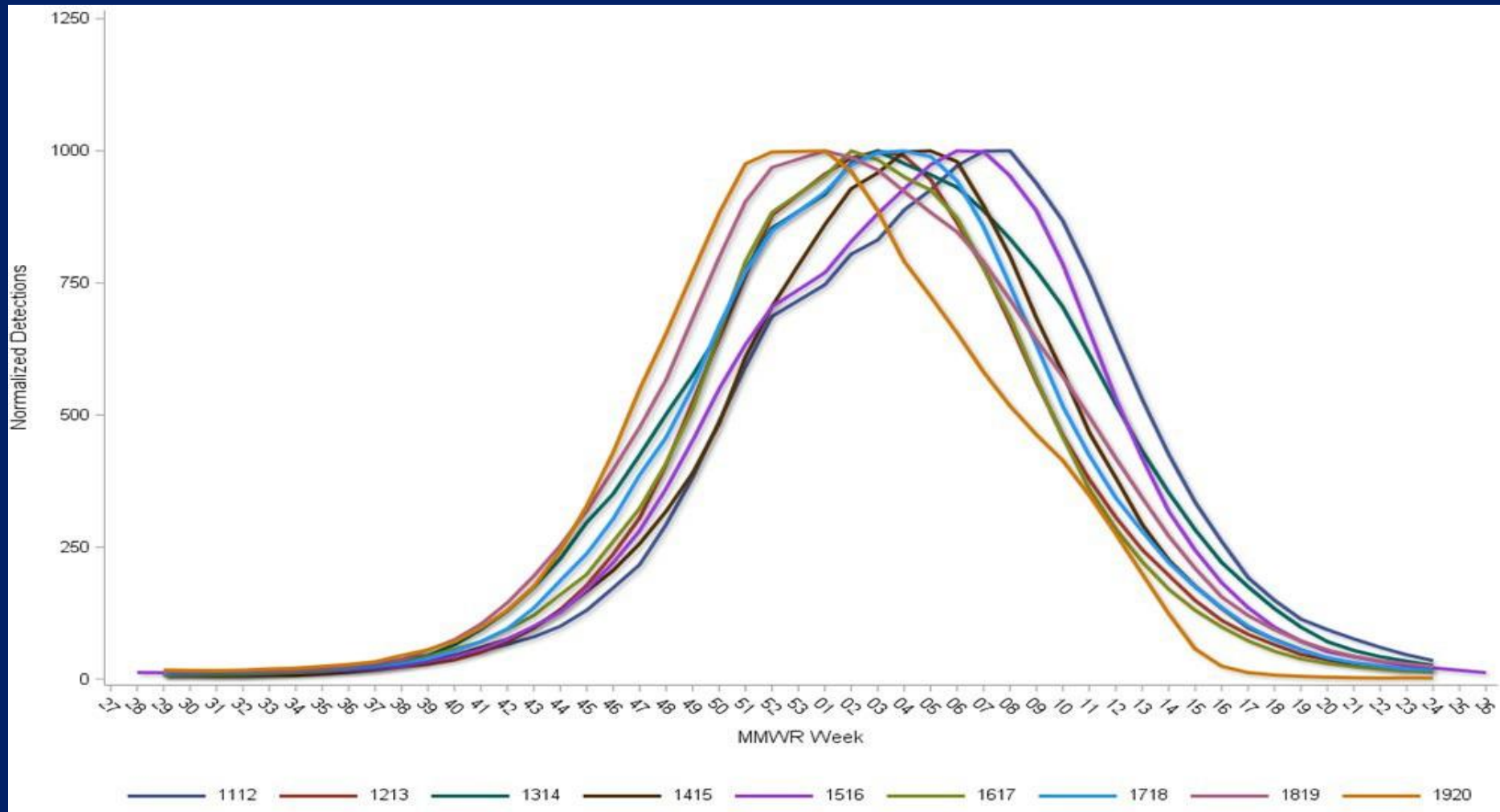
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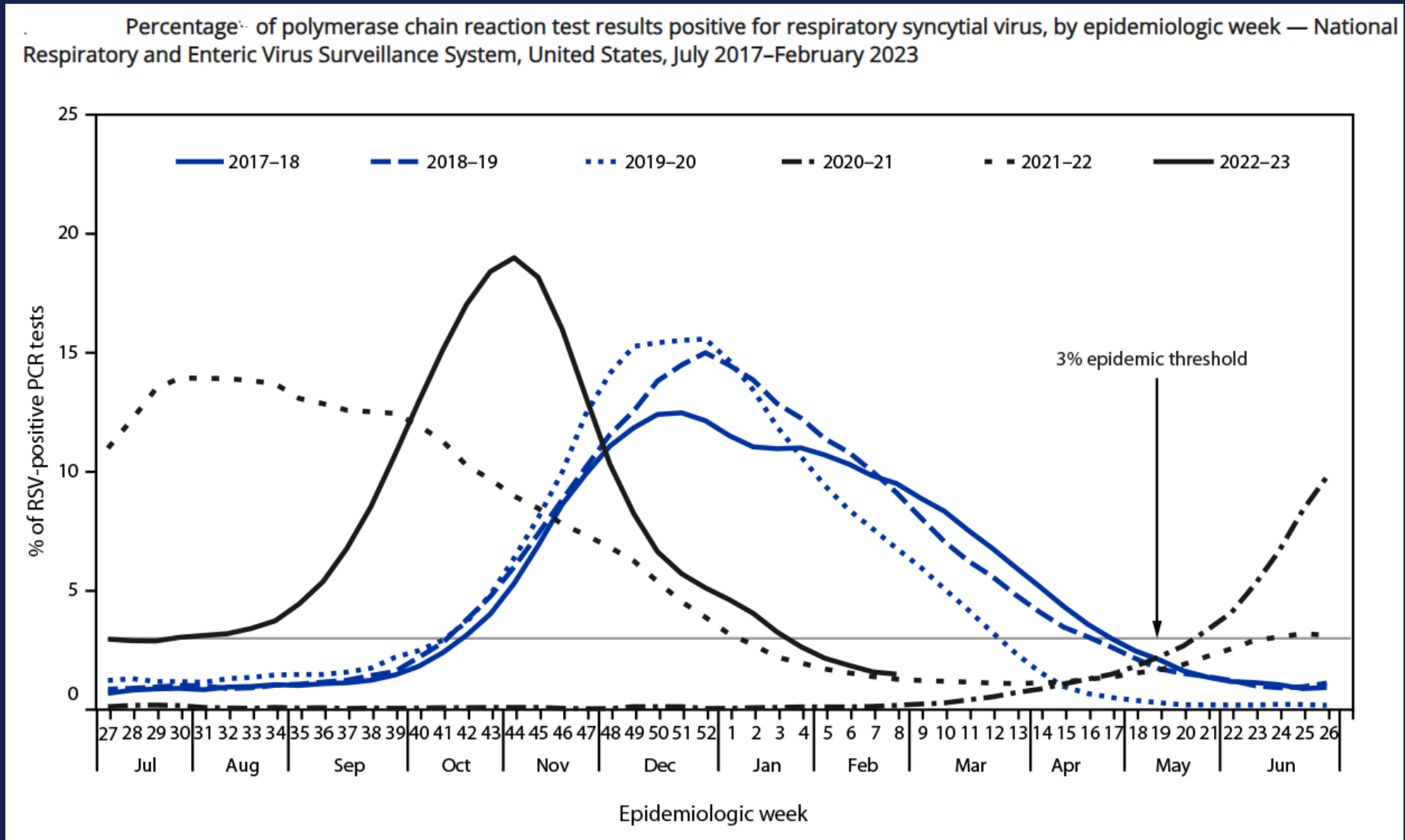
- National Respiratory and Enteric Virus Surveillance System (NRVESS) for monitoring RSV surveillance
- NRVESS is a passive laboratory-based surveillance
  - Voluntary reporting by participating commercial, hospital, and state/local public health laboratories
  - ~300 laboratories report RSV results
  - Weekly reporting of total tests performed and RSV positive tests
- All test types (majority PCR assays)
- Testing is clinician-directed
- All ages



# During 2011-2020, RSV circulation was highly seasonal in the U.S. with predictable peak activity during December – February annually



# Changes in RSV Seasonality in the U.S., 2017-2023





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# **RSV in Texas**

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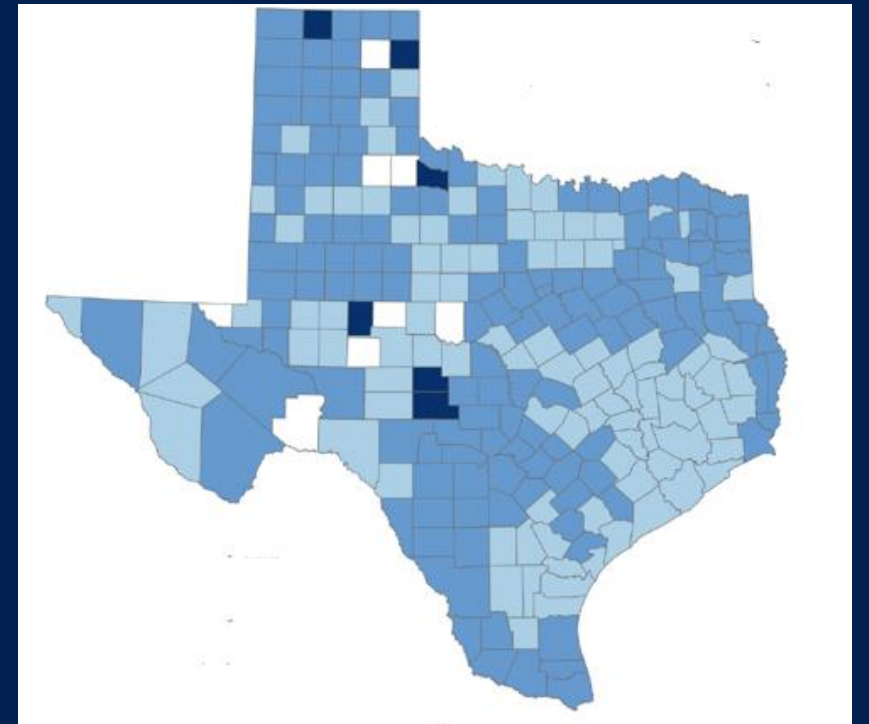
# RSV in Texas



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- Three different data sources to estimate RSV seasonality and RSV disease burden in Texas
  1. NREVSS
  2. Syndromic Surveillance (TxS2)
    - Emergency department data from about 80% of all hospitals reporting real time (every 4 to 24 hours)
  3. Hospitalization Data
    - Texas Health Care Information Collection (THCIC) inpatient research data file
      - Hospital discharge data from all hospitals
      - Data lag of 6-9 months





# RSV in Texas, July 2018 – September 2023

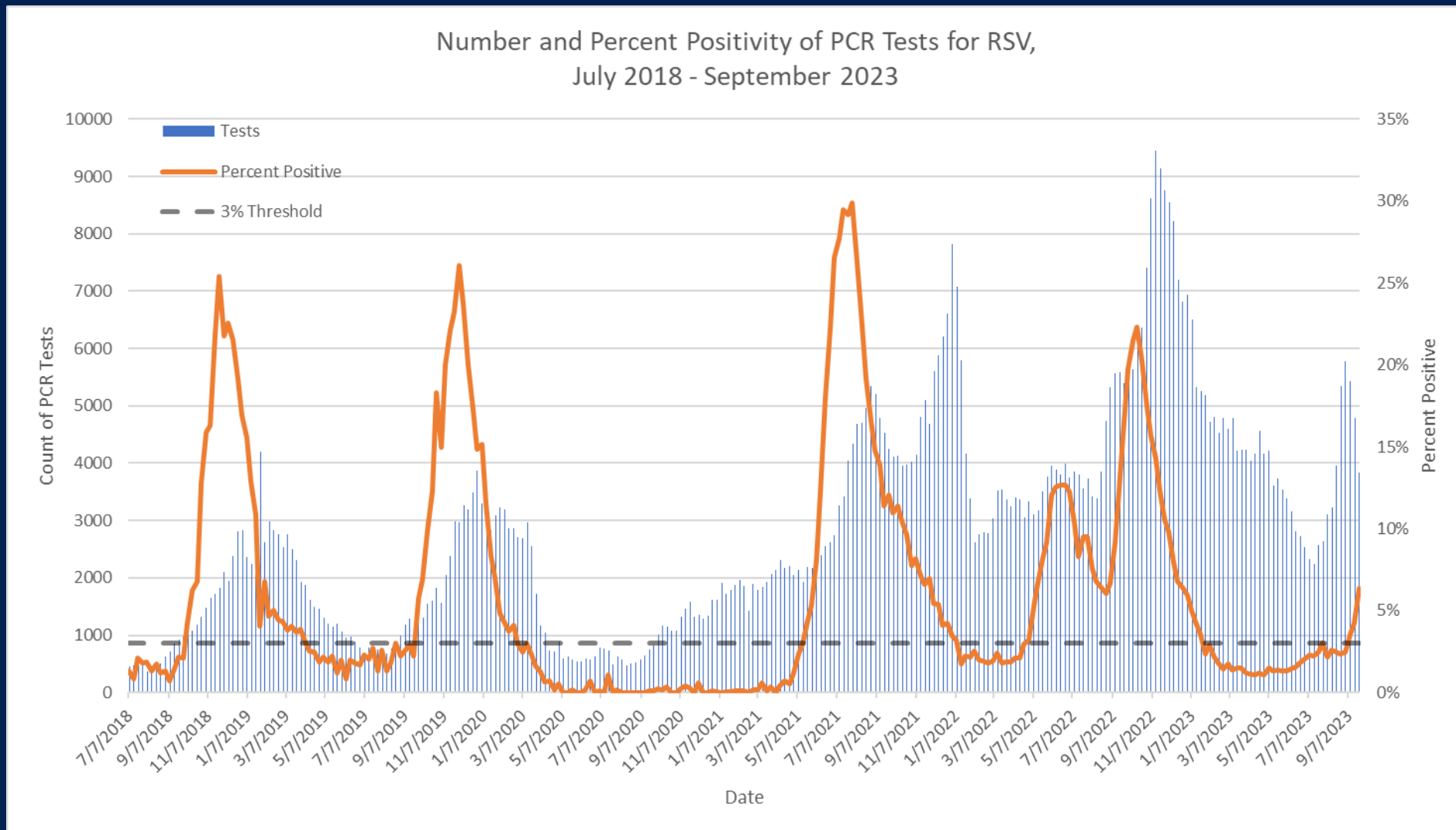
## NRVSS



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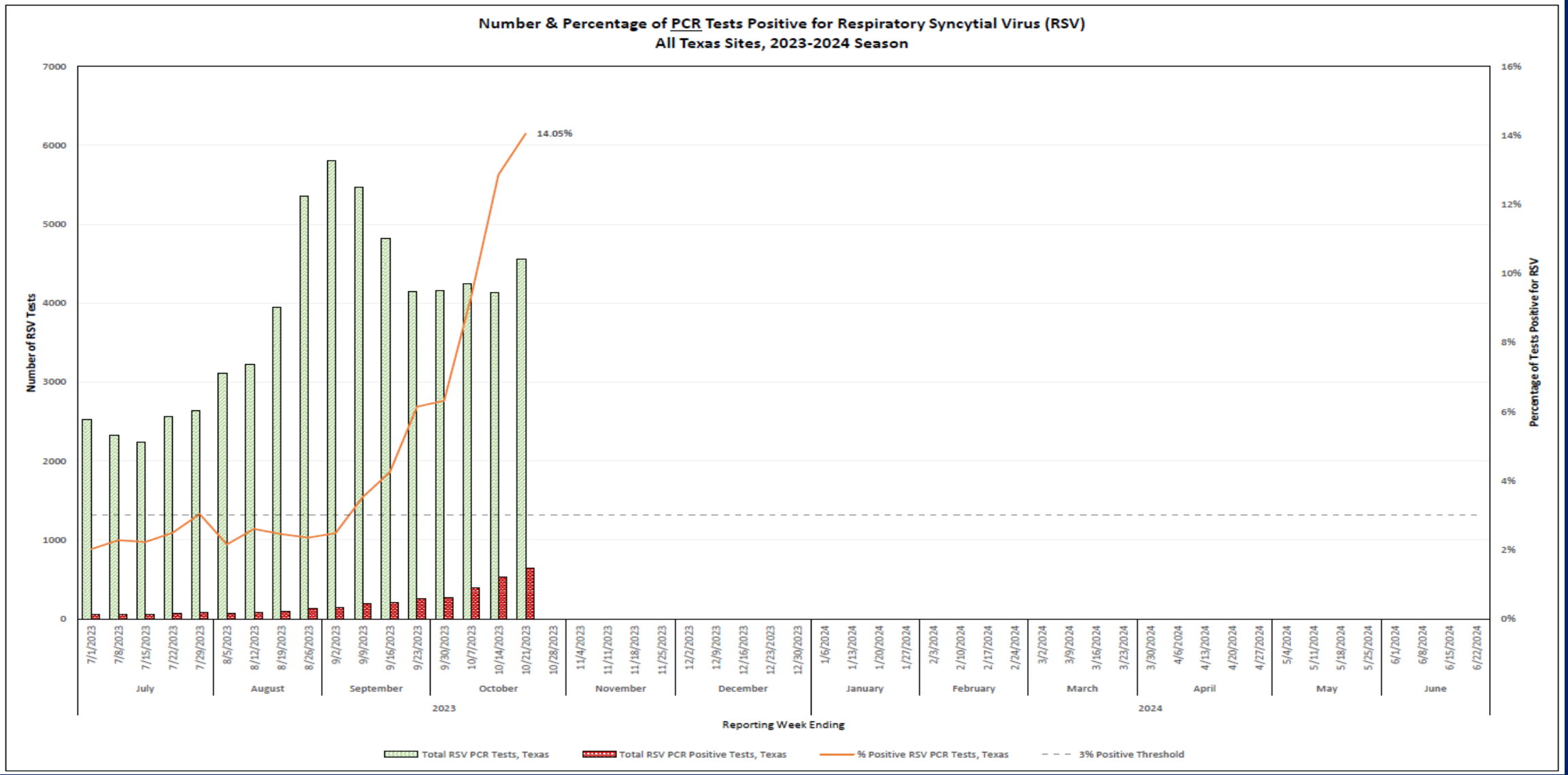
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Source: National Respiratory and Enteric Virus Surveillance System (NREVSS), July 2018 – September 2023. Data were extracted October 24, 2023.

# Number & Percentage of PCR Tests Positive for Respiratory Syncytial Virus (RSV) All Texas Sites, 2023-2024 Season



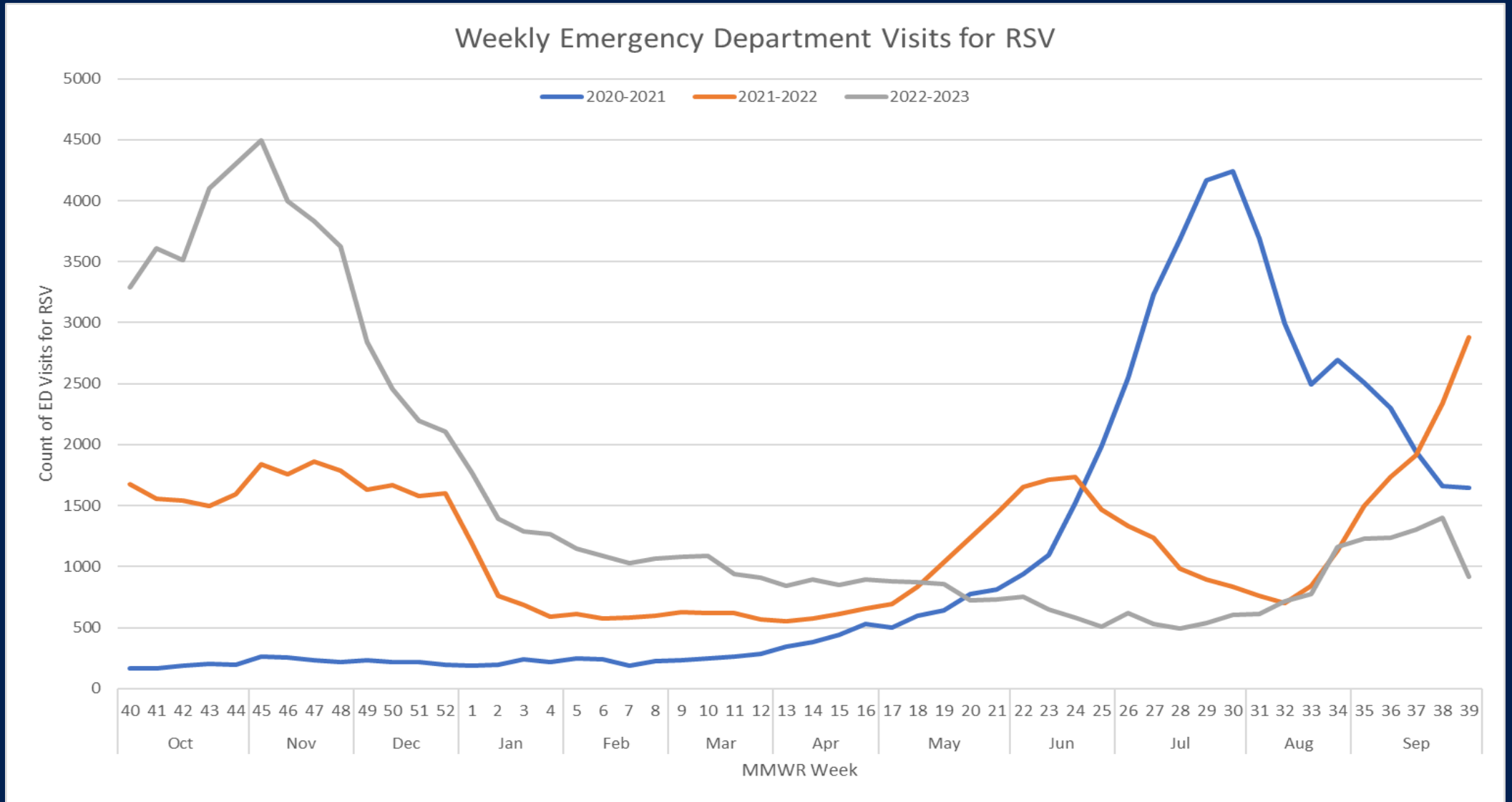
Source: National Respiratory and Enteric Virus Surveillance System

Available at: [2023-24 RSV by DSHS HSR 10.03.23 \(texas.gov\)](https://www.dshs.texas.gov/RSV/2023-24-RSV-by-DSHS-HSR-10.03.23-texas.gov), Accessed: 10/27/2023

# RSV in Texas, 2020 – 2023, All Age Groups Syndromic Surveillance



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Source: Texas Syndromic Surveillance (TxS2), October 2020 – September 25, 2023. Data were extracted September 28, 2023.

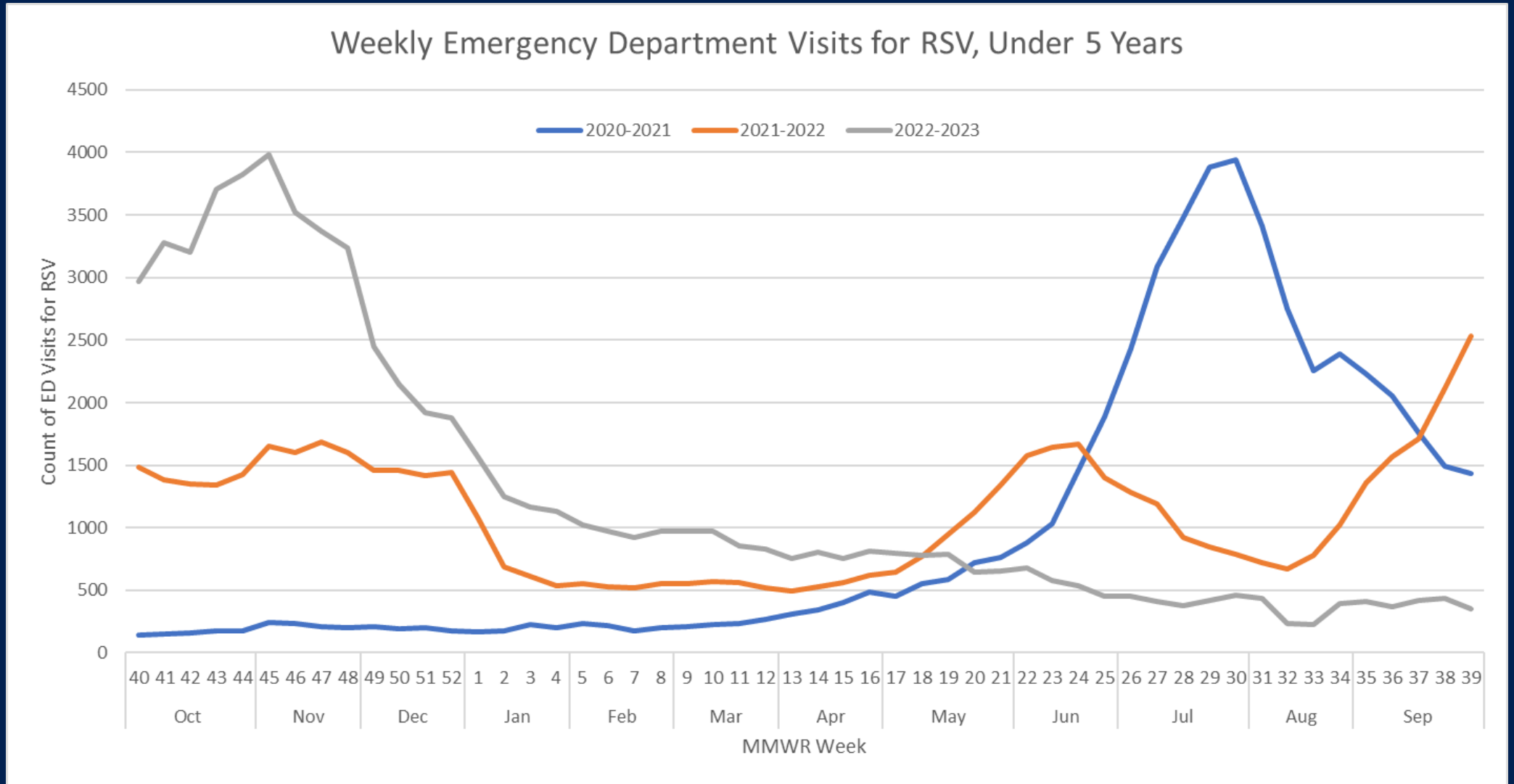
# RSV in Texas, 2020 – 2023, **Under 5 Years of Age** Syndromic Surveillance



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Source: Texas Syndromic Surveillance (TxS2), October 2020 – September 25, 2023. Data were extracted September 28, 2023.

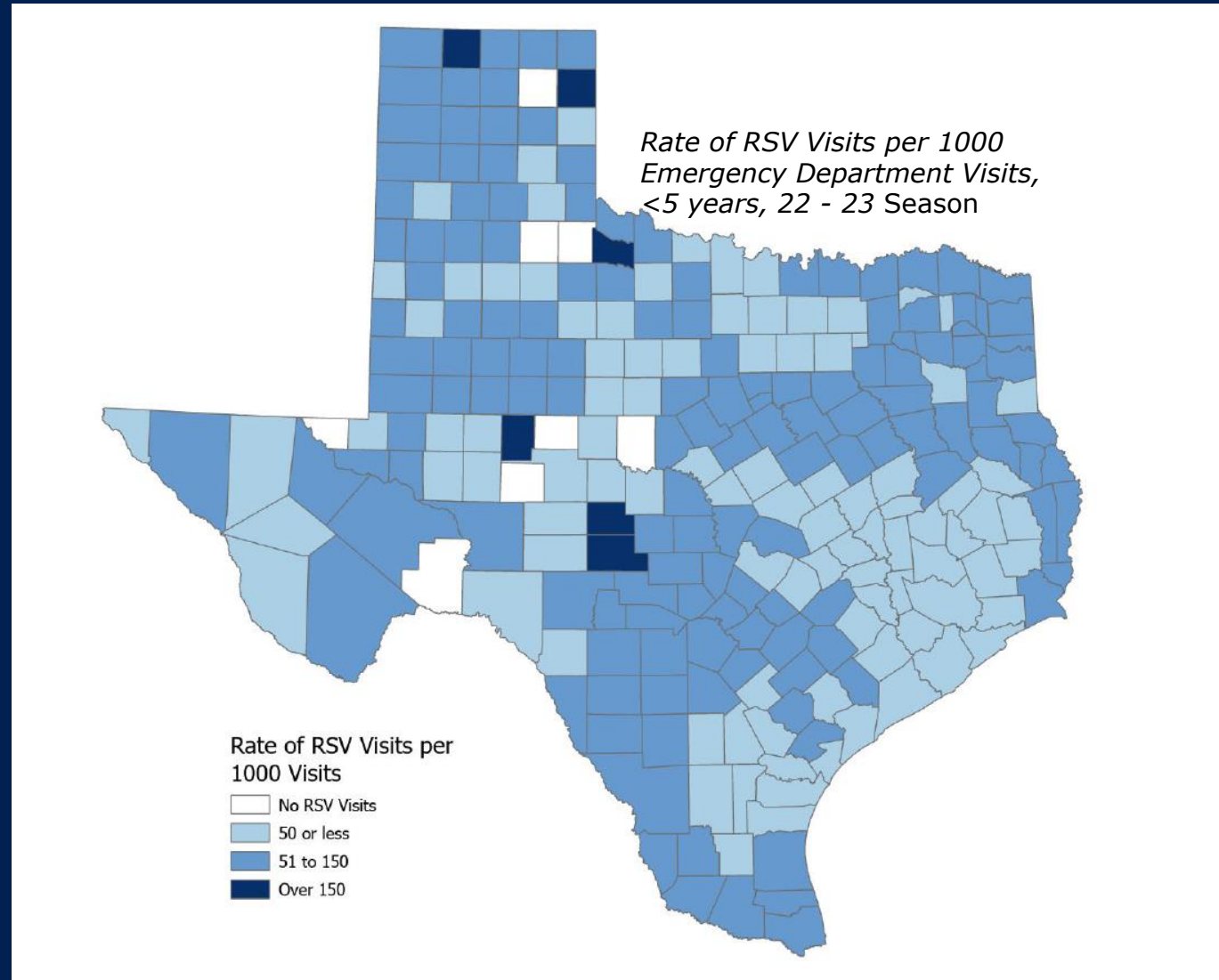
# RSV in Texas, 2022 – 2023, **Under 5 Years of Age** Syndromic Surveillance



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Source: Texas Syndromic Surveillance (TxS2). Data were extracted September 28, 2023.

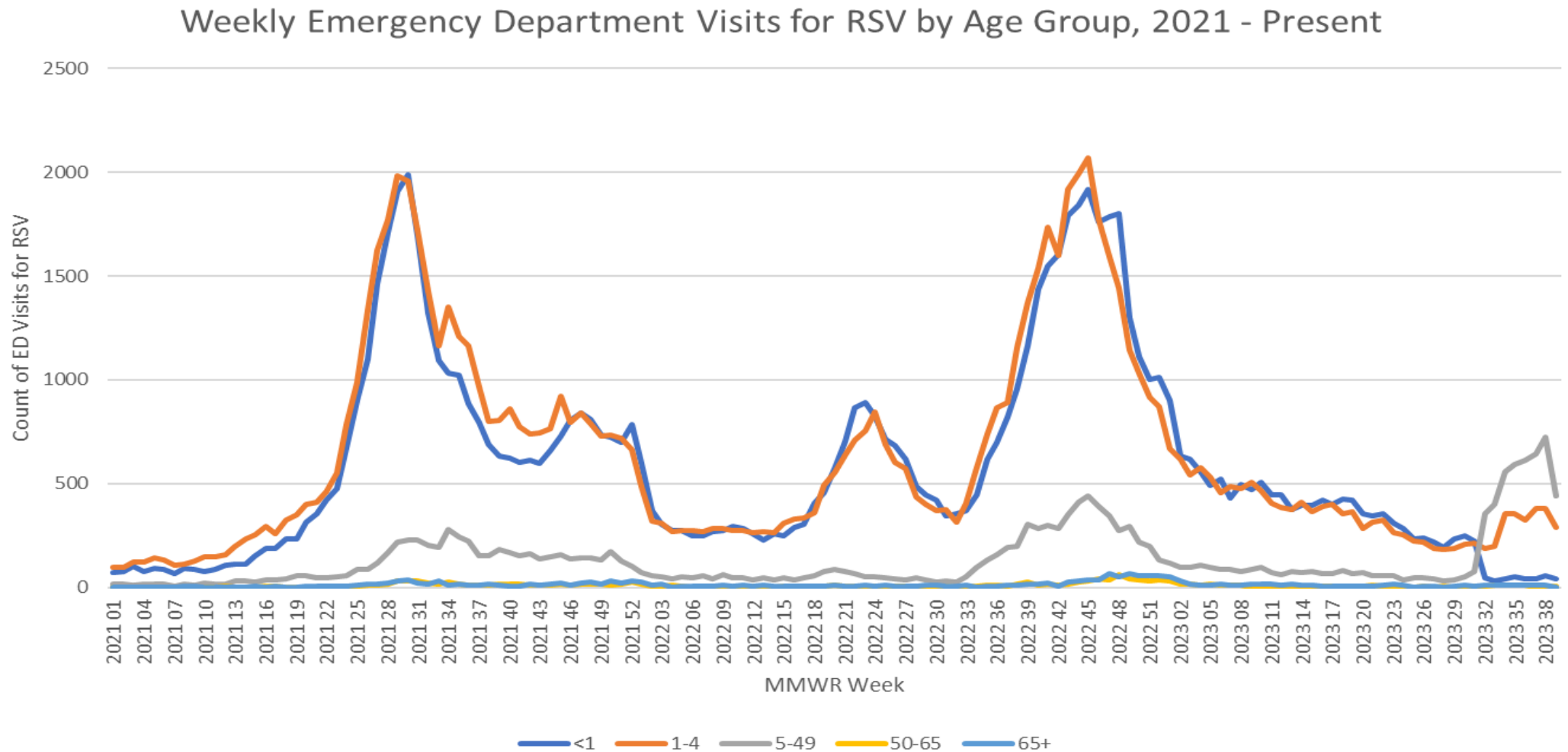
# RSV in Texas, 2021 – 2023, **by Age Groups** Syndromic Surveillance



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Source: Texas Syndromic Surveillance (TxS2), January 2021 – September 25, 2023. Data were extracted September 28, 2023.

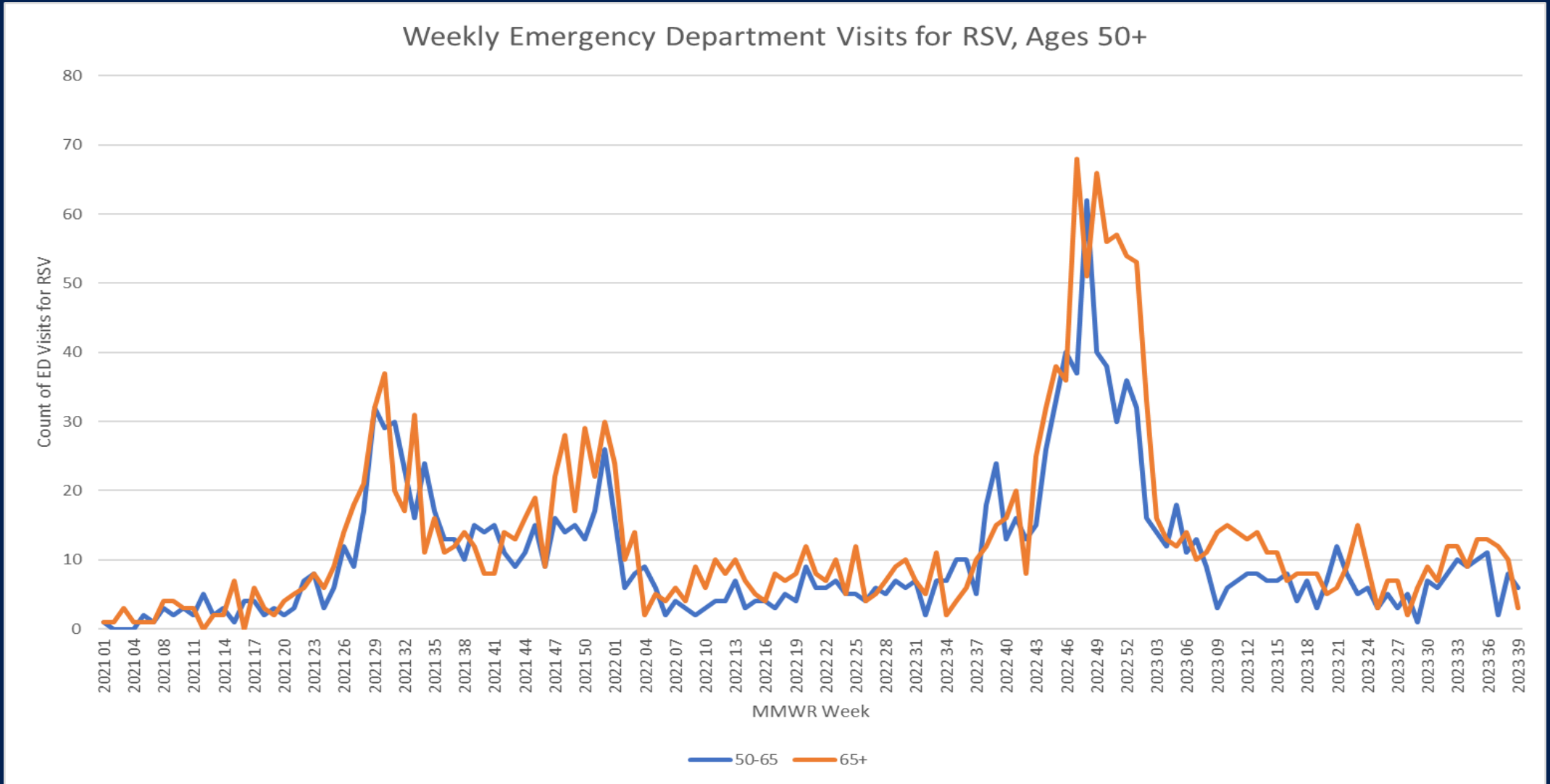
# RSV in Texas, 2021 – 2023, $\geq 50$ years of age Syndromic Surveillance



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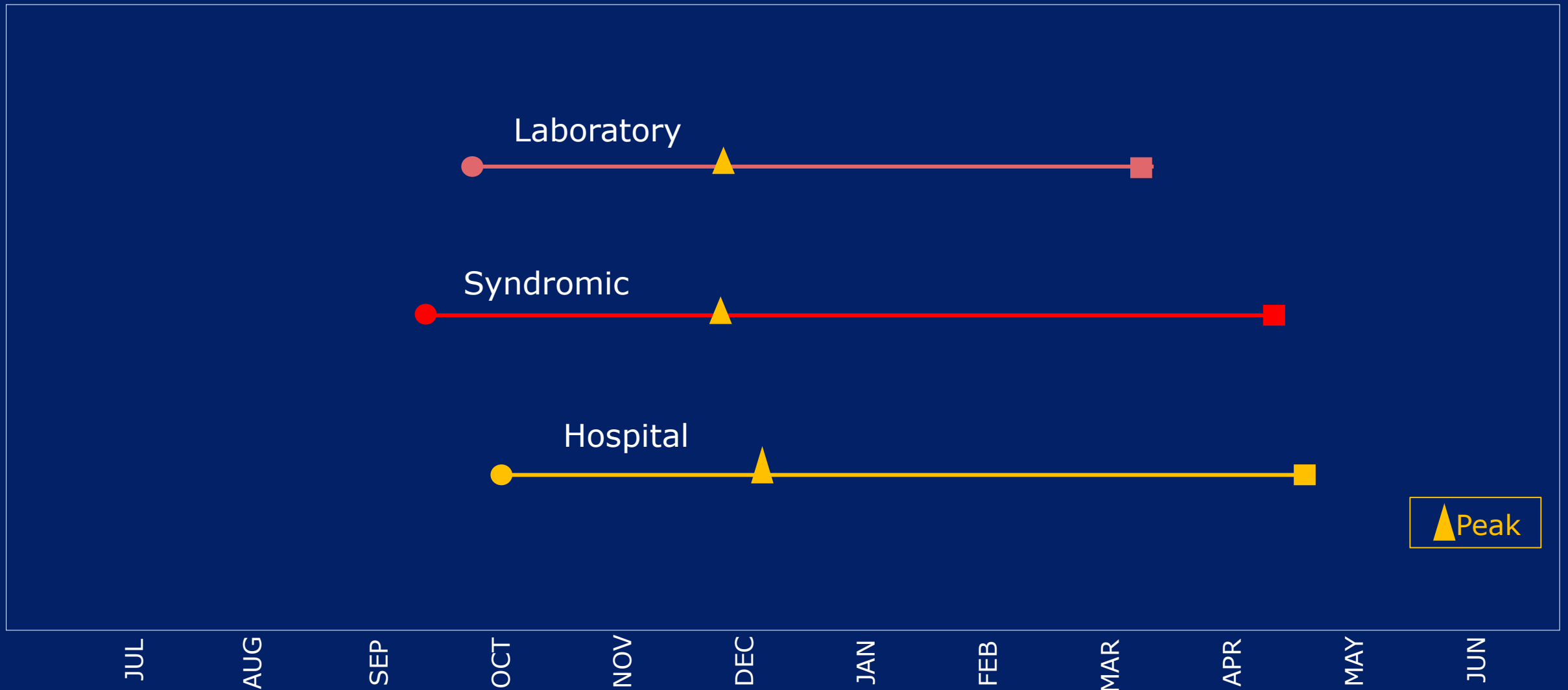
Source: Texas Syndromic Surveillance (TxS2), January 2021 – September 25, 2023. Data were extracted September 28, 2023.

# RSV Seasonality Estimates In Texas, 2017-2023 (Syndromic Surveillance)





# RSV Seasonality Estimates in Texas, 2019-2020 (Laboratory, Syndromic, and Hospital Data)





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# **RSV Disease Burden**

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# RSV is the leading cause of hospitalization in U.S. Infants

- Most (68%) infants are infected in the first year of life and nearly all (97%) by age 2<sup>1</sup>
- Premature infants born at <30 weeks gestation had hospitalization rates ~3x higher than term infants<sup>2</sup>
  - Preterm infants have higher rates of ICU admission, mechanical ventilation<sup>3</sup>
  - Average cost of hospitalization in infant <29 weeks ~4x higher than for term infant<sup>3</sup>
- 79% of children hospitalized with RSV aged <2 years had no underlying medical conditions<sup>2</sup>
- 2-3% of all infants will be hospitalized for RSV<sup>2,4</sup>



Image: Goncalves et al. Critical Care Research and Practice 2012

<sup>1</sup>Glezen et al, Arch Dis Child, 1986; <sup>2</sup>Hall et al, Pediatrics, 2013;

<sup>3</sup>McLaurin et al, J Perinatol, 2016; <sup>4</sup>Langley & Anderson, PIDJ, 2011

# Each year in U.S. children aged less than 5 years, RSV is associated with...

**100-300**<sup>1,2</sup>  
deaths

**58,000-80,000**<sup>3,4</sup>  
hospitalizations

**~520,000**<sup>3</sup>  
emergency department visits

**~1,500,000**<sup>3</sup>  
outpatient visits

<sup>1</sup>Thompson et al, JAMA, 2003; <sup>2</sup>Hansen et al, JAMA Network Open, 2022; <sup>3</sup>Hall et al, NEJM, 2009; <sup>4</sup>McLaughlin et al, J Infect Dis, 2022 (\*estimate 80,000 hospitalizations in infants <1y)

Source: [CDC RSV ACIP Meeting](#) accessed 10/6/2023

# MMWR: RSV hospitalizations have worse clinical outcomes for older adults than flu, COVID in the U.S.

TABLE 2. In-hospital outcomes among adults aged ≥60 years hospitalized with respiratory syncytial virus, COVID-19, or influenza — Investigating Respiratory Viruses in the Acutely Ill Network, 25 hospitals,\* 20 U.S. states, February 1, 2022–May 31, 2023

In-hospital outcomes	No./Total no. (%)			RSV vs. COVID-19 aOR† (95% CI)	p-value	RSV vs. influenza aOR† (95% CI)	p-value
	RSV patients n = 304	COVID-19 patients n = 4734	Influenza patients n = 746				
Standard flow oxygen therapy‡	157/197 (79.7)	2,169/3,726 (58.2)	390/593 (65.8)	2.97 (2.07–4.27)	<0.001	2.07 (1.37–3.11)	<0.001
HFNC or NIV¶	59/256 (23.0)	495/4,223 (11.7)	94/687 (13.7)	2.25 (1.65–3.07)	<0.001	1.99 (1.36–2.90)	<0.001
ICU admission	74/304 (24.3)	819/4,734 (17.3)	125/746 (16.8)	1.49 (1.13–1.97)	0.005	1.55 (1.11–2.19)	0.01
IMV or death	41/304 (13.5)	481/4,734 (10.2)	52/746 (7.0)	1.39 (0.98–1.96)	0.07	2.08 (1.33–3.26)	0.001

**Abbreviations:** aOR = adjusted odds ratio; HFNC = high-flow nasal cannula; ICU = intensive care unit; IMV = invasive mechanical ventilation; NIV = noninvasive ventilation; RSV = respiratory syncytial virus.

\* <https://www.cdc.gov/flu/vaccines-work/ivy.htm>

† Multivariable logistic regression models were adjusted for age, sex, race and ethnicity, number of organ systems with chronic medical conditions, and U.S. Department of Health and Human Services region.

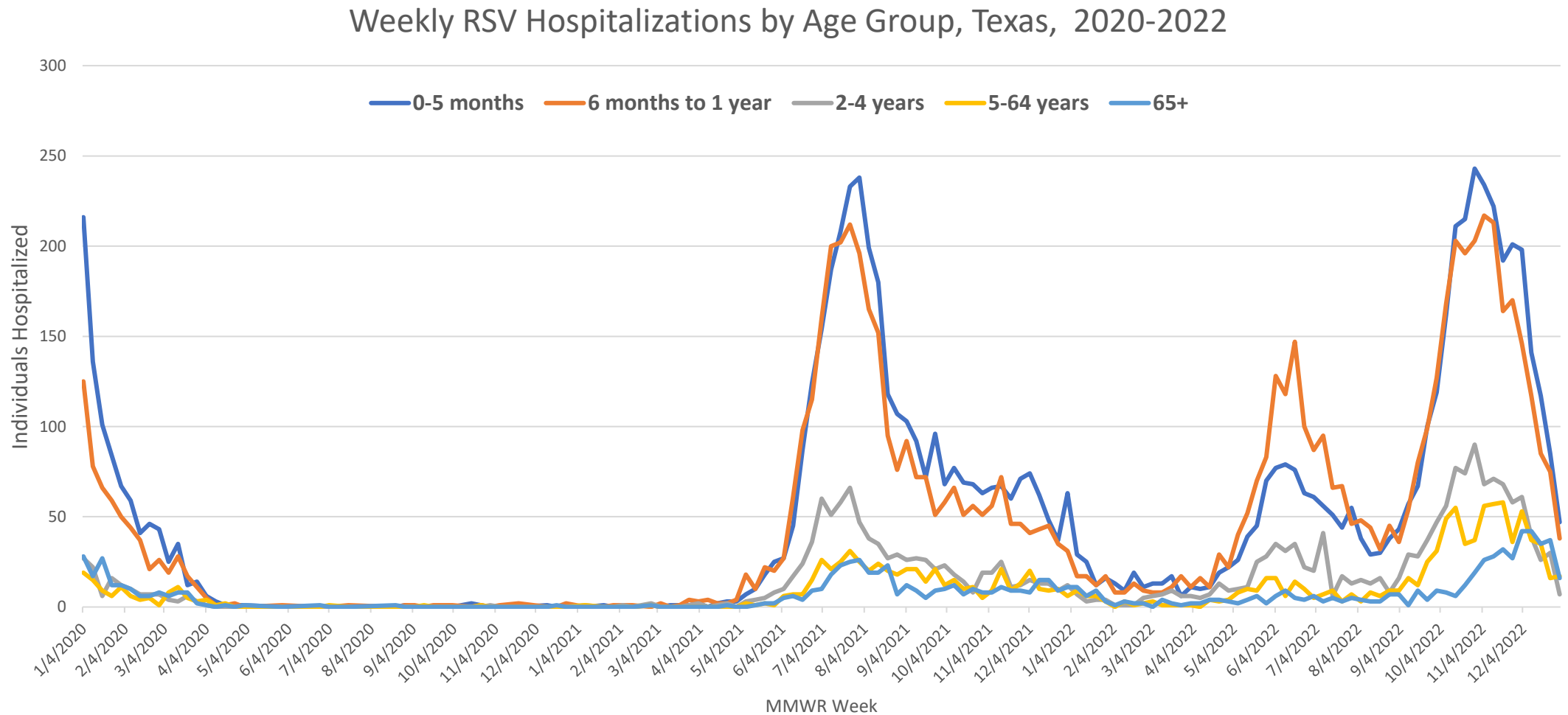
‡ Standard flow oxygen therapy was defined as receipt of supplemental oxygen therapy at a flow rate <30 L/minute as the highest level of oxygen support received during hospitalization.

¶ HFNC or NIV was defined as patients who received either HFNC (oxygen therapy at a flow rate ≥30 L/minute) or NIV as the highest level of oxygen support received during hospitalization.

Source: [Disease Severity of Respiratory Syncytial Virus Compared with COVID-19 and Influenza Among Hospitalized Adults Aged ≥60 Years — IVY Network, 20 U.S. States, February 2022–May 2023 | MMWR \(cdc.gov\)](#), accessed 10/8/2023

# RSV Hospitalizations in Texas, 2020 – 2022

## By Age Groups, THCIC



Source: Texas Healthcare Information Collection (THCIC) Inpatient Research Data File, January 1, 2020 – December 31, 2022

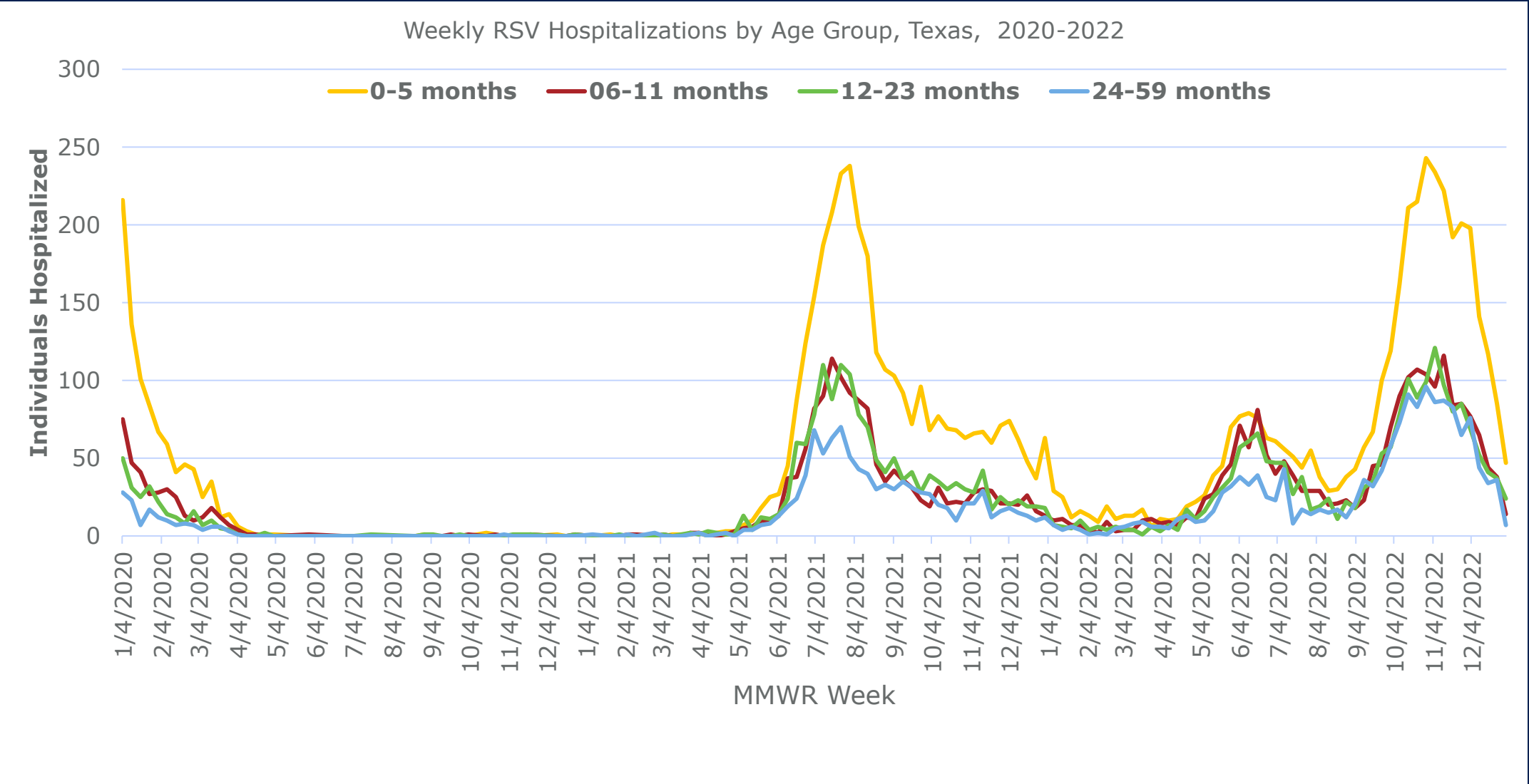


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# RSV Hospitalizations in Texas Among Persons <5yrs, 2020 – 2022, THCIC



Source: Texas Healthcare Information Collection (THCIC) Inpatient Research Data File, January 1, 2020 – December 31, 2022

# Overall Summary of RSV Hospitalizations in Texas January 2020 - December 2022

Of all RSV hospitalizations in TX, **88% were in children < 5 years of age**

- 63% did not have underlying medical conditions

Among children less than 5 yrs, **87% of RSV hospitalizations were in children < 1 year of age**

Among children less than 5 yrs, **45% of RSV hospitalizations were in children 0-5 months of age**



# Overall Summary of RSV Hospitalizations in Texas January 2020 - December 2022

Of all RSV hospitalizations, **45% were admitted to the ICU**

Among all ICU admissions, **89% of ICU admissions were in children < 5 years of age**

Among ICU admissions for children < 5 yrs, **88% were in children < 1 year of age**

# Next Steps



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- Further develop analysis of RSV burden in Texas
  - Include data from 2017 to 2022
  - Compare RSV rates Pre and post COVID-19 Pandemic
- Enhance the surveillance of respiratory viruses
  - Work with health systems to expand voluntary reporting of respiratory virus laboratory results
  - Recruit additional laboratories to submit to NREVSS

# Acknowledgement & Appreciation

- Anna Klioueva
- Erica Mendoza
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- Emilio Gonzalez

\*formerly at DSHS



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**Thank you**

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