

## Introduction

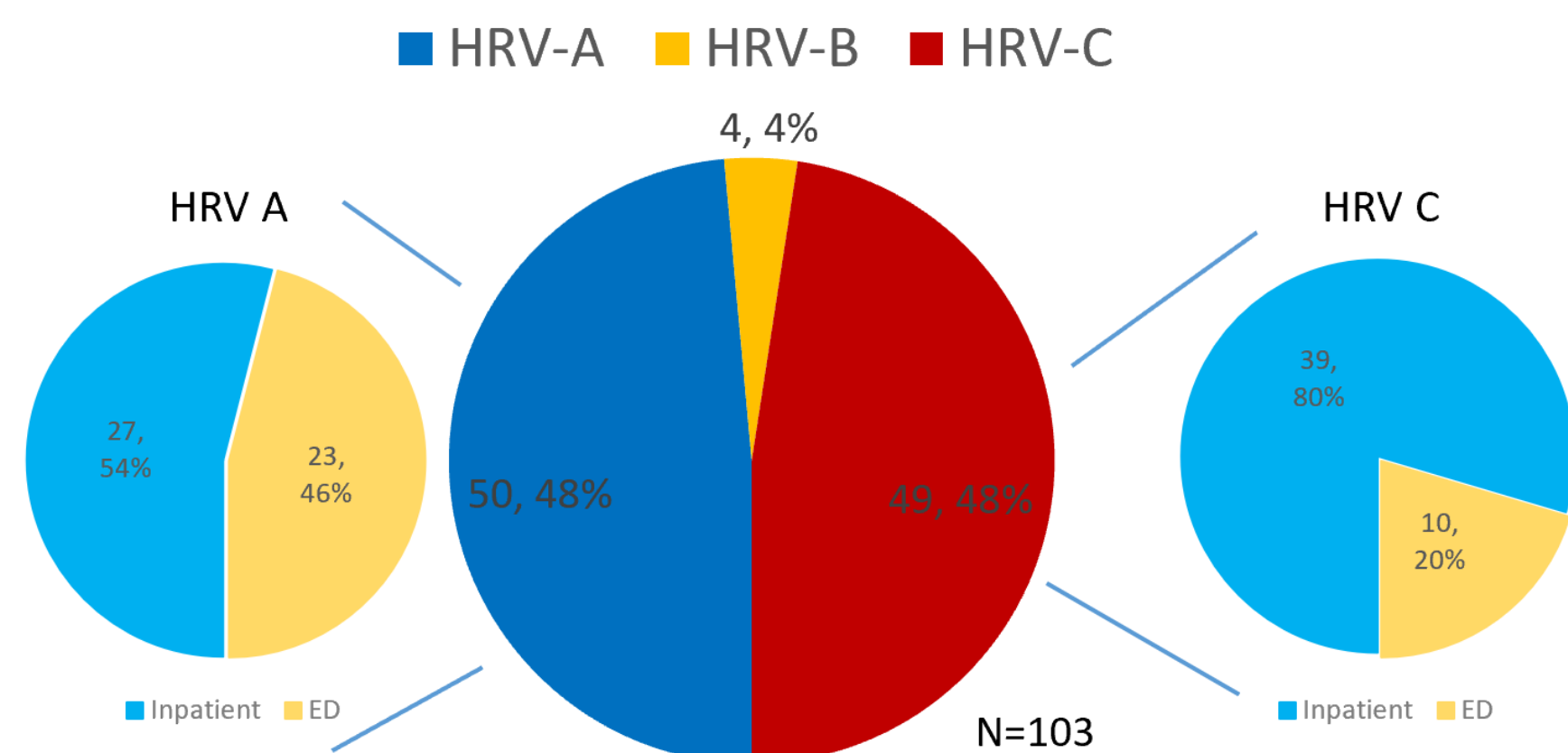
- Human rhinovirus (HRV) is a leading cause of acute respiratory tract infections in young children<sup>1</sup>
- Of the 3 HRV types (A,B,C), HRV-C has been most commonly associated with acute asthma exacerbations<sup>2</sup>
- The epidemiology of HRV is not well described in children >5 years of age
- We sought to characterize the epidemiology of HRV in children and adolescents >5 years of age with medically attended acute respiratory tract infection

## Methodology

- From December 2016-November 2017, 267 children, aged 5-17 years, who presented to Children's Mercy Hospital emergency department and inpatient units with acute respiratory tract infection were prospectively enrolled as part of a larger study.
- 114 (42.7%) were singly positive for human rhinovirus by multiplex PCR testing
- 103 (90.4%) specimens were successfully amplified via PCR and sequenced to determine HRV subtype utilizing PubMed nucleotide BLAST analysis
- Clinical data were manually abstracted into a case report form.
- Nominal data were evaluated by total number and percentage and  $\chi^2$  analysis. Continuous data were reported as median and interquartile range with analysis by Mann-Whitney U and Kruskal-Wallis testing. Multivariable regression was used to determine risk factors for inpatient admission.

## Results

**Figure 1.** HRV subtype by location



**Table 1.** Demographics of all children with HRV

	HRV A n=50	HRV B n=4	HRV C n=49	P value
Age, median years (IQR)	9.9 (7.5-12.6)	9.8 (5.6-14.9)	8.6 (6.6-12.3)	0.32
Male (%)	31 (62)	3 (75)	24 (49)	0.32
Tobacco Exposure	29 (58)	3 (75)	27 (46)	0.73
Race/ethnicity				0.49
White	17 (34)	3 (75)	13 (27)	
Black	28 (56)	1 (25)	32 (65)	
Other	5 (10)	0 (0)	4 (8)	
Hispanic, no. (%)	6 (12)	2 (66)	9 (18)	0.046
History of asthma	29 (58)	3 (75)	40 (83)	0.02

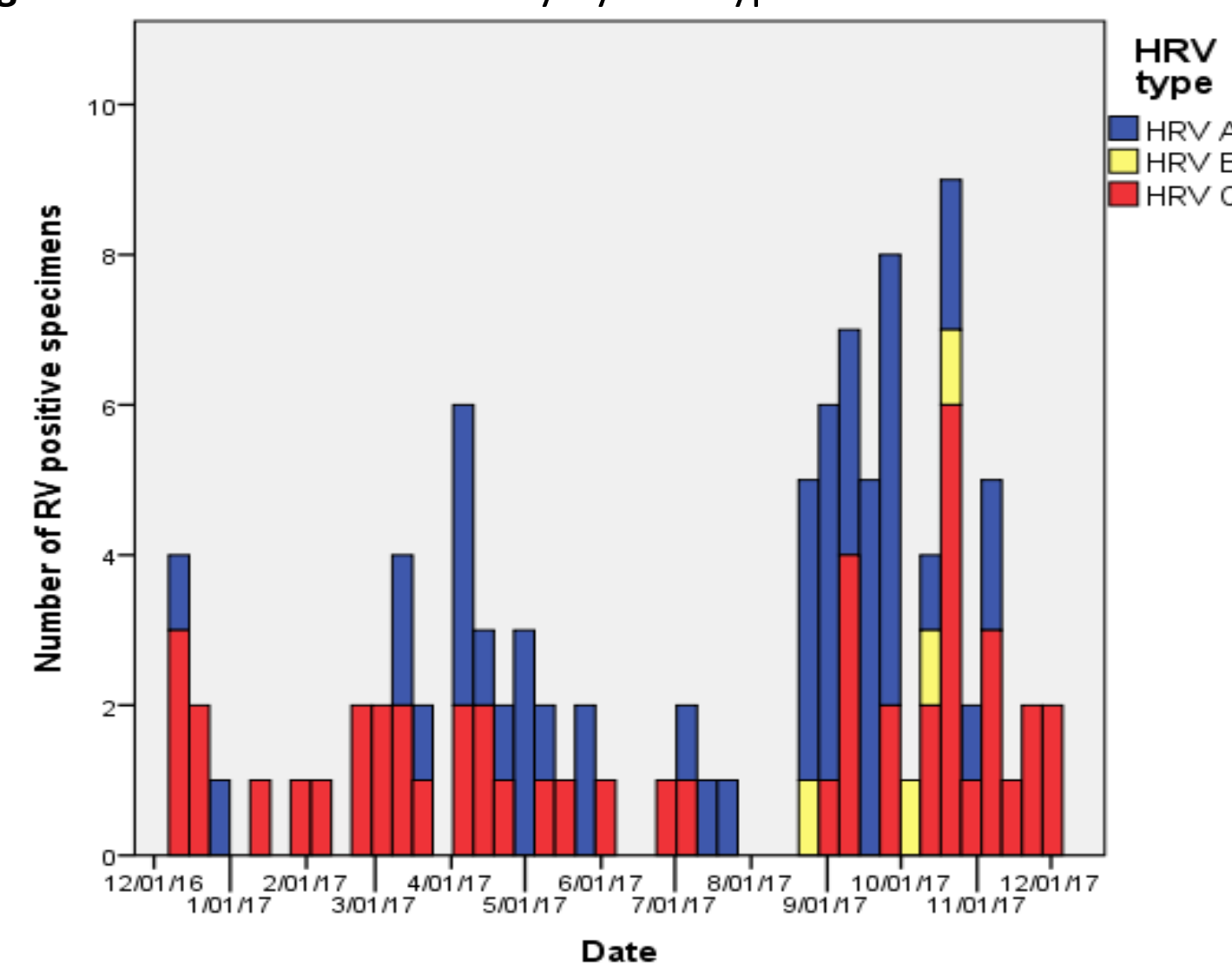
**Table 2.** Signs and symptoms by HRV type among admitted children

	HRV A n=27	HRV C n=39	P value
Retractions	9 (33.3)	21 (53.8)	0.10
Wheezing	16 (59.3)	31 (79.5)	0.07
Need for supplemental O <sub>2</sub>	16 (59.3)	31 (79.5)	0.07
Intensive care unit stay	5 (18.5)	8 (20.5)	0.84
History of asthma	18 (66.7)	34 (87.2)	0.02

**Table 3.** Clinical features in admitted asthmatic patients

	HRV A n=19	HRV C n=35	P value
Retractions	9 (50)	17 (50)	1.0
Wheezing	15 (83.3)	26 (76.5)	0.73
Need for supplemental O <sub>2</sub>	13 (72.2)	26 (76.5)	0.75
Asthma history			0.04
Mild intermittent	1 (5.6)	10 (31.3)	
Mild persistent	12 (66.7)	8 (25.0)	
Moderate persistent	4 (22.2)	9 (28.1)	
Severe persistent	0 (0)	2 (6.3)	
Status asthmaticus	8 (44.4)	22 (68.8)	0.09
Intensive care unit stay	4 (22.2)	7 (20.6)	1.0

**Figure 2.** Rhinovirus seasonality by HRV type



## Conclusion

- HRV is a common cause of MAARI in school-aged children with 43% of children showing only HRV/EV on multiplex PCR
- HRV A and C are the most common causes of HRV-MAARI
- HRV A and C circulate year-round, B appears mostly in the fall
- In a multivariable regression model, asthma, but not HRV type, was significantly associated with admission. Children with asthma were 3.1 times more likely to be admitted (p = 0.03, 95<sup>th</sup> % CI: 1.1-8.5)**

## References

- Fawcner-Corbett et. Al (2016). Rhinovirus-C Detection in Children Presenting with Acute Respiratory Infection to Hospital in Brazil. *Journal of Clinical Virology*, 88, 58-63
- MacKay, I. (2008). Human Rhinovirus: The Cold Wars Resume. *Journal of Clinical Virology*, 42, 297-320