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Association of respiratory viral testing and antibiotic use for pediatric patients admitted for acute respiratory illness between 2017-2021 at Children's Mercy-Kansas City

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Association of Respiratory Viral Testing and Antibiotic Use for Pediatric Patients Admitted for Acute Respiratory Illness between 2017-2021 at Children's Mercy-Kansas City

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CMH Research Days 2024

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Disclosures

- Nothing to disclose

Background

- Acute respiratory illnesses (ARI) are common in pediatrics
 - Most are caused by viruses
- Testing is varied
 - Single pathogen vs multiple pathogens
- Clinical variability in usage of these tests
- How, or if, they impact antibiotic use is unclear

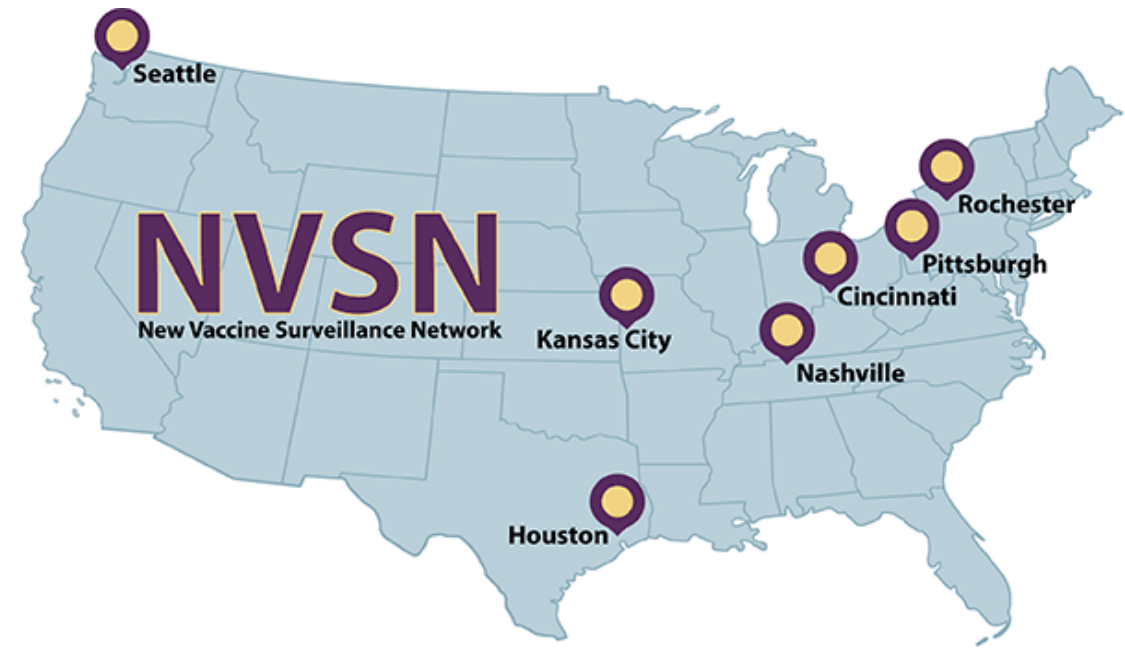
Objective

Understand frequency of use for clinical viral testing and its impact on antibiotic usage in children hospitalized with ARI

Methods

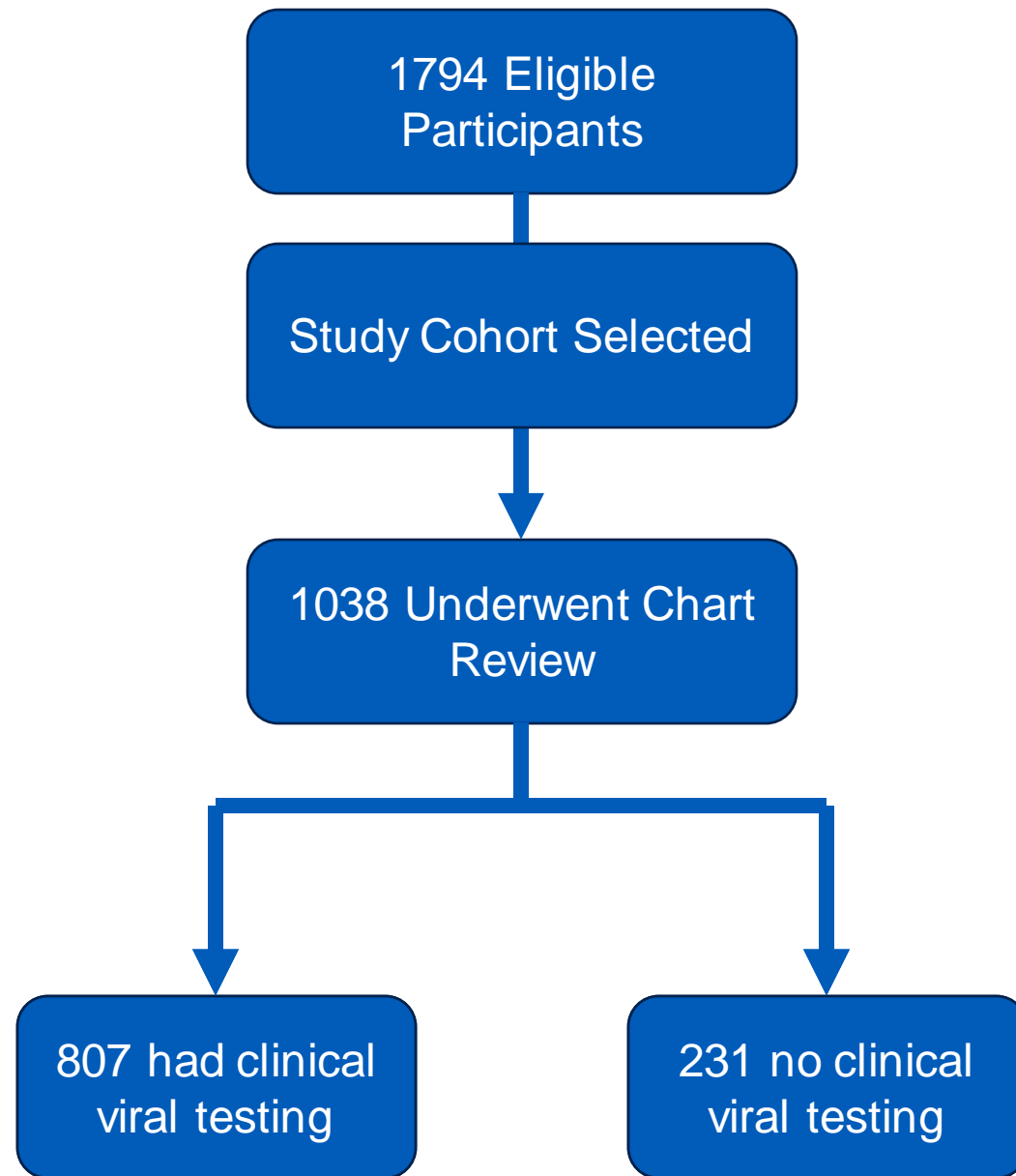
- New Vaccine Surveillance Network

- CDC based network at 7 sites
- Standardized enrollment for ARI
 - 0-18 years of age, Jackson County residents
 - Symptoms consistent with Acute Respiratory Illness
 - Enrolled within 48 hours of admission
 - Standardized data collection via parent interview, chart review
- All participants have a surveillance RPP (sRPP)



Methods

- Only some enrolled patients have clinical testing performed
 - Included PCR tests: Rapid RSV/Influenza, Rapid COVID, Multi-plex (cRPP)
- Analyzed all enrolled participants from Kansas City
 - September 2017-September 2021
- Chart Review
 - Demographic characteristics
 - Laboratory studies
 - Antimicrobial management



Results: Demographics Features of Patients with and without clinical viral testing

| | Clinical Viral Testing (N=807) | No Clinical Viral Testing (N=231) | P-value |
|---|--------------------------------|-----------------------------------|---------|
| Median Age (months) [IQR] | 17 [5, 49] | 18 [6, 58] | 0.451 |
| Parental Reported Race/Ethnicity | | | |
| White, non-Hispanic (NH) | 266 (33%) | <u>96 (41.6%)</u> | 0.021 |
| Black, NH | <u>304 (37.7%)</u> | 74 (32%) | |
| Other, NH | 15 (1.9%) | 4 (1.7%) | |
| Hispanic | <u>160 (19.8%)</u> | 33 (14.3%) | |
| Multi-Racial, NH | 55 (6.8%) | <u>24 (10.4%)</u> | |
| Unknown | 7 (0.9%) | 0 (0%) | |
| Smoking Exposure | 188 (23.3%) | 70 (30.3%) | 0.061 |

Results: Demographic Features and their Association with Clinical Viral Testing

| | Clinical Viral Testing (N=807) | No Clinical Viral Testing (N=231) | P-value |
|--------------------------------------|--------------------------------|-----------------------------------|---------|
| Daycare, Pre-School, School Exposure | 188 (23.3%) | 70 (30.3%) | 0.002 |
| Parent Reported Prematurity | 118 (14.6%) | 13 (5.6%) | <0.001 |
| Complex Care Condition | | | |
| 0 Conditions | 542 (67.4%) | 195 (84.4%) | <0.001 |
| ≥ 1 Conditions | 262 (32.6%) | 36 (15.6%) | |
| Technology Dependence, Assistance | 109 (13.6%) | 6 (2.6%) | <0.001 |

Results: Further Diagnostic Work-up and it's Association with Clinical Viral Testing

| | | Clinical Viral Testing (N=807) | No Clinical Viral Testing (N=231) | P-value |
|---------------|------------------|-----------------------------------|--------------------------------------|---------|
| Blood Culture | Collected | 297 (36.8%) | 26 (11.3%) | < 0.001 |
| | Positive | 18 (6.1%) | 1 (3.8%) | 0.999 |
| CSF Culture | Collected | 53 (6.6%) | 6 (2.6%) | 0.022 |
| | Positive | 2 (3.8%) | 1 (16.7%) | 0.279 |
| Urine Testing | Urine Tested | 234 (29%) | 27 (11.7%) | <0.001 |
| | *Positive UA* | 53/234 (22.7%) | 1/27 (3.7%) | 0.214 |
| | Positive Culture | 15/149 (6.4%) | 1/16 (3.7%) | 0.535 |
| Chest X-Ray | Performed | 501 (62.2%) | 78 (33.8%) | <0.001 |
| | Abnormal | 432 (86.2%) | 69 (88.5%) | 0.591 |

includes pyuria, bacteriuria and/or both

Results: Positive Clinical Viral Testing and Associated Antibiotic Usage

| | Positive Clinical Result (n=459) | Positive Surveillance Result (n=184) | P-value |
|-----------------------------------|----------------------------------|--------------------------------------|---------|
| Length of Stay Median hours [IQR] | 52 [37, 91] | 38 [25, 51] | <0.001 |
| Inpatient Antibiotics | 168 (36.6%) | 27 (14.7%) | <0.001 |
| Inpatient Antibiotics >48hr | 60 (35.7%) | 3 (11.1%) | 0.013 |
| Discharge Antimicrobials | 66 (14.4%) | 15 (8.2%) | 0.035 |

Conclusions

- There were differences in clinical viral testing between racial/ethnic groups
- Some participants were more likely to receive clinical viral testing
 - Medical complexity, technological dependence, prematurity
- Patients with positive clinical viral testing received more antibiotics
 - Across care settings
- Further analysis
 - Level of care
 - Diagnosis codes
 - Understand the influence of COVID pandemic on results

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