Implementation and Preliminary Results of Reporting for Severe Respiratory Syncytial Virus in Children <5 years in Los Angeles County, 2014-2015

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BACKGROUND

- Respiratory syncytial virus (RSV) causes significant morbidity in the pediatric population with an estimated 132,000-172,000 children < 5 years of age hospitalized for RSV related illness annually in the United States from 1997-2006 [1].
- In July 2014, the American Academy of Pediatrics (AAP) updated guidelines for prophylaxis use in children and infants at high risk for hospitalization attributable to RSV infection.
- The Centers for Disease Control and Prevention (CDC) plans to assess implementation of the recommendations by collecting data on severe cases.
- For these reasons, and with CDC funding and support, the Los Angeles County Department of Public Health (LACDPH) made severe RSV in children < 5 years old reportable beginning December 1, 2014.

OBJECTIVES

- Assess morbidity and mortality due to severe RSV in LAC.
- Assess complications, management, and prevention among severe RSV cases.

METHODS

Reporting

- Mandatory reporting was implemented by issuing a Health Officer order.
- Cases reported from December 1, 2014, to May 1, 2015, are included in analysis.

Case Definition

- Case definition: LAC resident who is a child <5 years old who died or was admitted to the Intensive Care Unit (ICU) as a direct or indirect consequence of infection with RSV.

Data Collection

- Demographic, clinical data and medical history were assessed using an epidemiology collection form and medical records.
- Variables determined through collaboration with CDC and literature review.

Analysis

- Calculated odds ratios and t-tests comparing prematurity status with outcomes, complications and history.

RESULTS

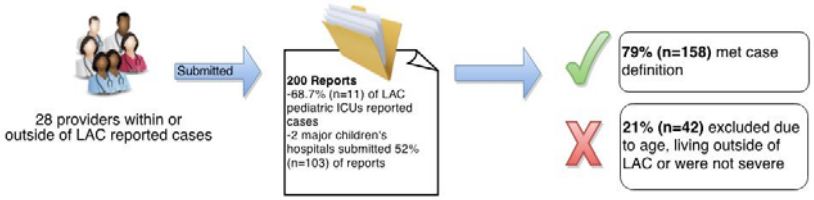

Table 1. Demographics of children admitted with severe RSV

Characteristics (n=158)		N (%)
Median age in months		2m
Sex, male		86 (54.4)
Ethnicity n=114		
	Hispanic	88 (77.2)
	White	13 (11.4)
	Black	6 (5.3)
	Asian	3 (2.6)
	Other	4 (3.5)
Medical History (n=157)		
Underlying Conditions	Premature (≤37 weeks)	62 (39.5)
	≤29 weeks	11 (17.7)
	30 to 32 weeks	10 (16.1)
	33 to ≤37 weeks	41 (66.1)
	Chronic Lung Condition	24 (15.3)
	Cardiac Condition	13 (8.3)
Eligible for RSV Prophylaxis (palivizumab)		11 (6.9)
Received Current Year Prophylaxis		7 (63.6)
Did not receive prophylaxis		4 (36.4)

Note: Premature defined as ≤37 completed full gestational weeks

- 67.7% (n=107) of cases were 0-6 months at onset of illness.
- 77.8% (n=123) of cases were <1 year and 41% (n=51) of this group was premature.
  - 56.3% (n=89) had a pre-existing condition.
  - The most common pre-existing condition was prematurity.
- 17.7% (n=11) of premature cases were born at <29 weeks.
- 7 (58.3%) of eligible cases (n=11) received prophylaxis with Synagis™ (palivizumab). Of these:
  - 5 (71.4%) were premature; 2 had other co-morbidities.
  - 3 completed prophylaxis prior to getting sick; 3 had missed doses or incomplete prophylaxis; 1 received the first dose 4 days prior to illness.

Table 2. Severe RSV case outcomes, complications and history by prematurity status

		Prematurity		
	All (n=158)	Yes (n=62)	No (n=96)	OR (95% CI)
Recovered	157 (99.3)	62 (100)	95 (99.0)	-
Fatal	1 (0.7)	0 (0.0)	1 (1.0)	-
Treatments				
Antivirals	18 (11%)	8 (12.9)	10 (10.4)	1.27 (0.47, 3.43)
Intubation	35 (22%)	20 (32.3)	15 (15.6)	**2.57 (1.91, 5.53)**
Chest X-ray (n=140), Abnormal	107 (76.4)	41 (66.1)	66 (68.8)	1.08 (0.48, 2.44)
Complications				
Bronchiolitis	121 (76.5)	49 (79.0)	72 (75.0)	1.25 (0.58, 2.70)
ARDS/ARF*	38 (24.0)	20 (32.3)	18 (18.8)	2.06 (0.98, 4.32)
Pneumonia	43 (27.2)	16 (25.8)	27 (28.1)	0.89 (0.43, 1.83)
Duration of Hospitalization				
Cases hospitalized for > 7 days	72 (45.5)	40 (64.5)	32 (33.3)	**3.63 (1.85, 7.11)**
Average Number of days hospitalized (d=days)	10.57d (1, 107)	14.20d	8.2d	***p*= 0.002**
Medical History				
Received Prophylaxis 2015	7 (4.4)	5 (8.1)	2 (2.1)	4.12 (0.77, 21.95)

*Acute respiratory distress syndrome/Acute respiratory failure

- 99.3% of cases recovered, while one case was fatal. The fatal case had unknown birth history but presented with chronic cardiac, lung and developmental problems.
- The average number of days in the hospital of a premature case was significantly higher than that of a full-term case, and the odds of being admitted for a week or more was 3.63 times that of the full-term group.
- The odds of premature cases being intubated was 2.57 times higher than the full-term cases and they were also more likely to have complications such as ARDS/ARF*.

DISCUSSION

- 2014-2015 was the 1st season of severe RSV reporting for LAC.
- >50% of cases came from 2 hospitals. Possible reasons for this include under-reporting of cases and severe cases being admitted more often to large hospitals
- Most cases were <6 months old (69.2%). This is consistent with literature indicating severity is highest in cases youngest at the start of the RSV season [2].
- 36.4% (n=4) of eligible cases did not receive prophylaxis. Barriers to prophylaxis could have been lack of physician awareness, complexity of guidelines, lack of access to care, or high expense of medication. Similar barriers may have existed for cases with missed doses.
- Eligible cases that completed prophylaxis may have had reduced complications or lengths of hospitalization compared to those who had not.
- Estimating the effectiveness of prophylaxis is difficult for this population as the total number that received it is not available; it was only possible to assess who was eligible but did not receive prophylaxis or where it failed.

LIMITATIONS

- Older cases often lacked detailed birth and/or comprehensive medical history making it difficult to determine prophylaxis eligibility as defined by AAP.
- Due to missing data, it is unclear what is the true distribution of race/ethnicity.

FUTURE PLANS

- Ensure collection of data to assess eligibility for prophylaxis.
- Conduct multivariate analysis.
- Explore feasibility of audits at LAC hospitals to assess reporting sensitivity and detect unreported cases.

REFERENCES

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2. Hall, C.B., et al. (2013). Respiratory Syncytial Virus – Associated Hospitalizations Among Children Less Than 24 Months of Age. *American Academy for Pediatrics*, 132(2), 341-348. doi: 10.1542/peds.2013-0303

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