HOSPITALIZATION OF CHILDREN DUE TO COMMUNITY-ACQUIRED PNEUMONIA

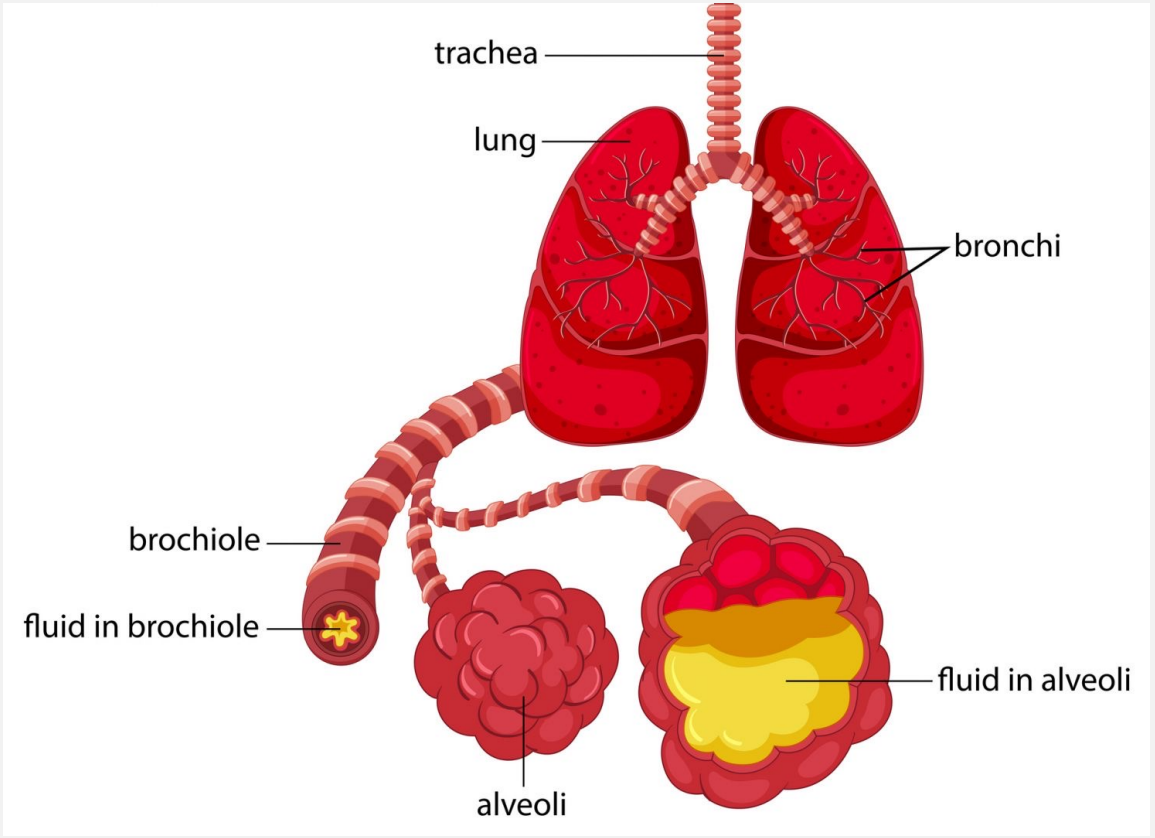
Presented by Megan Fuller

INTRODUCTION

- Questions to explore today:
  - What pathogens cause community-acquired pneumonia in children to the point of hospitalization?
  - Which assessment methods are most effective in pathogen determination?

WHAT IS COMMUNITY-ACQUIRED PNEUMONIA (CAP)?

- Pneumonia – infection in the alveoli of one or both lungs.
- Community-acquired – contracted from a pathogen outside of the hospital.
- Most common cause of hospitalization and death in children.



Harvard (2018)

Bhuiyan, et al. (2018) & Mayo Clinic (2020)

CAP SYMPTOMS

- Chest pain
- Productive cough
- Fatigue
- Fever (sweating/chills)
- Hypothermia
- Nausea/vomiting
- Diarrhea
- Shortness of breath

Mayo Clinic (2020)

WHAT IS THOUGHT TO CAUSE CAP?

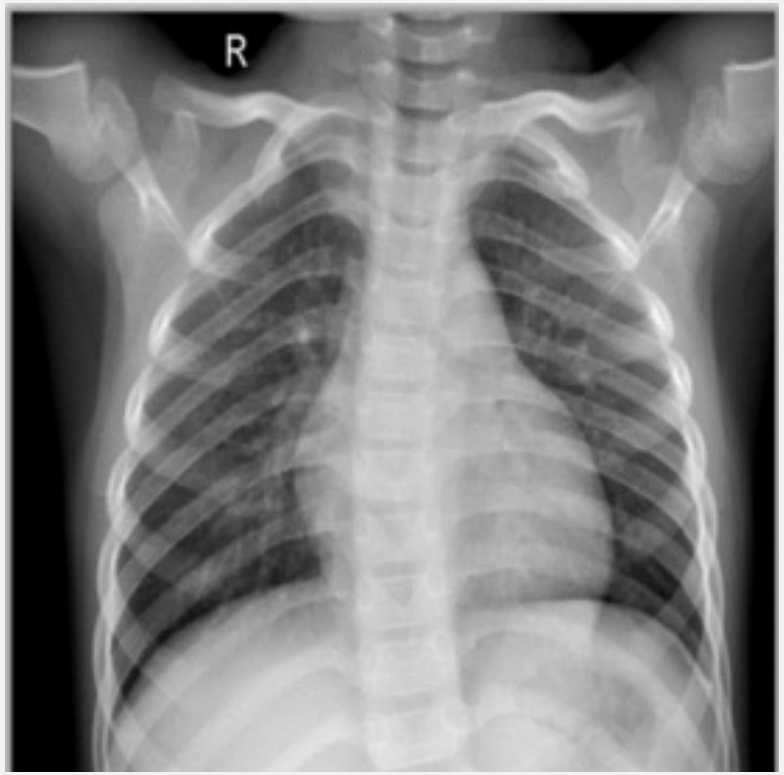
CDC (2020)

- Pneumonia can be caused by either:
  - Bacteria
  - Virus
  - Both (simultaneous infection)
- Pathogen determines treatment.

Fritz, et al. (2019)

BLOOD CULTURES & RADIOGRAPHS

- Assessment methods being evaluated in this presentation: **are they effective**?
- Blood cultures – bacterial pathogen.
- Radiograph – X-ray; any pathogen.



Neuman et al. (2017)

Rajaraman (2019)

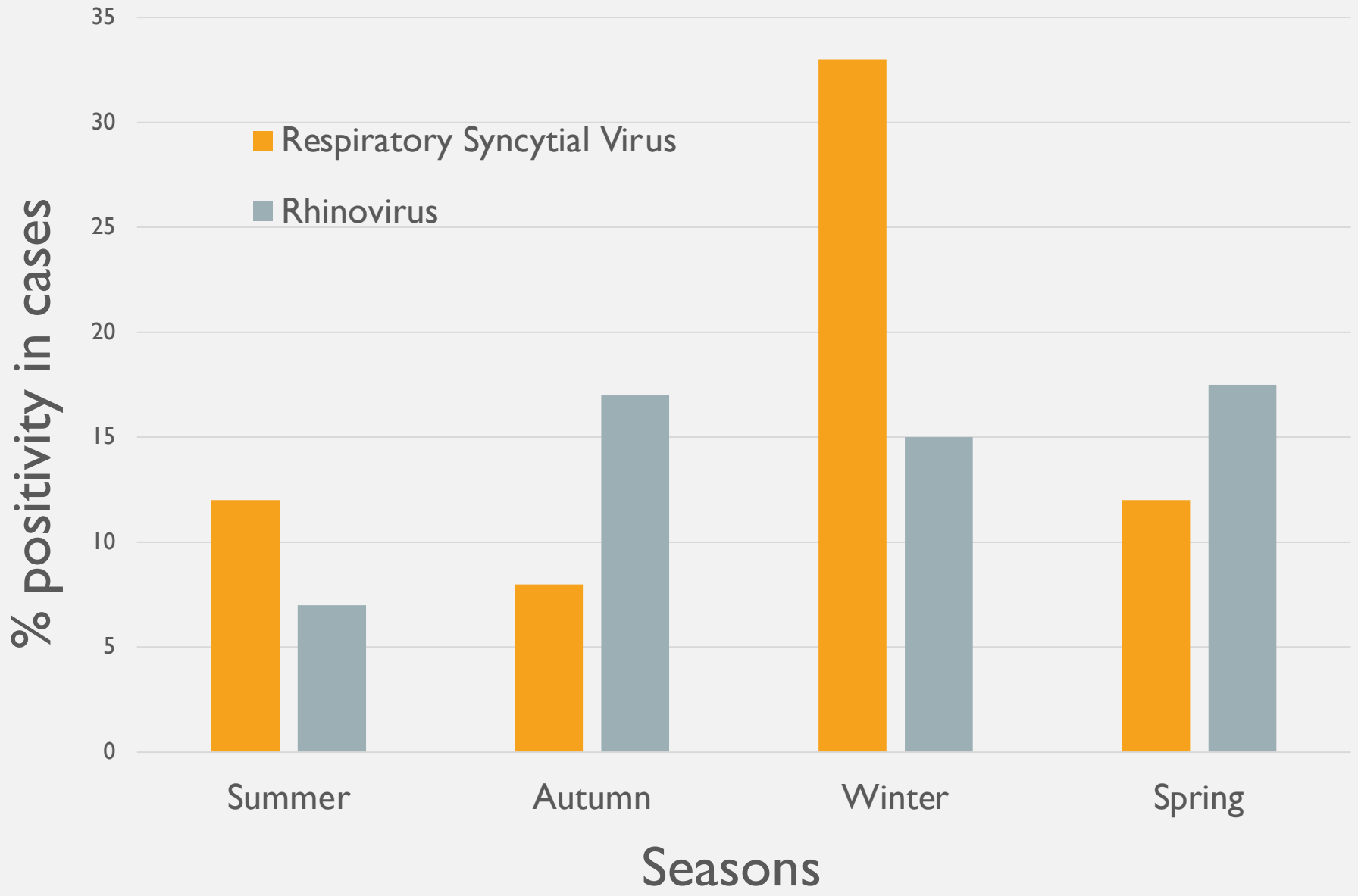
OBJECTIVES

- To determine the most common pathogens for bacterial and viral pneumonia infections.
- To determine if blood cultures and radiographs are effective methods of determining suspected pathogen.

HOW DO RESEARCHERS ACCOMPLISH THIS?

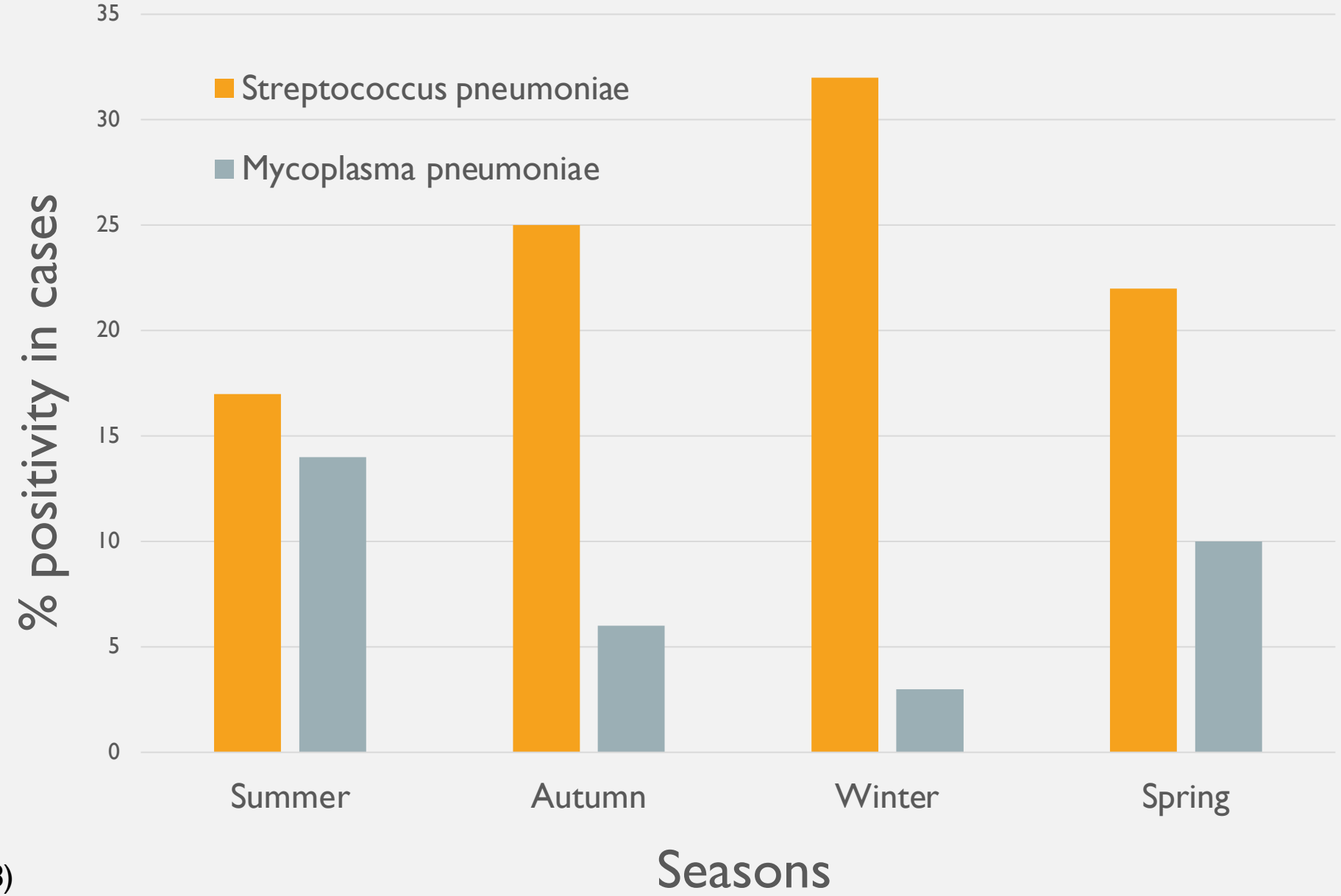
1. Enrollment
2. Demographics
3. Radiograph
4. Blood culture (bacterial)
5. Examine results
6. Treatment

Seasonality – Viruses



Bhuiyan, et al. (2018)

Seasonality – Bacteria



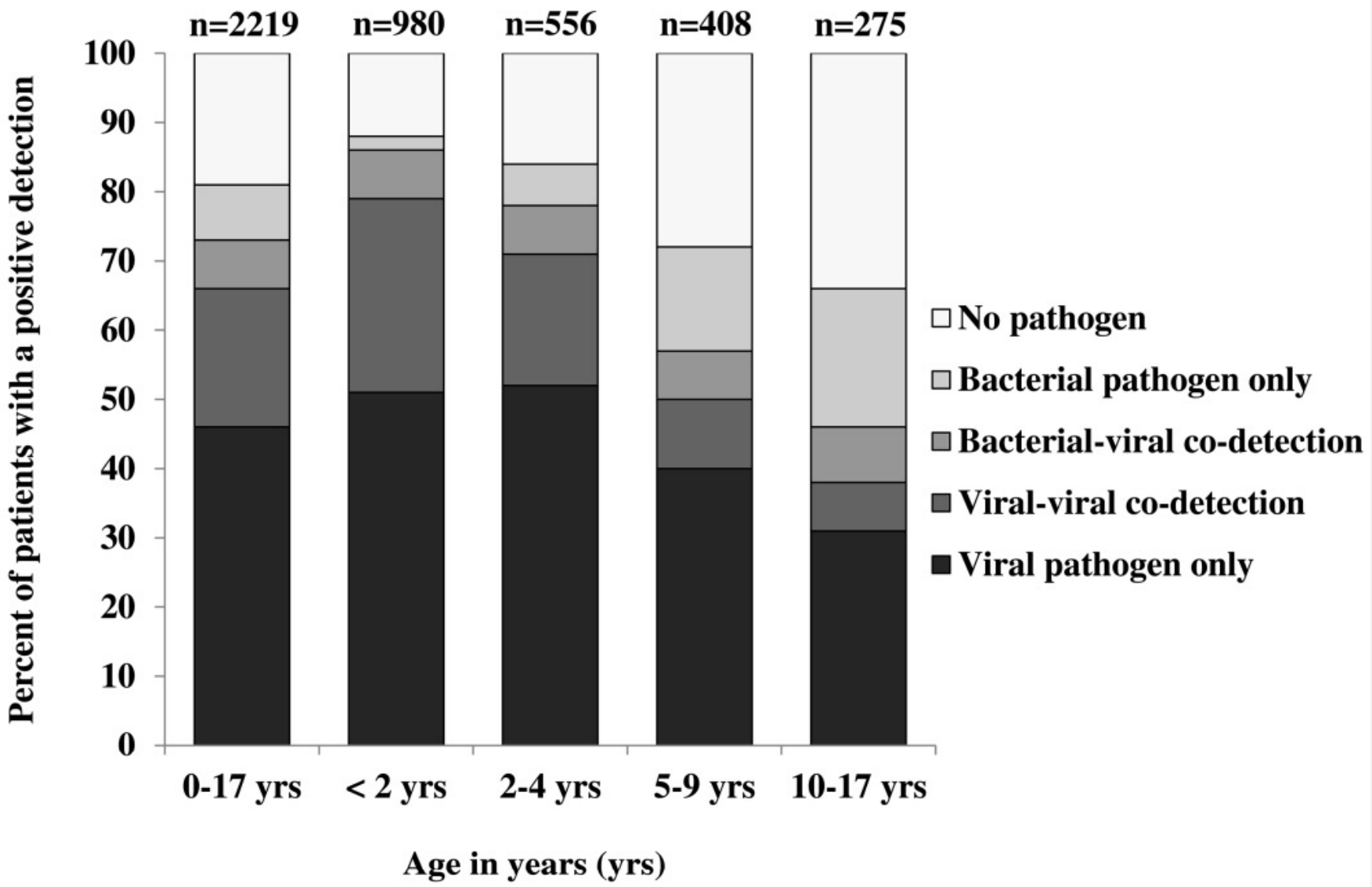
Bhuiyan, et al. (2018)

Age & Symptom Distribution

Characteristic	Children with radio graphic confirmation of pneumonia (n=2358)
Age groups – no. (%)	
<2 years	1055 (45)
2-4 years	595 (25)
5-9 years	422 (18)
10-17 years	286 (12)
Symptoms – no. (%)	
Cough	2230 (95)
Fever/feverish	2155 (91)
Anorexia	1766 (75)
Dyspnea	1657 (70)

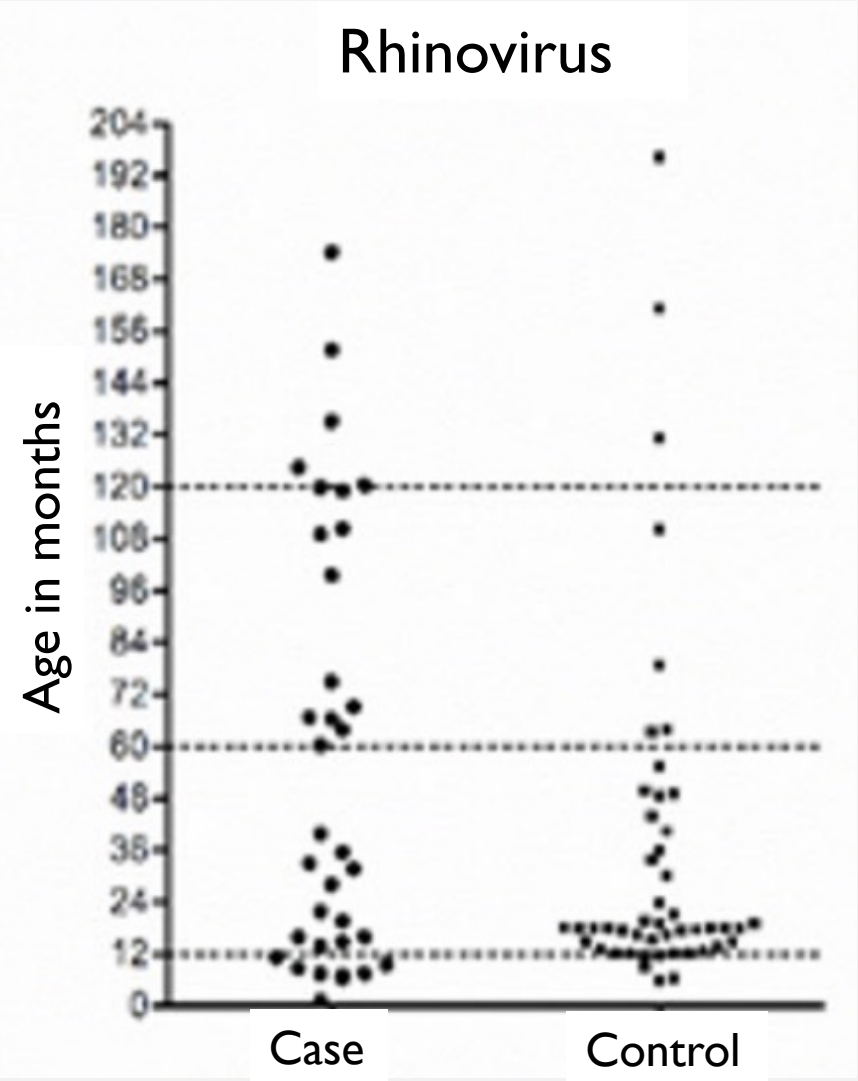
Jain et al. (2015)

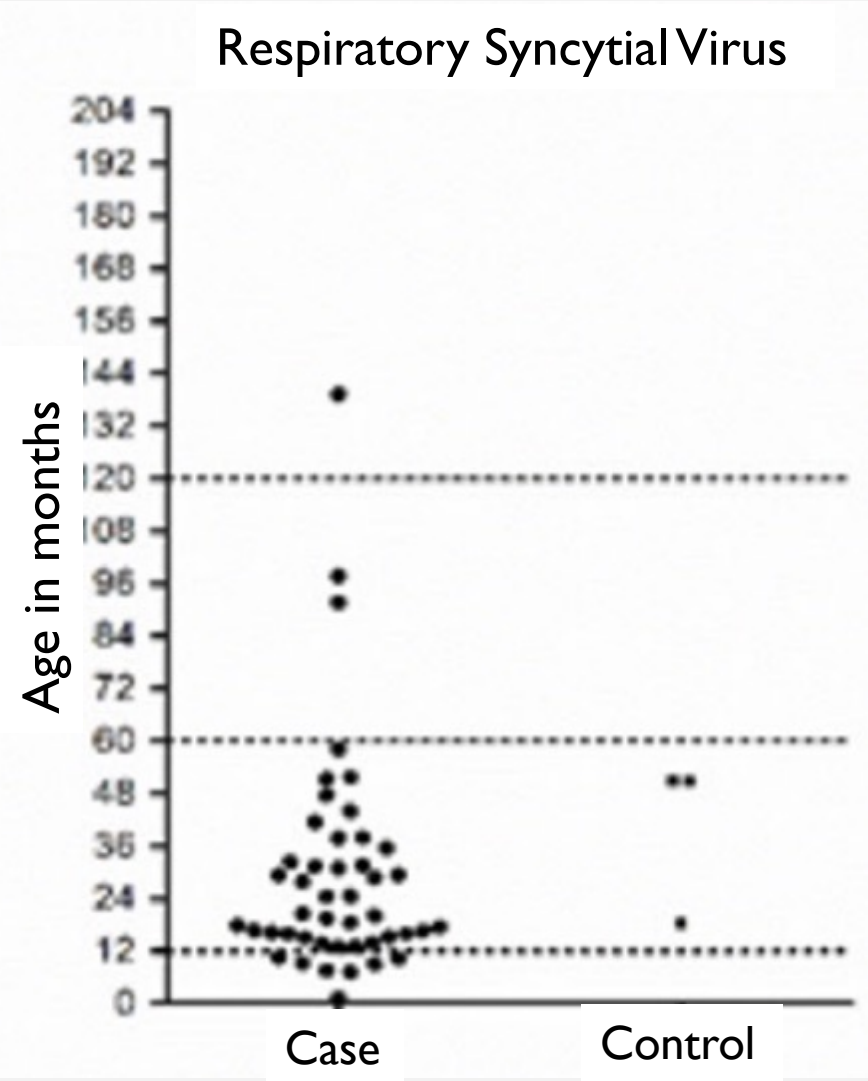
Pneumonia Classification Distribution



Jain et al. (2015)

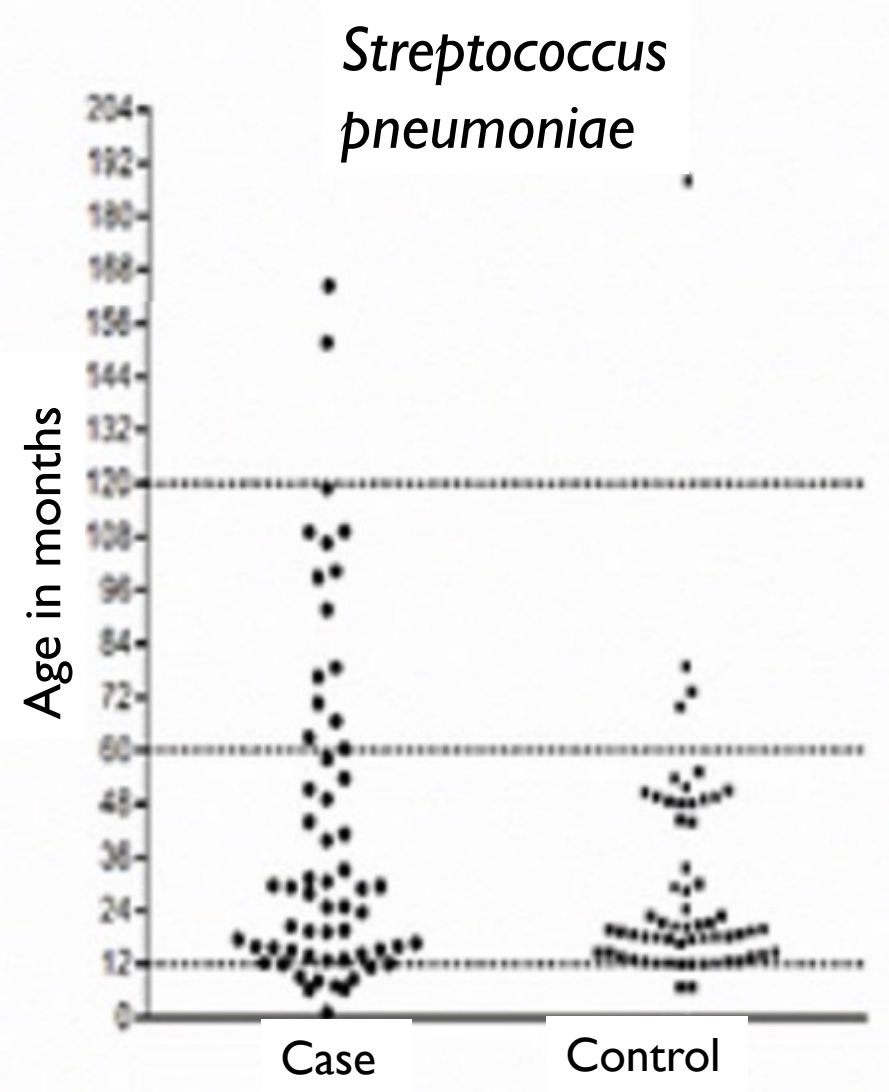
Age Distribution – Viruses

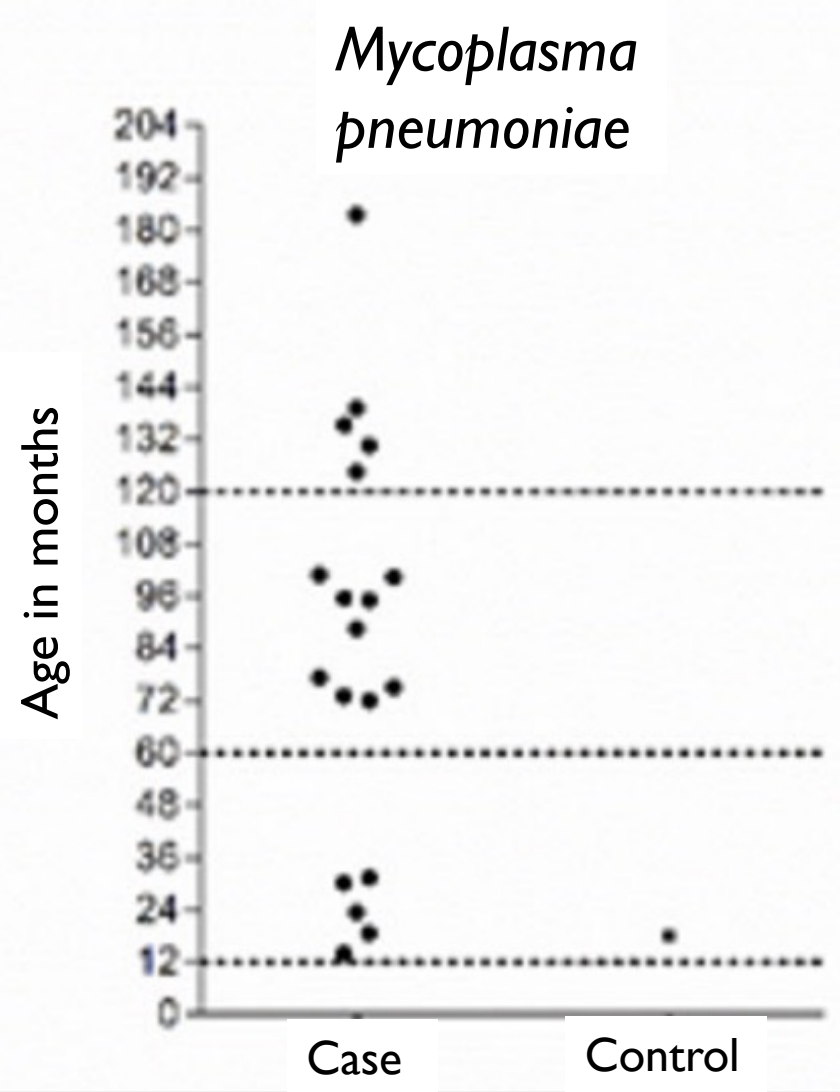




Bhuiyan, et al. (2018)

Age Distribution – Bacteria





Bhuiyan, et al. (2018)

Blood Cultures

Site	*N* of Hospitalized Children	*N* of Blood Cultures Performed (%)	*N* of Blood Culture Results (% of Patients in Whom Blood Culture Was Performed)	
			Pathogen	Contaminant
A	1236	328 (26.5)	7 (2.1)	3 (0.9)
B	1334	287 (21.5)	6 (2.1)	0 (0.0)
C	816	111 (13.6)	5 (4.5)	1 (0.9)
D	1675	651 (38.9)	18 (2.8)	6 (0.9)
E	1173	576 (49.1)	6 (1.0)	4 (0.7)
F	1275	615 (48.2)	23 (3.7)	11 (1.8)
Total	7509	2568 (34.2)	65 (2.5)	25 (1.0)

Neuman et al. (2017)

CONCLUSIONS

- Common bacterial pathogens:
  - *Streptococcus pneumoniae*
  - *Mycoplasma pneumoniae*
- Common viral pathogens:
  - Respiratory syncytial virus
  - Human rhinovirus
- Blood culture is not sufficient for CAP assessment, while radiograph/X-ray is very sufficient.

DISCUSSION

- Limitations
  - Scope of blood culture
  - Sample size
  - Enrollment selectivity
  - Convenience sampling
- Future implications
  - Vaccine development
  - More efficient assessment methods
  - Targeted treatment
  - Decreased mortality rate

Bhuiyan, et al. (2018) & Fritz, et al. (2019)

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