

8:00 – 10:00 am
Saturday, April 30

Concurrent Mini-Plenary Session

Infectious Diseases: Immunizations, RSV, and Pneumococcal Disease

Gregory J. Redding, MD

Respiratory Syncytial Viral Respiratory Infections: The Alaska Native Experience

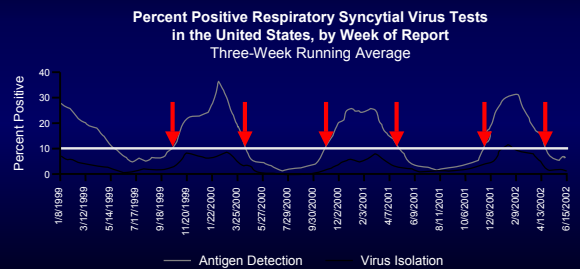
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The Burden of RSV Disease

- RSV is the leading cause of infant hospitalization and a leading viral cause of death in infants
- Greater than 120,000 hospitalizations annually
- 75% of infants hospitalized for RSV lower respiratory infection (LRI) are < 6 months of age.
- RSV infects up to 95% of children by age 2 years

Leader S, Kohlhase K. *PIDJ*. 2002; 21:629; Thompson WT, et al. *JAMA*. 2003;289:179-86;
Shay DK, et al. *JAMA*. 1999; 282:1440-9; Glezen WP, et al. *Am J Dis Child*. 1986; 140:543;
Weilliver RC. *Semin Perinatol*. 1998; 22:37; Navas L, et al. *J Pediatr*. 1992;121: 348-54;
LaVia WV, et al. *J Pediatr*. 1992; 121 (4): 503-10

RSV Epidemiology – U.S.A.



High Risk Patient Profiles

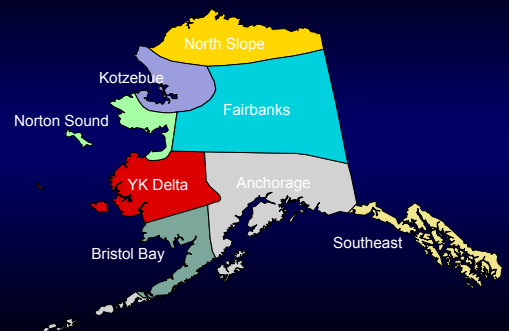
Susceptibility of RSV Infection

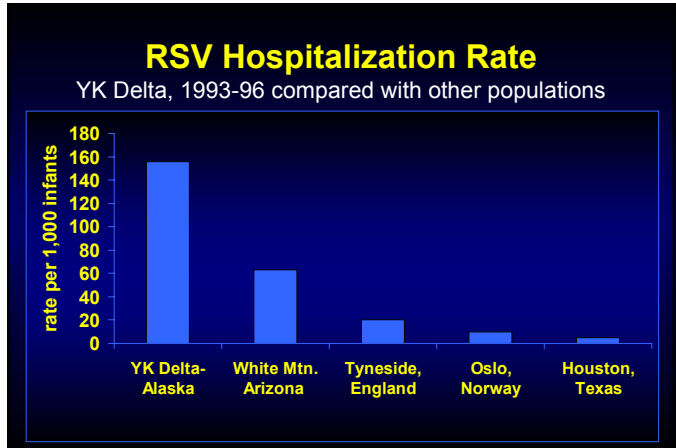
- Maternal smoking
- Crowded living conditions
- Daycare (> 6 children)
- Older siblings
- Uninfected inpatients during RSV season

Severe RSV Infection

- Males
- Children with small conducting airways
- Birth during the 6 months prior to RSV season
- Age 3-6 months (lowest antibody titers)
- Underlying cardiopulmonary disease
- Infants born prematurely
- Immunodeficiency conditions

Alaska Service Units





1993-96 RSV Surveillance and Case Control Study

CASE DEFINITION: *n=204*

- Hospitalization for acute respiratory infection
- RSV diagnosis: 2 NP FA's or 1 NP positive culture
- No previous hospitalizations for ARI during past year

CONTROL DEFINITION: *n=338*

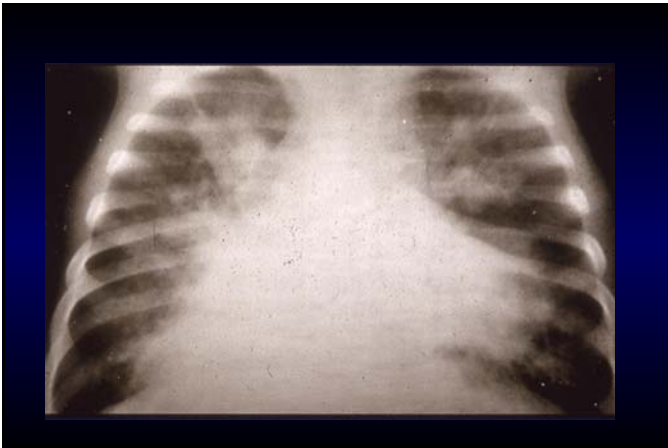
- Age matched by birth records (75% within 30 days)
- Village matched
- No hospitalizations for ARI for past year prior to enrollment

Risk Factors for Hospitalizations due to RSV LRI among Alaskan Native Infants

1993-1996
Cases = 204; Controls = 263

	Cases	Controls	Odds Ratio	<i>p</i> value
High Risk Medical Condition	16%	2%	3.9	<.01
<i>Crowding</i>				
>7 in home	19%	10%	2.1	<.01
>4 others <12 years old in home	30%	19%	2.0	.02
<i>Breast Fed</i>				
Ever	63%	81%	0.30	<.001
< 8 weeks prior to admission	32%	51%	0.32	<.001

Bulkow, et al, Pediatrics 2002; 109:210-216



RSV LRI Hospitalizations for AI/AN Infants by Region: 2000-2001

	#	#/1000 Infants
AI/AN Infants <11 months old		
Alaska	322	71
East	37	38
Northern Plains	87	11
Oklahoma	71	9
Southwest	741	48
Other US Infants <11 months old	221,450	27

Holman, et al, Pediatrics 2004; 114:e437-e444

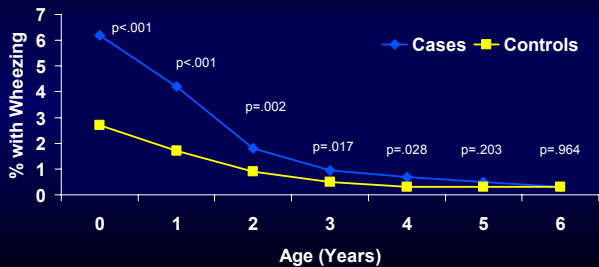
Demographic Characteristics

	RSV Survey 1993 - 1996		Follow-up Study 1998 - 2001	
	Cases	Controls	Cases	Controls
#	204	338	95	113
Mean age	0.7 yr	0.7 yr	6.5 yr	6.6 yr
Male gender	53%	55%	54%	50%
Median # in home	6	6	7	6
≥ 1 smoker in the home	68%	59%	49%*	48%*
Animals in the home	-	-	31%	18%**

Respiratory Symptoms, Signs and Lung Functions

	RSV Cases	Controls	OR	P-Value
SYMPTOMS				
Wheezing	45%	36%	1.25	0.23
Productive cough	45%	25%	1.98	0.03
Cough > 1 month	19%	5%	4.4	< 0.01
Daily cough	20%	13%	1.57	0.30
> 4 illnesses with cough	21%	12%	1.97	0.111
PHYSICAL FINDINGS				
Wheezing/crackles	6%	3%	1.92	0.347
Productive cough	12%	2%	5.41	.006
Increased AP chest size	10%	2%	6.78	.08
SPIROMETRY				
FEV ₁ /FVC < 85%	28%	16%	-	.24

Mean Number Of Visits With Wheezing Per Child By Year



Atopy, ETS and Respiratory Outcomes

	RSV Cases	Controls	OR	P-Value
IgE (U/ml) (median values)	78	93	-	.42
Any RAST ≥ Class 3 (> 220 IU/L)	3%	12%	0.24	.05
Serum Cotinine (ng/ml) (median values)	0.31	0.27	1.1	0.73

Chronic Respiratory Conditions: Definitions

Asthma = Wheezing during past year

Chronic Bronchitis = Productive cough plus one of the following :

- Daily cough
- Cough lasting > 1 month
- > 4 illnesses with cough

Asthmatic Bronchitis = Asthma + Chronic Bronchitis

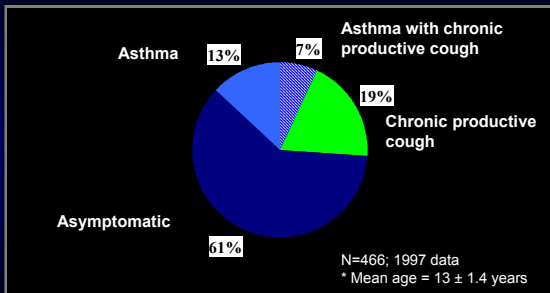
* Data sources for diagnosis: history, chart review, physical exam

Prevalence of Current Respiratory Diagnoses at Follow-up

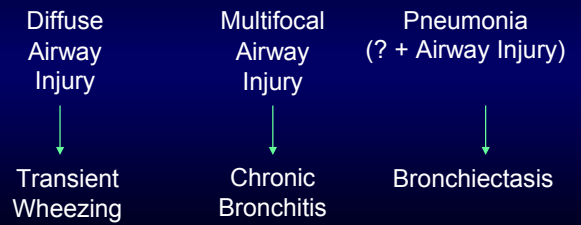
	RSV Cases	Controls	RR	P Value
Asthma	45%	36%	1.25	0.23
Chronic Bronchitis	22%	11%	2.06	0.03
Asthmatic Bronchitis	17%	6%	2.96	0.01*

*Overlap with first two categories

Prevalence of Chronic Respiratory Symptoms in Alaskan Native School Children*



Early Respiratory Infections, including RSV



Conclusion

- ✓ RSV lower respiratory tract infections are common and often severe in Alaskan Native children under 2 years of age. RSV pneumonitis is almost as common as RSV bronchiolitis among inpatients.
- ✓ RSV LRIs are associated with chronic respiratory symptoms, especially productive cough with or without wheezing, suggesting long-term multifocal airway injury, unrelated to atopy.
- ✓ Native Alaskan children constitute a high-risk population for severe RSV respiratory infections and should be considered as a unique category for RSV immunoprophylaxis.