



REHABILITATION
CENTRE FOR
CHILDREN



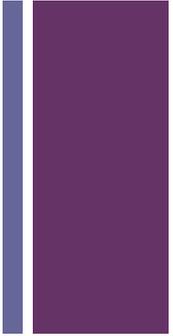
UNIVERSITY
OF MANITOBA

Is aspiration during swallowing a significant co-factor for pneumonia in children with aboriginal identity?

Prepared for the 2010 Maternal Child Health & Immunization Conference 2010

Gina Rempel, MD, FRCPC, FAAP & Barb Borton OTM

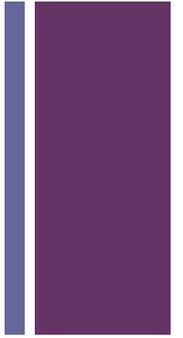
Children's Hospital Winnipeg
Rehabilitation Centre Winnipeg

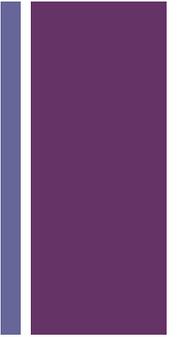


+ Winterpeg – the coldest city of its size in the world

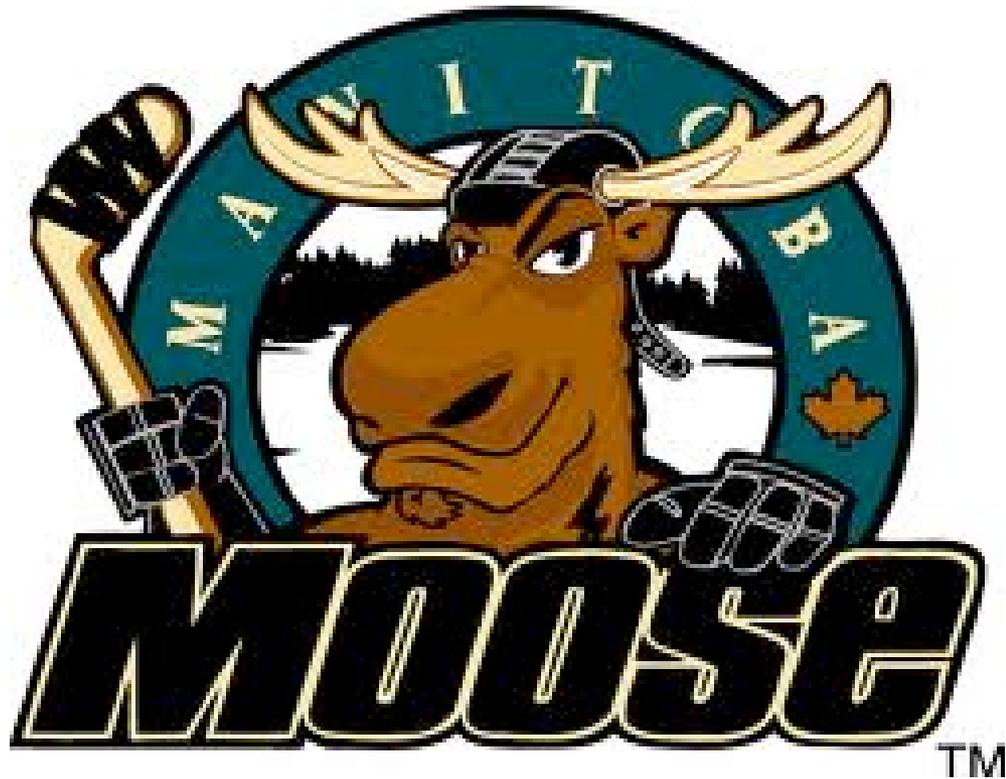


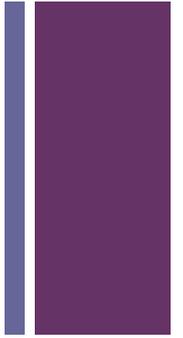
+ It's a dry cold...



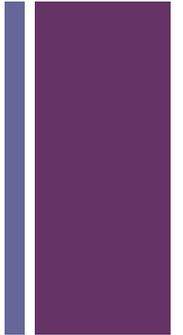


+ We too have urban moose

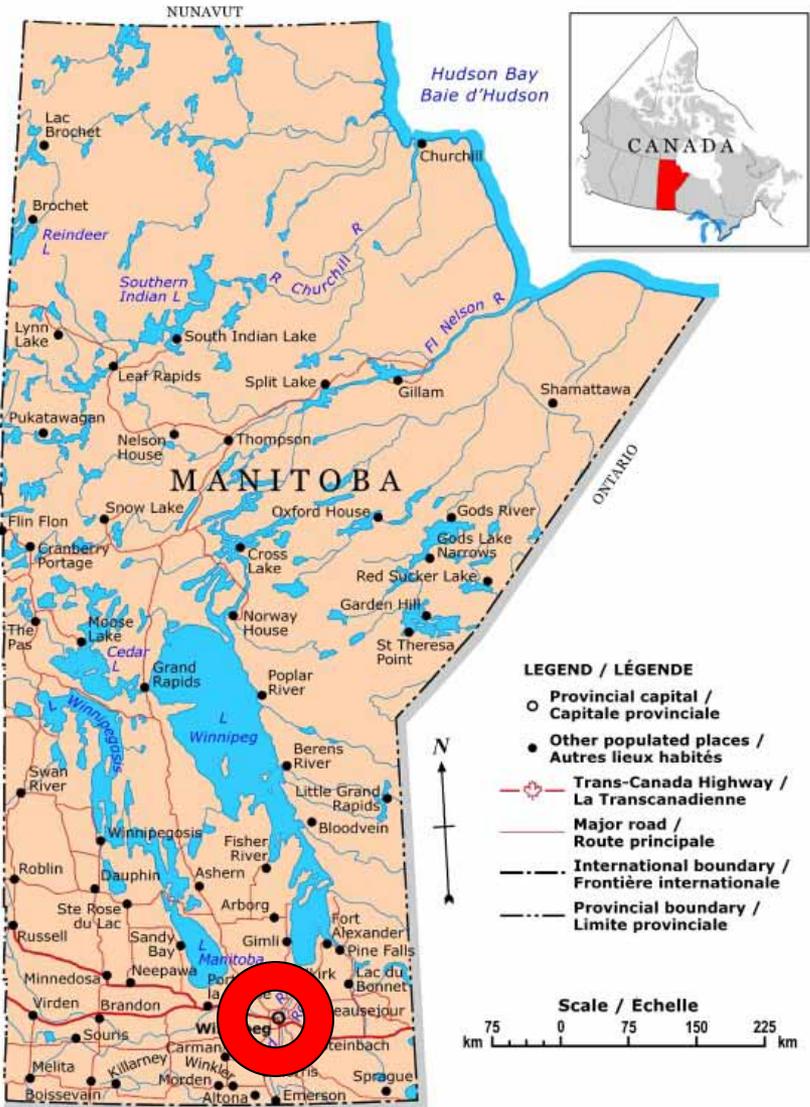
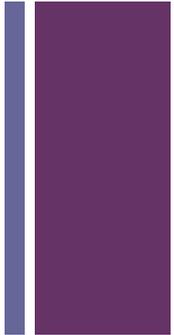




+ Where are we?



+ Where we are...

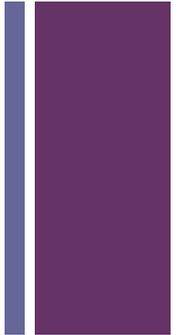


In Manitoba 26% of children age 0-14 are of aboriginal identity

In Canada 6% of children age 0-14 are of aboriginal identity

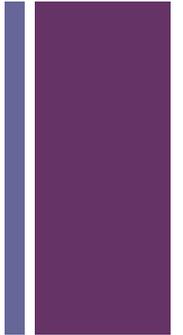
At any given time 75% of children in the only children's hospital in our catchment area have indigenous heritage

+ What do we know about lung health in children with indigenous heritage



- n What do we know for sure:
 - n They have more pneumonia than other children
 - n They have some of the highest rates of lower respiratory tract infections in the world
 - n Incidence of severe chronic lung disease has not changed significantly in several decades in Canadian children of indigenous heritage

+ Are we missing something that's causing more respiratory illness?



n We know certain factors impact lung health:

n Crowding

n Tobacco smoke exposure

n Poverty

n Dental caries

n But... is there something else we can do something about?

+ Shania

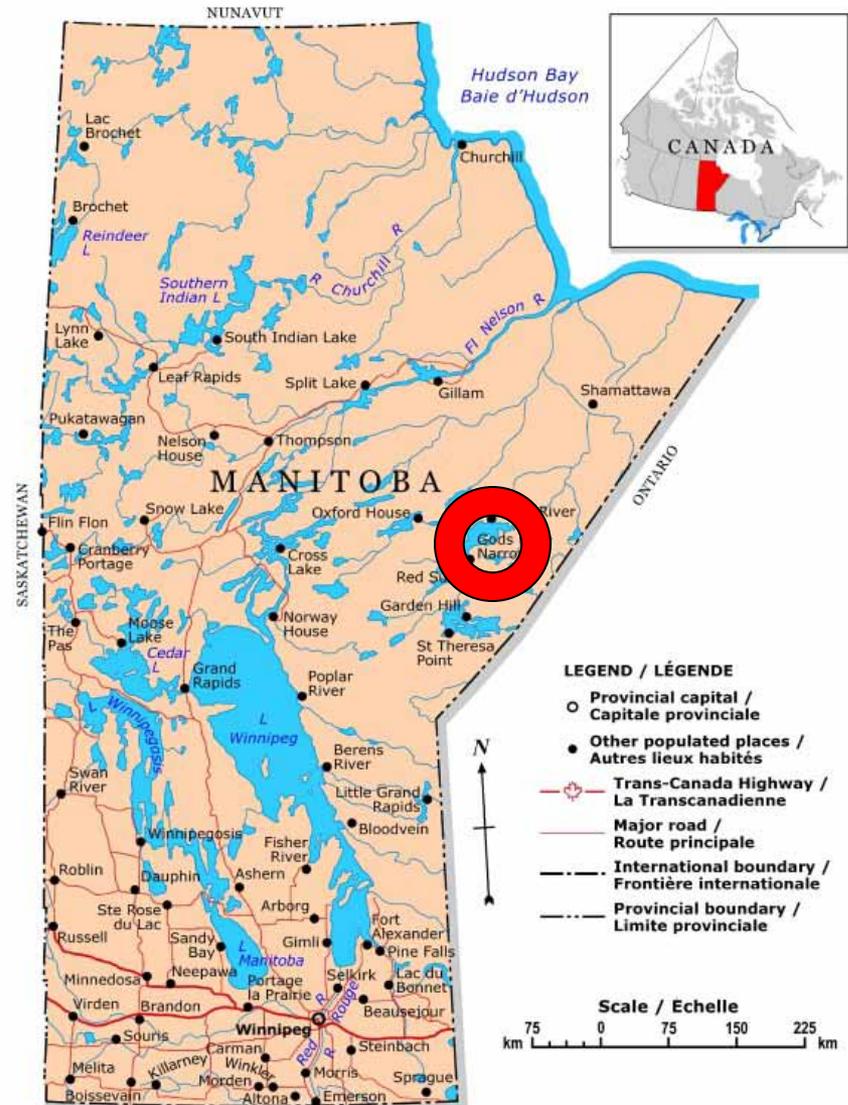


- n 3 year old typically developing child of indigenous heritage with chronic lung disease
- n First pneumonia @ 3 months with RSV
- n Required ventilatory support on three occasions
- n Immune work-up, sweat test, bronchoscopy
- n Supine bottling

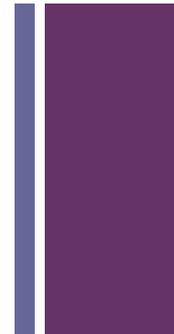


+ Shania

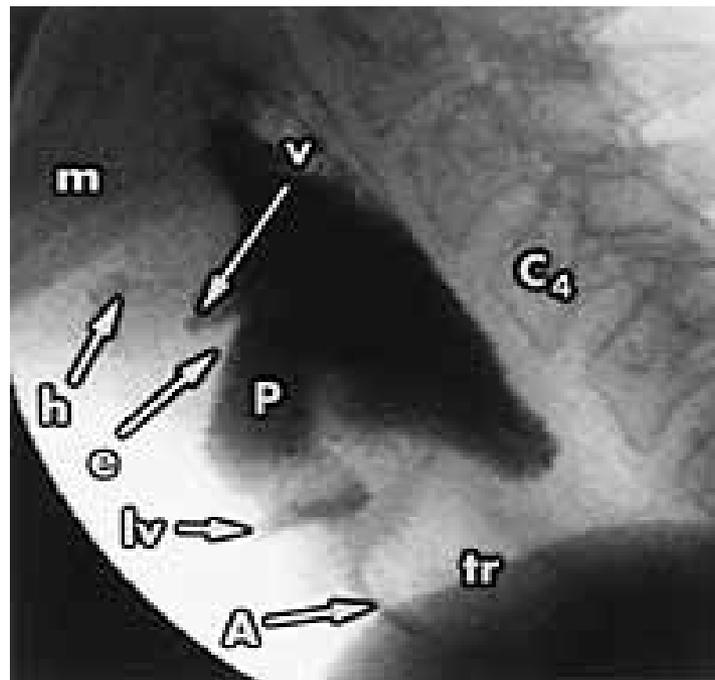
- n Large family crowded living circumstances
- n 2nd hand smoke exposure
- n Woodstove
- n No running water



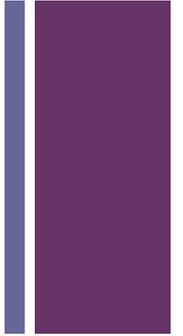
+ Shania



n VFSS



+ Shania



- n Marked decrease in LRTI after
 - n Cessation of bottle feeding and oral intake
 - n Fundoplication
 - n Extensive dental work
 - n Regular chest physiotherapy
 - n Non-smoking environment
 - n Living in an environment with lower viral burden

+

Shania

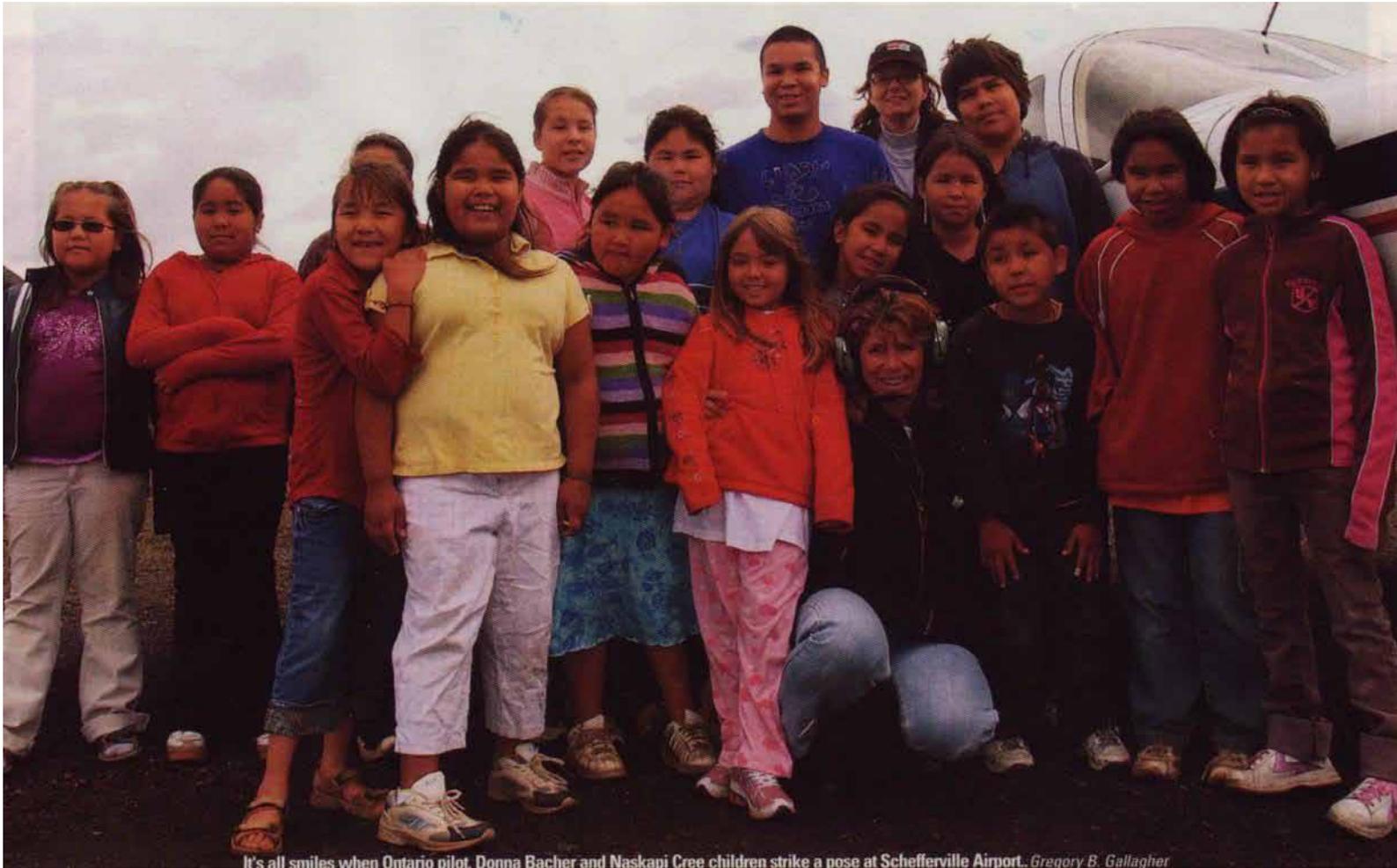


Why did she get better?

- n Steady improvement in VFSS every 4 months.
- n No further aspiration during swallowing documented at 5 years of age

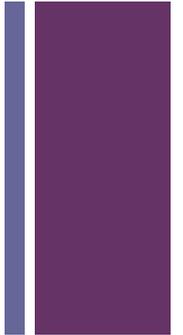
Why did she aspirate?

+ The search for other Shanias



It's all smiles when Ontario pilot, Donna Bacher and Naskapi Cree children strike a pose at Schefferville Airport. Gregory B. Gallagher

+ Search for other Shaniias



- n 7 children between 1998-2001 aspirated but had no known risk factors for aspiration
- n All had aboriginal identity

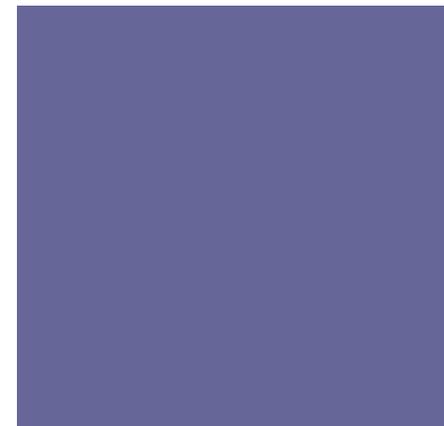
Rempel G, Borton B, Kumar R. Aspiration During Swallowing in Typically Developing Children of the First Nations and Inuit in Canada. *Pediatr Pulmonol* 2006;41:912-915

+ Search for other Shaniyas

- n All were typically developing & had normal anatomy
- n All presented with pneumonia requiring admission to tertiary care hospital prior to 6 months of age
- n 6/7 had diffuse bilateral infiltrates
- n 3 had gastrostomy tubes
- n Serial swallowing studies demonstrate continued improvement in swallowing safety
 - n On average they “outgrew” the aspiration by 21 months
- n Rempel G, Borton G, Kumar R. Aspiration During Swallowing in Typically Developing Children of the First Nations and Inuit in Canada. *Pediatr Pulmonol* 2006;41:912-915

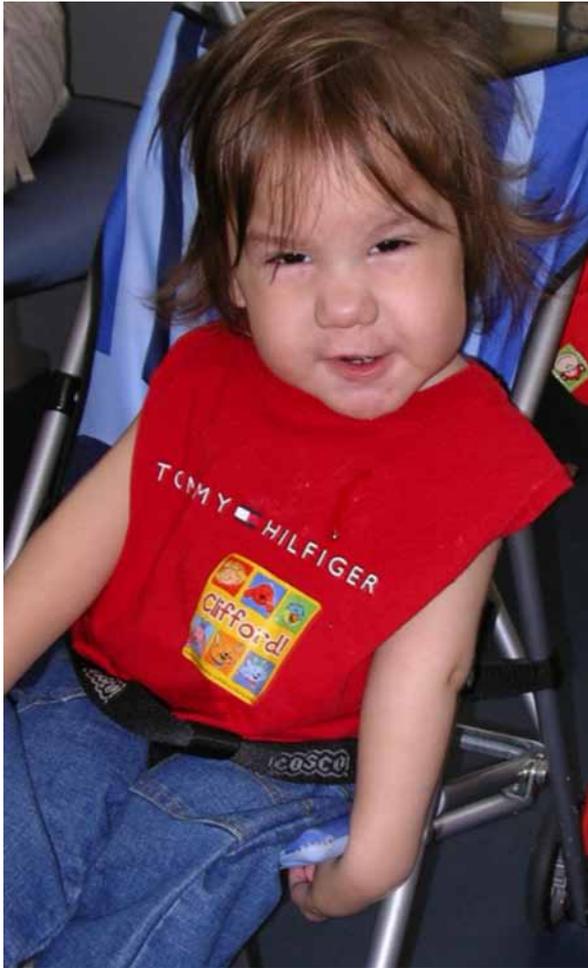
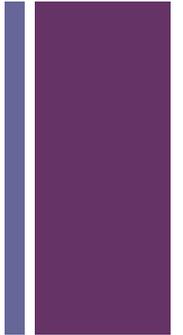
+ ...a clustering of cases due to genetic, biologic or environmental factors?



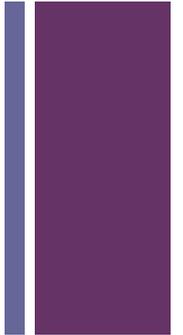


Is aspiration during swallowing more common in children with aboriginal identity?

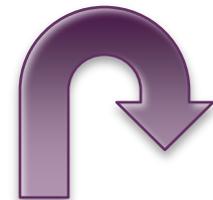
+ Who aspires?

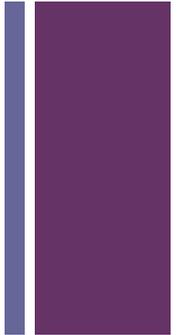


+ Who aspirates in Manitoba



- n Many children with neurodevelopmental problems who aspirate everyday but never get sick
- n Contrast, typical children with aspiration who have frequent lower respiratory tract infections

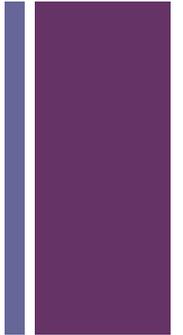




- n 325 consecutive children seen for swallowing studies 2004-6
- n Variety of medical conditions, diagnoses & ethnic backgrounds
 - n 62 % males
 - n Mean age: 32 months, median age 14 months
 - n 37 % of the total group aspirated

Aspiration correlated with LRTI ($p < .0001$)
Indigenous heritage ($p = .08$)
cough ($p = .001$)
congestion after eating ($p < .0001$)

+ Characteristics Associated with
Indigenous Heritage
Logistic Regression ($p < 0.05$)

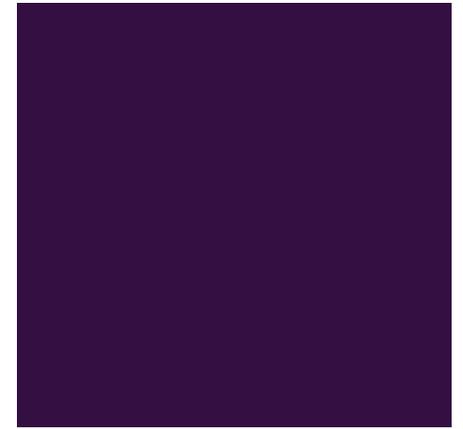


| Variable | p |
|--------------------------------------|----------|
| Aspiration | .009 |
| Lower Respiratory Tract Infection | .0001 |

+ Aspiration: what matters?

- n If you aspirated and had indigenous heritage you were more likely to have LRTI ($p=.028$)
- n If you aspirated but did not have indigenous heritage you did not have an increase in pneumonia (univariate)

So, maybe aspiration matters BUT only if you have other risk factors for pneumonia...
OR other risk factors for aspiration?



What constellation is required for aspiration to matter??



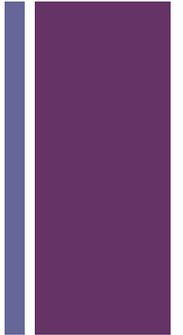
+ Are aspiration and pneumonias causally linked?

- n Independent risk factors associated with pneumonia:
 - n Dependent feeding (OR 19.98)
 - n Dental caries
 - n Smoking
 - n Multiple medical diagnoses
- n Aspiration was not...

n Langmore et al: Factors affecting aspiration pneumonia. *Dysphagia* 1998;13:69-81

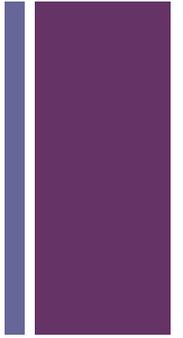
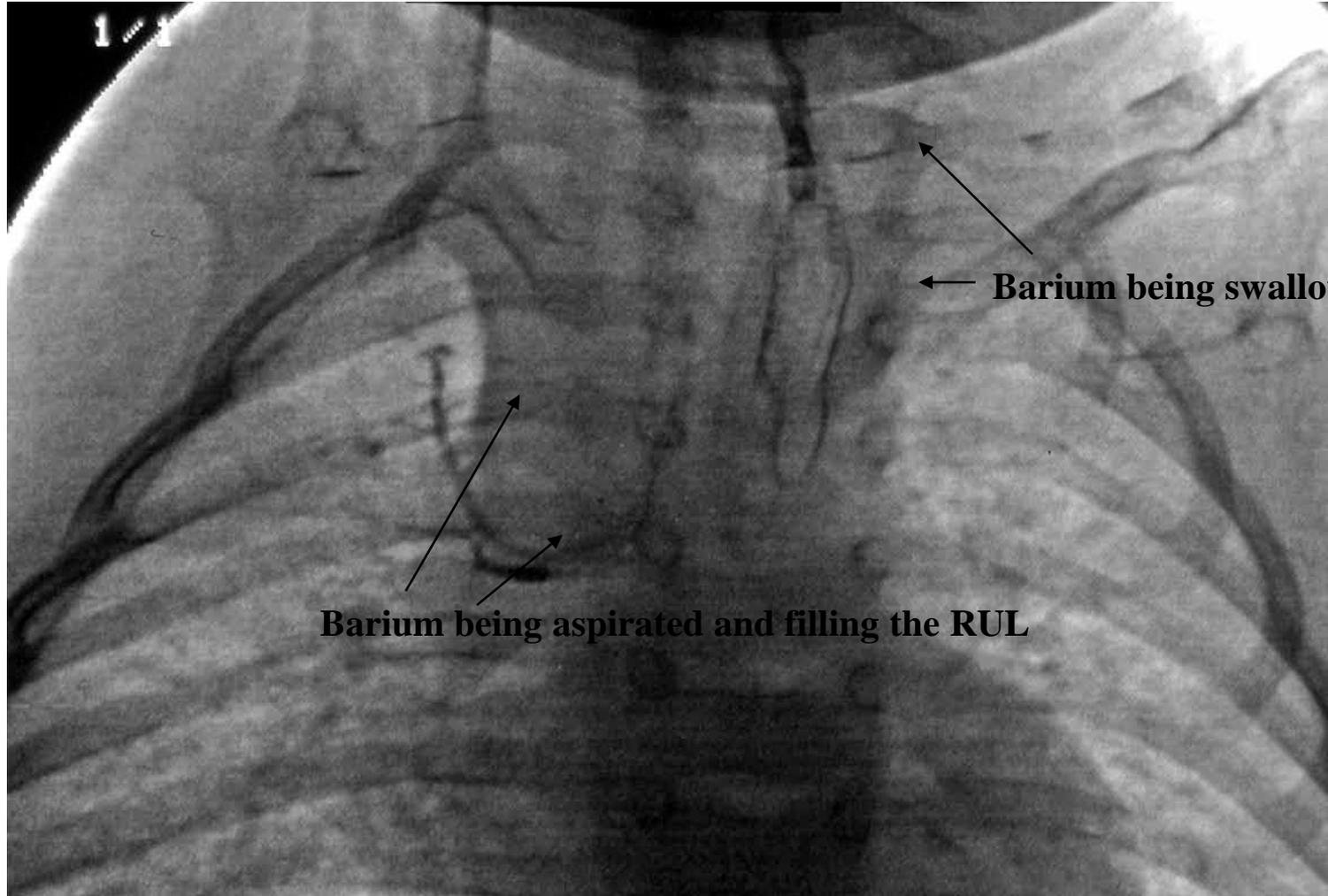


Are aspiration and pneumonias causally linked?



- n ...[aspiration] is “an important risk for aspiration pneumonia, but generally not sufficient to cause pneumonia unless other risk factors are present as well.”
- n Langmore et al: Factors affecting aspiration pneumonia. *Dysphagia* 1998;13:69-81
- n Taniguchi MH, Moyer RS: Assessment of risk factors for pneumonia in dysphagic children: significance of videofluoroscopic swallowing evaluation. *Dev Med Child Neurol* 1994;36:495-502
- n Weir K et al. Restriction of oral intake of water for aspiration lung disease in children. *The Cochrane Database of Systematic Reviews* 2005;4

+ Is supine bottling dependent feeding?



+ Do caries increase risk of aspiration pneumonia ?



100,000,000 bacteria /ml of saliva

+ And what about smoke exposure?



- } Kovesi T et al. Indoor Air quality risk factors for severe respiratory tract infections in Inuit infants in Baffin Region, Nunavut: A pilot study. *Indoor Air* 2006;16:266-75
- } Dua K et al. Effect of chronic and acute cigarette smoking on the pharyngoglottal closure Reflex. *Gut* 2002;51:771-775

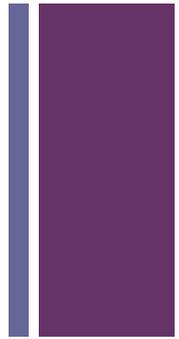
+ Aspiration risk...

- n Aspiration during swallowing may only matter if
 - n You are a dependent feeder (??supine bottling)
 - n You are smoke exposed
 - n You have bad teeth
 - n You are sick...

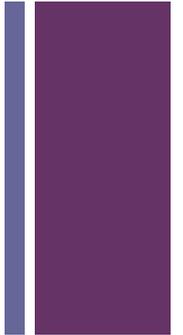


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An Approach



+ Don't eat like this...



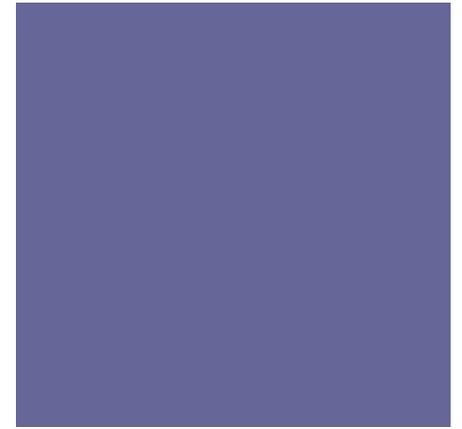
Is aspiration during
swallowing a significant
co-factor for pneumonia in
children of Aboriginal
Identity:

+

Maybe



Does
aspiration
matter?



Maybe



Definitely

Do we need more information?

