



Management and prevention of bronchiolitis

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Waterfall City hospital

Midrand



Conflict of interest

- ▀ Sponsored symposium by Abbvie
- 



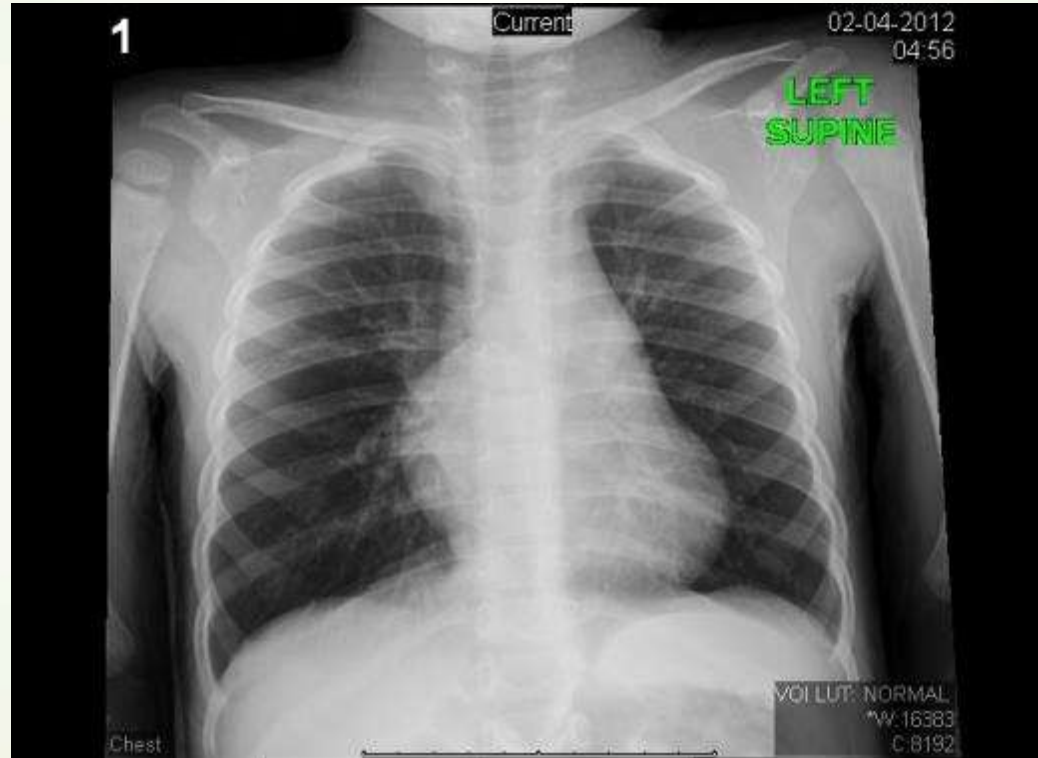
Outline

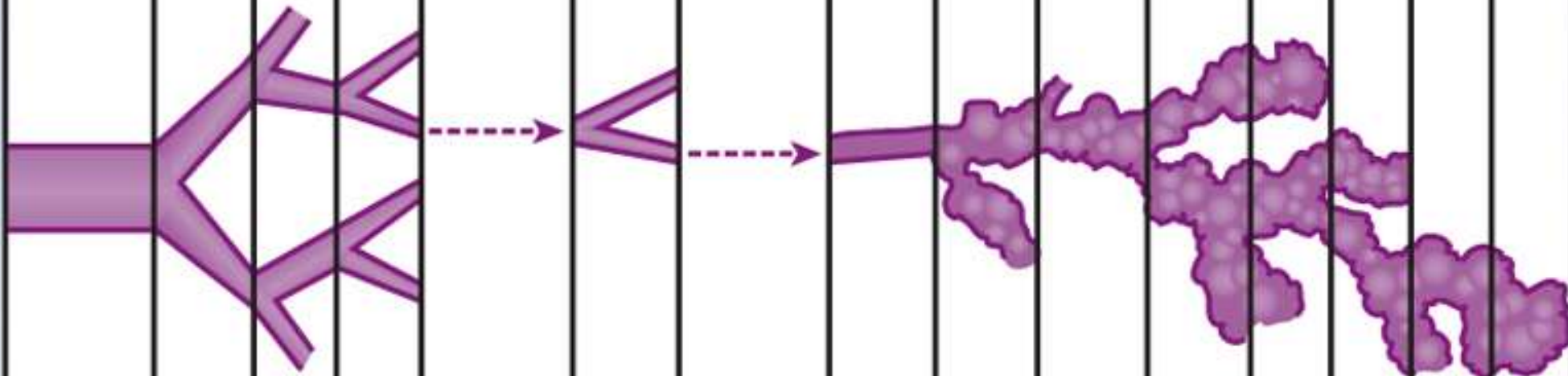
- Definitions
 - Aetiology and clinical
 - Management
 - Conventional
 - Other therapies
 - Prevention-
 - Guidelines AAP
 - Guidelines RSA
 - Conclusion
- 



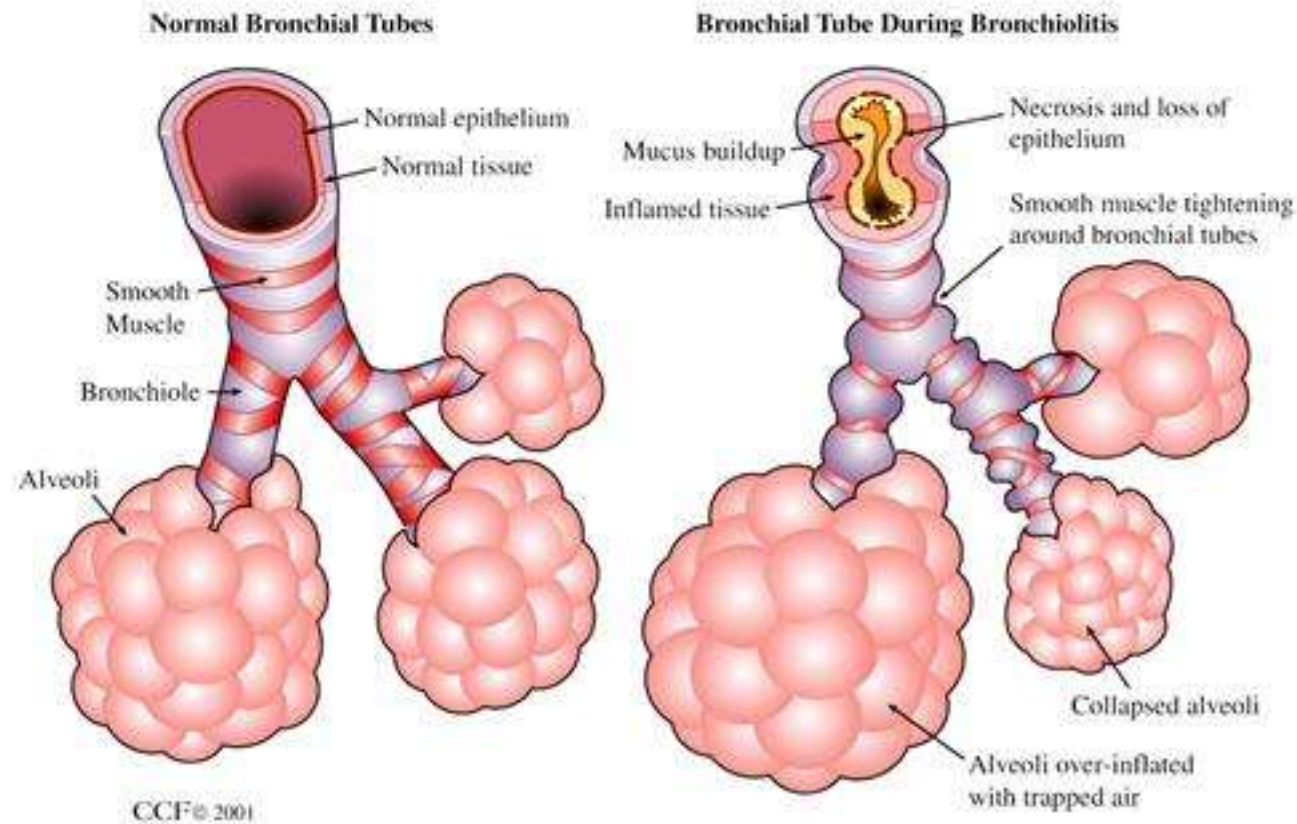
Bronchiolitis

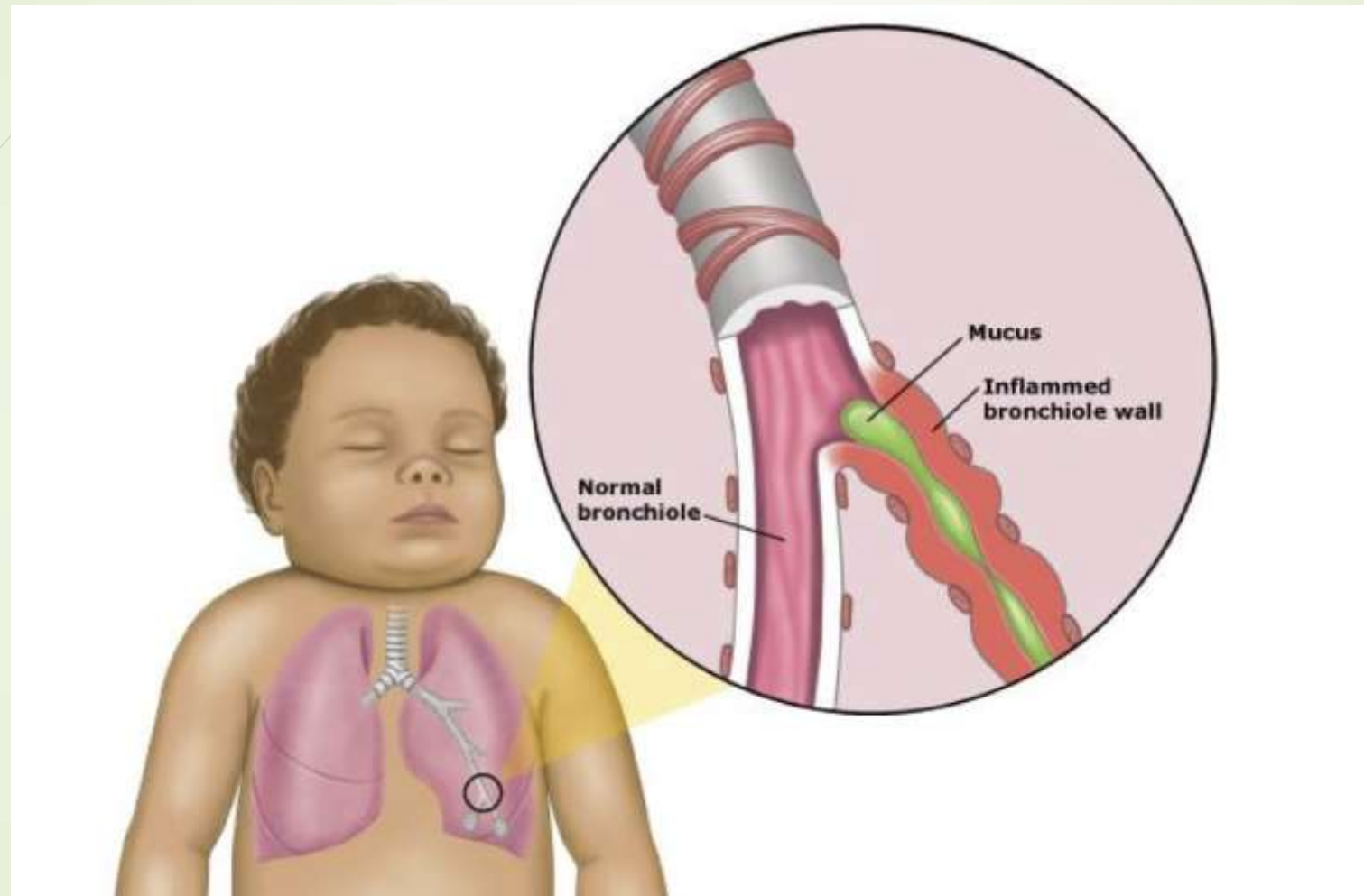
- Definition: viral induced inflammation of the bronchioles
- Age: usually <2yrs
- Clinical:
 - Mild URTI, fever, poor feeding
 - Wheeze
 - Hyperinflation
 - Hoover sign



CONDUCTING AIRWAYS								RESPIRATORY UNIT						
Trachea	Bronchi				Nonrespiratory Bronchioles			Respiratory Bronchioles			Alveolar Ducts			
														
0	1	2	3	→	10	→	16	17	18	19	20	21	22	23

Bronchiolitis Pathophysiology





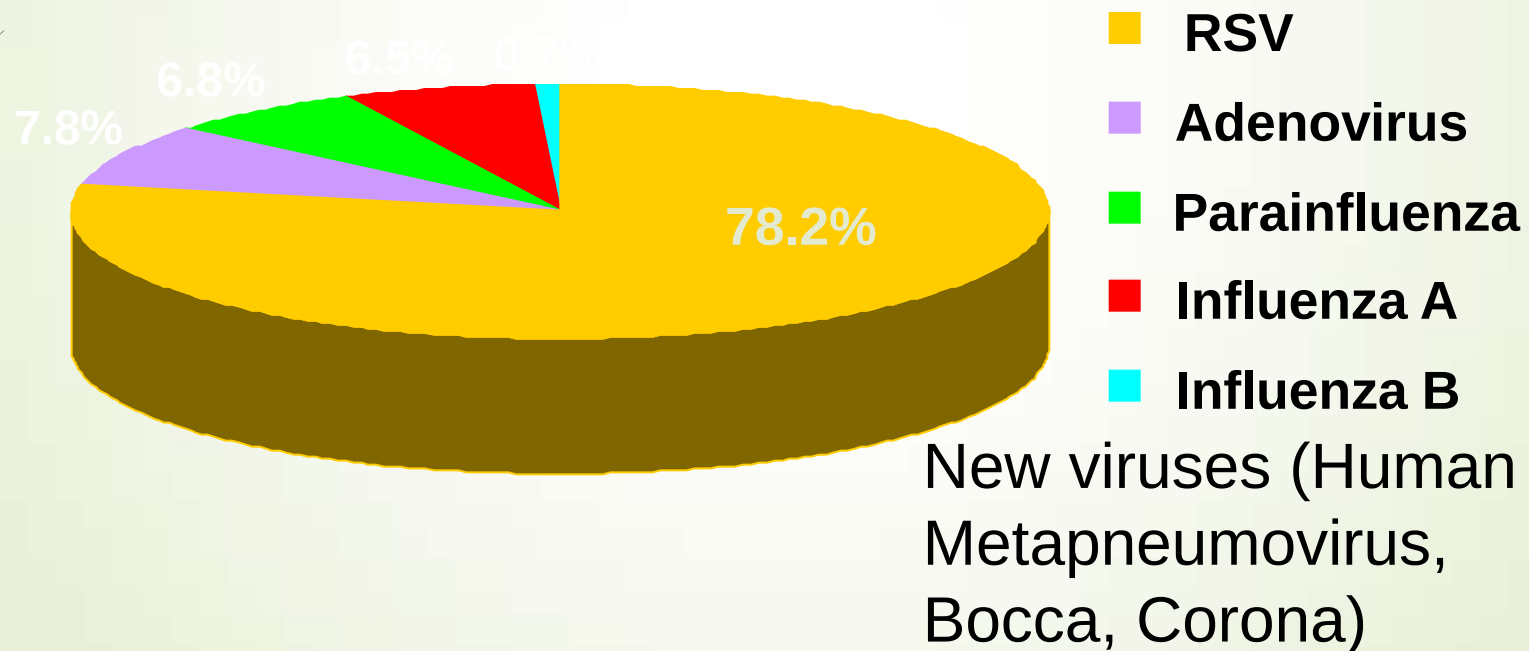


Aetiology

- RSV
- Rhinovirus
- Parainfluenza virus(esp type 3)
- Influenza
- Adenovirus
- Human metapneumovirus
- Bocavirus
- Corona virus
- Measles virus

RSV Is a Common Virus Causing Bronchiolitis in Children

- In a clinical study in Argentina, RSV was the most common virus isolated from a sample of children aged <5 years with acute lower respiratory infection



Carballal G et al. *J Med Virol* 2001;64:167-174



■ Illness is generally self-limiting



Indications for admission to Hospital

- Oxygen sats < 90% / 92%
- Severe resp distress (cyanosis, grunting, chest indrawing)
- Poor feeding
- Apnea
- Premature infants with assoc risk factors
- Underlying medical condition (CHD, CLD, Down syndrome) or risk of severe disease
- Severe malnutrition
- Family unable to provide appropriate care

Determinants of asthma after severe respiratory syncytial virus bronchiolitis

Leonard B. Bacharier, Rebecca Cohen, Toni Schweiger et al.

J Allergy Clin Immunol. 2012; 130(4):91-100

► **Objectives:** We sought to evaluate the potential determinants of physician-diagnosed asthma after severe RSV bronchiolitis during infancy.

► n= 206, followed these children for up to 6 years.
subset of 81 children-CCL5 (RANTES) mRNA expression in upper airway epithelial cells analyzed.

In a

► **Results**

48%-physician diagnosed asthma by age 7.

maternal asthma ,exposure to high levels of dog allergen, aeroallergen sensitivity at age 3 years, recurrent wheezing during the first 3 years of life and CCL5 expression in nasal epithelia during acute RSV infection-risk of asthma

White children and children attending day care had a decreased risk of physician-diagnosed asthma.

► **Conclusions**

► Approximately 50% of children who experience severe RSV bronchiolitis have a subsequent asthma diagnosis. The presence of increased CCL5 levels in nasal epithelia at the time of bronchiolitis or the development of allergic sensitization by age 3 years are associated with increased likelihood of subsequent asthma.



Management



Management (SA Guidelines)

Treatment Strategies for bronchiolitis: effective and those that are minimally or not effective.

Intervention	Benefit	Possible A/E, disadvantages	Recommendation
Oxygen	Hypoxic infants	Few	Use if sats<90/92%
Inhaled Bronchodilators via MDI-spacer	Modest	Tachycardia, hypokalaemia, Cost	Trial in hypoxic infants
Nebulised adrenalin	Some	As above	Trial in hypoxic infants
Nebulised saline 3%	Yes	Increase respiratory distress	Trial in hypoxic infants
Systemic steroids	None	Mood disturbance	No value
Nebulised steroids	None	Local thrush, hoarseness	No value
Inhaled steroids via MDI-spacer	None	Cost	No value
Montelukast	None	Cost	No value
Ribavirin	Doubtful	Discomfort	No value
Chest physiotherapy	None	Increasing respiratory distress and hypoxia	No value

SAMJ 2010

Antibiotics for bronchiolitis in children under two years of age.

[Farley R¹](#), [Spurling GK](#), [Eriksson L](#), [Del Mar CB](#)

[Cochrane Database Syst Rev.](#) 2014 Oct 9;10:CD005189.

N=824

➤ Conclusion

This review did not find sufficient evidence to support the use of antibiotics for bronchiolitis

Montelukast -bronchiolitis

- **Systematic review of montelukast's efficacy for preventing post-bronchiolitis wheezing.**

[Peng WS¹, Chen X, Yang XY, Liu EM.](#)

[Pediatr Allergy Immunol.](#) 2014 Mar;25(2):143-50

- 4 Trials, n=1430
- No effects on decreasing incidences of recurrent wheezing, symptom-free days, or the associated usage of corticosteroid in post-bronchiolitis patients

- **Study of montelukast for the treatment of respiratory symptoms of post-respiratory syncytial virus bronchiolitis in children.**[Bisgaard H¹, Flores-Nunez A, Goh A, Azimi P et al.](#)

[Am J Respir Crit Care Med.](#) 2008 Oct 15;178(8):854-60

- DBPCT, n= 979
- Montelukast did not improve respiratory symptoms of post-RSV bronchiolitis in children.



Glucocorticoids for acute viral bronchiolitis in infants and young children

[Fernandes RM¹](#), [Bialy LM](#), [Vandermeer B](#) et al.

[Cochrane Database Syst Rev.](#) 2013 Jun 4;6:CD004878

- **Objective:** To review the efficacy and safety of systemic and inhaled glucocorticoids in children with acute viral bronchiolitis.
- **Primary outcomes:** admissions by days 1 and 7 for outpatient studies; and length of stay (LOS) for inpatient studies. **Secondary outcomes:** included clinical severity parameters, healthcare use, pulmonary function, symptoms, quality of life and harms.
- 17 Trials, n=2596
- Conclusion: **Current evidence does not support a clinically relevant effect of systemic or inhaled glucocorticoids on admissions or length of hospitalisation.** Combined dexamethasone and epinephrine may reduce outpatient admissions, but results are exploratory and safety data limited. Future research should further assess the efficacy, harms and applicability of combined therapy.



Bronchodilators for bronchiolitis

Gadomski AM¹, Scribani MB

Cochrane Database Syst Rev. 2014 Jun 17;6:CD001266

- **OBJECTIVES:** To assess the effects of bronchodilators on clinical outcomes in infants (0 to 12 months) with acute bronchiolitis
- 30 trials, n= 1992
- **Conclusions:** Bronchodilators such as albuterol or salbutamol do not improve oxygen saturation, do not reduce hospital admission after outpatient treatment, do not shorten the duration of hospitalization and do not reduce the time to resolution of illness at home

Hypertonic saline (HS) for acute bronchiolitis: Systematic review and meta-analysis.

[Maguire C](#)¹, [Cantrill H](#)², [Hind D](#)³, [Bradburn M](#)⁴, [Everard ML](#)⁵

[BMC Pulm Med.](#) 2015 Nov 23;15:148

- 15 trials, n=1922

- Conclusion

- Disparity between combined effects of LoS vs the negative results from the largest and most precise trials

- this means that neither individual trials nor pooled estimates provide a firm evidence-base for routine use of HS in inpatient acute bronchiolitis.



Chest physiotherapy for acute bronchiolitis in paediatric patients between 0 and 24 months old.

[Roqué i Figuls M](#), [Giné-Garriga M](#), [Granados Rugeles C](#), [Perrotta C](#).

[Cochrane Database Syst Rev](#). 2016 Feb 1;2:CD004873.

- Chest physiotherapy is thought to assist infants in the clearance of secretions and to decrease ventilatory effort.
- Primary outcomes: change in severity of disease and time to recovery. Secondary outcomes: were respiratory parameters, length of hospital stay, duration of oxygen supplementation and the use of bronchodilators and steroids, AE and parents' impression on benefit
- **12 clinical trials including 1249 participants**
- Conclusion:
-Chest physiotherapy does not improve the severity of the disease, respiratory parameters, or reduce length of hospital stay or oxygen requirements in hospitalised infants with acute bronchiolitis. (vibration and percussion or forced expiratory techniques) have shown equally negative results.



Therapies not indicated

- ☐ Physiotherapy
- ☐ Mucolytics and cough mixtures
- ☐ Postural drainage
- ☐ Nebulised bronchodilators
- ☐ Steroids (- PCP)





Prevention





AAP Guidelines on Bronchiolitis Pediatrics Oct 2014

- No need for testing for viruses
- Routine radiology/Laboratory not necessary
- No trial of bronchodilator(no effect Level B evidence)
- Palivizumab not for >29weeks GA

South African guideline for the diagnosis, management and prevention of acute viral bronchiolitis in children

Robin J Green; Heather J Zar; Prakash M Jeena; Shabir A Madhi; Humphrey Lewis
SAMJ, S. Afr. med. j. vol.100 no.5 Cape Town May 2010

Table V. Indications for palivizumab

1. Premature infants of gestational age <32 weeks at birth. Prophylaxis should be continued until the earlier of:
 - 6 months of chronological age, or
 - the end of the RSV season (last dose in July)
2. Premature infants of gestational age 32 - 36 weeks at birth. Prophylaxis should be continued until the earlier of:
 - 3 months of chronological age, or
 - the end of the RSV season (last dose in July)
3. Children of any gestation who are <24 months of age at the start of the RSV season with any of the following: chronic lung disease of prematurity, chronic lung disease, primary immunodeficiency, cyanotic congenital heart disease. Prophylaxis should be used for 5 months beginning in February in most areas of South Africa except for KwaZulu-Natal, where it should be started in December
4. High-risk premature infants should commence their prophylaxis while still in hospital

It is recommended that prophylaxis be given for 5 months, beginning in December in KwaZulu-Natal and in February for the rest of the country.



The bronchiolitis season is upon us--recommendations for the management and prevention of acute viral bronchiolitis.

Zar HJ¹, White DA, Morrow B, Feldman C, Risenga S, Masekela R, Lewis H, Jeena P, Madhi SA. S Afr Med J. 2015 Sep 21;105(7):525-6

► Indications for palivizumab for children at high risk of severe bronchiolitis

- Premature infants of gestational age <36 weeks at birth and younger than 6 months of age at the start of the RSV season.

Prophylaxis should be continued until the end of the RSV season (last dose in May).

- Children of any gestation who are <24 months of age at the start of the RSV season with any of the following: chronic lung disease of prematurity, chronic lung disease, primary immunodeficiency, haemodynamically significant congenital heart disease.



The bronchiolitis season is upon us--recommendations for the management and prevention of acute viral bronchiolitis.

[Zar HJ¹](#), [White DA](#), [Morrow B](#), [Feldman C](#), [Risenga S](#), [Masekela R](#), [Lewis H](#), [Jeena P](#), [Madhi SA](#).

[S Afr Med J](#). 2015 Sep 21;105(7):525-6

Key elements of an education message for parents of children with bronchiolitis

- The condition has a prodrome of an upper respiratory tract infection with low-grade fever.
- Symptoms are cough and wheeze, and often fast breathing.
- Bronchiolitis is caused by a virus; antibiotics are not needed.
- Bronchiolitis is usually self-limiting, although symptoms may occur for up to 4 weeks in some children

Vaccination Schedule 2016

Disease	Vaccine	Birth	6 weeks	10 weeks	14 weeks	6 months	9 months	12 months	15 months	18 months	6 years	9 & 10 years	12 years
TB	BCG	●											
Polio	OPV	●	●										
Diphtheria, Tetanus Pertussis, Polio Haemophilus Influenza Hepatitis B	OR		●	●	●					●			
				●	●					●			
Pneumococcal	OR		●		●		●						
			●	●	●		●						
Rotavirus	OR		●		●								
			●	●	●								
Measles OR Measles Mumps Rubella OR						●	●	●		●			
							●	●	●	●			
								●	●	●			
Meningococcal Meningitis							●	●	●	●			
							●	●	●	●			
Hepatitis A	OR							●	●	●			
								●	●	●			
Chickenpox								●					
Tetanus, Diphtheria + Pertussis, Polio	OR OR										●		●
											●		●
											●		●
Human Papilloma Virus	OR											●	
												●	
Influenza													
Respiratory Syncytial Virus													

● **STATE EPI VACCINES** These vaccines are available free from Government supplied clinics

● **RECOMMENDED OPTIONAL VACCINES** Some of the vaccines in this schedule are only available from private clinics

From 9 years (State programme 2 doses 6 months apart)

From 6 months, important for children in creche, chronic illness and respiratory problems.

RSV prophylaxis in high-risk infants - prevention of serious LRTI caused by RSV. Start January and end in May.

Nine and a half months

Can be given at 12 years if not give at 6 years

New bivalent vaccine recommended due to increased risk of importation polio.

If no HepB at birth must be given at 8, 12 & 16 weeks

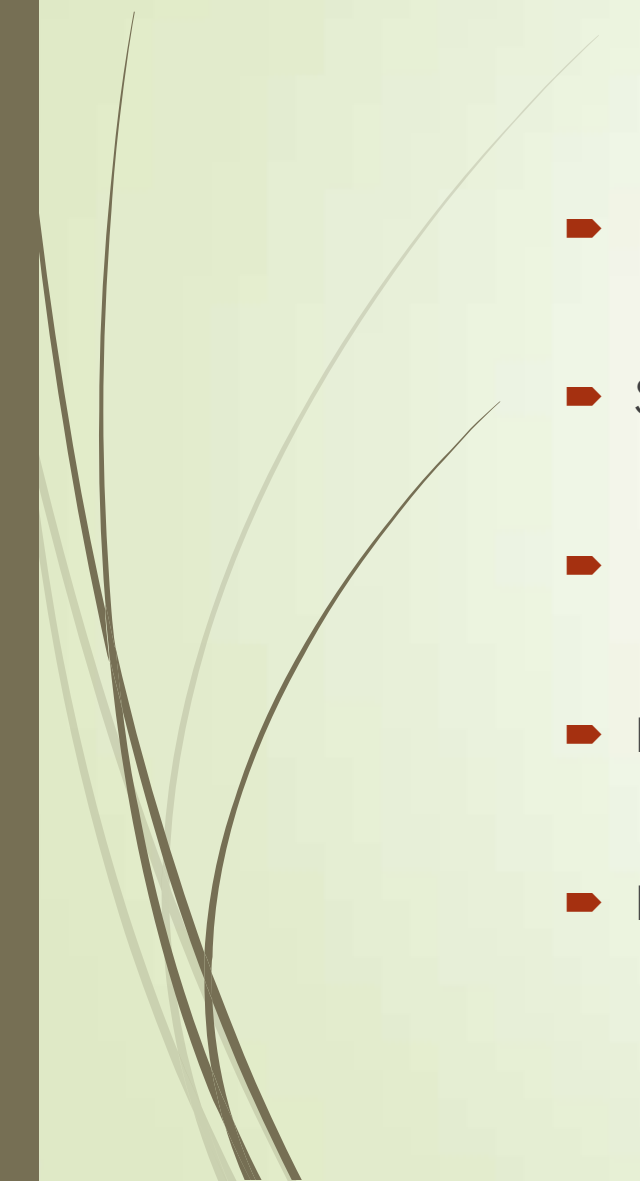
New measles vaccine. Must not be given together with any other vaccine. Rouvax will be phased out in 2016 / 17 and replaced by Measbio.

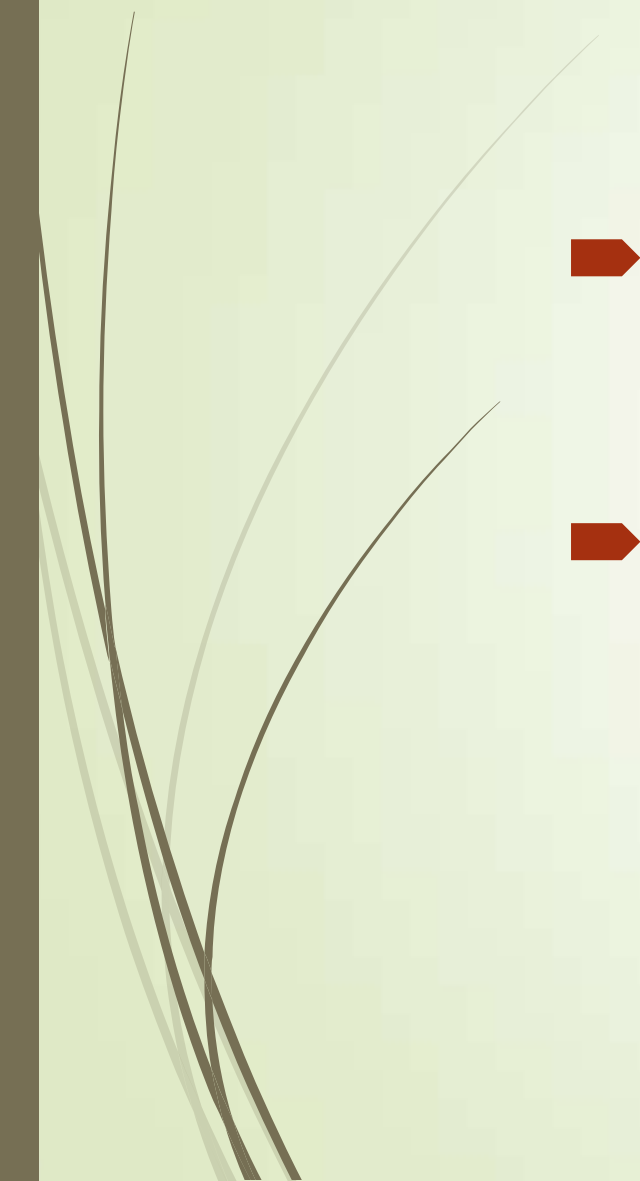
Can be given at 9 months if no single measles vaccine available.

For individuals 2-55 years administer one dose



Conclusion

- Bronchiolitis is caused by a virus
 - Self limiting disease
 - Oxygen- for hypoxia
 - Palivizumab prophylaxis –at risk patients
 - Patient education is key
- 



■ Thank you

■ Ke a Leboga