



Bronchiolitis

Three successful pilot studies completed in infants



Bronchiolitis Disease Overview

A leading cause of child mortality globally

The disease

- Acute inflammatory injury of the bronchioles usually caused by viral infection
- Usually affects children <2 years⁽¹⁾, with a peak in infants aged 3-6 months⁽¹⁾
- Approximately 130,000 bronchiolitis admissions annually in the US at an estimated cost of \$1.73 Billion⁽²⁾
- Most common cause is respiratory syncytial virus (RSV)⁽³⁾

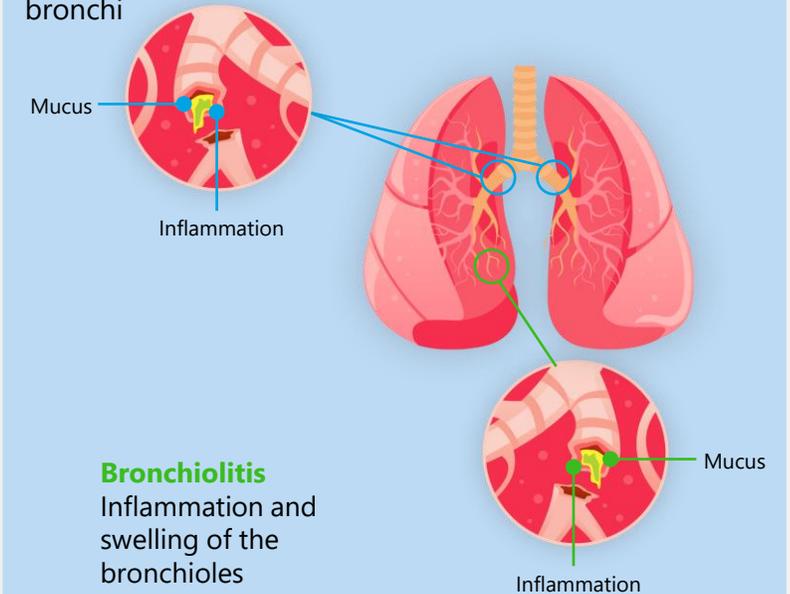
Benefits of nitric oxide

- Antiviral and Antibacterial mechanisms
 - Preclinical studies show high dose NO has antibacterial and antiviral properties⁽⁴⁻⁷⁾
- Pulmonary vasodilatory properties
 - FDA/EMA approved for ~20 years

Bronchitis is different from bronchiolitis⁽⁸⁾

Bronchitis

Inflammation and swelling of the bronchi



No drugs approved for the treatment of bronchiolitis⁽⁹⁾

1) Hasegawa K, Tsugawa Y, Brown DF, Mansbach JM, Camargo CA, Jr.: Trends in bronchiolitis hospitalizations in the United States, 2000-2009. Pediatrics 2013, 132(1):28-36.

2) Hall CB, Weinberg GA, Iwane MK, Blumkin AK, Edwards KM, Staat MA, Auinger P, Griffin MR, Poehling KA, Erdman D et al: The burden of respiratory syncytial virus infection in young children. The New England journal of medicine 2009, 360(6):588-598.

3) Piedimonte G, et al. Respiratory syncytial virus infection and bronchiolitis. Pediatr Rev. 2014; 35(12):519-30

4) Ghaffari, A., et al. Efficacy of gaseous nitric oxide in the treatment of skin and soft tissue infections. Wound Repair Regen. 2007; 15(3):368-77.

5) Miller, C.C., et al. (2013) Inhaled nitric oxide decreases the bacterial load in a rat model of Pseudomonas aeruginosa pneumonia. J Cyst Fibros 12, 817-20.

6) Regev-Shoshani, G., et al. (2013) Prophylactic nitric oxide treatment reduces incidence of bovine respiratory disease complex in beef cattle arriving at a feedlot. Res Vet Sci 95, 606-611

7) Regev-Shoshani, G., et al. (2017) Non-inferiority of nitric oxide releasing intranasal spray compared to sub-therapeutic antibiotics to reduce incidence of undifferentiated fever and bovine respiratory disease complex in low to moderate risk beef cattle arriving at a commercial feedlot. Prev Vet Med 138, 162-169

8) <https://www.healthline.com/health/bronchiolitis-vs-bronchitis>

9) American Academy of Pediatrics

Bronchiolitis Market

Bronchiolitis is the leading cause of hospitalization for infants worldwide ⁽¹⁾

Bronchiolitis Overview & Market Dynamics

- ~130,000 infant hospitalizations per year in the US⁽²⁾
- Significant impact on the elderly with 177,000 hospitalizations per year in the US⁽³⁾ for RSV alone
- No drugs approved for the treatment of bronchiolitis⁽⁴⁾
- Standard of care in the hospital is oxygen and hydration

Market Size

- Beyond Air estimates the global market to be >\$1.2 billion (>\$2.5 Billion including adults)
- Beyond Air's goal would be to reduce duration of symptoms in infants and the length of hospitalization
- Elderly population trials to follow infants (condition is not termed bronchiolitis in adults)



Two Completed and Published Pilot Bronchiolitis Trials

First two pilot bronchiolitis trials demonstrate reduction in hospital LOS



PEDIATRIC PULMONOLOGY

ORIGINAL ARTICLE: RESPIRATORY INFECTIONS

Nitric oxide inhalations in bronchiolitis: A pilot, randomized, double-blinded, controlled trial

Asher Tal✉, David Greenberg, Yossef Av-Gay, Inbal Golan-Tripto, Yael Feinstein, Shalom Ben-Shimol, Ron Dagan, Aviv D. Goldbart

First published: 27 November 2017 | <https://doi.org/10.1002/ppul.23905> | Citations: 1

LOS did not differ between groups. However, in a post-hoc analysis of a subgroup of infants hospitalized for >24 h (n = 24), the median LOS was shorter in the nitric oxide (41.9 h) than in the control group (62.5 h) (P = 0.014).

[Link](#)

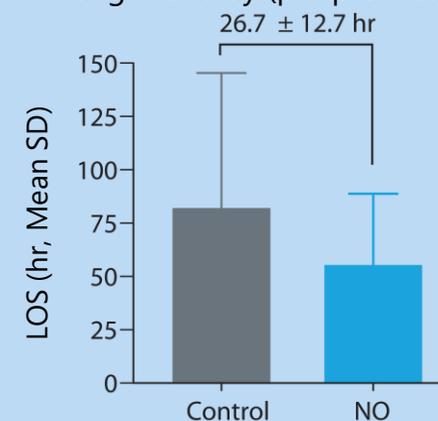
SCIENTIFIC REPORTS

nature research

Inhaled nitric oxide therapy in acute bronchiolitis: A multicenter randomized clinical trial

Aviv Goldbart^{1✉}, Inbal Golan-Tripto¹, Giora Pillar², Galit Livnat-Levanon², Ori Efrati³, Ronen Spiegel⁴, Ronit Lubetzky⁵, Moran Lavie⁵, Lior Carmon¹ & Amit Nahum¹

Length of Stay (per protocol)



[Link](#)

SCIENTIFIC REPORTS | (2020) 10:9605 | <https://doi.org/10.1038/s41598-020-66433-8>

Third Bronchiolitis Pilot Study Top Line Data

Statistical significance on both the primary and secondary endpoint at 150 ppm vs. placebo and vs. 85 ppm

	150 ppm vs. 85 ppm	150 ppm vs. SST	85 ppm vs. SST
<i>Primary endpoint</i>			
Time to Fit-to-Discharge (FTD)			
Hazard Ratio	2.11	2.32	0.90
95% CI	1.03, 4.31	1.01, 5.33	0.44, 1.81
P-value	0.041	0.049	NS
<i>Secondary endpoint</i>			
Hospital Length of Stay (LOS)			
Hazard Ratio	2.01	2.28	0.77
95% CI	1.01, 3.99	1.03, 5.06	0.40, 1.48
P-value	0.046	0.043	NS

Pivotal study delayed due to COVID-19 – Beyond Air is prepared to initiate in the fourth quarter of 2021