Positive Airway Pressure (PAP)
Mask for Tracheobronchomalacia

Unmet Need
Tracheobronchomalacia (TBM) is a pathologic condition in which softening of tracheal and bronchial cartilage causes the dynamic narrowing of transverse or sagittal diameters of tracheobronchial lumen. This causes the airways to lose their stiffness and the walls moves closer together, especially during exhalation or coughing. TBM may be congenital and it is also common among patients with COPD, asthma, cystic fibrosis, and among smokers: 12.7% of all adult patients undergoing bronchoscopy are diagnosed with TBM. TBM results in severe and chronic coughing. The coughing episodes can last up to 20 minutes and were very debilitating. Continuous positive airway pressure (CPAP), a treatment that uses mild air pressure to keep patients’ breathing airways open, can be applied to relive TBM symptoms. However, CPAP is not portable, complicated to use, expensive, and not reimbursed for TBM patients. A portable, easy to use, affordable device is needed to provide relief to these patients.

Technology
To provide relief to TBM patients, Duke inventors produced a positive airway pressure (PAP) mask by combining the mask from a manual resuscitation bag (Ambu Bag) with a Positive End-Expiratory Pressure (PEEP) valve to help TBM patient with exhalation and coughing. During coughing, patients simply need to hold the device over their nose and mouth. Coughing into the device will provide positive pressure to keep the lumen of the airways open and ease the urge to cough. It is a portable device that is easy to use even during the event of coughing. This device was tested in TBM patients and has significantly reduced the number and severity of coughing episodes.

Advantages
- It is a non-invasive approach that can help control TBM symptom.
- This invention has been tested on patients and has clinical data.
- This invention is portable, easy to use, and costs significantly less than CPAP machines.