TRANSTRACHEAL AUGMENTED VENTILATION WITH VAPOTHERM 2000i IN THE HOME Kathleen W Garwick RRT, Jeff Culbertson RCS RN, Robert Cook MD. Mercy Assisted Care, Janesville WI.

INTRODUCTION: Transtracheal Augmented Ventilation (TTAV) utilizing the SCOOP transtracheal catheter has been used safely and effectively in appropriately selected patients since 1989. Since TTAV bypasses the upper airway, heat and humidity must be provided to prevent dessication of mucus and the potential for the development of mucus balls. TTAV is delivered via SCOOP catheter inserted through a hole drilled into the cap of the patient's tracheostomy (trach) tube. The main goal of TTAV therapy is to rest the muscles of ventilation and in some cases liberate from the ventilator. Carbon dioxide removal is often seen in patients using TTAV. These patients' outcomes are reviewed for the effectiveness of humidification using lab analysis, radiography, and frequency of therapeutic bronchoscopy as indicators following episodes of respiratory failure. Both patients initially were sent home on TTAV with heated wire circuit humidity (HWH). The Vapotherm 2000i (Vtherm) became available to homecare in April of 2003. After approximately one year these patients were switched from HWH to the Vtherm.

CASE REPORT: Pt # 1 trached 67 y/o male patient with multiple diagnoses including COPD, post renal transplant, chronic fibrotic lung disease, type 2 diabetes, and pulmonary hypertension. Multiple bronchoscopies and CAT scans (4/6/03-5/7/04) showed nearly continuous mucus plugging. Arterial blood gases (ABGs) on 4/5/03 showed a pH of 7.42, $PaCO_2$ of 39 mmHg, and PaO_2 of 54 mmHg. Within 2 mos of starting on Vtherm (4/04) the patient no longer required fiberoptic bronchoscopy (FB). Although this patient continues to have other ongoing health issues, after 27 months, he continues to do well at home on TTAV with Vtherm at 10 L/min O_2. Patient # 2 trached 50 y/o female, diagnoses COPD, Charcot Marie Tooth disease (muscular dystrophy), fibromyalgia, and left hemi diaphragm paralysis with recurrent LLL (left lower lobe) consolidation. Patient history includes 4 consecutive FBs from 7/03-8/03 revealing left main stem obstruction with secretions. This condition persisted for several months prior to hospital discharge when the patient was placed on TTAV with HWH daytime and ventilator at noc. Prior to discharge ABGs were pH 7.36, $PaCO_2$ 67, PaO_2 68 mmHg. The HWH heater and circuit were replaced by Vtherm 13 mo later in late 8/04. Less than 2 weeks after initiating Vtherm ABGs drawn on 9/10/04 showed significant improvement with a pH of 7.36, $PaCO_2$ 57 mmHg, PaO_2 154 mmHg. Chest x-rays taken during this time 11/03-9/04 showed little or no change. A careful review of the nursing notes from the home prior to Vtherm therapy told a very different and compelling story. While this patient was on TTAV with HWH (13 mos) the nurses noted the need for percussion, postural drainage, vigorous frequent suctioning, and an order for a cough assist device. Vtherm was started in 08/04, and by November nursing notes indicated that breath sounds had improved in the basilar segments of the LLL. By 1/05 postural drainage was discontinued and the patient's vocal quality (which had deteriorated) returned to baseline. This patient is approaching 24 mos of TTAV at home with Vtherm on 6 L/min air and 3 L/min O_2. During this time the patient has not been hospitalized. **DISCUSSION:** TTAV can be a valuable adjunctive therapy when treating patients whose respiratory function is complicated by chronic hypercapneic respiratory failure. TTAV using the Vtherm heated humidifier may be delivered safely and effectively in the home with an improvement of airway desiccation and reduction in mucous ball formation. These two patients demonstrate the importance of the need for direct patient observation versus relying only on standard laboratory results.