University Hospital Southampton NHS
NHS Foundation Trust

Therapy Department

Standard Operating Procedure – Manual and Ventilator Hyperinflation Treatment

Background to Hyperinflation Treatment Techniques

Manual Hyperinflation (MHI) was originally described in 1968 by Clement and Hubsch. This is a technique designed to increase alveolar oxygenation, reverse atelectasis and mobilise pulmonary secretions (Jones et al 1997). Secretions are cleared through the principle of generating annular two-phase, gas-liquid flow (Leith et al 1968 in Maxwell and Ellis 1998). This mobilisation of secretions has been suggested to be most effective when creating an inspiratory to expiratory flow ratio of less than or equal to 0.9 (Kim et al 1985).

Recent studies have shown MHI to be a safe and feasible technique to increase compliance, oxygenation and clearance of airway secretions (Paulus et al 2012), decrease resistance and increase compliance (Choi and Jones 2005) and increase oxygenation and compliance (Patman et al 2000).

Ventilator Hyperinflation (VHI) is a more recently developed technique and was first described by Berney and Denehy in 2002. The potential advantages of VHI over MHI is maintenance of PEEP, decreased infection risk during the procedure due to avoiding disconnection from the ventilator, more accurate control of parameters and a cost reduction as therapists can complete the technique independently (Anderson et al 2014). VHI has been compared to MHI in the literature and has been found to be equally effective with no adverse effects (Anderson et al 2014, Ahmed et al 2010, Berney and Denehy 2002 and Dennis et al 2012).

Purpose

Physiotherapists working at University Hospital Southampton (UHS) across the critical care areas such as General Intensive Care (GICU) and Cardiac Intensive Care (CICU) have noticed an increased use of VHI as a treatment technique to assist with secretion clearance.

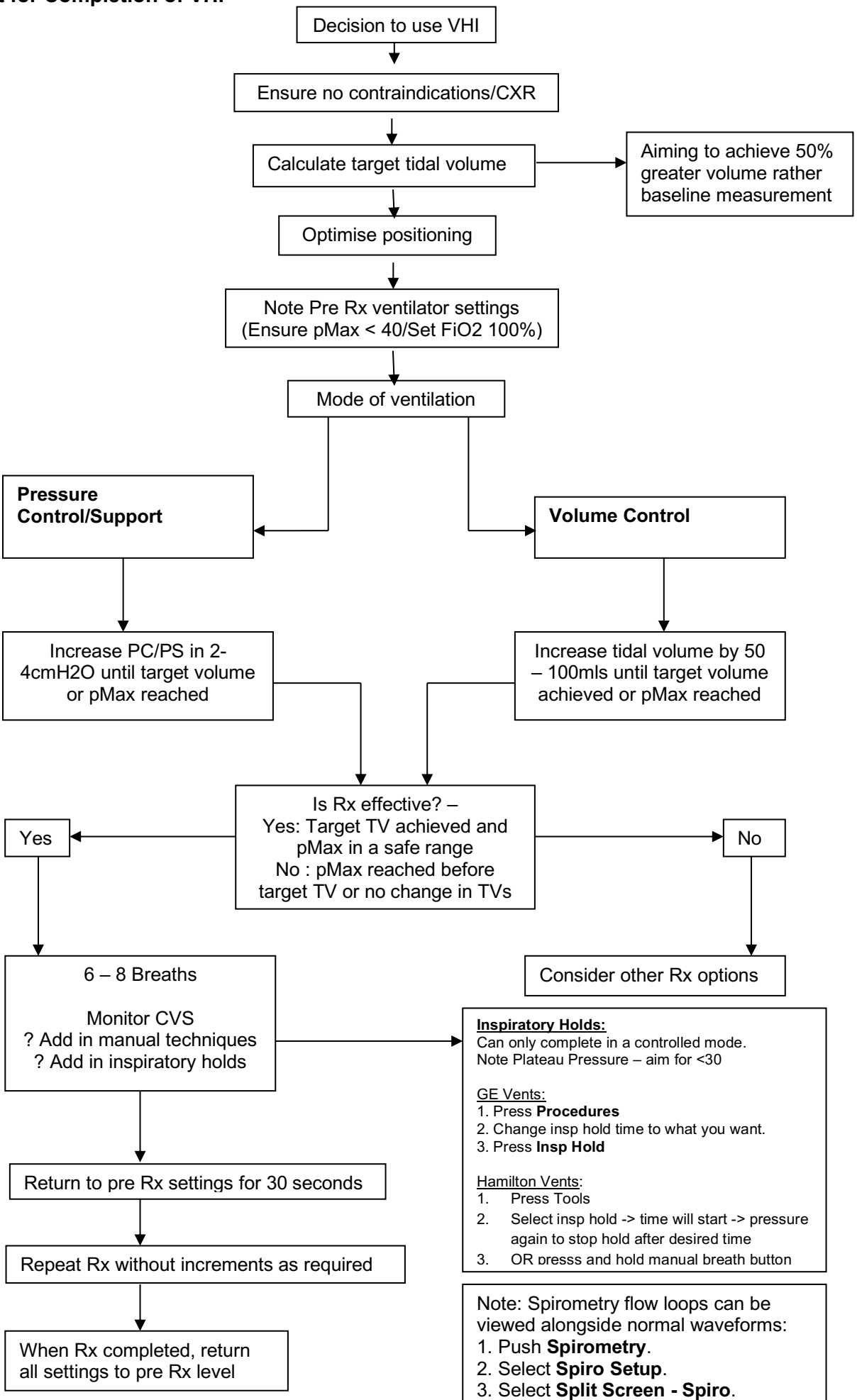
The aim of this document is to provide advice on the operating procedures for the completion of both MHI and VHI. For MHI, this document will sit alongside oncall competency documents which refer to MHI. For VHI, this document will help with the education and training of new staff to clinical areas such as GICU and CICU to become more confident and competent in the completion of VHI. Based on a thorough literature search, comprehensive flowcharts for the completion of the treatments have been agreed by a Consultant Respiratory Physiotherapist and Senior Respiratory Physiotherapists from across the trust.

Staff members who may complete technique

This procedure is intended for the following staff:

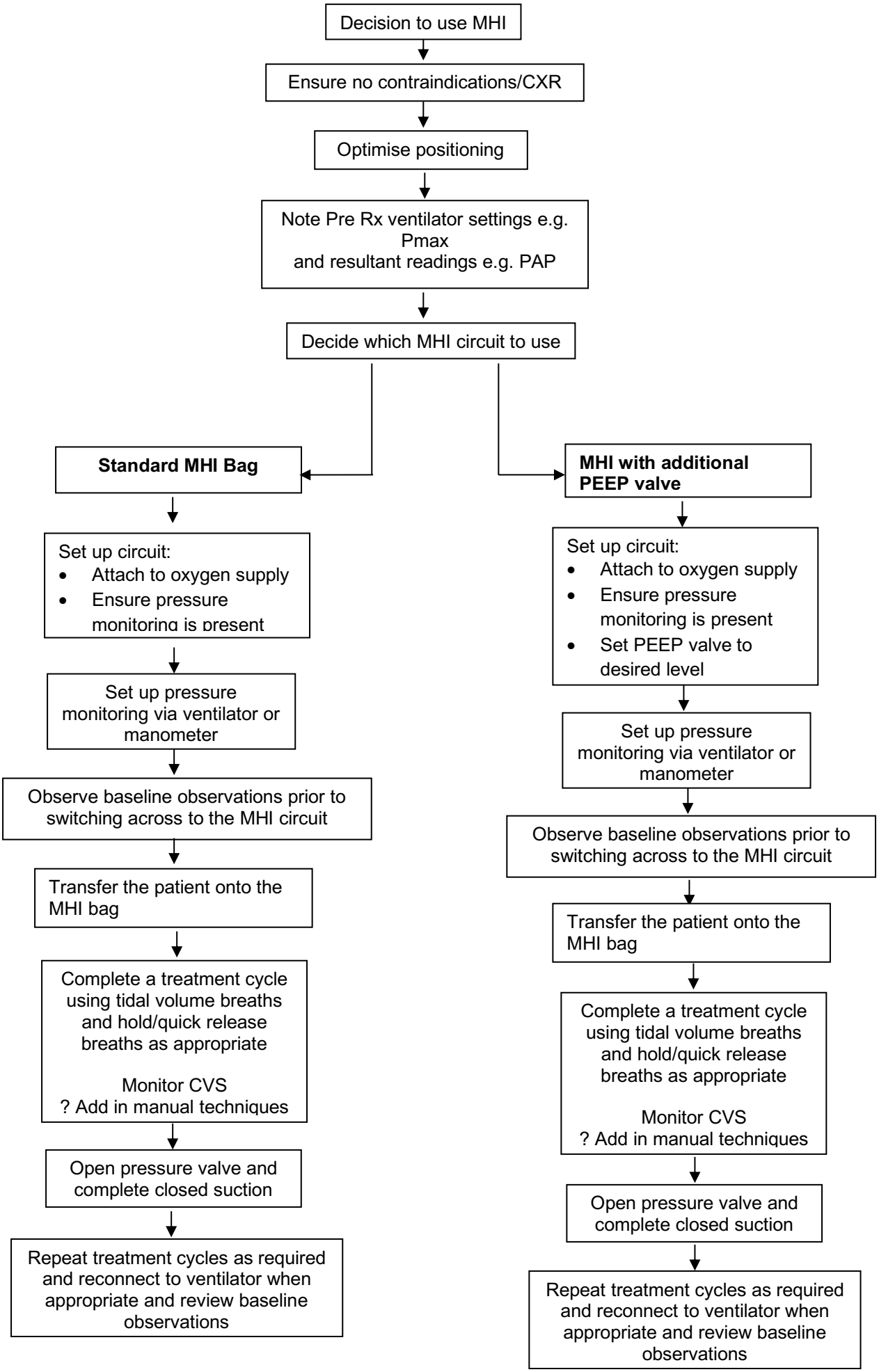
- Static Senior Physiotherapists working within Critical Care areas
- Rotational Band 6 and Band 5 Physiotherapists completing rotations in a Critical Care rotation after completion of competency assessment
- Physiotherapy staff working out of hours during Twilight, On-call and Weekend shifts
- Nursing staff within Critical Care areas as appropriate

Flowchart for Completion of VHI



Rebecca Vokes and Colette Green, Updated January 2019

Flowchart for the completion of MHI



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