Are Your Patients Breathing **Comfortably?**

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A RESPIRATORY PATHWAY FOR MS SERVICES

- **Respiratory complications are one of the most common causes of death in MS**. In one large study, respiratory complications accounted for approximately 47% of all deaths in MS patients (1).
  Between 2016 and 2019 in the CCGs of the areas studied the **average cost of non elective admissions** for respiratory problems in pwMS was **£216,000**. Of this, the highest ranking cost was for admissions with pneumonitis due to aspiration of food and vomit, which was £75,000.

- It has been shown that there is an **insidious decline of respiratory function** in people with multiple sclerosis (pwMS) **from diagnosis** (2).
  Pulmonary function is affected even at the level of early disability in MS patients, and muscles that provide core stabilization are affected. It is seen that decreasing core stabilizer muscle strength in MS patients causes impaired pulmonary function, HRQOL, functional level and increasing fatigue levels.(7).

- Respiratory impairment in neurologic or neuromuscular injuries or disorders such as MS includes difficulty in ventilation due to inspiratory muscle weakness, difficulty in coughing due to weakness of the expiratory muscles, upper-airway (glottic) muscles, and inspiratory muscles risk of aspiration of fluids due to upper-airway muscle weakness.(3) **Hence it is important that lung health is maintained and monitored throughout the course of the disease** (9).

- **Expiratory muscle weakness** has been shown to be **the main issue** and there is a **sharper decline when people stop walking** and this can lead to a **weak cough.**(1)

- Currently, respiratory function of people with MS in the clinical setting is generally **not routinely monitored with any definitive outcome measures**.
  There is limited data as to what happens to respiratory function with pwMS throughout the course of their disease.

- **NICE guidelines state that respiratory function should be assessed as part of the annual review** and tailored to the needs of the individual, referring on to appropriate services if needed. (12).

- A universal finding of all studies is decreased indices of maximal inspiratory pressure (MIP), and the maximal expiratory pressure (MEP) in MS(1).
  The MIP reflects the strength of the diaphragm and other inspiratory muscles, while the MEP reflects the strength of the abdominal muscles and other expiratory muscles (4). Peak cough flow (PCF) is considered an acceptable alternative to measuring MEP in assessing expiratory muscle weakness in pwMS (5)
  If insufficient pre-cough volume is obtained due to inspiratory muscle weakness, cough capacity decreases in spite of functional expiratory muscles.
  Both MIP and MEP showed significant correlations with PCF. (6)

- **Peak Cough flow (PCF) is a simple and inexpensive way of monitoring a person's cough strength.**
  A PCF above 350 is considered normal, below 270 there is a need for increased monitoring and intervention to assist with airway clearance e.g breathing exercises, lung volume recruitment, increased activity, improved posture and below 160 additional intervention/ onward referral is needed to assist airway clearance e.g assessment for a cough assist. (10)
  The goal is to identify respiratory issues of pwMS early so there can be early and appropriate intervention

This poster looks at a respiratory pathway for MS services. It was developed with consideration of the above research and advice from the Southampton specialist respiratory service. The pathway looks at issues someone with MS might have at each stage of their condition, what assessment would be optimal and where this should take place. Also some suggested interventions are discussed. Considerations are noted which then informed the questions we asked our participants in the test study which relate to the risk factors. (See adjoining poster)

RESPIRATORY PATHWAY FOR pwMS

STAGE OF MS	ASSESSMENT	INTERVENTION	CONSIDERATIONS
Early -EDSS 0-5 People may have issues with fatigue hence become de conditioned and develop poor posture. **Mid- EDSS 5.5-7** With increasing EDSS the person may become more sedentary. They may have reduced core stability and balance, spasticity and pain which may alter pattern of breathing and posture.	Initial Assessment on diagnosis or transfer to service. **Where**: Annual assessment, thereafter in clinic or at home. If person takes a DMD, to be screened in neurology clinics. **What:** Peak cough flow, (>270- OK) Ideally test base line vital capacity on initial assessment. Consider sending for spirometry tests if PCF between 160 and 270 if respiratory co-morbidities or smoker. As a minimum: assess PCF more frequently. Assessment of active cough, glottis closure. Ask regarding any swallow issues. Monitor issues also with self-reported questionnaire.	Discussion re healthy living, smoking cessation, diet, keeping fit/ aerobic exercise, activity e.g. singing, Core stability exercise eg Pilates/ Yoga. With increasing disability may require more specific intervention eg teaching correct breathing pattern, breathing exercises, core stability exercises.	Co morbidities eg asthma, COPD, back, abdomen or thoracic pain, obesity or smoker Co-morbidities plus any medication which may reduce respiratory drive eg opiates, Gabapentin in higher doses and especially if taken in combination. If has intrathecal baclofen (ITB) pump possibly more at risk.
Late **EDSS 7.5-9.5/ Palliative** People may have issues with fatigue and posture. Likely to be sat most of the time so at risk of reduced aerobic fitness++, reduced or poor sitting balance. May have swallow issues, reduced or absent upper limb function, poor or absent active cough. As MS becomes more advanced person may develop saliva management issues, increasing swallow issues. At risk of aspiration and infection.	**Where**: 3/6/12 monthly assessment at home or in clinic dependant on issues. **What**: Peak cough flow, (>270- OK) Consider sending for spirometry tests if PCF between 160 and 270 if co-morbidities or smoker. As a minimum assess PCF more frequently. Assessment of active cough, glottis closure. Ask regarding any swallow issues. Monitor issues also with self-reported questionnaire. Assess cough strength with a manual assisted cough. Assess the strength of the spontaneous cough (as if it is strong it may be sufficient without specialist intervention even if PCF value low but consider other factors eg any admissions for respiratory infections) Assess glottis closure by asking person to repeat an "E" several times, if stacato=normal, if struggling, glottis closure poor and hence won't be able to do breath stacking / use LVR bag.	Arm and sitting balance exercises. Standing frame if appropriate. May need referral to specialist respiratory service if Peak cough <270 for assessment with Lung Volume Recruitment (LVR) bag or <160 for a cough assist assessment. May need referral for swallow assessment if glottis or swallow issues (before referral to specialist respiratory service) Provision of appropriate seating if applicable to maintain good posture for some of the day, especially for meals. Assessment as to whether a manual assisted cough would achieve a good cough for that person. Encouraging deep breaths when rolling side to side with personal care and when in sitting. Saliva management with medication, mouth care, Side to side positioning in bed for comfort in more palliative conditions.	

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