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Title: Development of a system to allow independent home use of a mechanical in-exsufflator (M I-E device) for a patient with advanced neuromuscular disease

Mrs. Alison 21180 Armstrong alison.armstrong@nuth.nhs.uk ¹, Mrs. Rachael 21187 Moses rachel.moses@stgeorges.nhs.uk ² and Dr. Robert 21383 Bullock robert.bullock@nuth.nhs.uk MD ¹. ¹ Regional Assisted Ventilation Service, Newcastle Upon Tyne Hospitals NHS Foundation Trust, Newcastle upon Tyne, Tyne and Wear, United Kingdom, NE1 4LP and ² Physiotherapy, St George's Healthcare NHS Trust, London, United Kingdom, SW17 0QT .

Body: Introduction: A variety of methods are available to provide lung volume recruitment and cough augmentation. However, currently they cannot be used independently by patients who have very limited functional ability. This restricts treatment access for those community patients with limited care provision, reducing autonomy and increasing their dependence on others. Objective: Using a single patient case study, the main objective was to develop a system to allow the independent use of an M I-E device (NIPPY Clearway) without the need for additional carer support in a patient with severe neuromuscular weakness and associated respiratory symptoms. Methods: Following consultation with colleagues in technical aid services, we explored the possibility of using the M I-E device with remote micro switch and mouthpiece support adaptations. The M I-E device was fixed to the side of the patient's bed. The mouthpiece was positioned in a spring loaded mechanism and secured to the patients table. By adjusting the angle of the bed, and using remote switches, the patient could access the mouthpiece and activate the M I-E device. Results: The addition of this spring loaded mechanism and micro switch adaptation allowed independent use of the M I-E device. Conclusion/clinical relevance: By the development of a system to facilitate the independent use of the M I-E device, this treatment can be made more accessible to those patients in the community with complex health care needs but limited care provision. Within this case study, the patient reports a subjective improvement in breathlessness, cough strength and ability to speak in full sentences.