

## Airway clearance techniques in acute exacerbations of COPD: a survey of Australian physiotherapy practice

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### Abstract

**Objectives** To identify airway clearance techniques (ACTs) used to treat patients with acute exacerbations of chronic obstructive pulmonary disease (AECOPD) and identify factors underpinning their utilisation, including therapists' knowledge of the literature.

**Design** Cross-sectional postal survey using Likert scales and multiple-choice responses.

**Setting** 112 'large' or 'principal referral' Australian public hospitals.

**Participants** 189 physiotherapists from 89 hospitals (response rate 81%).

**Main outcome measures** Purpose designed survey measuring self-reported rate of ACT prescription; perception of ACT indications, aims, importance and effectiveness; factors influencing ACT choice; and knowledge of the evidence.

**Results** Most physiotherapists (123/189, 65%) prescribed ACTs for 60–100% of patients with AECOPDs. The most frequently prescribed ACTs were physical exercise (169/189, 89%), the forced expiratory technique (153/189, 81%) and the active cycle of breathing technique (149/189, 79%). Most were rated highly effective. Physiotherapists who perceived the role of ACTs to be important to patients' overall management (137/189, 73%) and those with less than 5 years cardiorespiratory experience (113/189, 60%) prescribed ACTs significantly more frequently than others. The main factors influencing ACT choice were precautions/contraindications to individual techniques (148/189, 78%) and degree of dyspnoea (136/189, 72%). The primary aim of ACT prescription was to clear sputum (178/189, 94%). Understanding of the evidence for ACTs in AECOPDs was mixed, with 43% citing it as supportive, 30% inconclusive and 19% unsure.

**Conclusions** Australian physiotherapists frequently prescribe ACTs for patients with AECOPDs and perceive their role to be important. Physical exercise is frequently prescribed for airway clearance and warrants further investigation.

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**Keywords:** Pulmonary disease, chronic obstructive; Acute exacerbation; Health care surveys; Physical therapy modalities; Mucociliary clearance; Airway clearance techniques

### Introduction

Chronic obstructive pulmonary disease (COPD) is a disabling respiratory condition with a rising global prevalence [1]. It is defined by airflow obstruction that is not fully

reversible and is characterised by chronic and progressive breathlessness, cough and sputum production [2]. Chronic cough and sputum are independent risks of premature COPD-related death [3–5] and are closely associated with frequent exacerbations [6]. Acute exacerbations of COPD (AECOPD) are clinically important events known to negatively affect quality of life [7,8], lung function [9,10], healthcare utilisation [11] and mortality [12]. Early therapy can enhance recovery and quality of life [13] and exercises to remove sputum from the airways ('airway clearance techniques') may be important. Airway clearance techniques (ACTs) work via manipulation of lung volumes, gas flow, pulmonary pressures and compressive forces to shear sputum

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along the airway lumen towards the mouth [14,15]. This process is essential for effective clearance of secretions in conditions where mucociliary dysfunction is present, such as COPD [15,16].

The clinical impact of ACTs during AECOPD is difficult to ascertain. There is a lack of strong evidence regarding their benefits [17–19] and their role is not universally advocated in international COPD management guidelines [2,20–22]. Awareness and interpretation of this evidence is likely to vary between therapists and may explain some of the global variability in clinical practice for patients with AECOPD. For example, the most frequently used ACT in the United Kingdom is the active cycle of breathing technique [23] whereas in Canada it is ‘conventional chest physiotherapy’ techniques (e.g. postural drainage, percussion, vibration) [24]. In Australia and New Zealand, the active cycle of breathing technique and deep breathing exercises are widely used for patients with COPD [25], however it is unclear whether this practice relates to individuals with acute or stable disease. Physiotherapists also reported that choice of ACT was significantly influenced by the ‘use of best practice’. There has been no documentation to date of clinicians’ knowledge of ‘best practice’ in this area, nor of the specific factors underpinning their clinical reasoning such as perceptions of the importance and effectiveness of airway clearance therapy. An understanding of these factors, as well as the true extent of ACT prescription for patients with an AECOPD may also provide important insight into the impact of this therapy on healthcare resources.

### *Objective*

This study aimed to (a) identify current physiotherapy practice of ACTs during AECOPD in Australia; (b) examine perceptions of ACT importance and effectiveness; (c) explore factors which influence ACT prescription; and (d) identify physiotherapists’ knowledge of the evidence for ACTs during AECOPD.

## **Method**

### *Design*

We created a new survey in accordance with evidence-based recommendations [26,27] to address the unique aims of this cross-sectional study as no appropriate validated tool existed. A review of previous similar studies and a comprehensive search of databases Medline, CINAHL, Embase and the Cochrane library were conducted in September 2009 and, with consultation with experts in the clinical field, gaps in the literature were identified and a set of corresponding clinical questions was generated in accordance with the study aims. To maximise the brevity of the survey, most questions were designed using 5-point Likert scales (e.g. ‘very often/always’, ‘often’, ‘sometimes’, ‘rarely’, ‘very rarely/never’) or multiple-choice responses. For questions

relating to physiotherapy experience, current practice or awareness of the literature (e.g. how frequently do you prescribe the ACTs?), only single responses were requested. Multiple responses were allowed for questions relating to clinical reasoning (e.g. ‘what do you consider to be important indications for ACTs in patients with AECOPD?’), including one ‘other’ free text response option. An initial draft was reviewed by two physiotherapists for content and face validity and a final draft was piloted on a representative cohort of five cardiorespiratory physiotherapists from one Australian state who were known to the research team but were ineligible to participate in the study. Minor amendments to wording were made without additional pilot testing. A copy of the survey is available in the online supplement.

Supplementary material related to this article can be found, in the online version, at [doi:10.1016/j.physio.2012.01.002](https://doi.org/10.1016/j.physio.2012.01.002).

For the purpose of this study, an AECOPD was defined as an admission to hospital for the management of problems relating to an acute exacerbation of previously diagnosed COPD, but excluded those requiring non-invasive ventilation or intubation. COPD included emphysema and/or chronic bronchitis and excluded asthma, bronchiectasis and cystic fibrosis. An ACT was defined as any physiotherapy technique used with the primary intent of clearing sputum from the airways.

### *Setting and participants*

One paper-based survey was mailed to a ‘senior cardiorespiratory physiotherapist’ at all ‘principal referral’ and ‘large’ Australian public hospitals, identified via an Australian Government health resource [28]. Each survey was assigned a unique code for de-identification and follow-up purposes and was accompanied with an explanatory statement and reply-paid envelope. Recipients were instructed to distribute the survey to ‘all physiotherapists who usually treat patients with an AECOPD’, as the study aimed to document individual knowledge and opinion rather than consensus, site-specific practice. One reminder letter and an additional survey was sent to hospitals that did not reply within 3 weeks to maximise response rates. Surveys were only excluded from analysis when respondents indicated that patients with an AECOPD were not usually managed at their hospital. Individual consent was implied by return of completed surveys.

### *Outcomes*

The main outcomes of this survey included: frequency of ACT prescription; perception of ACT effectiveness and importance; perception of the indications and aims of prescribing ACTs; factors influencing choice of ACTs; and knowledge of the ACT literature.

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