

**Title:** Breathlessness in the emergency care setting

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Nothing to disclose

This is a non-final version of Johnson, M., & Hutchinson, A. (2018). Breathlessness in the emergency care setting. *Current opinion in supportive and palliative care*, 12(3), 232–236.

doi:10.1097/SPC.0000000000000374

## Abstract

### Purpose of review

Breathlessness is one of the most common reasons for presentation at the emergency department (ED). This review summarises work published from 2017 which focusses on the symptom of breathlessness in its own right rather than as a signpost to diagnosis in relation to presentation to the ED.

### Recent findings

Seven relevant papers are included in this review. Five describe the epidemiology of breathlessness presentation showing; i) a prevalence of approximately 5% all presentations, ii), a high likelihood of hospital admission especially for those with heart failure, iii) breathlessness as a predictor of re-presentation. A sixth study described self-management strategies for breathlessness crisis used by expert patients successfully avoiding presentation to the ED. The seventh reported the validation of the shorter Dyspnea Severity Scale for use in the ED using a mixture of symptom report and clinical observation measures.

### Summary

Breathlessness is a common presenting feature at the ED and carries clinical outcome significance irrespective of the causative disease. Routine enquiry is needed to identify, assess and manage breathlessness alongside interventions to stabilise underlying reversible pathology. Presentation to the ED due to breathlessness should trigger community-based supported self-management for future episodes of breathlessness crisis.

### Keywords

Breathlessness; dyspnoea; emergency department; self-management

### Video abstract

## Introduction

The emergency department (ED) is a chaotic and fast-paced environment with the primary purpose of rapid assessment and acute clinical care. Breathlessness crisis, defined by the American Thoracic Society as “a sustained and severe resting breathing discomfort that occurs in patients with advanced, often life-limiting illness and overwhelms the patient and caregivers’ ability to achieve symptom relief”,<sup>1</sup> is a common reason for presentation to the ED and is frightening for patient and carer. Prevalence estimates of breathlessness as a primary reason for presentation range between 2.7% and 9% depending on the measure used and population studied.<sup>2-4</sup> Previous work has focussed mainly on breathlessness as a signpost to diagnosis,<sup>5, 6</sup> or in particular diseases,<sup>7, 8</sup> rather than studies to understand the impact of the symptom in its own right in relation to ED presentation. The severity of breathlessness on arrival at the ED is a predictor of subsequent admission to hospital or discharge home.<sup>9</sup>[ref]

We searched MEDLINE (2017 to current) for articles using terms “dyspnea OR dyspnoea”, OR “breathlessness”, OR “breath\$”, OR “short of breath” combined with “emergency department OR emergency services” OR “accident and emergency”. Articles studying breathlessness and the ED were included where the focus of enquiry was in relation to the symptom itself. In addition, relevant articles known to the authors published within the same time limits were included.

## Prevalence of breathlessness as a reason for presentation

Four studies presented prevalence of breathlessness in people presenting to the ED; two studied a general population,<sup>10, 11</sup> one studied a specific population (palliative care patients<sup>12</sup> and the fourth studied re-presentation within 30 days in previous attendees.<sup>13</sup>

Kelly and colleagues<sup>11</sup> conducted a prospective interrupted time series cohort study collecting data over three 72-hour periods (autumn, winter and spring of one year) from 46 EDs across the Asia-Pacific region (Australia, and New Zealand Dyspnea in Emergency Departments Study [AANZDEM]). Patients presenting as “walk-ins” or by ambulance were included and identified as presenting with breathlessness as a main symptom by the assessing clinician. A prevalence of 5.2% (3,105/60,059, 95% confidence interval [CI] = 5.0% to 5.4%) was found. Hutchinson and colleagues found a similar prevalence of a minimum estimate of 5.2% (245/4,692, 95% CI 4.6 to 5.9%).<sup>10</sup> This single site study invited consecutive people presenting to the “majors” area (ambulance arrival) over 17 days (24 hours, weekends included) to complete a self-report survey if clinically stable to do so. Survey respondents could also give consent for clinical record review. Of those brought by ambulance, a third (35.0% [95% CI 32.2% to 37.7%]) reported living with breathlessness most days over the past four weeks at least (over half of whom had had breathlessness for over 2 years) and fifth (20.2% [245/1,212, 95% CI 17.9% to 22.5%]) reported that breathlessness was a reason for attendance that day. Taking the total number of admissions to the ED (“majors” and “minors”; n=4,692), the minimum estimate of 5.2% was calculated. It was assumed that patients presenting to “minors” (walk-ins) with clinically significant breathlessness would be transferred to “majors”, therefore some people with breathlessness may have been missed. Only people presenting with acute-on-chronic breathlessness were included and the patients who were too sick to complete a survey (arguably included a significant number of those with breathlessness) were excluded. Nevertheless, this study is the only published self-report prevalence to date.

Of interest, the clinical case note review aspect of Hutchinson and colleagues showed that documentation of breathlessness in any form by a clinician was present in only two-thirds of records of patients for whom breathlessness was a reason for presentation by self-report. In the survey participants were asked to recall the severity of breathlessness at the time of ambulance call-out and to rate their current level. A median level of “severe” was reduced to “mild” at the time of survey completion in the ED. Recall of breathlessness severity over this timescale has been shown to be reliable.<sup>14, 15</sup> Breathlessness is recognised as a symptom which can be “invisible”.<sup>16</sup> As it is so closely related to physical and emotional exertion patients may show no physical sign of the experience of the symptom once they have rested and feel safe. A qualitative exploration of reasons why palliative care patients present to the ED describes how breathlessness often settles quickly once in a safe and reassuring environment.<sup>17</sup> If clinicians do not routinely seek self-report measures, and only document breathlessness once it has become a physical sign, this distressing symptom will be underestimated.

Another single-site study (the observational component of the qualitative study reported above<sup>17</sup>) examined the electronic health records of consecutive patients known to the specialist palliative care team who presented to the ED over a 10 week period.<sup>12</sup> One third (35%) of the 101 patients (115 presentations) presented with breathlessness. Most (70%) had a diagnosis of cancer consistent with the recognised under-representation of people with non-cancer diagnoses in specialist palliative care services. Overall, 83% were deemed to meet at least one criterion for care in the ED (urgent investigation, received immediate intervention unavailable in primary care or in the palliative care facility). However, it is not possible to assess whether the investigations or intervention received were clinically justified for individuals, that is, necessary to inform clinical management, or just performed as part of a routine battery triggered by attendance alone. Of the 12 where it was judged that ED presentation was inappropriate, four had breathlessness-related presentations.

In the fourth study, the North Carolina Prehospital Medical Information System records were used to examine 1,711,669 transports to the ED for 689,664 older adults with regard to re-transportation to the ED within 30 days of the index visit.<sup>13</sup> Approximately one sixth (17.7%) had a repeat transportation within that time, and those with shortness of breath had an increased risk of re-transportation ((OR 1.21; 95% CI 1.15 to 1.30).

## Disposition of ED attendees following presentation with breathlessness

A numerical rating scale breathlessness severity of  $\geq 8/10$  has been identified as a predictor of admission to hospital from the ED.<sup>9</sup> Previous studies show that most of those attending the ED with breathlessness are admitted to hospital.<sup>7, 8</sup> Studies in this review found a similar admission rate in their study cohorts; 64%<sup>11</sup>, 69%<sup>10</sup>, 61.6%<sup>12</sup>. A sub-study of the AANZDEM study cohort with heart failure showed a particularly high admission rate for this group (86%).<sup>18</sup> People with breathlessness accounted for around a tenth of all ward admissions from the ED (11.4%<sup>11</sup>; minimum estimate 7.6%<sup>10</sup>).

Of interest, 4/7 of the palliative care study patients that could have been managed directly by the palliative care facility presented during out-of-office hours and this unit did not provide an emergency admission service.<sup>12</sup> Length of hospital stay differed (5, IQR 3–8 days<sup>11</sup> vs 1, IQR 0-5 days<sup>10</sup>).

## Impact of community-based care

The availability of community-based care appears to be a significant factor in presentation with 68% of general presentations made outside of office hours (8am-6.30 pm Monday to Friday excluding public holidays).<sup>10</sup> In the palliative care study, half presented out of hours.<sup>12</sup> The need for and relevance of self-efficacy techniques in managing breathlessness crisis has been highlighted by the American Thoracic Society<sup>1</sup> who recommend that patients and carers receive education and training in techniques to help manage breathlessness problems before a full-blown crisis develops which is then reinforced at every breathlessness encounter. In the self-report ED survey of people living with chronic breathlessness,<sup>10</sup> three-quarters stated that they discussed this symptom with their family doctor; underlining the key role of primary care support, consistent with the consequent disproportionate ED presentation rate when this support is not available. In the studies of general ED attendees, a third were discharged home without need for hospital admission. For many presentation may have been necessary in order to receive immediate investigation and intervention. However, for others, breathlessness many have been driven primarily by the affective (anxiety and panic) dimension of breathlessness and so possible to manage more effectively using self-management techniques thus preventing ED presentation. Presentation to the emergency services with breathlessness crisis may be a useful occasion to use for the first time or reinforce supported self-management techniques.<sup>1</sup>

Some patients become experts in self-management of such crises. A qualitative study reported interview findings from 20 participants (15 with chronic obstructive pulmonary disease).<sup>19</sup> Patients were eligible if they had breathlessness on most days due to a diagnosed lung condition and had experience at least one ED “near miss” where they had considered presenting, but managed their breathlessness crisis without recourse to the ED. Successful approaches to self-management were: using a project-management approach with goal-setting, self-monitoring and risk management; addressing the affective aspect of breathlessness distinct from the sensory perception of breathlessness intensity; building therapeutic partnerships which involved both primary care and respiratory services. A recent qualitative synthesis of 101 studies presented the new concept of Breathing Space; the interplay between patients’ coping and help-seeking approaches with their clinician’s response to breathlessness in its own right (rather than disease management only).<sup>20</sup> Clinicians who understood the widespread impact of breathlessness on everyday life, and who were aware of and referred appropriately to breathlessness services and interventions helped improve patients’ quality of life. Patients able to engage in problem solving and to take a proactive approach to help-seeking rather than waiting until crisis experienced better “Breathing Space”. Routine enquiry to detect patients with chronic breathlessness, recently defined as disabling breathlessness which persists despite optimum treatment of the underlying disease, will help ensure patients get access to appropriate evidence-based interventions for breathlessness.<sup>21</sup>

## Measurement of breathlessness in the emergency department

Breathlessness is a significant presenting feature at the ED; its severity and likely impact irrespective of cause should be assessed. A two-site prospective observational study of 350 patients presenting to the ED with breathlessness, validated a scale (Dyspnea Severity Score) to assess severity of the

breathlessness in terms of physiological threat that can be used irrespective of breathlessness aetiology or stage of disease.<sup>22</sup> The initial scale comprised seven variables scoring from 0 (normal) to 3 (most severe); exercise tolerance (self-report), ability to speak (observed), able to co-operate with instructions (observed), cyanosis and SpO<sub>2</sub> (measured), breathing (observed/measured) and heart rate/rhythm (measured). Their final scale, validated against a number of physiological variables (lactate, pH, base-excess), was able to dispense with some variables (ability to speak, observed respiration and heart measurement) without losing prognostic probability. The study authors concluded that a score of  $\geq 7$  on the four dimension model could be useful for immediate decision making at the triage or during pre-hospital care. However, they did not follow up patients beyond immediate care and they caution against use in other settings.

## Conclusion

Breathlessness is a common presenting feature at the ED and carries clinical outcome significance irrespective of the causative disease. Routine enquiry, even in those who appear to have comfortable breathing, is needed to ensure breathlessness is identified, appropriately assessed and managed alongside interventions to stabilise underlying reversible pathology. Presentation to the ED due to breathlessness should be a signal for primary care and relevant secondary care teams to ensure patients have “joined-up” management for chronic breathlessness thus maximising supported self-management in future episodes of breathlessness crisis.

## Key points

- Breathlessness is a common presenting feature at the ED and is associated with important adverse clinical outcomes such as hospital admission
- Most presentations to the ED due to breathlessness occur out of office hours; supporting the patient and carer in being proficient in self-management techniques may help prevent avoidable presentations.
- Routine enquiry and systematic assessment of breathlessness in the ED alongside stabilisation of pathology is important.

Financial support and sponsorship. None

Conflicts of interest. None.

Figures and tables?

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