

# Return to work after acute exacerbation of chronic obstructive pulmonary disease: A literature review

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**ABSTRACT Introduction:** Chronic Obstructive Pulmonary Disease (COPD) results in poor health-related quality of life, increased mortality and physical limitations. Approximately 60% of COPD patients between 18-64 years does not have a connection to the workforce, and the COPD patients in the workforce have more time off work due to illness. The current literature review aimed to examine COPD patients' return to work after exacerbation of COPD and predisposing factors in the population for detachment or delayed return to work. **Methods:** The literature search was conducted in the databases Pubmed, Embase, CINAHL, and the Cochrane Library. Search terms regarding COPD and "return to work" was used. **Results:** Only one article describing COPD patients' return to work after acute exacerbation of the chronic obstructive pulmonary disease. **Conclusion:** There is a need for more studies investigating COPD patients' return to work after exacerbations, as well as an exploration of modifiable aspects in COPD patients' connection to the workforce.

**KEYWORDS** Pulmonary Disease, Chronic Obstructive, Return to work, Employment, Absenteeism, Retirement, Sick leave

## Introduction

The World Health Organization estimates that 65 million people worldwide suffer from moderate to severe chronic obstructive pulmonary disease (COPD) which resulted in 3.0 million deaths globally in 2016, and thereby the third leading cause of death in the world [1,2]. An exacerbation of COPD is defined as an acute worsening of respiratory symptoms that lead to additional therapy [4]. The exacerbation usually persists for 7-10 days and contributes to a progression in disease severity [5].

Approximately 40% of COPD patients between 18-64 years are employed compared to 80% of the entire Danish population [7]. Somewhat similar results were found in the Burden of Obstructive Lung Disease-study, which found that 36.7% of participants (age 40-64) reported paid jobs within the last year, whereas 52.6% of the population without airway obstruction

reported paid work [8]. Furthermore, patients with COPD have high sick leave frequencies of approximately 8.5 days off work per person per year due to disease [9]. As such, the poor connection to the workforce affect productivity. Estimates of patients' costs in loss of productivity per person per year differs between countries, ranging from 566-9815 USD [9].

In a previous study by Peters et al. from 2007, return to work, and job loss were examined for respiratory illness. At that time only five articles were included, where only one described return to work for COPD patients [10]. Due to the sparse literature, the review concluded a need for more prospective cohort studies. Given the substantial socioeconomic consequences of COPD not least due to patients' sparse connection to the workforce, and increased scientific interest in the area since 2007 would be expected. The aim of this review was therefore to investigate the literature that has emerged on COPD patients return to work after exacerbation of chronic obstructive pulmonary disease.

## Methods

### Data sources

The literature search was performed on January 29, 2019, with 6045 results. The Pubmed, Embase, CINAHL and Cochrane Library yielded 1389, 4076, 340 and 240 results respectively. The

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search was conducted on MeSH terms, title, abstract and key word (text word) as following: (“Chronic obstructive pulmonary disease”, COPD, “chronic obstructive lung disease”, “chronic obstructive airway disease”, “chronic bronchitis”) and (“Return to work”, “job re-entry”, “employment”, “employed”, “absenteeism”, “retirement”, “occupational health”, “medical leave”, “sick leave”).

### Study selection

Articles containing information on patients return to work after AECOPD were included, and examined for predisposing factors of poor outcomes. Reference manager Endnote X9 was used for reference handling, and after a duplicate search 5015 articles remained. Paper headlines and abstracts were examined and excluded if they did not contain relevant information on return to work. Conference abstracts were excluded due to insufficient data to perform the review. Papers on work-related exposure with pulmonary toxicity were excluded due to a possible bias of work-related exposure. Articles in other languages than English and Danish were excluded. A primary reviewer was responsible for the primary examination and after the initial sorting 27 articles remained. The remaining articles were independently examined by a primary and a secondary reviewer for relevant information on return to work and prognostic factors affecting return to work. In case of disagreement between the reviewers, a third reviewer had the final vote on which articles to include. After reviewing the articles by both reviewers, one relevant article remained and was included in the review.

### Data extraction

Data extraction and analysis were not performed because only one article described return to work as an outcome. The results of this study are presented as it was in the original article.

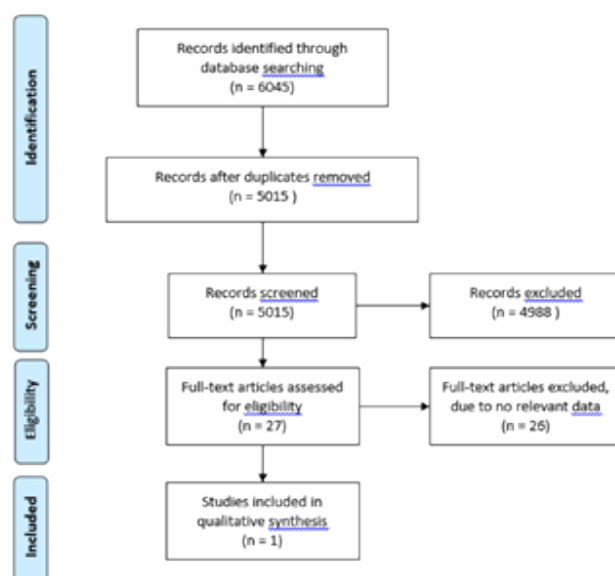
### Results

Only one article was identified with a description of characteristics affecting COPD patients' return to work, explained in table 1. The article, by Alexopoulos et al., examined among other things return to work after absence from work with respiratory symptoms categorized into asthma, COPD and chronic non-specific lung symptoms (11). Employees, consisting of 251 male employees from two different companies involved in building large constructions, was examined by comparing office clerks, welders and metal workers. The study found that 67% returned to work within five workdays, 90% returned to work within ten workdays, and only 2% had absence that exceeded 20 days. The only significant prognostic return to work association was a delayed return for metalworkers and welders compared with office clerks in patients with COPD symptoms.

### Discussion

This review aimed to identify studies describing COPD patients' return to work. Only one study was found describing the aim of the review.

The review from 2007 by Peters et al. was conducted on return to work or job loss in patients with respiratory symptoms and included the article by Alexopoulos et al. [10]. They conclude that there was a lack of evidence of delayed return to work and that the measure of return to work might not be the best measure for bad respiratory health. The authors argue that since workers with sick leave due to respiratory ill-health



**Figure 1:** Flow chart of literature search. Template used from PRISMA website.

might have shorter sick leave periods, a measure of duration and frequency might be more appropriate. The shorter sick leave in COPD patients falls in line with the median duration of symptoms of an exacerbation in moderate to severe COPD is approximately seven days (IQR 4-14) and may, therefore, be the reason why no further research on return to work in COPD patients has emerged since 2007. However, some patients have a prolonged recovery from exacerbation with 7.1% not recovering pre-exacerbation peak expiratory flow rate after 91 days [5]. These patients may also have prolonged return to work, and if it is possible to identify these patients earlier, preventive measures may be set in place.

In a systematic review from 2018, by Rai et al., COPD's effect on work-related outcomes were examined [6]. This review found that COPD patients had lower employment rates compared to patients without COPD, was less likely to return to the workforce after leaving the workforce compared to patients without chronic conditions, had higher early retirement rates compared to patients without COPD, and took more time off work than those without COPD [6]. Different studies in the review found statistical significant longer periods of absenteeism in patients who reported greater symptoms, greater perceived disease severity and a tendency towards longer periods of absenteeism in patients with breathlessness [6]. However, the review concludes that there is a need for research examining modifiable characteristics of COPD patients to be able to implement interventions aimed at improving the workforce connection [6].

Interestingly, no new papers on return to work have been published in the last 12 years. Other measures of work attachment have been researched such as presentism, absenteeism and early retirement. COPD patients have within these fields a poorer connection to the workforce compared to healthy adults and other chronic diseases [6]. Some characteristics have been associated with worse outcomes, e.g. increased airflow obstruction, COPD symptoms and infections [6]. The relationship with AECOPD and return to work, however, remains unanswered. Questions that might be answered by researching this subject are; does the AECOPD initiates the detachment from the work-

**Table 1** Overview of the Alexopoulos et al. paper, describing patients reporting symptoms of COPD with delayed return to work [11].

Author:	Outcome:	Population: n=251	RR delayed return to work:	(95% CI)	P-value:
Author: Alexopoulos E. C.	Return to work after symptoms of COPD	COPD symptoms: 79			
		Office worker 4	1.00		
		Metal workers 45	5.53	(1.83 - 16.73)	0.002
		Welders 30	4.79	(1.56 - 14.71)	0.006

force; does patients who are vulnerable to prolonged periods of detachment from the workforce in connection to AECOPD exist in the COPD population; and when in the progression of COPD should intervention be implemented. It might be that the Peters et al. review is right in the observation that patients in general who suffer sick leave due to respiratory ill health have shorter periods of sick leave [10]. This is, however, more an assumption than a conclusion and not sufficiently established in the literature. It is therefore paramount to examine return to work for the COPD population due to the known poor connection to the workforce.

The question of a return to work has however been examined in other chronic diseases entities such as musculoskeletal- and mental health disorders, traumatic and acquired brain injury, cardiovascular conditions, cancer, stroke and multiple sclerosis [12]. There are shared prognostic factors between the different conditions. Positive factors affecting return to work include higher education and socioeconomic status, lower severity of the injury/illness and employment before injury [12]. Negative factors affecting return to work include older age, female sex, higher pain or disability, depression, previous sick leave, activity limitations/participation restriction, and higher physical work demands [12]. Interventions with favourable outcomes regarding return to work within the different conditions include multidisciplinary, occupational care/training, education, psychological, and outpatient interventions/comprehensive treatment [12]. One study regarding return to work concerning occupational respiratory illness that included a wide variety of diagnoses found that being a union member, early referral to the occupational clinic and a lower number of comorbid conditions had a more favourable return to work [13]. They however counterintuitively found that smokers have a more favourable return to work than non-smokers do. With the knowledge that approximately 60% of COPD patients are outside the workforce and smoking is the primary cause of COPD, it seems to be unlikely that smoking would have beneficial effects on return to work in a COPD population. These prognostic factors may also apply to COPD patients return to work, and it is essential to confirm this together with identifying prognostic factors specific for COPD (e.g. spirometry, symptom score, smoking status). The identification of vulnerable patients and modifiable factors in COPD patients will assist in the development of rehabilitation programs for COPD to retain their connection to the workforce.

The current literature review has limitations. Only one reviewer conducted the primary literature search. Only articles in Danish or English were included which may have excluded relevant articles. The choice of excluding articles regarding pulmonary toxic substances might also have excluded some information on return to work for COPD patients, which may skew the result. However, the inclusion of these studies would

limit the generalizability of the results. The study by Alexopoulos et al. has its limitations. A very small population of four office workers who reported COPD symptoms in connection with absence from work served as a control group for return to work in metalworkers and welders. It is, therefore, possible that there are statistical uncertainties in the study. Besides, the study population of metalworkers and welders may have been exposed to pulmonary toxic substances that may have biased the findings of the study.

In conclusion, only one article found on COPD patients return to work. We must conclude that the literature on the subject is very sparse. No new studies have been published the past 12 years. This review therefore calls for studies investigating, for one, COPD patients' return to work after absence due to health problems, secondly, disease-specific prognostic factors that may be modifiable to improve the COPD population connection to the workforce and lastly, early interventions to prevent absenteeism in COPD patients.

### Conflict of Interest

There are no conflicts of interest to declare by any of the authors of this study.

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