

# Changes in asthma mortality in England and Wales since 2001

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## ABSTRACT

The number of deaths from asthma in England and Wales has not changed significantly over the last decade. This lack of improvement has received attention from both national asthma guidelines and the media. We examined asthma death data from the Office for National Statistics, stratified by age band. Every 5-year age band below the age of 80 years has seen a large reduction in mortality between 2001 and 2017, whereas numbers of asthma deaths have increased by 81% for people aged 80 years or above. This increase in older people dying from asthma requires explanation.

## INTRODUCTION

In the UK, recent press attention has focused on how death rates from asthma compare unfavourably to the rest of Europe<sup>1</sup>; according to data from Eurostat, the number of asthma deaths in the UK has increased by more than 20% in 5 years, with figures from 2015 showing 1434 people dying from an asthma attack. Attention has also fallen on asthma mortality in young people; the UK has the worst mortality rate in people aged 10–24 years, and the second highest among 15–19 years olds in European countries.<sup>2</sup>

Conversely, a recent paper describes asthma mortality, emergency admissions and prevalence as decreasing over recent decades in England, although mortality did appear to be related to socioeconomic status with a 19% lower mortality among 5–44 years olds in the most deprived quintile compared with those in the least deprived quintile. In older adults, this trend was reversed.<sup>3</sup>

## METHODS

To investigate this apparent discrepancy and explore the age distribution of asthma deaths in more detail, we examined the raw numbers of deaths from asthma across England and Wales in the period 2001–2017 using data from the Office for National Statistics, which compiles data from death certificates using the International Classification of Diseases Revision 10 (ICD-10) codes J45 and 46 for asthma.

Raw data were grouped into 5-year age bands (<1 year, 01–04 years, 05–09 years, 10–14 years, etc) up to 85–89 and >90 years. In order to explore the possibility of miscoding asthma deaths as a potential issue, we also obtained data on 5-year age bands for deaths from COPD using ICD-10 codes J40–44. To calculate and plot annual asthma and COPD mortality rates, we used 2011 population data as a baseline: <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/>

populationestimates/datasets/2011censuspopulationandhouseholdestimatesforenglandandwales (accessed 17 May 2019). For ease of presentation, data were split into age-related quartiles—0–24, 25–49, 50–74 and >75 years.

## RESULTS

There was only a 2.5% reduction in asthma deaths in England and Wales from 2001 to 2017 (see [table 1](#)). However, when stratified by age, there was a large variation in the change in the number of deaths over time. For those aged below 75 years, there was a 53% reduction in deaths, as compared with a 50% increase in deaths from asthma in people aged over 75 years. In the same period, there was a 22.4% increase in deaths from COPD in people aged over 75 years. The trends for death from asthma and COPD in people stratified by age are shown in [figures 1 and 2](#).

## CONCLUSION

There has been no overall change in the numbers of asthma deaths in England and Wales since 2001; however, there has been a large drop in deaths in people aged below 75 years, with a corresponding increase in those aged over 75 years. There has also been a corresponding rise in the number of people dying from COPD.

The cause of such divergent trends based on age in asthma mortality is unclear. The difference may reflect disease chronicity with airway remodelling and consequently reduced response to bronchodilators in older people. Older people can also be more sensitive to side effects from beta-adrenergic agonists and glucocorticoids, especially in the face of polypharmacy, and many have difficulty using inhalers correctly.<sup>4</sup> There is evidence that asthma exacerbation rates are higher in older age groups<sup>5</sup> and although anecdotally it is recognised that people who develop asthma at an older age may have a worse outcome,<sup>6</sup> an older age of onset of asthma does not appear to be associated with higher exacerbation rates.<sup>7</sup>

The differential mortality rates after stratification by age may reflect the misattribution of the cause of death as asthma rather than as a different respiratory disease, such as COPD; we also collected data on COPD deaths and a similar increase was observed above and the age of 75 years.

This potential issue of miscoding was flagged in the National Review of Asthma Deaths (NRAD),<sup>8</sup> where 514/1414 (36%) of the deaths in the 12 months from February 2011 with asthma in part II of the Medical Certificate Cause of Death were possibly erroneously classified as J459; that is,



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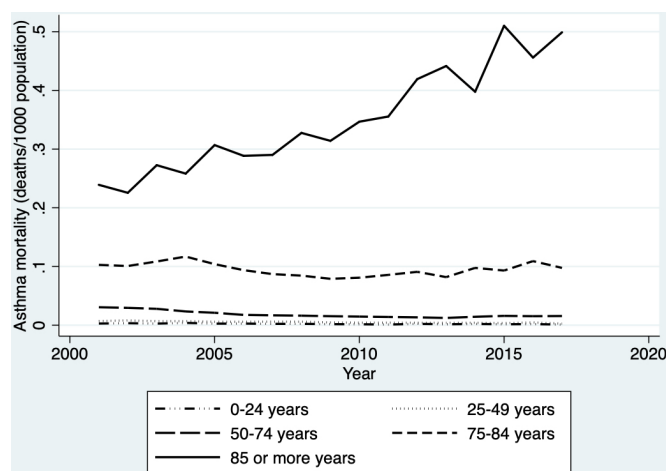
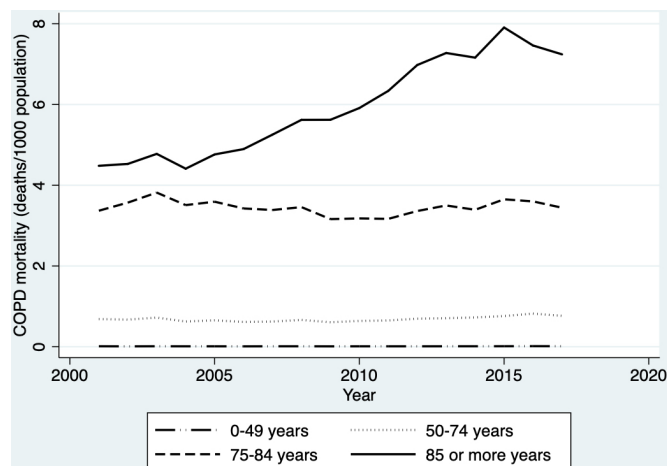
**Table 1** Numbers of death from asthma or COPD in 2001 and 2017 in England and Wales

Age band (years)	Asthma deaths			COPD deaths		
	2001	2017	% change	2001	2017	% change
0–24	48	18	–62.5	8	5	–37.5
25–49	137	51	–62.8	163	181	+11
50–74	459	234	–49	8113	9063	+11.7
>75	620	930	+50	16120	19814	+22.4
Total	1264	1233	–2.5	24404	29063	+19.1

deaths due to asthma. Complex rules applied by the WHO for classifying diseases to determine the underlying cause of death based on death certificates can result in considerable variation in the subsequent assignment of the cause of death. However, it is still important to note that most of the deaths from asthma examined in NRAD were thought to be preventable.

Whatever the reason for the apparent age difference in mortality, more research is needed into this rise in deaths from asthma in the older population. This is particularly pertinent as it is estimated that many elderly patients with asthma are treated with drugs that have not been tested in older populations and that older people with asthma are often excluded from clinical studies because of age-based inclusion criteria and comorbidities; one study found the odds ratio of being excluded from randomised controlled trials increased to 18.6 at the age of 75–84 years when compared with the youngest populations.<sup>9</sup>

In summary, the stable rate of asthma deaths seen over the last 18 years hides significant differences related to age. The apparent increase in deaths from asthma in an older population

**Figure 1** Asthma mortality (deaths/1000 population), 2001–2017 in England and Wales.**Figure 2** COPD mortality (deaths/1000 population), 2001–2017 in England and Wales.

needs explanation if we are to improve asthma outcomes in the context of an ageing population.

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