



Public Health
England

Protecting and improving the nation's health

State of Respiratory Health in Yorkshire and the Humber 2019

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Executive summary

Respiratory diseases, such as asthma and Chronic Obstructive Pulmonary Disease (COPD), can have a substantial impact on quality of life and are responsible for 13.6% of all deaths in Yorkshire and the Humber (Y&H) in 2017 (PHE analysis of ONS mortality data). This report examines respiratory diseases across the life course, highlighting examples of good practice, as well as opportunities for improvement in both primary prevention and disease management.

In Y&H in 2017/18, 14.2% of women still smoked during pregnancy (PHE, 2019a). Smoking during pregnancy and the early years of a child's life is associated with increased risk of premature births, infant mortality, babies having restricted growth and acute respiratory tract infections (RTIs) (RCPCH, 2014). The hospital admission rate for RTIs in infants in 2016/17 for under one year olds in Y&H is 619 per 10,000 which is similar to the England rate of 625 per 10,000 (PHE, 2019b).

In 2017/18, the prevalence of asthma for all ages in the Y&H NHS region was 6.3% (362,087 people) compared to 5.9% nationally (PHE, 2019c). The modelled estimated prevalence of asthma is predicted to be higher than this at 9.2% for the Y&H NHS region and 9.1% nationally (PHE, 2019c). In Y&H 71.1% of asthma patients received the NICE-recommended annual review in 2017/18 which was significantly higher than the England average of 70.2% (PHE, 2019c), though still means that nearly 30% of asthma patients did not receive an annual review. Emergency admissions to hospital for asthma amongst those aged 18 or under in Y&H are lower than the national average at 171.6 v 186.4 per 100,000 (PHE, 2019b). In England, children with asthma, on average, miss an extra 1.5 days of school a year (Edwards, Street and Rix, 2016). The 2016 Adult Asthma National Audit report showed that 27% of asthmatics (all ages) admitted to hospital are smokers compared with an estimated 16% of the general population (BTS, 2017).

Although recorded prevalence of COPD tends to be higher in the North of England, it has been estimated that only a third of COPD sufferers have a confirmed diagnosis (BLF, 2016a). Emergency hospital admissions in men and women aged 35yrs or over for COPD are 19% higher in Y&H compared to the national average (493 per 100,000 v 415 per 100,000) (PHE, 2019d). In the Y&H NHS region, the rate of uptake of the flu vaccine among those with COPD 2017/18 was 79.7% which is above the 55% uptake benchmark (PHE, 2019e). Deaths from COPD are most likely to take place in hospital (Cohen et al, 2017) and access to palliative care is less common than for people with lung cancer (Spathis and Booth, 2008).

In Y&H, 58% of people self-reported successfully quitting smoking in 2017/18 (51% in England), and 73% of those self-reported quitters in Y&H were CO validated compared to 71% for England (NHS Digital, 2018).

The incidence of tuberculosis (TB) in Y&H has been consistently low compared with the England average (7.4 per 100,000 compared to 9.9 per 100,000 nationally in 2015-17) (PHE 2019a). Throughout England there are continuing challenges to support people with complex social needs and to monitor the emerging risks of multi drug-resistant TB. Evidence-based opportunities to prevent respiratory diseases, reduce service variation and improve health outcomes for people with respiratory conditions are included in a list of recommendations at the end of the report.

Health and social care commissioners; health care providers; local authority officers; community and voluntary organisations; and public health professionals are invited to use this resource to review best practice, identify key areas of current delivery and address areas for improvement.

Glossary

ASH	Action on Smoking and Health
BCG	Bacillus Calmette-Guérin
BLF	British Lung Foundation
BTS	British Thoracic Society
CBT	cognitive behavioural therapy
CCG	Clinical Commissioning Group
CF	cystic fibrosis
CO	carbon monoxide
COMEAP	Committee on the Medical Effects of Air Pollutants
COPD	chronic obstructive pulmonary disease
CPD	continuing professional development
CVD	cardiovascular disease
DH	Department of Health and Social Care
EWM	excess winter mortality
FEV	forced expiratory volume (litres per second)
FEV1	forced expiratory volume in first second of breath
Flu	influenza
GP	general practitioner
HADS	hospital anxiety and depression screening tool
HES	hospital episode statistics
HMP	Her Majesty's Prisons

HSE	Health and Safety Executive
IPoD	International Place of Death study
LRTI	lower respiratory tract infection
NCD	non-communicable disease
NCSCT	National Centre for Smoking Cessation Training
Y&H	Yorkshire and Humber
NECS	North East Commissioning Support Unit
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
NOMIS	National Offender Management Information System
NPS	novel psychoactive substance
NRT	nicotine replacement therapies
ONS	Office for National Statistics
OR	odds ratio
PCV	pneumococcal conjugate vaccine
PEF	peak expiratory flow
PHE	Public Health England
PHOF	Public Health Outcomes Framework
PPV	pneumococcal polysaccharide vaccine
PR	pulmonary rehabilitation
QOF	Quality and Outcomes Framework
RCN	Royal College of Nursing
RCP	Royal College of Physicians

RCPCH	Royal College of Paediatrics and Child Health
RTI	respiratory tract infection
SAR	standardised hospital admission ratio
SIDS	sudden infant death syndrome
SIGN	Scottish Intercollegiate Guidelines Network
SSS	Stop Smoking Service
TB	tuberculosis
UNICEF	United Nations Children's Fund
URTI	upper respiratory tract infection
VBA	very brief advice
WHO	World Health Organisation

Introduction

A focus on respiratory health

This report presents the state of respiratory health and disease in Yorkshire & Humber (Y&H). It includes intelligence to highlight inequalities; variation in health service delivery; and identifies outcomes that are priority improvement areas.

The respiratory system describes the lungs and airway structures. A healthy working respiratory system is essential for people to get fresh oxygen into their body and to remove harmful gases. Healthy working airways give people protection from harmful substances through coughing and sneezing, the ability to speak and to regulate their body temperature. These functions allow people to communicate, move and exercise freely, and provide increased protection from infections.

Diseases of the respiratory system affect people across the life course from infancy to later life and are associated with significant rates of premature death, illness and disability. Highly prevalent causes of morbidity and mortality in England include both non-communicable diseases (NCDs): asthma, chronic obstructive pulmonary disease (COPD) and lung cancer; and communicable conditions: influenza (flu), respiratory tract infections (RTIs) and pneumonia.

Some countries, such as those in Central Sub-Saharan Africa, continue to face endemic TB, one of the world's most common causes of premature mortality, while the UK has an aging population with an increasing burden of non-communicable diseases ([Global Burden of Disease](#)). Crucially, many of these challenges, such as sedentary lifestyles, tobacco smoking and environmental pollution are strongly associated with causing and exacerbating respiratory disease, and are persistently patterned by social characteristics.

In common with other regions in England, Y&H has many public health challenges as set out in the Public Health Outcomes Framework. Despite areas of high affluence, many areas in Y&H have deprivation levels amongst the highest in England ([DCLG, 2015](#)). In Y&H there are high proportions of children brought up in poverty as well as high levels of adults of working age who experience long-term unemployment and high % of working days lost due to sickness absence compared to England ([PHE, 2019a](#)). Additionally, high levels of risk factors for disease associated with deprivation such as poor self-reported well-being related to anxiety and happiness, high levels of obesity and inactivity and low breastfeeding initiation rates vary across the region but can be similarly poor compared to the national average ([PHE, 2019a](#)).

Smoking prevalence in Y&H in 2018 was recorded as 16.7% compared to 14.4% on average in England and smoking status at time of delivery in 2017/18 was recorded as 14.2% compared to 10.8% in England ([PHE, 2019a](#)). Health outcomes across Y&H reflect these characteristics – the premature mortality rate (deaths from all causes, persons aged under 75 years of age) in Y&H in the period 2015-17 was higher than in

England as a whole (362 per 100,000 compared with 332 per 100,000 population in England) (PHE, 2019f). The smoking attributable mortality rate during the same period in those aged 35 years and over was 299.7 per 100,000 compared with 262.2 per 100,000 in England as a whole (PHE, 2019f).

The opportunity for public health action is clear. Respiratory diseases are overwhelmingly associated with modifiable factors and behaviours. Opportunities to prevent future respiratory disease are available, yet there is little evidence of structured and equitable implementation to protect population groups known to be at increased risk (APPG on Respiratory Health, 2014). Organisational leadership and whole-system commitment is required from Y&H partners to deliver primary, secondary and tertiary prevention for respiratory conditions to ensure that people of all ages are supported to live long, healthy lives.

A well-established association between smoking and low socioeconomic status means the burden of respiratory disease and their known determinants are not evenly distributed across the population. As such, focusing on respiratory health and the determinants of respiratory disease offers an effective approach that not only improves health outcomes in the general population, but also contributes to the reduction in the uneven distribution of ill-health

Scope of the report

This report focuses on the major causes of respiratory morbidity and mortality in the region. Public Health England (PHE) produced *Cancer in Y&H* in December 2016, a statistical resource specifically for the 'big four' cancers, which included lung cancer. As such, despite the significant regional burden attributed to lung cancer (particularly mortality) these data have been excluded. Those with a particular interest in lung cancer can access the full report at [Cancer in Y&H 2016](#).

Reducing Tuberculosis (TB) is one of seven priority areas for PHE over the next five to ten years. Despite relative low population numbers affected by TB in Y&H, the impact on individual sufferers and demand on health and social care providers is significant. To highlight the health and social inequalities associated with TB this report provides a brief summary of the priority public health management of TB.

Further exclusions include complete influenza (flu) data, cystic fibrosis (CF) and pertussis (whooping cough). Information relating to these topics can be accessed using the hyperlinks below:

- [PHE guidance, data and analysis on seasonal influenza](#)
- [UK Cystic Fibrosis Registry](#)
- [PHE guidance, data and analysis on pertussis](#)

Technical Guidance

The latest readily available data at the time of writing has been used. Where appropriate, data has been presented using a traffic light system (Red – Amber – Green). This indicates the statistical significance of the variation presented where red means Y&H is statistically significantly worse than the England average, green is statistically significantly better and amber means Y&H is not statistically significantly different from the England average. For some indicators it is not appropriate to define values as ‘better’ or ‘worse’ compared to the England average. Where this is the case, Blue – Amber – Blue charts have been used instead to reflect whether a Y&H value is statistically significantly different from the England average or not. In this case light blue means Y&H is statistically significantly higher than the England average, dark blue means it is statistically significantly lower and amber not significantly different. Grey bars represent the England value.

Respiratory disease burden

Respiratory diseases can be acute or chronic illnesses, and they may cause long-term disability and/ or lead to premature death. Moreover, respiratory illnesses do not affect population groups equally and are subject to strong social patterning: the UK has higher respiratory mortality than other Western European countries ([Eurostat](#)). Y&H had rates higher than those in England for under 75 mortality rate from respiratory disease in 2015-17 (39.7 v 34.3 per 100,000) ([PHE, 2019a](#)).

Respiratory disease mortality

The majority of mortality from respiratory health impacts older people, specifically with lung cancer, COPD and pneumonia. Whilst older people are more susceptible to acute infections such as pneumonia, much of the risk for lung cancer and COPD is attributable to the cumulative effect of life-long smoking. Smoking in pregnancy is associated with miscarriage, stillbirth and sudden infant death syndrome (SIDS) in infants. The UK has one of the highest rates of admissions for asthma in Europe ([Global Asthma Report, 2018](#)).

Respiratory disease morbidity

Long-term respiratory morbidity in adulthood is most commonly caused by asthma and COPD, but illness from flu and pneumonia are also relatively common although they tend to be short-lived and effectively treated. Respiratory disease is a significant cause of illness in childhood and adolescence. Children and young people experience

relatively high rates of asthma and respiratory tract infections compared to the adult population.

Smoking in pregnancy is associated with restricted growth (low birth weight) and prematurity in infants (RCP, 1992), as well as increasing children's risk of chronic disease in later life, such as cardiovascular disease (CVD), obesity and Type II Diabetes (Power C, Atherton K and Thomas C, 2010).

Non-communicable respiratory diseases

Asthma

Asthma is a sensitivity of the airways and is the most common respiratory disease in the UK with approximately 5.4 million people currently receiving treatment (Asthma UK, 2018a). When asthma is triggered in a sufferer, they find it difficult to breathe and this can cause chest tightness, wheezing, shortness of breath and coughing. This happens because asthma causes their airways to tighten and narrow or become inflamed, which means that mucus or phlegm builds up to further narrow the airway.

Asthma is slightly more common in women than men and is most commonly diagnosed during childhood although may not lead to asthma in adulthood. The severity of asthma can vary significantly, but there are known triggers which can set off exacerbations depending on the type of asthma people have. Triggers may include behaviors such as exercise, smoking or specific foods, but can also be in the environment such as pollen, cold weather and pollution (BLF, 2017a).

Asthma is predominately managed in primary care where treatments are focused on managing symptoms, often with medication from inhalers, but which can vary (BLF, 2017a). The adult asthma audit showed that women are more likely to have asthma that is most difficult to treat and are therefore more likely to be admitted to hospital, but the reasons for this are not fully understood (BTS, 2017). The vast majority of asthma deaths are considered preventable (RCP, 2014).

Chronic Obstructive Pulmonary Disease (COPD)

COPD is a progressive condition characterised by obstruction of the airways and describes both chronic bronchitis and emphysema (BLF, 2016a). COPD causes inflammation of the lungs which leads to sufferers experiencing coughing, sputum and breathlessness. The disease is strongly associated with smoking, and long-term smokers often experience onset of the disease in middle age (NHS Choices, 2016a). COPD is the only major cause of death that is on the increase in the UK, and exacerbations are attributed to 10% of all UK medical admissions (BLF, 2016a).

There is no cure for COPD, and treatment is focused on symptom management and improving quality of life (NICE, 2018a). COPD patients experience high levels of disability and impairment on daily living activities, particularly as their lung function decreases. COPD sufferers have a high prevalence of comorbidities such as cardiovascular disease, obesity and anxiety (NHS Choices, 2016a).

Smoking in pregnancy

Smoking in pregnancy is the most common risk factor attributed to poor health in infants (<1 year) due to the strong association maternal smoking has with prematurity, restricted growth, stillbirth and SIDS (Marufu et. al, 2015). Smoking during pregnancy can restrict the unborn baby's access to oxygen, reducing the nutrients they receive through the placenta, which restricts healthy growth and development (NHS Choices, 2016b). This means there is a higher risk of complications during labour, and infants are more vulnerable to infections, breathing difficulties and feeding problems (NHS Choices, 2016b).

Premature babies (born before the 37th week of pregnancy) often have under-developed lungs and restricted growth, described as *immaturity* (ONS, 2017). Low birth weight (< 5 pounds 8 ounces/2,500 grams) can be related to congenital anomalies or infections such as rubella, but is twice as likely to occur from maternal smoking and remains the greatest cause of infant mortality (ONS, 2017). Smaller babies are at greater risk of infection and need more help to breath, feed and keep warm. Both prematurity and restricted growth are associated with an increased risk of childhood morbidity, restricted cognitive development and chronic disease in adults (UNICEF and WHO, 2004). Children who experience exposure to smoke during their infancy are also more at risk of passive smoking during childhood which can cause respiratory irritation and risk of disease (RCP, 2010).

Maternal age and socioeconomic status are associated with smoking in pregnancy where young mothers (<25 years old) and those living in poverty are much more likely to be smoking at the time of delivery (Scottish Government, 2016). Deprivation is an important characteristic associated with complications during and after pregnancy which is attributed to a number of risk factors such as malnutrition, poor housing conditions and low breastfeeding rates (Bowers et. al, 2012). However, maternal smoking is by far the most significant cause of poor outcomes for infants and is wholly preventable through whole-population and targeted interventions (RCP, 2010).

Communicable Respiratory Disease

Respiratory Tract Infections (RTIs)

RTIs describe infections of the nose, sinuses and throat (upper RTIs - URTI) and of the airways and lungs (lower RTIs – LRTI) (NHS Choices, 2018). Commonly viral, RTIs include very common infections such as colds, tonsillitis, bronchitis (chest infections) and flu. Due to the scale of morbidity and mortality associated with pneumonia it is described in more detail below. The most common symptoms of RTIs are a cough, headache, running or blocked nose, sneezing, sore throat, muscle aches and tiredness.

RTIs are commonly spread through droplets in the air when infected people sneeze or cough or if they breathe closely to them. Indirect contact, through touching the same object or surface can also cause spread (NHS Choices, 2018). Practising good hygiene through hand-washing and disposing of used tissues in bins is the most effective intervention to prevent spread of RTIs. Children are more prone to RTIs as they are less able to practice good hygiene and haven't yet built up immunity to the range of viral infections that commonly cause RTIs (NHS Choices, 2018).

These infections tend to be mild and self-limiting for a few weeks and can be treated with painkillers, fluids and rest so don't require medical intervention (NICE, 2008). However, RTIs are one of the most common reasons for attendance at the GP. People who have symptoms consistent with a presentation of pneumonia or those in high risk groups, particularly those with existing chronic respiratory disease or those over 80 years, are recommended to see their GP (NICE, 2008). People in these groups may need antibiotics or further tests such as X-rays or blood tests to get an accurate diagnosis and appropriate treatment.

Pneumonia

Pneumonia is a lower respiratory tract infection (LRTI) that inflames the lung tissue and causes a build-up of fluid (NHS Choices, 2019a). Pneumonia is usually from a pneumococcal (bacterial) infection caused by *Streptococcus pneumoniae* and can have a sudden or slow onset (NHS Choices, 2019a).

Symptoms of pneumonia can vary in severity but usually include a cough (which may or may not produce thick phlegm), difficulty breathing, chest pain, fever, general feeling of being unwell, rapid heart rate and sweating/shivering (BLF, 2016b). People may also experience coughing up blood, headaches, fatigue, wheezing, muscle pain, confusion/disorientation and nausea (BLF, 2016b). Mild cases of pneumonia are treated in the community with antibiotics, fluids and rest and should resolve in several weeks. More severe cases may require treatment in hospital and can be fatal (NHS Choices, 2019a).

People of all ages are at risk of pneumonia but infants and the elderly are commonly affected with more serious infections and are at higher risk of complications, particularly when the weather is colder during winter (NHS Choices, 2019a). People who have long-term conditions and people who are immunosuppressed are also at increased risk of more serious pneumonia (BLF, 2016b).

The pneumococcal vaccine is offered to all babies as part of the routine childhood vaccination programme; those 65 or over; and people with chronic disease such as COPD, diabetes, coeliac disease, HIV and congenital heart disease (NHS Choices, 2019b). Welders and metal workers are advised to have the pneumococcal vaccine due to the increased risk of respiratory disease associated with these occupational groups as results of dust, vapours and fumes exposures (HSE, 2014).

Tuberculosis (TB)

Tuberculosis (TB) is a bacterial infection that can affect many parts of the body including the brain, bones and bowel, but TB of the lungs, pulmonary TB, is the most common (BLF, 2017b). People with pulmonary TB usually have a cough which may bring up phlegm or blood. They may also experience fever, extreme weight loss, chest pain, loss of appetite, neck lymph node swelling and night sweats (BLF, 2017b).

People, especially those born in countries with a high prevalence of TB, can also have latent TB. People with latent TB do not have symptoms and are not infectious, but roughly . one in 10 people with latent TB will go on to develop active disease in the future (sometimes many years in the future) (WHO, 2018).

Pulmonary TB spreads from person-to-person through prolonged close contact with an infected person by inhaling tiny droplets from their coughs or sneezes (BLF, 2017b). People exposed to someone with TB may be screened as part of a standard contact tracing protocol, which aims to prevent further spread (NICE, 2016a). TB can be effectively treated, but typically requires a long course (at least six months) of a combination of different antibiotics. Some strains of TB are becoming resistant to antibiotics (known as 'MDR-TB' strains), and so require longer and more complex treatment (NICE, 2016a). However, TB can be fatal, and is a common cause of death in many low-income countries. This is associated with stigma in some cultures where treatment is expensive or not easily accessible (WHO, 2018). This can cause people to fear a TB diagnosis, and making them reluctant to seek medical intervention, including those who have migrated to the UK.

UK cases of TB are much more common in men between 15-44 years old, and specifically in urban areas with ethnic diversity (PHE, 2017). TB is most common in

Africa, Southeast Asia, Russia, China, South America and the western Pacific region but continues to be a public health priority in the UK, particularly for non-UK born population groups (WHO, 2018). Social characteristics associated with UK cases are alcohol misuse, homelessness, drug misuse and imprisonment (PHE, 2017). People in these population groups are more likely to have the pulmonary form of TB and experience worse outcomes (PHE, 2017).

National priorities to control TB include: targeted vaccination for infants at increased risk; high-quality diagnostic services; specialist staff to support treatment completion; comprehensive contact tracing; pre-entry screening for cases of active pulmonary TB; early testing and treatment in patients with latent TB infection; and ongoing implementation of the enhanced TB surveillance system (NICE, 2016a).

Public health action

Actions to promote and protect

Legislative actions to ban smoking in public places; in vehicles with children; and occupational health and safety requirements have made much progress to protect population health from respiratory disease. At an individual level, the most effective public health interventions to prevent respiratory disease continue to be immunisations and tobacco control measures. However, there are a range of evidence-based actions that individuals, families and organisations can take that will promote a healthy respiratory system and reduce the risk of illness.

Immunisations

Immunisations have been one of the most significant public health achievements to date. People of specific ages, pregnant women and those with conditions that make them vulnerable to acute respiratory illness are invited for a number of immunisations against respiratory disease at various intervals. Despite robust evidence on the effectiveness of immunisations to reduce and prevent communicable disease, uptake rates vary across population groups including those vulnerable to serious outcomes from infections like pneumonia.

The NHS England recommended immunisations for respiratory disease protection are:

- pertussis vaccination for pregnant women between 16 and 32 weeks of pregnancy
- the pneumococcal conjugate vaccine (PCV) for infants and pneumococcal polysaccharide vaccine (PPV) for people aged 65 and over, and those with long-term health conditions
- the annual influenza vaccine for children aged 2-8 years, those 65 and over and those with long-term health conditions
- the BCG (Bacillus Calmette-Guérin) vaccine for infants born in areas of high TB prevalence (parts of inner London) and those with a parent or grandparent who was born in a country with high rates of TB

Stopping smoking

Stopping smoking is the single most important thing anyone can do to improve their health, and this is particularly important for people with an existing respiratory disease and women who are pregnant. There are a number of national and local Stop Smoking Services (SSS) for people wanting to quit with various types of support available. These include evidence-based free nicotine replacement therapies (NRT) and drugs such as

varenicline and bupropion, one-to-one motivational interviewing or increasingly popular e-cigarettes, which are currently thought to be 95% less harmful than tobacco cigarettes (PHE, 2015a).

Smoking is likely to be attributed to a presenting illness; increase a patient's risk of infection; negatively impact treatment outcomes and increase each patient's risk of complications or secondary disease, and therefore addressing smoking is a clinical priority for effective and cost-effective healthcare providers (NICE, 2013). Evidence suggests that when health professionals raise the patient's awareness on the harms of smoking to their health and advise on the benefits of smoking cessation people are more likely to quit compared to advice from a non-healthcare professional (NICE, 2006). This is why it is important that all healthcare commissioners and providers take responsibility within their role to ensure that smoking is addressed at each and every appropriate interface with patients. Good quality care, aligned to clinical evidence, means that patients should have their smoking status recorded; be offered a referral or information to stop smoking support; and be advised that they can access services at any time in the future (NICE, 2018b).

SMOKEFREE NHS www.nhs.uk/smokefree is the public health campaign initiated and supported by Public Health England (PHE). The website provides many resources to support people in their quit attempt including a Facebook community and online chat advisors with links to local stop smoking services and a national telephone helpline delivered by expert advisors.

For people with chronic respiratory disease it is important that they have evidence-based management of their condition to maintain (or improve) their quality of life, which should include sustained support to stop smoking.

Accessing services

All healthcare contacts with smokers who are not yet symptomatic and/or unwell (as well as those who are) are opportunities for professionals to highlight the impact of smoking on health. These opportunities allow practitioners to signpost or refer patients to support services during a potentially powerful 'teachable moment', particularly if patients have experienced acute illness and are motivated to make changes advised by health professionals to prevent further episodes.

The National Centre for Smoking Cessation and Training (NCSCT) have a suite of e-learning resources to support health professionals raise the issue of smoking and second-hand smoke. This includes an evidence-based module on delivering Very Brief Advice (VBA) <http://elearning.ncsct.co.uk/vba-launch> that is recommended for all health professionals continued professional development (CPD).

NHS England encourages people to attend their GP if they have a cough lasting longer than three weeks; if they experience chest pain or breathlessness; are bringing up phlegm/blood; or have swollen/painful lymph nodes. Although most causes of these symptoms won't be serious, they may require antibiotics or need further tests from specialists. For serious respiratory problems, early intervention is essential to get the best possible outcomes.

Physical activity

Regular exercise is an important component of a healthy respiratory system and current UK guidelines recommend 150 minutes of moderate physical activity per week for adults of all ages and 60 minutes every day for children (Bull et. al, 2010). Physical activity makes the lungs and heart work more effectively to supply oxygen around the body, described as cardiorespiratory fitness. As well as improving heart and lung function, cardiorespiratory fitness has been found to be an independent risk factor for premature mortality and is associated with lung disease, Type II Diabetes, heart disease and poorer mental health (Lee et. al, 2010).

People with lung disease are encouraged to be physically active to increase their cardiovascular fitness although they may require additional support to initiate and monitor their exercise levels (Foster et. al, 2005). This may include evidence-based interventions such as Pulmonary Rehabilitation courses offered in the NHS or self-management activities such as active travel in the community and use of local leisure facilities (NICE, 2016b).

Air pollution

Despite improvements in air quality in recent years, air pollution continues to be a significant public health issue. WHO estimate that, globally, approximately 3.7 million people died in 2012 from outdoor sources which caused COPD, lung cancer, ischaemic heart disease, stroke and LRTI in children (WHO, 2014). Harmful levels of air pollution are most common in urban areas where there is concentrated road traffic due to diesel and petrol fuels. People living in urban areas of England are regularly exposed to air that does not meet European standards (Kelly and Fussell, 2015). Air pollution is also created from other sources such as agriculture, industry, household fuels or natural processes (dust, pollen etc.) which similarly affect rural settings.

Pollutants in the air such as particulate matter, nitrogen dioxide and ozone cause irritation of the respiratory system. Particulate matter (specifically PM2.5 and PM10) are associated with the majority of negative health effects from poor air quality and evidence suggests that long-term exposure to these pollutants can increase the risk of respiratory disease, in particular lung cancer (Cancer Research UK, 2016).

UK air pollution varies with regional topography and industry but national data estimates that particulate matter PM2.5 currently accounts for approximately 29,000 premature deaths per year (COMEAP, 2010). Urbanised areas such as London have a much poorer air quality than rural settings like Scotland. These harms often impact populations with a mid-range of deprivation, although deprived areas tend to have higher concentrations of nitrogen dioxide and PM10 (PHE, 2014a; NICE, 2017a).

Populations most at risk of poor air quality are people with asthma or COPD where there is strong evidence that high levels of air pollution can cause severe symptoms, including heart attacks, due to their sensitivity to allergens (Kelly and Fussell, 2015). Similarly, children and older people are more likely to be more vulnerable to the negative impacts of poor air quality leading to sore throats, coughing or long-term disease (NICE, 2017a). Recent evidence also suggests an association between pregnancy and post-natal exposures leading to increased airway inflammation and risk of pneumonia in early childhood (Kelly and Fussell, 2015; MacIntyre et al, 2014). People at risk of the effects of air pollution are encouraged to avoid periods of high congestion; not to exercise outdoors when pollution levels are high; and to use their preventer and reliever inhalers as prescribed (NICE, 2017a).

Occupational Health

Specific occupations are associated with respiratory a disease which tends to affect workers with lower levels of education, often in manual jobs, such as construction, coal mining and agricultural workers, because of the exposures within these working environments (Melville et. al, 2010). More specifically, COPD, mesothelioma, lung cancer and occupational asthma are associated with workplace hazards such as dust, fumes, and chemicals and, in particular, asbestos exposure (HSE, 2018).

In Great Britain, it is estimated that there are 12,000 deaths each year associated with occupational respiratory diseases, which are predominately caused by asbestos-related disease or COPD (HSE, 2018). The majority of these deaths will occur as a result of past working conditions, because these respiratory diseases have a long latency period. The Health and Safety Executive (HSE) suggests that there are approximately 14,000 new cases of respiratory irritations or diseases each year that are associated with workplace exposures (HSE, 2018).

Weather preparedness

The weather plays an important role in respiratory health for people with existing conditions and those at increased risk of infection, such as people over 75.

In the UK, more people die during winter when the temperature is colder, and this is described as Excess Winter Mortality (EWM). The highest increase in risk of mortality

during winter is associated with respiratory diseases, particularly pneumonia (ONS, 2018). In the winter months, people should make sure their house is kept warm, maintain physical activity, regularly have hot drinks, and dress warmly – wearing layers and using a scarf to prevent cold air going directly into their lungs (BLF, 2017c).

People over age of 65 and those with chronic conditions are invited to receive the pneumococcal and seasonal influenza vaccine during winter months for additional protection during this period of increased risk.

Respiratory conditions may also be exacerbated during the summer months because there are increased levels of ozone which may cause breathing problem in asthmatics and people with COPD (BLF, 2018). Other allergens in the air, such as pollution and pollen are also less dispersed in still, hot weather and can trigger symptoms for people with asthma, hay fever and sensitive lungs. People are also more likely to be dehydrated in the heat and therefore everybody, whether they have a respiratory disease or not, are encouraged to drink plenty of cold water, keep out of the direct sun and to only exercise in well ventilated spaces (BLF, 2018).

Housing

People spend most of their time indoors, particularly in their home, and the condition of the home can significantly impact their respiratory system. Poor housing conditions commonly associated with deprivation, such as damp, mould and poor ventilation increase risk of harm and exacerbation of respiratory disease, particularly for people with asthma (BLF, 2017d). Indoor pollutants include specific cleaning/decorating products, air fresheners, pet hairs and wood/coal fires.

Household smoking is also a common cause of indoor respiratory harm and particularly affects children, exposure to smoke from parents and relatives (BLF, 2016c). Children are most vulnerable to poor quality air as they have less developed immune systems to protect them against pollutants, and this is particularly pertinent for children with asthma (WHO, 2019a). Moreover, a key component of the public health strategy to reduce EWM is to ensure that people have energy efficient homes and are able to adequately heat them during winter months, which particularly impacts people with low incomes who may experience fuel poverty.

People with respiratory disease, who are often limited to their home in the latter stages of their illness, should be educated to make sure their property is well ventilated, select water-based products for cleaning or decorating, and to take action when they identify signs of condensation or mould as part of their self-management.

Diet

Breastfeeding offers infants important protection from infectious respiratory disease, and very strong evidence shows a reduced incidence of these infections, particularly in infants who were exclusively breast fed for six-months (WHO, 2013). Breastfed babies are also less likely to need medical treatment or an admission to hospital due a respiratory illness (WHO, 2013).

Across the life course people living in deprivation are more likely to have a poorer diet and be more susceptible to illness as a result of this (The Marmot Review, 2010, p133). A balanced diet is important to support a healthy immune system to protect against infections and means that people are likely to recover quicker when they are unwell.

People with respiratory disease are particularly encouraged to drink plenty of water to move mucus through their lungs and reduce the risk of an infection occurring (BLF, 2017e).

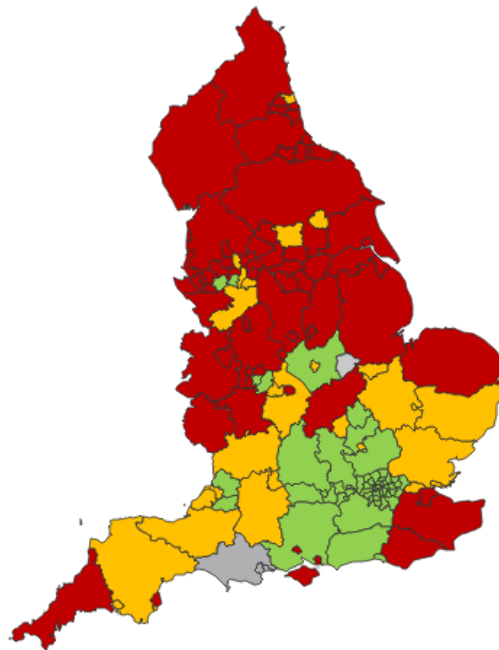
Infants

As part of the antenatal and routine childhood vaccination programme, infants are offered protection from pertussis and pneumonia through the pertussis vaccination in pregnancy and pneumococcal conjugate vaccine (PCV) in infancy. In 2017/18, Y&H attained 94.7% coverage for the PCV vaccination (compared to 93.3% for England) and 94.5% for the combined vaccine covering pertussis at 1 years old compared to 93.1% for England (PHE, 2019a).

Smoking in pregnancy

For Y&H, the under-16 and under-18 conception rates were both higher than the national average. In under-16s the rate of conception in 2017 was 3.3 per 1,000 (2.7 for England) and for under-18s the rate was 20.6 per 1,000 (17.8 for England) (PHE, 2019a). Under-16 and under-18 conception rates are associated with maternal smoking, and this is reflected in regional smoking in pregnancy rates presented below.

Smoking at time of delivery 2017/18



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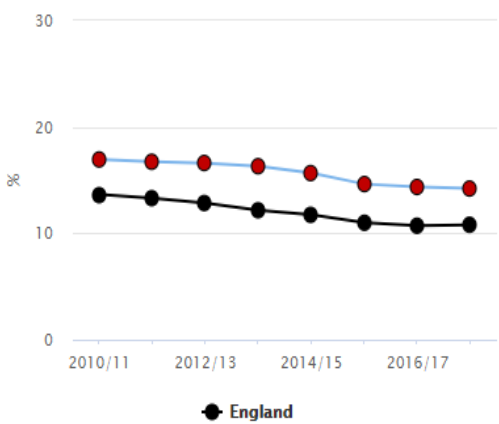
(PHE, 2019a)

Published in July 2017, The Tobacco Control Plan for England set a target to reduce the smoking in pregnancy prevalence rate from 10.7% to 6% or less by 2022 (DH, 2017). To achieve this, targeted action by maternity services to support women to quit smoking

during their pregnancy, alongside broader whole-population tobacco control action, is recommended by a strong body of evidence (DH, 2017).

Mirroring the positive trends of reduced maternal smoking observed across the country, rates of smoking in pregnancy have decreased steadily in Y&H over the past few years. Between 2010/11 and 2017/18 rates in Y&H reduced, in absolute terms, by 2.7% (percentage points) from 16.9% to 14.2% (PHE, 2019a). Despite this progress, Y&H continues to have higher than average maternal smoking rates: 3.4% (percentage points) above the England average.

Smoking status at time of delivery regional trend data



Recent trend: ↓

Period	Yorkshire and the Humber region				England
	Count	Value	Lower CI	Upper CI	
2010/11	10,986	16.9%	16.7%	17.2%	13.6%
2011/12	10,872	16.7%	16.4%	17.0%	13.3%
2012/13	10,648	16.6%	16.3%	16.9%	12.8%
2013/14	10,089	16.3%	16.0%	16.6%	12.2%
2014/15	9,544	15.7%	15.4%	15.9%	11.7%
2015/16	8,952	14.6%	14.4%	14.9%	11.0%
2016/17	8,669	14.4%	14.1%	14.6%	10.7%
2017/18	8,006	14.2%	13.9%	14.5%	10.8%

Source: Calculated by PHE from the NHS Digital return on Smoking Status At Time of delivery (SAT OD)

(PHE, 2019a)

The National Institute for Health and Care Excellence (NICE) recommend that midwives screen all pregnant women for smoking at their first antenatal appointment using a carbon monoxide (CO) test (NICE, 2010). Women who smoke should be given advice about the benefit of stopping smoking for their health and the health of their baby. All women should be referred to Stop Smoking Services as per the local arrangement (ie NHS or private provider). Ongoing antenatal care should reinforce the importance of stopping smoking for women who continue to smoke, monitor CO levels and offer support to stop smoking throughout their pregnancy and postnatal care, and these actions should be recorded on the patient’s record (NICE, 2010).

Between 2016/17 and 2017/18 there was an overall reduction of 10% in the number of pregnant women who set quit dates in England. Over the same period, the number in Y&H fell by 18% (NHS Digital, 2017a, NHS Digital, 2018). However, of those pregnant women who set quit dates in 2017/18, the Y&H region had the second highest rate of self-reported successful quitters at 49% (of which 37% were CO validated). The equivalent figures for England are 45% (CO validated 27%) (NHS Digital, 2018).

Compared to the national average (10.8%), smoking at time of delivery was statistically higher in nearly all Y&H local authorities in 2017/18 ranging from 10.4% in York to

22.1% in North East Lincolnshire (PHE, 2019a). Smoking status at time of delivery by LA 2017/18

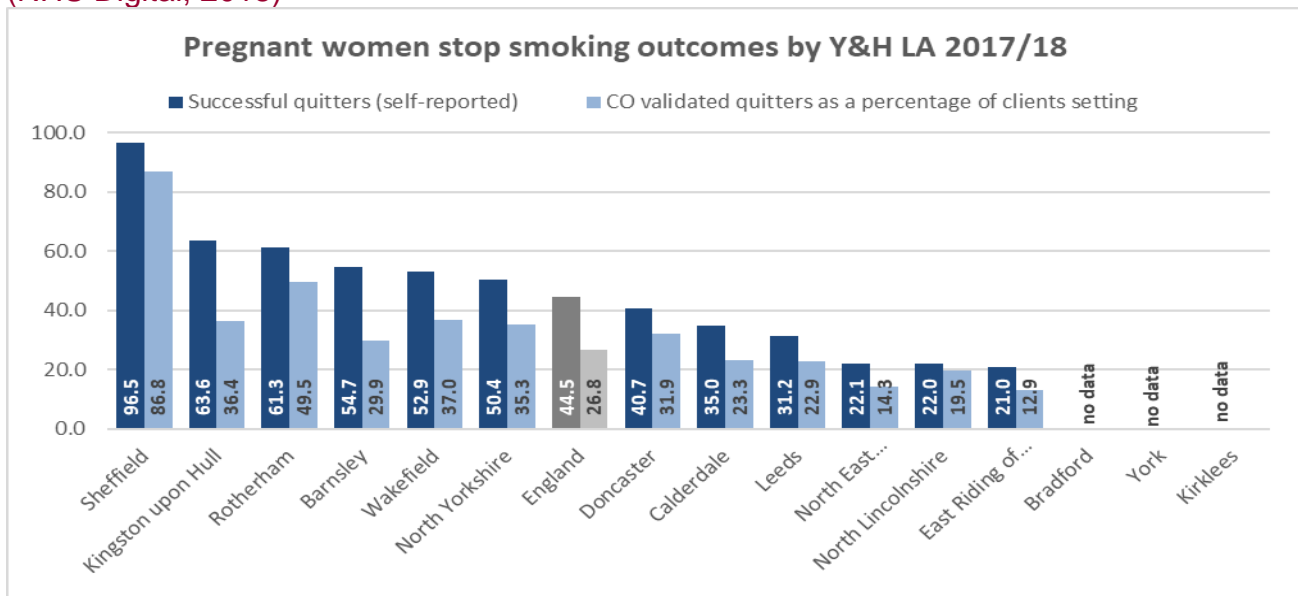
Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
England	↓	64,391	10.8	10.7	10.9
Yorkshire and the Humber region	↓	8,006	14.2	13.9	14.5
North East Lincolnshire	→	390	22.1	20.2	24.1
Kingston upon Hull	→	431	20.4*	18.7	22.2
Rotherham	↓	521	19.9	18.4	21.5
North Lincolnshire	→	301	19.2	17.3	21.2
Wakefield	↓	681	17.7	16.6	19.0
Barnsley	↓	505	16.8	15.5	18.2
Doncaster	↓	482	15.6	14.4	16.9
Bradford	↓	1,071	14.4	13.6	15.2
East Riding of Yorkshire	→	257	13.9*	12.4	15.6
Calderdale	→	309	13.5	12.1	14.9
Kirklees	↓	595	12.6	11.7	13.6
Sheffield	↓	708	12.0	11.2	12.9
North Yorkshire	↓	595	11.7	10.9	12.6
Leeds	↓	984	10.5	9.9	11.1
York	↓	177	10.4	9.0	11.9

Source: Calculated by PHE from the NHS Digital return on Smoking Status At Time of delivery (SATOD)

(PHE, 2019a)

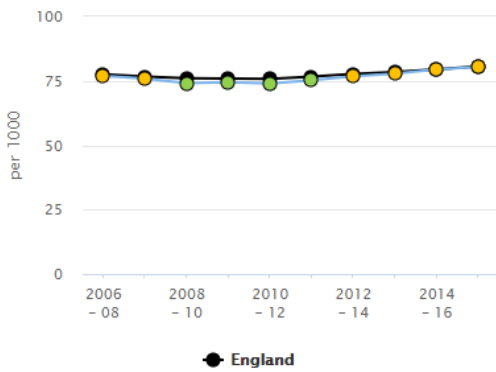
The Figure below shows the proportion of pregnant women in each Y&H local authority who self-reported successfully quitting smoking in pregnancy, and the proportion of women these women who had this validated by a CO measurement. These data are compared to the England average for both measures. The rate of successful quits during pregnancy in Sheffield was more than twice that of the national rate. Of the local authorities for which there were data (note: values were not available for Bradford, Kirklees and York), the lowest proportion of 'successful quitters' was in East Riding of Yorkshire. The use of CO monitors to validate successful quits in pregnancy was more variable and the results lower than those that were self-reported. North Lincolnshire had the greatest level of agreement between the two measures (NHS Digital, 2018).

(NHS Digital, 2018)



The Y&H rate of premature births (less than 37 weeks gestation) was 80.4 per 1,000 live births: similar to the England average of 80.6 per 1,000 (2015-17) (PHE, 2019b). The trend data showed that the region is generally similar to the England average.

Premature births (less than 37 weeks gestation) regional trend data



Recent trend: –

Period	Yorkshire and the Humber region				England
	Count	Value	Lower CI	Upper CI	
2006 - 08	14,907	77.0	75.7	78.2	77.6
2007 - 09	14,949	76.0	74.7	77.2	76.7
2008 - 10	14,759	74.1	72.9	75.3	76.0
2009 - 11	14,833	74.5	73.3	75.7	75.9
2010 - 12	14,824	73.9	72.8	75.1	75.7
2011 - 13	14,964	75.3	74.1	76.5	76.7
2012 - 14	15,093	76.8	75.5	78.0	77.6
2013 - 15	15,052	77.9	76.6	79.1	78.4
2014 - 16	15,297	79.4	78.2	80.7	79.5
2015 - 17	15,324	80.4	79.2	81.7	80.6

Source: Office for National Statistics adhoc table request

(PHE, 2019b)

Although not clearly demonstrated in Y&H, it is likely that the proportion of women smoking at time of delivery and the rates of premature births found in the region suggest an association between the two. Mothers who smoke are more likely to have full-term babies with restricted growth which is an independent risk factor for poor health and infant mortality (RCPCH, 2014). Babies born prematurely, with restricted growth or those from socially disadvantaged families are more likely to die in the first year of life (RCPCH, 2014). For example, in the UK the mortality rate for restricted-growth babies was a stark 31.6 per 1,000 live births compared to 1.1 per 1,000 live births for babies with a normal birthweight (over 2,500 grams) (ONS, 2017). By local authority in 2015-17, four LAs in the region had statistically significantly lower rates of premature births and four had higher.

Premature births (less than 37 weeks gestation) 2015 - 17

Crude rate - per 1000

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Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
England	–	159,684	80.6	80.2	81.0
Yorkshire and the Humber region	–	15,324	80.4	79.2	81.7
Doncaster	–	1,084	102.6	96.6	108.9
North Lincolnshire	–	523	98.1	89.9	106.9
North East Lincolnshire	–	512	91.6	83.9	99.9
Kingston upon Hull	–	947	89.2	83.6	95.1
Calderdale	–	626	85.5	78.9	92.4
Kirklees	–	1,351	84.2	79.8	88.8
Bradford	–	1,961	83.0	79.3	86.7
Barnsley	–	695	82.4	76.4	88.7
Wakefield	–	986	81.5	76.4	86.7
Rotherham	–	753	81.1	75.4	87.1
East Riding of Yorkshire	–	664	76.3	70.6	82.4
Sheffield	–	1,477	75.0	71.2	78.9
North Yorkshire	–	1,224	72.7	68.7	76.9
Leeds	–	2,145	70.3	67.4	73.3
York	–	376	64.5	58.1	71.3

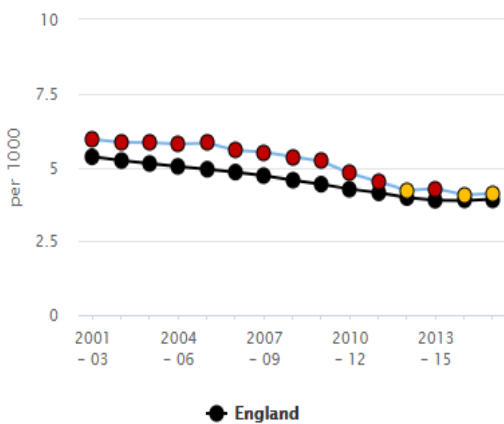
Source: Office for National Statistics adhoc table request

(PHE, 2019b)

Infant mortality describes the rate of babies who die in the first year of life per 1,000 live births. Risk factors for infant mortality are strongly associated with specific maternal social characteristics including smoking status, economic deprivation, and maternal age (The Marmot Review, 2010). As such, infant mortality is often used as an indication of the overall health status of a population and quality of their healthcare.

In Y&H, the rate of infant mortality in 2015-17 was 4.1 per 1,000, not statistically significantly different to the England rate of 3.9 per 1,000 (PHE, 2019a). The chart below shows that previously Y&H has been above the England average but in recent years rates of infant mortality decreased at a faster rates than England and so it was now similar.

Infant mortality regional trend data



Recent trend: –

Period	Yorkshire and the Humber region				England
	Count	Value	Lower CI	Upper CI	
2001 - 03	1,006	5.9	5.6	6.3	5.4
2002 - 04	1,016	5.9	5.5	6.2	5.2
2003 - 05	1,043	5.8	5.5	6.2	5.1
2004 - 06	1,066	5.8	5.5	6.2	5.0
2005 - 07	1,094	5.8	5.5	6.2	4.9
2006 - 08	1,079	5.6	5.2	5.9	4.8
2007 - 09	1,085	5.5	5.2	5.8	4.7
2008 - 10	1,070	5.4	5.0	5.7	4.6
2009 - 11	1,040	5.2	4.9	5.5	4.4
2010 - 12	963	4.8	4.5	5.1	4.3
2011 - 13	895	4.5	4.2	4.8	4.1
2012 - 14	826	4.2	3.9	4.5	4.0
2013 - 15	824	4.3	4.0	4.6	3.9
2014 - 16	779	4.1	3.8	4.4	3.9
2015 - 17	781	4.1	3.8	4.4	3.9

Source: Office for National Statistics (ONS)

(PHE, 2019a)

Though eight local authorities in Y&H had higher rates of infant mortality in 2015-17, this was only statistically significant for Bradford and Sheffield. Three local authorities had significantly lower rates compared to England: East Riding of Yorkshire, Barnsley and North Yorkshire.

4.01 - Infant mortality 2015 - 17

Crude rate - per 1000

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Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
England	–	7,734	3.9	3.8	4.0
Yorkshire and the Humber region	–	781	4.1	3.8	4.4
Bradford	–	137	5.8	4.9	6.9
Calderdale	–	37	5.1	3.6	7.0
Kirklees	–	79	4.9	3.9	6.2
Sheffield	–	95	4.8	3.9	5.9
Kingston upon Hull	–	50	4.7	3.5	6.2
Doncaster	–	48	4.6	3.4	6.0
North East Lincolnshire	–	24	4.3	2.8	6.4
Leeds	–	129	4.2	3.5	5.0
North Lincolnshire	–	20	3.8	2.3	5.8
York	–	20	3.4	2.1	5.3
Rotherham	–	30	3.2	2.2	4.6
Wakefield	–	39	3.2	2.3	4.4
East Riding of Yorkshire	–	22	2.5	1.6	3.8
Barnsley	–	18	2.1	1.3	3.4
North Yorkshire	–	33	2.0	1.4	2.8

Source: Office for National Statistics (ONS)

(PHE, 2019a)

Respiratory Tract Infections (RTIs)

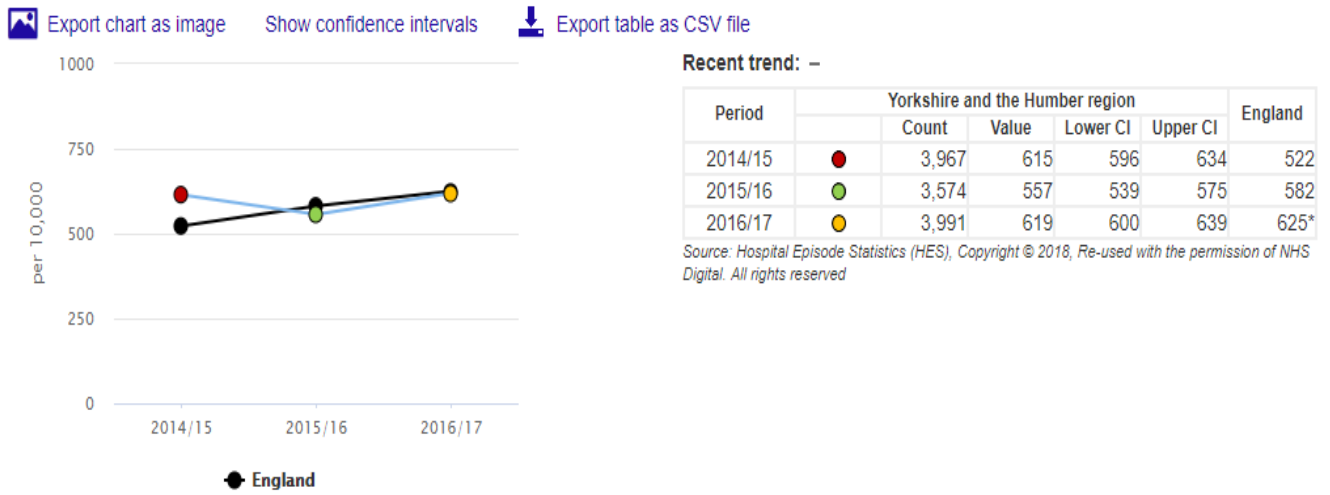
In the UK, infant mortality has declined over the past twenty years and this is attributed to a range of public health interventions to reduce population smoking prevalence; improved overall living standards; and specific education campaigns to reduce Sudden Infant Death Syndrome (SIDS) (DH, 2010). Medical advancements have particularly improved perinatal outcomes (the first 28 days of life). However, national infant mortality trends remain subject to strong social patterning, and respiratory disorders continue to be one of the major causes of infant mortality (DH, 2010).

Maternal smoking puts infants at increased risk of acute respiratory illness such as a pneumonia. The PCV routine immunisation for infants will reduce their risk of pneumonia, however respiratory and cardiovascular disorders remain the most common cause of infant deaths in the UK (DH, 2010). These conditions are specifically associated with *immaturity*, which can be significantly influenced through addressing maternal smoking and smoking in young women (preconception) (DH, 2010). Chest infections (RTIs) are usually successfully treated within the community and may require primary care clinicians to prescribe antibiotics. However, infants (particularly those who are smaller and thus more vulnerable to infection) may require further medical intervention in hospital if their symptoms are severe.

The Y&H average rate of hospital admission for RTIs in infants <1 year old during 2016/17 was 619 per 10,000 which was similar to the England average of 625 per

10,000. Regional trend data showed that Y&H has fluctuated in previous years. Most recently it has risen and is line with the England average (PHE, 2019b).

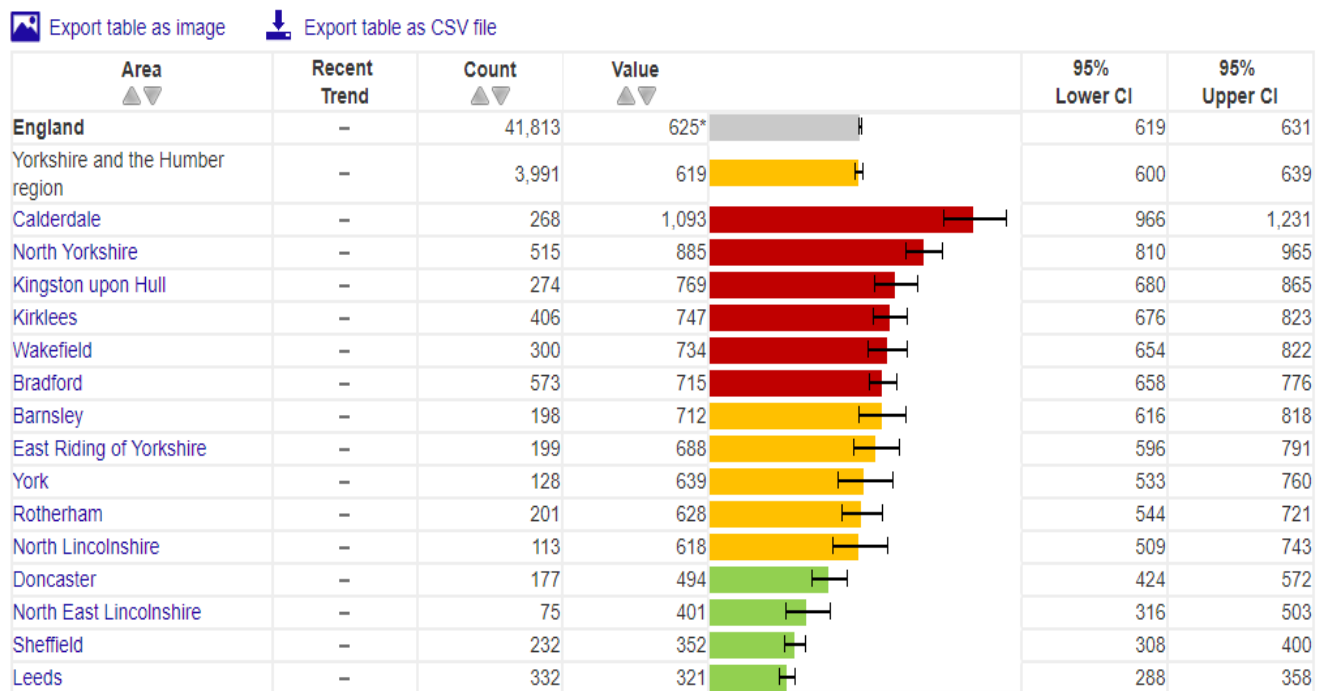
Admissions for respiratory tract infections in infants aged under 1 year Yorkshire and the Humber region Crude rate - per 10,000



(PHE, 2019b)

Calderdale had the highest rates of admissions at 1,093 per 10,000 and showed a sharp increase in the past two years. Doncaster, North East Lincolnshire, Sheffield and Leeds all had significantly lower rates of emergency admissions for RTI compared to the England average (PHE, 2019b).

Admissions for respiratory tract infections in infants aged under 1 year 2016/17 Crude rate - per 10,000



(PHE, 2019b)

It is likely that these outcomes are associated with the prevalence of maternal smoking and exposures to smoke in the first year of life, and are therefore subject to similar social patterning. However, the low rate of emergency admissions for RTIs in Doncaster and North East Lincolnshire (despite high rates of premature births and a high proportion of mothers who smoke at the time of delivery) warrants further investigation. None-the-less these data reinforce the need for focused efforts to ensure that all children receive the best start in life.

Children and young people

Priorities for children and young people's respiratory health are effective asthma diagnosis and management; preventing a new generation of smokers; and protection from exposure to second hand smoke.

All children are at increased risk of communicable diseases because their immune system is still developing protection against common infections and young children are less able to practise good infection control (WHO, 2019a). Children who are exposed to smoke in their homes are at an even greater risk of illness, particularly those that affect the respiratory system such as chest infections, asthma (and wheezing), and this exposure can also reduce lung function (cardio-respiratory fitness) (RCP, 2010). Routine vaccinations for children include the pre-school influenza type b and pneumococcal immunisations, and the annual flu vaccination for 2 to 6 years old.

Asthma

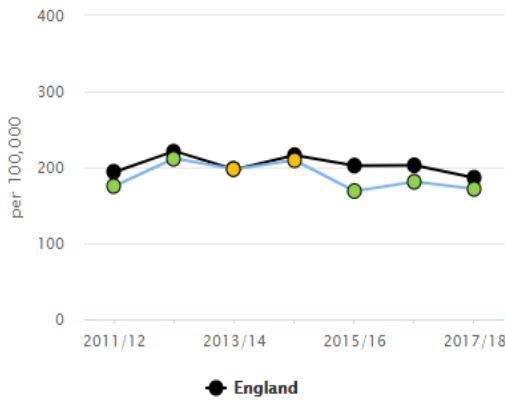
The British Thoracic Society (BTS) National Paediatric Asthma Audit 2015 found medical interventions that are used to manage asthma continue to be highly effective (BTS, 2016). However, there appear to be opportunities to increase preventative action. The audit identified that over 30% of children admitted to hospital with a primary diagnosis of asthma had been exposed to tobacco smoke; a known risk factor strongly associated with hospitalisation of asthmatics. Whilst data gaps within this audit were noted, the authors suggested improvements could be made regarding the recording and advising parents on the hazards of smoking in general, but particularly to those with an asthmatic child (BTS, 2016). Additionally, the audit identified evidence of discharge plans being implemented in less than 60% of children's care, which was identified as contributing to the high rates of readmission: less than 25% visiting their GP within 2 working days following an acute admission (as per clinical guidelines) (BTS, 2016). These data were not available at a regional level, and these areas of national concern require local assessment for relevance to Y&H.

Asthma attacks are responsible for large numbers of accident and emergency department attendances and hospital admissions, particularly in children aged 2-5 years old (BTS, 2016). The majority of asthma admissions, which are predominately emergencies, are considered to be preventable through primary care management and effective patient education, for example on the appropriate use of inhalers and taking measures to ensure protection from second-hand smoke (NICE, 2018c).

The average rate of hospital admissions in under-19s due to asthma for Y&H in 2017/18 was 171.6 per 100,000 v 186.4 for England (PHE, 2019b). These data showed lower

average rates of admissions in Y&H compared to the national average in the past few years.

Asthma admissions < 19 years regional trend data



Recent trend: ↓

Period	Yorkshire and the Humber region				England
	Count	Value	Lower CI	Upper CI	
2011/12	2,103	175.5	168.1	183.2	193.9
2012/13	2,544	211.7	203.6	220.1	221.5
2013/14	2,379	197.7	189.8	205.8	197.2
2014/15	2,531	209.4	201.4	217.8	216.1
2015/16	2,047	168.9	161.6	176.3	202.4
2016/17	2,205	181.1	173.6	188.8	202.8
2017/18	2,099	171.6	164.4	179.1	186.4

Source: Hospital Episode Statistics (HES). Copyright © 2016, Re-used with the permission of NHS Digital. All rights reserved.

(PHE, 2019b)

In 2017/18 seven local authorities in Y&H had statistically lower rates of admissions in under-19s due to asthma compared to the national average. Four local authorities in Y&H had statistically significant higher rates compared to England (Calderdale, Bradford, North Lincolnshire and Kirklees).

Hospital admissions for asthma (under 19 years) 2017/18

Crude rate - per 100,000

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Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
England	↓	23,327	186.4	184.1	188.8
Yorkshire and the Humber region	↓	2,099	171.6	164.4	179.1
Calderdale	↑	159	327.0	278.2	382.0
Bradford	↑	385	258.6	233.4	285.7
North Lincolnshire	→	94	251.0	202.8	307.1
Kirklees	→	251	238.6	210.0	270.0
Doncaster	↓	146	210.6	177.8	247.7
North East Lincolnshire	→	59	162.8	123.9	210.0
Barnsley	↓	83	157.0	125.1	194.7
York	→	59	150.2	114.3	193.8
Wakefield	→	112	148.7	122.4	178.9
Kingston upon Hull	↓	86	145.0	116.0	179.0
North Yorkshire	→	171	137.5	117.7	159.7
Rotherham	↓	82	136.5	108.6	169.4
Leeds	↓	219	124.7	108.7	142.3
Sheffield	↓	135	109.0	91.4	129.0
East Riding of Yorkshire	↓	58	87.2	66.2	112.7

Source: Hospital Episode Statistics (HES). Copyright © 2016, Re-used with the permission of NHS Digital. All rights reserved.

(PHE, 2019b)

Asthma admissions for children aged 0 to 9 years in 2016/17 in Y&H were 229.8 per 100,000 (significantly lower than the national average of 255.8 per 100,000) (PHE,

2019b). For children aged 10-18 years old, the Y&H rate was also below the England average at 122.2 v 137.6 per 100,000 (PHE, 2019b).

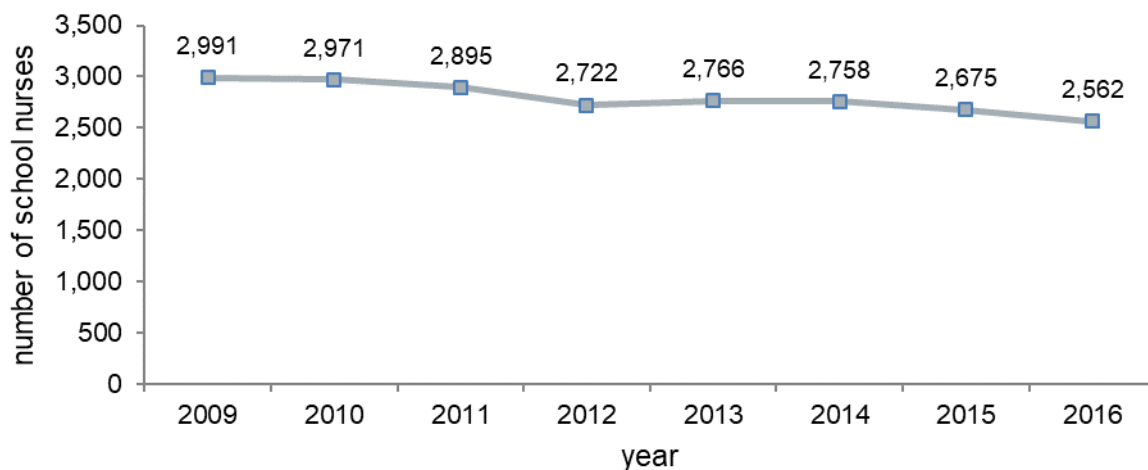
School nursing

Almost a quarter of 11-15 year-olds in England have a disability or long-term condition, including asthma, diabetes or epilepsy and this can affect their attendance in school (Moonie et al, 2006). Asthma is the most common long-term condition in children and school nurses are specifically trained to provide care and education for children with asthma (McMurray and Wark, 2014). Asthma UK estimates that there are approximately three children with asthma in every classroom in the country, and these children will miss an average of 1.5 more school days per year compared to those without asthma (Edwards, Street and Rix, 2016).

School nurses are a key group to who promote school attendance and support effective condition management by delivering health reviews during key transitions; making reasonable adjustments for children with long-term conditions; as well as supporting all children’s health and wellbeing in a health-promoting setting (PHE, 2013). Moreover, school nurses are uniquely placed to deliver public health interventions for children; coordinate multidisciplinary care, train teaching staff when to take action and to work with families (McMurray and Wark, 2014).

Between 2009 and 2016 the number of school nurses has gradually and consistently declined in England by almost 14% in the eight-year period, equating to more than 420 school nurse roles lost across England. Concern regarding this trend has been raised by the Royal College of Nursing (RCN) who have identified that this could lead to some children with long-term conditions being unable to attend school (Ford, 2017).

School Nurse numbers in England, December 2009-2016



(NHS Digital, 2017b)

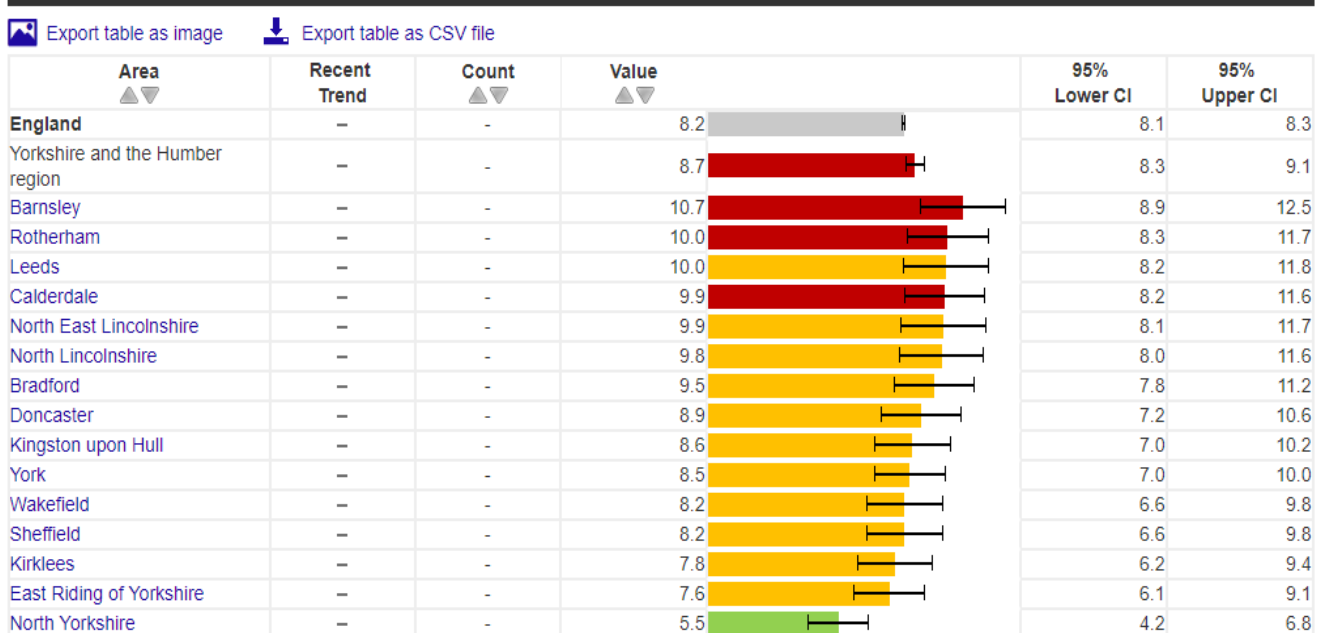
Smoking and vaping

Many children are exposed to second-hand smoke which means they are at greater risk of respiratory illness and chronic disease. Children who have parents that smoke are also more likely to start smoking themselves, and therefore much of the focus on tobacco control and reducing smoking in the adult population is designed to reduce rates of smoking in the next generation (RCP, 2010).

Most people start smoking during their teenage years or as young adults (WHO, 2019b). Smoking rates in young people therefore provide an indication of the level of smoking in the next generation of adults and parents, and future prevalence of smoking-related disease. The prevalence of smoking at age 15-years old in Y&H was significantly worse (8.7%) than the England average (8.2%) but the level of prevalence varied throughout the region. Barnsley, for example, had a prevalence of 10.7%, whereas North Yorkshire had a significantly lower prevalence of 5.5% The majority of Y&H local authorities however fell somewhere between the two but were not significantly different to the national average (PHE, 2019b).

Smoking prevalence at age 15 - current smokers (WAY survey) 2014/15

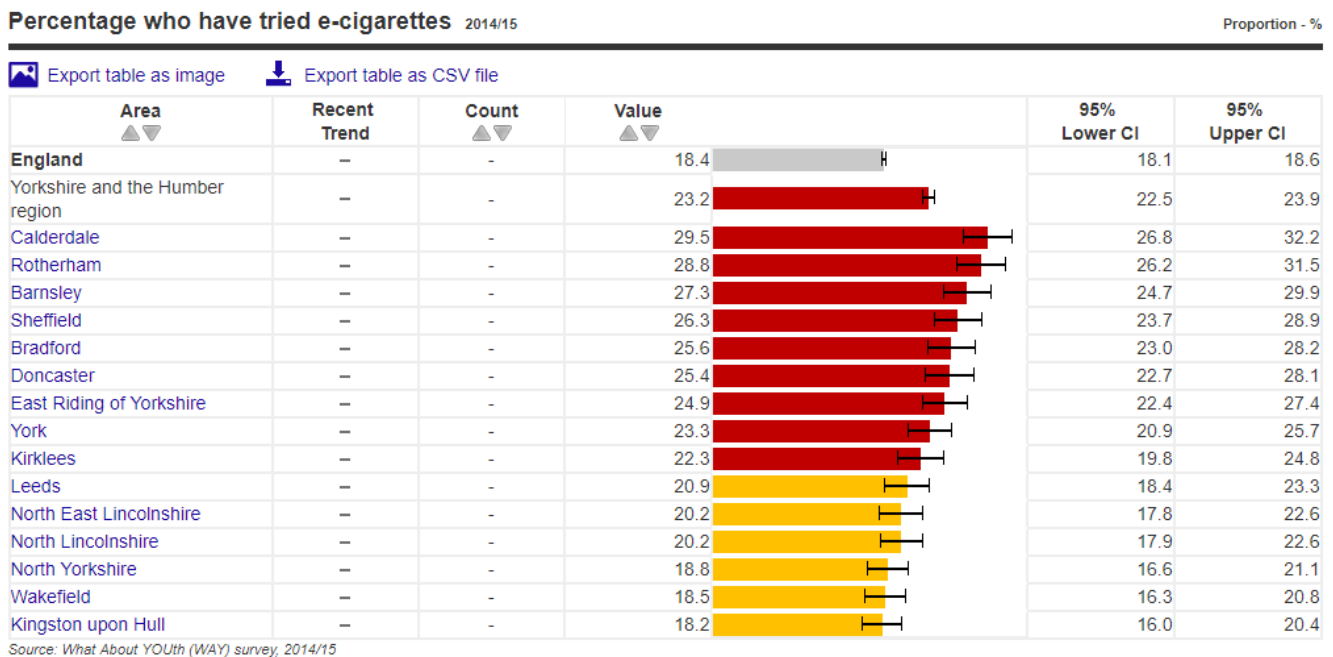
Proportion - %



(PHE, 2019b)

Reducing population smoking levels remains one of the most important global public health priorities. As e-cigarettes have become increasingly popular with those who are substituting them for tobacco, the potential utility of e-cigarette use is an emerging area of public health research and practice (PHE, 2016a). Current evidence suggests that e-

cigarettes are likely to be 95% less harmful than smoking cigarettes (PHE, 2016a). Data collection on e-cigarette use is now routine within the WAY youth survey. Matched data to assess whether those who reported to tobacco smoking within the survey were also those who had previously vaped was not available. The prevalence of smoking e-cigarettes at age 15-years old in Y&H was significantly worse (23.2%) than the England average (18.4%): figures for 2014/15. Most local authorities had rates higher than the national average, with Calderdale having the highest prevalence rate in the region of 29.5% (PHE, 2019b).

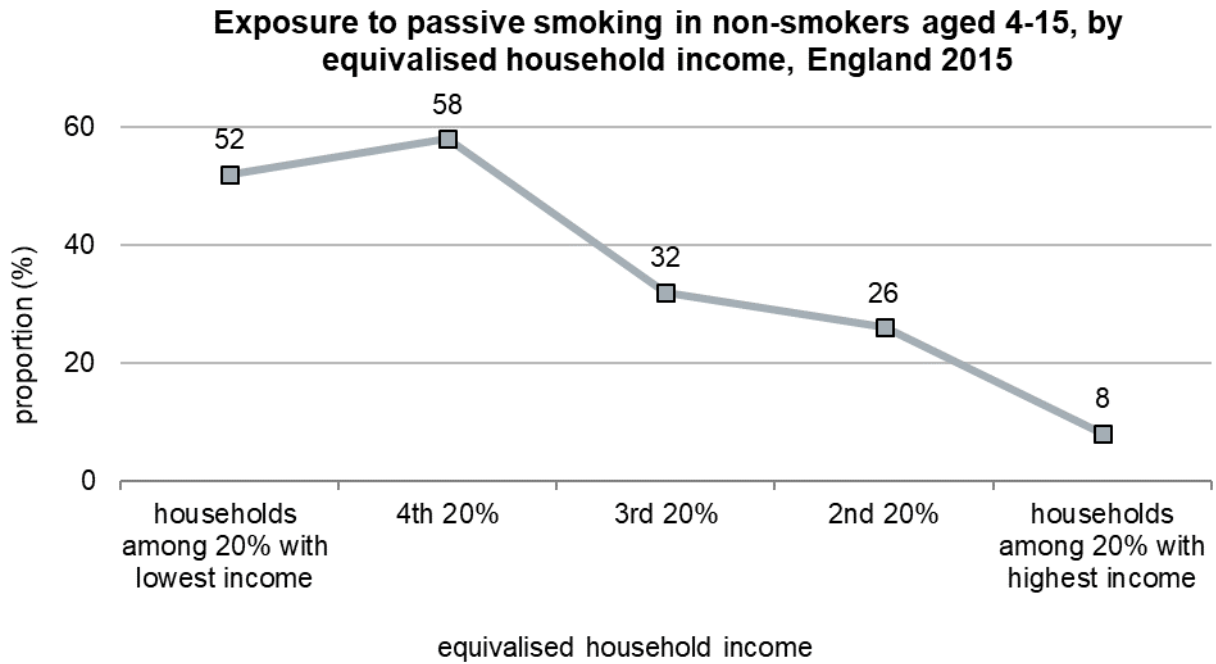


(PHE, 2019b)

Interpreting the implications of these findings is difficult given the available evidence on e-cigarettes. There is no current evidence to indicate that young people who use e-cigarettes are likely to start smoking tobacco (NCSCT, 2016).

Protection from second-hand smoke

The Health Survey for England estimated that, in 2014, 34% of boys and 38% of girls aged 4-15 (who did not smoke) had detectable levels of cotinine - a validated measure of exposure to other people’s smoke (NHS Digital, 2015). Moreover, 57% of the 8-15 year olds surveyed reported that exposures to cigarette smoke ‘bothered them’ (NHS Digital, 2015). Similar to available tobacco data, national analysis of this survey showed strong evidence of a social gradient to the risk of exposure in children, where those with the highest income were least likely to be at risk of passive smoking shown below.



(NHS Digital, 2016)

Despite this association between household income levels and smoking, data from self-reported surveys with 8-15 years suggests that the majority of children exposure to smoke occurs out-with the household itself. More specifically, second hand smoke exposures in the street were the most common place for children; whereas outdoor spaces at cafes, restaurants and public places were the second most common; followed by exposures in other people’s homes (NHS Digital, 2015). The latter may refer to household exposure from family members, such as grandparents with caring responsibilities. Therefore, raising awareness of the risk of cumulative exposures with frequently visited homes and not just the primary household may be required, as well as exploring the protection of children in enclosed outdoor spaces at commercial premises and public settings.

Adults

Key issues for adults' respiratory health are the management of COPD and asthma; and prevention of respiratory disease through stop smoking support, particularly in priority groups from deprived communities and people with chronic disease and mental illness. Adults with chronic diseases and compromised immune systems are offered the pneumococcal polysaccharide vaccine (PPV) and annual flu vaccine.

COPD

For the majority of indicators presented within this section, CCG areas can examine individual GP practices' performance for specific COPD indicators and outcomes on the PHE National General Practice Profiles in the 'respiratory diseases' section at:

<https://fingertips.phe.org.uk/profile/general-practice/>

Disease prevalence and diagnosis

Many COPD sufferers experience a poor quality of life for decades and the magnitude of this morbidity can result in high rates of hospital admissions and healthcare costs for acute interventions.

In 2017/18 the Y&H NHS region had a significantly higher rate of COPD prevalence (2.3%) compared to the national average (1.9%). Whilst Bradford City, Greater Huddersfield CCG and Vale of York CCG had significantly lower rates of COPD compared to the England average, 16 CCGs in the region had significantly higher prevalence rates of COPD (PHE, 2019e). The chart below shows the spread of COPD prevalence across the region in 2017/18. Note: It is estimated that only half of COPD sufferers have a confirmed diagnosis (Nacul, Soljak et al, 2010).

COPD: QOF prevalence (all ages) 2017/18

Proportion - %

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Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
England		1,113,417	1.9	1.9	1.9
North East and Yorkshire (Yorkshire and Humber) NHS region		132,318	2.3*	-	-
NHS Barnsley CCG		8,475	3.2	3.1	3.3
NHS Rotherham CCG		7,741	2.9	2.9	3.0
NHS Wakefield CCG		10,703	2.9	2.8	2.9
NHS Doncaster CCG		8,939	2.8	2.7	2.8
NHS Hull CCG		8,196	2.7	2.7	2.8
NHS North East Lincolnshire CCG		4,312	2.5	2.5	2.6
NHS Bradford Districts CCG		8,257	2.5	2.4	2.5
NHS East Riding Of Yorkshire CCG		7,430	2.4	2.4	2.5
NHS North Kirklees CCG		4,723	2.4	2.4	2.5
NHS Bassetlaw CCG		3,006	2.4	2.4	2.5
NHS Scarborough And Ryedale CCG		2,824	2.3	2.3	2.4
NHS North Lincolnshire CCG		4,159	2.3	2.3	2.4
NHS Calderdale CCG		4,990	2.3	2.2	2.3
NHS Airedale, Wharfedale And Craven CCG		3,368	2.1	2.0	2.2
NHS Sheffield CCG		12,454	2.1	2.0	2.1
NHS Leeds CCG		17,299	2.0	1.9	2.0
NHS Harrogate And Rural District CCG		3,028	1.9	1.8	1.9
NHS Greater Huddersfield CCG		4,488	1.8	1.8	1.9
NHS Vale Of York CCG		6,156	1.7	1.7	1.8
NHS Bradford City CCG		1,770	1.3	1.2	1.3

Source: Quality and Outcomes Framework (QOF), NHS Digital

(PHE, 2019e)

Many people will have early indications of respiratory disease such as a persistent cough and wrongly recognise this as a normal ‘smokers cough’. This means people do not consult their GP until symptoms worsen and therefore most people receive a COPD diagnosis in their 50s, after many years of signs of respiratory disease.

For patients who attend their GP with respiratory symptoms, COPD can often be misdiagnosed as asthma, despite common differences in clinical presentation. More specifically, asthmatics are more likely to be younger and less likely to smoke or have a persistent and deteriorating cough (NICE, 2018a).

COPD diagnosis is dependent on a good patient history, physical presentation and assessment of the degree of airflow obstruction (using spirometry). As such, quality assured spirometry is an important objective measure for generalist clinicians to improve their diagnostic accuracy and is recommended by NICE to confirm a COPD diagnosis. Low use of spirometry or spirometry that is not quality assured by appropriately trained staff is an issue that contributes to the issues of misdiagnosis and underdiagnoses of COPD.

Y&H data show that the use of spirometry to diagnose COPD in the region in 2017/18 was slightly higher (81.6%) than the national average 80.8%. However, the use of spirometry was not uniform across the region, significantly higher among the population of Harrogate & Rural District CCG for example at 85.6% and significantly lower (77.0%) in Barnsley CCG (PHE, 2019e).

COPD002: Diagnosis conf. by spirometry (den. incl. exc.) 2017/18

Proportion - %

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Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
England		494,533	80.8	80.7	80.9
North East and Yorkshire (Yorkshire and Humber) NHS region		58,847	81.6*	-	-
NHS Harrogate And Rural District CCG		1,483	85.6	83.9	87.2
NHS North East Lincolnshire CCG		2,050	85.2	83.7	86.6
NHS Greater Huddersfield CCG		2,102	84.9	83.5	86.3
NHS North Kirklees CCG		2,411	84.9	83.5	86.2
NHS Bradford Districts CCG		3,674	84.1	83.0	85.1
NHS Wakefield CCG		4,673	84.0	83.0	85.0
NHS Airedale, Wharfedale And Craven CCG		1,488	83.9	82.1	85.6
NHS Calderdale CCG		2,439	83.1	81.7	84.4
NHS Leeds CCG		7,966	82.3	81.5	83.0
NHS Vale Of York CCG		2,787	82.0	80.7	83.3
NHS Doncaster CCG		3,785	82.0	80.9	83.1
NHS Scarborough And Ryedale CCG		1,370	81.7	79.8	83.5
NHS Rotherham CCG		3,382	81.0	79.8	82.2
NHS East Riding Of Yorkshire CCG		3,330	81.0	79.8	82.2
NHS Bassetlaw CCG		1,248	80.9	78.8	82.8
NHS Bradford City CCG		796	79.0	76.4	81.4
NHS North Lincolnshire CCG		1,818	78.3	76.6	80.0
NHS Sheffield CCG		5,210	78.2	77.2	79.2
NHS Hull CCG		3,462	77.9	76.6	79.1
NHS Barnsley CCG		3,373	77.0	75.7	78.2

Source: Quality and Outcomes Framework (QOF), NHS Digital

(PHE, 2019e)

Due to the progressive nature of COPD it is important that routine reviews to monitor general health and lung function occur in order to reduce the frequency and severity of exacerbations. These reviews can identify the need for additional interventions, such as pulmonary rehabilitation and oxygen therapy, and they enable important conversations between clinicians and patients about the stage of their disease and identify measures to improve their quality of life, such as physical activity. During reviews, patients' health and well-being must be considered in relation to possible co-morbidities (particularly anaemia, anxiety, depression and heart failure), as well as inhaler technique and self-management strategies including physical activity (NICE, 2018a). NICE recommend that reviews also include FEV1 (lung function) assessment and inhaler technique review.

The Y&H NHS region average rate of FEV1 assessments in 2017/18 was significantly lower than the England average (70.6% v 71.1%). However there was variation across the region ranging from 63.2% in Sheffield CCG up to 78.2% in Harrogate and Rural CCG (PHE, 2019e).

COPD004: Record of FEV1 in last 12mths (den. incl. exc.) 2017/18

Proportion - %

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Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
England		791,993	71.1	71.1	71.2
North East and Yorkshire (Yorkshire and Humber) NHS region		93,481	70.6*	-	-
NHS Harrogate And Rural District CCG		2,367	78.2	76.7	79.6
NHS Greater Huddersfield CCG		3,445	76.8	75.5	78.0
NHS Leeds CCG		13,061	75.5	74.9	76.1
NHS North Kirklees CCG		3,556	75.3	74.0	76.5
NHS North East Lincolnshire CCG		3,207	74.4	73.0	75.7
NHS North Lincolnshire CCG		3,076	74.0	72.6	75.3
NHS Bradford City CCG		1,309	74.0	71.9	75.9
NHS Bradford Districts CCG		5,955	72.1	71.1	73.1
NHS Scarborough And Ryedale CCG		2,017	71.4	69.7	73.1
NHS East Riding Of Yorkshire CCG		5,285	71.1	70.1	72.1
NHS Bamsley CCG		6,002	70.8	69.8	71.8
NHS Bassetlaw CCG		2,125	70.7	69.0	72.3
NHS Vale Of York CCG		4,345	70.6	69.4	71.7
NHS Airedale, Wharfedale And Craven CCG		2,347	69.7	68.1	71.2
NHS Wakefield CCG		7,425	69.4	68.5	70.2
NHS Doncaster CCG		6,105	68.3	67.3	69.3
NHS Calderdale CCG		3,375	67.6	66.3	68.9
NHS Rotherham CCG		5,232	67.6	66.5	68.6
NHS Hull CCG		5,372	65.5	64.5	66.6
NHS Sheffield CCG		7,875	63.2	62.4	64.1

Source: Quality and Outcomes Framework (QOF), NHS Digital

(PHE, 2019e)

In areas significantly below the England average, this suggests that either reviews of registered COPD patients are not routinely occurring, or that lung function assessments are not consistently conducted within reviews: both scenarios imply scope for improvement.

Early intervention and secondary prevention

Due to the nature of the disease, people with COPD often require regular and broad ranging support to address their mental, physical and social needs. As the disease permeates through all aspects of their life, self-management is essential for patients' understanding of their disease, ability to recognise exacerbations and empowering them to improve their wellbeing and prevent secondary disease or complications.

Supporting people with COPD who smoke, to stop smoking and encouraging them to do so throughout their treatment is a clinical priority (NICE, 2018a). Over 90% of COPD cases are caused by smoking and continued smoking is strongly associated with a higher frequency and greater severity of exacerbations (NHS Choices, 2016a). People who smoke and have COPD are able to receive nicotine replacement therapy (NRT) to improve their chances of successful quits and this can be administered alongside behavioural therapy. Smoking cessation for people with COPD is reviewed later in this chapter.

As described above, the disabling impact of COPD on a patient's quality of life is often not limited to physical limitations. This condition is also commonly associated with reduced well-being, particularly anxiety, due to the disruption caused by the disease on function, employment and social activities (Heslop-Marshall and De Soyza, 2014). In one study, Newcastle-upon-Tyne Hospitals screened 1,500 patients with COPD in a stable phase at secondary care clinics and found a 60% prevalence of symptoms of anxiety (using the HADS-A screening tool) (Heslop-Marshall and De Soyza, 2014). This compares to an estimated anxiety of 6-7% in the general adult population (McManus et al, 2016). Anxiety is associated with low self-efficacy and confidence which means patients with anxiety are less likely to take prescribed medications, have low motivation to exercise and be unlikely to try to quit smoking (Heslop-Marshall and De Soyza, 2014). Furthermore, many patients recognise their 'sense of panic' from anxiety as 'breathlessness' from airway obstruction which means anxiety symptoms are often misinterpreted and lead to an emergency admission. This is because anxiety can increase both respiratory and heart rate, causing symptoms similar to those of disease exacerbations that may not be fully understood by patients without appropriate education and advice from their clinician (Heslop-Marshall and De Soyza, 2014). As such, evidence suggests that anxiety is a significant predictor for hospital admissions as symptoms continue to be unrecognised and untreated in COPD patients (Heslop et al. 2013; Yohannes, A. et al 2001).

This growing body of evidence – led by practitioners from the North East –strongly suggests that providers and commissioners should consider how they are addressing the mental health needs of patients within chest clinics, particularly in relation to anxiety management, which is not currently routine practice in most settings.

Physical activity is an important aspect of maintaining lung function and is associated with improved quality of life, as well as both primary and secondary disease prevention. Low physical activity levels significantly increase the risk of poor health and disease including depression, obesity, breast and colon cancer, hypertension, coronary heart disease, stroke, diabetes and frailty (PHE, 2016b). Moreover, despite strong evidence that being active can improve wellbeing and condition management, people who have chronic conditions are often more likely to be inactive, such as those who experience breathlessness from COPD and this places them at risk of secondary disease and complications.

In 2017/18, 64.0% of adults in the region met the recommended levels of activity on a weekly basis, compared to 66.3% on average in the country as a whole. Furthermore, Y&H also had statistically significantly worse rates of sedentary adults (< 30 minutes of physical activity per week) with 24.1% in the region classed as inactive compared to 22.2% for England (PHE, 2019a).

Pulmonary rehabilitation (PR) is an evidenced-based exercise programme recommended for COPD patients to improve their lung function, alleviate symptoms and enhance their wellbeing (BTS, 2014). NICE recommend PR for all COPD sufferers who have experienced an exacerbation that has resulted in a hospital admission (NICE, 2018a). However, national data from the British Thoracic Society’s (BTS) most recent clinical audit on PR identified that the quality of PR pathways across the country warranted concern. Issues identified include the delayed enrolment following a referral into PR; services that lack flexibility to meet people’s needs and very low rates of referral to PR following an acute admission from COPD. The BTS further highlighted that only approximately 40% of people referred to PR complete the programme, and that the majority do not receive an exercise plan to maintain their improved activity levels (Steiner et. al, 2016).

People with respiratory disease are also at increased risk of acute infections such as influenza and, because of this, people with COPD are advised to have the annual flu immunisation available free on the NHS for this group of patients. Among those diagnosed with COPD on GP Practice registers, the national average uptake of the flu immunisation was 80.0% across England in 2017/18. In Y&H the uptake rate was 79.7%, though there was variation in the region across CCGs from 74.8% for Hull CCG up to 82.9% for Harrogate and Rural District CCG (PHE, 2019e).

COPD007: Influenza immunisation given 1 Aug - 31 Mar (den. incl. exc.) 2017/18 Proportion - %

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Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
England		890,872	80.0	80.0	80.1
North East and Yorkshire (Yorkshire and Humber) NHS region		105,500	79.7*	-	-
NHS Harrogate And Rural District CCG		2,510	82.9	81.5	84.2
NHS Sheffield CCG		10,255	82.3	81.7	83.0
NHS Vale Of York CCG		5,012	81.4	80.4	82.4
NHS Leeds CCG		14,030	81.1	80.5	81.7
NHS Doncaster CCG		7,174	80.3	79.4	81.1
NHS Wakefield CCG		8,589	80.2	79.5	81.0
NHS Greater Huddersfield CCG		3,600	80.2	79.0	81.4
NHS Calderdale CCG		3,998	80.1	79.0	81.2
NHS Rotherham CCG		6,188	79.9	79.0	80.8
NHS North Kirklees CCG		3,767	79.8	78.6	80.9
NHS Bradford Districts CCG		6,569	79.6	78.7	80.4
NHS North Lincolnshire CCG		3,299	79.3	78.1	80.5
NHS Airedale, Wharfedale And Craven CCG		2,660	79.0	77.6	80.3
NHS East Riding Of Yorkshire CCG		5,866	79.0	78.0	79.9
NHS Barnsley CCG		6,672	78.7	77.8	79.6
NHS North East Lincolnshire CCG		3,376	78.3	77.0	79.5
NHS Bassetlaw CCG		2,314	77.0	75.4	78.4
NHS Scarborough And Ryedale CCG		2,158	76.4	74.8	77.9
NHS Bradford City CCG		1,336	75.5	73.4	77.4
NHS Hull CCG		6,127	74.8	73.8	75.7

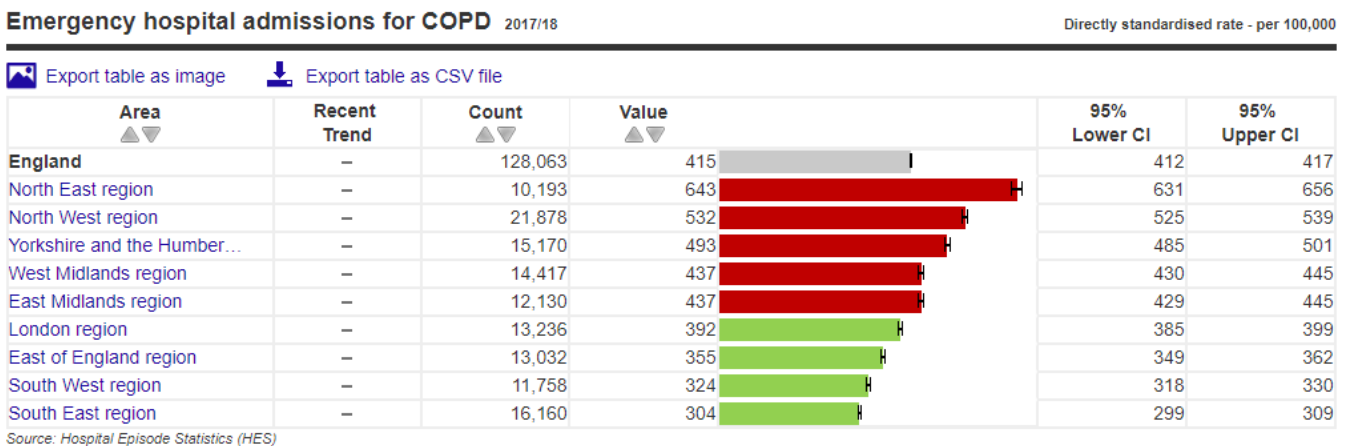
Source: Quality and Outcomes Framework (QOF), NHS Digital

(PHE, 2019e)

Secondary Care Intervention

As the disease progresses, COPD management is focused on reducing symptoms and improving the patient’s quality of life, which can predominantly be done in the community. This means that people with COPD, who are particularly vulnerable to infections, may need regular antibiotics or close monitoring from primary care. However, during exacerbations people may require specialist intervention in hospital depending on the severity of their symptoms, and this often leads to an urgent admission.

Emergency (unplanned) admissions for COPD can be distressing for both patients and their families, and place significant demand on health services. Moreover, hospital admissions due to severe exacerbations of the disease are associated with mortality from COPD where 25% of people admitted to hospital die within . one year and 50% die within 5 years (Hoogendoorn et al, 2011). Regional variations in emergency hospital admissions for COPD are presented in the chart below.



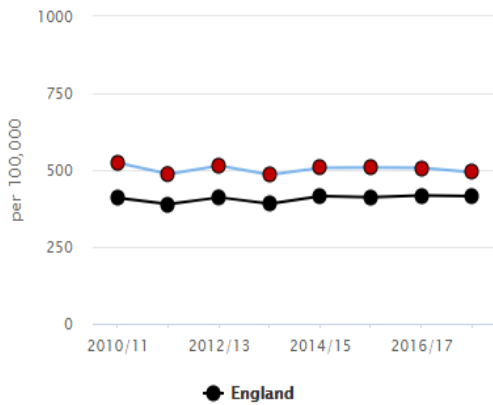
(PHE, 2019d)

Whilst the North East and North West, Yorkshire and the Humber and East and West Midlands, were all significantly worse than the national average for rates of hospital admissions for COPD in 2017/18, there was much variation across these poorly performing regions. The England average rate for COPD emergency admissions was 415 per 100,000 compared to a significantly higher rate of 493 per 100,000 in Y&H. Moreover, the emergency admission rate (adjusted for age) for Y&H were consistently higher than the rate for England as per the regional trend data chart below.

Emergency hospital admissions for COPD Yorkshire and the Humber region

Directly standardised rate - per 100,000

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Recent trend: -

Period	Yorkshire and the Humber region				England
	Count	Value	Lower CI	Upper CI	
2010/11	14,490	523	515	532	410
2011/12	13,635	487	479	495	389
2012/13	14,650	514	506	523	411
2013/14	13,978	485	477	493	390
2014/15	14,881	507	499	516	415
2015/16	15,154	509	501	517	411
2016/17	15,323	507	499	515	417
2017/18	15,170	493	485	501	415

Source: Hospital Episode Statistics (HES)

(PHE, 2019d)

Only 3 local authorities in Y&H in 2017/18 had COPD emergency admission to hospital rates that were significantly lower than the national average: these were North Yorkshire, East Riding of Yorkshire, and York. The rate of admissions in Kingston upon Hull was more than double the national average at 981 per 100,000 (PHE, 2019d). Data were not available by CCG subgroups but, given the substantial costs associated with each acute COPD admission relative to primary care management; these data present a strong case for CCGs to consider preventative spend approaches in both primary and secondary care.

Emergency hospital admissions for COPD 2017/18

Directly standardised rate - per 100,000

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Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
England	-	128,063	415	412	417
Yorkshire and the Humber region	-	15,170	493	485	501
Kingston upon Hull	-	1,190	981	926	1,039
Barnsley	-	1,233	868	820	918
Rotherham	-	1,014	647	608	688
Bradford	-	1,383	557	528	587
North Lincolnshire	-	590	548	505	594
Sheffield	-	1,564	545	519	573
Doncaster	-	946	532	499	568
Wakefield	-	973	492	462	524
Leeds	-	1,800	477	455	500
Calderdale	-	555	471	432	512
North East Lincolnshire	-	431	441	400	485
Kirklees	-	1,028	438	412	466
East Riding of Yorkshire	-	912	358	335	382
York	-	406	351	318	387
North Yorkshire	-	1,145	258	243	274

Source: Hospital Episode Statistics (HES)

(PHE, 2019d)

Asthma

Primary care management

Diagnosis of asthma is determined through clinical judgement and this means it can be misdiagnosed as COPD without specialist expertise, a good patient history and the use of validated tools (spirometry).

Annual reviews for asthma patients are typically conducted in primary care by a GP or practice nurse, often within an 'asthma clinic'. Similar to the management of COPD, it is important that adults with diagnosed asthma receive routine reviews of their symptoms so that clinicians can assess symptoms, measure lung function; check inhaler technique and adherence; adjust the prescription dose; and review the patient's self-management plan (SIGN, 2016). The purpose of annual reviews is to reduce the frequency and severity of 'attacks' and minimise exposure to 'triggers' such as passive smoking, exercise or cold symptoms, depending on the individual. In contrast to COPD, asthma is not caused by smoking but will be exacerbated by it and can reduce the effectiveness of the corticosteroids used to manage symptoms (SIGN, 2016). As such, supporting asthmatics to stop smoking should be embedded into all aspects of their asthma care.

Figures recorded on the QOF asthma register suggest that in 2017/18 there were an estimated 362,087 people (6.3% prevalence) in the Y&H NHS region with an asthma diagnosis, though this is likely to be an underestimate. This compares to an estimated prevalence of 5.9% for England. Within the region the values range from 5.7% for Bassetlaw CCG, Barnsley CCG and Leeds CCG up to 7.9% for Scarborough and Ryedale CCG (PHE, 2019e).

Asthma: QOF prevalence (all ages) 2017/18

Proportion - %

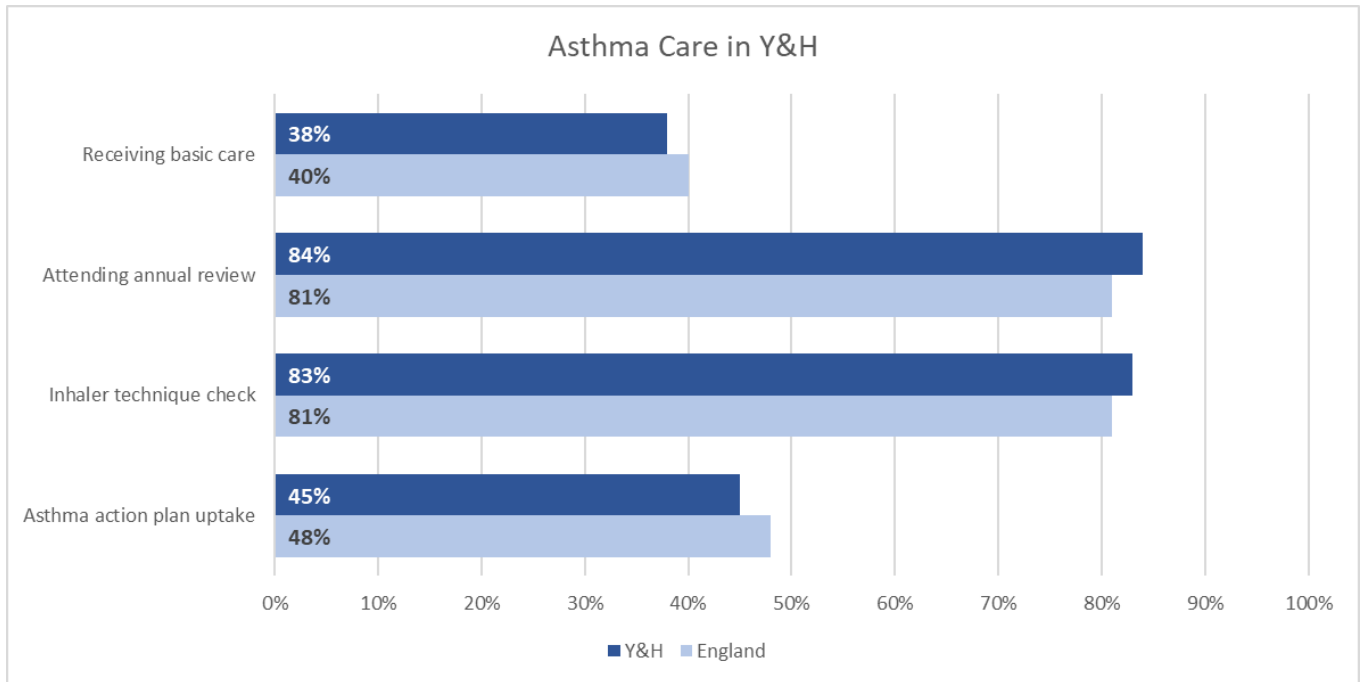
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Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
England		3,463,893	5.9	5.9	5.9
North East and Yorkshire (Yorkshire and Humber) NHS region		362,087	6.3*	-	-
NHS Scarborough And Ryedale CCG		9,494	7.9	7.7	8.0
NHS Airedale, Wharfedale And Craven CCG		11,465	7.2	7.1	7.3
NHS North Kirklees CCG		13,430	6.9	6.8	7.1
NHS Wakefield CCG		25,284	6.8	6.7	6.9
NHS East Riding Of Yorkshire CCG		20,393	6.7	6.6	6.8
NHS Calderdale CCG		14,577	6.6	6.5	6.7
NHS Bradford Districts CCG		21,972	6.6	6.5	6.7
NHS Doncaster CCG		21,238	6.6	6.5	6.7
NHS Greater Huddersfield CCG		16,267	6.5	6.4	6.6
NHS Rotherham CCG		17,044	6.5	6.4	6.6
NHS Bradford City CCG		8,926	6.4	6.2	6.5
NHS Sheffield CCG		37,981	6.3	6.3	6.4
NHS North East Lincolnshire CCG		10,696	6.3	6.2	6.4
NHS Harrogate And Rural District CCG		10,126	6.2	6.1	6.3
NHS Hull CCG		18,206	6.1	6.0	6.2
NHS Vale Of York CCG		21,612	6.1	6.0	6.1
NHS North Lincolnshire CCG		10,808	6.0	5.9	6.2
NHS Leeds CCG		50,385	5.7	5.7	5.8
NHS Bamsley CCG		15,154	5.7	5.6	5.8
NHS Bassetlaw CCG		7,029	5.7	5.6	5.8

Source: Quality and Outcomes Framework (QOF), NHS Digital

(PHE, 2019e)

Clinical guidance on the management of asthma recommends that everyone with an asthma diagnosis should; 1) receive basic care, 2) have an annual review to assess how well controlled their symptoms are; 3) review their inhaler technique; and 4) discuss their asthma management plan (NICE, 2018c). Annual reviews, typically conducted in primary care by a GP or practice nurse, are associated with reduced absence from school or work, a reduced exacerbation rate, improved symptom control and reduced attendance in accident and emergency departments (NICE, 2018c). The chart below compares Y&H with England on each of these four measures.



(Asthma UK, 2018b)

In England 70.2% of people with asthma had an asthma review at least once in the past year (2017/18), for the Y&H NHS region this figure was 71.1%. Annual reviews for asthma patients across the Y&H region ranged between 60.2% in Bassetlaw CCG to 77.6% in Bradford City CCG, with five CCGs significantly below the national average (PHE, 2019e).

AST003: review in the last 12 months (incl. an assessment using the 3 RCP questions), den. incl. exc. 2017/18

Proportion - %

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Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
England		2,430,506	70.2	70.1	70.2
North East and Yorkshire (Yorkshire and Humber) NHS region		257,517	71.1*	-	-
NHS Bradford City CCG		6,930	77.6	76.8	78.5
NHS Harrogate And Rural District CCG		7,646	75.5	74.7	76.3
NHS Greater Huddersfield CCG		12,159	74.7	74.1	75.4
NHS North East Lincolnshire CCG		7,978	74.6	73.8	75.4
NHS Wakefield CCG		18,777	74.3	73.7	74.8
NHS North Kirklees CCG		9,916	73.8	73.1	74.6
NHS North Lincolnshire CCG		7,944	73.5	72.7	74.3
NHS Rotherham CCG		12,272	72.0	71.3	72.7
NHS Scarborough And Ryedale CCG		6,825	71.9	71.0	72.8
NHS Sheffield CCG		27,223	71.7	71.2	72.1
NHS Bradford Districts CCG		15,651	71.2	70.6	71.8
NHS Airedale, Wharfedale And Craven CCG		8,159	71.2	70.3	72.0
NHS Leeds CCG		35,768	71.0	70.6	71.4
NHS Calderdale CCG		10,170	69.8	69.0	70.5
NHS Doncaster CCG		14,783	69.6	69.0	70.2
NHS Vale Of York CCG		14,925	69.1	68.4	69.7
NHS Barnsley CCG		10,456	69.0	68.3	69.7
NHS East Riding Of Yorkshire CCG		13,897	68.1	67.5	68.8
NHS Hull CCG		11,807	64.9	64.2	65.5
NHS Bassetlaw CCG		4,231	60.2	59.0	61.3

Source: Quality and Outcomes Framework (QOF), NHS Digital

(PHE, 2019e)

Secondary care interventions

The BTS National Adult Asthma Audit 2016 found variation in the quality of asthmatics' care across the 171 participating institutions (including Y&H providers) and identified several key areas for improvement already identified in the previous audit in 2012 (BTS, 2017). In particular, the audit identified poor levels of standardised assessment of asthmatics who were admitted into hospital. For example, the Peak Expiratory Flow (PEF) meter was only used in 80% of admitted patients and only 76% prior to discharge, despite this test being an important element of determining appropriate treatment and safe discharge planning for patients (NICE, 2018c). Similar to issues with appropriate or accurate COPD diagnosis, the audit recorded that 89% of admitted patients had a previous diagnosis of asthma (in 11% there was no evidence of a previous diagnosis). Of these 89%, only 42% had a diagnosis supported by objective testing (spirometry) (BTS, 2017).

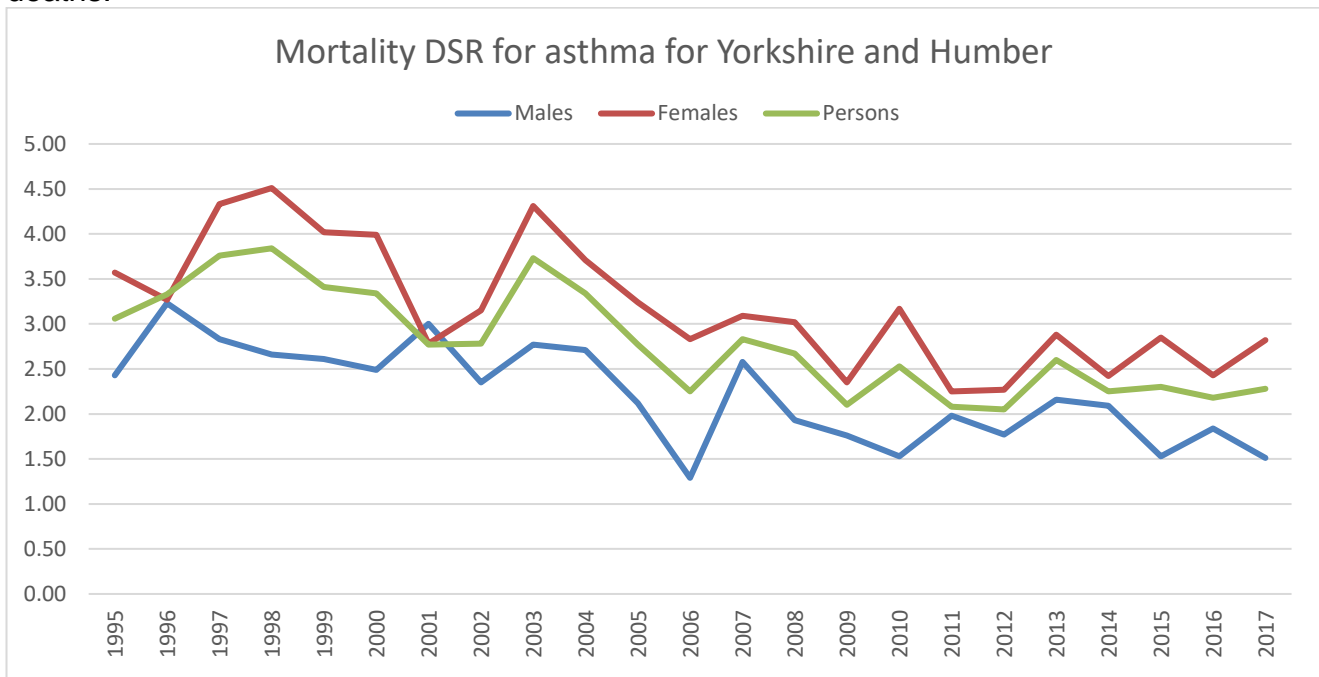
The study also identified a smoking prevalence of 27% in asthmatics admitted to hospital, which is much higher than the general population (16%). The sample of over 4,000 admissions included 19% of ex-smokers, and 1% e-cigarettes users. Of concern, almost 10% of these admissions had no smoking status recorded which was considered unacceptable in light of the potential opportunity to discuss the impact of smoking on

their asthma in order to refer patients to stop smoking services (BTS, 2013, BTS, 2017). Moreover, within the hospital discharge pathway there was poor assessment of inhaler technique, and low provision of a follow-up clinic appointment and an action plan, as recommended within clinical guidelines (BTS, 2017). Commentary from the BTS experts proposed that these data indicate poor quality care is likely to be associated with the persisting trend of high readmission rates found in asthmatic adults, with 9% readmitted within 30 days.

Although these data are not specific to Y&H, this report highlighted potential opportunities for services to review practices and to potentially introduce simple mechanisms to improve quality and reduce variation such as the use of a standard proforma for an asthma-related admission.

The vast majority of asthma deaths are considered preventable, however, rates of death from asthma have increased in the past several years and the UK has amongst the highest rates of asthma deaths in Europe (BTS, 2013): please see also ONS updated asthma deaths data ONS adhoc asthma enquiries. The UK National Review of Asthma Deaths conducted in 2014 was the first UK-wide investigation into asthma deaths and included review of 195 cases by a range of experts. This review identified that varied and poor quality management of asthma was attributed to many of these deaths, particularly preventable deaths of children. More specifically, poor primary care management, prescribing errors and unsatisfactory hospital care during or following their last attack led to 46% of the deaths (RCP, 2014): areas for improvement were found in both primary and secondary care asthma management.

A lack of annual reviews in primary care to assess the patient’s symptoms, discuss self-management strategies and review medications were associated with preventable deaths.



(NHS Digital, 2019)

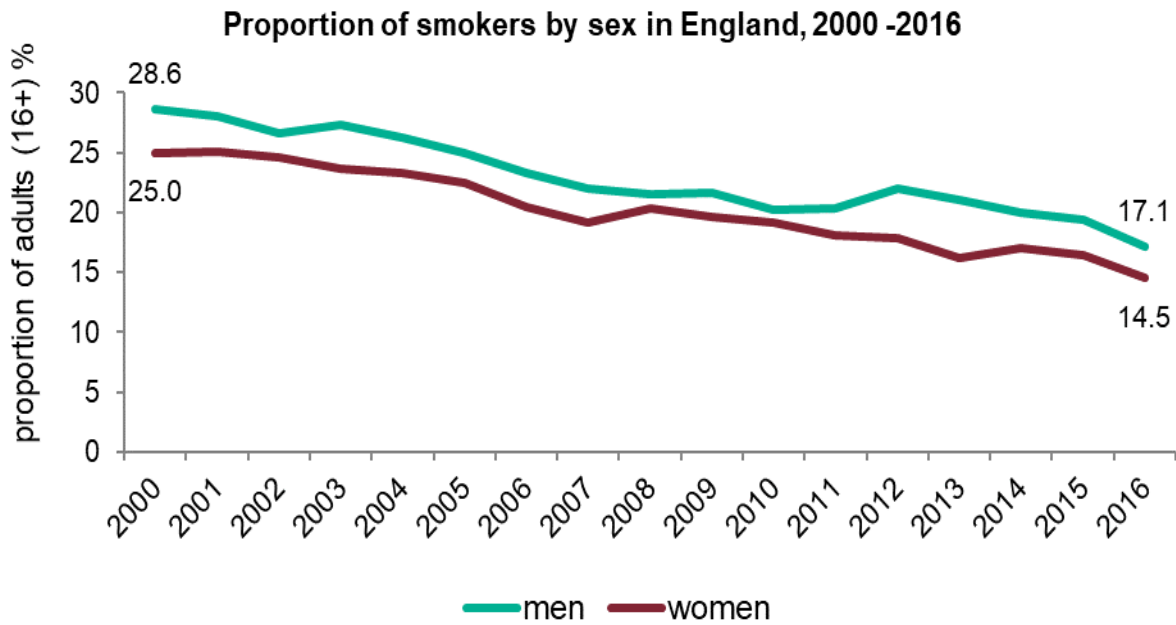
Within secondary care, poor discharge planning and non-standardised assessments of patients symptoms contributed to deaths from asthma that were considered preventable (RCP, 2014).

In the review, the panel identified that patient education on reducing exposures to triggers by patients, their family, and within their environment, was particularly poor. Almost two-thirds of cases had avoidable factors contributing to their death, including exposure to tobacco smoke, and this increased to avoidable factors in over 90% of cases involving children (RCP, 2014): the review specifically identified inequalities between the asthma care received by children when compared to adults. The authors of the review called for greater clinical leadership to engage parents in managing their child's condition and to support young people to transition into adult services. Analysis of data on asthma deaths is often not meaningful or appropriate at a CCG or local authority level due to the fortunately small numbers this involves. However, data presented in Y&H in relation to: i) patient-reported quality of care; and ii) emergency admissions and readmissions to hospital rates, suggest primary care management improvements, and secondary care practices might warrant further inspection at CCG level to identify areas for improvement, such as better discharge planning and stop smoking service referral pathways (Asthma UK, 2018a).

Following the 2012 Adult Asthma Audit report and 2014 National Review of Asthma Deaths, the BTS developed a Care Bundle for Asthma to address key improvement priorities for both children and adults which appear largely unchanged from the 2016 audit. This Care Bundle, which may be helpful to Y&H providers, can be accessed here: www.brit-thoracic.org.uk/standards-of-care/quality-improvement/care-bundle-for-asthma.

Smoking in adults

Smoking prevalence has been an area of public health progress in the last fifty years as evidence on the association between smoking and mortality and morbidity has shown, and continues to emerge (Jha and Zatonski, 2005). This is particularly true in relation to the evidence on the impact of passive smoking and its relationship with heart disease and specific cancers, which has driven legislative changes on the protection of public spaces and framed highly effective mass population health campaigns (Fresh, 2016).



(ONS, 2016)



Healthmatters **Why treat tobacco dependence?**

Nearly **7 MILLION** people in England smoke

Smoking is the single largest cause of preventable ill health and premature death

It is responsible for **16%** of all deaths in people aged 35+

The annual cost of smoking to society in England is estimated to be

£14.7 bn

Of this, direct costs to the NHS are estimated at

£2.5 bn

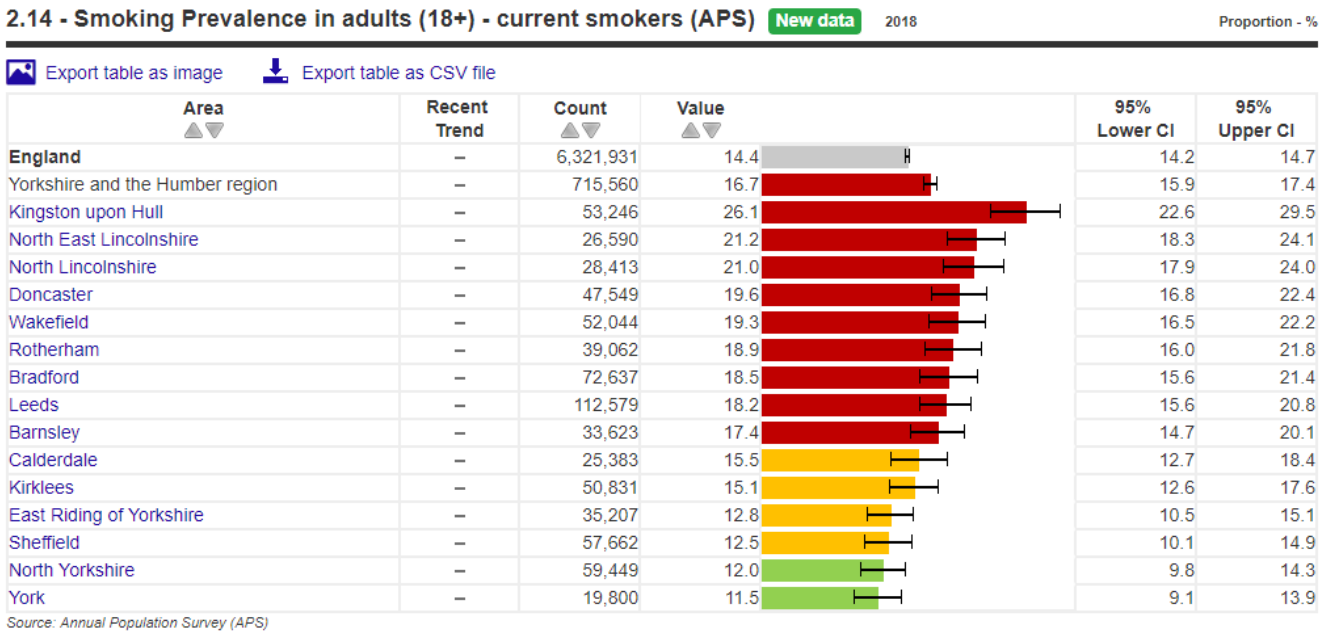
and costs to social care at

£1.4 bn

Tobacco smoking remains the single biggest cause of premature death in the world. Furthermore, as presented throughout this report, smoking is strongly associated with health inequalities. Smoking behaviours are significantly patterned by social characteristics, namely deprivation.

Y&H contains some of the most deprived local authorities in England with Kingston upon Hull in the top ten and Bradford, North East Lincolnshire, Barnsley and Doncaster in the top 40 most deprived local authorities nationally (DCLG, 2015). In Y&H, adult

smoking prevalence was higher than the national average in 2018 (16.7% v 14.4%). This included nine local authorities that had smoking prevalence rates which were significantly higher than the national average. The local authorities range in value from 11.5% (York) up to 26.1% (Kingston upon Hull). Only North Yorkshire and York local authorities had adult smoking rates that were statistically significantly lower than the national average. The remaining Y&H local authorities had rates similar to the England average (PHE, 2019a).



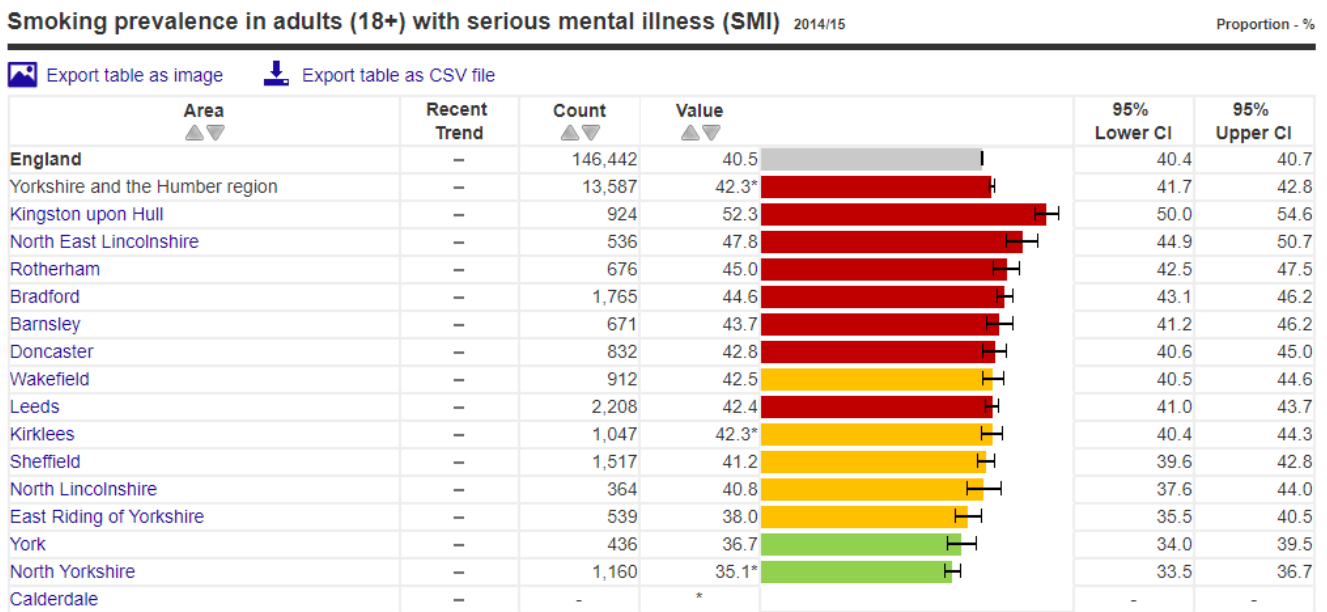
(PHE, 2019a)

Moreover, the association between smoking and social inequalities means that there is much variation of smoking-related harms across Y&H population groups. Smoking rates in routine and manual workers aged 18-64 years old tend to be much higher than the average population rate. For example, women in routine and manual occupations are five times more likely to smoke during pregnancy than those in managerial and professional roles and this has profound implications for their child’s health throughout their life (DH, 2017). In 2018, Y&H local authority smoking rates for routine and manual workers (27.4%) are higher than the England average of 25.4%, and range between 18.6% up to 33.0%. York had an adult ‘routine and manual occupations’ smoking prevalence rate that was significantly lower than the national average. The highest rates were in Kingston upon Hull and Wakefield (both had a prevalence rate of 33.0% which were significantly higher than the England average) (PHE, 2019d). It is a priority within the national tobacco control strategy, to target and engage with those most at risk (DH, 2017).

There is a longstanding association with mental illness and smoking, where there is an extreme difference between general population smoking prevalence compared to smoking amongst adults with mental illness (25% higher) (RCP, 2013). It is estimated

that 33% of people with a mental health condition smoke tobacco, rising to 70% of those in psychiatric units. For people with mental health problems, smoking is thought to be the largest contributor to their reduced life expectancy (PHE, 2015b).

Y&H data showed that the region as a whole had a higher rate of smoking in adults with serious mental illness in 2014/15 compared to the national average (42.3% v 40.5%). This ranged from 35.1% in North Yorkshire up to 52.3% in Kingston upon Hull (PHE, 2019d). Please note there were data quality issues for Kirklees and North Yorkshire and missing data for Calderdale.



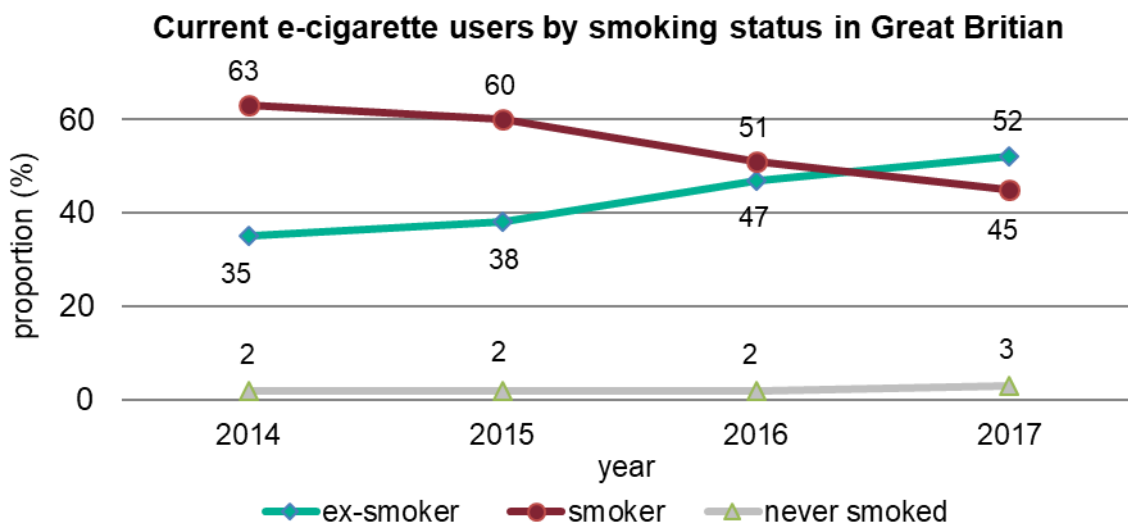
(PHE, 2019d)

Improving the physical health of people with mental illness is a national priority (DH, 2017). Evidence suggests that the majority of smokers with severe mental illness want to stop smoking and actions to support people with mental illness to quit should be a priority (ASH, 2016).

Part of the approach to support people with mental illness to stop smoking is settings-based action by health care providers under The Health Act 2006 and NICE guidance for Smoking Cessation in Secondary Care (NICE, 2013). This means that all mental health and acute hospitals should create settings that protect staff, patients and visitors from smoking-related harms, through routinely promoting cessation services and providing temporary abstinence support in smoke-free settings (eg NRT offered on admission). These actions should complement and reinforce primary care action to address and refer people with mental illnesses in the community to support services.

Vaping in adults

An estimated 2.9 million people in Great Britain now use e-cigarettes and the vast majority (97%) of e-cigarette users are smokers or ex-smokers (ASH, 2017). As the popularity of e-cigarettes has increased over time, the rates of smoking in adults have decline, with the most commonly cited reason for e-cigarette use from current vapers being to stop or to cut down cigarette smoking (ASH, 2017). Most significantly, there are now more ex-smokers (1.5 million) using e-cigarettes than there are current cigarettes smokers who use e-cigarettes (1.3 million) (ASH, 2017). E-cigarette use is more common among men than women, and those aged 35-49 were the most likely current users (ASH, 2017). Interestingly, young men aged 16-24 years old were the most common group amongst males to use e-cigarettes whereas women 16-24 had the lowest rates of use. E-cigarettes were most popular in women aged 50-59 (ASH, 2017).



(ASH, 2017)

As mentioned in chapter 6, interpreting data on e-cigarette use is complex due to the infancy of knowledge available on this topic. The decline in tobacco smoking is undoubtedly a positive indicator of progress against the largest cause of premature death. Current evidence suggests that smokers' substitution behaviour for e-cigarettes is very likely to reduce harms to their health (PHE, 2016a). Current trends therefore offer a potentially promising opportunity for those at increased risk of smoking-related illness and health inequalities, for instance pregnant women, COPD sufferers and people with mental illness. Studies exploring e-cigarettes through targeted interventions and the long-term impacts of vaping are required to consolidate this initially positive understanding that e-cigarettes are a safe tool to support people to stop smoking. The 2017 Tobacco Control Plan for England states there is government support to use technologies that are a safer alternative to smoking, but establishes caution at this time over the regulation and promotion of e-cigarette devices without ongoing study of the relationship to smoking cessation and initiation (DH, 2017). The Public Health England

consensus statement on e-cigarettes emphasised that whilst e-cigarettes appear to be a most useful tool in reducing smoking prevalence, importantly led by public popularity, the ultimate goal of tobacco control action remains to stop stop tobacco consumption completely (PHE, 2016a).

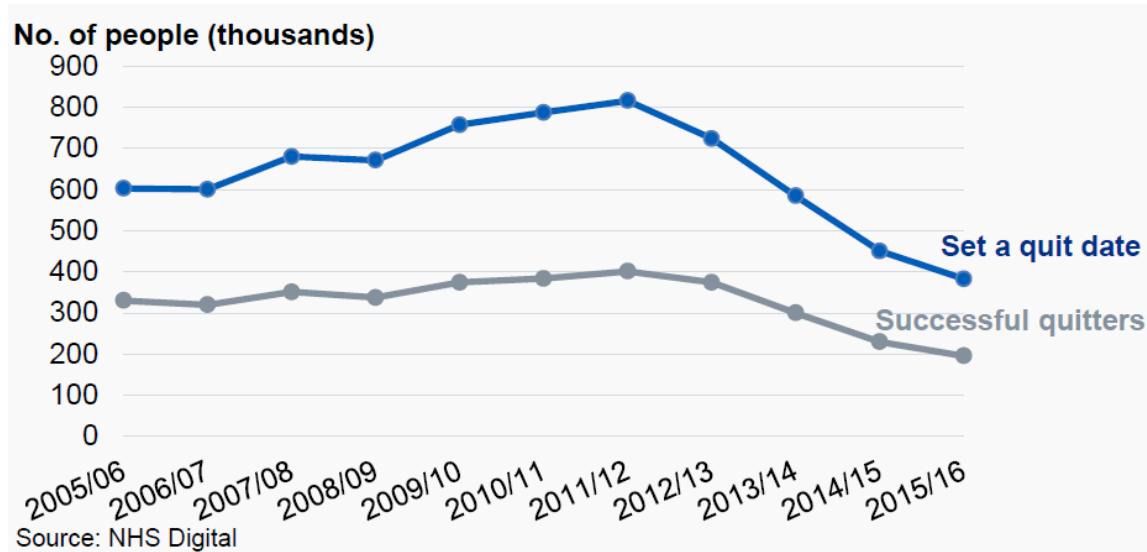
Stop smoking support

Patterns of access

Evidence consistently shows that most smokers would like to stop, with approximately 40% making quit attempts each year (PHE, 2015c). People using formal treatment to support their quit attempt are much more likely to successfully quit with a 1-year quit rate of approximately 15% in those who use specialist services, compared to only 4% in those who don't use either NRT or behavioural support (NHS Digital, 2016). Therefore, although e-cigarettes are increasingly popular with people trying to quit smoking, current evidence shows that local stop smoking services are the most effective way to stop (PHE, 2016a).

Most people take several attempts to quit smoking (Chaiton M. et al, 2016) and this is why easy and reliable access to effective support for smokers wanting to quit is essential. Since 2012/13 there has been a continued decline in the rate (crude rate per 100,000 smokers aged 16+) of people setting quit dates and successfully quitting which has occurred in all nine regions in the country: this may be associated with the increased use of e-cigarettes. Trends for England suggest that more women set quit dates with the support of specialist services, but the prevalence of successful quitters is slightly higher among men than women (52% compared to 50%) (NHS Digital, 2016). Whilst engagement with stop smoking services has decreased across the country, national data show that routine and manual occupations represent the highest proportion of people setting a quit date. However, people with 'managerial and professional occupations' have the highest success rate (NHS Digital, 2016). The variation in success between different socio-economic groups may be associated with the presence of wider support and/or external triggers that people are exposed to in their everyday lives. For example, if people around them are smokers, it may make individuals less motivated to quit, which is more likely to be the case for routine and manual workers because of the high prevalence rate amongst this group.

Number setting a quit date and successful quits for England, 2005/6-2015/16



(NHS Digital, 2016)

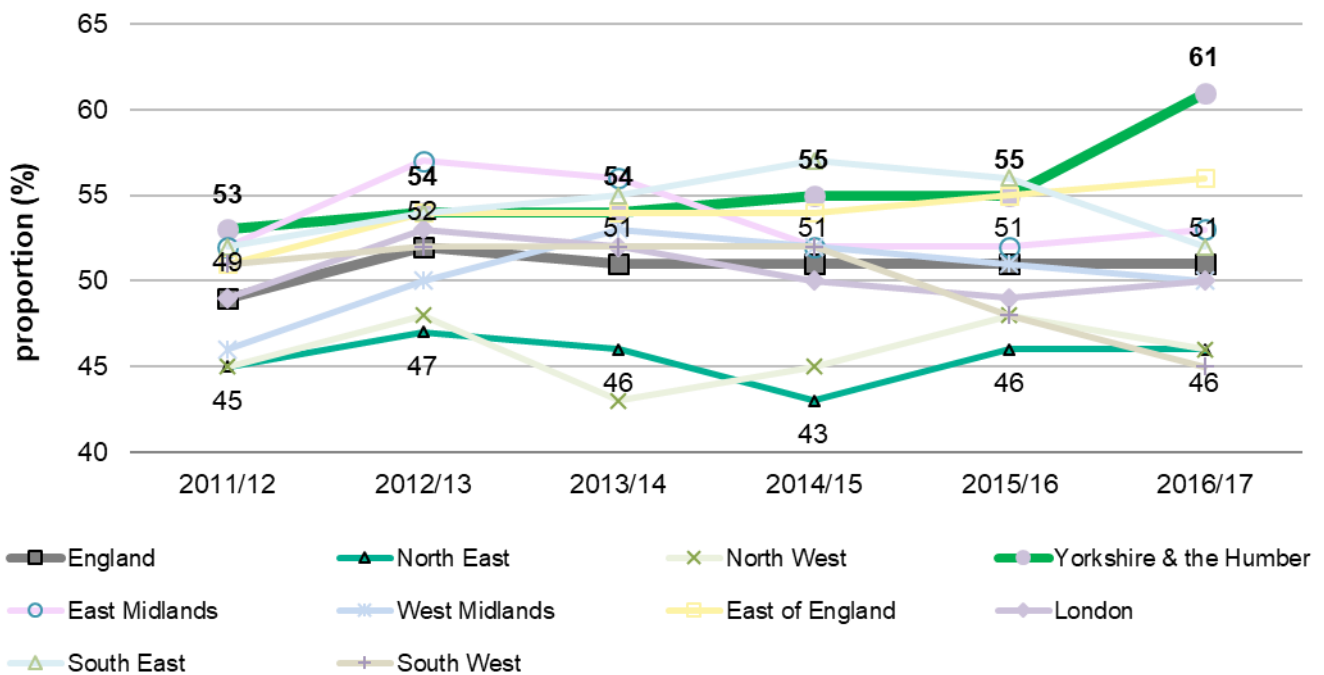
Models of service delivery

Within England, various models of Stop Smoking Services (SSS) exist within different local authorities and NHS providers: this makes service comparisons challenging. A SSS may, for example, be embedded within the outpatient clinic of an acute site, or be a pharmacy-led service and/or may be provided by a private provider commissioned by the local authority.

Local SSS design needs to consider target population groups, established or common points of contact with these potential clients and the most effective placement of specialist stop smoking advisors to maximise outcomes within the community: this means that models will differ across locations.

Service engagement may increase if self-referral and opt-out pathways are available, both opportunistically and through the identification of individual need at a healthcare appointment eg during an asthma clinic review that establishes smoking status.

Proportion of successful quits by region in England 2011/12-2016/17



N.B. the y-axis is truncated below 40% for presentation

(NHS Digital, 2017a)

An opt-out referral pathway is one where a healthcare service user is automatically referred in to a SSS if it is established that they are a smoker, unless they explicitly choose to opt out of the referral.

As different models of services continue to develop, examination of success rates within specific intervention settings can inform service planning towards the most effective opportunities to engage with smokers. Nationally, current evidence might suggest that the most effective intervention setting for successful quits as a proportion of those attending a particular setting was in hospital (57% of successful quits, n=4,526), this equates to 64% (n=318) in Y&H. However, although the proportion was lower for those attending a general practice setting and who subsequently successfully quit (48% nationally, 54% in Y&H) the actual numbers of people who quit were significantly higher, namely 49,826 in England and 3,519 in Y&H (NHS Digital, 2018).

Many health professionals continue to not ask and/or record whether or not their patients smoke, and this is a critical missed opportunity. For the proportion of smokers with a recorded offer of support and treatment within the last 24 months, seven CCGs in Y&H had rates which were statistically significantly worse than the national average and eleven were better (PHE, 2019c).

SMOK004: record of offer of support and treatment (15+, last 24 mnths), den. incl. exc. 2017/18

Proportion - %

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Area ▲▼	Recent Trend	Count ▲▼	Value ▲▼	95% Lower CI	95% Upper CI
England	↑	7,403,416	89.2	89.2	89.2
North East and Yorkshire (Yorkshire and Humber) NHS region	↑	789,328	89.7*	-	-
NHS Bradford City CCG	↑	21,019	94.3	94.0	94.6
NHS Bradford Districts CCG	↑	52,799	93.6	93.3	93.8
NHS Leeds North CCG	↑	25,591	93.2*	-	-
NHS Airedale, Wharfedale And Craven CCG	↑	19,014	93.1	92.7	93.4
NHS Scarborough And Ryedale CCG	↑	16,671	92.7	92.4	93.1
NHS Harrogate And Rural District CCG	↑	16,870	91.6	91.2	92.0
NHS East Riding Of Yorkshire CCG	↑	34,344	91.2	90.9	91.5
NHS Sheffield CCG	↑	76,099	91.0	90.8	91.2
NHS Calderdale CCG	↑	31,881	90.9	90.6	91.2
NHS Vale Of York CCG	↑	37,334	90.9	90.6	91.2
NHS Greater Huddersfield CCG	↑	32,918	89.9	89.6	90.2
NHS Leeds South And East CCG	↑	46,208	89.5*	-	-
NHS Hull CCG	↑	53,524	89.5	89.2	89.7
NHS Leeds West CCG	↑	53,005	89.0*	-	-
NHS North East Lincolnshire CCG	↓	28,082	88.7	88.3	89.0
NHS Doncaster CCG	↑	49,426	88.7	88.4	88.9
NHS Wakefield CCG	↑	54,695	88.1	87.8	88.3
NHS North Lincolnshire CCG	↑	25,693	88.1	87.7	88.4
NHS North Kirklees CCG	↑	26,675	87.3	86.9	87.7
NHS Barnsley CCG	↑	38,646	86.4	86.1	86.8
NHS Rotherham CCG	↑	34,619	84.0	83.7	84.4
NHS Bassetlaw CCG	↑	14,215	83.1	82.5	83.6

Source: QOF

(PHE, 2019c)

Access among people with long-term conditions

People with long-term conditions can particularly benefit from support to stop smoking due to the impact smoking will have on their acute health, disease management and long-term outcomes. Targeting people through healthcare settings, particularly for respiratory disease, also means a higher proportion of smokers can be reached – as smokers are more likely to have illnesses that require interventions – and therefore these settings offer an evidence-based and efficient mechanism to support smokers to quit.

SMOK005: cessation support and treatment offered (certain conditions), den. incl. exc. 2017/18

Proportion - %

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Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
England	↑	1,880,350	94.9	94.9	94.9
North East and Yorkshire (Yorkshire and Humber) NHS region	↑	212,285	95.4*	-	-
NHS Leeds North CCG	↑	6,053	97.4*	-	-
NHS Bradford Districts CCG	↑	14,735	97.4	97.1	97.6
NHS North East Lincolnshire CCG	↑	8,098	97.0	96.7	97.4
NHS Bassetlaw CCG	↑	4,094	96.5	95.9	97.0
NHS Harrogate And Rural District CCG	↑	4,223	96.3	95.8	96.9
NHS Vale Of York CCG	↑	9,189	96.1	95.7	96.5
NHS Scarborough And Ryedale CCG	↑	4,481	96.0	95.3	96.5
NHS East Riding Of Yorkshire CCG	↑	9,913	95.9	95.5	96.3
NHS Leeds South And East CCG	↑	12,311	95.7*	-	-
NHS Airedale, Wharfedale And Craven CCG	↑	5,209	95.7	95.1	96.2
NHS Wakefield CCG	↑	15,949	95.6	95.3	95.9
NHS Leeds West CCG	↑	11,558	95.4*	-	-
NHS Sheffield CCG	↑	19,947	95.4	95.1	95.7
NHS Doncaster CCG	↑	13,841	95.4	95.1	95.8
NHS North Lincolnshire CCG	↑	7,066	95.3	94.8	95.8
NHS Bradford City CCG	↑	4,942	95.1	94.5	95.7
NHS Greater Huddersfield CCG	↑	8,392	94.8	94.3	95.3
NHS Calderdale CCG	↑	8,523	94.8	94.3	95.2
NHS North Kirklees CCG	↑	8,055	94.7	94.2	95.1
NHS Hull CCG	↑	14,346	94.4	94.0	94.7
NHS Barnsley CCG	↑	11,050	93.4	92.9	93.8
NHS Rotherham CCG	↑	10,310	93.1	92.7	93.6

Source: QOF

(PHE, 2019c)

Data are available on the support offered to population groups that should be prioritised due to a long-term condition¹, which includes respiratory disease (COPD and asthma) as well as cardiovascular disease and mental illness. These data show that the proportion of people with long-term conditions having their smoking status recorded and being offered cessation support is higher than the average for the whole-population (95.4% in the region v 94.9% nationally). Rates in the Y&H vary between 93.1% in Rotherham CCG up to 97.4% in Leeds North CCG and Bradford District CCG (PHE, 2019c). This may indicate that review of the referral processes and/or disease-specific pathways is required and may identify further variation between these clinical specialities.

Service delivery and quality

Variation in stop smoking service models of delivery means that it is difficult to compare how efficient stop smoking services are for a specific population group. Regional comparisons are available of the total amount allocated to, or spent on, stop smoking

¹ Coronary heart disease, PAD, stroke or TIA, hypertension, diabetes, COPD, CKD, asthma, schizophrenia, bipolar affective disorder or other psychoses

services for each successful quitter (ie cost per each successful 4-week quitter) which include marketing, staff costs, training and pharmacotherapies issued as part of this service (not NRT on prescription).

In 2017/18 the average cost per quit in England was £519, with a range across all regions of £419 in East of England up to £668 in the North East. In Y&H the average cost per quit was £575 and consequently services appear to be less cost-effective in this region than in some other areas (PHE, 2019d). There is also substantial in-region variation in the costs per quit across Y&H. Kirklees local authority has the lowest cost per quitter in the region of £117 and Leeds has the highest cost per quitter (£896). However it should be noted that data is missing for seven out of the 15 local authorities in Y&H (PHE, 2019d). The variation between regions and local authorities suggests scrutiny of the models being implemented is required.

Cost per quitter 2017/18 Crude rate - £

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Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
England	—	-	519*	-	-
Yorkshire and the Humber region	—	-	575*	-	-
Leeds	➔	728,820	896	-	-
North Yorkshire	➔	867,974	793	-	-
Rotherham	➔	669,654	631	-	-
Kingston upon Hull	➔	617,232	544	-	-
Sheffield	➔	598,568	533	-	-
North East Lincolnshire	➔	272,407	527	-	-
East Riding of Yorkshire	➔	214,012	293	-	-
Kirklees	➔	63,272	117	-	-
North Lincolnshire	—	-	*	-	-
York	—	-	*	-	-
Barnsley	—	-	*	-	-
Doncaster	—	-	*	-	-
Bradford	—	-	*	-	-
Calderdale	—	-	*	-	-
Wakefield	—	-	*	-	-

Source: Health & Social Care Information Centre - Statistics on NHS Stop Smoking Services, England

(PHE, 2019d)

There is evidence of both inter-region variation and within region changes over time in rates of self-reported successful quits. In 2017/18, the Y&H local authority average proportion of self-reported successful quitters ranged between 42-68%: the average for the Y&H region as a whole was 58% compared to 51% for England (NHS Digital, 2018). Over the past seven years, 2011/12 to 2017/18, the proportion of self-reported successful quitters in Y&H increased from 53% to 58%. During the same period, the national average remained fairly constant at 49-51%.

In Y&H, 36% of people under 18 years old successfully quit at 4 weeks compared to 65% of 60+ years old. This pattern was also true nationally (<18yrs 41%, >=60yrs 56%) (NHS Digital, 2018). Data disaggregated by gender shows that, similar to the national trends, a slightly higher proportion of men than women in Y&H in 2017/18 were successful in their quit attempts (60% and 56% respectively in Y&H, and 52% and 49% respectively in England). The rates for both genders in Y&H were higher than the national average (NHS Digital, 2018).

Older adults

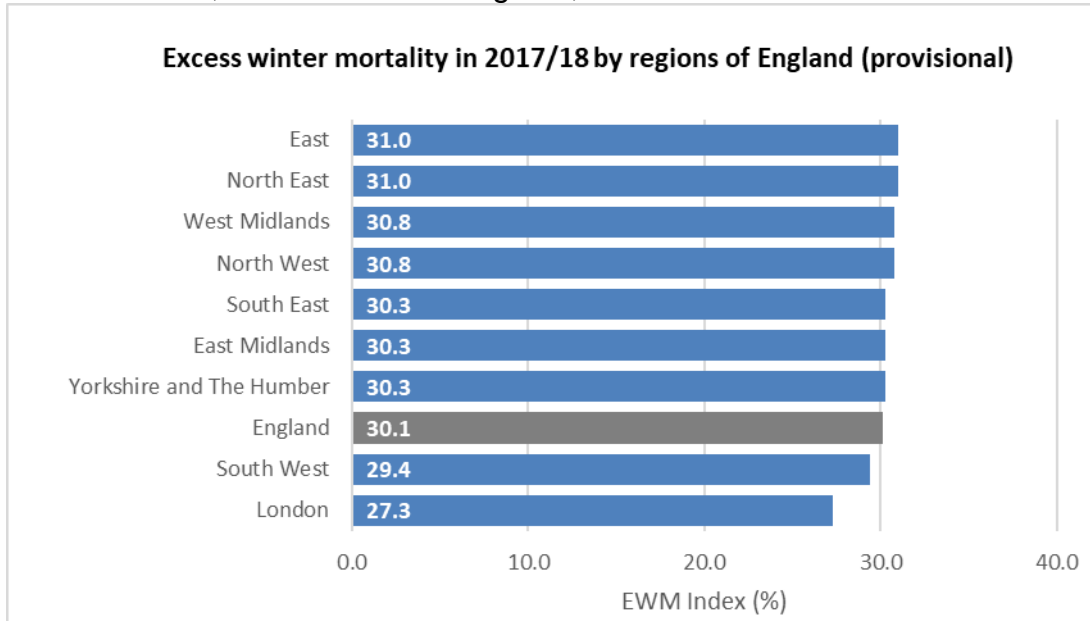
Priorities for older adult's respiratory health are Excess Winter Mortality; Premature Mortality for those with chronic disease; and End of Life Care. All adults with chronic respiratory disease, such as COPD and asthma, should receive treatment and care to reduce exacerbations and maximise their quality of life. This chapter examines premature mortality and quality of life for older adults.

Excess Winter Mortality (EWM) index

During the winter months (December to March), when the average temperature is colder, the number of deaths generally increases: the additional numbers of deaths are known as Excess Winter Deaths (EWDs), calculated using the following formula: winter deaths – average non-winter deaths. The number of "Excess winter deaths (EWDs) are generally higher in females than males, which may partly be explained by the higher proportion of females aged 85 and over compared with males (ONS, 2018).

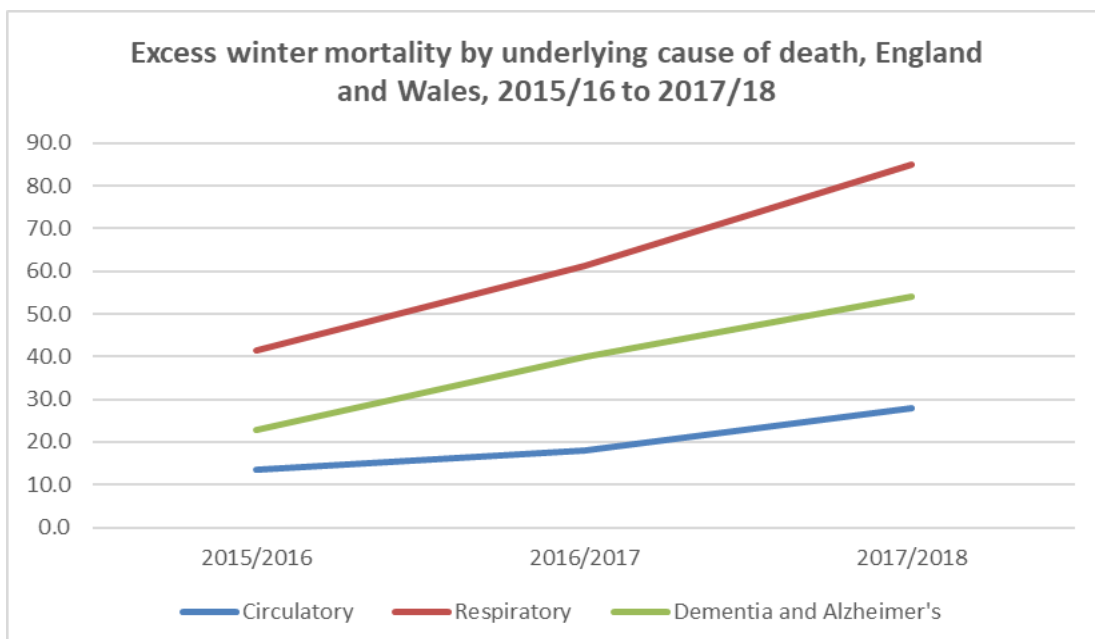
To allow for comparisons between different groups to be made eg by age, by gender or by location an Excess Winter Mortality (EWM) Index is calculated. The EWM Index is calculated by dividing the number of excess winter deaths (excess deaths in the months December to March) by the average number of non-winter deaths (the average number of deaths in the preceding August to November and the following April to July), and is expressed as a percentage. International comparisons indicate that England has an above average rate of deaths during winter compared to other European countries. In 2017/18 provisional figures show that there was an estimated total of 50,100 excess winter deaths in England and Wales (compared to 34,530 in 2016/17). This is an average EWM index of 30.1 for England. The rate of excess winter mortality is higher among people aged 75 and over (ONS, 2018).

Across England in 2017/18, the EWM Index ranged between 27.3 in London to 31.0 in the North East, and the East of England, with an EWM index of 30.3 for Y&H.



(ONS, 2018)

Acute respiratory diseases are the most common cause of EWD in England accounting for 34.7% of all excess winter deaths, and pneumonia and COPD account for the largest proportion of these deaths (ONS, 2018). People with chronic respiratory disease such as COPD or asthma are at increased risk of dying in the winter months as they are both more likely to get an acute respiratory illness, and more likely to experience severe symptoms when they do. This is especially true if they are: older (65 years and over); female; physically inactive; live in poor housing &/or on a low income (NICE, 2015).



(ONS, 2018)

Because temperatures are generally lower in winter, it is important that people are able to keep adequately warm at this time of year through heating their home, particularly those who are more likely to be sedentary due to frailty or limiting chronic illness. Fuel poverty describes the circumstance where people have a low income and experience high energy costs in order to adequately heat their home, either due to poor energy efficiency in their property or high energy prices. Evidence strongly suggests that people experiencing fuel poverty are more likely to experience poorer health because of this (PHE, 2014c). “Estimates suggest that some 10% of excess winter deaths are directly attributable to fuel poverty and 21.5% of excess winter deaths are attributable to the coldest 25% of homes” (PHE, 2014c).

In 2016, the proportion of households living in fuel poverty was above the national average for 11 of the 15 local authorities in Y&H (PHE, 2019a). The region with the lowest proportion of households living in fuel poverty was the South East at 9.0%: the highest was the North East at 13.8%. Y&H had 12.1% of households living in fuel poverty (PHE, 2019a).

There is a social gradient in fuel poverty, with lower income households more likely to be at risk of fuel poverty than high income households. For example, the East Riding of Yorkshire, North Yorkshire and York have a relatively low proportion of fuel poverty within the region and could be considered a relatively affluent area and least socially deprived. In contrast, Kingston upon Hull and Bradford are more socially deprived and have higher levels of fuel poverty. Recent trend data shows an increase in fuel poverty for all LAs in the region (PHE, 2019a).

1.17 - Fuel poverty New data 2016 Proportion - %

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Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
England	↑	2,550,565	11.1	-	-
Yorkshire and the Humber region	↑	274,874	12.1	-	-
Bradford	↑	29,095	14.3	-	-
Kingston upon Hull	↑	15,877	13.8	-	-
Kirklees	↑	23,211	13.1	-	-
Leeds	↑	42,929	13.1	-	-
North East Lincolnshire	↑	9,176	12.9	-	-
Barnsley	↑	12,550	12.2	-	-
Calderdale	↑	11,092	12.2	-	-
Sheffield	↑	28,658	12.2	-	-
Doncaster	↑	15,722	12.1	-	-
Rotherham	↑	12,618	11.4	-	-
Wakefield	↑	16,061	11.2	-	-
North Lincolnshire	↑	8,066	11.1	-	-
York	↑	9,005	10.5	-	-
North Yorkshire	↑	26,576	10.1	-	-
East Riding of Yorkshire	↑	14,238	9.7	-	-

Source: Department for Business, Energy and Industrial strategy

(PHE, 2019a)

People aged 65 and over and those with a number of chronic diseases are advised to get the annual seasonal influenza (flu) and pneumococcal (PPV) vaccines as part of

protective measures against acute illness (PHE, 2019g). Cases of invasive pneumococcal infection usually peak in the winter during December and January and routine vaccinations tend to be rolled out between September and October in preparation for this (PHE, 2019g). Vaccination coverage is closely related to levels of disease, and is the best indicator of population level protection against vaccine preventable communicable diseases (PHE, 2014b).

The England average coverage of the PPV vaccination among eligible adults 65 years and over in 2017/18 was 69.5%, (below the 75% goal). All of the Y&H local authorities have population vaccination coverage that is between 64.5% (North Lincolnshire) and 73.9% (Bradford) (PHE, 2019a). The Y&H value is 71.3%.

3.03xiii - Population vaccination coverage - PPV 2017/18 Proportion - %

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Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
England	↑	6,890,546	69.5	69.5	69.5
Yorkshire and the Humber region	↑	720,609	71.3	71.2	71.4
Bradford	↑	60,774	73.9	73.6	74.2
Wakefield	↑	49,671	73.7	73.3	74.0
Leeds	↑	94,407	73.6	73.4	73.8
Calderdale	↑	28,239	73.4	73.0	73.9
Kirklees	↑	52,239	72.8	72.4	73.1
Rotherham	↓	34,452	72.2	71.8	72.6
York	↓	29,457	72.0	71.6	72.5
North Yorkshire	↓	99,895	71.9	71.7	72.2
Sheffield	↓	67,991	71.1	70.8	71.4
Doncaster	↓	40,887	70.0	69.7	70.4
Kingston upon Hull	↓	31,863	70.0	69.6	70.4
Barnsley	↑	32,807	69.4	69.0	69.8
East Riding of Yorkshire	↑	52,063	67.3	67.0	67.6
North East Lincolnshire	↓	21,519	64.9	64.4	65.4
North Lincolnshire	↓	24,345	64.5	64.0	65.0

Source: Public Health England

(PHE, 2019a)

In contrast to the PPV coverage, the population vaccine coverage for flu is not as successfully implemented across the country or within this region specifically. The World Health Organisation (WHO) has set a target of at least 75% coverage in adults aged 65 and over years and people in ‘at risk’ groups for influenza (such as those with long term conditions). Within England in 2017/18, for people aged 65 and over, all regions apart from the North West were below this target of 75%. Coverage rates varied between 66.9% in London to 75.3% in the North West, with a national average of 72.6% (PHE, 2019a).

3.03xiv - Population vaccination coverage - Flu (aged 65+) 2017/18

Proportion - %

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Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
England	↓	7,426,917	72.6	72.5	72.6
North West region	↓	1,022,547	75.3*	75.2	75.3
North East region	↓	385,790	73.9*	73.8	74.0
Yorkshire and the Humber region	↓	754,734	73.7*	73.6	73.8
East Midlands region	↓	684,866	73.6*	73.5	73.6
South West region	↓	903,539	73.1*	73.1	73.2
South East region	↓	1,287,891	72.8*	72.8	72.9
East of England region	↓	878,275	72.0*	71.9	72.1
West Midlands region	↓	790,318	71.8*	71.7	71.8
London region	↓	718,957	66.9*	66.8	67.0

Source: <https://www.gov.uk/government/collections/vaccine-uptake#seasonal-flu-vaccine-uptake-figures>

(PHE, 2019a)

The Y&H regional average for population flu vaccine coverage (73.7%) was higher than the national average, but was still below the target rate for people aged 65 and over. In 2017/18, Leeds was the best performing local authority in the region with a coverage rate of 76.2%, above the 75% target rate. Kingston upon Hull had the lowest coverage rate in Y&H at 70.7%. Only three out of 15 local authorities in the region achieved the 75% coverage target for flu vaccinations in people aged 65+ (Leeds, Rotherham and Sheffield) (PHE, 2019a).

3.03xiv - Population vaccination coverage - Flu (aged 65+) 2017/18

Proportion - %

Export table as image Export table as CSV file

Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
England	↓	7,426,917	72.6	72.5	72.6
Yorkshire and the Humber region	↓	754,734	73.7*	73.6	73.8
Leeds	↓	96,994	76.2	76.0	76.4
Rotherham	↓	37,769	76.0	75.6	76.3
Sheffield	↓	73,181	76.0	75.7	76.2
York	↓	30,315	74.6	74.1	75.0
Bradford	↓	61,156	73.7	73.4	74.0
North Yorkshire	↓	104,147	73.6	73.3	73.8
Doncaster	↓	44,443	73.5	73.1	73.8
Kirklees	↓	53,784	73.3	73.0	73.6
Wakefield	↓	49,666	73.1	72.8	73.4
Barnsley	↓	35,032	72.6	72.2	73.0
Calderdale	↓	27,977	72.3	71.8	72.7
North Lincolnshire	↓	26,562	71.9	71.4	72.3
North East Lincolnshire	↓	23,797	71.3	70.8	71.8
East Riding of Yorkshire	↓	57,404	71.2	70.9	71.5
Kingston upon Hull	↓	32,507	70.7	70.3	71.1

Source: <https://www.gov.uk/government/collections/vaccine-uptake#seasonal-flu-vaccine-uptake-figures>

(PHE, 2019a)

For individuals aged <65 years at risk of influenza due to a chronic disease, the target coverage in the UK is set lower at 55%. Coverage in individuals at risk is below this target rate both nationally and regionally, suggesting improvements are required to target and engage groups at risk. The England average coverage in 2017/18 was 48.9% compared to 50.3% in Y&H. Across local authorities in the region, coverage varied from 46.1% in York to 53.6% in Rotherham (PHE, 2019a).

3.03xv - Population vaccination coverage - Flu (at risk individuals) 2017/18

Proportion - %

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Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
England	↓	3,344,593	48.9	48.9	49.0
Yorkshire and the Humber region	↓	339,511	50.3*	50.2	50.4
Rotherham	↓	18,242	53.6	53.1	54.1
Calderdale	↑	13,714	52.3	51.7	52.9
Barnsley	↓	16,975	51.6	51.0	52.1
Kirklees	↑	27,505	51.5	51.1	51.9
Sheffield	↓	36,306	51.4	51.1	51.8
North Yorkshire	↓	34,123	51.2	50.8	51.5
Wakefield	↓	23,219	51.0	50.6	51.5
Doncaster	↓	20,498	50.5	50.0	51.0
Leeds	↓	47,924	50.3	50.0	50.6
North Lincolnshire	↓	10,571	50.3	49.7	51.0
Bradford	↓	36,297	49.1	48.7	49.5
North East Lincolnshire	↓	9,804	47.9	47.2	48.6
East Riding of Yorkshire	↓	17,475	47.7	47.2	48.2
Kingston upon Hull	↓	16,547	46.8	46.3	47.4
York	↓	10,311	46.1	45.4	46.7

Source: <https://www.gov.uk/government/collections/vaccine-uptake#seasonal-flu-vaccine-uptake-figures>

(PHE, 2019a)

End of Life Care

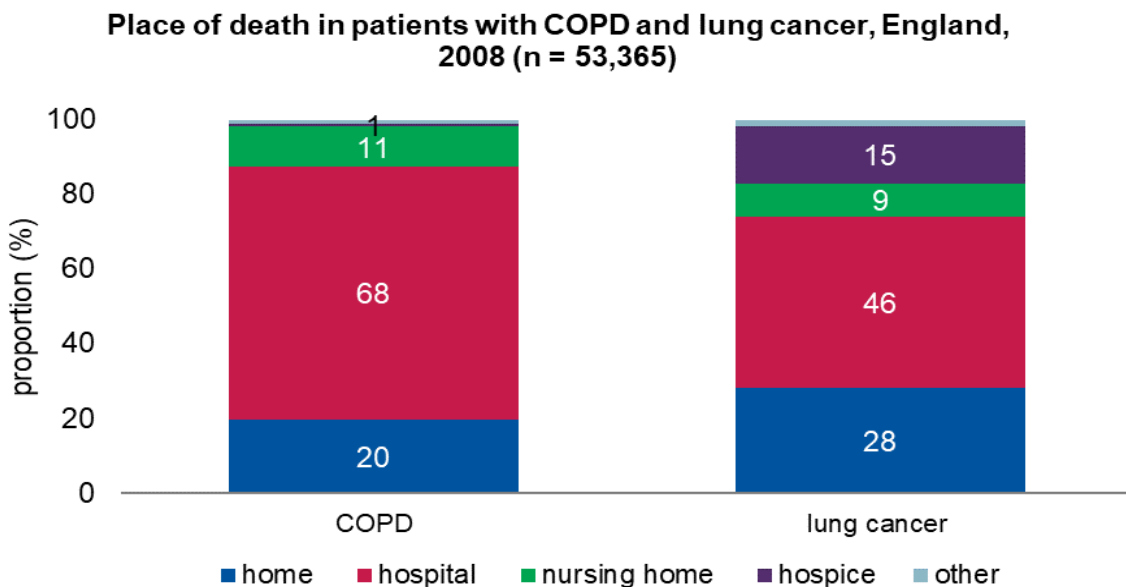
Despite COPD being a progressive and incurable disease that causes people to have increasing pain and shortness of breath, research suggests that people with advanced stage disease are much less likely to access palliative care compared to people with cancer (Spathis and Booth, 2008, Yohannes, 2007). Although palliative care is known to improve the quality of life for patients and reduce health and social care costs, studies suggest that a number of factors influence poor quality end of life care for people with chronic respiratory disease (Yohannes, 2007; Gott et. al, 2009). Studies suggest that clinicians are often apprehensive to raise end of life care conversations with COPD sufferers because the somewhat unpredictable disease progression limits prognostic accuracy and therefore makes the timing of this conversation sensitive (Spathis and Booth, 2008). Due to the slow gradual decline in health, deaths from COPD are often perceived as unexpected because people may experience many acute exacerbations that are successfully managed by emergency services but these episodes are often not acknowledged as an indicator of advance disease associated with the end of life (Cohen et al, 2017). For example, multiple hospital admissions in a single year are strongly associated with mortality from COPD within the next two years. However, acute exacerbations are routinely managed with reactive interventions without end of life care conversations or referrals in to palliative care pathways (Hoogendoorn et al, 2011; Spathis and Booth, 2008; Gott et. al, 2009).

NICE guidelines for COPD management recommend that patients with end-stage disease should have access to all palliative care services, including admission to hospices (NICE, 2018a). However, data suggests that people with COPD are much

more likely to die in hospital compared to people with cancer, often following an acute episode, due to a lack of communication and palliative care planning.

The International Place of Death (IPoD) Study, examined population level death certificate data from fourteen countries to compare the place of death in COPD and lung cancer patients from over five-million deaths in the selected reference year, 2008. There is a long established evidence to assert that most people would prefer to die at home and that the hospital setting is people’s least desirable place of death (NICE, 2017b; Cohen et. al, 2017). Moreover, multi-disciplinary planned palliative care is found to improve the end of life care for patients, families and carers by aligning people’s care to their needs and preferences, reducing deaths in inappropriate places (such as on a hospital trolley) and safeguarding people who are vulnerable to avoidable harm (NICE, 2017b).

Published in 2017, the IPoD study found that people with COPD were significantly less likely to die at home than people with lung cancer in 10 countries, including England (OR = 0.7) (Cohen et al, 2017). Moreover, England-specific comparisons between people with lung cancer and COPD demonstrated that COPD sufferers were much less likely to die in a hospice setting (OR = 0.1) and were in fact much more likely to die in hospital (OR = 2.5) (Cohen et al, 2017).



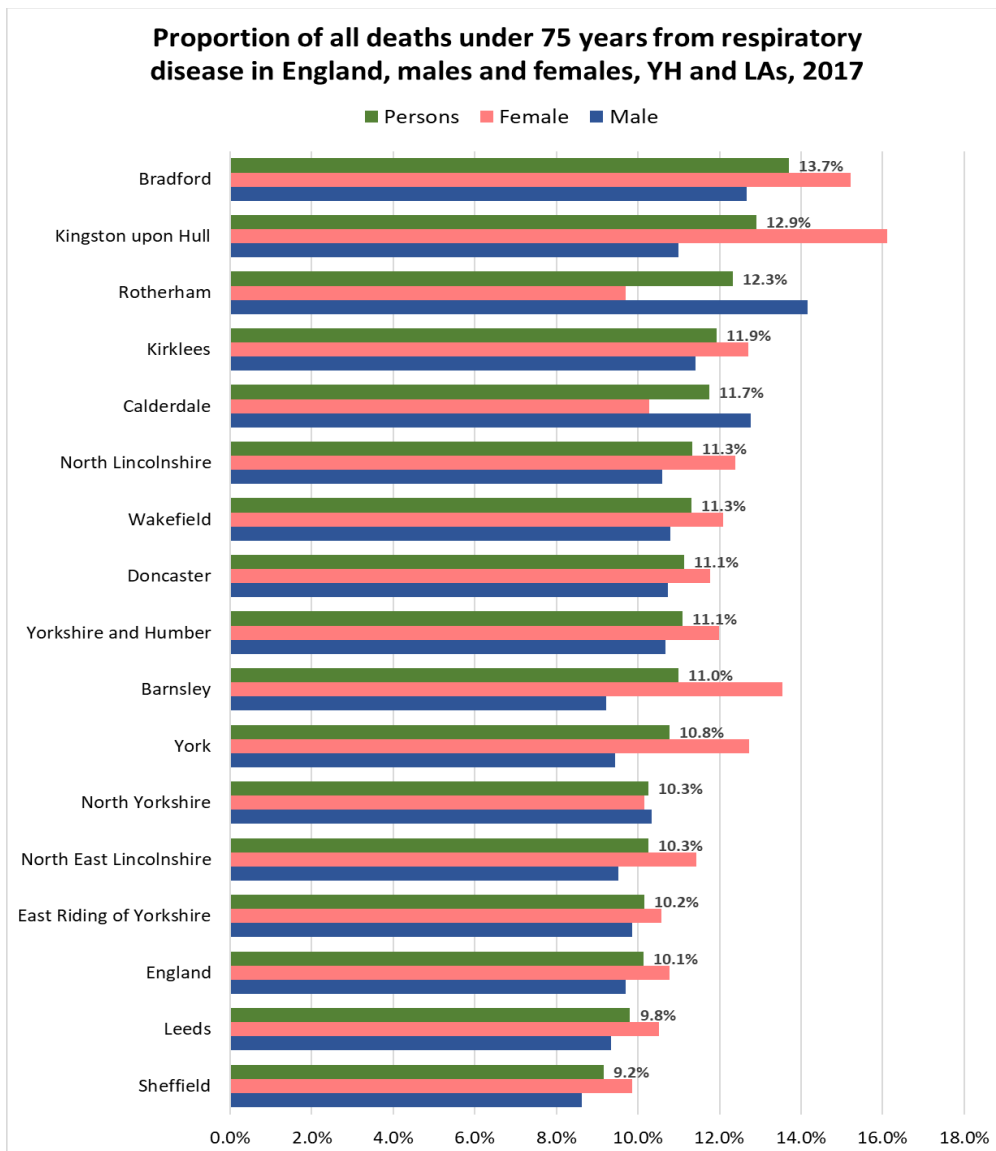
(Cohen et. al, 2017)

The IPoD study adds to the growing evidence of inequalities in the end of life care experienced by chronic respiratory disease patients and suggests that patients may experience avoidable distress and suffering during their death. Data presented within in this report on variation in disease management and these end of life data suggest high demands of acute services during fatal exacerbations could have been prevented and the quality of care improved, had clinical guidance been implemented.

GPs and specialist respiratory services need to communicate the progressive, incurable nature of COPD to patients and their families; implement protocols to plan end of life care with patients prior to advanced disease presentations; and facilitate access to end of life support through structured referral pathways and collaboration with palliative care providers (NICE, 2018a).

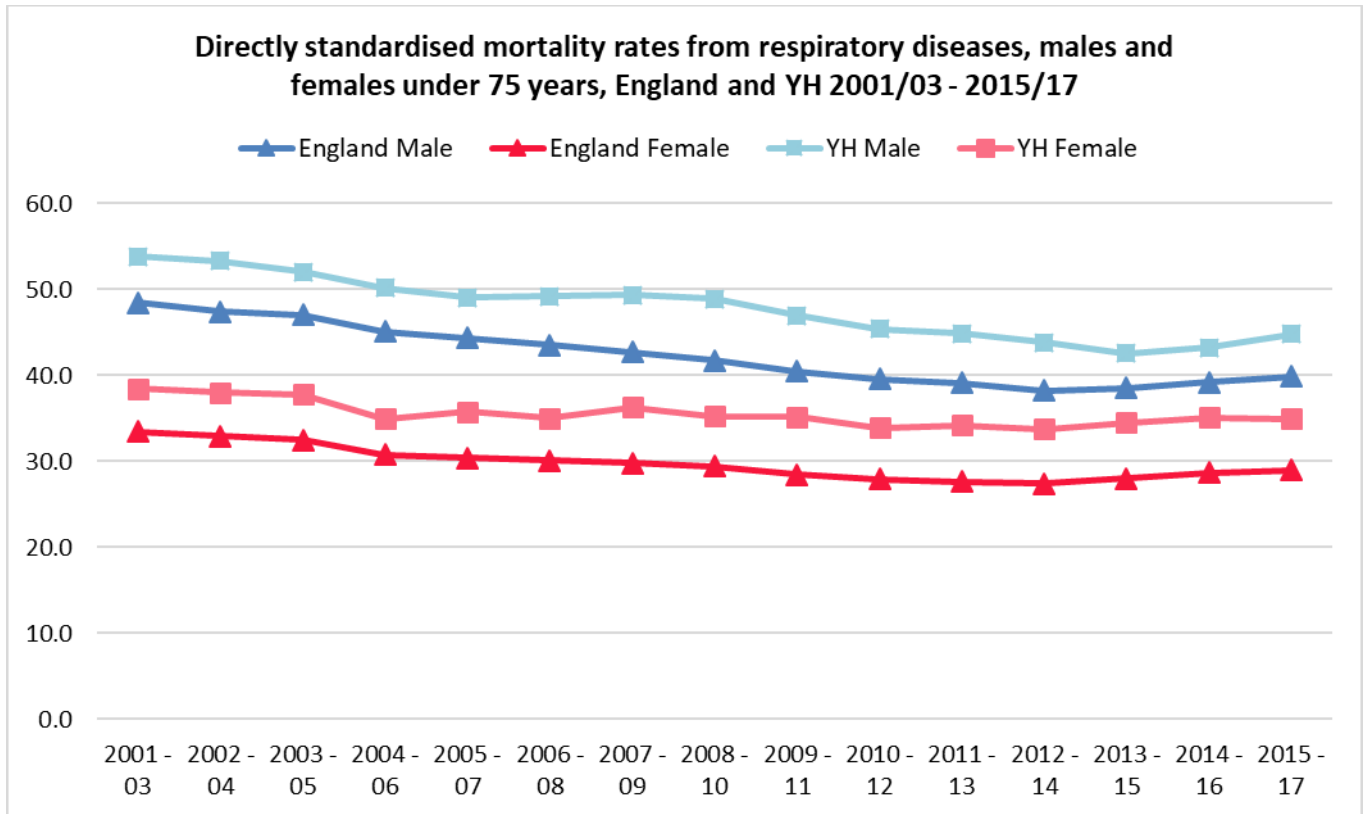
Premature mortality due to respiratory diseases

Respiratory disease accounted for 13.6% of all deaths in Yorkshire and the Humber in 2017 (13.7% in England). In those age under 75, respiratory disease accounted for 11.1% of all deaths in Y&H and 10.1% of all deaths in England (PHE analysis of ONS mortality data). The chart below shows that in Y&H the proportion of all deaths that are due to respiratory diseases, for men and women combined, is greatest among the population of Bradford (13.7%).



(PHE analysis of ONS mortality data)

For most LAs in Y&H, respiratory disease deaths accounted for a greater proportion of all deaths in women than in men, but in terms of absolute numbers there were more respiratory deaths among men. This is demonstrated in the following chart which takes into account the age structure of the population to calculate directly standardised rates of respiratory disease mortality in under 75s.



(PHE, 2019a)

For some of the smaller local authorities, the number of deaths is not robust enough to examine death rates for specific causes by year, so three-years of data have been pooled.

Mortality attributable to particulate air pollution

Within Y&H in 2017, the proportion of air pollution was lower for all Local Authorities compared to the England average. The average level in Y&H as a whole (4.2%) was amongst the lowest in England (only the North East and North West had lower levels, 3.7% and 4.1% respectively): other regions were as high as 6.5% (London). The average for England as a whole was 5.1% (PHE, 2019a). The fraction of mortality attributed to particulate air pollution in 2017 in Y&H ranged between 3.8% in Barnsley, Sheffield and North Yorkshire, up to 4.9% in Kingston upon Hull (PHE, 2019a).

3.01 - Fraction of mortality attributable to particulate air pollution 2017

Proportion - %

Export table as image Export table as CSV file

Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
England	–	-	5.1	-	-
Yorkshire and the Humber region	–	-	4.2	-	-
Kingston upon Hull	–	-	4.9	-	-
Leeds	–	-	4.5	-	-
North East Lincolnshire	–	-	4.5	-	-
North Lincolnshire	–	-	4.3	-	-
Bradford	–	-	4.3	-	-
Doncaster	–	-	4.3	-	-
East Riding of Yorkshire	–	-	4.2	-	-
York	–	-	4.2	-	-
Rotherham	–	-	4.1	-	-
Wakefield	–	-	4.1	-	-
Kirklees	–	-	4.1	-	-
Calderdale	–	-	4.0	-	-
North Yorkshire	–	-	3.8	-	-
Sheffield	–	-	3.8	-	-
Barnsley	–	-	3.8	-	-

Source: Background annual average PM_{2.5} concentrations for the year of interest are modelled on a 1km x 1km grid using an air dispersion model, and calibrated using measured concentrations taken from background sites in Defra's Automatic Urban and Rural Network (<http://uk-air.defra.gov.uk/interactive-map/>). Data on primary emissions from different sources and a combination of measurement data for secondary inorganic aerosol and models for sources not included in the emission inventory (including re-suspension of dusts) are used to estimate the anthropogenic (human-made) component of these concentrations. By approximating LA boundaries to the 1km by 1km grid, and using census population data, population weighted background PM_{2.5} concentrations for each lower tier LA are calculated. This work is completed under contract to Defra, as a small extension of its obligations under the Ambient Air Quality Directive (2008/50/EC). Concentrations of anthropogenic, rather than total, PM_{2.5} are used as the basis for this indicator, as burden estimates based on total PM_{2.5} might give a misleading impression of the scale of the potential influence of policy interventions (COMEAP 2012).

(PHE, 2019a)

Whilst Y&H has one of the lowest levels of mortality attributed to air pollution in the country, local authorities within the region will be aware of the long-term implications of air pollution. The latest NICE guidelines to address the impact of outdoor air quality on health, identifies specific actions that public sector, private organisations and members of the public can take to protect people from harmful pollutants in the air and reduce illness related to poor air quality (NICE, 2017a). All tiers of government have a role to prevent and reduce poor air quality, and NICE recommends that local authorities should consider air pollution when developing all plans regarding transport, housing, environment and public health. For example, considering the proximity of proposed residential settings in relation to the levels of congestion, particularly if the new buildings are intended for vulnerable groups such as school children or elderly people within a nursing home (NICE, 2017a). This may lead to green space and landscaping features within new build planning specifications, upscaling and promoting safe, active travel options to key services and/or utilising bylaws to reduce vehicle idling and encouraging smooth driving.

Public Health England's SHAPE tool <https://shapeatlas.net/place/> (registration required) can help by showing small area maps of nitrogen dioxide, particulate matter and sulphur dioxide levels, as well as greenspace and existing facilities.

The guidelines also recognise the role of health professionals to advise people who are vulnerable to the impact of poor air quality, such as those with respiratory conditions like asthma and COPD (NICE, 2017a). This includes practical measures such as avoiding exercising outside in areas of high pollution; being aware of symptoms of irritation such

as an increased need for the reliever inhalers; and closing windows at times when there is dense traffic close by. Actions by employers include incentives to support car sharing schemes, scheduling deliveries to minimise congestion and supporting employees to cycle to work with appropriate facilities (NICE, 2017a).

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