

The clinical case for smoking cessation for respiratory patients

What is the relationship between smoking and respiratory illnesses?

Cigarette smoke is a leading risk factor for the development, aggravation and/or progression of most major respiratory diseases including COPD, lung cancer, asthma and interstitial lung diseases (respiratory bronchiolitis-associated interstitial lung disease, desquamous interstitial pneumonia, pulmonary Langerhans cell histocytosis).¹⁻⁵ People who smoke are also at an increased risk of serious respiratory infections such as pneumococcal pneumonia, influenza and tuberculosis (TB), and COVID-19.^{1,2,4,6}

Why intervene in secondary care?

Hospitalisation offers an opportune time to encourage patients to stop smoking for five main reasons:

- Firstly, this time is often a 'teachable moment' where patients are more receptive to intervention and are more motivated to quit.
- Secondly, abstaining from smoking at this time can lead to significant health benefits.
- Thirdly, the hospital's no smoking environment creates an external force to support abstinence.
- Fourthly, patients are ideally placed to be given information about treatment options, supported through withdrawal and signposted to specialist services.
- Finally, smoking cessation interventions are highly cost-effective and result in direct cost-savings to the NHS.

Cigarette smoke damages the lungs through several mechanisms including oxidative injury, impaired oxygen metabolism, inflammation and carcinogenesis, as well as having effects on the immune system.^{1,2} Cigarette smoke initiates an inflammatory process that results in direct destruction of lung parenchyma that is mediated by:²

- proteinases release that results in damage to the extracellular matrix of the lung,
- apoptosis due to oxidative stress, and
- loss of matrix-cell attachment and ineffective repair of extracellular matrix components that enlarge the airspace, including elastin

Asthma

- Smoking is associated with more severe symptoms, an accelerated decline in lung function, higher frequency of exacerbations, increased number of life-threatening asthma attacks, increased hospital-based care and increased mortality following hospital admission with an acute episode of near fatalexacerbation, and poorer quality of life, compared to levels seen in non-smoking asthma patients.^{1,2,7,8}
- Smoking has been associated with corticosteroid resistance and poorer symptom control compared with non-smoking asthma patients.^{1,8,9}

COPD

- Smoking is associated with an accelerated decline in lung function, greater prevalence and severity of symptoms, increased hospitalisation and increased COPD-related mortality.^{1,2,5,10}
- The risk of developing COPD increases based on the number of years smoked (i.e. earlier age of smoking onset) with women who begin smoking at younger ages being at particularly high risk.¹

Respiratory infections

- Smoking is a significant risk factor for the development of respiratory infections, including pneumonia, which is due to the adverse effects on respiratory endothelium and the clearance of bacteria from the respiratory tract.^{2,11}
- There is a dose-response relationship with the number of cigarettes smoked per day and invasive pneumococcal disease (causes pneumonia, bacteraemia and meningitis).^{2,12}
- Smoking has been associated with an increased risk of contraction, activation, disease severity, poorer treatment outcomes, drug resistance, recurrent TB and TB mortality.^{2,13-15}
- Despite some uncertainty regarding the exact nature and magnitude of the association between smoking and COVID-19, there is growing evidence to support that smokers are at higher risk of developing severe disease and death.^{6,16}

Effects of smoking on respiratory illness^{1,2}

- Decreased pulmonary function including early age decline of forced expiratory volume (FEV1) and accelerated annual decline of FEV1
- More severe symptoms
- Poorer treatment response
- Increased hospitalisations
- Increased mortality

What are the health benefits of quitting for respiratory patients?

Stopping smoking is associated with significant benefits in terms of respiratory disease outcomes (see below). Importantly, reducing smoking does not result in the same benefits as quitting completely.¹

Asthma

- Smoking cessation results in a progressive reduction of pro-inflammatory effects in the airways.¹
- Smoking cessation has been shown to improve lung function, reduce self-reported symptoms, reduce medication use including rescue medications, improve corticosteroid response, and improve asthma specific quality of life scores.^{1,17,18}

COPD

- Smoking cessation has been shown to be more effective than all pharmacological treatment for improving COPD outcomes and reducing COPD-related mortality.^{8,19,20}
- While quitting smoking cannot reverse the damage caused by COPD, smoking cessation is the only established intervention for slowing respiratory function decline (FEV1) associated with COPD.^{1,5,8,19-22}
- With sustained quitting (approx. 2 years) the rate of decline in respiratory function among former smokers will return to that of never smokers.¹ Reducing smoking does not reduce lung function decline unless cigarette consumption was reduced by at least 85%.¹
- Lung function may increase by 5–10% with 3–9 months of smoking cessation.¹

- Smoking cessation is associated with improved respiratory symptoms including reduced cough, sputum production, shortness of breath within 3–9 months.^{1,2}
- Smoking cessation has been associated with a decreased risk in COPD exacerbations, with the size of the risk reduction increasing with duration of smoking abstinence.²³
- Smoking cessation improves the efficacy of therapies, including oxygen therapy and COPD inhalator medication such as bronchodilators² or inhaled corticosteroids.^{1,24}
- Smoking cessation is associated with a 43% decreased risk of hospitalisation (HR 0.57 (95% CI 0.33–0.99)).²⁵
- Although smoking cessation results in less severe symptoms there is evidence to suggest that the inflammatory burden may persist months to years after cessation and as such the full benefits of cessation may not be seen immediately.¹

Respiratory infections

- Smoking cessation reduces the risk of developing bronchitis and pneumonia compared to continued smoking.¹
- There is limited high-quality evidence regarding the effectiveness of stopping smoking in improving TB treatment outcomes.^{14,26} Available evidence supports that quitting smoking reduced TB related mortality, risk of TB recurrence, improved treatment outcomes and reduced transmission of TB.^{14,26,27}

Other diseases

Successful quitting will also benefit a patient's long-term health by reducing the risk of developing other smoking-related diseases (e.g. heart disease, stroke, cancers).² For more information on smoking and lung cancer see the NCSCT factsheet '*The clinical case for smoking cessation for cancer patients*'. Smoking abstinence may help a patient recover quicker by eliminating the acute effects of smoking on the body (see overleaf).

Main acute effects of smoking on the body

(estimated time of recovery, if known)

- Increase in sympathetic tone leading to an increase in blood pressure, heart rate and peripheral vasoconstriction leading to an increased demand for oxygen and cardiac function²⁸ **(24 – 48 hours)**
- Formation of carboxyhaemoglobin and decreased oxygen dissociation rate in the blood leading to a reduction in oxygen delivery to the tissues²⁹ **(8 – 24 hours)**
- Formation of carboxymyoglobin leading to a reduction in oxygen storage in the muscles²⁹ **(8 – 24 hours)**
- Increase in red blood cell production, which leads to an increase in blood viscosity, a decrease in tissue perfusion, a decrease in oxygen delivery to the tissues and potentiation of thrombotic process^{30,31}
- Hypersecretion of mucus, narrowing of the small airways, decrease in ciliary function and change in mucus rheology leading to a decrease in mucociliary transport^{30,31} **(12 – 72 hours)**
- Changes in functioning of a range of immune cells (pro- and anti-inflammatory cytokines, white blood cells, immunoglobulins) which lead to decreased immunity and are associated with atherosclerosis^{30,31} **(1 week – 2 months)**
- Induction of hepatic enzymes which increases drug metabolism through both pharmacokinetic and pharmacodynamic mechanisms^{32,33} **(6 – 8 weeks)**

What do we know about helping respiratory patients with quitting?

Smoking cessation interventions have been proven effective for hospitalised patients regardless of reason for admission,³⁴ and smoking cessation rates have also been improved by smoking cessation interventions in respiratory patients.^{1,5,20,35-37} Both inpatient and outpatient treatment settings that treat respiratory patients should introduce **systems to address tobacco use to ensure best practice intervention** is received to support this high-risk patient population with quitting.^{38,39}

Smoking cessation interventions for hospitalised patients increase the rate of long-term quitting if they include:³⁴

- in-hospital behavioural support,
- stop smoking medication (nicotine replacement therapy or varenicline), and
- follow-up for at least 1 month after discharge

Available evidence suggests more intensive stop smoking interventions are necessary to support cessation among some groups of respiratory patients.²⁰ Data from the Health Survey for England shows COPD patients have greater tobacco dependence compared to the general population of smokers and their COPD does not necessarily make them more motivated to stop smoking.⁴⁰

Vaping

E-cigarettes provide nicotine without combustion and are popular among UK smokers as an alternative to smoking. While electronic cigarettes are not risk-free, Public Health England estimates they are 95% safer than smoking cigarettes.⁴¹ There is also evidence to indicate that e-cigarettes are effective in helping patients stop smoking.^{41,42} Evidence on safety and the role vaping plays in supporting quitting is reviewed regularly. Policies related to the use of electronic cigarettes in inpatient settings will vary by trust and organisation.

Best practices for managing tobacco withdrawal in the inpatient setting

Most regular smokers will experience tobacco withdrawal symptoms within hours of their last cigarette and can range from mild to severe.⁴³ Withdrawal symptoms include aggression and hostility and can affect the care of the patient. Recognising and managing withdrawal among hospitalised patients who smoke should be a priority. Providing nicotine replacement therapy (NRT) or varenicline to a patient will ease tobacco withdrawal symptoms and can also support long-term quitting. A combination of the patch (NRT patch can take 20–40 minutes to reach therapeutic dose) with a short-acting oral NRT product (e.g. gum, inhaler, spray) is a recommended evidence-based practice for managing tobacco withdrawal in inpatient settings.^{38,44}

Tobacco withdrawal symptoms include:⁴³

- Urges to smoke or cravings
- Restlessness or difficulty concentrating
- Irritability, aggression, anxiety, crying, sadness or depression
- Difficulty sleeping or sleeping disturbances
- Increased appetite and weight gain
- Coughing
- Mouth ulcers
- Constipation
- Light headedness

Very Brief Advice on Smoking

How to approach smoking cessation with patients

The NHS Long Term Plan has committed that all people admitted to hospital who smoke will be offered NHS-funded tobacco treatment services by 2023/24.³⁹

NICE outlines a care pathway for supporting smoking cessation in the inpatient setting that can be adopted for respiratory patients.^{38,45} In essence, the care pathway incorporates a very brief intervention using the 3As model:

ASK and record smoking status

ADVISE the patient:

- the best way of quitting is with a combination of support and stop smoking medication
- support with stopping smoking and/or managing any tobacco withdrawal symptoms (temporary abstinence) is available
- of the personal health benefits of stopping smoking

ACT on patient response:

- prescribe NRT for patients in withdrawal
- monitor withdrawal and adjust pharmacotherapy accordingly
- refer to specialised stop smoking support (hospital-based, local stop smoking service)

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