



**Liverpool
Public Health
Observatory**

Interventions to reduce emergency hospital admissions for respiratory illness

Cath Lewis

Liverpool Public Health Observatory

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clewis@liverpool.ac.uk

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LIVERPOOL PUBLIC HEALTH OBSERVATORY

Liverpool Public Health Observatory was founded in the autumn of 1990 as a research centre providing intelligence for public health for the five primary care trusts (PCTs) on Merseyside: Liverpool, St.Helens and Halton, Knowsley, Sefton and Wirral. It receives its core funding from these PCTs.

The Observatory is situated within the University of Liverpool's Division of Public Health. It is an independent unit. It is not part of the network of regional public health observatories that were established ten years later, in 2000. Copies of this report are available from our website <http://www.liv.ac.uk/PublicHealth/obs>.

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INTRODUCTION

Respiratory illness is a particular concern in the North West. According to the North West Public Health Observatory (<http://www.nwph.net/healthprofile>: website last accessed July 2009), indirectly standardised ratios of those admitted to hospital with Acute Respiratory conditions (173.51) and Chronic Lower Respiratory conditions (194.32) are much higher for Liverpool than for England as a whole. In Central and Eastern Cheshire, however, and in Western Cheshire, ratios for Acute Respiratory conditions (95.29, 92.31 respectively) and Chronic Lower Respiratory conditions (94.34, 91.53), are lower than for England.

Chronic lung disease and asthma accounted for more than 275,000 hospital episodes and almost 1,320,000 bed days in England in 2004/05 (Copeland et al, 2000). There are about 900,000 people in the UK with diagnosed COAD (Department of Health, 2004), although many cases are undiagnosed (The Information Centre, 2007).

Asthma also comes under this heading, and the extent to which asthma is controlled predicts health service use (Sjostrum et al, 1997).

KEY RECOMMENDATIONS - EFFECTIVE INTERVENTIONS

EFFECTIVE POLICY INTERVENTIONS

- Effective tobacco control policies have included the 2003 ban on tobacco advertising, The Health Act 2006, which increased the age at which tobacco can be purchased from 16 to 18, and the 2007 ban on smoking in public places. Increases in taxation are the most cost-effective means of increasing smoking quit rates.

EFFECTIVE COMMUNITY INTERVENTIONS

- For smoking cessation, mass media campaigns are effective in preventing uptake of smoking and increasing numbers of quitters. Support at work is also effective in smoking cessation.

EFFECTIVE HEALTH SERVICE INTERVENTIONS

- For patients with pulmonary disease and asthma, assisting patients to stop smoking is, again, one of the most effective components of management (see below). Other components include pulmonary rehabilitation, as well as assisted or early discharge schemes. Access to specialist support is also key.
- Brief interventions delivered in GP surgeries to improve quit rates are the third most cost-effective intervention. Nicotine replacement therapies are also effective in smoking cessation
- In preventing respiratory disease, the influenza vaccine and pneumococcal vaccines are effective for high risk groups, in reducing death rates and reducing hospitalisation, including those aged over 65 or with chronic health problems.

1. COPD

1.1 POLICY INTERVENTIONS

Smoking is estimated to cost the NHS £1.5 billion a year (Parrott et al, 1998), and is the most significant risk factor for COPD, according to NICE (2004). Smoking is age-related, and prevalence for men was highest among those aged 20-34, and for women aged 25-24 (Lader 2007). Slightly more men than women smoke (ONS, 2009).

Reducing smoking prevalence is a key government priority. The Public Service Agreement on smoking aims to reduce adult smoking rates, from 26% in 2002, to 21% or less by 2010. It aims to reduce smoking prevalence among routine manual groups, from 31% in 2002 to 26% or less in 2010 (DoH, 2006).

According to Health England Leading Prioritisation (HELP), which provides information on the cost-effectiveness, and, impact on health inequalities, of interventions, increases in tax on cigarettes are the most cost-effective intervention. A 5% increase in taxation increases the quit rate by 0.11%. A 0.12% increase in the quit rate is associated with an additional 0.001 Quality Adjusted Life Years (QALYs) per person, and cost savings of £5.80 per person.

Effective tobacco control policies can help prevent young people from starting smoking, as well as supporting those who are trying to quit. There have been a number of policies in the UK in recent years, including the 2003 ban on tobacco advertising and enlarged text on warnings on cigarette packets. According to a recent study (Hastings et al, 2007), these are effective measures, that seem to have equal effect across different socioeconomic groups. http://www.york.ac.uk/phrc/PHRC%20A1-05%20Exec%20Summary_num%203.pdf.

Virtually all public places and workplaces in England have been required to be smokefree since 1 July 2007, with other venues including mental health establishments have been smokefree since 2008. A government report (http://www.smokefreeengland.co.uk/files/dhs01_01-one-year-on-report-final.pdf) shows that compliance with smokefree legislation is high. In addition, from October 2007, it became illegal to sell tobacco products to anyone under the age of 18 (www.smokefreeengland.co.uk). The Health Bill 2009 was also introduced to Parliament on 15th January. It includes proposals to remove tobacco displays in shops and to restrict the sale of cigarettes from vending machines.

1.2 COMMUNITY INTERVENTIONS

1.2.1 MASS MEDIA CAMPAIGNS

Mass media – these campaigns combine different sorts of media, such as TV, radio and national newspaper advertising. Cost effectiveness is difficult to judge in advance, as it is impossible to know in advance if a campaign will work. However, even if a comparatively small number of people stop smoking, the campaign will be cost effective, and mass media campaigns are recommended by NICE (2008). National mass media campaigns are the second most cost-effective intervention for smoking cessation, according to HELP. National mass media campaigns (comprising TV and press advertising, telephone help lines and information booklets), would cost £288 per QALY gained. Campaigns cost an average £1.63 per smoker, and increase the quit rate by 0.445. Therefore the net cost is actually a saving of 318.90 per person, associated with an additional 0.006 QALYs per person.

Communication between different agencies involved in smoking cessation at local, regional and national level is key, as is the use of social marketing techniques.

1.3 HEALTH SERVICE INTERVENTIONS

1.3.1 SMOKING CESSATION

- Effectiveness of smoking cessation interventions is increased when 3 or 4 formats are used (e.g. self-help, telephone counselling, group or individual counselling).
- *Brief interventions* – these may include opportunistic advice, encouragement, self-help materials, and referral to more intensive support, such as the NHS Stop Smoking Service, where appropriate. They are delivered by a range of professionals, typically in less than 10 minutes (NICE, 2006a; 2006b). Brief interventions delivered in GP surgeries to improve quit rates are the third most cost-effective intervention, according to HELP. Five minutes of GP opportunistic advice to smokers presenting at GP surgeries cost £11 per person more than usual care, for 2007/8. These interventions increase the quit rate by 0.727%, and result in 0.009 additional QALYs per person. Based on health care cost savings of quitting, interventions are associated with savings of £31.10 per person. NICE also recommend referral to NHS Stop Smoking services.
- Counselling delivered by a smoking cessation counsellor increased the likelihood of success compared to less intensive support (Naidoo et al, 2004).
- A cognitive behavioural therapy approach may be effective in raising abstinence stakes and decreasing the number of cigarettes smoked among smokers living in a deprived area (Marks and Sykes, 2002).
- The same smoking cessation interventions are effective for both men and women, and across different black and ethnic minority groups, and for those aged over 50 (Fiore, 2000).

- Analyses of UK data suggests that people less likely to give up smoking were from lower social classes (Buck and Morgan, 2001). Smoking cessation rates are lower among people in routine and manual groups than those in higher socioeconomic groups, suggesting that some groups face social and economic barriers that inhibit their ability to quit. People in these groups may need extra support to quit, and more research is needed in this area (NICE, 2008).
- NICE recommend that Nicotine Replacement Therapy (NRT), should be offered as appropriate to people who are planning to stop smoking. This should be prescribed as part of an abstinence-contingent treatment, in which a smoker makes a commitment to stop smoking on or before a particular date. This is also appropriate for women who are pregnant or breastfeeding. Varenicline or bupropion should be offered to those considering quitting, but not to pregnant or breastfeeding women, or those under the age of 18. Systematic review evidence showed nicotine replacement therapy and bupropion are effective for those with COPD (NICE, 2004). Nicotine replacement therapy (NRT) is the fourth most cost-effective intervention to reduce smoking rates, according to HELP. NRT cost around £57.30 more per person than attempts to quit with no therapy. NRT increases the quit rate by 1.86% and results in an additional 0.024 QALYs per person, and cost savings of £79.70.
- Support at work can be an important component in helping people to quit. The National Institute for Health and Clinical Excellence (NICE) has issued public health guidance on the most effective ways to encourage and support employees to stop smoking. Recommended initiatives include giving workers time off without losing pay to attend stop smoking clinics, and providing on-site stop smoking support, if feasible, where there is sufficient demand (NICE, 2007a). However, NICE (2008) recommend that more research needs to be carried out on workplace interventions.
- Methods of assisting pregnant women to stop smoking are cost effective if women do not return to smoking after the birth of the baby. Insufficient evidence was available to determine if home visits by specialist stop smoking professionals were effective compared to attending stop smoking clinics.
- Data routinely collected by NHS Stop Smoking Services could be improved in order to enhance the service. For example, although reducing prevalence among people in routine and manual groups is a priority, information on occupation is not collected as part of the minimum data set required by the Department of Health.
- New media such as text messaging and podcasts are potentially effective in delivering personalised advice to people who smoke. However, more published evidence of their long-term impact is needed.
- There is strong evidence for the effectiveness of pharmacy-led stop smoking services (Anderson, 2009), in community settings as well as in hospitals. The community pharmacy contractual framework requires pharmacies to provide opportunistic healthy lifestyle advice to smokers. They are also obliged to participate in up to six

public health campaigns per year, and many use stop smoking as one of these campaigns (NHS Employers, 2009).

- It is important to map local prevalence rates on smoking, as a baseline, including high-risk groups such as those with mental health problems, as well as priority populations such as pregnant women (NHS Employers, 2009).
- High Impact changes listed in the Department of Health's 'Excellence in Tobacco Control' Report (2008), include partnership working, collection of robust data, tackling cheap and illicit tobacco, and helping young people to be smokefree. Smoking prevalence among 11 year olds has remained at 9% in recent years, although by age 15, 16% of boys and 24% of girls are regular smokers.

1.3.2 PROACTIVE MANAGEMENT IN BOTH COMMUNITY AND HOSPITAL SETTINGS

Development of a chronic care model that leads to more pro-active management of COPD is key. Multi-disciplinary working is very important in effective care. Care should be optimised during inpatient episodes to improve clinical outcomes and decrease recurrent hospitalization. Assisted or early discharge schemes can also be an important component of care for some people admitted with exacerbations of COPD. They aim to facilitate the early discharge of patients admitted with an exacerbation of COPD by providing increased medical, nursing and social support in the community; and by their nature involve hospital admission and usually at least one over-night stay (NICE website <http://www.nice.org.uk/usingguidance/commissioningguides/assdissvcpatientscopd/commissioninganassisteddischargeservice.jsp>: last accessed October 2009).

Follow-up care is also key. Most patients can be reviewed in primary care, and this should happen twice a year. Patients with severe disease requiring interventions such as long-term non-invasive ventilation, should be reviewed regularly by specialists. Patients with COPD should be given self-management advice that allows them to respond promptly to symptoms of an exacerbation.

1.3.3 BMI AND NUTRITIONAL SUPPORT

Healthy BMI is associated with lower mortality and improved lung function. Those with a low BMI may benefit from nutritional supplements (NICE, 2004).

1.3.4 PULMONARY REHABILITATION

Following recovery from an exacerbation of COPD, patients may then be eligible for pulmonary rehabilitation, which is defined by NICE as 'exercise training for about 4 weeks with or without education or psychological support', (<http://www.nice.org.uk/usingguidance/commissioningguides/pulmonaryrehabilitationserviceforpatientswithcopd/clinicalrecommendations.jsp>: last accessed October 2009). According to NICE, potential benefits of robustly commissioning an effective pulmonary rehabilitation

service for patients with COPD include improvement to patients' quality of life and exercise capacity. Some, but not all, studies have also shown reduction in hospital admissions and length of stay. Pulmonary rehabilitation should be offered to patients who consider themselves functionally disabled by COPD.

1.3.5 VACCINATIONS

A NICE (2004) review of three retrospective cohort studies found influenza and pneumococcal vaccinations reduced hospitalisations and death rates in elderly people with chronic lung disease.

1.3.6 WEATHER WARNING SYSTEMS.

Although COPD exacerbations are associated with adverse weather conditions, although one study found that a forecasting alert service for GPs, to warn of adverse conditions, did not result in a significant number of reductions in hospital admissions (Maheswaran et al, 2009). <http://guidance.nice.org.uk/CG12/NiceGuidance/pdf/English>

2. ASTHMA

It is estimated that admissions due to asthma cost the NHS £58.3 million a year. There were 67,713 admissions for asthma in 2004 (BTS/SIGN). Around three quarters of these could be avoided with appropriate care, saving around £43.7 million from the NHS hospital budget (Asthma UK, 2007). In addition, patients with asthma find urgent hospital admissions for this condition frightening and distressing. Improved routine care could help to avoid many of these admissions – it is estimated that 75% of these admissions could potentially be avoided (Partridge, 1991), saving £43.7 million.

In North-West England, hospital admissions are 65% higher than in East England (Asthma UK, 2007). Standardised admissions rate for the North West was 130, compared with 100 for England as a whole, although rates vary across the region. (now Halton and St Helen's) PCT (Department of Health, 2004). Admissions also vary according to ethnic group - compared with white people, people of South Asian origin who have asthma are three times more likely to require an emergency admission, with double the rate among people of Afro-Caribbean descent (Department of Health, 2004).

2.1 POLICY INTERVENTIONS

For interventions on smoking cessation, see section 1, above.

2.2 COMMUNITY INTERVENTIONS

For mass media interventions, see section 1, above.

2.3 HEALTH SERVICE INTERVENTIONS

2.3.1 PRIMARY PREVENTION

Interventions where there is *evidence for effectiveness* include;

- Avoidance of tobacco smoke – see section 1, above.
- Written asthma plans (Adams et al, 2000), and review of people with asthma at least once a year (Asthma UK, 2007). Only 16% of people with asthma in England have a written personal asthma plan, although hospital admissions are four times lower in people who do.
- Weight reduction is recommended in obese patients with asthma, to promote general health and improve asthma control.

Interventions where there is *insufficient evidence for effectiveness*, according to the British Thoracic Society, include allergen avoidance, modified milk formulae, nutritional supplementation during pregnancy, use of ionisers, immunotherapy impact or use of complementary or alternative medicine, upon primary prevention of asthma.

2.3.2 SECONDARY PREVENTION

Interventions where there is *insufficient evidence for effectiveness*, according to the British Thoracic Society (2008b), include acupuncture, Herbal and Chinese medicines, homeopathy, hypnosis, ionisers, and physical exercise

Interventions where there is *evidence for effectiveness*, according to the British Thoracic Society, include;

- Avoidance of tobacco smoke. Direct or passive smoking adversely affects quality of life, lung function and need for medications
- Avoidance of air pollution – further research is needed on the role of indoor pollutants
- Allergic specific immunotherapy is beneficial in the management of patients with allergic asthma.
- The Buteyko breathing technique, which focuses on control of hyperventilation, may be useful in controlling symptoms, and family therapy may also be useful.
- One study found that socio-economic factors, such as material deprivation and poor housing, had little effect on risk of admission, although socially isolated people were more likely to be admitted. The most important factors influencing risk of admission were presence of long-term medical conditions and being housebound.

2.3.4 INFLUENZA VACCINES

Flu immunisation is available free of charge on the NHS for those aged over 65, and for all adults with chronic health problems including respiratory disease, chronic heart disease and diabetes. A meta-analysis of 20 cohort studies in elderly persons had a pooled estimate of vaccine efficacy at 56%. These studies have found that for patients with chronic lung disease, administration of the influenza vaccine substantially decreases mortality, hospitalisation for influenza and pneumonia, exacerbation of chronic lung disease, and physician visits for respiratory complaints (Sharma, 2009), although other reports have found the flu vaccine to be of less value in preventing emergency admissions in the elderly.

The swine flu vaccination programme began on 21st October 2009, with the highest risk groups being offered the vaccine first. High risk groups include those aged 65 and over in the seasonal flu vaccine groups, which includes those with chronic lung disease, chronic heart disease, chronic liver disease, chronic neurological disease, and immunosuppression.

2.3.5 PNEUMOCOCCAL VACCINE

The pneumococcal vaccine programme was launched in August 2003. This vaccine offers protection against serious pneumococcal infections such as pneumonia, meningitis and septicaemia. The Centers for Disease Control and Prevention have demonstrated a 57% overall protective effectiveness of this vaccine against invasive disease. Since April 2005, all those aged 65 and over, and adults in high-risk groups, are recommended to have the vaccine. High risk groups include those with dysfunction of the spleen, chronic respiratory disease (not asthma, unless particularly severe), chronic heart disease, chronic renal disease, chronic liver disease, diabetes, immunosuppressed patients, individuals with cochlear implants, individuals with the potential for cerebrospinal fluid leaks.

2.4 TERTIARY PREVENTION

2.4.1 PULMONARY REHABILITATION

Pulmonary rehabilitation can be defined as;

“a multidimensional continuum of services directed to persons with pulmonary disease and their families...with the goal of achieving and maintaining the individual’s maximum level of independence and functioning in the community”
(Sharma et al, 2009).

NICE guidelines recommend that all patients who consider themselves to be disabled by COPD should have access to pulmonary rehabilitation. Most programmes are hospital based, although there is also growing provision for pulmonary rehabilitation in the community.

- The effectiveness of pulmonary rehabilitation programmes has been established by clinical trials.
- The benefits of pulmonary rehabilitation are seen even in irreversible pulmonary disorders.
- This is achieved through patient and family education, exercise training, psychosocial and behavioural intervention, and outcome.
- COPD is the major disease involved in referral for rehabilitation services. Although it is not conclusively proven, patients with other conditions (including asthma, cystic fibrosis and lung cancer) may also benefit.
- A smoking cessation plan is an essential part of a comprehensive management strategy.
- Treatment also involves the use of pharmaceuticals including anti-inflammatory agents, bronchodilators, antibiotics, mucolytic agents, oxygen therapy.
- Preventative therapy includes administration of the influenza vaccine (described above).
- In terms of surgical approaches, only giant bullectomy, and, possibly, lung volume reduct surgery, are useful.
- The optimal frequency of a pulmonary rehabilitation programme is not well established.

- Few studies have been published on the impact of pulmonary rehabilitation on health care costs.

2.4.2 ACCESS TO SPECIALIST SUPPORT

Specialised respiratory services include a range of services not usually provided in every local hospital. Hospitals providing these services usually cater for a number of neighbouring PCTs. Services normally include home non-invasive ventilation, respiratory function testing, occupational lung disease, and other specialised tests.
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Liverpool Public Health Observatory

Division of Public Health
Whelan Building
Quadrangle
University of Liverpool
Liverpool L69 3GB

Tel: 0151 794 5570/81
Fax: 0151 794 5588
E-mail: obs@liv.ac.uk

WWW: <http://www.liv.ac.uk/PublicHealth/obs>



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