

## **Smoking and mental disorder: Paper for NICE smoking cessation guidance (2012)**

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Smoking is the largest cause of preventable illness and responsible for almost one in five deaths (79,100) in England in adults over 34 years old (NHS IC, 2012). Smokers die on average 10 years earlier than non-smokers with 1 in 2 smokers in general population dying 15 years early and 1 in 4 smokers dying 23 years early (Doll, 2004). In 2010/11, smoking was responsible for 459,900 hospital admissions in England and there were 1.5 million admissions primary diagnosis caused by smoking (NHS IC, 2012). Increased smoking is responsible for half the difference in survival rates to 70 years of age between social classes I and V (Wanless, 2004).

### **Risk factors for smoking**

Smoking rates are highest in young adults (27% for 16-19 year olds) (NHS IC, 2011). It also occurs more commonly in those from lowest 20% household income (40% for men and 34% for women) compared to highest 20% household income (14% for men and 11% for women) (NHS IC, 2011). Geographical variation occurs with highest smoking rates in men in North West England (24%) and London (26%) (NHS IC, 2011).

Knowledge about risk factors for smoking initiation is important since people typically continue to smoke for decades once they have started and 65% of current and ex-smokers started smoking before the age of 18 (NHS IC, 2012). Children who live with parents or siblings smokers are up to three times more likely to become smokers (Leonardi-Bee et al, 2011). Mental disorder during adolescence is particularly important since half of lifetime mental disorder has arisen by the age of 14 (Kessler et al, 2005) and 43% of smokers aged 11-16 have either emotional or conduct disorder (Green et al, 2005).

### **Higher levels of smoking in people with mental disorder and other groups**

Compared to smoking rates in the general population, rates are higher in particular groups such as routine and manual socio-economic groups (28%) (NHS IC, 2011) and certain Black and Minority groups (Karlsen et al, 2011). Particular settings also have much higher rates including prisons (80%) (Singleton et al, 1999) and mental health units (70%) (Jochelson and Makrowski, 2006). Other groups of smokers requiring targeted approaches include people with long term (physical) conditions who also have much higher rates of mental disorder such as depression (NICE, 2009). However, smokers with mental disorder represent the largest single groups of smokers.

### **Levels of smoking in people with mental disorder**

The most recent national survey found that smoking rates among 11-16 year olds with mental disorder were 30% for those with conduct disorder (affects 6%), 19% for those with emotional disorder (affects 4%), 15% for those with attention deficit hyperactivity disorder (affects 3%) and 5% in those without such disorders (Green et al, 2005).

Level of smoking in adults with mental disorder is higher in those with mental disorder compared to those without mental disorder as highlighted in the table below (McManus et al, 2010)

Table 1: Level of smoking by people with different mental disorder in England (McManus et al, 2010)

	Prevalence of disorder in population	Proportion who are regular smokers
Any mental disorder	23%	33%
Common mental disorder	16%	32%
• Depressive episode	3%	37%
• Phobias	2%	37%
• Generalised anxiety disorder	4%	36%
• PTSD screen	3%	37%
• ADHD screen	1%	31%
Psychosis	1%	40%
Suicide attempt in past year	1%	57%
Drug dependence	3%	69%
Alcohol dependence	6%	46%
Alcohol problems	24%	30%

For people with common mental disorder, smoking rates are 33.8% for those on antidepressants and 41.6% for those on anxiolytics (RCP, 2013). For those with probable psychosis, smoking rates of 40% underestimate smoking due to sampling method excluding people not in private households (McManus et al, 2010). A more recent review found smoking rates of 59% in people with first episode of psychosis who had been smoking for an average of 5.3 years before onset of psychosis (Myles et al, 2012). The RCP (2013) report also found that 59% of those taking antipsychotic medication were smokers (RCP, 2013). However, highest smoking rates occurred in those with illicit drug dependence (69%) (McManus et al, 2010) which is important to address since smoking predicts illicit substance use in methadone maintenance programmes (Frosch et al 2000).

### **Proportion of tobacco consumption in those with mental disorder**

Due to almost one in four of the population being affected by mental disorder at any one time and associated increased rates of smoking, 42% of adult tobacco consumption in England occurs in those with mental disorder with 31% of adult tobacco consumption by those with common mental disorder (McManus et al, 2010). The RCP (2013) report estimated that 33% of tobacco was consumed by adults with common mental disorder, PTSD, probable psychosis and eating disorder but did not include consumption by those with drug and alcohol misuse or attempted suicide. The proportion of tobacco consumption by children and adolescents with mental disorder is even higher with 43% of smokers aged 11-16 having either conduct disorder or emotional disorder (Green et al, 2005).

### **Bidirectional relationship between smoking and mental disorder**

Evidence suggests that mental disorder is associated with increases uptake of smoking while smoking is associated with increases risk of mental disorder. For common mental disorder, uptake of smoking is associated with anxiety disorders (Sonntag et al, 2000; Swendsen et al, 2010) and depression (43% increased uptake) (RCP, 2013) while smoking is associated with increased risk of anxiety disorders (Cuijpers et al, 2007) and 52% increased risk of depression with women who smoke in pregnancy at two fold risk of post-partum depression (RCP, 2013). For dementia, smoking increases risk of Alzheimer's by 79% and vascular dementia by 78% (Anstey et al, 2007). Furthermore, smoking during pregnancy is associated with 2-fold increased risk of conduct disorder in boys at age 3 (Hutchinson et al, 2010), antisocial behaviour and ADHD symptoms in children (Button et al, 2007) and increased risk in children of externalising problems (Roza et al, 2009).

### **Impact of smoking on people with mental disorder**

As highlighted in the introduction, smoking is the largest single cause of preventable death in England (NHS IC, 2012). Due to higher level of smoking, people with mental disorder experience even higher levels of smoking related harm and associated inequalities. For instance, people with schizophrenia have significantly reduced life expectancy (20.5 years less for men and 16.4 years for women) with the largest single cause of excess mortality due to increased levels of smoking (Brown et al, 2010). Smokers with schizophrenia 3-fold increased death rate from respiratory disease (Saha et al, 2007)

As highlighted, 42% of adult tobacco consumption in England is by those with mental disorder (McManus et al, 2010). Similar levels of consumption by those with mental disorder in USA is responsible for 45.5% of all smoking related deaths by those with mental disorder (Williams & Ziedonis, 2004).

Higher levels of smoking by people with mental disorder compounds social exclusion, is associated with reduced alternative coping strategies (Malpass & Higgs, 2009) and has disproportionate financial impacts. Smokers with mental disorder also require up to double the doses of certain medication (Taylor et al, 2012).

### **Economic impact of smoking**

In the UK, £17.7 billion spent on tobacco in UK in 2010 (NHS IC, 2011). The annual direct costs of smoking to NHS are £2.7 billion in England (Callum et al, 2010) and £5.2 billion in UK (Allender et al, 2009) while annual wider cost of smoking is £13.7 billion (Nash & Featherstone, 2010). The NHS spends £720 million a year on treating smoking related disease in people with mental disorder while smoking increases psychotropic drug costs in the UK by up to £40 million per annum (RCP, 2013).

Assuming 45% of all smoking related deaths by those with mental disorder (Williams & Ziedonis, 2004), cost of smoking in those with mental disorder can be estimated as £6.2 billion. This compares to total expenditure on NHS Stop Smoking Services in England in 2010/11 of £84.3 million (excluding pharmacotherapy prescriptions) (NHS, IC, 2011).

### **Attitude to smoking cessation**

Most smokers (67%) want to give up, 75% have previously tried to give up and 69% of smokers did not allow smoking in their home (NHS IC, 2011). Smokers with mental disorder as motivated to quit as general population (Siru et al, 2009; HSE, 2010).

### **Smoking cessation interventions for those with mental disorder**

Interventions for smokers with mental disorder are the same as for heavier smokers in the general population but with additional monitoring and adaptation (HMG, 2011a; RCP, 2013). Smoking cessation is an important clinical issue for the following reasons:

#### **1) Medication toxicity following cessation**

Smoking induces particular liver enzymes (CYP1A2) which means that certain medications are metabolised more quickly. These medications include antidepressants (mirtazapine and tricyclic antidepressants), certain antipsychotics (olanzapine, clozapine and haloperidol), some benzodiazepines and opiates (Taylor et al, 2012). Therefore, smokers require up to twice the doses of these medications to achieve the same plasma levels. Smoking cessation can result in toxic levels of these drug over a matter of days if doses are not reduced while resumption of smoking quickly reduces plasma levels. Therefore, ongoing liaison is required between prescribers in secondary and primary care. Dose changes following cessation include the following although further dose reductions may be required (Taylor et al, 2012):

- 25% dose reduction during first week of cessation for clozapine and olanzapine and further weekly plasma levels until levels have stabilised
- 25% dose reduction during first week of cessation for fluphenazine and benzodiazepines
- 10-25% dose reduction during first week of cessation for tricyclic antidepressants

## 2) Side effects of pharmacotherapy

Bupropion can result in seizures as well as dry mouth, constipation, nausea and insomnia. For varenicline, there have been reports of changes in behaviour or thinking, anxiety, depression, mood swings, psychosis, hallucinations, aggressive behaviour, suicidal thoughts/ attempts in people taking varenicline some of whom had no known pre-existing psychiatric condition (MHRA, 2010). Care is required if varenicline is prescribed to patients with a history of psychiatric illness and if people taking varenicline or bupropion develop such symptoms or display any changes in behaviour which are of concern for the doctor, patient, family, or caregiver, they should stop varenicline and contact their doctor immediately (MHRA, 2010).

## 3) Potential worsening of symptoms

Smoking cessation can be associated with worsening of depression in a minority of those with depression (Hughes, 2007)

## 4) Weight gain

Average weight increases by 7kg following smoking cessation in people without mental disorder (Parsons et al, 2009). Interventions to reduce post cessation weight gain include very low calorie diets and CBT although general advice was ineffective (Parsons et al, 2009)

## **Coordination of smoking cessation to enhance safe smoking cessation**

DH 2011/12 service and monitoring guidance for NHS Stop Smoking Services emphasises importance of improved co-ordination between NHS SSS, primary care, community and acute mental health services (DH, 2011). Following smoking cessation, the plan for dose reductions and dose monitoring of certain medications above need to be clearly communicated with prescribers in primary and secondary care to prevent medication toxicity. Effective coordination between primary and secondary care as well as NHS SSS is required to facilitate dose changes, reduces relapse following cessation, promptly increase doses of medication if the patient starts smoking again and facilitate regular monitoring by health professionals for changes in mental state. For those taking bupropion and varenicline, there should be a clearly negotiated plan of support especially in first 2-3 weeks with clear strategies in the event of change.

As well as NHS Stop Smoking Services, primary and secondary care, smoking cessation can also be provided in other settings such as social care with 25% reduction in risk of financial stress following cessation (Siahpush et al, 2007). All providers require appropriate training (HMG, 2011a).

## **Interventions to prevent smoking**

Annual rates of permanent cessation are just 2-3% in the UK (Taylor et al, 2006). Effective population-based tobacco control approaches include a mix of educational, clinical, regulatory, economic and social strategies, especially if aimed at younger age groups (HM Government, 2011b). Price is important with tobacco 16.9% less affordable in 2009 compared to 1980 (NHS IC, 2010) and cost-effective prevention interventions include cigarette tax increases (Kahende et al, 2009). Other interventions include mass media campaigns, assessing compliance with tobacco legislation and addressing illicit tobacco are also important.

Since 65% of adult smokers start smoking before 18 (NHS IC, 2011), this represents a key opportunity for preventive intervention (NICE, 2008; NICE, 2010). Since adolescents with either conduct or emotional disorder represent 43% of smokers under the age of 17 (Green et al, 2005), they are a particularly important target population.

### **Interventions to prevent smoking update in adolescents**

Some evidence suggests that smoking cessation pharmacotherapy in adolescents has limited effectiveness (Kim et al, 2011). Ability to resist smoking in social and stressful situations mediated almost 56% of the smoking cessation intervention's effect in a trial of more than 2500 adolescent smokers (Bricker et al, 2010). Another study of more than 1300 adolescent smokers highlighted the social influence of peers as a main predictor of cessation and the importance of inclusion of peer groups in cessation strategies (Dijk et al, 2007).

Uptake of smoking can be prevented and since most smoking starts before adulthood, the greatest opportunity for prevention occurs during childhood and adolescence. Various programmes can prevent uptake of smoking in children/young people (NICE, 2008; NICE, 2010) including school-based programmes (Ariza et al, 2008; Conner and Higgins, 2010; Crone et al, 2011) and internet based interventions (Thyrian et al, 2008). Parental smoking cessation is associated with reduced smoking in their children (Wyszynski et al, 2011) with parenting programmes to prevent tobacco smoking associated with significant reductions in smoking (Petrie et al, 2007). Since smoking uptake is several times higher in those with mental disorder, this group requires targeted approaches

Smoking prevention during adolescence is cost effective (Rasch & Greiner, 2008) while school-based smoking cessation and prevention is potentially more cost-effective than cessation of tobacco use in adults (Dino et al, 2008). Relapse prevention is also highly cost effective (Coleman et al, 2010).

### **Public mental health interventions to reduce smoking**

Since 42% of adult tobacco consumption is by those with mental disorder and 43% of smokers aged 11-16 have either conduct or emotional disorders, interventions to prevent mental disorder, treat as soon as mental disorder arises, and promote mental health have an important place in reducing level of smoking.

a) Prevention of mental disorder can prevent a large proportion of smoking

Mental disorder is associated with a range of risk factors (Campion et al, 2012). Certain evidence based interventions which address such risk factors and promote protective factors for mental health can prevent a large proportion of mental disorder and associated smoking (Campion and Fitch, 2012). For instance, risk factors for mental disorder in children and adolescents include:

- Household factors: Children from lowest 20% household income are at 3 fold increased risk of mental disorder (Green et al, 2005)
- Parental factors: Poor parental mental health 4–5 fold increased rate in onset of mental disorder
- Child adversity which is one of the strongest predictor of mental disorder (Kessler et al, 2010). Child abuse is associated with several fold increased risk of mental disorder with even higher increased risk for those experiencing sexual abuse (Jonas et al, 2011)

Among adults risk of mental disorder is associated with socioeconomic inequality, unemployment, debt, violence, stressful life events, inadequate housing and fuel poverty (Campion et al, 2012). However, inequality is a key factor underlying many other risk factors for mental disorder which then further compounds inequality.

Certain groups are at several fold risk of mental disorder and therefore disproportionately benefit from prevention and early treatment. Such groups include children with learning disability (6.5 fold increased risk of mental disorder), looked after children (5 fold increased risk of mental disorder), certain BME groups, lesbian, gay and bisexual people, prisoners and homeless people (Campion et al, 2012).

Inequality is an important underlying element for many of these risk factors and therefore interventions to address and prevent inequality can prevent mental disorder and associated health risk behaviour.

b) Early intervention for mental disorder and reduced smoking

Mental disorder results in a further range of inequalities which can also be prevented by early treatment of mental disorder, intervention for health risk behaviours such as smoking, and detection and treatment of physical illness. This is an important part of reducing high levels of physical illness and premature death in those developing mental disorder

c) Promotion of mental health and prevention of smoking

Improved wellbeing associated with reduced rates of health risk behaviour (Deacon et al, 2009). Both the Public Health White Paper (DH, 2010) and mental health strategy (HMG, 2011a) highlight the association between improved mental health and a range of reduced health-risk behaviours. Therefore interventions which promote mental wellbeing have an important role in reducing such behaviours.

### **Assessment of local smoking cessation needs**

Data exists on local smoking levels numbers of smokers and smoking related deaths (APHO, 2012). Numbers of smokers with mental disorder can be estimated by applying national smoking rates for different mental disorder (table 1) to local numbers with different mental disorder (Campion and Fitch, 2012). Information about levels of smoking in higher risk groups including those with mental disorder informs commissioning needs.

### **Level of unmet need**

Only a minority of people with mental disorder except psychosis in the UK receive any treatment despite cost effective interventions (Green et al, 2005; McManus et al, 2009; Campion and Fitch, 2012).

Similarly for those with nicotine dependence, only a minority receive any intervention. The largest provider of smoking cessation is NHS Stop Smoking Services which facilitated 788,000 quit attempts and 384,000 successful quits in England in 2010/11 (cessation rate 49%) (NHS IC, 2011). With 41.8 million adults in England (ONS, 2012) and 21% smoking rates equating to 8.8 million smokers, this means that 9.0% of smokers had one attempt and 4.4% quit. However, no information is available on the proportion with mental disorder who received cessation interventions from NHS Stop Smoking Services despite this group being responsible for 42% of tobacco consumption in England (McManus et al, 2010) and DH smoking service guidance highlighting that 'health inequalities experienced by people with mental disorder will widen if investment in smoking cessation for this group is not greater than for the general population' (DH, 2011).

In primary care, smokers with mental disorder are more likely than the general population of smokers to receive advice to quit smoking and 80% more likely to be prescribed smoking cessation pharmacotherapy (RCP, 2013). However, 50% of smokers with mental disorder were given advice to quit but only around 12% were prescribed NRT, bupropion or varenicline (RCP, 2013).

The Joint Strategic Needs Assessment is a key vehicle to highlight unmet need for Health and Wellbeing Boards and can enhance early access to smoking cessation particularly in higher risk groups, interventions to prevent health risk behaviour including wellbeing promotion, interventions to prevent mental disorder and associated health risk behaviour.

### **Commissioning to address unmet need**

Although smoking is the largest single cause of premature death, only a minority of smokers receive any intervention which dramatically contrasts with almost all with cancer receiving intervention

Effective commissioning is required to meet the level of unmet smoking cessation need so that higher risk groups disproportionately benefit from interventions. Local information on impacts and cost of not addressing such need is also important; the NICE Tobacco Return on Investment Tool at [www.nice.org.uk/ROItobacco](http://www.nice.org.uk/ROItobacco) enables local authorities to estimate the local cost of tobacco-related harm and the longer term economic savings arising from tobacco control strategies particularly if addressing the 42% of adult national tobacco consumption by those with mental disorder. Information is required on both levels of smoking, access to interventions and rates of cessation to ensure compliance with equality legislation

### **Assessing impact of smoking cessation on a broad range of outcomes**

Benefits of smoking cessation include Inequality reduction, improved physical health and life expectancy, improved mental health and wellbeing, improved financial wellbeing, lower doses of medication, and is a key part of wider health promotion. Smoking cessation impacts on social care, public health, health and other outcomes. Broader public mental health interventions also reduce health risk behaviour including smoking as well as improve mental health, physical health, resilience, life expectancy, healthy lifestyles, economic productivity, social functioning and quality of life and reduce range of inequalities (Campion et al, 2012; Campion and Fitch, 2012).

### **Summary**

Smoking is the largest single cause of preventable death in the UK. Mental disorder is associated with higher rates of smoking and therefore greater risk of smoke related harm. Treatment of mental disorder is affected by negative impact on well-being and psychiatric symptoms, increased doses of required medication, increased risk of physical illness and long term conditions, and premature death.

Public health intelligence enables local assessment of levels and impact of smoking including in those with mental disorder as well as the proportion receiving smoking cessation and prevention including from higher risk groups. This provides key information to inform the Joint Strategic Needs Assessment and Health and Wellbeing strategy.

Interventions for those with mental disorder illness same as general population but require additional monitoring. However, despite almost half of tobacco consumption being by those with mental disorder, intelligence about both levels of smoking and treatment in those with mental disorder is largely absent although can be estimated. Such intelligence facilitates reduced treatment gap and early intervention for smoking including in those with mental disorder. . Improved access to smoking cessation will reduce associated inequalities on the single largest group of smokers. Broader prevention of smoking can occur through promotion of mental health, prevention of mental disorder and early promotion interventions for those developing mental disorder

Appropriate commissioning of smoking cessation interventions results in significant improvements in a broad range of health, public health and social care outcomes with associated personal, social and economic savings.

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