

# Smoking and mental health

## Introduction

Smoking rates amongst people with a mental health disorder are significantly higher than in the general population and there is growing evidence to show a strong association between smoking and mental health disorders.<sup>1 2 3 4 5</sup> This association becomes stronger relative to the severity of the mental disorder, with the highest levels of smoking found in psychiatric in-patients.<sup>5 6 7 8</sup> It is estimated that of the 10 million smokers in the UK about 3 million have a mental disorder.<sup>7</sup>

It is not clear whether smoking is the cause or effect of mental illness. However, some researchers believe that smoking could act as a trigger for mental ill-health.<sup>9</sup> There is also some evidence which suggests that smoking may play a role in the onset of mental illness.<sup>10</sup>

As a result of high smoking rates, people with a mental health disorder also have high mortality rates compared to the general population.

## What is a mental disorder?

Defining what constitutes a "mental disorder" is complex with no universally accepted consensus on the meaning of the term. Mental disorders comprise a broad range of psychological conditions, with varying symptoms, characterised by a combination of abnormal thoughts, emotions, behaviour and relationships with others.<sup>11</sup> As mental illnesses are often defined as much by the severity of their symptoms as by the occurrence of specific symptoms, diagnosis frequently relies on an assessment of the impact of symptoms on functioning.<sup>7</sup>

The two principal diagnostic classifications used by mental health professionals are the [World Health Organisation's International Classification of Diseases \(ICD-10\)](#)<sup>12</sup> and the [Diagnostic and Statistical Manual of Mental Disorders](#)<sup>13</sup> (DSM IV) published by the American Psychiatric Association, both of which can be viewed on their respective websites. The DSM is currently being updated with Version 5 expected to be published in 2013. Information about this version is also [available on the APA website](#).

A more straightforward definition of mental illness is provided by the International Society for Psychological and Social Approaches to Psychosis, that is, "a significant change in a person's thinking, feelings or behaviour. The changes need to be bad enough to affect how the person functions or to cause distress to them or other people".<sup>14</sup>

## Smoking trends among the mentally ill

Smoking prevalence amongst people with a mental illness is substantially higher than in the general population. A 2013 study from the Centers for Disease Control in the United States found that a person with a mental illness was 70% more likely to smoke than a person without a mental disorder.<sup>15</sup> In addition to this, people with mental health problems smoke significantly more, have increased levels of nicotine dependency and are therefore at even greater risk of smoking-related harm.<sup>2</sup>

Studies which examine prevalence within individual mental disorders have found prevalence of 40% to 50% in people with depressive and anxiety disorders and 70% in people with schizophrenia.<sup>16</sup> In the UK, smoking prevalence in forensic psychiatric units (those treating

offenders with a mental disorder) was also extremely high prior to implementation of the smokefree law in mental health premises in 2008.<sup>17 18</sup>

- The 2010 Health Survey for England found that smoking prevalence amongst people with a long standing mental health disorder was 37%<sup>19</sup> compared to 20% in the general population.<sup>20</sup>
- The 2007 Adult Psychiatric Morbidity Survey (APMS) found the following smoking prevalence among the disorders in the table below.<sup>21</sup>

	<b>Smoking prevalence (%)</b>
Depressive episode	37
Phobias	37
Generalised anxiety disorder	36
Obsessive compulsive disorder	34
Panic disorder	31
Mixed anxiety and depression	29
Probable psychosis	40
Post-traumatic stress disorder	37
Attention deficit hyperactivity disorder	31
Eating disorder	20

- The Health Improvement Network (THIN) is an electronic dataset capturing GP medical records from around 8 million patients across the United Kingdom. Data collected between 2009 and 2010 reported smoking prevalence amongst patients recorded as having a mental disorder:

	<b>Smoking prevalence (%)</b>
Schizophrenia, schizotypal and delusional disorders	44.6
Bipolar affective disorder	36.7
Depression	31.4
Neurotic, stress-related and somatoform disorders	28.9
Eating disorders	23.1
Specific personality disorders	47.1
Hyperkinetic disorders, including ADHD	27.2

<b>Patients prescribed one or more psychoactive medications</b>	27.1
Antipsychotic	34.4
Lithium (antimanic)	30.2
Antidepressant	27.2
Anxiolytic (anti-anxiety agent)	29.5

Some of these figures will be slightly elevated because a person with multiple diagnoses will be registered as a smoker across several categories. However, using this data, the Royal College of Physicians has estimated that there are approximately 2.6 million smokers in the UK with a common mental disorder and around 3 million with a mental disorder of any kind. This means that of the 10 million smokers in the UK, approximately 30% have a mental disorder.<sup>7</sup> Smokers with a mental disorder are more heavily addicted to tobacco and smoke substantially more cigarettes per day than smokers in general.<sup>27</sup>

In the United States, the National Health Interview Survey (an annual population level survey

conducted by the National Center for Health Statistics) found that people with higher levels of psychosocial stress smoked higher numbers of cigarettes per day.<sup>2</sup>

Estimates about the proportion of cigarettes smoked by people with a mental illness vary. APMS data suggests that 43% of all cigarettes smoked in the UK are smoked by someone with a mental disorder (including alcohol and drug dependence). If only mental illnesses are counted this figure falls to 33%.<sup>7</sup> However, figures from a study in the United States have estimated that nearly half of all cigarettes sold in the US are bought by a person with a mental illness.<sup>22</sup>

## Why there are high smoking rates amongst the mentally ill

Tobacco contains nicotine, a highly addictive chemical which is quickly absorbed into the bloodstream. Nicotine in turn stimulates dopamine production, a chemical associated with pleasurable feelings.<sup>23 24</sup> Smokers quickly develop regular smoking patterns which ensure release of a steady stream of dopamine. When the nicotine content in their blood drops below a certain level, smokers begin to crave a cigarette. This craving causes a feeling of 'stress' until the craving is relieved. The relief felt when this craving is finally satisfied is the feeling that smokers commonly mistake as 'relaxing'. Eventually, smokers need increasing levels of nicotine to feel 'normal'.<sup>2 25</sup>

See also: [ASH Fact Sheet: Nicotine and Addiction](#)

For smokers with a mental illness, the association between smoking and feeling relaxed is more pronounced.<sup>26 27</sup> It is commonly believed that people with a mental illness use cigarettes to self-medicate.<sup>28</sup> Smokers with a mental disorder are more heavily addicted to smoking; the higher the number of cigarettes smoked per day, the greater the likelihood of mental illness. The more severe the mental illness, the more likely a person is to be a smoker.<sup>7 29</sup>

There is some evidence that smoking is associated with first-ever incidence of a mental disorder.<sup>30</sup> A population-level study found that people who smoked but had no history of mental disorder had an increased risk of developing one.<sup>10</sup> Conversely, mental disorders such as anxiety and depression may be a factor in smoking initiation.<sup>32</sup> Studies with teenagers and young people found that depression and anxiety are strong predictors of smoking experimentation and the transition to daily smoking.<sup>33 31</sup>

Other possible explanations for the particularly high rates of smoking amongst the mentally ill include a common genetic vulnerability;<sup>7</sup> a greater susceptibility to addiction because of a greater subjective experience of reward or pleasure;<sup>34</sup> that tobacco helps relieve some of the symptoms related to a behavioural disorder<sup>25</sup> or that people with a mental illness are less susceptible to anti-smoking messages.<sup>2</sup> Cigarette smoking may be an attempt to self-medicate symptoms of depression, anxiety, boredom or loneliness.<sup>3 27</sup> Another possible explanation for continuing to smoke is an increase in withdrawal symptoms.<sup>9 25</sup>

## Consequence of tobacco use

Tobacco use contributes significantly to the main causes of ill-health and mortality in people with mental health disorders.<sup>25 35</sup> The rates of cancer, heart disease and respiratory diseases among individuals with schizophrenia, who have the highest rates of smoking of any group, are up to double those of age-matched controls.<sup>9</sup> People with schizophrenia have life expectancy 20% shorter than the general population,<sup>36</sup> a tenfold increase in risk of dying from respiratory disease<sup>37</sup> and two thirds will die of cardiovascular disease.<sup>25</sup> Tobacco interacts with some psychiatric medication making it less effective, resulting in increased dosages and more side effects associated with these drugs.

Given that half of all long-term smokers will die of a smoking related illness,<sup>38</sup> it is unsurprising that there are high levels of smoking-related mortality amongst the mentally ill.<sup>25</sup>

## Smoking and stress

Cigarette smokers often report that smoking helps to relieve feelings of anxiety and stress. The high smoking prevalence among people facing social and economic deprivation suggests that smoking may be used as a self-medicating method of coping with stress.<sup>39 40</sup> However, instead of helping people relax, smoking actually increases anxiety and tension. The feeling of relaxation is temporary and soon gives way to withdrawal symptoms and increased cravings. So, although

smoking reduces withdrawal symptoms, which are similar to the feelings of anxiety, it does not reduce anxiety or deal with the underlying causes.<sup>2 41</sup> While the self-medication theory is widely believed by many people working in mental health, smoking is not, in fact, an effective means of managing a mental health problem.<sup>42</sup>

## Depression

Tobacco use is associated with increased risk of major depression.<sup>1 43 44 45</sup> Smoking rates among adults with depression are twice as high as among adults without depression.<sup>1 5 46</sup>

Levels of dopamine are often low in people with depression, and these individuals may then use cigarettes as a way of temporarily increasing their dopamine supply (to increase pleasurable feelings).<sup>47</sup> However, smoking adversely affects the brain's own mechanism for making dopamine so that, in the long term, the supply decreases, which in turn prompts people to smoke more.<sup>25</sup>

Most people start to smoke before they show signs of depression and there is some evidence to indicate that smoking is a causal factor in depression or that depression encourages people to start smoking.<sup>31 48</sup> Numerous studies have found that smoking significantly increases the risk of major depression.<sup>1 30</sup>

The relationship between smoking and depression may be the result of a genetic predisposition.<sup>7 49 50</sup> Other potential shared causes are factors in the social environment, genetics, personality (for example, low self-esteem), and coping styles.<sup>51</sup> Nicotine may act as an anti-depressant in some smokers and could therefore be viewed as a form of self-medication.<sup>3 52</sup>

One study showed that only 37% of the depressed smokers in a sample population were able to abstain for one week, whereas 56% of the non-depressed were able to do so.<sup>53</sup> However, a meta-analysis of published studies found no differences in either short-term ( $\leq 3$  months) or long-term abstinence rates ( $\geq 6$  months) between smokers with or without a history of depression.<sup>54</sup>

## Bipolar disorder

Bipolar disorder, previously known as manic depression is characterised by shifts in a person's mood, energy and ability to function. An association between smoking and bipolar disorder has not been firmly established although smoking prevalence rates among people with bipolar are significantly higher than in the general population,<sup>7 55</sup> in one study as high as 82.5%.<sup>3</sup>

One study found that among patients treated for bipolar disorder, smokers were more likely to have an earlier onset of the disorder, greater severity of symptoms, a history of suicide attempt, and co-morbid anxiety or substance use disorder.<sup>56</sup> The association with suicide ideation was confirmed in a separate study.<sup>57</sup>

## ADHD

The link between Attention Deficit Hyperactivity Disorder (ADHD) and smoking is well established<sup>58 59</sup> with both children and adults with ADHD significantly more likely to smoke than those without.<sup>60</sup> Also, there is strong evidence to show that maternal smoking during pregnancy is a risk factor for ADHD in children.<sup>61 62 63</sup>

Studies suggest that people with ADHD use smoking to improve attention and cognitive performance.<sup>64 65 66 67</sup> Laboratory studies have also shown that nicotine reduces the symptoms of ADHD and, in fact, acts in a similar way to medication used to treat ADHD which may explain why people with ADHD use tobacco to self-medicate.<sup>7</sup>

A four-year prospective study of adolescents found that ADHD symptoms were significantly related to smoking initiation. Seventy-one per cent of smokers with ADHD started smoking before age 17 compared to 27% of smokers without ADHD.<sup>68</sup>

Teenagers with untreated ADHD were more likely to initiate smoking and smoked more regularly.<sup>69 70</sup> Smokers with ADHD also appear to be at greater risk of severe tobacco dependence.<sup>71</sup> In addition to this, smokers with ADHD are more likely to develop drug and alcohol disorders.<sup>72</sup>

## Schizophrenia

Smoking rates among people with schizophrenia are significantly higher than in the general population, with prevalence estimated to be between 58% and 88%.<sup>73</sup> One possible explanation is that people with schizophrenia use smoking to manage some of the symptoms associated with their illness and that tobacco lessens some of the side effects of their medication.<sup>7 74 75 76</sup>

Research has also shown that smoking may improve attention and short-term memory in people with schizophrenia.<sup>75 77</sup> It may also be that nicotine stimulates the subcortical reward system and the prefrontal cortex both of which malfunction in people with schizophrenia.<sup>78</sup>

The metabolism of psychotropic drugs can be increased in cigarette smokers.<sup>7</sup> As a result, smokers frequently need higher doses of this type of medication to have the same therapeutic effect. A smoker with schizophrenia on Clozapine, for example, should have medication cut by 25% in the first week following a quit attempt.<sup>79</sup> Another study found that patients smoke more when treated with the neuroleptic (anti-psychotic drug) Haloperidol than during a medication-free state.<sup>80</sup>

Studies have shown that stopping smoking will not lead to an exacerbation of schizophrenia symptoms<sup>5 81</sup> although there is some evidence to suggest that people with this disorder may experience more severe withdrawal symptoms during the first week of a quit attempt than other would-be quitters.<sup>82</sup>

## Alzheimer's Disease and Dementia

Alzheimer's Disease (AD) is a common form of senile dementia, the other being vascular dementia. Loss of neurons (brain cells) that use acetylcholine as their neurotransmitter, and loss of memory are prominent features of AD.

Studies conducted in the early 1990s suggested that smoking had a protective effect against AD.<sup>83</sup> Although research on this subject has failed to be conclusive, it was thought that nicotine could delay the onset of familial AD. Acetylcholine binds to nicotinic receptors to exert its effect. A loss of neurons leads to a loss of these receptors and this is associated with the aetiology of AD. It was hypothesised that nicotine from cigarettes may compensate for the loss of nicotinic receptors in AD and therefore postpone the onset of the disease.

More recent research has shown that smoking is a risk factor for Alzheimers and vascular dementia by increasing the amount of free radicals, which impair brain and body cell functions and undermine immunity.<sup>84</sup> Other studies have found that nicotine use appears to worsen the effects of a brain protein called tau, responsible for the fibrous tangles that are an indicator of the disease.<sup>85</sup> While there is still some minor disagreement about the relationship between smoking and dementia, the belief that smoking has a protective effect against Alzheimer's Disease has been discredited.<sup>7 86</sup>

A study involving 17, 600 people aged 65 and over, screened participants for dementia. The survey, conducted in Britain, Denmark, France and the Netherlands looked at the effect of smoking on cognition in non-demented elderly. It concluded that smoking may indeed accelerate cognitive decline in this population.<sup>87</sup> Independent meta analyses.<sup>88 89</sup> and one large scale cohort study<sup>90</sup> confirm that current smoking is a risk factor for dementia.

## Post Traumatic Stress Disorder

There is a clear link between Post-Traumatic Stress Disorder (PTSD) and smoking.<sup>91 92</sup> A 2007 review of the relationship between smoking and PTSD found a causal bidirectional link between the two.<sup>93</sup> In the United States, war veterans with PTSD have smoking prevalence of between 53 and 63%. Women with PTSD following domestic violence were also more likely to be smokers.<sup>94</sup>

Among US veterans of the Vietnam war with PTSD 48% were classified as heavy smokers, compared to 28% of veterans without PTSD.<sup>95</sup> Veterans with PTSD who smoke also reported higher levels of PTSD symptoms.<sup>96</sup> These smokers are also significantly more likely to be heavy smokers and to have significantly higher levels of nicotine craving<sup>92</sup> and lower quit rates.<sup>93</sup>

## Impact of smokefree policies

Since July 2008, mental health facilities in England have been required by law to be smokefree indoors. Since the introduction of the law, an increasing number of mental health facilities have offered stop smoking support to patients who express an interest in quitting.<sup>27</sup>

Prior to the introduction of the law, a large survey of NHS staff found that one third of psychiatric staff disagreed with smokefree legislation compared to only one in ten of general staff.<sup>97</sup> A survey of mental health units in England in January 2007 found that the vast majority (91%) believed mental health premises faced particular challenges due to the high smoking prevalence among patients, associated safety risks, and potential interactions with anti-psychotic medication.<sup>98</sup> However, despite the challenges, the smokefree policy introduction has been rated positive overall. Advantages cited include: reduced exposure of patients and staff to secondhand smoke, an enhancement in patients' motivation to stop smoking, better sleeping patterns among patients, and the conversion of former smoking rooms into new recreational spaces.<sup>98</sup> An analysis of one medium secure unit's experience of implementing a smokefree policy found no significant difficulties and that widely-anticipated problems did not materialise.<sup>18</sup>

## Smoking cessation

There is a long-standing perception that people with a mental illness are less able or less willing to quit smoking.<sup>26 99</sup> Nevertheless, new evidence suggests that mental health professionals in the UK are starting to routinely offer stop smoking support to their clients and that these smokers are able to quit.<sup>7</sup> A large UK study found that about half of smokers with indicators of poor mental health were given advice to quit smoking. However, cessation support was offered in a lower proportion of primary care consultations for smokers with mental health indicators than to those without.<sup>100</sup> The Royal College of Physicians report, *Smoking and Mental Health*, recommends that because smokers with a mental illness are usually more heavily addicted to nicotine they should be prescribed a combination of nicotine replacement therapy products to support a quit attempt.<sup>7</sup>

Smokers with mental illness are frequently motivated to quit and are generally able to do so provided they are given evidence-based support.<sup>3 101 102 103</sup> The 2010 Health Survey for England found 66% of smokers with a mental illness would like to quit, with the figure rising to 69% of smokers taking a psychoactive medication. The survey also found that smokers with a mental illness are more likely to have been offered support to quit and more likely to have been prescribed stop smoking medication than smokers in the general population.<sup>19</sup>

- A review of smoking cessation treatments for people with mental illnesses concluded that pharmacological aids given to the general population can be as effective in helping people with mental illness to stop smoking as those in the general community. However, care must be taken to avoid adverse medication interactions and to monitor anti-psychotic medication as cigarette consumption declines.<sup>25</sup> Particular caution should be exercised in the prescribing of varenicline and bupropion to smokers with a mental illness. This group should be closely monitored during the first few weeks of taking the medication.
- A Cochrane review of smoking cessation for people with schizophrenia reported evidence that bupropion increases smoking abstinence without jeopardising mental state.<sup>104</sup> A separate, smaller study investigating the effectiveness of bupropion use amongst smokers with PTSD found that 80% of people in the study group successfully quit using the medication.<sup>92</sup>
- A review of smoking cessation interventions aimed at smokers with a severe mental illness found that these programmes enjoy moderate success. Stop smoking support offered to smokers with a mental illness was as successful as that offered to smokers in the general population and cessation did not lead to worsened mental state.<sup>105</sup> Other studies have also found that quitting smoking did not lead to a deterioration of the person's mental health<sup>106</sup> and that, following a successful quit attempt, lower levels of anxiety are reported amongst former smokers.<sup>107</sup> This contradicts the belief that cessation will lead to an exacerbation of mental health symptoms.
- Lower quit rates may occur if treatments are not adapted to the needs of patients with mental health problems.<sup>108</sup> Mental health professionals are starting to recognise that programmes designed specifically for smokers with a mental illness are necessary. A stop smoking programme for smokers with post traumatic stress disorder developed in the United States, for example, has doubled the chance of this group of smokers quitting successfully.<sup>109</sup> The

Royal College of Physicians is now recommending that the NHS Stop Smoking Services develop services specifically for smokers with a mental disorder and that the Government considers introducing incentives for them to do so.<sup>7</sup> [See key recommendations below.]

- A 2010 review of the Stop Smoking Services in London found that only a minority of services routinely checked the mental health status or mental health service use of their clients, and few implemented checks or measures when mental health problems are revealed.<sup>110</sup> A 2011 study of a NHS Stop Smoking Service which had implemented a policy of screening for mental disorders found that 12% of stop smoking service users considered themselves to have a mental health problem. The study authors recommended that all NHS Stop Smoking Services should implement a policy of screening for mental health problems so that this group can be offered appropriate levels of support.<sup>111</sup>

## Attitudes of mental health staff

Despite overwhelming evidence about the dangers of tobacco use, many mental health professionals maintain the view that smoking is as an effective coping mechanism for their patients and a means of self-medicating to cope with symptoms. Furthermore, cigarettes continue to be used as a means of reward and punishment for in-patients.<sup>112</sup> Research suggests that staff objections to offering stop smoking support may stem from their own prejudices about smoking, or their own smoking status.<sup>113</sup>

A lack of knowledge among mental health staff about tobacco dependence, treatment and its interaction with psychotic medication may limit the support given to patients to quit smoking.<sup>114</sup> A survey of clinical staff in one NHS mental health trust found that 41% of doctors were unaware that smoking can decrease blood levels of antipsychotic drugs, and 36% were unaware that stopping smoking could reduce the dose needed. Staff who smoked were more likely to have reservations about the importance of the smokefree policy and the treatment of nicotine dependence among patients.<sup>115</sup>

A specialist cessation programme for smokers accessing the mental health service in the London Borough of Merton was established in 2008. The greatest challenge to overcome in establishing the service was the negative attitudes of staff and their refusal to engage with the cessation programme. It is clear that much work needs to be done to raise awareness amongst mental health professionals about the dangers of smoking and the benefits of quitting. A similar programme established in Nottingham also cited staff attitudes as one of the main barriers to the programme.<sup>7</sup>

## The tobacco industry and mentally ill smokers

The tobacco industry has a well documented history of marketing to vulnerable groups and there is evidence to show that it has specifically targeted the mentally ill.<sup>3 22 26</sup> In the United States there was a long standing practice of providing cigarettes to psychiatric hospitals, supporting efforts to block hospital smoking bans and engaging in a variety of activities that slowed development of treatment for nicotine dependence treatment for this population group.<sup>25 116</sup>

A recent study of secret tobacco industry documents found industry-funded research supporting the idea that individuals with schizophrenia were less susceptible to the harms of tobacco and that they needed tobacco as self-medication.<sup>116</sup> The idea that tobacco is a useful tool for self medicating has been widely supported by cigarette companies.<sup>26</sup>

## Policy implications

The Royal College of Physicians' report on Smoking and mental health makes the following recommendations:<sup>7</sup>

- Smoke-free policy is crucial to promoting smoking cessation in mental health settings.
- All healthcare settings used by people with mental disorders should therefore be completely smoke free.
- Smokers with mental disorders using primary and secondary care services, at all levels, should be identified and provided routinely and immediately with specialist smoking cessation behavioural support, and pharmacotherapy to relieve nicotine withdrawal, promote cessation and reduce harm.
- Commissioners should require mental health service settings to be smoke free, and to provide support for cessation, temporary abstinence and harm reduction.
- Service indicators, such as the primary care Quality Outcome Framework (QOF) and Commissioning for Quality and Innovation (CQUIN), should measure and incentivise cessation, not just delivery of advice to quit.
- All professionals working with or caring for people with mental disorders should be trained in awareness of smoking as a major health issue, to deliver brief cessation advice, to provide or arrange further support for those who want help to quit and to provide positive (i.e. non-smoking) role models. Such training should be mandatory.
- Research funding agencies should consider encouraging and investing in research to address this leading cause of ill-health, and health inequalities, in British society.

## References

- 1 Pasco JA, Williams LJ, Jacka FN, et al. Tobacco smoking as a risk factor for a major depressive disorder: a population-based study. *The British Journal of Psychiatry* 2008; 193: 322-326. [Download article](#)
- 2 Lawrence D, Mitrou F, Zubrick SR. Smoking and mental illness: results from population surveys in Australia and the United States. *BMC Public Health* 2009; 9:285 [Download article](#)
- 3 Lasser K, Boyd JW, Woolhandler S, et al. Smoking and mental illness: a population-based prevalence study. *JAMA* 2000; 284 (20): 2606-2610. [Download article](#)
- 4 De Leon J, Becona E, Gurpegui M, et al. The association between high nicotine dependence and severe mental illness may be consistent across countries. *The Journal of Clinical Psychiatry* 2002; 63 (9): 812-816. [Download article](#)
- 5 Meltzer H, Gill B, Hinds K, Petticrew M. OPCS Surveys of Psychiatric Morbidity in Great Britain, Report 6: Economic activity and social functioning of residents with psychiatric disorders. London, HMSO, 1996.
- 6 Farrell M, Howes S, Taylor C, et al. Substance misuse and psychiatric comorbidity: An overview of the opcs national psychiatric morbidity survey. *Addictive Behaviors* 1998;23:909-18.
- 7 The Royal College of Physicians. [Smoking and mental health](#) London, RCP, March 2013
- 8 Jochelson J, Majrowski B, Clearing the Air. Debating Smoke-Free Policies in Psychiatric Units. King's Fund. 2007. [Download publication](#)
- 9 West, R, Jarvis, M. Tobacco smoking and mental disorder. *Italian Journal of Psychiatry & Behavioural Science* 2005; 15: 10-17
- 10 Cuijpers P, Smit F, ten Have M, et al. Smoking is associated with first-ever incidence of mental disorders: a prospective population-based study. *Addiction* 2007; 102: 1303–1309
- 11 World Health Organization. International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) Version for 2010. Chapter 5: Mental and behavioural disorders. F00-F99 Available on the [WHO website](#). Accessed 17 March 2013
- 12 World Health Organization. International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) Version for 2010. Chapter 5: Mental and behavioural disorders. F00-F99 Available on the [WHO website](#). Accessed 17 March 2013
- 13 American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV), 2000.
- 14 <http://ispsuk.org/?p=312> The International Society for Psychological and Social Approaches to Psychosis
- 15 Centers for Disease Control. Press release: Smoking among US adults with mental illness 70 percent higher than for adults with no mental illness. Released 5 February 2013. [View press release](#).
- 16 Olivier D, Lubman DI, Fraser R. Tobacco smoking within psychiatric inpatient settings: biopsychosocial perspective. *Aust & NZ J Psych* 2007; 41: 572-580
- 17 Meiklejohn C, Sanders K, Butler S. Physical health in medium secure services. *Nursing Standard* 2003;17:33-37. [View article](#)

18 Shetty A, Alex R, Bloye D. The experience of a smoke-free policy in a medium secure hospital.  
19 The Psychiatrist on line 2010 34:287-289. [View abstract](#)  
20 The NHS Information Centre. Health Survey for England 2010. Published Dec 2011. [Download  
the Health Survey for England 2010](#)  
21 Dunstan S. General Lifestyle Survey overview: A report on the 2010 General Lifestyle Survey.  
Newport: Office for National Statistics, 2012. [Download the General Lifestyle Survey 2010](#).  
22 McManus S, Meltzer H & Campion J. Cigarette smoking and mental health in England. Data from  
the Adult Psychiatric Morbidity Survey 2007. National Centre for Social Research, Dec. 2010  
23 Apollonio DE, Malone RE. Marketing to the marginalised: tobacco industry targetting of the  
homeless and mentally ill. *Tobacco Control* 2005; 14: 409-415. [Download article](#)  
24 Novak G, Seeman P, Le Foll B. Exposure to nicotine produces an increase in dopamine D2(High)  
receptors: a possible mechanism for dopamine hypersensitivity. *International Journal of  
Neuroscience* 2010; 120 (11): 691-7. doi: 10.3109/00207454.2010.513462 [Download abstract](#)  
25 Pomerleau OF, Pomerleau CS: Neuroregulators and the reinforcement of smoking: towards a  
bio-behavioral explanation. *Neurosci Biobehav Rev.* 1984; 8:503-513.  
26 Campion J, Checinski K, Nurse J McNeill A. Smoking by people with mental illness and  
benefits of smoke-free mental health services. *Advances in Psychiatric Treatment.* 2008; 14:  
217-228.  
27 Prochaska JJ. Smoking and Mental Illness: Breaking the Link. *NEJM* 2011; 365:196-8.  
[Download article](#)  
28 Ratschen E, Britton J, McNeill A. The smoking culture in psychiatry: time for change. *The  
British Journal of Psychiatry* 2011; 198: 6-7. [Download article](#)  
29 Khantzian EJ. The self-medication hypothesis of substance use disorders: A reconsideration and  
recent applications. *Harv Rev Psychiatry* 1997; 4: 231-244.  
30 Aguilar MC, Gurpegui M, Diaz FJ et al Nicotine dependence and symptoms in schizophrenia.  
Naturalistic study of complex interactions. *British Journal of Psychiatry* 2005; 186: 215–221.  
31 Breslau N, Peterson E, Schultz LR, et al. Major depression and stages of smoking: a  
longitudinal investigation. *Arch Gen Psychiatry* 1998; 55:161-166.  
32 Breslau N, Klein DF. Smoking and panic attacks: an epidemiologic investigation. *Arch Gen  
Psych.* 1999; 56:1141-1147  
33 Patton GC, Carlin JB, Coffey C, et al. Depression, anxiety, and smoking initiation: a prospective  
study over 3 years. *AJPH* 1998; 88 (10): 1518-1522. [View abstract](#)  
34 Patton GC, Hibbert M, Rosier MJ, et al. Is smoking associated with depression and anxiety in  
teenagers? *Am J Public Health* 1996; 86: 225-230  
35 Spring S, Pingitore R, McChargue DE. Reward value of cigarette smoking for comparably heavy  
smoking schizophrenic, depressed and nonpatient smokers. *Amer J Psychiatry* 2003; 160: 316–322  
36 Brown S, Barraclough B, Inskip H Causes of the excess mortality of schizophrenia. *British  
Journal of Psychiatry* 2000; 177: 212–217. [View abstract](#)  
37 Hennekens CH, Hennekens AR, Hollar D et al. Schizophrenia and increased risks of cardiovascular  
disease. *American Heart Journal* 2005; 150: 1115–1121  
38 Joukamaa M, Heliövaara M, Knekt P, et al. Mental disorders and cause-specific mortality. *British  
Journal Psychiatry* 2001; 179: 498–502. [View abstract](#)  
39 Doll R, Peto R, Boreham J et al. Mortality in relation to smoking: 50 years' observation on male  
British doctors. *BMJ* 2004; 328: 745.  
40 Jarvis M and Wardle J. Social patterning of individual health behaviours: the case of cigarette smoking.  
In: *Social determinants of Health.* Eds. Marmot M and Wilkinson RG., OUP, 1999.  
41 Williams JM, Ziedonis D Addressing tobacco among individuals with a mental illness or an  
addiction. *Addict Behav.* 2004; 29:1067-1083.  
42 Picciotto MR, Brunzell DH, Caldarone BJ: Effect of nicotine and nicotinic receptors on anxiety  
and depression. *Neuroreport* 2002;13:1097-1106  
43 Ziedonis D, Hitsman B, Beckham et al. Tobacco use and cessation in psychiatric disorders:  
National Institute of Mental Health report. *Nicotine Tob Res* 2008;10:1691-1715  
44 Harlow BL, Cohen LS, Otto MW, et al. Prevalence and predictors of depressive symptoms in  
older premenopausal women: the Harvard Study of Moods and Cycles. *Arch Gen Psychiatry*  
1999; 56: 418 -24.

44 Hamalainen J, Kaprio J, Isometsa E, et al. Cigarette smoking, alcohol intoxication and major  
depressive episode in a representative population sample. *JECH* 2001; 55: 573-6.

- 45 Klungsoyr O, Nygard JF, Sorensen T, Sandanger I. Cigarette smoking and incidence of first  
depressive episode: an 11-year, population-based follow-up study. *Am J Epidemiol.* 2006; 163:  
421-32.
- 46 Wilhelm K, Mitchell P, Slade T, et al. Prevalence and correlates of DSM-IV major depression in  
an Australian national survey. *J Affect Disord* 2003; 75:155–62
- 47 Mendelsohn C Smoking and depression: a review *Australian Family Physician* 2012; 41 (5):  
304-307.
- 48 Patton GC, Carlin JB, Coffey C, et al. Depression, anxiety, and smoking initiation: a prospective  
study over 3 years. *AJPH*1998; 88 (10): 1518-1522. [View abstract](#)
- 49 Kendler KS et al. Smoking and major depression – A causal analysis. *Arch Gen Psychiatry* 1993; 50:  
36-43
- 50 Korhonen T, Broms U, Varjonen J, et al. Smoking behaviour as a predictor of depression  
among Finnish men and women: a prospective cohort study of adult twins. *Psychol Med.* 2007;  
37 (5): 705-15.
- 51 Mendelsohn C. Smoking and depression: a review *Australian Family Physician* 2012; 41 (5):  
304-307.
- 52 Ratschen E, Britton J, McNeill A. The smoking culture in psychiatry: time for change. *The*  
*British Journal of Psychiatry* 2011; 198 (1):6-7. [Download article](#)
- 53 Kinnunen T et al. Depression and smoking cessation: Characteristics of depressed smokers and  
effects of nicotine replacement. *Journal of Consulting and Clinical Psychology.* 1996; 64: 791-798
- 54 Hitsman B et al. History of depression and smoking cessation outcome: A meta-analysis. *Journal*  
*of Consulting and Clinical Psychology* 2003, Vol. 71, No. 4, 657–663.
- 55 Diaz FJ, James D, Botts S, Maw L Susce MT et al Tobacco smoking behaviours in popular  
disorder: a comparison of the general population, schizophrenia and major depression. *Bipolar*  
*disorders.* 2009. 11. 2: 154-165. [View abstract](#)
- 56 Ostacher MJ et al The relationship between smoking and suicidal behaviour, comorbidity, and course  
of illness in bipolar disorder. *J Clin Psychiatr* 2006; 67: 1907-1911 [View abstract](#)
- 57 Ostacher M, LeBeau RT, Perlis RH, et al. Cigarette smoking is associated with suicidality in bipolar  
disorder. *Bipolar disorders* 2009; 11 (7): 766 - 771. [View abstract](#)
- 58 Fuemmeler BF, Kollins SH, McClernon FJ. Attention deficit hyperactivity disorder symptoms  
predict nicotine dependence and progression to regular smoking from adolescence to young  
adulthood. *J Pediatr Psychol.* 2007; 32 (10):1203-13. [View abstract](#)
- 59 Wilens TE, Vitulano M, Upadhyaya H, et al. Cigarette smoking associated with attention deficit  
hyperactivity disorder. *J Pediatr.* 2008; 153 (3):414-9.
- 60 Matthies S, Holzner S, Feige B, et al. ADHD as a serious risk factor for early smoking and  
nicotine dependence in adulthood. *Journal of Attention Disorders.* First published online  
January 2012. In print March 2013. doi: 10.1177/1087054711428739 [View abstract.](#)
- 61 Milberger S, Biederman J, Faraone SV, et al. Is maternal smoking during pregnancy a risk  
factor for attention deficit hyperactivity disorder in children? *Am J Psychiatry* 1996; 153  
(9):1138-42. [View abstract](#)
- 62 Thapar A, Fowler T, Rice F, et al. Maternal smoking during pregnancy and attention deficit  
hyperactivity disorder symptoms in offspring. *Am J Psychiatry* 2003; 160 (11):1985-9.
- 63 Langlely K, Heron J, Davey Smith G, Thapar A. Maternal and paternal smoking during pregnancy  
and risk of ADHD symptoms in offspring: testing for intrauterine effects. *Am. J. Epidemiol.* 2012;  
176 (3): 261-268. doi: 10.1093/aje/kwr510 [View abstract](#)
- 64 Hahn B, Shoaib M, Stoleran IP. Nicotine-induced enhancement of attention in the five-choice  
serial reaction time task: the influence of task demands. *Psychopharmacology* 2002;162  
(2):129-37.
- 65 Hahn B, Stoleran IP. Nicotine-induced attentional enhancement in rats: effects of chronic  
exposure to nicotine. *Neuropsychopharmacology* 2002; 27 (5):712-22. [View abstract](#)
- 66 Mirza NR, Stoleran IP. Nicotine enhances sustained attention in the rat under specific task  
conditions. *Psychopharmacology* 1998; 138: 266-74.
- 67 Gehricke JG, Hong N, Whalen CK, et al. Effects of transdermal nicotine on symptoms, moods,  
and cardiovascular activity in the everyday lives of smokers and nonsmokers with attention-  
deficit/hyperactivity disorder. *Psychol Addict Behav.* 2009; 23 (4):644-55. [View abstract](#)
- 68 Milberger S, Biederman J, Faraone SV, et al. ADHD is associated with early initiation of  
cigarette smoking in children and adolescents. *J Am Acad Child Adolesc Psychiatry* 1997; 36  
(1):37-44. [View abstract](#)

- 69 Whalen CK, Jamner LD, Henker B, et al Is there a link between adolescent cigarette smoking  
and pharmacotherapy for ADHD? *Psychol Addict Behav.* 2003; 17 (4):332-5.
- 70 Lambert NM, Hartsough CS. Prospective study of tobacco smoking and substance  
dependencies among samples of ADHD and non-ADHD participants. *J Learn Disabil.* 1998; 31  
(6):533-44. [View abstract](#)
- 71 Wilens TE, Vitulano M, Upadhyaya H, et al. Cigarette smoking associated with attention deficit  
hyperactivity disorder. *J Pediatr.* 2008; 153: (3): 414-9.
- 72 Biederman J, Carter RP, Hammerness P. Cigarette smoking as a risk factor for other  
substance misuse: 10 year study of individuals with and without attention-deficit hyperactivity  
disorder. *British Journal of Psychiatry* 2012; 201: 207-214. [View abstract](#)
- 73 Sacco, K. et al. Effects of cigarette smoking on spatial working memory and attentional deficits in  
schizophrenia. *Archives of Gen Psych* 2005; 62: 649-659
- 74 Levin ED, McClernon FJ, Rezvani AH. Nicotinic effects on cognitive function: behavioral  
characterization, pharmacological specification, and anatomic localization. *Psychopharmacology.*  
2006; 184 (3-4): 523-39.
- 75 Levin ED, Rezvani AH. Nicotinic treatment for cognitive dysfunction. *Curr Drug Targets CNS*  
*Neurol Disord.* 2002; 1(4):423-31.
- 76 Watkins SS, Koo GF, Markou A. Neural mechanisms underlying nicotine addiction: acute  
positive reinforcement and withdrawal. *Nicotine and Tobacco Research* 2000; 2: 19–37.
- 77 Depatie L, O'Driscoll GA, Holahan AL, et al. Nicotine and behavioral markers of risk for  
schizophrenia: a double-blind, placebo-controlled, cross-over study.  
*Neuropsychopharmacology* 2002; 27 (6):1056-70.
- 78 Chambers RA, Krystal JH, Self DW. A neurobiological basis for substance abuse comorbidity in  
schizophrenia. *Biological Psychiatry* 2001; 50: 71–83.
- 79 Desai HD SJ. Smoking in patients receiving psychotropic medications: a pharmacokinetic  
perspective. *CNS Drugs* 2001; 15: 469-94.
- 80 McEvoy JP et al. Haloperidol increases smoking in patients with schizophrenia. *Psychopharmacology*  
1995; 119:124-126
- 81 Ziedonis D, Hitsman B, Beckham JC, et al. Tobacco use and cessation in psychiatric disorders:  
National Institute of Mental Health report. *Nicotine Tob Res.* 2008; 10 (12):1691-1715.
- 82 George TP, Vessicchio JC, Termine A, et al. Effects of smoking abstinence on visuospatial  
working memory function in schizophrenia. *Neuropsychopharmacology* 2002; 26 (1):75-85.
- 83 Duijn C.M et al. Apolipoprotein E genotype and association between smoking and early onset  
Alzheimer's disease. *BMJ* 1995; 310: 627-631
- 84 Dickerson T, Janda K. Glycation of the amyloid beta-protein by a nicotine metabolite: a potentially  
fortuitous chemical dynamic between smoking and Alzheimer's disease. *Proceedings of the National*  
*Academy of Sciences* 2003; 100 (14): 8182- 8187
- 85 Oddo, s. Chronic nicotine administration exacerbates tau pathology in a transgenic model of  
Alzheimer's disease. *PNAS* 2005; 102(8): 3046-3051
- 86 Ott A et al. Smoking and risk of dementia and AD in a population-based cohort study: the Rotterdam  
study. *The Lancet* 1998; 351:1840-1843
- 87 Ott A, et al. Effect of smoking on global cognitive function in non-demented elderly. *Neurology* 2004;  
62: 920-924
- 88 Anstey KJ, von Sanden C, Salim A, O'Kearney R. Smoking as a risk factor for dementia and  
cognitive decline: a meta-analysis of prospective studies. *Am J Epidemiol.* 2007; 166 (4): 367-  
78. [View abstract](#)
- 89 Peters R, Poulter R, Warner J, et al. Smoking, dementia and cognitive decline in the elderly, a  
systematic review. *BMC Geriatr.* 2008; 8:36. [View abstract](#)
- 90 Sabia S. Elbaz A, Dugravot A, et al Impact of smoking on cognitive decline in early old age: the  
Whitehall II cohort study. *Archive of General Psychiatry* 2012; 69 (6): 627-35. [View abstract](#)
- 91 Hapke U, Schumann A, Rumpf H-J, et al. Association of smoking and nicotine dependence with  
trauma and post traumatic stress disorder in a general population sample. *Journal of Nervous*  
*and Mental Disease* 2005; 193 (12): 943-846. [View abstract](#)
- 92 Hertzberg MA, Moore S, Feldman M, Beckham JC. A preliminary study of bupropion sustained-  
release for smoking cessation in patients with chronic post-traumatic stress disorder. *Journal of*  
*Clinical Psychopharmacology* 2001; 21 (1): 94-98 [View abstract](#)
- 93 Fu SS, McFall M, Saxon AJ, et al. Post traumatic stress disorder and smoking: a systematic  
review. *Nicotine Tob Res* 2007; 9 (11): 1071-1084. [View abstract](#)

- 94 Acierno R, Kilpatrick DG, Resnick HS, et al. Violent assault, post traumatic stress disorder and depression risk factors for cigarette use among adult women. *Behav Modif.* 1996; 20 (4): 363-384. [View abstract](#)
- 95 Beckham JC, Kirby AC, Feldman M, et al. Prevalence and correlates of heavy smoking in Vietnam veterans with chronic post traumatic stress disorder. *Addictive Behaviours* 1997; 22 (5): 637-647. [View abstract](#)
- 96 Beckham JC, Roodman AA, Shipley RH, et al. Smoking in Vietnam combat veterans with post traumatic stress disorder. *Journal of Traumatic Stress* 1995; 8 (3): 461-472. [View abstract](#)
- 97 McNally L et al. A survey of staff attitudes to smoking-related policy and intervention in psychiatric and general health care settings. *J Pub Health* 2006; 28: 192-196
- 98 Ratschen E, Britton J and McNeill A. Implementation of smoke-free policies in mental health in-patient settings in England. *Br J Psych* 2009; 194: 547-551
- 99 Lawn S. Systematic barriers to quitting smoking among institutionalised public mental health service populations: a comparison of two Australian sites. *International Journal of Social Psychiatry* 2004;39:866-85.
- 100 Szatkowski L & McNeill A. The delivery of smoking cessation interventions to primary care patients with mental health problems. *Addiction* 2013 doi 10.1111/add.12163
- 101 Caosella AM, Ossip-Klein DJ, Owens CA. Smoking attitudes, beliefs, and readiness to change among acute and long term care inpatients with psychiatric diagnoses. *Addictive Behaviors* 1999; 24: 331-344
- 102 Siru R, Hulse GK, Tait RJ. Assessing motivation to quit smoking in people with mental illness: a review. *Addiction* 2009; 104 (5): 719-733. [View abstract](#)
- 103 Center for Disease Control US. *Vital Signs: Smoking and Mental Illness.* February 2013. [Download factsheet](#)
- 104 Tsoi DT, Porwal M & Webster AC. Interventions for smoking cessation and reduction in individuals with schizophrenia. *Cochrane Database of Systematic Reviews.* 2010, Issue 6. Art. No. CD007253. <http://onlinelibrary.wiley.com/doi/10.1002/14651858.cd007253>
- 105 Banham L, Gilbody S. Smoking cessation in severe mental illness: what works? *Addiction* 2010; 105 (7): 1176-1189. [View abstract](#)
- 106 Hall SM, Prochaska JJ. Treatment of smokers with co-occurring disorders: emphasis on integration in mental health and addiction treatment settings. *Annu Rev Clin Psychol* 2009; 5: 409-431. [View abstract](#)
- 107 McDermott M, Marteau T, Hollands G, et al. Change in anxiety following successful and unsuccessful attempts at smoking cessation: a cohort study. *British Journal of Psychiatry* 2013; 202: 62-7.
- 108 McNally, L. *Quitting in mind. A guide to implementing stop smoking support in mental health settings.* The London Development Centre, 2009. [www.quittinginmind.net](http://www.quittinginmind.net)
- 109 McFall M, Saxon AJ, Thameemit-Chen S, et al. Integrating smoking cessation into mental health care for post-traumatic stress disorder. *Clinical Trials* 2007; 4 (2): 178-189. [View abstract](#)
- 110 McNally L & Ratschen E. The delivery of stop smoking support to people with mental health conditions: A survey of NHS stop smoking services. *BMC Health Services Research.* 2010; 10: 179
- 111 McNally L, Todd C, Ratschen E. The prevalence of mental health problems among users of NHS Stop Smoking Services: effects of implementing a routine screening procedure. *BMC Health Services Research* 2011; 11: 190 doi:10.1186/1472-6963-11-190
- 112 Ratschen E, Britton J, McNeill A. The smoking culture in psychiatry: time for change. *The British Journal of Psychiatry* 2011; 198 (1): 6-7. [Download article](#)
- 113 Lawn S, Condon J. Psychiatric nurses' ethical stance on cigarette smoking by patients: Determinants and dilemmas in their role in supporting cessation. *International Journal of Mental Health* 2006; 15 (111):118. [View abstract](#)
- 114 Ratschen E, Britton J, McNeill A. The smoking culture in psychiatry: time for change. *The British Journal of Psychiatry* 2011; 198 (1): 6-7. [Download article](#)
- 115 Ratschen E et al. Tobacco dependence, treatment and smoke-free policies: a survey of mental health professionals' knowledge and attitudes. *Gen Hosp Psych* 2009; 31 (6): 576-582
- 116 Prochaska JJ, Hall SM, Bero LA. Tobacco use among individuals with schizophrenia: what role has the tobacco industry played? *Schizophr Bull* 2008; 34: 555-567