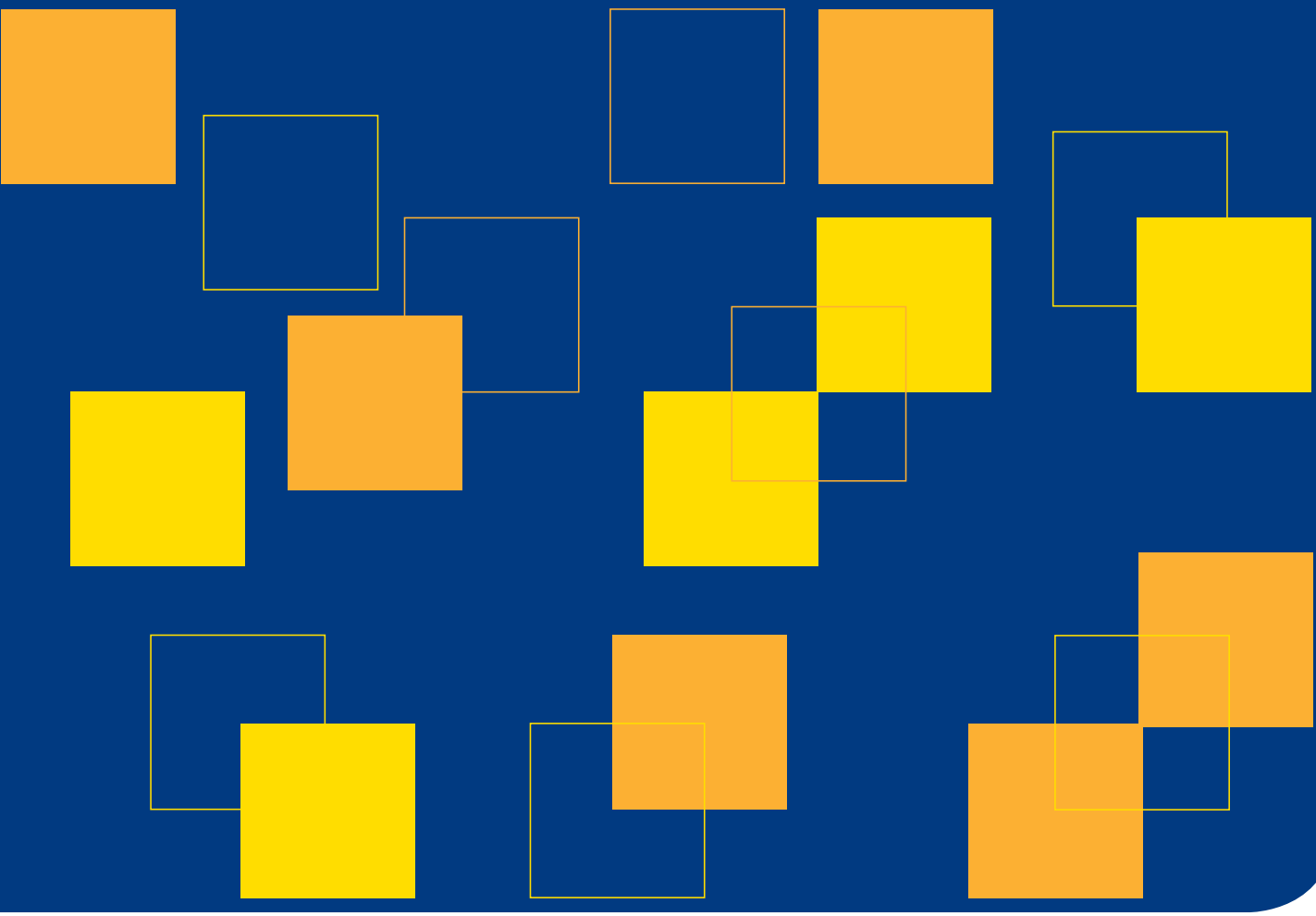
Tackling Tobacco Program
Research Series No. 1

Smoke and Mirrors:

a review of the literature on smoking and mental illness.



Cancer Council

tackling tobacco
Action on Smoking & Disadvantage

The Tackling Tobacco Program is a project of Cancer Council NSW. It aims to reduce the harm caused by tobacco use amongst socially disadvantaged population groups by supporting community service organisations to assist their staff and clients to stop smoking and adopt harm reduction behaviours.

The target groups for this program include:

- People living with a mental illness
- Vulnerable young people
- Aboriginal and Torres Strait Islanders
- Low income single parent families
- People with drug and alcohol problems
- Homeless people
- People in the NSW prison system

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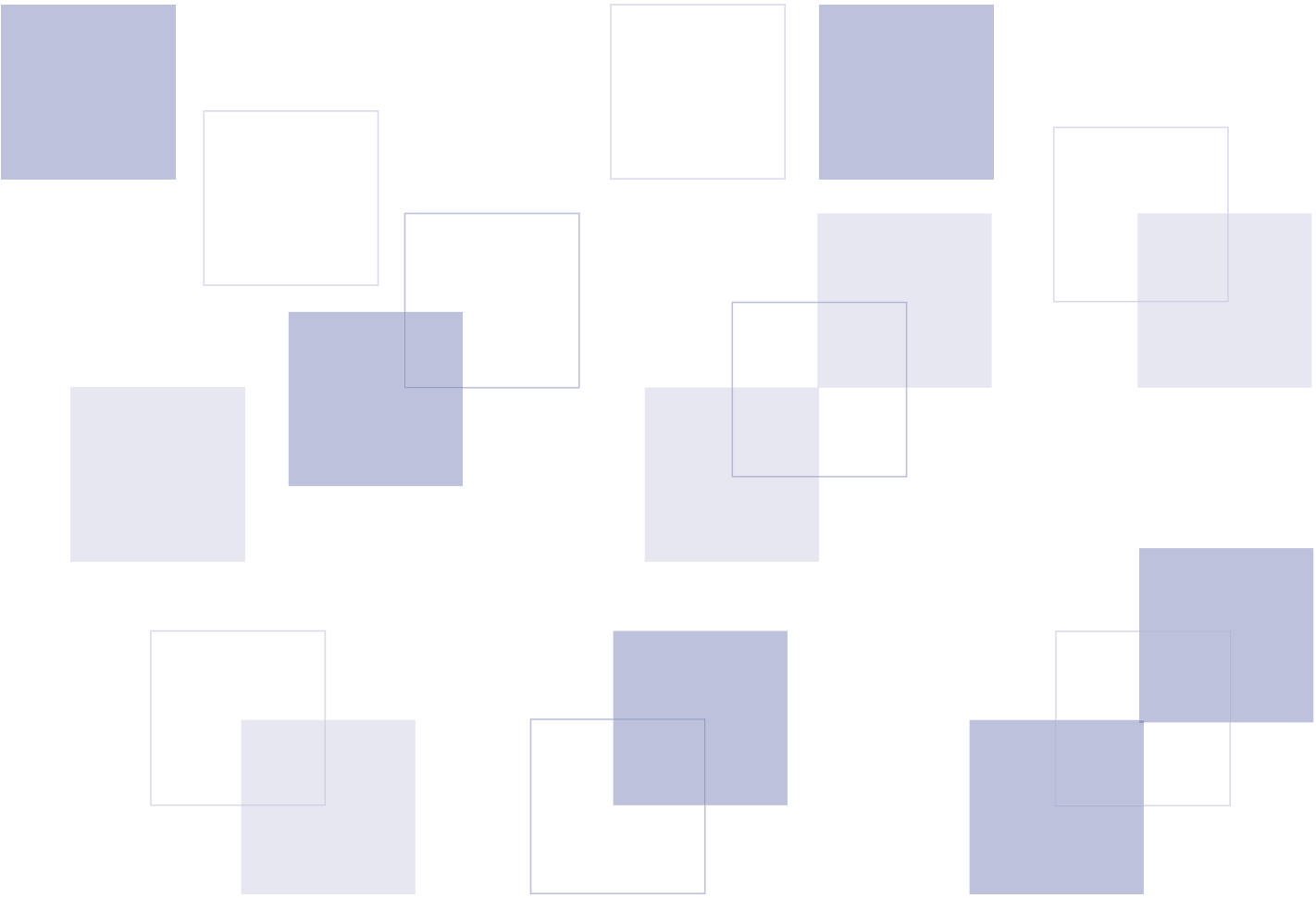

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The very high prevalence of smoking in schizophrenia is not an inevitable feature of the illness, but is a behaviour that could be significantly influenced by economic and social factors … [The importance of this fact is that] if one deems smoking is an unavoidable neurochemical consequence of the illness, attempts at controlling the harmful behaviour will not be sure-footed.

TN Srinivasan & R Thara
Schizophrenia Research 2002;56(1-2):67-74

[My studies showed that] systematic reinforcement of smoking existed by means of a series of entrenched institutional and clinical practices, beliefs and attitudes held by patients and particularly by staff. There was overwhelming knowledge of smoking problems with little or no acknowledgement of responsibility by staff for addressing them within the setting. Staff at all levels and all disciplines, from clinical to administrative staff, spoke of their full awareness of the use of cigarettes for trade, standover, exchange for other goods, other drugs and sexual favours among patients. Pressure to become smokers, in the absence of other meaningful activity was clearly shown with several patients and staff recounting their first-hand knowledge of being initiated into smoking, or knowing of others for which this occurred, as a consequence of being in the hospital setting.

S Lawn
Australian and New Zealand Journal of Psychiatry 2005;39:886-891

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Preface

As more Australians quit smoking and more areas become smoke-free, it is notable that some health services which provide care for people with mental illnesses do not also provide them with the same protection against tobacco smoke as they provide for their other clients. Recent efforts to make NSW Health's psychiatric facilities smoke-free in line with their other health services have been hotly debated both by health and community service professionals and people living with mental illness.

While the best care of the person with the mental illness is topmost in these discussions, underlying the positions on both sides are fears and beliefs which need closer examination. It is reasonable to be concerned that changes to their smoking behaviour could affect a person's management of their illness. But what is the real risk? And, given the known and certain health consequences of smoking, could any effects (if there are any) be managed in the same way that other life changes are managed?

How sad to hear health professionals justify a life-time of smoking related illness by saying that smoking is "the least of their problems" and "their little bit of pleasure". Surely people with mental illness deserve better than that.

It is a sad reality that while smoking rates have declined significantly in Australia in the last 30 years they remain much higher for the most disadvantaged and vulnerable members of our community. People with severe mental illness are well represented amongst these groups.

As part of its Tackling Tobacco Program the Cancer Council NSW commissioned a review of the peer reviewed, published literature to examine the underlying evidence for many of the contentious issues around smoking and mental illness. The reviewers were asked to examine the evidence in an attempt to answer the most pressing question: Is there any reason why all the efforts put into reducing smoking should not be applied equally to people with a mental illness?

Their answer is "no".

In arriving at this conclusion the review challenges some common beliefs about smoking and mental illness: that it is normal; that it is self medication; that depressed people find it harder to quit. The review finds other things to be true: that people with mental illness smoke for much the same reasons other people do; that smoking causes rather than relieves stress; that people with mental illness can quit and want to quit and; that the risks of smoking far outweigh any benefits it provides.

Assumptions about smoking and mental illness are too easily used as excuses to justify inaction about smoking. Health services in particular need to ask whose interest is being served by not actively supporting their clients to address smoking - the client with the mental illness or the convenience of the service?

We recognise that some people may find this review and its conclusions challenging. We welcome debate on the findings and their implications.

But the Cancer Council NSW is committed to speaking out on this issue. It is too important for us to remain silent. The burden of financial hardship, disease and premature death imposed by tobacco on people with a mental illness cannot be allowed to continue unchecked.

We look forward to meeting with stakeholders at the political, administrative and service delivery level to consider the evidence and to work for change. Most importantly, there must be a transformation of culture around smoking in mental health services. Every person with a mental illness should be asked about their smoking and offered help to quit. No person with a mental illness should be encouraged to smoke by other people or because of the service environment.

We are grateful for the work of Dr Mark Ragg and Dr Tanya Ahmed in preparing this review. It is our hope that it helps lifts the pessimism about the prospects for people with a mental illness to enjoy the health and financial benefits of a smoke-free life as fully and equitably as other members of our community.

Andrew Penman
Chief Executive Officer
Cancer Council NSW

Summary

People with some forms, but not all forms, of mental illness are more likely to smoke than the general population. However, the majority of people with mental illness do not smoke.

It appears that the prevalence of smoking varies between groups with different mental illnesses. Smoking is more common among people with schizophrenia and substance abuse disorders than among people with major depression. It is less common still among people with some form of anxiety disorder. It may be below population levels in people with other forms of anxiety disorder.

It also appears that smoking is more common among people with severe mental illness than with less severe mental illness.

It is not clear whether or not the prevalence of smoking in people with mental illness is falling in line with that of the general population.

Commonly quoted statistics – that 80% to 90% of all people with schizophrenia smoke and that 44% of all cigarettes are smoked by people with mental illness – are exaggerations brought about by misreadings of the literature.

Many of the common beliefs of smoking and mental illness – that smoking is the norm, that people with mental illness smoke to self-medicate, that people with a history of depression find it harder to quit smoking – are not supported by evidence.

The factors underlying smoking for people with mental illness are the same as the factors underlying smoking in people without mental illness – a complex interaction between socioeconomic status, education level, parental modelling, peer influences, genetics, personality traits, opportunity, cost and other factors. More people with mental illness are affected by these factors than are people without mental illness.

As well, people with mental illness may have other contributory factors – a culture which is either neutral about or actively encourages smoking, and in some cases a disability which impairs their willingness and ability to seek help.

There is a general belief that an important neurobiological factor drives the high prevalence of smoking in people with mental illness. Nicotine receptors, monoamine oxidase and genetics have all been investigated thoroughly. But if that single independent factor exists, it has not yet been isolated. There is, as yet, no correlation between laboratory research on this topic and clinical evidence.

Five main models have been proposed to account for the extra burden of smoking among people with mental illness – that people with mental illness self-medicate, that there are common factors (genetic, social, environmental) that lead to both mental illness and smoking, and that mental illness causes smoking, that smoking causes mental illness, or that the relationship is bidirectional.

The self-medication model is not supported by evidence. There is evidence to support the others, although none of it is unequivocal. But these models must be considered as additional to, rather than replacing, the factors affecting smoking prevalence mentioned above.

Smoking causes, rather than relieves, stress. The stress relief people feel on smoking is the stress relief that comes from easing withdrawal symptoms. Prospective studies show that people who take up smoking report increased levels of anxiety, stress and depression. Many people who quit find their mood improves.

Until a decade ago, there was little research which examined questions such as: do people with mental illness want to quit, and can they? The research is still sparse, but the majority of it is pointing in the same direction.

There is strong evidence that the majority of people with mental illness, when asked, want to give up smoking. There is evidence that people with mental illness can give up smoking. The idea that people with depression find it hard to give up smoking is not supported by evidence. For people with other mental illnesses, the evidence is sparse.

There is also evidence that people with substance abuse disorders want to give up smoking, can give up smoking and that quitting smoking benefits other substance abuse problems. There appears to be a synergism between substance abuse disorders and smoking – giving up one substance aids in giving up other substances.

The risks of smoking to people with mental illness far outweigh any possible benefits, should there be any.

The benefits of quitting for people with mental illness far outweigh the risks of quitting, should there be any.

There is still little research which looks beyond biological factors to consider social and cultural aspects of why people may smoke and why they don't quit. The research that does exist suggests that the main barriers to quitting are:

- lack of care by mental health staff – most mental health staff do not ask people with mental illness about cigarettes, nor do they provide any help with quitting
- promotion of smoking in some institutions – some people with mental illness take up smoking when admitted to hospital
- use of smoking as a behavioural tool by mental health staff – this is common in locked wards
- lack of support for people with mental illness – there are few dedicated programs for people with mental illness to help them quit
- lack of leadership by most health departments, area health services and professional organisations in working to protect the health of people with mental illness
- dehumanisation of people with mental illness – they are said to have nothing better to do
- false beliefs about the causes of smoking for people with mental illness – the self-medication hypothesis, in particular, encourages mental health staff and other carers to opt out of efforts to control smoking
- the assumption – made by both people with mental illness and health professionals – that agitation and negative mood after cessation of smoking are symptoms of mental illness, rather than possibly being symptoms of withdrawal
- the severity of illness of some people with mental illness – a small proportion of people with mental illness are unable to formulate or carry out plans.

We believe that:

- every person with mental illness should be asked whether they smoke or not
- every person with mental illness should be advised of the risks of smoking and the benefits of quitting
- every person with mental illness should be offered help to quit smoking
- no person with mental illness should ever be encouraged to smoke.

We can find no evidence to support the notion that any person with mental illness should not be encouraged to quit smoking, or should be advised not to quit.

1. Introduction

This review was commissioned by Cancer Council NSW, as part of its Tackling Tobacco Program which aims to reduce the impact of smoking on disadvantaged people.

This program was developed because of the knowledge that smoking is now, to some extent, a sign of disadvantage. Smoking is more common in those with less education, with less money, with less employment, with less housing, and with poorer mental health.

But any attempt to reduce the prevalence of smoking in disadvantaged groups comes up against beliefs that, for example, "public health campaigns can't reach disadvantaged groups'' or "the poor have so few pleasures in life''.

In the area of mental health, other beliefs prevail: "people with mental illness can't stop because their illness will flare up'', or "smoking is self-medication'' or, again, "they have so few pleasures in life''.

Accordingly, Cancer Council NSW commissioned this review to reach a firm understanding of the evidence on the larger questions surrounding smoking and mental illness, and to test those beliefs.

We started the review with a certain philosophical framework. We believe that people with mental illness are first and foremost people, not diagnoses. As such, they should be treated with the same care and consideration as other people. This care and consideration includes matters of public policy, legal considerations, such as duty of care, public health approaches and clinical interventions.

We believe that smoking is harmful, and that society has benefited greatly through its decline over the past half century.

Accordingly, our starting point for this review is the following question:

> **Is there any reason why all the efforts put into reducing smoking should not be applied equally to people with mental illness?**

In assessing the literature, we have concentrated on this question. Accordingly, our review has limitations, as all do. Our most significant limitation is that because of our concentration on the questions of policy (ie. the manner in which people with mental illness should be treated with regards to smoking), our review only touches briefly on details of exactly which public health approaches or which elements of smoking cessation programs may be successful. We acknowledge that, in these areas, we provide an overview only. These questions are covered in depth in another review by the authors.[1]

2. Methodology

In February 2007 we searched the MEDLINE database from 1995 through to January 2007. We used the subject terms “smoking’’, “smoking cessation’’, “tobacco use disorder’’, “tobacco industry’’, “tobacco’’ and “tobacco use cessation’’, then combined them with the subject terms “mental health’’ and “mental disorders’’ (all terms expanded). We restricted articles to those on human subjects in the English language. In June 2007 we searched again for relevant articles published in 2007.

The first author screened all 9000 citations and reviewed the full text of about 750 peer-reviewed journal articles deemed relevant. We also searched the references of those articles we found useful for further articles of relevance.

In carrying out this second layer of searching, we concentrated on three types of papers:

- seminal papers which have been widely quoted
- clinical trials carried out after 2000
- Australian papers.

The reason for concentration on the first is that the literature on smoking and mental health is, like many other fields of endeavour, heavily influenced by key papers. We tried to capture and analyse those key papers.

The reason for concentration on the second is that since 2000, there has been a rapid development in clinical trials looking at a number of important questions. Can people with mental illness quit smoking? What interventions help? Until 2000, assumptions had been made about these questions, but the assumptions were based on data which was either incomplete, of poor quality or designed to answer other questions.

The reason for the concentration on the third is not misguided nationalism, but a desire to have the research we discuss reflect reality. Research never does fully reflect reality, but using Australian data edges it closer.

For the purpose of this review, mental illness is defined as disorders that fall within the scope of Axis 1 and 11 of the DSM system. However, we would like to recognise the broader use of the term ‘‘mental illness’’, which may incorporate many situations where an absence of good mental health does not meet the criteria for a specific mental disorder. We also have to acknowledge some vagueness in our definitions. For example, many researchers use the term “serious mental illness’’ without defining it. We assume it means people who are frequently hospitalised, but it is often not clear.

3. Mental illness

What is mental illness?

Medicine generally seeks to identify disorders (make diagnoses), and flowing from this are potential treatments (management) and prediction of what will follow (prognosis). Ultimately, the aim is to identify the physical abnormality (pathology) and cause of the disease (aetiology) and so develop means of prevention and cure. The ideal diagnostic system labels diseases according to cause.

Most medical illnesses fit this approach. For example, coronary heart disease and disorders of the heart valves may produce superficially similar symptoms – chest pain and shortness of breath. But the causes are different, the pathology is different, the management is different and the prognosis is different.

Mental illnesses are not like this. There are few clear pathological signs of mental illness – diagnostic systems tend to be based on common clinical features, shared natural history, common treatment response, or a combination of all three.[2]

Mental illness is a diagnosis that involves a large degree of judgement. That judgement is strongly influenced by social, political and cultural values at any given time in any given community.

Diagnostic systems

There are two main diagnostic systems in use worldwide:

- the International Classification of Diseases (current version ICD-10)[3], produced by the World Health Organization, in which psychiatric classifications are part of a broader general medical classification intended for multi-specialty use
- the Diagnostic and Statistic Manual of Mental Disorders (current version DSM-1V-TR)[4], produced by the American Psychiatric Association, which is intended for use by psychiatrists and other mental health workers.

European research is largely based on the ICD, while US research is based mainly on the DSM, and researchers elsewhere use either. Australian clinicians tend to use the DSM, but Australian research uses either.

The introduction of these diagnostic systems has made it possible to compare clinical diagnostic data, but there are still difficulties.

For example, are mental illnesses discrete entities, able to be classified separately? Or is there a spectrum of human behaviours, psychological vulnerabilities, thought processes and environmental factors, the extreme end of which is called mental illness?

This is not an idle question. Systems of classification, and much research in mental health, is based on the assumption that mental illnesses are, if not discrete entities, at least fairly close to being discrete. However, many psychiatrists disagree.[5]

There is continued debate as to whether the diagnostic categories used in ICD and DSM are valid in cultures other than Western ones.

For example, in Western cultures, Cartesian dualism – which sees that the mind dwells within the body – underpins the expression of symptoms in the mind. But in many other cultures, no such dualism exists, so psychological distress is expressed in physical symptoms. So while an Australian may complain of depression, people in Mediterranean cultures may have “nerves’’ or headaches, those in the Middle East may suffer problems of

the heart, while people in China may have imbalance, weakness or tiredness. This makes the use of Western diagnostic classification systems difficult across cultures.[2]

In all, cultural differences can hamper cross-cultural comparisons or pooling data.

Methodological limitations in psychiatric research

This lack of consensus on classification and diagnosis in psychiatry underpins one of the serious problems in this area of research, and one that was an important consideration in this review.

It is this. If one cannot define a true case of a particular mental disorder consistently over time and place, then comparing or pooling data from different studies is not possible – one is not comparing data on the same illness.[6]

This has serious implications for prevalence data, which relies on accurately and consistently defining a true case, and subsequently defining a population of affected persons. Prevalence data is the starting point for all subsequent research including, for example, research into risk factors for developing a particular mental illness.[6]

For example, Prince reviewed 40 community-based studies of the prevalence of late life depression.[7] He found that the prevalence was 0-3% in those studies which used the DSM as the basis for defining a case, and 9-18% in those which used other criteria. What is the prevalence of late life depression? And to look more broadly, how possible is it to rely on prevalence data, and all that flows from it, when studies disagree to such an extent because of the way the disorder is defined?

As well as diagnostic concepts and classifications, assessment instruments play a critical role in epidemiological research in psychiatry. Numerous diagnostic instruments are used. These generally take the form of semi-structured or fully structured questionnaires often linked to a specific classification system. Some are applied by trained lay people and some by professionals in mental health. Either way, reliability and validity relies entirely on the skills of the interpreter.[6]

A further limitation is that a large proportion of people with mental illness never get to hospital or even receive specialist psychiatric care. For example, Andrews et al[8] found that 65% of people with a current mental illness had not sought or received professional help for it in the previous 12 months. These people are often not reflected in psychiatric research, which is usually centred around hospital inpatients or outpatient populations, which are easier populations to access. Rate of utilisation of these facilities varies between population groups. Factors such as age and sex distribution, socioeconomic status, ethnicity and illness severity in groups studied vary enormously from the broader population of those with mental illness. In other words, patients with depression admitted to hospital are unlikely to be a representative sample of all people with depression. Given that many of the studies we have reviewed have this hospital focus, we feel that an important segment of mental morbidity in the community is not captured in the data.

One final limitation is that there is little data on personality disorders. Personality disorders may be difficult to diagnose without a longitudinal history and observation – this is often not possible in research so people with apparent personality disorders are excluded from the sample. Also, there is a trend away from giving a diagnosis of personality disorder towards a description of certain personality traits – these traits (without a definitive psychiatric diagnosis) may not be picked up in research.

This limitation is an important one. People with personality disorder are at high risk of substance abuse disorders,[9,10] so their involvement with smoking should be the subject of considerable research. It is not, presumably in part because personality disorder can not be diagnosed on a single interview.

The causes of mental illness

The common approach is to consider mental illness through the biopsychosocial model. That is, there are biological elements, psychological and personality components and sociocultural components.

There have been significant advances recently in understanding the genetic basis of some mental illnesses, and also in describing many of the neurochemical pathways apparently involved. In fact, much of the research in mental health is now concentrated on understanding the biological basis of the more serious illnesses. In part, this is because technological advances are allowing a greater understanding of neurochemistry and genetics.

But this research is not without its flaws. For example, genetic research using twin studies and family approaches is based on a number of assumptions – for example, that monozygotic twins grow up in identical environments, and that there is no selection in the adoptive process. As Tyndale says, these assumptions mean that the relationship between the research findings and reality is limited.[11]

The standard of mental health research we reviewed

We must note that, in general, the quality of the literature was poor. While there are a significant number of exceptions, we found that a proportion of the papers made some of the following errors:

- examining mental illness through a biological lens only, while neglecting to consider issues such as the conditions in which people with mental illness live, how they live their lives, the strong and pervasive culture of smoking in mental institutions, employment status, socioeconomic status and so on
- jumping from neurochemical explanations to clinical assumptions without the benefit of clinical trials: for example, much of the research on nicotinic receptors
- ignoring evidence: for example, arguing that smoking reduces stress in the face of strong evidence suggesting the opposite
- drawing inferences that are unsustainable from the data
- neglecting the concept of heterogeneity: for example, assuming that because an average person of a certain class does something, that all people of that class do the same thing
- using tiny studies: for example, quantitative studies in mainstream journals such as the Journal of Addictive Diseases[12] and the American Journal of Psychiatry[13] used six and eight subjects respectively.

These problems are common and make much of the literature less than credible.

Key points:

Much of the research is of poor quality. Large conclusions are drawn from small and inconclusive studies. Occasionally, the data is misrepresented. Consequently, the conclusions that can be drawn from the literature are broad and directional, rather than specific and prescriptive.

The prevalence of mental illness

The prevalence of mental illness in Australia is either 11%[14] or 18%[15], depending on the survey tool used.

The Australian Bureau of Statistics' report titled Mental health and wellbeing: profile of adults, Australia[15] is the most reliable available source of information on mental illness in Australia, although possibly outdated. It used a semi-structured interview by trained interviewers to make a diagnosis based on the ICD, and its data referred to an occurrence of a disorder in the previous 12 months. The interviews took place in 1997.

It found that 2.38 million Australians, or 18% of the adult population, had a mental disorder (and that about 1 million of these people have a physical condition as well). Most of these 2.38 million people had anxiety disorders, mood disorders, and drug and alcohol use disorders. The survey did not provide data on schizophrenia and other psychotic disorders (because they are relatively uncommon), nor on personality disorders (which can't be diagnosed in one interview).

There was a marked age gradient – the prevalence of mental disorder was 27% in those aged 18-24 and declined to 6% in those over 65. Most, but not all of that decline was due to the decline in substance use disorders with age. But, as well, mood and anxiety disorders generally declined from middle age on.

The ABS carried out another survey – the 2004-05 ABS National health survey[14] – which examined mental health using self-report. In that study, 11% of respondents said they currently had a long-term mental health or behavioural problem.

Psychotic disorders are far less common. Jablensky et al[16] carried out a study on people living with psychotic illness to pick up those missed by the larger ABS survey. It recruited about 1000 subjects in four catchment areas in the Australian Capital Territory, Queensland, Victoria and Western Australia.

The point prevalence for a psychotic illness was 0.47%. This suggests there were about 70,000 adults in Australia with a psychotic illness at the time of the survey.

Key points:

Different survey methods give different results, but something in the order of 2 million adult Australians have a mental disorder – primarily an anxiety disorder, a mood disorder or a substance abuse disorder. About 70,000 Australians have a psychotic illness.

Mental illness is most common in people aged about 20, and becomes less common with age.

Multiple conditions

Many people with mental illness have more than one problem. That may be because circumstances (be they genetic or life events) which predispose to one condition also predispose to another. Or it may be because one condition makes the development of another more likely. Or both.

The 1997 Australian national survey of mental health and well-being found that almost 40% of those with a mental disorder had at least one other mental disorder.[17] In other words, someone with a mental disorder was almost as likely to have another mental disorder as not. The survey also found that as the number of mental disorders increased, so did the likelihood of disability.

People with mental illness are also far more likely than average to have substance abuse problems.[18,19]

Knowledge of the association between mental illness and substance abuse is relatively recent. Half a century ago the dual diagnosis of schizophrenia and substance abuse disorder was so rare that it was thought that schizophrenia was protective.[20] Now the dual diagnosis is common.

The lives of people with mental illness

From a relativist perspective, mental illness is associated with lower than average socioeconomic status. See, for example, the Australian Bureau of Statistics (ABS)[14], McLennan et al[15] and Jablensky et al[16].

However if looked at from another perspective, the ABS data showed that most people with mental illness were married and employed.[15] Most completed high school, and more than 1 million had post-secondary qualifications. The great majority were Australian-born. Although the rates of marriage, employment, high school completion and post-secondary qualification were slightly lower than for people without mental illness, it is worth noting that most people with mental illness live lives not too far from the norm on these basic measures.

Things are different for people with psychotic illnesses.

Of the 980 Australians with psychotic illness interviewed by Jablensky et al,[16] 63% had never married and 48% had no school qualification.

In this study, the majority of people with a psychotic illness lived in homes that they or their family owned or rented.

About a third reported one or more episodes of psychosis with good recovery, almost a third reported multiple episodes with partial recovery and more than a third reported chronic illness.

More than 70% of the sample were unemployed, with 18% in full-time work and 9% in part-time work. As well, 49% reported using street drugs or non-prescribed medicines, and 31% had five or more cups of coffee a day.

People with a psychotic illness are at significant risk of losing custody of their children to child welfare authorities (T Ahmed and M Ragg, personal observations).

In this population, 73% of men and 56% of women smoked in 1997. The national population prevalence of smoking at that time was 27% of men and 22% of women, although it has since dropped to 26% of men and 20% of women.[21]

Key Points:

Taken as a whole, people with mental illness have lower than average socioeconomic status. However the lives of people with non-psychotic mental illnesses such as depression, anxiety and substance abuse disorders are not too different from the national average. The majority are married, employed and finished high school.

Things are different for people with psychotic illnesses. While most live in housing owned or rented by themselves or their family according to one Australian study, most are unmarried and unemployed.

The physical health of people with mental illness

The physical health of people with mental illness is, in general, worse than the physical health of people without mental illness. And in general, people with more severe mental illness have worse physical health than those with less severe mental illness.

Mortality rates are higher. People with schizophrenia live on average 9-12 years less than expected.[22] On any given day, a person with a mental illness is about 2.5 times more likely to die than the average person.[23] Other data has found a range of 1.5 to 3 times increased mortality.[24] Babidge et al found a similarly high mortality range (greater than 3 times average) among homeless people in Sydney.[25] Many of those in the study group had schizophrenia.

People with serious mental illness have higher than average rates of cardiovascular disease.[26-28] They also have higher than average rates of lung cancer,[29] although rates of other forms of cancer appear to be similar to that of the general population.[30]

People with schizophrenia have higher than normal rates of chronic obstructive lung disease.[31] Pregnant women with schizophrenia have significantly increased risks of stillbirth, infant death, pre-term delivery and low birth weight babies.[32]

People with schizophrenia have a higher than average incidence of adverse events during hospitalisation for medical and surgical needs.[33] In a sophisticated study, Druss et al showed that a substantial portion of the ill-health suffered by people with mental illness was due to deficits in proper medical care.[34] Staff attitudes and practices are likely to play a part. In fact, much of the physical disease may go undetected.[35]

Other contributors to ill-health include:

- less healthy behaviours (including smoking, diet, alcohol and other drugs)
- the medical illnesses that underlie some depression
- biological dysregulation[36]
- low use of health services (see below).

People with mental illness and health services

The ABS data[15] shows that fewer than 40% of people with a mental disorder saw a health professional for their condition in the preceding year. Those that did see a health professional were three times as likely to see GPs as anybody else. Only 8% of people with a mental illness saw a psychiatrist in the year preceding the survey.

The data for people with severe mental disorders are slightly different, but still show the same pattern. Fewer than 60% of people with a psychotic illness saw a health professional or service (usually a community team) for their condition in the preceding year, although about 80% had seen a GP for any reason. Half had spent time in hospital in the preceding year. Only 21% of people with a psychotic disorder saw a psychiatrist outside hospital in the year preceding the survey.

These figures suggest that the people with mental health disorders must be reached by a population health approach. That is true even for people with psychotic disorders, for whom hospitals, GPs and community teams are important points of contact.

Key points:

The majority of people with mental disorders do not use health services regularly for their conditions. Only a small proportion see psychiatrists or psychologists. Those who do use health services predominantly see GPs.

People with psychotic illnesses follow similar patterns, but may have frequent contact with hospitals, GPs and community teams. There is still a proportion of people with a psychotic illness who have little contact with health services.

4. The prevalence of smoking

The prevalence of smoking in Australia

The prevalence of smoking rose in the first half of last century, then dropped significantly in the second half. Its decline is continuing into the new century. Smoking is now about a third as common among men, and slightly less common among women, as it was at the end of World War II.

Table 1: The prevalence of smoking in Australia (%)

Year	Male	Female	Total
1900	..	..	38
1945	72	26	49
1964	58	28	43
1969	45	28	37
1974	45	30	37
1976	43	33	38
1980	41	31	36
1986	33	29	31
1992	28	24	26
1995	27	23	25
1997	27	22	24
2004	26	20	23

Sources: Australian Institute of Health and Welfare 2005; Winstanley, Woodward et al 1995; Tyrrell 1999; Australian Bureau of Statistics 2006[21,37-40]

Prevalence varies between different populations. People born in southern and central Asia, (12%) south-east Asia (15%) and north-east Asia (16%) have a low prevalence of smoking.[21] In general, smoking prevalence among migrants is similar to, or slightly lower than, rates of smoking among Australian-born people.[21,41] However there are exceptions, with high prevalence among men of Croatian, Vietnamese and Arabic descent.[42] And in one survey, about 50% of Indigenous people smoked.[21]

Smoking is inversely related to education. An Australian community survey found that the prevalence of smoking was 12% among those with tertiary education, and 26% for those with lower levels of education.[43] In the 1997 Australian national survey of mental health and well-being, 30% of those who hadn't completed secondary school smoked compared to 21% of those with post-secondary education. Smoking prevalence among the unemployed was 47.6%.[15]

Smoking is also associated with socioeconomic disadvantage. After adjusting for age differences, 33% of men and 28% of women in the most disadvantaged areas reported being daily smokers, compared to 16% of men and 11% of women in the most advantaged areas, as measured by being in the first or fifth quintiles of the Index of Relative Socio-Economic Disadvantage respectively.[21]

Key points:

The prevalence of smoking in Australia is now about 23%. Smoking is far less common now than 50 years ago.

Smoking is less common among educated groups and among people with good mental health. Smoking is becoming strongly associated with social disadvantage.

The prevalence of smoking in people with mental illness

Mental illness in general

A number of studies have looked at people with mental illness as a group. These give varied results, although certain patterns emerge.

In a population of mixed inpatients and outpatients in France, with a variety of diagnoses, 59% were smokers, compared to a population prevalence of 33.6%.[44]

Among those who self-reported mental illness in Australia, 32% were smokers. In comparison 20% of people without mental illness were smokers.[14]

In a community sample of about 1000 people, Black et al found mental illness far more common among the half of the sample who were smokers.[45] Odds ratios were significantly raised at 3.6 for any substance abuse disorder, 2.1 for any affective disorder, and 1.9 for any personality disorder. There was no significant difference in anxiety disorders between smokers and non-smokers.

Key points:

Smoking is more common among the very diverse group of people with mental illness than among the rest of the population (32% versus 20% for the latest Australian data). However, that broad statement is too simple for a complex situation, and hides enormous differences between different groups of people with mental illness, some of whom are not more likely than average to smoke.

There is no data at all on which to judge the question of whether the prevalence of smoking is rising, declining or staying the same, among people with mental illness.

Substance abuse disorders

Smoking is a serious health problem even for people with multiple addictions. Alcoholics are more likely to die of tobacco-related disease than they are of alcohol-related disease.[46]

Smokers are five times more likely to have an alcohol use disorder than people who have never smoked,[47] and in an Australian community-based sample, 51% of people with an alcohol use disorder smoked.[48]

The prevalenc is remarkably high in study populations. Studies have found smoking prevalences of 91% among injecting drug users,[49] and 75%[50] and 85%[51] among people admitted to a clinic for alcohol abuse.

In Australia, a diagnosis of substance abuse complicates treatment. In most jurisdictions, mental illness and substance abuse are treated by different clinical teams with different philosophical approaches and in different settings. Some drug and alcohol treatment centres will not accept patients with mental illness, and some mental illness services will not treat drug and alcohol problems. (T Ahmed, personal communication).

Schizophrenia

It is generally believed that the prevalence of smoking among people with schizophrenia is very high, with Australian guidelines for general practitioners [52,53] and for psychiatrists and physicians[54] stating it is towards 90%. Many inferences are drawn from this belief. It needs to be examined in detail.

The most comprehensive collection of the data is that compiled by de Leon and Diaz, who performed a meta-analysis of available studies looking at the prevalence of smoking in schizophrenia. The authors looked at 42 studies from 20 nations. Thirteen of these studies referred to inpatients only, 24 to outpatients only and four to mixed samples. About two-thirds of the subjects were male. The average prevalence of smoking in the men studied was 71%, and among the women was 44%. The combined average prevalence was 62%.[55]

The authors concluded that “a large number of worldwide studies describing current smoking in schizophrenia consistently suggest that schizophrenia patients from all countries share a biological factor that makes them prone to smoke,’’ however this conclusion is disputable.

Several points are worth noting about this meta-analysis.

The first issue is its significant heterogeneity. Prevalence among the subjects with schizophrenia ranged from 88%[56,57] to 14%[58]. Smoking prevalence in the general populations, used as controls, ranged from 58% in Ireland[59] to 16% in Singapore[60]. The odds ratios for smoking in people with schizophrenia compared to controls range from 26.0 [57] to 0.74 [58,61]. This enormous heterogeneity, and the highly significant difference in average prevalence between men and women, undermines the authors’ conclusion that the association is “relatively independent of sociocultural values’’.

The second issue is the relative homogeneity within cultures, but not between them. For example, the prevalence of smoking among subjects with schizophrenia was over 50% in all 12 US studies – the US provided all five studies with odds ratios greater than 10.0. The prevalence of smoking among people with schizophrenia was under 30% in all three Colombian studies. Prevalence within cultures was within relatively narrow ranges – 61-71% in four Canadian studies, 55-61% in three Finnish studies, 53-70% in four Spanish studies and 31-41% in the three studies quoted from eastern Asia (Singapore, Japan and Taiwan).

This data suggests, in fact, that prevalence is relatively dependent on the sociocultural context.

The third issue is the lower prevalence among women compared to men. Five studies[62-66] found the prevalence among women was less that 20%. The weighted average of odds ratios in de Leon's meta-analysis was 3.3 for women, compared to 7.2 for men.

The fourth issue is that there have been a number of studies which mention the prevalence of smoking among people with schizophrenia which have been published since the de Leon and Diaz meta-analysis, and generally they reveal a lower prevalence of smoking. For example, in a Turkish study, 57% of 66 people with schizophrenia smoked, as did 55% of 78 people with bipolar disorder and 47% of healthy controls.[67] In a Finnish study of a birth cohort (ie. a true community sample), 48% of the people with schizophrenia were smoking at the age of 31. The general population prevalence at the time was 29%.[68] In a study on male Chinese inpatients with schizophrenia, 40% smoked in 1996.[69] This is lower than the prevalence of smoking among the general population, which was 63% at the time.[70] The prevalence of smoking in a sample of 256 long term inpatients in Japan with schizophrenia was 36%.[71]

A study of men in India,[72] omitted from the de Leon and Diaz meta-analysis, found that smoking among men with schizophrenia was lower than in the general population.

In another study omitted from the de Leon meta-analysis, Kelly and McCreadie found that the prevalence of smoking among a sample of all 168 known people with schizophrenia in a relatively poor region of Scotland was 58%, compared with a local general population rate of 28%. Although the samples are small, smoking was more common among inpatients (63%), day patients (62%) and outpatients (62%) than among those looked after by general practitioners and community nurses alone (25%). Smoking was more common among those with more hospitalisations and those with greater contact with health services.[73] These findings suggest two possible explanations – that smoking is a marker of severity in people with schizophrenia, or that contact with hospitals induces, or perhaps maintains, smoking. Both explanations are feasible.

If these more recent studies show lower prevalence data, it raises the possibility that the prevalence of smoking in people with schizophrenia may be declining. An alternative explanation is that the studies have sampled different populations.

A further issue with prevalence data among people with schizophrenia is the sample size. For example, the Hughes study from 1986,[56] which gives a smoking prevalence among people with schizophrenia of 88%, comprises a sample of just 24 people with schizophrenia. Yet it has been cited by 108 other papers, according to Medline (accessed M Ragg June 2007). The English-language study with the lowest prevalence of smoking among people with schizophrenia (34% among 137 people with schizophrenia versus 37% in the general population)[74] has been cited only once.

A final issue is the age of the data. Glassman's 1993 paper is often quoted, as it draws on a number of studies finding smoking prevalence of 75-92%.[75] However, the studies Glassman draws on were published between 1983 and 1992. The data are now 20 to 30 years old, and in that time the prevalence of smoking in Australia has dropped by between one third and one half (see table 1). We do not know what has happened to the prevalence of smoking among people with schizophrenia in any population, as no relevant studies have been done. This makes the data out of date at best, and irrelevant at worst. Yet Glassman's 1993 paper is still quoted widely in Australia by reputable bodies – for example, see Smoking reduction and cessation for people with schizophrenia: guidelines for general practitioners, published by SANE Australia and the University of Melbourne Department of

Psychiatry, and endorsed by both the Royal Australian College of General Practitioners and the Royal Australian and New Zealand College of Psychiatrists.[53]

The main conclusions that can be drawn from the literature is that in most cultures examined, people with schizophrenia smoke more than the general population. However the opposite is true in some cases.

There is a significant difference in prevalence between men and women – a difference which generally reflects cultural norms – and there is significant homogeneity within cultures.

Far from suggesting that this study supports a biological basis for the high world-wide prevalence of smoking among people with schizophrenia, if the literature were able to support a conclusion, that conclusion would be that the prevalence of smoking among people with schizophrenia varies enormously between genders and cultures, and that sociocultural factors appear highly significant.

It is also worth noting that one high quality community-based study comes to a conclusion different to the majority, which are generally based on either inpatient or outpatient populations. Zammit et al followed 50,000 men who were conscripted into the Swedish army in 1969-70. They then examined all admissions to hospital between 1970 and 1986 and found that of the 50,000 men, 362 had been diagnosed with schizophrenia by 1996. They compared the smoking rates of those who had been diagnosed with schizophrenia and those who had not been diagnosed over that period.

After adjusting for many variables, the prevalence of smoking was slightly higher than average among those diagnosed within the first five years after conscription, but slightly lower among those diagnosed with schizophrenia more than five years after conscription. They argue that smoking is common in people going through the prodromal period of schizophrenia, which accounts for the slightly higher prevalence of smoking among men diagnosed with schizophrenia in the first 5 years after conscription. But they go on to argue, on the basis of the reduced incidence of schizophrenia among smokers more than five years after conscription compared to those who were not diagnosed with schizophrenia, that smoking protects against schizophrenia to some extent. Furthermore, they say that there is a dose relationship, with heavier smokers receiving a greater level of protection against schizophrenia.[76]

Key points:

The prevalence of smoking is high among people with schizophrenia in most studies, and in some studies it surpasses 80%. But in other studies, the prevalence is less than 20%. Most of the studies are old and of limited relevance, and are drawn from hospital or clinic populations.

Although this prevalence is probably affected significantly by factors usually associated with smoking, such as socioeconomic disadvantage, research has not teased out the relative contribution of such factors.

There appears to be a significant homogeneity of results within cultures, but not between cultures. This suggests that the cultural context is highly significant.

The wide differences between cultures, and the significant differences between men and women, provide no support for the contention that smoking in schizophrenia is biologically driven.

Depressive disorders

One of the difficulties of studying the relationship between smoking and depression is the wide variety of meaning ascribed to the term "depression'', as described above.

The first study which showed a high incidence of smoking in people with depression appeared in 1988. Glassman et al found that 60% of people attending a smoking cessation clinic had a history of major depression.[77]

Subsequent cross-sectional studies have reported lower prevalences, but many have found that smoking is more common in people with a history of depression (see, for example, Lasser et al[78]), and that the prevalence of depression is higher than average among smokers (for review, see Covey et al[79]).

And although most of the studies have been carried out in US populations, an association between smoking and depressive symptoms has also been reported in a Mexican population,[80] in military medical students in Turkey[81] and in two Australian community surveys[82,83.]

However, this is not a universal finding. Lopes et al found that smoking among outpatients with depression or anxiety disorders was about the same rate as the general population in Brazil.[84]

Roy et al found differences in smoking rates between people in different diagnostic categories of depression – 8% for those with psychotic depression, 25% for those with endogenous depression or reactive depression and 42% for those with neurotic depression (n=92 for total group, but no breakdown between groups recorded).[85]

Key points:

Smoking is generally more common in people with depression than in the general population. The increase in prevalence over the general population is likely to be moderate.

Bipolar disorder

There is little research which looks at the prevalence of smoking in people with bipolar disorder.

In one US study, 33% from a long-term research group smoked.[86] Itkin et al found the prevalence of smoking to be 43% for people with bipolar disorder attending an outpatient clinic in southern Israel in 1997.[87] At that time, the prevalence of smoking in Israel was 27.5%. And in a small case-control study, 51% of people with bipolar disorder smoked compared with 33% of controls.[88]

Anxiety disorders excluding PTSD

In an Australian community-based study, people with anxiety disorders were twice as likely to smoke as those without.[89] In a cross-sectional study of 155 outpatients in the US, McCabe et al showed that the prevalence of smoking was higher in people with panic disorder (40%) than in people with obsessive compulsive disorder (22%) or social phobia (20%).The latter two rates are below the population prevalence.[90]

In a Swedish study of 99 people with obsessive compulsive disorder attending an anxiety clinic, only 14.5% smoked. The prevalence in the general population in Sweden at that time was 25%.[91]

Key points:

The data on smoking and anxiety disorders is mixed.
It is possible that people with panic disorders are more likely to smoke than average, while people with other forms of anxiety disorder are less likely than average to smoke. However, this is not a firm conclusion – there is not enough data.

Post traumatic stress disorder (PTSD)

The prevalence of smoking in people with PTSD is higher than the general population.[92-96]

The prevalence of smoking is also high in the sub-populations from whom people with PTSD are drawn – such as men who have fought in war[97] and women who have been raped[98].

There is conflicting evidence about whether or not trauma itself is associated with an increased likelihood of smoking – Acierno et al found that smoking is more common in women who have been assaulted, [99] while Breslau et al found that trauma alone, without PTSD, does not have an association with smoking.[100]

Key points:

The relationship between smoking and PTSD is not clear. Most studies show that people with PTSD are more likely than the average person to smoke, but most of these studies draw on sub-populations where smoking is common.

Eating disorders

A number of studies (for example Welch and Fairburn[101] and Wiseman et al[102]) have shown that people with eating disorders are more likely to smoke than the general population.

Anzengruber et al found that the prevalence of smoking varied according to the type of eating disorders. The authors found that at a time when the smoking prevalence of age-matched and education-level matched women was 29.7%, the prevalence of smoking among women with the restrictive type of anorexia nervosa was 25.5%, and the prevalence of smoking among women with a history of bulimia, but no anorexia, was 61.0%. Prevalence with a mixed type of eating disorder was 39.9%.[103]

Key points:

The prevalence of smoking in mental illnesses apart from schizophrenia, depression, anxiety disorders and PTSD is not well studied. But smoking appears to be more common than average in some groups, and less common than average in others.

5. Heavy smoking

The literature is troubled by lack of consensus on the definition "heavy smoker''. For many, a heavy smoker consumes more than 20 cigarettes a day. But this varies – McCabe et al defines a heavy smoker as someone who has more than 10 cigarettes a day.[90]

In a US community study Lasser et al found that people who said they had a mental illness smoked more heavily, on average, than those without a mental illness. The difference was small – 26 cigarettes a day versus 22 cigarettes a day.[104]

Studies in selected populations of people with serious mental illness have found more significant differences. Studies have shown that people with serious mental illness smoke more cigarettes per day and draw more smoke per cigarette than smokers without mental illness.[105-110]

Also, most studies have shown that people with serious mental illness who smoke have more metabolites of nicotine in bodily fluids than other smokers,[111,112] suggesting that they inhale more nicotine, although some have not.[113]

"Hardcore'' smokers

A conceptual debate is under way regarding the issue of "hardcore'' smokers. Hardcore smokers are not, by definition, simply heavy smokers, although some may be. This pejorative term is used in different ways by different groups,[114] but essentially it means the group of people who have little knowledge of or interest in quitting.

Much effort is being put into characterising the group. According to Augustson and Marcus, there are three groups of people involved:

- smokers who have little contact with people and events that encourage and support quitting, and are relatively untouched by public health smoking cessation efforts
- smokers who have contact with those elements, and have tried many times to quit, but have failed
- smokers who have contact with those elements, but have not tried to quit.[115]

Based on the evidence noted in this report, it appears that people with serious mental illness who are "hardcore'' smokers fall into the first category. However, it seems unreasonable to call people "hardcore'' smokers when the issue is not that they have continued to smoke despite all efforts, but that efforts have either not been made or not reached them. And in some cases, people with mental illness have been encouraged to smoke.

The term "hardcore", in effect, blames the smokers for not quitting. This review provides evidence that there has been a failure to provide this particular group of smokers with adequate and appropriate care.

We recommend the term "hardcore" not be used in reference to people with mental illness or other disadvantaged groups.

Key points:

It is likely that if someone with a serious mental illness smokes, they will smoke with more intensity than an average smoker. The situation is less clear for people with milder forms of mental illness.

The term “hardcore smoker’’ should not be used. It is pejorative and, given the failure of the health sector to help people with mental illness quit, unfair.

6. The diagnosis of nicotine dependence

WHO first recognised tobacco as a dependence-producing substance in 1974. However, it wasn't until 1992 that nicotine was recognised with other dependence-producing drugs in the ICD-10.[116] It describes dependence as:

A cluster of behavioural, cognitive and physiological phenomena that develop after repeated substance use and that typically include a strong desire to take the drug, difficulties in controlling its use, persisting in its use despite harmful consequences, a higher priority given to drug use than to other activities and obligations, increased tolerance, and sometimes a physical withdrawal state.[3]

The American Psychiatric Association first recognised tobacco dependence in the DSM-III published in 1980.[117] It now defines dependence as a maladaptive pattern of tobacco use, leading to clinically significant impairment or distress, as shown by three or more of the following:

- tolerance
- withdrawal
- smoking more, or for longer periods, than desired
- the persistent desire to quit or reduce smoking
- spending a great deal of time getting or using cigarettes, or recovering from their effects
- giving up or reducing other important activities
- continued use despite knowledge of a persistent or recurrent problem caused or worsened by smoking.[4]

But little is known about nicotine dependence in clinical practice. It is rarely studied separately from smoking.[118] Breslau et al found a lifetime prevalence of nicotine dependence among US smokers of 24%.[119] Grant et al found a point prevalence of 12.8% among the US population. It is more common among people with a mental illness, and particularly a substance abuse disorder.[120]

Yet in clinical practice, it was diagnosed in only 4% of smokers in two separate studies [121,122,] and in only six of 47 smokers in a child and adolescent inpatient unit.[123]

Sellman et al report on changes in the rate of diagnosis in a clinical setting. Staff at an adolescent mental health service in New Zealand discussed, for two-month period in early 1998, whether or not the diagnosis of nicotine dependence was an appropriate activity for a mental health service. There was no conclusion, no new protocols or policies, and no change in staff mix.[124]

Yet an audit of clinical records from 1996, 1997 and 1998 (after the discussion) shows that the rate of diagnosis of nicotine dependence rose from 3.6% to 8.3% to 26.3%. The mix of patients and their smoking behaviours attending the service did not change. This suggests that staff discussion or education about nicotine dependence can increase the frequency which with it is diagnosed.

Neuman et al argue that the tobacco industry has worked assiduously to limit the impact of the diagnosis of nicotine dependence, realising that if the term nicotine dependence was used more widely, and diagnosed more widely, that would have flow-on effects to the number of people receiving treatment for it.[125] See Appendix for further discussion of this paper.

Key points:

Nicotine dependence is described by the World Health Organization and the American Psychiatric Association as a mental illness. Research on nicotine dependence is sparse, but suggests that about a quarter of smokers may have nicotine dependence, that it is vastly under-diagnosed, that discussing the issue may lead to an increase in diagnosis among smokers, and that smokers with such a diagnosis may be more likely to be offered help with quitting.

The tobacco industry has worked to minimise the frequency of diagnosis of nicotine dependence. This point alone suggests that efforts should be made to ensure that nicotine dependence is diagnosed where clinically appropriate.

7. Smoking: effects, benefits and harms

Neurobiological effects

There is a substantial body of work examining the neurobiological effects of smoking.

It has long been accepted that smokers tend to report improved concentration, enhanced mood and pleasure. However, prospective studies of adolescents who take up smoking show they report increased levels of anxiety, stress and depression. Also, adults who quit smoking report enduring mood improvements. So the prospective data actually shows that smoking heightens distress, not eases it.[126]

There is evidence that smoking significantly increases the risk of developing dementia.[127] It also may accelerate cognitive decline in non-demented elderly people.[128]

Most research on nicotine has looked at nicotinic receptors, which are a diverse, and incompletely understood, set of receptors. They are found in the brain and other neural tissue, and at the neuromuscular junction.

Clinical and laboratory studies suggest they are involved in complex brain functions such as memory, attention and cognition.[129] There are variations in the level of nicotinic receptors in conditions such as Alzheimer's disease, Parkinson's disease and nocturnal frontal lobe epilepsy,[130] although the clinical significance of this is unclear. There may be variable expression of genes involved in nicotinic receptors in people with schizophrenia,[131] although, again, the clinical significance of this is unclear.

There are about 3000 other chemical compounds in cigarettes, and these non-nicotine components also have a substantial effect.[132]

There is evidence that non-nicotine components of tobacco inhibit both A and B forms of monoamine oxidase (MAO), which is a neurochemical implicated in many psychiatric disorders.[133] There is also evidence that MAO concentrations in platelets are depleted in people with mental illness who smoke (for review, see Fowler et al[134]). However, evidence of the clinical applicability and usefulness of this knowledge is lacking at this stage.

Neurobiological effects in people with mental illness

There is a substantial body of literature and a significant number of reviews of this literature examining the effects of smoking, and in particular the role of nicotinic receptors, in laboratory tests in people with schizophrenia.[135-140.]

Most of these studies are performed with people who smoke regularly, which makes it impossible to determine what improvement is due to nicotine per se and what improvement is due to the reversal of nicotine withdrawal.

Although the literature is not totally consistent, much of it shows that people with schizophrenia who smoke improve their performance on tests such as visual spatial memory and speed of finger-tapping (for example, see Silver et al[141]). It is worth noting that the point of comparison is generally not their performance before they started smoking, but their performance before and after having a cigarette.

In a review of the evidence, Sacco et al found that a number of studies provide evidence that nicotine, in experimental conditions, improves certain limited aspects of cognitive function in all people. Under experimental conditions, nicotine also improves the performance of people with schizophrenia in certain tests which are usually performed poorly by people with schizophrenia, but which have uncertain clinical relevance.[142]

For example, in a few small studies, nicotine has been shown to correct two neurophysiological abnormalities commonly found in people with schizophrenia and their families – a deficit in sensory auditory gating and abnormalities in smooth-pursuit eye movements.[143]

But there is also a large body of literature which shows that nicotine does not improve the performance of people with schizophrenia who smoke on other tests which are thought to reflect certain aspects of neurological functioning.

And in another review, McEvoy and Allen say the available literature on the effects of nicotine on cognitive functioning in the general population is unsatisfying, and the literature regarding people with schizophrenia is very sparse. Definitions of such cognitive functions such as "attention'' and "working memory'' usually vary between studies, and the methodology for studying them differs. He points out that in comparing people "on'' and "off'' nicotine, most of the people "off'' nicotine would have some degree of nicotine withdrawal, and it is possible that any benefits found during the "on'' phase are simply the alleviation of nicotine withdrawal.[144]

The clinical relevance of this is not clear. To our knowledge, there have been no studies which examine the cognitive function of people with schizophrenia outside the laboratory. Does smoking help people with schizophrenia think more clearly? Does it help them manage their lives more effectively? Those questions have, to our knowledge, not been examined. The theory that smoking improves some aspects of neurological function in people with schizophrenia is biologically plausible, and the laboratory data remains suggestive, but there is little more than that.

Key points:

There is a widespread belief that nicotine improves the neurological functioning of people with schizophrenia. This is a biologically plausible theory. There is a substantial amount of animal data to support the theory. And there is some laboratory data to suggest nicotine may be of benefit to the neurological functioning of humans.

But clinical data is lacking. There is no evidence that nicotine provides any neurological, cognitive or functional benefit to people with schizophrenia.

Health benefits of smoking

Smoking reduces the incidence of endometrial cancer (in postmenopausal women), Parkinson's disease, hypertension of pregnancy, Alzheimer's disease and possibly ulcerative colitis. [145,146.]

Health harms of smoking

Almost half of all people in developed nations who smoke die of a smoking-related disease, losing an average of 15 years of life per death.[147]

Smoking causes cancers of the bladder, oral cavity, pharynx, larynx, oesophagus, cervix, kidney, lung, pancreas, and stomach, and causes acute myeloid leukaemia.[148]

Smoking causes about 90% of lung cancer deaths in women and almost 80% of lung cancer deaths in men. The risk of dying from lung cancer is more than 23 times higher among men who smoke cigarettes, and about 13 times higher among women who smoke cigarettes compared with 'never smokers'.[148]

Smoking causes coronary heart disease. Cigarette smokers are 2–4 times more likely to develop coronary heart disease than non-smokers.[149]

Smoking roughly doubles a person's risk for stroke. Smoking causes reduced circulation by narrowing the arteries. Smokers are more than 10 times as likely as non-smokers to develop peripheral vascular disease. Smoking causes abdominal aortic aneurysm and lung disease.[148]

Smoking has many adverse reproductive and early childhood effects, including an increased risk for infertility, preterm delivery, stillbirth, low birth weight and sudden infant death syndrome.[148]

Smoking may be a gateway drug to cannabis use. That is, adolescents who smoke are more likely, all other things being equal, to use cannabis.[150-153]

Adolescent smokers are likely to have later problems with heavy drinking, including problems like hospitalisation and drink driving,[154] as well as later drug use.[155]

Heavy smoking is associated with cognitive impairment and decline in mid-life, even after controlling for known effects on cardiovascular and respiratory health.[156]

Health benefits of smoking in people with mental illness

We can find no evidence of health benefits of smoking in people with mental illness.

Health harms of smoking in people with mental illness

Apart from all the other harms to health of smoking (see above), it also exposes people with mental illness to the risk of burns.[157] Also, smoking increases stress.[158]

Financial consequences of smoking

People who smoke generally suffer in terms of lower wages, more absences, more injuries, and higher unemployment levels. Productivity at work also suffers because of withdrawal symptoms and cigarette breaks.[159]

Financial consequences of smoking for people with mental illness

In a US study, Steinberg et al looked at the finances of 78 people with schizophrenia or schizoaffective disorder who smoked.[160] They found that subjects spent a median of $142.50 a month on cigarettes, and almost 90% were receiving welfare payments with a median figure of $596. Using these figures, the authors calculated that they spent 27% of their income on cigarettes.

Controlling for other factors, Jofre-Bonet et al found that men in the workforce who smoke and have poor mental health have a 16% loss of wages relative to men who don't smoke and don't have poor mental health. For women who smoke and have poor mental health, the loss of wages is 5.3%.[161]

Lawn presented Australian data from an earlier study, analysed for financial implications.[162] All of the 24 people with mental illness she interviewed received a Disability Support Pension from the Australian Government worth, at that time, $197.05 per week. A cheap packet of cigarettes at that time cost $10.40 for 40. So somebody who smoked 40 cigarettes a day would spend $72.80 a week, or 37% of their pension, on cigarettes.

Key points

A small number of studies suggest that people with serious mental illness who smoke spend around a third of their income on cigarettes.

Smoking and suicide

Several cross-sectional studies have noted a link between smoking and suicide. Tanskanen et al surveyed more than 1000 "psychiatric patients'' (few more details supplied) and found that smokers were twice as likely to have attempted suicide as non-smokers.[163] Malone et al found that among inpatients with serious mental illnesses, smokers were more likely to have attempted suicide, and to have suicidal ideation, than non-smokers.[164] Smoking was associated with suicide attempts in Eastern European, Western European, North American, South African and South American subgroups of a large multicentre cross-sectional study.[165] And in a case-control study, Schneider et al found smoking to be an independent risk factor for suicide.[166]

But longitudinal studies give mixed results.

Hemmingsson and Kriebel found that people who smoked at ages 18 – 20 had a much higher risk of suicide over the next 26 years. When they controlled for a variety of factors (including family factors, mental health problems, education and contact with police), the association disappeared. They concluded that smoking is not an independent risk factor, but a marker of other problems.[167]

In a prospective study, Oquendo et al looked at more than 300 people with a major mood disorder and followed them for more than two years. They found the three strongest predictors of a suicide attempt among this group was a previous suicide attempt, severity of depression and smoking. Smoking roughly doubled the risk of another suicide attempt.[168]

Breslau et al examined a young and healthy cohort and found that current smoking was associated with a risk of suicidal thoughts and suicide attempts. However, she concludes simply that ''there is an association which survives adjustment for many potential confounders''.[169]

In all, it is clear that people who smoke are more likely to attempt suicide than those who do not. But it is not clear whether smoking is an independent risk factor for suicide or simply a marker for other factors.

Key points

Smoking does enormous physical, financial and social harm to the smoker in many different ways. It has few benefits. The harms far outweigh the benefits in all people, including people with mental illness.

8. The smoking culture in mental health

Smoking was a cultural norm for centuries. Evidence that smoking was harmful first appeared in Germany in the early 1930s.[170] Comprehensive and widely discussed English language reports on the harms of smoking appeared by 1950 (for example, Doll and Hill[171]). By the time landmark reports were released in the UK in 1962[172] and the US in 1964[173], nobody working in health care could fail to know, and reasonably fail to tell their patients, that smoking was harmful.

Even if people did not read or take any note of professional or lay media, warnings of the health impact of smoking have appeared on Australian cigarette packs since 1973.[39]

The health effects of smoking are well known. Yet a culture of smoking in mental health still exists.

Smoking among mental health workers

The prevalence of smoking among mental health staff is high. This is shown by a substantial Australian survey of drug and alcohol treatment centres, which found that 36% of mental health staff smoked in 2000.[174] The prevalence in the general population was 24% at the time.[21]

And in a study of 600 Scottish nurses in 1989, 39% of women and 47% of men smoked. Among female mental health nurses, 62% smoked.[175] Trinkoff and Storr also found, among US nurses, that those working in mental health were twice as likely to smoke as nurses working in other areas.[176]

When smoking bans are imposed in workplaces, the number of cigarettes smoked by staff declines significantly, particularly among heavy smokers (for Australian data see Borland et al).[177,178]

Key points

Smoking is common among Australian mental health staff.

There is strong evidence that smoking bans in workplaces reduce smoking among staff.

Attitudes among mental health workers to smoking

In one US study from 1993, only a third of 771 professionals employed in alcohol treatment programs agreed that people in active alcohol treatment programs should be urged to quit. Those staff who smoked were one-third to one-half as likely to provide counselling on smoking cessation as those who had never smoked.[179]

Numerous studies have shown that staff who smoke are less likely to initiate smoking cessation among staff, and may not be as effective when they do.[180]

Nurses and doctors sometimes consider smoking a benign problem compared to mental disorders or other substance dependencies.[181] Negative attitudes among staff may undermine efforts to introduce change with respect to treatment for nicotine dependence.[182]

A recent survey of smoking beliefs and attitudes among British mental health staff at one psychiatric hospital found that registered nurses held far more relaxed views about smoking than did other health professionals.[183] They were more likely to think staff should be allowed to smoke with patients, to think this creates a therapeutic relationship, and that patients not having cigarettes leads to a deterioration in their condition.

Lawn says cigarettes are seen by many patients and some staff as currency for social and economic exchange.[184]

Moeller-Saxone says: "Smoking is still very much a way of controlling behaviour. So, people come into hospitals psychotic. They are very distressed and perhaps difficult to be with and one of the strategies that staff can often use to control their behaviour is to withhold their cigarettes."[185]

Key points

Mental health staff generally consider smoking benign, and some consider it a positive experience for people with mental illness.

There is little evidence that mental health staff routinely or regularly try to help people quit smoking.

Mental health staff who smoke are even less likely than others to help smokers quit.

Institutional practices

Two key sets of work describe Australian institutional practices – that of Walsh et al[186] and the on-going work of Lawn.[184,187-190]

In 2001, Walsh et al surveyed managers and other staff at all Australian drug and alcohol agencies about their current practices with regard to smoking cessation policies and practices, and related staff attitudes.[191] More than 400 questionnaires were returned from 260 agencies.

About 25% of respondents said there was a written policy regarding smoking cessation interventions, and disagreement between managers and other staff over the existence of a policy was common.

About 80% of respondents said the decision to deliver a smoking cessation intervention was left to individual staff members.

Respondents also estimated that:

- about 80% of clients should receive smoking advice
- about 40% of clients did receive any smoking advice
- about 32% of clients did receive adequate smoking advice.

The authors explored the disparity between what staff perceive as good practice and what they delivered. Barriers rated as very important or quite important by the majority of staff include:

- the perceived potential negative impact on progress with clients' other drug issues
- the perception that clients would not be receptive
- lack of staff training in smoking cessation
- lack of coordinated staff approach
- lack of staff time.

As this review shows, the two main perceptions – those regarding interference with other drug issues and non-receptive clients – run counter to the evidence. The other three are concerned with management issues.

Lawn's work – a series of descriptions and analyses of current practices in Australian institutions – is instructive.

Staff in one South Australian hospital "at all levels and all disciplines, from clinical to administrative staff, spoke of their full awareness of the use of cigarettes for trade, standover, exchanges for other goods, other drugs and sexual favours among patients."[189]

Staff may condone smoking among patients because they believe:

- it helps staff avoid assault by agitated patients
- quitting is a low priority in ill people
- quitting would be too difficult
- it helps patients manage their symptoms
- smoking is one of the few pleasures for people with mental illness.[189]

As this reviews shows, the first three beliefs run counter to the evidence, while the fourth belief is contentious.

For more details, see Appendix.

Attitudes and practices of psychiatrists

A number of papers have examined the practices of psychiatrists in the US.

Thorndike et al analysed data from six large annual surveys (1991-1996) of US doctors to determine how often they identified the smoking status of their patients, and how often they counselled their patients about smoking. The authors found that 76% of people with a psychiatric diagnosis had their smoking status noted, but doctors counselled their smoking patients against smoking in only 23% of cases (27% for people with anxiety and 11% for people with schizophrenia). Most strikingly, 38% of visits by smokers to a primary care physician led to counselling, compared with 12% of visits by smokers to a psychiatrist.[192]

Prochaska et al examined a randomly selected sample of 250 records from an acute care adult psychiatric hospital in the US which had a smoke-free policy. The authors found that 56% of smokers were given a prescription for NRT while in hospital. But only one smoker was advised to quit smoking, referred for smoking cessation therapy or given NRT on discharge. Smokers who were not given NRT were twice as likely to discharge themselves against medical advice as non-smokers or smokers given NRT. [193]

Prochaska et al also surveyed 105 psychiatry residents in the US, who are the equivalent of our psychiatry registrars. Among the residents, most thought they had received inadequate training in smoking and nicotine dependence, most rated their ability to help patients quit smoking as fair or poor, and most were interested in learning more.[194]

As part of another group, Prochaska et al then conducted a national (US) survey of psychiatry residency training directors. The survey found that only half provided any training at all in tobacco treatment. Of those that provided training, the mean duration was one hour. Respondents said they would like to provide more training, but often lacked the skills to do so.[195]

In Australia, Doran et al found that a little over 80% of GPs and psychiatrists in a fairly representative sample said they identified their patients' smoking habits, but only 78.5% of GPs and 59.3% of psychiatrists said they provided even brief advice on the benefits of quitting. Only 27% of GPs and only 7.3% of psychiatrists had received any training in providing a brief smoking intervention. Yet 86% of GPs said their preferred treatment for smoking cessation management was counselling by themselves. Also, 54% of psychiatrists said their preferred form of therapy for smoking cessation was "counselling by others'', which included themselves.[196]

Key points

It is likely that psychiatrists in Australia do not provide their patients who smoke with the assistance they need by offering either advice, counselling or referral. In the US, trainee psychiatrists believe they have neither the training nor the skills to help their patients properly, and would like to improve their skills.

Nurse-given cigarettes as cues to smoke

Cigarettes are given out in some hospitals. There are different approaches:

- sometimes the staff give an individual a pack of cigarettes, and at set times each day replenish the supply of those who have finished their packs[197,198]
- sometimes the staff give out individual cigarettes at 45-minute or 1-hour intervals (M Ragg, anecdotal evidence from sittings of the NSW Mental Health Tribunal)
- sometimes new patients are encouraged to smoke.[199]

This practice is current in some hospitals in Australia.

Lawn and Condon interviewed 26 mental health nurses about their beliefs regarding smoking and mental illness. All the nurses spoke of a rich smoking reinforcement environment. All had trained in a system that both condoned smoking and used cigarettes as a tool of behaviour management. In general, the nurses believed:

- their patients had a right to smoke
- their patients were making free and informed choices about smoking
- they did not want to make the patient suffer by making them quit
- they did not want to risk harm to staff by making smokers quit
- they did not want to broach the subject while people were unwell
- they did not see it as their role or responsibility to encourage people to quit.[200]

But is giving out cigarettes a neutral act? We would argue that it encourages smoking for the following reasons:

- Because cigarettes are given out at set times, as are medications, they may come to adopt some of the features of a medication – prescribed, regular and necessary for well-being
- Cigarettes act as a cue to smoking, triggering craving as well as physiological arousal in smokers.[201]
- Because they are given out by nursing staff, they are likely to be seen as something prescribed by the hospital.

In some cases, nursing staff describe detained patients as “starting to socialise – now turning up for the cigarette rounds’’ or “not all that compliant – missed a couple of ciggies yesterday’’ (M Ragg, anecdotal evidence from sittings of the NSW Mental Health Tribunal). This suggests that at least in some cases, nursing staff see cigarettes as both a medication and a marker of well-being. Could some patients help feeling the same?

Key points

Smoking is encouraged by parts of the mental health sector. There is no other part of society in which this happens.

Part of the reason for this is ignorance about the impact of smoking on mental health and other substance use. Another reason is the false belief that clients would not be interested in quitting.

9. Why do people smoke?

Why do people start smoking?

Most people who smoke start in adolescence, with the average age of onset being 15.2 years for males and 16.5 for females.[21] One-third to one-half of people who try smoking become regular smokers, and a small proportion become chippers – people who smoke occasionally but not daily.[202]

In a review of the issue, Sussman says that the strongest risk factors for young people in the US to start smoking and to become regular smokers are:

- lower education and income
- white ethnicity
- family and friends who smoke
- a perception that the social consequences of smoking are positive
- behavioural and psychological handicaps
- access and opportunity
- cognition and physiological reinforcement
- habit and addiction.[203]

A population-based study of Australian twins found that unpleasant conflicts with parents, strictness, frequent disobedience and early onset of sexual activity are also associated.[204] Other research has reported that sexual assault is also a risk factor for girls,[205] and experiencing physical assault or witnessing violence was a risk factor for both boys and girls.[206]

Heritability is also thought to be a factor (for example, see Agrawal et al[207]). A meta-analysis of 17 twin studies estimated the genetic contribution to smoking initiation to be 40%-60%, however estimates from individual studies range from 11% to 78%.[208]

Trauma may also play a part. Nandi et al[209] and Parslow and Jorm[210] have found increased smoking in the months after the September 11 attacks in the US and the 2003 Canberra bushfires respectively. In a comprehensive review Feldner et al [(174)] found a continuum – people who had witnessed a trauma were more likely to smoke than those who hadn't, those who had experienced a trauma were more likely to smoke than those who had not, and those who developed PSTD were more likely to smoke than those who had not.[211]

What are the steps towards regular smoking?

The following steps are followed to various degrees in most young people:

- Non-smoking: with no thoughts of smoking.
- The preparation phase: the personality, family, peer and other socio-environmental factors operate. Risk-takers, those of low self-esteem, those uninvolved with school activities and those whose family and peers smoke are those most likely to prepare to smoke.
- The trial phase: peer factors are most important here, and low parental monitoring further increases both the importance of peers, and the likelihood of exposure to peers who smoke. Curiosity about smoking and social information (mainly advertisements) play a part.
- The experimental phase: expectations of pleasure or stress relief, habits and physiological reinforcement become important.
- Regular use: physiological reinforcement, identity as user, automatic cognitive processing and addiction all become important as reasons for smoking.
- Dependence: addiction gains increasing influence.[212]

10. Does smoking relieve stress?

This question deserves examination on its own, because it is both a commonly held belief[213] and a powerful one which can be used to justify allowing, or even encouraging, people with mental illness to smoke.

This belief arises from evidence which shows that smokers say they feel better when smoking than when abstaining. They say smoking gives them pleasure, calms them down, improves concentration, relieves stress and reduces anger.[214] The longer they go without cigarettes, the worse they feel. When they smoke, they feel better.

Parrott examined the relationship between smoking and stress by predicting what would happen during the phases of initiation and cessation for each of three different relationships – that smoking eases stress, that smoking causes stress and that the two are independent.[215]

If it were true that smoking relieves stress, then adolescents who start smoking should report reduced stress and reduced depression. If smoking caused distress then adolescent smokers should report increased stress and increased depression. If the two were independent, then taking up smoking should not affect levels of stress and/or depression.

Regarding cessation, if smoking relieved stress then people who quit would become more stressed and depressed. If smoking caused distress, then quitting would lead to a reduction in stress and depression. If the two were unrelated, then quitting would not cause any change in psychobiological status.

Parrott found a range of longitudinal studies showed that smoking in adolescence increases the risk of later mental health problems such as depression and anxiety.[216-220] Only Breslau et al[221] and, to a lesser extent Goodman and Capitman,[222] found that depression in adolescence leads to a higher rate of smoking.

Overall, Parrott concludes that "no prospective study has found that the uptake of smoking leads to psychobiological gains. Instead they show the opposite, with smoking leading to increased levels of stress and depression.''

Australian data supports this, with a community survey showing that people who smoke are twice as likely to feel distressed than people who don't smoke.[21]

On cessation, Parrott found that most longitudinal studies[223-226] reported that smokers felt better – less stress and/or less anxiety – three to six months after quitting.

Key points

Smoking causes stress. People who start smoking are more likely than average to become stressed and depressed. Most of the evidence shows that people who give up smoking become, after a period, less likely to be stressed and depressed.

Smokers say they feel a cigarette relieves their stress. This is true in the short term – having a cigarette eases the stress of withdrawal. In effect, one cigarette eases the stress that many cigarettes cause. But the stress returns, and will continue to return until the smoker quits.

11. Why do people with mental illness smoke?

It is clear there is an association between smoking and mental illness. That association differs between nations, differs between genders, and differs between types of mental illness.

Does smoking cause mental illness? Does having a mental illness induce smoking? Are there common pathways that lead people to both smoking and mental illness? Is it a chance observation? Or is there some other explanation?

People with mental illness live in the same world as people without mental illness, and are subject to the same external influences. This has been most closely studied in people with schizophrenia (for example, by Tidy and others[227-230]). In particular, people with schizophrenia respond to external cues in the same manner as people without schizophrenia, and modifying the environment is likely to be an important factor in reducing smoking prevalence.[231]

An examination of the risk factors for smoking listed by Sussman[232] (all except white ethnicity, which appears US-specific) shows that people with mental illness are more likely to have all of these risk factors than the average person:

- lower education: people with mental illness have, on average, lower education than people without mental illness[14,233]
- lower income: people with mental illness have, on average, lower income than people without mental illness and are more likely to be unemployed [14,15]
- family and friends who smoke: certainly people with serious mental illness who spend time in hospitals, or who live in boarding houses, or who are homeless, are surrounded by people who smoke.[234] To the extent that mental illness is familial, people with mental illness who smoke are more likely to have relatives with mental illness who smoke.[235]
- a perception that the social consequences of smoking are positive: smoking is encouraged by many people in mental health, and people at their most seriously ill – in hospital – are often given cigarettes by nurses [189,236]
- behavioural and psychological handicaps: many people with mental illnesses have behavioural and psychological handicaps [2]
- access and opportunity: people with mental illness have the same access and opportunity to smoke as people without mental illness. There may be financial barriers in some cases, but there is direct encouragement in others. [237]
- cognition and physiological reinforcement: people with mental illness who smoke feel better in the short term because of the abolition of withdrawal symptoms. [238]
- habit and addiction: people who have mental illness have the same opportunity for habit and addiction as others. Those with substance abuse disorders probably have more potential for addiction.[239,240]

And at each of the steps described by Sussman[241]
– the preparation phase, the trial phase, the experimental phase, regular use and dependence – people with mental illness are vulnerable based simply on their sociocultural situation.

People with mental illness give the same reasons for smoking as people without mental illness. For example, Lawn et al carried out a qualitative study with 24 people with mental illness living in the community who smoked heavily (average 40 cigarettes a day). These people said:

- they saw smoking as something in their lives they could control
- they felt despair and hopelessness about their lives and could not see the point of quitting
- they felt better when they smoked
- they saw smoking as a reliable friend
- smoking is accepted and reinforced by peers and by health care institutions and staff
- they thought quitting would be hard.[242]

And as an interesting parallel, Spencer et al looked at why people with a psychotic disorder say they use alcohol and other substances. The authors found that people with psychotic disorders gave similar reasons to the general population – "enhancement'', "social motives'', "coping with unpleasant affect'', and "conformity and acceptance''. The idea that substance use offered "relief of positive symptoms and side effects'' was not supported by the research.[243]

Another factor is that public health policies – through legislation, through workplace policies, through public education campaigns – have helped reduce smoking prevalence in the general population substantially. Smoking is no longer acceptable in most workplaces and in some social situations.

But these public health approaches, to our knowledge, have not specifically targeted people with mental illness.

As well, people with mental illness – a most vulnerable group – are the only group of people in Australia who are either not discouraged from smoking, or are actively encouraged to smoke.

And finally, people with serious mental illnesses attend hospitals, where smoking is often actively encouraged. Some who have given up smoking in the community relapse on readmission.[189]

Key points

People with mental illness smoke for all the reasons people without mental illness smoke – they tried it in adolescence, it is addictive, some keep going and others don't.

There are many risk factors for smoking and, in general, people with mental illness have them in excess. A high prevalence of smoking among people with mental illness would be expected based simply on an accumulation of risk factors.

It is not clear whether or not this accumulation of risk accounts for all the increased prevalence of smoking among people with mental illness.

Is there something special about mental illness that makes people smoke?

There is an enormous body of research attempting to tease out a special factor, or the special factors, that make people with mental illness smoke in excess.

The five commonly proposed models are:

- self-medication model
- smoking causes mental illness model
- mental illness causes smoking model
- bi-directional model
- common factor model.

Noordsy and Green[244] and Sacco et al[245] summarise much of the evidence regarding these models. We'll review the evidence briefly.

Self-medication model

This model suggests that people with mental illness smoke to ease the symptoms of depression, schizophrenia, substance abuse and other disorders. [246-254]

This model has inherent appeal and it is widely believed. But it relies on there being a biological commonality between schizophrenia, depression, substance abuse and other mental illnesses which has not been discovered, or even hypothesised.

Also, it has no predictive power and no real world data (as opposed to biochemical data drawing on theories of causation of mental illness) to support it. That is, there is no evidence that people with mental illness get better when they start smoking, and get worse when they stop smoking. In fact, the evidence shows that people who start smoking become more stressed, that smokers have higher stress levels than non-smokers and that people who quit smoking reduce their stress levels.[255] While stress levels are not equivalent to mental well-being in general, there is some commonality.

We prefer the approach of Lubman and Sundram who, writing specifically about schizophrenia, say "despite the intrinsic appeal of [the self-medication] hypothesis, there is conflicting evidence, and it seems that factors associated with substance abuse in people with schizophrenia are similar to those in the general community (ie. availability, cost, peer-group use and acceptance, facilitation of social interaction, intoxication and relaxation)."[256]

Smoking causes mental illness model

This model suggests that people who smoke are more likely to develop mental illness. There is some evidence to support this, especially with major depression.[257] This model has predictive power – it proposes that people who smoke will develop mental illness, and they will feel better when they stop smoking, and there is some evidence to suggest that this happens.

Mental illness causes smoking model

This model suggests that mental illness causes smoking. There is evidence to support it from Ismael et al, who performed an analysis of five annual waves of recruitment into the British Household Panel Survey 1991 – 1995. Using a fairly broad definition of mental disorder (such that about a quarter of the population were affected), they found that people with a mental disorder were about 30 per cent more likely than the average person to have increased their smoking 12 months later. This suggests that a mental disorder, or the accompanying changes that go with it, tend to increase the amount of smoking.[258]

Muted support also comes from Parrott who, after reviewing the evidence regarding smoking and depression, did not come to a firm conclusion. But he found there were more studies suggesting smoking led to depression than studies suggesting depression led to smoking.[259]

Bidirectional models

This model suggests there are complex interactions between smoking and mental illness.[260] For example, smoking could induce a depression in a biologically vulnerable person, and the smoking is maintained through learned social behaviours and the difficulties in dealing with withdrawal symptoms.

McMahon reviewed the data on child and adolescent psychopathology as risk factors for subsequent smoking. He found that several longitudinal studies have found that the presence of depressive symptoms or a diagnosis of major depressive disorder in adolescence is associated with subsequent smoking, but these studies generally did not take into account any co-morbid factors. He concluded that there is a bidirectional relationship between smoking and depression – each has a comparable probability of preceding the other.[261]

Common factor models

This model suggest there are social, environmental, genetic, psychological and other elements common to both smoking and various mental illnesses. The case for this model is argued most strongly in people with major depressive illnesses.[252]

Hanna et al examined data from the Third National Health and Nutrition Examination Survey (NHANES III), which was carried out in the US from 1988 – 1994. They selected 2000 respondents aged 12 – 16. They found a strong association between smoking and other forms of risky behaviour and its consequences – drug use, alcohol use, early sex, troubles at school, pregnancy. The authors believe that smoking is not a cause, but an indicator, of a group that we may non-scientifically called troubled youth.[262]

Breslau et al tried to untangle the relationship between smoking and depression by examining a cohort established some years earlier. The cohort was more than 1000 people aged 21-30 randomly selected from a health maintenance organisation in Michigan.[263] This would be similar, in some respects to taking a sample from people in their 20s belonging to a private health insurance fund in Australia – they would be generally, but not exclusively, relatively healthy, relatively wealthy and relatively employed.

Over a 5 year follow-up period, 12.1% of smokers developed a first episode of major depression, as did 6.5% of non-smokers. Over that same period 23.0% of people with a history of major depression at baseline became daily smokers, as did 9.3% of people with

no history of depression. These differences were significant, but the authors noted that the power of both these relationships diminished if the effects of early conduct disorder were taken into account.

Over that same period, about 20% of smokers quit, with no significant difference between those with a history of major depression and those without.

Breslau et al concluded that the relationship between smoking and depression is complex, and bilateral, and that they probably have shared aetiologies – whether that be from genetics, the social environment, personality and coping styles. They also concluded that early conduct disorder may be an important antecedent for both.

Dierker et al used family study techniques to examine smoking and depression. She concluded that the association between smoking and depression was probably one mediated through other factors, rather than a direct causal one.[264]

Four other studies provided longitudinal data – one from New Zealand[265] and three from the US. [266-268] All found a relationship between smoking in adolescence and depression later in life, although none found the straightforward causative relationship that prevalence studies had led them to consider possible. Their conclusions fitted generally within the common factor model.

Conclusion

The available evidence does not support the self-medication hypothesis. The other models are all feasible, and could all be true to some extent in different circumstances. It is unlikely that any one model will fit all people with mental illness.

Key points

People with some forms of mental illness, but not others, are more likely to smoke than people in the general population. Is there something special about mental illness that makes people smoke?

That is not certain. There are many possible explanations, and more than one of them may be true:

- smoking is often encouraged in people with mental illness, where it is discouraged in almost all other groups in society
- the peers of many people with serious mental illness smoke
- the health care providers of many people with mental illness smoke and/or encourage smoking
- cigarettes have been used in a manner analogous to medication in some psychiatric hospitals

- people with serious mental illness, as a group, have low employment rates, low incomes, low educational levels, low self-esteem – all of which are associated with smoking. They are among the most disadvantaged groups in society, and smoking is clearly linked with social disadvantage.
- people with serious mental illness may find it slightly harder than the average person to give up smoking, although they do not find it at all impossible
- there are theoretical explanations to suggest that smoking helps normalise some neurological dysfunctions in people with schizophrenia, although there is no clinical evidence to support this.

The common belief that people with mental illness smoke to self-medicate is unlikely to be true – it has been tested and found wanting.

It is not clear whether or not there is some distinct biological driver for excessive smoking in people with mental illness. The enormous variation between settings and between countries – prevalence rates vary from 14% to 88% – suggests the importance of a biological driver to smoke has been overstated, and that cultural values play a significant part.

The most consistent finding of all is that of a group of people with schizophrenia, those with the most severe illness are more likely to smoke and are more likely to smoke heavily. Researchers have not yet addressed the obvious question – could the smoking itself, or the stress of the repeated withdrawal that smokers endure each day, be causing harm?

12. Quitting

Quitting is important. There are only two ways to reduce the number of people who smoke – reduce the number who take it up and increase the number who quit.

Australian data shows that each year, about 40% of smokers try to quit, and about 75% of smokers say they have tried to quit at least once.[269]

About 5-10% of those who try unaided succeed in any single attempt.[270]

The benefits and harms of quitting

Smokers who quit live longer than smokers who don't, no matter what age they quit. The risk of dying, compared with people who continue to smoke, starts to drop soon after quitting and keeps dropping for 10 to 15 years. After that time, the risk of dying for an ex-smoker is very close to the risk of dying for someone who has never smoked.[271]

People who quit are healthier in many ways – they say they feel better, they have fewer health complaints and they have less time off work.[271]

People who have quit feel more in control of their lives than those who continue to smoke.[271]

The benefits and harms of quitting in people with mental illness

There is no research which looks specifically at the benefits of quitting in people with mental illness. However, the evidence shows that:

- people who quit smoking feel better
- people who quit smoking live longer
- people who quit smoking have fewer health problems
- people who quit smoking feel more in control of their lives
- people who quit smoking are much better off financially, especially if they were economically disadvantaged.[271]

There is no evidence to suggest that these results do not apply to people with mental illness.

Do people with mental illness want to quit?

There is overwhelming evidence that many people with mental illness want to quit.
The evidence comes from people with:

- schizophrenia [272-276]
- substance abuse disorders [277,278]
- community studies[279-281]
- studies of inpatients[282-285]
- dual diagnoses.[286]

Do people with schizophrenia want to quit?

Addington et al studied 60 people who smoked, recruited from a schizophrenia outpatients clinic at a teaching hospital in Canada. Of the 60, 18 were thinking about quitting and seven were making active preparations to quit. Sixty-three per cent of the group said they'd be keen to attend a smoking cessation group.[287]

When asked why they might quit, the five most common reasons given were:

- to save money
- to avoid serious illness
- to lengthen their lives
- to avoid physical symptoms from smoking
- because of an awareness that smoking causes illness in others.

These reasons are no different to those reported in the general population.[288]

Addington et al also found that the study group were generally motivated more by intrinsic concerns (such as health concerns) than by extrinsic concerns (such as social pressures). This may increase their chances of success.[289]

Lucksted et al found that among a group of 242 people with serious mental illness who attended a community psychiatric service, 82% said they wanted to reduce or quit smoking, half had recently reduced their smoking and a third were planning to quit within six months.[290]

Etter et al showed that people with schizophrenia attending an outpatient clinic and who smoke have roughly the same level of preparedness to quit as the general population.[281]

Do people with substance abuse disorders want to quit?

In a large study of people entering substance abuse treatment, 100% of alcoholics, 72% of cocaine addicts and 70% of heroin addicts were interested in stopping smoking. Nearly half the overall sample said they were interested in quitting at the same time as starting treatment for other addictions.[282]

About half of all those smokers admitted to an alcohol treatment clinic were thinking about stopping smoking or had decided to stop.[284]

Among 550 clients of methadone clinics, 77% smoked, three-quarters of them had quit for 24 hours at least once, the average number of quit attempts was five, and 80% of smokers said they were "somewhat'' or "very'' interested in quitting.[291]

Among a cohort of almost 500 intravenous drug users enrolled from a methadone program or a needle exchange program – that is, they were people who were trying to deal with their substance abuse in some way – 62% said they were planning to quit smoking in the next six months.[49]

Zullino et al asked 69 consecutive patients admitted to an alcohol detox unit in Switzerland whether or not they would undergo detox if smoking was banned. Fifteen of 69 said they would not, but this number dropped to five of 69 if nicotene replacement therapy was made available.[292]

In one naturalistic study of people with substance use disorder and another Axis 1 diagnosis, 54% tried to quit smoking over the course of a year.[293]

Among almost 400 people enrolled in four separate methadone clinics in the US, almost half the smokers were thinking about quitting.[294]

On the other hand, Kolly et al found that only 15% of 100 people attending an illegal drug withdrawal program were even thinking about quitting smoking.[295]

Community studies of people with mental illness

Community-based studies of people with mental illness show that people with mental illness are concerned about their physical health, and say smoking causes them financial hardship. Many people are interested in quitting but are often discouraged by mental health care providers, who considered them too emotionally fragile to quit and who focused more on clients' mental, rather than physical, health.[296]

Inpatients with mental illness

Among psychiatric inpatients in a veterans affairs hospital – the most common diagnoses were substance abuse disorders, schizophrenia and affective disorders – the majority of smokers believed that smoking hurt their health, while 40% of smokers said they planned to quit within six months.[297]

Dickens et al carried out a small but careful examination of the views of 45 forensic patients in an English psychiatric hospital. They found that the majority agreed with statements such as "it's just too difficult to give up smoking'', "seeing other patients smoking would make it difficult to stop smoking'' and "seeing members of staff smoking would make it difficult to stop smoking''.[298]

In general, the people interviewed thought smoking should be allowed for patients, staff and visitors, but that staff should encourage patients who smoke to stop or cut back.

Key points

There is strong evidence that people with mental illness would like to quit smoking, and would like help with it. Negative staff attitudes are a significant barrier.

How do people quit?

There are two ways to view this question. There is the clinical perspective, and there is the population perspective.

The clinical perspective

Using the clinical perspective, quitting is very difficult. Prospective studies show that most people who try to quit relapse within a week, and that 5–10% of people who try to quit are abstinent 12 months later.[270]

Again, using this clinical perspective, quite a few interventions have been shown to help quit rates. Nicotine replacement therapies (NRT) have been found, in a number of studies, to double the chances of quitting.[299] In absolute terms, NRT leads to abstinence at 6-12 months in close to 20% of people.[300]

Bupropion has fairly similar results in a smaller number of studies, with a doubling of quit rates.[301]

Psychological interventions are, in general, more effective than no psychological interventions, although none stand out as indisputably better than others.[302] Spending greater time with people wishing to quit increases their success rate,[303] although this is acknowledged as a very expensive approach.

The population health perspective

From the population health perspective, quitting is manageable. There are now more ex-smokers than smokers in Australia. About 30% of adults, or about 4.5 million people, once smoked and smoke no longer.[21] Most people who attempt to quit do so.

And about 90% of people who quit do so on their own.[304] Self-quitting – quitting without the aid of clinical interventions – has not been well studied, but it is the most common form of quitting by far.

Siahpush et al found that in Australian conditions, the social environment such as household smoking restrictions and having fewer smokers as friends were key factors for successful quitting.[305]

The usual path to relapse starts not with a relapse but a lapse – a single cigarette.[306] This is an important point for people who are repeatedly exposed to smoking by attending mental health services.

Key points

Quitting is not easy, but it is manageable. Most people who try to quit eventually do so. There are now more ex-smokers in Australia than smokers.

Most people who quit have done so without clinical intervention. They have been encouraged by a population health approach which entails getting the environment right for quitting, then providing support if needed.

How do people with mental illness quit?

There is little direct evidence with which to answer this question. But there is a reasonable amount of indirect evidence.

Quitting alone

As stated above, about 90% of people who quit do so on their own.[304] Given that people with mental illness make up more than 10% of the population, and more than 10% of the population of smokers, it is reasonable to infer that many people with mental illness quit on their own.

Among a group of 242 people with serious mental illness who attended a community psychiatric service and who smoked, most had tried to quit before.[307] The most common reported approaches to quitting were gradually cutting down (79%) and going cold turkey (73%). Few participants reported using Nicorette gum (28%), self-help literature (12%), quit smoking programs (7%), support groups (7%) or hypnosis (4%).

Lasser et al found that the proportion of lifetime smokers who have quit were in the order of 30% - 40% for most diagnostic categories, compared with 42% for people who had never had a mental illness.[308] This data was collected in 1991 and 1992. At that time, there were few or no dedicated smoking cessation programs for people with mental illness, and nicotine replacement therapy had reached the market only a few years before. This study suggests that most people with mental illness who quit have done so unaided.

Karam-Hage et al analysed data provided by people attending an outpatient clinic for alcohol dependence in 1995. Of the 389 people admitted consecutively through the year, 218 reported smoking at baseline – a prevalence of 68%. Of these, 144 provided follow-up data at six months. The authors found that 18 of the subjects had quit smoking at six months.[309] This is a rate of 13% with the group providing all data as a baseline, or 8% if the baseline was all smokers including those lost to follow-up. This quit rate is similar to that of the general population. There was a significant difference between the quit rates for those who kept drinking and those who abstained. Although this study's sample group was better educated than most groups seeking treatment for alcohol abuse, and this may limit its applicability, it does suggest that people who give up drinking may find it relatively easy to quit smoking.

Key points

Although there are no clear and definitive data, it is likely that most people with mental illness who stop smoking do so unaided. The beliefs and behaviours of people with mental illness who quit smoking appear to be similar to those of people without mental illness.

Quitting with help

Nicotine replacement therapy is useful in people with mental illness (see, for example, Chou et al[310], Williams et al[311,312] and Thorsteinsson et al[313]).

A number of studies have shown that various combinations of non-pharmacological and pharmacological approaches can be useful in helping to reduce either the number of smokers, or the number of cigarettes smoked, among populations with mental illness. [314-326]

Antidepressants have been of great interest to researchers. A Cochrane review on antidepressants and smoking cessation found that:

- bupropion SR (positive results in 19 trials of 24) used alone doubled the odds of cessation
- nortriptyline (positive results in four trials of six) used alone also doubled the odds of cessation
- the addition of bupropion to a nicotine patch slightly increased the quit rate in one trial, but not in a trial which attempted to replicate that finding
- five trials of selective serotonin uptake inhibitors – three involving fluoxetine, one of sertraline and one of paroxetine – found no significant effects, either individually or when the results were pooled
- two trials of bupropion SR for extended periods to prevent relapse found no benefit.[327]

The authors concluded that "the fact that only some forms of antidepressants aid cessation, and that they do so regardless of depressive symptoms, suggests that their mode of action is independent of their antidepressive effect.''

A very small retrospective case series found nicotine nasal spray effective in people with schizophrenia who had tried and failed other methods of quitting.[328]

Key points

Many of the trials which specifically examine smoking cessation in people with mental illness suffer from fairly small numbers and short follow-up. But in general, it can be said that:

- smoking cessation interventions can and do work in people with mental illness
- it is probable, but not definite, that these interventions have a slightly lower success rate than in people without mental illness
- most smoking cessation interventions in clinical trials have led to a reduction in smoking among many subjects and abstinence in some
- the types of interventions that are effective in the general population – both pharmacological and non-pharmacological – appear effective in people with mental illness, although some modifications to standard programs may help.

Quitting in combination with treatment for substance abuse

There has been a strong belief that people who have substance abuse disorders should not be bothered about their smoking. Recently, this belief has been challenged by research.

As shown earlier, many people with substance abuse disorders would like to quit smoking.

There were concerns that attempts to dissuade people in alcohol treatment programs may interfere with the primary program, but these concerns have been shown to be baseless.[329,330]

A review by Sullivan and Covey of 67 clinical trials among people abusing alcohol, marijuana, cocaine, or opioids showed that:

- smokers with a past but not current history of alcohol dependence are just as likely to quit successfully as non-alcoholic smokers
- tobacco abstinence does not increase alcohol relapse
- continued smoking adversely affects treatment for marijuana dependence
- patterns of cocaine and nicotine use are interrelated.[331]

They concluded that quitting is indicated for substance dependent people already in recovery, and that it may protect against relapse to the illicit drug of abuse.

Even smokers who reduce the number of cigarettes they smoke, without quitting, are more likely to give up drinking than alcohol abusers who maintain their smoking.[332]

What is the ideal time for people with substance abuse problems to quit? Sussman reviewed 24 studies and reviewed them by stage of recovery. He found that while the number of studies was too small and the variability between them was too great to draw strong conclusions, it appeared that people who had been sober for longer periods did better than those who were in the early stages of recovery.[333]

An important point was raised by Friend and Pagano, who found that 15% of non-smokers who entered drug and alcohol treatment programs were smokers 15 months later. They ascribe this to two main factors:

- many non-smokers in drug and alcohol treatment programs are actually ex-smokers who are at significant risk of relapse
- smoking is normal in drug and alcohol treatment centres, and the non-smokers may have succumbed to the norm.[334]

Key points

People with substance use disorders are able to quit smoking, especially if their substance use is abating. Quitting may also help control their use of other substances. That is, there appears to be a synergistic effect between reducing smoking and reducing other substance use.

Quitting: the population health approach

We could find no reports of population level attempts to specifically target people with mental illness, nor on attempts to measure the effects of mass media activities or other population health campaigns on people with mental illness.

This is a gap in the literature, and it is likely to reflect a gap in policy and practice.

Key points

We could find no evidence regarding a population health approach to reduce smoking among people with mental illness. But given that most people with mental illness who quit probably do so unaided, and that the population health approach has been an important contributor to the decline in smoking over the past 50 years, it is likely that the population health approach for the general population has helped some people with mental illness quit.

Are people with mental illness less successful at quitting than others?

A cross-sectional study of 1200 smokers attending a clinic for smoking cessation found that those with a current psychiatric diagnosis were less likely to quit than those without such a diagnosis.[335] However, a longitudinal study found that people with a psychiatric diagnosis were just as likely to quit as those without.[336]

Lasser et al found that the proportion of lifetime smokers who have quit was in the order of 30% - 40% for most diagnostic categories of mental illness, compared with 42% for people who had never had a mental illness. This suggests that people with mental illness might be slightly, but not inordinately, less likely to quit than people without a mental illness.[337]

A review by El-Guebaly et al concluded that across a variety of types of smoking interventions, quit rates for people with mental illness are only marginally lower than those for the general population.[338]

Hitsman et al performed a meta-analysis of 15 studies, examining whether or not smokers with a history of depression were less successful at quitting.[339]

Hitsman et al found that only two of 13 studies which measured abstinence at three months found that people with a history of depression were less likely to quit. The other 11 found no effect.

The authors found that only one of 12 studies which measured abstinence at six months found that people with a history of depression found it harder to quit. The other 11 found no effect.

Key points

Overall, people with mental illness might be less likely to quit than those without, but the difference, should it exist, is small. It is likely that people with a history of depression do not find it harder to quit smoking than people without a history of depression.

What happens when people stop smoking?

When people who smoke regularly are without a cigarette, they may suffer from a range of symptoms including sadness, anger, anxiety, stress, depression, irritability, restlessness and difficulty in concentration.[271,340] Many of these symptoms develop within an hour or two.[341,342]

These withdrawal symptoms vary enormously. The variability is both between smokers and over time in individual smokers.[343,344] Some smokers have few symptoms, while others suffer quite badly. For some people, the level of distress is so high that it is as if they had a psychiatric illness.[345]

Mood symptoms, in particular, vary in smokers trying to quit. They also vary in non-smokers[346] and in smokers who are not trying to quit.[347,348]

Smoking relieves withdrawal symptoms temporarily. However when people quit smoking, smoking does not relieve these symptoms and they persist, for varying periods – perhaps days, perhaps months. However, they do resolve spontaneously. People who give up smoking often have reduced anxiety levels within a week of quitting.[349]

A group in the US has worked on the idea that there may be different subgroups of smokers who get different effects when they quit.[350-353] That work is yet to show its clinical application.

Key points

Quitting smoking leads to extremely variable responses. Some people find it easy, while others find it very hard.

Does quitting lead to a relapse in mental illness?

This idea is commonly expressed, for two reasons.

Firstly, it is a natural consequence of the self-medication hypothesis, which we have shown has no evidence base to support it.

Secondly, there are a number of case studies which have suggested that quitting can lead to a relapse of depression [253,354,355] or an increase in symptoms of schizophrenia.[356]

However, case studies are little more than indicators of a potential problem, not evidence of a real problem, and are inherently unreliable. The question has been examined in a number of clinical trials.

Clinical trials

Covey et al followed 126 people who had successfully quit smoking with the help of clonidine. After three months:

- 2% of those without a history of major depression had developed an episode of major depression
- 17% of those with a history of a single episode of major depression had developed an episode
- 30% of those with a history of recurrent major depression had another episode.[357]

This shows that people with a history of depression are more likely to have another episode. Without a control group, and without comparative historical data, no other conclusions can be drawn from this study.

Five of 114 people enrolled in a trial of fluoxetine or placebo for smoking cessation developed depression soon after quitting.[358] However there is a major drawback to this study – 32% of the sample had a history of major depression, which suggests the sample was skewed. The lack of a control group again limits the ability to draw conclusions.

Killen et al monitored the development of major depressive disorder among 224 smokers being treated for nicotine dependence. Twenty per cent had a history of major depressive disorder. The authors found that the overall abstinence rates were 36% at 10 weeks and 24% at 26 weeks. Ten people developed a major depressive disorder during the 10 weeks of follow-up – two of these (20%) had a history of major depressive disorder.[359] There is no control data – without this no conclusions can be drawn.

Glassman et al carried out a study on 100 highly selected smokers who had a history of major depression but had taken no antidepressants for the previous six months. All were given sertraline or placebo, but the major end-point of the study design was recurrence of

major depression (using DSM-IV criteria) at three or six months. The subjects were not told this.[360]

The authors found that two of the 34 (6%) who continued smoking developed major depression, while 13 of the 42 (31%) who stopped did so. They also found that those who quit while on placebo were more likely to develop major depression than those who quit while on an antidepressant (43% versus 19%).

This paper suggests that people with major depression who quit smoking are at an increased risk of developing depression over those who quit smoking, and that the antidepressant sertraline can protect against this risk to some extent.

However, other studies have not supported this conclusion.

Eighty-eight smokers recruited by advertisement, mainly from banking and industrial companies, took part in a trial of moclobemide versus placebo, and were followed for a year. Clinical assessments, including ratings for depression and anxiety, were carried out one week before the trial started then at days 7, 28, 84 and 91.

There were only very minor differences between the 50 subjects with a history of depression and the 38 subjects with no history of depression in the study. There were minor differences in some withdrawal symptoms at some stages, but no differences in depression and anxiety. The authors mentioned in passing, without comment, that no subject became depressed during follow-up.[361]

Addington et al, in an uncontrolled trial, studied a group of 65 outpatients with schizophrenia or schizophreniform disorder. She presented results on the 50 who completed a series of group sessions (49 of whom also used nicotine patches). The authors mentioned, in passing, that they found no change in symptoms of schizophrenia with quitting.[362]

A very small study found that people with schizophrenia did not have an increase in their symptoms during the first four days of quitting smoking.[363]

Tsoh et al followed 300 people recruited by newspaper advertisements for one of two separate smoking cessation trials. The authors found that 14% reported a major depressive episode within 12 months of finishing the trial – this rate was the same for those who had quit smoking and those who had not.[364]

One study suggests that quitting may reduce the risk of depression for people with a history of it who smoke.[365] The authors compared standard smoking cessation therapy with smoking cessation therapy plus cognitive behaviour therapy in a group of 179 smokers with a history of major depressive disorder. Participants were excluded if they used nicotine replacement therapy. The main findings were that:

- 31 of the 179, or 17%, were still abstinent at one year follow-up
- those who quit had significantly fewer negative symptoms that those who continued smoking at one and two weeks post quit date
- those who quit had significantly lower scores on the Beck Depression Inventory than those who continued smoking at one and two weeks post quit date.
- there was a non-significant trend towards those who quit having fewer episodes of depression during the year of follow-up than those who kept smoking.

Burgess et al examined patterns of change in depressive symptoms in 163 smokers with a history (but no current symptoms) of major depression who had entered a smoking cessation program.[366]

They performed a cluster analysis on the cohort, and found five distinct groups of people according to the pattern of changing scores on the Beck Depression Inventory. The groups were:

- those with a marked and rapid increase in depressive symptoms
- those with an initial decline then steady increase in depressive symptoms
- those with a rapid rise then decline in depressive symptoms
- those with a delayed but rapid decline in depressive symptoms
- those with an immediate and rapid decline in depressive symptoms.

They then showed that those whose depressive symptoms declined after quitting were more likely to be abstinent than those whose depressive symptoms increased.

The significance of this finding is two-fold:

- the authors have shown that the response to quitting smoking in people with a history of depression is heterogeneous – some people have an increase in depressive symptoms while others have a decrease
- the authors have shown that people whose depressive symptoms declined are more likely to be abstinent.

Key points

The evidence regarding the quitting among people with a history of depression is conflicting. There are a number of case studies which raise the issue, and a number of poorly designed studies which don't allow us to draw conclusions.

Several good quality studies suggest quitting reduces the incidence of depression, while one well-designed but unethical study suggests quitting increases the rate of depression. One study suggests there is significant heterogeneity in response to quitting among people with a history of depression.

We believe the following:

1. Quitting is feasible for people with a history of depression
2. Some people will find their mood improves with quitting
3. Some people will find their mood declines with quitting
4. The population risk of developing depression after quitting is uncertain, but it is probably either unchanged or changed only slightly

5. There is no significant population risk to encouraging people with a history of depression to quit smoking.
6. Clinicians need to monitor their patients with a history of major depression who plan to quit.
7. The risk to the health of people with a history of depression of continuing to smoke is far greater than any possible risk to their health of quitting.

There is no evidence beyond an occasional case study to suggest that people with schizophrenia are at risk of psychosis by quitting. However, as in any situation involving significant change, people with schizophrenia who plan to quit should be monitored. No person with schizophrenia should be advised to continue or resume smoking.

Why do people relapse?

Smoking is highly addictive, even in relation to illicit drugs. For example, data from the US National Comorbidity Survey shows that 32% of people who have ever tried smoking become dependent, compared with 23% of those who have ever tried heroin, 17% of those who have tried cocaine and 15% of those who have tried alcohol.[367]

The addiction is both physiological and psychological. That is true for people with and without mental illness.

Relapse is the most common result of a smoking cessation attempt of any form, with any amount of support, with any population group.[368] In a review of relapse from drug, alcohol and smoking abstinence which acknowledged the shortcomings of the research methodologies, McKay found consistent evidence to support five main findings with regard to relapse:

- negative emotional states appear to play a role in the onset of relapse
- cravings before relapse are common
- several cognitive factors such as reduced commitment to abstinence, lower ability to control oneself, and the urge to give up after a lapse have predictive value
- interpersonal factors are linked to relapse
- lack of coping efforts during periods of temptation are linked to relapse.[369]

We could find no specific data on why people with mental illness relapse. However, we note that if people with mental illness go to a psychiatric hospital, they will be certainly exposed to high levels of smoking among staff and patients. In some settings, they will be encouraged to smoke. In some settings, they will be given free cigarettes. In some settings, they will have cigarettes used against them as a tool of behaviour modification.[370]

13. Smoking and medication

The cytochrome P450 system is an enzyme system. It is found mainly in the liver, but also to a lesser degree in the brain and lung. It is important in processing many medications used by people with mental illness.

By-products of smoking, particularly the polycyclic aromatic hydrocarbons, induce both the cytochrome P450 enzyme 1A2 (CYP1A2) and the UDP-glucuronyltransferases (UGTs). In general, this means that people who smoke process those drugs affected by the cytochrome P450 system and UGTs more quickly than non-smokers, which generally means lower serum levels of affected drugs.

This induction takes a few weeks to occur fully when someone starts smoking. It also takes a few weeks for the effects of induction to diminish when someone stops smoking.[371]

The cytochrome P450 system is also:

- more active in men than in women (meaning men generally have lower blood levels for equivalent doses)
- blocked to some extent by caffeine (meaning coffee drinkers have higher blood levels for equivalent doses).

Older people are not so sensitive to the effects of medication and caffeine on their liver enzymes as younger people.[372]

Pharmacokinetics

According to a review of the pharmacokinetics of smoking and psychotropic medication,[372] smoking has a broad range of effects. Smoking:

- increases the hepatic metabolism and reduces plasma concentrations of imipramine, clomipramine, fluvoxamine, trazodone, clozapine and chlorpromazine
- has variable effects on amitriptyline and nortriptyline
- has no effect on amfebutamone, chlordiazepoxide and carbamazepine
- increases the clearance of tiotixene, fluphenazine, haloperidol, olanzapine and the benzodiazepines alprazolam, lorazepam, oxazepam, diazepam and demethyl-diazepam.

People who stop smoking may find that their blood levels of some antipsychotics rise by about 50%. People who stop drinking coffee may find their blood levels of some antipsychotics fall by about the same extent.[373]

Atypical antipsychotics which are not heavily dependent on CYP1A2 or UGTs for their metabolism include risperidone and aripiprazole (metabolised by CYP2D6 and CYP3A), quetiapine (mainly metabolised by CYP3A) and ziprasidone (mainly metabolised by an aldehyde oxidase and CYP3A).[374]

There was no difference between smokers and non-smokers in dose-corrected blood levels in people taking amisulpride for schizophrenia or schizoaffective disorder.[375] However it was noted that smokers needed higher doses of amisulpride to get the same blood levels.

It is worth noting that the studies reviewed are often small (fewer than 20 subjects) and are often of variable quality. Similar studies on the same drug can reach opposite conclusions. In their review, Desai et al have described summary positions only, and they relate only to changes in blood levels.[372] They are not descriptions of what will happen in each individual patient. And they certainly do not describe changes of clinical significance. In nearly all the studies reviewed, the clinical impact of any change in blood level was not considered.

Table 2: Effect of smoking on blood levels of certain psychiatric drugs

Smoking decreases blood level	Smoking has little to no level effect on blood	Smoking has variable effect on blood levels
Alprazolam	Amfebutamone	Amitriptyline
Chlorpromazine	Carbamazepine	Nortriptyline
Clomipramine	Chlordiazepoxide	
Clozapine		
Demethyl-diazepam.		
Diazepam		
Fluphenazine		
Fluvoxamine		
Haloperidol		
Imipramine		
Lorazepam		
Olanzapine		
Oxazepam		
Tiotixene		
Trazodone		

Source: Desai et al 2001

Clinical impact

If the pharmacokinetics are not always certain, the clinical impact of the pharmacokinetics is even less certain.

Concern has been expressed that people who stop smoking may run into clinical difficulties by, in effect, overdosing on their medication. This concern arises mainly from case reports.

There have been case reports of significant problems after quitting smoking.[376-381]

However these case reports need to be treated with caution. In some, the clinical applicability is questionable. For example, in one paper, a person described as having "severe'' symptoms took eight months to seek help, while another person with a very high serum clozapine had no symptoms.[382]

The case reports may be misleading. For example, the abstract for one series of case reports says: "This report examines the development of major depression following smoking cessation among three women *without* [their emphasis] notable histories of depression.''[253] However, the text of the report contradicts the abstract, stating that of the three women studied, two had been treated for depression and the third had recurrent depressive symptoms premenstrually.

Beyond case studies, there have been no longitudinal studies which have looked at people taking antipsychotics who start or stop smoking.

There have been a small number of studies which have examined the mental state of people giving up smoking as a secondary measure. Patten[322] and Evins[383] have shown a trend towards better mental health with the cessation of smoking.

Do some antipsychotics reduce smoking?

Some small studies have found that people taking clozapine smoke less than people taking other antipsychotics, [384-386] although others have not.[387]

George et al randomised a group of smokers with schizophrenia to receive either a standard American Lung Association behavioural program or a smoking cessation program adapted to people with schizophrenia. They found a little difference between the groups, but noted that people taking atypical antipsychotics were more likely to quit than those on typical antipsychotics.[388] Some caution is needed as this was not the primary question of the study, but it supports other findings.

In one study, haloperidol increased smoking in people with schizophrenia.[389]

In a review, Noordsy and Green concluded there was reasonably strong evidence that clozapine was effective in reducing the prevalence of substance use in people with schizophrenia or schizoaffective disorder and a substance use disorder.[390]

Key Points

Smoking increases blood levels of some psychotropic drugs, decreases blood levels of other drugs and has variable or unknown effects in others. There is no clear relationship between effects on blood levels and clinical effect.

There are case reports to suggest that some people have developed clozapine toxicity after stopping smoking. Case reports are inherently unreliable, and there is no adequate research to say how common this problem is. The degree of change in blood level is probably about the same as the change in blood level for people who start or stop drinking coffee.

In the absence of sufficient evidence, clinicians should continue to monitor the clinical status of people taking clozapine, as they do now, and take particular note when their patients start or stop smoking, and start or stop drinking coffee.

There is no reason to recommend that people taking clozapine, or any other medication, do not stop smoking. The risks of continued smoking far outweigh the risks of stopping it.

14. Smoking and the law

This chapter summarises briefly the legal position regarding smoking and mental health.

The Australian Occupational Health and Safety and Welfare Act 1986 says, in summary, that employees must provide a workplace free of avoidable and foreseeable risks. That legislation has been supported by a ruling of the Federal Court. Employers that do not make every effort to remove smoke from the workplace have been found liable under the Act.[39]

Health institutions have a common law duty of care to their patients. Although this has not been tested in Australian courts, it is conceivable that giving a patient cigarettes and encouraging smoking could be seen as *not* fulfilling that duty of care.

This duty of care could, conceivably, be extended to include the passive acceptance of smoking. Although this has not been tested in Australian courts, it is feasible that a future Australian court may test whether, for example, an institution has fulfilled its duty of care while not advising a patient to quit smoking, or not offering psychological or pharmacological support for quit attempts.

For institutions to fulfil their duty of care will require a conscious act. It is clear that smoking in psychiatric institutions is not simply a matter of choice, but that there is "systematic reinforcement … by means of a series of entrenched institutional and clinical practices, beliefs and attitudes held by patients, and particularly by staff."[189]

Apart from the question of duty of care, there are both professional and legal standards regarding negligence. It is foreseeable that an individual staff member may face a legal challenge over a question of negligence because of either providing cigarettes, or failing to provide advice and pharmacological and/or psychological support to quit smoking.

15. Smoking bans in psychiatric institutions

There have been two major reviews of the effects of smoking bans in psychiatric institutions.

El-Guebaly et al reviewed 17 studies which examined the impact of smoking bans on psychiatric settings. Seven of these studies examined total bans – no smoking at all allowed – and 10 examined partial bans, in which smoking was restricted.[391] The authors examined whether or not there had been a change in patient behaviour, and/or whether or not staff supported the policy change.

El Guebaly et al found that with respect to patient behaviour, improvements were reported in two studies, a decline in behaviour in one and no change in six studies.

Perceptions of these bans varied. In some studies there were increases in support for the bans once they had been introduced among staff and patients. Other results reported include:

- a perception among patients that the ward had more control
- an initial increase then later decline in complaints from patients
- that 75% of nurses quit smoking in a setting with a total ban.

Lawn and Pols reviewed the findings from 26 international studies which reported on the effect of partial or complete smoking bans in inpatient psychiatric settings.[184] The studies, published between 1988 and 2002, were set in the US (21), Canada (3) and Australia (2). They varied greatly in size, setting, methodology, research questions being asked and rigour, which limits the strengths of the conclusions that can be drawn. But the table below outlines their conclusions.

Key points

Staff are generally wary of smoking bans in psychiatric institutions, but come to accept them slowly.

Patients have initial complaints, but adapt more quickly than staff and often welcome the bans.

Fears among staff about increases in difficult behaviour or aggression among patients are, in general, unfounded.

Total bans were more successful than partial bans.

The research has focussed almost exclusively on administrative procedures and staff and patient attitudes – there is little research on the effects of smoking bans on smoking prevalence or patient well-being.

Lawn and Pols noted that few of the studies looked at patient wellbeing, including quit rates and relapse rates.

One of the few studies to look at smoking prevalence after the introduction of a smoking ban in a hospital was carried out by Kitabayashi et al.[392] The authors studied 256 people with schizophrenia who had been in hospital for a mean of 12 years. Patients and staff had been allowed to smoke freely in a smoking room in each ward, although not elsewhere in the buildings. With a change in policy, people had to leave the building to smoke. Those in isolation wards could smoke when attended by a nurse or family member.

The prevalence of smoking dropped from 36% to 22% at three months. There was a significant but slight decline in the mental state of the subjects at three months.

Table 3: Summary of key findings from review of studies on the effects of a partial or complete ban on smoking in inpatient psychiatric settings

There was no increase in aggression, use of seclusion, discharge against medical advice or increased use of prn medication following ban in 20 studies, but a significant increase in the use of prn medications and seclusion, and in verbal assaults, immediately post-ban in three studies.
NRT was used by patients as part of imposing the ban in 19 studies, although uptake was low in five studies.
Staff predicted more adverse effects than actually occurred and they developed a much more positive view post-ban.
Consistency, coordination and full administrative support for the ban were seen as essential to success, with problems occurring where this was not the case.
Bans were seen as an opportunity for staff to develop new clinical skills.
Smoking escort privileges for individual patients post-ban caused increased staff and patient complaints, and increased verbal aggression and animosity.
Violations such as smuggling and leaving the grounds, and increased fire risk, were noted post-ban. Enforcement problems were also noted.
Severely disturbed patients who were smokers coped less well with the ban.
Many patients continued to smoke in hospital in seven studies, although in two studies many gained a greater sense of self-esteem and self-control as a result of the ban, prompting them to consider quitting.
Problems with nursing tasks such as gaining patient cooperation and discussing treatment were decreased in four studies and increased in one study.

Source: Adapted from Lawn and Pols 2005.

16. Current Australian guidelines

Several guidelines exist for Australian health professionals in the management of smoking in people with mental illness.

The Royal Australasian College of Physicians and the Royal Australian and New Zealand College of Psychiatrists released Tobacco policy: Using evidence for better outcomes in 2005.[54]

These guidelines contain statements that are not in line with the published evidence. For example, they say "people with schizophrenia have a cigarette smoking prevalence as high as 90%'' and "addressing cigarette smoking will interfere with and have a negative impact on the treatment of other addictions''. They say "violence can be a risk when attempting to enforce smoke-free policies,'' while the majority of studies have shown that banning smoking does not lead to violence.

The Royal Australian College of General Practitioners also has guidelines.[393] The guidelines estimate the prevalence of smoking in people with mental illness at 50 to 80% – published Australian data puts the prevalence at 32%.[14] These guidelines, too, repeat the statement that the prevalence of smoking in people with schizophrenia may be as high as 90%, where the published data provides estimates in different populations between 14% and 88%.[394] Also, the RACGP guidelines suggest using bupropion and nortriptyline, while neglecting to mention NRT.

Both these guidelines contain inaccurate statements, and tend to overstate the extent of potential problems compared with the data available in the literature. We suggest both are in need of review.

17. Conclusion

Is there a problem?

Yes, there is a problem. Although prevalence data is often old and inexact, it is clear that some groups of people with mental illness are more likely to smoke than the average person.

Is the problem significant?

Yes. Smoking-related diseases are a major cause of death for people with mental illness. Smoking is also an enormous financial stress on people who, in some cases, have very limited financial resources.

Can anything be done?

Yes. We believe that:

- every person with mental illness should be asked whether they smoke or not
- every person with mental illness should be advised of the risks of smoking and the benefits of quitting
- every person with mental illness should be offered help to quit smoking
- no person with mental illness should ever be encouraged to smoke.

Are there any risks?

Yes. The risks of smoking to people with mental illness are considerable and far outweigh any possible benefits, should there be any.

The benefits of quitting for people with mental illness are considerable and far outweigh the risks of quitting, should there be any.

We can find no evidence to support the notion that any person with mental illness should not be encouraged to quit smoking, or should be advised not to quit.

Appendix: Key papers

Beratis S, Katrivanou A, Gourzis P. Factors affecting smoking in schizophrenia. Comprehensive Psychiatry 2001 Sep;42(5):393-402.[395]

In a good quality study, Beratis et al examined the smoking status of 406 people with schizophrenia – 133 inpatients and 273 outpatients. They found that the prevalence of smoking was 58%, compared with 42% for control subjects who were matched for age, sex and place of residence, and mostly matched for occupation and education level.

But Beratis et al took the work a stage further than most, and divided the subjects according to their particular subtypes of schizophrenia. They found that smoking prevalence was 66% for the paranoid subtype (48% for controls, $p = .0008$), 59% for undifferentiated subtype (36% for controls, $p = .001$), 66% for residual subtype (39% for controls, $p = .002$). However smoking prevalence was far lower in the disorganised subtype (33%) and catatonic subtype (18%).

Across the subtypes, the male smokers smoked a mean of 31.5 cigarettes, compared to controls who smoked a mean of 23.1 ($p = .000001$). The females smoked a mean of 26.3 cigarettes per day, compared with controls who smoked 15.5 per day ($p = .0028$). These differences were reasonably consistent across subtypes.

The authors also analysed the onset of smoking relative to the onset of disease. Overall, 86% of subjects started smoking at least a year before the illness was diagnosed. But there was a significant difference among subtypes. The proportion of subjects who started smoking before the onset of the disease was 90% for paranoid subtype ($p < .000$ compared to onset of smoking with or after onset of disease), 87% for undifferentiated ($p = .003$) and 81% for residual subtype ($p = .003$). There were non-significant differences for the disorganised subtype (67% onset of smoking before onset of disease, $p = .500$) and the catatonic sample was too small for analysis.

The authors also analysed the data looking at smoking prevalence, disease subtype and score on the global assessment of functioning (GAF) scale. The mean score of the positive symptoms in the subjects who smoked was 35.0, where in non-smokers it was 30.5 ($p = .002$). The mean score for negative symptoms for subjects who smoked was 26.6, where in non-smokers it was 30.7 ($p = .01$). In other words, smokers tend to have more positive symptoms and fewer negative symptoms.

The authors analysed smoking prevalence by use of medication. There was a non-significantly higher mean number of cigarettes smoked by subjects using typical versus atypical antipsychotics (31.9 versus 27.9, $p = .25$).

They also analysed the age of onset of smoking. Males started earlier than females, but there were no differences in age of onset between people with schizophrenia and controls.

Beratis et al note that based on their subtype analysis, “the increased prevalence of smoking is not a uniform phenomenon in schizophrenia.”

Bowman JA, Walsh RA. Smoking intervention within alcohol and other drug treatment services: a selective review with suggestions for practical management. [Review] [59 refs]. Drug & Alcohol Review 2003 Mar;22(1):73-82.[396]

Bowman and Walsh reviewed the evidence regarding smoking and people using drug and alcohol services.

They found, as have others, that people who drink are likely to smoke more than the general population, smoke more puffs per cigarette, draw in more deeply and are less likely to quit than others. They also noted that the damaging effects of alcohol and tobacco are synergistic – the two together are worse than each alone.

Bowman and Walsh describe four main reasons standing in the way of people with drug and alcohol problems quitting smoking:

1. A strongly held belief system held by those providing drug and alcohol services, including beliefs that:
    - substance abusers are intractable hard-core smokers not interested in quitting
    - even if they were interested, they're not capable of changing
    - even if they tried, that might damage their treatment for other substance abuse problems
    - it is unfair to ask someone to try to give up two or more substances at once.
2. The behaviour and attitudes of staff reduce the occurrence and effectiveness of smoking interventions.
3. The belief among staff that smoking is a relatively minor problem and is socially acceptable.
4. There is a lack of good quality research into interventions.

They argue that:

1. Those beliefs are myths
2. Staff attitudes need to change
3. The addictive nature and health impact of smoking are usually under-rated by staff
4. The lack of research is true.

Although this article was written specifically about drug and alcohol services, we see parallels with mental health services generally.

Farrell M, Howes S, Taylor C, Lewis G, Jenkins R, Bebbington P, et al. Substance misuse and psychiatric comorbidity: an overview of the OPCS National Psychiatric Morbidity Survey. International Review of Psychiatry 2003 Feb;15(1-2):43-9.[397]

A British paper compared the results of three surveys concerned with psychiatric morbidity and substance abuse. These were a private household survey of more than 10,000 people; a survey of about 750 permanent residents of institutions such as hospitals and hostels; and a national survey of about 1000 homeless people.

While not directly related to mental illness, this data is important for Cancer Council's broader strategy.

The paper found that smoking prevalence was 32% in the general population, 74% among those in institutions and 70% among the homeless. Of smokers, 11% of the general population, 34% of the homeless and 50% of the institutional sample were heavy smokers.

Hitsman B, Borrelli B, McChargue DE, Spring B, Niaura R. History of depression and smoking cessation outcome: a meta-analysis. [Review] [42 refs]. Journal of Consulting & Clinical Psychology 2003 Aug;71(4):657-63[398]

Hitsman et al performed a meta-analysis of 15 studies, examining the hypothesis that smokers with a history of depression would have significantly lower abstinence rates after cessation trials than those without such a history. That is, he was asking the question whether or not smokers with a history of depression find it harder to quit.

Hitsman found that only two of thirteen studies, which measured abstinence at three months, found that people with a history of depression found it harder to quit.
The other 11 found no effect.

The authors found that only one of 12 studies, which measured abstinence at six months, found that people with a history of depression found it harder to quit. The other 11 found no effect.

Glassman was the only author to have "positive'' results – in 1988[77] and 1993.[399]
All 13 studies published since 1993 have failed to replicate Glassman's findings.

The authors wonder whether people with a history of recurrent depression may find quitting harder, as a trend towards that finding was identified in the only three studies which examined the question.

They also point out that only two studies looked at the ability to quit among smokers with current depression – both these studies showed they may be able to achieve short-term abstinence.

The authors also argue that the consequences of unequivocally accepting assertions based on unreproducible studies have been negative. Some smokers with a history of depression may have been pushed into unnecessarily intensive programs, while others may have been put off trying to quit altogether.

Hughes JR, Stead L, Lancaster T. Antidepressants for smoking cessation. The Cochrane Library 2006[327]

In a Cochrane review on antidepressants and smoking cessation, Hughes et al found that:

- bupropion SR (19 trials of 24) used alone doubled the odds of cessation
- nortriptyline (four trials of six) used alone also doubled the odds of cessation
- the addition of bupropion SR to a nicotine patch slightly increased the quit rate in one trial, but not in a trial which attempted to replicate that finding
- five trials of selective serotonin uptake inhibitors – three involving fluoxetine, one of sertraline and one of paroxetine – found no significant effects, either individually or when the results were pooled
- two trials of bupropion SR for extended periods to prevent relapse found no benefit.[327]

Hughes concluded that "the fact that only some forms of antidepressants aid cessation, and that they do so regardless of depressive symptoms, suggests that their mode of action is independent of their antidepressive effect.''

Jablensky A, McGrath J, Herrmann N, Castle D, Gureje O, Morgan V, et al. People living with psychotic illness: an Australian study 1997-98. 1999. Canberra, Department of Health and Aged Care.[16]

This study was performed to pick up those excluded from the ABS 1997 survey due to small numbers. It was the first, and is still the only, multicentre study on psychoses in Australia. It gathered subjects in a variety of ways – by census-style interviewing over a month, then by asking health services, homeless shelters and refuges for cases. It recruited about 1000 subjects in four catchment areas in the Australian Capital Territory, Queensland, Victoria and Western Australia, then interviewed them using the Diagnostic Interview for Psychoses and the ICD-10. It excluded people over the age of 65, because of possible confusion with organic causes of delirium; those who were demented; those who didn't speak English well enough for a thorough interview; and those who had had a single brief episode of drug-induced psychosis.

The point prevalence for a psychotic illness was 0.47%. Psychosis was slightly more common in men aged 25-44, and in women aged 35-64. The mean age of onset was 24.

Of the 980 people interviewed, 26% were inpatients, 43% were outpatients, 9% were recruited through GPs, 9% through a private psychiatrist and 12% were marginalised or homeless.

Of those interviewed, 63% had never married and 48% had no school qualification.

The type of accommodation in the past month was as follows:

- 31% in a rented home
- 29% in a home owned by themselves or their family
- 20% in an institution
- 14% in a hostel
- 9% in a rooming house, a hotel, homeless or with no fixed address
- 3% in a group home
- 3% in supported housing.

The figures add to more than 100%, because people may have used more than one type of housing in the previous month.

The course of the illness varied:

- about 9% had a single episode with good recovery
- about 21% had multiple episodes with good recovery
- about 28% had multiple episodes with partial recovery
- about 20% had chronic illness with little deterioration
- about 22% had chronic illness with clear deterioration.

In this population, 73% of men and 56% of women smoked in 1997. The national population prevalence of smoking at that time was 27% for men and 20% for women.

As well, 49% reported using street drugs or non-prescribed medicines, and 31% had five or more cups of coffee a day.

More than 70% of the sample were unemployed, with 18% in full-time work and 9% in part-time work.

Of the 980 interview subjects 506 (52%) had been admitted to hospital in the previous year,

and 474 (48%) had not. About 35% had been admitted voluntarily, about 24% involuntarily and about 7% both ways.

Of those who had been admitted to hospital, most people had had only one admission for the year. Few of these admissions (7.5%) were to a private facility.

Of the 980 people interviewed about the time spent in hospital during the previous year:

- about 48% spent no time in hospital
- about 23% spent less than a month
- about 21% spent three to six months
- about 3% spent six to twelvemonths
- about 5% spent the whole year in hospital.

Other data showed that:

- more than 40% of those interviewed had contact with an emergency service or crisis intervention team in the preceding year
- about 60% had attended an outpatient service at least once in the preceding year
- more than 50% said they had a case manager in a community team who was responsible for their care
- about 80% had seen a GP at least once
- about 24% had seen a private psychiatrist at least once
- about 86% of those interviewed were taking medications – 86% of those said they had side effects from the medication.

The overall picture of this study is one vastly different from the ABS Survey of mental health and wellbeing. People with psychosis are in a much more difficult situation, in many ways, than other people with mental illness.

But points to note are that, of this sample:

- 60% were living in a family home or in rented accommodation
- almost 60% had complete or partial recovery between episodes of psychosis
- about half had not been admitted to hospital in the previous 12 months, and most of those who had been admitted had only had one admission
- the most common points of contact with the health system were GPs and case managers.

Lasser K, Boyd JW, Woolhandler S, Himmelstein DU, McCormick D, Bor DH. Smoking and mental illness: A population-based prevalence study. JAMA 2000 Nov 22;284(20):2606-10.[400]

Lasser et al used data from the US National Comorbidity Survey, which was administered to a nationally representative sample of 8000 non-institutionalised civilians aged 15-54 between 1990 and 1992. Questions about tobacco were asked of 4400 people. Respondents were surveyed using the Composite International Diagnostic Interview, which gives a diagnosis according to DSM-III-R.

They found that among respondents:

- 28.5% of the population smoked
- 50.7% of the population had never had a mental illness, and 22.5% of these people smoked
- 49.3% had had a mental illness at some time in their lives, and 34.8% of these people smoked
- 28.3% had had a mental illness in the previous month, and 41.0% of these people smoked
- quit rates (the proportion of lifetime smokers who have quit) were in the order of 30% - 40% for most diagnoses, compared with 42% for people who had never had a mental illness.

The authors also calculated that people with a current mental illness comprised 44.3% of the US tobacco market.

This study has been quoted widely. A point worth noting is the very broad definition used of mental illness. Based upon DSM-III-R, it captures the spectrum of mental illnesses from schizophrenia to social phobia. Based upon the interview tool, the National Comorbidity Survey estimated that only 50% of Americans had never had a mental illness, and that many Americans had had a diagnosable episode of social phobia (12.5%), simple phobia (11.0%), alcohol abuse or dependence (21.5%), drug abuse or dependence (11.4%), post-traumatic stress disorder (6.4%) and antisocial personality, antisocial behaviour or conduct disorder (14.6%).

The one-month prevalence of 28.3% is significantly higher than the 18% one-year prevalence found by the ABS15, and the 11% current prevalence self-reported in the ABS survey[14].

The study by Lasser et al is not necessarily wrong. But it suggests that the oft-quoted figure – 44% of cigarettes are smoked by people with mental illness –does not apply to Australian conditions.

The study also shows that people with mental illness are able to quit without specific programs, which were not present in 1992. It is also likely that most of the people with mental illness who quit had done so without the benefit of nicotine replacement therapy.

Lawn S. Cigarette smoking in psychiatric settings: occupational health, safety, welfare and legal concerns. Australian and New Zealand Journal of Psychiatry 2005;39:886-91[189]

Lawn carried out a series of interviews with people with mental illness – both those who smoked and those who had quit – and with multidisciplinary staff of community and hospital public mental health services in Adelaide between 1998 and 2001. Her results bear repeating in full.

The studies that inform this review found that systematic reinforcement of smoking existed by means of a series of entrenched institutional and clinical practices, beliefs and attitudes held by patients and particularly by staff.

There was overwhelming knowledge of smoking problems with little or no acknowledgement of responsibility by staff for addressing them within the setting. Staff at all levels and all disciplines, from clinical to administrative staff, spoke of their full awareness of the use of cigarettes for trade, standover, exchange for other goods, other drugs and sexual favours among patients. Pressure to become smokers, in the absence of other meaningful activity, was clearly shown with several patients and staff recounting their first-hand knowledge of being initiated into smoking, or knowing of others for which this occurred, as a consequence of being in the hospital setting.

Many nursing staff said that they smoked to cope with the stress of their work environment, to socialise with other staff and to act as temporal points of reference such as short breaks from their duties with patients. Many staff said that they condoned patients' smoking, because they saw patients as needing to smoke to help manage their mental illness symptoms. Staff also said they condoned smoking to avoid assault by agitated patients, because they saw quitting as a lesser priority while patients were acutely unwell, and because they perceived cigarettes to be one of the few pleasures for this otherwise highly stigmatized group who many believed were unable to quit.

Several nursing staff recounted the historical context for tobacco rationing within the hospital setting. They said that they were directed by management to roll, dispense and light cigarettes for patients where the patients were unable or unsafe to do so themselves and that this was how they started smoking. This mirrored the current practices that were reported and observed during the study period, with nurses dispensing cigarettes routinely in the locked ward and some extended care wards, being responsible for storing cigarettes and lighters and handing them to patients each hour at the nurses' station door in production line fashion. In the open wards, staff said that the storage and management of some patients' cigarettes was a clinical judgement based on concern for the patients' fire risk, level of vulnerability to standover by other patients, level of impaired thinking because of mania or other symptoms and generally to protect patients' funds. Several nurses who had worked in the settings for more than 10 years, said that the promise of a cigarette was how they got patients to do as they asked, that this was common practice as part of their clinical role in the daily care of patients. In the locked settings, but also the open settings, patients newly arriving to the ward were sometimes encouraged to cooperate with doctors' assessments and nurses tasks based on the promise of a smoke break.

Many nurses reported that being a smoker was an advantage when establishing rapport with patients and performing assessments. Staff also said they felt left out and lacked a clinical edge once they became non-smokers.

During the study period, it was reported by some staff that patients were being given cigarettes as an inducement to participate in training doctors' in vivo exams. Several social workers recounted how, when faced with agitated patients without cigarettes, doctors pressured nurses to respond and nurses pressured social workers to respond by organizing

funds to purchase more cigarettes. It was also noted that institutionalized smoking and higher percentages of staff-smoking were found in wards where the clinical nurse consultant in charge was also a smoker. The converse of this was noted when that person was a non-smoker.

Administrative reinforcement was seen in a number of ways. During the study period, the hospital canteen still held a tobacco license, with the sale of cigarettes contributing substantially to the canteen's overall revenue. Funds raised by the Op Shop adjoining the canteen were used to purchase cigarettes for indigent patients. The tobacco licence was subsequently withdrawn abruptly as a result of the study; however, no clear management of this process and its impact was put in place at the time, causing some problems for clinical staff, in particular, when dealing with indigent patients and extended detainees. The hospital had also a policy of subsidizing the board and care fees charged to long-term patients in extended care wards, with patients who were smokers receiving a lesser fee. Before and during the study period, the hospital had also no clear policy for addressing nicotine withdrawal for patients, especially those admitted to locked wards. Provision of nicotine replacement therapy as a core clinical pharmacy item was not seen as necessary, despite there being clear clinical protocols for patients who were admitted with alcohol withdrawal or withdrawal from other addictive drugs such as amphetamines.

Passive smoking by staff and patients was commonly observed throughout the settings. The physical structure of the wards, especially the locked barrier doors between patients and staff, were observed to heighten the sense of conflict between them. The community hostels mirrored the interactions in the inpatient extended care wards.

Lawn pointed out the legal implications of:

- inducing a person to start smoking while they are unwell
- dispensing cigarettes, supervising patients' smoking and buying cigarettes for patients.

Lawn's preliminary recommendations are:

- that psychiatric hospitals move toward imposing smoking bans as a priority for staff, patients and visitors in line with general hospitals
- for psychiatric settings to develop clear guidelines that reflect strong leadership and involvement and commitment by staff at all levels and with clear administrative support and resource allocation to achieve a smoke-free environment
- [to ensure] widespread clinical availability of free NRT in psychiatric settings as a treatment protocol for patients, as well as comprehensive resource materials and support for quitting
- [to ensure] greater availability of NRT (possibly at discount prices), education and support to quit for staff
- for staff of all disciplines, but especially doctors, to receive education and support to effectively recognise and treat patients' nicotine withdrawal
- that hospitals be encouraged to seriously consider showing preference to new staff who are non-smokers and to appoint non-smoking nurses to be in charge of wards, as part of general employment practices
- that more meaningful rehabilitation activities be a priority for patients in inpatient psychiatric settings and the community
- ensuring that Schools of Nursing and Medicine adequately cover education about the smoking issue from a clinical, ethical and legal perspective

- that mental health services work assertively with young people with mental illness to discourage them from taking up smoking and to support those who do smoke to quit early
- that smoking cessation support programs be set up specifically for mental health service users and for these programs to be subsidized by government funding.

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 Nursing 2006 Jun;15(2):111-8.[401]

Lawn and Condon interviewed seven inpatient and community nursing staff who worked in the public mental health sector in Adelaide. Of the seven, three were ex-smokers, two were current smokers and two were non-smokers. The findings of the interviews were checked by participants for accuracy, and were supported by about 100 hours of observation over 31 site visits.

The main findings were that:

- all nurses spoke of a rich smoking reinforcement history within the psychiatric institution
- all had trained in a system that condoned smoking by staff and patients, and accepted the clinical use of cigarettes to help manage their patients' mental illness
- some had worked in a previous era when patients were given cigarette rations whether they smoked or not – these could be used for barter
- nurses considered support for patients' smoking within the ethical framework of autonomy (they have the right to smoke, or they can make free and informed choices to smoke) or beneficence/non-maleficence (while we should do them no harm, it is a greater harm to stop patients smoking)
- some nurses were concerned they would be assaulted if smoking was banned
- smoking was seen as a less immediate and less serious problem than the mental illness
- most nurses believed it was both no use and not fair to talk about quitting when patients were unwell
- some nurses considered giving people cigarettes to raise an ethical dilemma, while others did not.

Lawn S, Pols R. Smoking bans in psychiatric inpatient settings? A review of the research. Australian & New Zealand Journal of Psychiatry 2005;39:866-85.[184]

Lawn and Pols reviewed 26 studies which had examined the effectiveness of smoking bans in inpatient psychiatric hospitals. These studies were published between 1988 and 2002. Twenty-one of the papers were from the US, three from Canada and two from Australia. Only one of the Australian studies, that of Rich et al[402] – was published.

The results of this paper are summarised in Table 3 above.

Lawn and Pols noted that most of the studies were weighted towards examining the impact on staff and the institution itself, rather than on patient wellbeing.

McLennan W. Mental health and wellbeing: profile of adults, Australia. ABC Catalogue No. 4326.0. 1998. Canberra, Australian Bureau of Statistics.[15]

The Australian Bureau of Statistics' report titled Mental health and wellbeing: profile of adults, Australia[15] is the best available source of information on the prevalence of mental illness in this country. The data is 10 years old, but that may be of little concern as there is little evidence that mental illness has changed significantly in type or prevalence over the past decade.

The ABS surveyed about 10,600 people aged 18 or over, using the Composite International Diagnostic Interview, or CIDI, which gives a diagnosis according to DSM-III-R. It concentrated on the most common mental disorders – anxiety disorders, affective (or mood) disorders, and drug and alcohol use disorders. It did not collate information on schizophrenia and other psychotic disorders (too uncommon), nor on personality disorders (not diagnosable on a single interview). Its prevalence data are based on the occurrence of such a disorder in the previous 12 months.

It found that 2.38 million Australians, or 18% of the population, had a mental disorder. About 1 million of these people had a physical condition as well.

There was a marked age gradient – the prevalence was 27% in those aged 18-24, and it declined to 6% in those over 65. Most, but not all, of that decline was due to the decline in substance use disorders with age. But as well, mood and anxiety disorders generally declined from middle age on.

Most people with mental disorders did not live alone. A recalculation of the ABS data shows that:

- 270,000 people with mental disorders live alone
- 743,000 people with mental disorders live with one other person
- 1,360,000 people with mental disorders live with two or more people.

It also shows that most people with mental disorder are married. A recalculation of the ABS data (age-standardised) shows that:

- 1,390,000 people with mental disorders are married
- 292,000 people with mental disorders are separated or divorced
- 142,000 people with mental disorders are widowed
- 622,000 people with mental disorders have never married.

According to the ABS, most people with mental disorders are in the workforce. A recalculation of the ABS data (age-standardised) shows that:

- 916,000 people with mental disorders are employed full-time
- 433,000 people with mental disorders are employed part-time
- 150,000 people with mental disorders are unemployed
- 962,000 people with mental disorders are not in the workforce.

According to this data, qualifications beyond secondary school are common.
A recalculation of the ABS data (age-standardised) shows that:

- 1,040,000 people with mental disorders have a qualification beyond secondary school
- 470,000 people with mental disorders completed secondary school only
- 861,000 people with mental disorders did not complete secondary school.

The ABS data shows that mental disorders are more common in people born in Australia.
A recalculation of the ABS data (age-standardised) shows that:

- 1,873,000 people with mental disorders were born in Australia
- 240,000 were born in another English-speaking country
- 270,000 were born in a non-English speaking country.

The data gathered shows that most people with mental disorders are not in regular contact with health services. The data shows that:

- 62% of people with mental disorders did not see a health professional or service for their condition in the preceding year
- 29% of people with mental disorders saw a GP for their condition in the preceding year
- 10% of people with mental disorders saw a mental health professional (excluding psychiatrists and psychologists) for their condition in the preceding year
- 10% of people with mental disorders saw another health professional for their condition in the preceding year
- 8% of people with mental disorders saw a psychiatrist for their condition in the preceding year
- 7% of people with mental disorders saw a psychologist for their condition in the preceding year.

These figures suggest that people with mental health disorders must be reached by a population health approach.

The data for people with severe mental disorders are slightly different, but still show the same pattern:

- 43% of people with severe mental disorders did not see a health professional or service for their condition in the preceding year
- 46% of people with severe mental disorders saw a GP for their condition in the preceding year
- 21% of people with severe mental disorders saw a psychiatrist for their condition in the preceding year
- 18% of people with severe mental disorders saw a psychologist for their condition in the preceding year
- 18% of people with severe mental disorders saw a mental health professional (excluding psychiatrists and psychologists) for their condition in the preceding year
- 17% of people with severe mental disorders saw another health professional for their condition in the preceding year.

Even for people with severe mental health disorders, a population health approach is required.

In summary, this data shows that the majority of people with mental disorders finish school, live in the community, work in the community, marry and live lives that, from the outside, are not that dissimilar to people without mental disorders.

A striking feature of the ABS data is that the great majority of people with mental disorders do not use health services regularly for their conditions. Only a small proportion see psychiatrists or psychologists. Those who do use health services predominantly see GPs. This is true even for people with severe mental disorders. The importance of a population health approach can not be over-emphasised.

Neuman MD, Bitton A, Glantz SA. Tobacco industry influence on the definition of tobacco related disorders by the American Psychiatric Association. [Review] [61 refs]. Tobacco Control 2005 Oct;14(5):328-37.[403]

This paper outlines the history of the Diagnostic Services Manual (DSM), through its first two iterations in 1952 and 1968.

The tobacco industry had known since at least the early 60s, from its own unpublished research, that smoking was addictive.

The DSM's third edition, published in 1980, was long planned. It was known from early on to be a thorough revision and expansion, encapsulating all common conditions seen by psychiatrists (which creates the rather circular definition that a psychiatric illness is one treated by a psychiatrist). The first draft was made available in 1975. It was also to correlate the diagnoses listed in DSM-III with those in the ICD-9, which was published in 1977.

Internal tobacco industry documents collated by the authors show that the industry feared that including some form of nicotine addiction in the DSM-III would:

- allow smoking cessation clinics to be covered by health insurance, therefore reducing their cost and increasing their use
- stigmatise smokers and, by association, cigarettes.

The industry used Dr Richard Proctor, the head of a department of psychiatry, as a consultant. Proctor wrote repeatedly to the chairman of the taskforce on the DSM revision, and argued against the inclusion of nicotine dependence. In that portion of the correspondence found by the authors, he did not disclose his close and long term financial links with the tobacco industry.

In the end, DSM-III did contain a definition of nicotine dependence. But as the authors point out, it is an unusual one in that dependence alone is not enough. A person can be dependent on nicotine by all the usual definitions but if they are not concerned about it and have no serious physical consequences such as lung disease or heart disease, then they are not classified as having nicotine dependence.

It is not clear whether or not the tobacco industry did actually influence the outcome. But it is clear that:

- the tobacco industry attempted to influence the process and outcome
- it recognises that the diagnosis of nicotine dependence, if used widely, would have a significant impact on smoking and cessation practices.

Parrott AC. Cigarette-derived nicotine is not a medicine. [Review] [59 refs]. World Journal of Biological Psychiatry 2003 Apr;4(2):49-55[404]

Regular smokers feel better when smoking than not smoking, and empirical studies confirm that nicotine reinstatement relieves feelings of stress, depression and anger. These acute mood changes have led to the belief that cigarette-derived nicotine can provide medicinal benefits for smokers. However, prospective studies of adolescents who take up cigarette smoking find that they report increased levels of anxiety, stress and depression. Furthermore, adults who quit smoking report enduring mood improvements.

Thus, the prospective data shows that the nicotine derived from cigarettes leads to heightened distress.

The empirical patterns of mood change reported by regular smokers show why nicotine dependency is psychologically damaging. Regular smokers report average moods when replete with nicotine, but suffer mood deteriorations in-between cigarettes.

Thus the supposed mood gains of smoking only represent the temporary relief of withdrawal symptoms.

This mood relief becomes conditioned with smoke inhalation, which is why cigarettes are regarded positively by smokers. However, the repetitive experience of irritability and other abstinence symptoms in between cigarettes paradoxically causes smokers to suffer worse daily moods than non-smokers. The stronger the nicotine dependency the greater the mood decrements, helping to explain why disadvantaged individuals often smoke heavily and find quitting difficult.

In conclusion, there is no empirical evidence that cigarettes provide medicinal benefits, but extensive data showing that nicotine dependency heightens psychological distress in tobacco smokers.

Siahpush M, Borland R, Scollo M. Factors associated with smoking cessation in a national sample of Australians. Nicotine & Tobacco Research 2003;5(4) (August):597-602.[305]

This Australian paper examines the correlates of successful quitting by looking at a subsample of about 2500 people (smokers and ex-smokers) who took part in the 1998 Australian National Drug Strategy Household Survey.

The odds of having quit were 4.5 times greater for those living in households where smoking was not allowed than for those living in households where smoking was allowed.

The odds of having quit were 3.2 times greater for those who said few or none of their friends smoked than it for those who said most or all of their friends smoked.

There was a correlation between quitting and socioeconomic status which disappeared when controlling for the social environment, which suggests that the effect of socioeconomic status, which has been found in other studies, is mediated to some extent through the social environment.

Srinivasan TN, Thara R. Smoking in schizophrenia - all is not biological. Schizophrenia Research 2002 Jul 1;56(1-2):67-74.[405]

This Indian study looked at a sample of 286 men with schizophrenia treated consecutively at an outpatients clinic in Chennai.

Of these men, all lived at home with their families. About 70% were married and 66% were employed.

In the study group, 38% smoked. This was similar to a group of controls with mental illness and lower than the general population prevalence of 45% in Indian men. In a group not formally studied, but noted in passing, only five of the 300 women treated for mental illness in the same study period smoked. Smokers were more likely to be employed than non-smokers.

The authors make a number of points regarding the social norms for these men. They are cared for by their families. They are not supported by the state. Many are employed, but in low-paid jobs, so are reliant for money on their families, who have a greater influence over their lives (and their spending) than in Western cultures. The authors also speculate whether the presence of a wife and children might be a "restrictive influence''.

The authors conclude this.

The issue highlighted by this study is that the very high prevalence of smoking in schizophrenia is not an inevitable feature of the illness, but is a behaviour that could be significantly influenced by economic and social factors. … [the importance of this fact is that] if one deems smoking is an unavoidable neurochemical consequence of the illness, attempts at controlling the harmful behaviour will not be sure-footed. … All social, cultural and family influences that curb smoking should be utilised to reduce and prevent smoking by patients with schizophrenia.

Tyndale RF. Genetics of alcohol and tobacco use in humans. [Review] [351 refs]. Annals of Medicine 2003;35(2):94-121.[11]

Tyndale found, on a review of the literature, that a number of different genes are likely to be involved in a number of different aspects of smoking (such as age of onset, the amount smoked and level of dependence). She reported that estimates of heritability for these different factors varied from 4% to over 90%, and cautioned that many twin and family studies are based on questionable assumptions, and that, as she put it, "there are limitations as to how realistic these assumptions are''.

She argued that while knowledge is growing rapidly, it is still limited. All genes nominated so far must be considered candidate genes only – that is, their involvement is considered possible but not definite – and that in 20 years time, the contribution of genetics to smoking will be known more clearly.

References

(1) Ragg M, Ahmed T. Smoking in mental health facilities, prisons, drug and alcohol facilities and in people living with mental illness in the community: prevalence and interventions. A systematic review of the literature. Cancer Institute NSW; 2008.

(2) Semple D, Smyth R, Burns J, Darjee R, McIntosh A. Oxford Handbook of Psychiatry. Oxford: Oxford University Press; 2005.

(3) World Health Organization. *The ICD-10 classification of mental and behavioural disorders: clinical descriptions and diagnostic guidelines.* Geneva: World Health Organization; 1992.

(4) American Psychiatric Association. Diagnostic and statistical manual of mental disorders. Fourth edition, text revision ed. Arlington VA: American Psychiatric Association; 2000.

(5) Haslam N. Categorical versus dimensional models of mental disorder: the taxometric evidence. *Australian and New Zealand Journal of Psychiatry* 2003;37:696-704

(6) Jablensky A. Research methods in psychiatric epidemiology: an overview. *Australian and New Zealand Journal of Psychiatry* 2002;36:297-310

(7) Prince M. Measurement in psychiatry. *International Review of Psychiatry* 1998;10:264-71

(8) Andrews G, Henderson S, Hall W. Prevalence, comorbidity, disability and service utilisation: Overview of the Australian National Mental Health Survey. *British Journal of Psychiatry* 2001;178:145-53

(9) Serman N, Johnson JG, Geller PA, et al. Personality disorders associated with substance use among American and Greek adolescents. *Adolescence* 2002;37:841-54

(10) Trull TJ, Waudby CJ, Sher KJ. Alcohol, tobacco, and drug use disorders and personality disorder symptoms. *Experimental & Clinical Psychopharmacology* 2004;12:65-75

(11) Tyndale RF. Genetics of alcohol and tobacco use in humans. [Review] [351 refs]. *Annals of Medicine* 2003;35:94-121

(12) Cox LS, Patten CA, Krahn LE, et al. The effect of nicotine patch therapy on depression in nonsmokers: a preliminary study. *Journal of Addictive Diseases* 2003;22:75-85

(13) Weiner E, Ball MP, Summerfelt A, et al. Effects of sustained-release bupropion and supportive group therapy on cigarette consumption in patients with schizophrenia. *American Journal of Psychiatry* 2001;158:635-7

(14) Australian Bureau of Statistics. Mental health in Australia: a snapshot 2004-05. Canberra: Australian Bureau of Statistics; 2006.

(15) McLennan W. Mental health and wellbeing: profile of adults, Australia. 1998; ABC Catalogue No. 4326.0. Canberra, Australian Bureau of Statistics.

(16) Jablensky A, McGrath J, Herrmann N, et al. People living with psychotic illness: an Australian study 1997-98. 1999. Canberra, Department of Health and Aged Care.

(17) Andrews G, Henderson S, Hall W. Prevalence, comorbidity, disability and service utilisation: Overview of the Australian National Mental Health Survey. *British Journal of Psychiatry* 2001;178:145-53

(18) Farrell M, Howes S, Bebbington P, et al. Nicotine, alcohol and drug dependence and psychiatric comorbidity. Results of a national household survey. *British Journal of Psychiatry* 2001;179:432-7

(19) 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

(20) Westermeyer JJ, Schneekloth TD. Course of substance abuse in patients with and without schizophrenia. *American Journal on Addictions* 1999;8:55-64

(21) Australian Bureau of Statistics. Tobacco smoking in Australila: a snapshot, 2004-05. 2006. Report No.: 4831.0.55.001.

(22) Lambert TJ, Velakoulis D, Pantelis C. Medical comorbidity in schizophrenia. *Medical Journal of Australia* 2003;178:Suppl-70

(23) Lawrence D, Holman C, Jablensky A. Preventable physical illness in people with mental illness. Perth: University of Western Australia; 2001.

(24) Compton MT, Daumit GL, Druss BG. Cigarette smoking and overweight/obesity among individuals with serious mental illnesses: a preventive perspective. [Review] [138 refs]. *Harvard Review of Psychiatry* 2006;14:212-22

(25) Babidge NC, Buhrich N, Butler T. Mortality among homeless people with schizophrenia in Sydney, Australia: a 10-year follow-up. *Acta Psychiatrica Scandinavica* 2001;103:105-10

(26) Lett HS, Blumenthal JA, Babyak MA, et al. Depression as a risk factor for coronary artery disease: evidence, mechanisms, and treatment. [Review] [161 refs]. *Psychosomatic Medicine* 2004;66:305-15

(27) Osborn DP, Levy G, Nazareth I, et al. Relative risk of cardiovascular and cancer mortality in people with severe mental illness from the United Kingdom's General Practice Rsearch Database. *Archives of General Psychiatry* 2007;64:242-9

(28) Osborn DP, Nazareth I, King MB. Risk for coronary heart disease in people with severe mental illness: cross-sectional comparative study in primary care. *British Journal of Psychiatry* 2006;188:271-7

(29) Carney CP, Woolson RF, Jones L, et al. Occurrence of cancer among people with mental health claims in an insured population. *Psychosomatic Medicine* 2004;66:735-43

(30) Osborn DP, Levy G, Nazareth I, et al. Relative risk of cardiovascular and cancer mortality in people with severe mental illness from the United Kingdom's General Practice Rsearch Database. *Archives of General Psychiatry* 2007;64:242-9

(31) Compton MT, Daumit GL, Druss BG. Cigarette smoking and overweight/obesity among individuals with serious mental illnesses: a preventive perspective. [Review] [138 refs]. *Harvard Review of Psychiatry* 2006;14:212-22

(32) Nilsson E, Lichtenstein P, Cnattingius S, et al. Women with schizophrenia: pregnancy outcome and infant death among their offspring. *Schizophrenia Research* 2002;58:221-9

(33) Compton MT, Daumit GL, Druss BG. Cigarette smoking and overweight/obesity among individuals with serious mental illnesses: a preventive perspective. [Review] [138 refs]. *Harvard Review of Psychiatry* 2006;14:212-22

(34) Druss BG, Bradford WD, Rosenheck RA, et al. Quality of medical care and excess mortality in older patients with mental disorders. *Archives of General Psychiatry* 2001;58:565-72

(35) Lambert TJ, Velakoulis D, Pantelis C. Medical comorbidity in schizophrenia. *Medical Journal of Australia* 2003;178:Suppl-70

(36) Cuijpers P, Schoevers RA. Increased mortality in depressive disorders: a review. [Review] [104 refs]. *Current Psychiatry Reports* 2004;6:430-7

(37) Winstanley M, Woodward S, Walker N. Tobacco in Australia: facts and issues 1995. 2nd ed. Melbourne: Victorian Smoking and Health program (Quit Victoria); 2007.

(38) Australian Institute of Health and Welfare. Statistics on drug use in Australia 2004. Canberra: AIHW (Drug statistics series no. 15); 2005.

(39) Winstanley M, Woodward S, Walker N. Tobacco in Australia: facts and issues 1995. 2nd ed. Melbourne: Victorian Smoking and Health program (Quit Victoria); 1995.

(40) Tyrrell. Deadly enemies: Tobacco and its opponents in Australia. Sydney: University of New South Wales Press; 1999.

(41) Baker A, Ivers RG, Bowman J, et al. Where there's smoke, there's fire: high prevalence of smoking among some sub-populations and recommendations for intervention. [Review] [107 refs]. *Drug & Alcohol Review* 2006;25:85-96

(42) Baker A, Ivers RG, Bowman J, et al. Where there's smoke, there's fire: high prevalence of smoking among some sub-populations and recommendations for intervention. [Review] [107 refs]. *Drug & Alcohol Review* 2006;25:85-96

(43) Jorm AF, Rodgers B, Jacomb PA, et al. Smoking and mental health: results from a community survey. *Medical Journal of Australia* 1999;170:74-7

(44) Poirier MF, Canceil O, Bayle F, et al. Prevalence of smoking in psychiatric patients. *Progress in Neuro-Psychopharmacology & Biological Psychiatry* 2002;26:529-37

(45) Black DW, Zimmerman M, Coryell WH. Cigarette smoking and psychiatric disorder in a community sample. *Annals of Clinical Psychiatry* 1999;11:129-36

(46) Hurt RD, Offord KP, Croghan IT, et al. Mortality following inpatient addictions treatment. Role of tobacco use in a community-based cohort.[erratum appears in JAMA 1996 Sep 11;276(10):784]. *JAMA* 1996;275:1097-103

(47) Degenhardt L, Hall W. The relationship between tobacco use, substance-use disorders and mental health: results from the National Survey of Mental Health and Well-being. *Nicotine & Tobacco Research* 2001;3:225-34

(48) Degenhardt L, Hall W. Patterns of co-morbidity between alcohol use and other substance use in the Australian population. *Drug & Alcohol Review* 2003;22:7-13

(49) Clarke JG, Stein MD, McGarry KA, et al. Interest in smoking cessation among injection drug users. *American Journal on Addictions* 2001;10:159-66

(50) Hurt RD, Offord KP, Croghan IT, et al. Mortality following inpatient addictions treatment. Role of tobacco use in a community-based cohort.[erratum appears in JAMA 1996 Sep 11;276(10):784]. *JAMA* 1996;275:1097-103

(51) Patten CA, Hurt RD, Offord KP, et al. Relationship of tobacco use to depressive disorders and suicidality among patients treated for alcohol dependence. *American Journal on Addictions* 2003;12:71-83

(52) Strasser K, Moeller-Saxone K, Meadows G, et al. Smoking cessation in schizophrenia. General practice guidelines. *Australian Family Physician* 2002;31:21-4

(53) Strasser K. Smoking reduction and cessation for people with schizophrenia: guidelines for general practitioners. SANE Australia and University of Melbourne Department of Psychiatry; 2001.

(54) Royal Australasian College of Physicians, Royal Australian and New Zealand College of Psychiatrists. Tobacco policy: using evidence for better outcomes. Sydney: RACP and RANZCP; 2005.

(55) de Leon J, Diaz FJ. A meta-analysis of worldwide studies demonstrates an association between schizophrenia and tobacco smoking behaviors. *Schizophrenia Research* 2005;76:135-57

(56) Hughes JR, Hatsukami DK, Mitchell JE, et al. Prevalence of smoking among psychiatric outpatients. *American Journal of Psychiatry* 1986;143:993-7

(57) Chiles JA, Cohen S, Maiuro R, et al. Smoking and schizophrenic psychopathology. *American Journal on Addictions* 1993;2:315-9

(58) Suarez M, Haydar R, Campo A, et al. Tabaquismo y trastornos mentales. *Acta Medica Colombiana* 1996;21:317–321

(59) Masterton E, O'Shea B. Smoking and malignancy in schizophrenia. *British Journal of Psychiatry* 1984;145:429-32

(60) Chong SA, Choo HL. Smoking among Chinese patients with schizophrenia. *Australian & New Zealand Journal of Psychiatry* 1996;30:350-3

(61) de Leon J, Diaz FJ. A meta-analysis of worldwide studies demonstrates an association between schizophrenia and tobacco smoking behaviors. *Schizophrenia Research* 2005;76:135-57

(62) Chong SA, Choo HL. Smoking among Chinese patients with schizophrenia. *Australian & New Zealand Journal of Psychiatry* 1996;30:350-3

(63) LLerena A, de la Rubia, Penas-Lledo EM, et al. Schizophrenia and tobacco smoking in a Spanish psychiatric hospital.[republished from Schizophr Res. 2002 Dec 1;58(2-3):323-7; PMID: 12409173]. *Schizophrenia Research* 2003;60:313-7

(64) LLerena A, de la Rubia A, Penas-Lledo EM, et al. Schizophrenia and tobacco smoking in a Spanish psychiatric hospital. *Schizophrenia Research* 2002;58:323-7

(65) Liao DL, Yang JY, Lee SM, et al. Smoking in chronic schizophrenic inpatients in Taiwan. *Neuropsychobiology* 2002;45:172-5

(66) Sandyk R, Kay SR. Tobacco addiction as a marker of age at onset of schizophrenia. *International Journal of Neuroscience* 1991;57:259-62

(67) Ucok A, Polat A, Bozkurt O, et al. Cigarette smoking among patients with schizophrenia and bipolar disorders. *Psychiatry & Clinical Neurosciences* 2004;58:434-7

(68) Riala K, Hakko H, Isohanni M, et al. Is initiation of smoking associated with the prodromal phase of schizophrenia? *Journal of Psychiatry & Neuroscience* 2005;30:26-32

(69) Tang YL, George TP, Mao PX, et al. Cigarette smoking in Chinese male inpatients with schizophrenia: a cross-sectional analysis. *Journal of Psychiatric Research* 2007;41:43-8

(70) Yang G, Fan L, Tan J, et al. Smoking in China: Findings of the 1996 National Prevalence Survey. JAMA: *The Journal of the American Medical Association* 1999;282:1247-53

(71) Kitabayashi Y, Narumoto J, Shibata K, et al. Effect of institutional smoking prohibition on Japanese inpatients with chronic schizophrenia. *Nihon Arukoru Yakubutsu Igakkai Zasshi* 2006;41:128-33

(72) Srinivasan TN, Thara R. Smoking in schizophrenia -- all is not biological. *Schizophrenia Research* 2002;56:67-74

(73) Kelly C, McCreadie RG. Smoking habits, current symptoms, and premorbid characteristics of schizophrenic patients in Nithsdale, Scotland. *American Journal of Psychiatry* 1999;156:1751-7

(74) Mori T, Sasaki T, Iwanami A, et al. Smoking habits in Japanese patients with schizophrenia. *Psychiatry Research* 2003;120:207-9

(75) Glassman AH. Cigarette smoking: Implications for psychiatric illness. *The American Journal of Psychiatry* 1993;150:546

(76) Zammit S, Allebeck P, Dalman C, et al. Investigating the association between cigarette smoking and schizophrenia in a cohort study. *American Journal of Psychiatry* 2003;160:2216-21

(77) Glassman AH, Stetner F, Walsh BT, et al. Heavy smokers, smoking cessation, and clonidine. Results of a double-blind, randomized trial. *JAMA* 1988;259:2863-6

(78) Lasser K, Boyd JW, Woolhandler S, et al. Smoking and mental illness: A population-based prevalence study. *JAMA* 2000;284:2606-10

(79) Covey LS, Glassman AH, Stetner F. Cigarette smoking and major depression. [Review] [28 refs]. *Journal of Addictive Diseases* 1998;17:35-46

(80) Benjet C, Wagner FA, Borges GG, et al. The relationship of tobacco smoking with depressive symptomatology in the Third Mexican National Addictions Survey. *Psychological Medicine* 2004;34:881-8

(81) Gulec M, Bakir B, Ozer M, et al. Association between cigarette smoking and depressive symptoms among military medical students in Turkey. *Psychiatry Research* 2005;134:281-6

(82) Jorm AF, Rodgers B, Jacomb PA, et al. Smoking and mental health: results from a community survey. *Medical Journal of Australia* 1999;170:74-7

(83) Wilhelm K, Mitchell P, Slade T, et al. Prevalence and correlates of DSM-IV major depression in an Australian national survey. *Journal of Affective Disorders* 2003;75:155-62

(84) Lopes FL, Nascimento I, Zin WA, et al. Smoking and psychiatric disorders: a comorbidity survey. *Brazilian Journal of Medical & Biological Research* 2002;35:961-7

(85) Roy K, Parker G, Mitchell P, et al. Depression and smoking: examining correlates in a subset of depressed patients. *Australian & New Zealand Journal of Psychiatry* 2001;35:329-35

(86) Waxmonsky JA, Thomas MR, Miklowitz DJ, et al. Prevalence and correlates of tobacco use in bipolar disorder: data from the first 2000 participants in the Systematic Treatment Enhancement Program. *General Hospital Psychiatry* 2005;27:321-8

(87) Itkin O, Nemets B, Einat H. Smoking habits in bipolar and schizophrenic outpatients in southern Israel. *Journal of Clinical Psychiatry* 2001;62:269-72

(88) Gonzalez-Pinto A, Gutierrez M, Ezcurra J, et al. Tobacco smoking and bipolar disorder. *Journal of Clinical Psychiatry* 1998;59:225-8

(89) Degenhardt L, Hall W, Lynskey M. Alcohol, cannabis and tobacco use among Australians: a comparison of their associations with other drug use and use disorders, affective and anxiety disorders, and psychosis. *Addiction* 2001;96:1603-14

(90) McCabe RE, Chudzik SM, Antony MM, et al. Smoking behaviors across anxiety disorders. *Journal of Anxiety Disorders* 2004;18:7-18

(91) Bejerot S, Humble M. Low prevalence of smoking among patients with obsessive-compulsive disorder. *Comprehensive Psychiatry* 1999;40:268-72

(92) Acierno RA, Kilpatrick DG, Resnick HS, et al. Violent assault, posttraumatic stress disorder, and depression. Risk factors for cigarette use among adult women. *Behavior Modification* 1996;20:363-84

(93) Beckham JC, Kirby AC, Feldman ME, et al. Prevalence and correlates of heavy smoking in Vietnam veterans with chronic posttraumatic stress disorder. *Addictive Behaviors* 1997;22:637-47

(94) Koenen KC, Hitsman B, Lyons MJ, et al. Posttraumatic stress disorder and late-onset smoking in the Vietnam era twin registry. *Journal of Consulting & Clinical Psychology* 2006;74:186-90

(95) Koenen KC, Hitsman B, Lyons MJ, et al. A twin registry study of the relationship between posttraumatic stress disorder and nicotine dependence in men. *Archives of General Psychiatry* 2005;62:1258-65

(96) Breslau N, Davis GC, Schultz LR. Posttraumatic stress disorder and the incidence of nicotine, alcohol, and other drug disorders in persons who have experienced trauma. *Archives of General Psychiatry* 2003;60:289-94

(97) Beckham JC, Feldman ME, Vrana SR, et al. Immediate antecedents of cigarette smoking in smokers with and without posttraumatic stress disorder: a preliminary study. *Experimental & Clinical Psychopharmacology* 2005;13:219-28

(98) Acierno RA, Kilpatrick DG, Resnick HS, et al. Violent assault, posttraumatic stress disorder, and depression. Risk factors for cigarette use among adult women. *Behavior Modification* 1996;20:363-84

(99) Acierno RA, Kilpatrick DG, Resnick HS, et al. Violent assault, posttraumatic stress disorder, and depression. Risk factors for cigarette use among adult women. *Behavior Modification* 1996;20:363-84

(100) Breslau N, Davis GC, Schultz LR. Posttraumatic stress disorder and the incidence of nicotine, alcohol, and other drug disorders in persons who have experienced trauma. *Archives of General Psychiatry* 2003;60:289-94

(101) Welch SL, Fairburn CG. Smoking and bulimia nervosa. *International Journal of Eating Disorders* 1998;23:433-7

(102) Wiseman CV, Turco RM, Sunday SR, et al. Smoking and body image concerns in adolescent girls. *International Journal of Eating Disorders* 1998;24:429-33

(103) Anzengruber D, Klump KL, Thornton L, et al. Smoking in eating disorders. *Eating Behaviors* 2006;7:291-9

(104) Lasser K, Boyd JW, Woolhandler S, et al. Smoking and mental illness: A population-based prevalence study. *JAMA* 2000;284:2606-10

(105) Almeida OP, Pfaff JJ. Depression and smoking amongst older general practice patients. *Journal of Affective Disorders* 2005;86:317-21

(106) Beckham JC. Smoking and anxiety in combat veterans with chronic posttraumatic stress disorder: a review. [Review] [69 refs]. *Journal of Psychoactive Drugs* 1999;31:103-10

(107) Beckham JC, Kirby AC, Feldman ME, et al. Prevalence and correlates of heavy smoking in Vietnam veterans with chronic posttraumatic stress disorder. *Addictive Behaviors* 1997;22:637-47

(108) de Leon J, Diaz FJ. A meta-analysis of worldwide studies demonstrates an association between schizophrenia and tobacco smoking behaviors. *Schizophrenia Research* 2005;76:135-57

(109) de Leon J, Tracy J, McCann E, et al. Schizophrenia and tobacco smoking: a replication study in another US psychiatric hospital. *Schizophrenia Research* 2002;56:55-65

(110) de Leon J, Dadvand M, Canuso C, et al. Schizophrenia and smoking: an epidemiological survey in a state hospital. *American Journal of Psychiatry* 1995;152:453-5

(111) Strand JE, Nyback H. Tobacco use in schizophrenia: a study of cotinine concentrations in the saliva of patients and controls. *European Psychiatry: the Journal of the Association of European Psychiatrists* 2005;20:50-4

(112) Williams JM, Ziedonis DM, Abanyie F, et al. Increased nicotine and cotinine levels in smokers with schizophrenia and schizoaffective disorder is not a metabolic effect. *Schizophrenia Research* 2005;79:323-35

(113) Bozikas VP, Niopas I, Kafantari A, et al. No increased levels of the nicotine metabolite cotinine in smokers with schizophrenia. *Progress in Neuro-Psychopharmacology & Biological Psychiatry* 2005;29:1-6

(114) Burns DM, Warner KE. Smokers who have not quit: is cessation more difficult and should we change our strategies? Those who continue to smoke: is achieving abstinence harder and do we need to change our interventions? Rockville, MD: U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute; 2003. p. 11-32.

(115) Augustson E, Marcus S. Use of the current population survey to characterize subpopulations of continued smokers: a national perspective on the “hardcore” smoker phenomenon. *Nicotine & Tobacco Research* 2004;6:621-9

(116) Salin-Pascual RJ, cocer-Castillejos NV, ejo-Galarza G. Nicotine dependence and psychiatric disorders. [Review] [141 refs]. *Revista de Investigacion Clinica* 2003;55:677-93

(117) Salin-Pascual RJ, cocer-Castillejos NV, ejo-Galarza G. Nicotine dependence and psychiatric disorders. [Review] [141 refs]. *Revista de Investigacion Clinica* 2003;55:677-93

(118) Breslau N, Johnson EO, Hiripi E, et al. Nicotine dependence in the United States: prevalence, trends, and smoking persistence. *Archives of General Psychiatry* 2001;58:810-6

(119) Breslau N, Johnson EO, Hiripi E, et al. Nicotine dependence in the United States: prevalence, trends, and smoking persistence. *Archives of General Psychiatry* 2001;58:810-6

(120) Grant BF, Hasin DS, Chou SP, et al. Nicotine dependence and psychiatric disorders in the United States: results from the national epidemiologic survey on alcohol and related conditions. *Archives of General Psychiatry* 2004;61:1107-15

(121) Peterson AL, Hryshko-Mullen AS, Cortez Y. Assessment and diagnosis of nicotine dependence in mental health settings. *American Journal on Addictions* 2003;12:192-7

(122) Sellman JD, Wootton AR, Stoner DB, et al. Increasing diagnosis of nicotine dependence in adolescent mental health patients. *Australian & New Zealand Journal of Psychiatry* 1999;33:869-73

(123) Upadhyaya HP, Brady KT, Wharton M, et al. Psychiatric disorders and cigarette smoking among child and adolescent psychiatry inpatients. *American Journal on Addictions* 2003;12:144-52

(124) Sellman JD, Wootton AR, Stoner DB, et al. Increasing diagnosis of nicotine dependence in adolescent mental health patients. *Australian & New Zealand Journal of Psychiatry* 1999;33:869-73

(125) Neuman MD, Bitton A, Glantz SA. Tobacco industry influence on the definition of tobacco related disorders by the American Psychiatric Association. [Review] [61 refs]. *Tobacco Control* 2005;14:328-37

(126) Parrott AC. Cigarette-derived nicotine is not a medicine. [Review] [59 refs]. *World Journal of Biological Psychiatry* 2003;4:49-55

(127) Ott A, Andersen K, Dewey ME, et al. Effect of smoking on global cognitive function in nondemented elderly. *Neurology* 2004;62:920-4

(128) Ott A, Andersen K, Dewey ME, et al. Effect of smoking on global cognitive function in nondemented elderly. *Neurology* 2004;62:920-4

(129) Mihailescu S, Drucker-Colin R. Nicotine, brain nicotinic receptors, and neuropsychiatric disorders. [Review] [222 refs]. *Archives of Medical Research* 2000;31:131-44

(130) Mihailescu S, Drucker-Colin R. Nicotine, brain nicotinic receptors, and neuropsychiatric disorders. [Review] [222 refs]. *Archives of Medical Research* 2000;31:131-44

(131) Leonard S, Breese C, Adams C, et al. Smoking and schizophrenia: abnormal nicotinic receptor expression. *European Journal of Pharmacology* 2000;393:237-42

(132) Rose JE. Nicotine and nonnicotine factors in cigarette addiction. [Review] [100 refs]. *Psychopharmacology* 2006;184:274-85

(133) Lewis A, Miller JH, Lea RA. Monoamine oxidase and tobacco dependence. [Review] [92 refs]. *Neurotoxicology* 2007;28:182-95

(134) Fowler JS, Logan J, Wang GJ, et al. Monoamine oxidase and cigarette smoking. [Review] [75 refs]. *Neurotoxicology* 2003;24:75-82

(135) Dalack GW, Healy DJ, Meador-Woodruff JH. Nicotine dependence in schizophrenia: clinical phenomena and laboratory findings. [Review] [100 refs]. *American Journal of Psychiatry* 1998;155:1490-501

(136) Dursun SM, Kutcher S. Smoking, nicotine and psychiatric disorders: evidence for therapeutic role, controversies and implications for future research. [Review] [78 refs]. *Medical Hypotheses* 1999;52:101-9

(137) Leonard S, Adler LE, Benhammou K, et al. Smoking and mental illness. [Review] [140 refs]. *Pharmacology, Biochemistry & Behavior* 2001;70:561-70

(138) McEvoy JP, Allen TB. The importance of nicotinic acetylcholine receptors in schizophrenia, bipolar disorder and Tourette's syndrome. [Review] [75 refs]. *Current Drug Targets - CNS & Neurological Disorders* 2002;1:433-42

(139) Picciotto MR, Brunzell DH, Caldarone BJ. Effect of nicotine and nicotinic receptors on anxiety and depression. [Review] [164 refs]. *Neuroreport* 2002;13:1097-106

(140) Ripoll N, Bronnec M, Bourin M. Nicotinic receptors and schizophrenia. [Review] [303 refs]. *Current Medical Research & Opinio*n 2004;20:1057-74

(141) Silver H, Shlomo N, Hiemke C, et al. Schizophrenic patients who smoke have a faster finger tapping rate than non-smokers. *European Neuropsychopharmacology* 2002;12:141-4

(142) Sacco KA, Bannon KL, George TP. Nicotinic receptor mechanisms and cognition in normal states and neuropsychiatric disorders. [Review] [190 refs]. *Journal of Psychopharmacology* 2004;18:457-74

(143) McEvoy JP, Allen TB. The importance of nicotinic acetylcholine receptors in schizophrenia, bipolar disorder and Tourette's syndrome. [Review] [75 refs]. *Current Drug Targets - CNS & Neurological Disorders* 2002;1:433-42

(144) McEvoy JP, Allen TB. The importance of nicotinic acetylcholine receptors in schizophrenia, bipolar disorder and Tourette's syndrome. [Review] [75 refs]. *Current Drug Targets - CNS & Neurological Disorders* 2002;1:433-42

(145) English DR, Holman CDJ, Milne E, et al. The quantification of drug caused morbidity and mortality in Australia. Canberra: Commonwealth Department of Human Services and Health; 1995.

(146) Graves AB, Van Duijn CM, Chandra V. Alcohol and tobacco consumption as risk factors for Alzheimer's disease: a collaborative re-analysis of case-control studies. *International Journal of Epidemiology* 1991;20:S48-S57

(147) Peto R, Lopez AD, Boreham J, et al. Mortality from tobacco in developed countries: indirect estimation from national vital statistics. *Lancet* 1992;339:1268-78

(148) US Department of Health and Human Services. The health consequences of smoking: A report of the Surgeon General. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2004.

(149) US Department of Health and Human Services. Reducing the health consequences of smoking - 25 years of progress: A report of the Surgeon General. Atlanta, GA: US Department of Health and Human Services, CDC; 1989. Report No.: DHHS Pub. No. (CDC) 89-8411.

(150) Tullis LM, Dupont R, Frost-Pineda K, et al. Marijuana and tobacco: a major connection? *Journal of Addictive Diseases* 2003;22:51-62

(151) Upadhyaya HP, Deas D, Brady KT, et al. Cigarette smoking and psychiatric comorbidity in children and adolescents. [Review] [84 refs]. *Journal of the American Academy of Child & Adolescent Psychiatry* 2002;41:1294-305

(152) Kandel DB. Stages and pathways of drug involvement: examining the gateway hypothesis. 2002. Cambridge, U.K. ; New York, Cambridge University Press.

(153) Biederman J, Monuteaux MC, Mick E, et al. Is cigarette smoking a gateway to alcohol and illicit drug use disorders? A study of youths with and without attention deficit hyperactivity disorder. *Biological Psychiatry* 2006;59:258-64

(154) Riala K, Hakko H, Isohanni M, et al. Teenage smoking and substance use as predictors of severe alcohol problems in late adolescence and in young adulthood. *Journal of Adolescent Health* 2004;35:245-54

(155) Lewinsohn PM, Rohde P, Brown RA. Level of current and past adolescent cigarette smoking as predictors of future substance use disorders in young adulthood. *Addiction* 1999;94:913-21

(156) Richards M, Jarvis MJ, Thompson N, et al. Cigarette smoking and cognitive decline in midlife: evidence from a prospective birth cohort study. *American Journal of Public Health* 2003;93:994-8

(157) Anwar MU, Majumder S, Austin O, et al. Smoking, substance abuse, psychiatric history, and burns: trends in adult patients. *Journal of Burn Care & Rehabilitation* 2005;26:493-501

(158) Parrott AC. Cigarette-derived nicotine is not a medicine. [Review] [59 refs]. *World Journal of Biological Psychiatry* 2003;4:49-55

(159) Jofre-Bonet M, Busch SH, Falba TA, et al. Poor mental health and smoking: interactive impact on wages. *The Journal of Mental Health Policy & Economics* 2005;8:193-203

(160) Steinberg ML, Williams JM, Ziedonis DM. Financial implications of cigarette smoking among individuals with schizophrenia. *Tobacco Control* 2004;13:206

(161) Jofre-Bonet M, Busch SH, Falba TA, et al. Poor mental health and smoking: interactive impact on wages. *The Journal of Mental Health Policy & Economics* 2005;8:193-203

(162) Lawn S. Australians with mental illness who smoke. *British Journal of Psychiatry* 2001;178:85

(163) Tanskanen A, Viinamaki H, Hintikka J, et al. Smoking and suicidality among psychiatric patients. *American Journal of Psychiatry* 1998;155:129-30

(164) Malone KM, Waternaux C, Haas GL, et al. Cigarette smoking, suicidal behavior, and serotonin function in major psychiatric disorders. *American Journal of Psychiatry* 2003;160:773-9

(165) Altamura AC, Mundo E, Bassetti R, et al. Transcultural differences in suicide attempters: analysis on a high-risk population of patients with schizophrenia or schizoaffective disorder. *Schizophrenia Research* 2007;89:140-6

(166) Schneider B, Schnabel A, Weber B, et al. Nicotine use in suicides: a case-control study. *European Psychiatry: the Journal of the Association of European Psychiatrists* 2005;20:129-36

(167) Hemmingsson T, Kriebel D. Smoking at age 18-20 and suicide during 26 years of follow-up-how can the association be explained? *International Journal of Epidemiology* 2003;32:1000-4

(168) Oquendo MA, Galfalvy H, Russo S, et al. Prospective study of clinical predictors of suicidal acts after a major depressive episode in patients with major depressive disorder or bipolar disorder. *American Journal of Psychiatry* 2004;161:1433-41

(169) Breslau N, Schultz LR, Johnson EO, et al. Smoking and the risk of suicidal behavior: a prospective study of a community sample. *Archives of General Psychiatry* 2005;62:328-34

(170) Proctor R. The Nazi war on cancer. Princeton NJ: Princeton University Press; 1999.

(171) Doll R, Hill AB. Smoking and carcinoma of the lung. *British Medical Journal* 1950;2:739-48

(172) Royal College of Physicians. Smoking and health. Tunbridge Wells, Kent: Pitman Medical; 1962.

(173) US Department of Health and Human Services. Smoking and health: report of the advisory committee to the Surgeon General of the public health service. Washington DC: US Department of Health and Human Services, Government Printing Office; 1964.

(174) Walsh RA, Bowman JA, Tzelepis F, et al. Smoking cessation interventions in Australian drug treatment agencies: a national survey of attitudes and practices. *Drug & Alcohol Review* 2005;24:235-44

(175) Plant ML, Plant MA, Foster J. Alcohol, tobacco and illicit drug use amongst nurses: a Scottish study. *Drug & Alcohol Dependence* 1991;28:195-202

(176) Trinkoff AM, Storr CL. Substance use among nurses: differences between specialties. *American Journal of Public Health* 1998;88:581-5

(177) Borland R, Chapman S, Owen N, et al. Effects of workplace smoking bans on cigarette consumption. *American Journal of Public Health* 1990;80:178-80

(178) Chapman S, Borland R, Scollo M, et al. The impact of smoke-free workplaces on declining cigarette consumption in Australia and the United States. *American Journal of Public Health* 1999;89:1018-23

(179) Romberger DJ, Grant K. Alcohol consumption and smoking status: the role of smoking cessation. [Review] [89 refs]. *Biomedicine & Pharmacotherapy* 2004;58:77-83

(180) Baker A, Ivers RG, Bowman J, et al. Where there's smoke, there's fire: high prevalence of smoking among some sub-populations and recommendations for intervention. [Review] [107 refs]. *Drug & Alcohol Review* 2006;25:85-96

(181) Baker A, Ivers RG, Bowman J, et al. Where there's smoke, there's fire: high prevalence of smoking among some sub-populations and recommendations for intervention. [Review] [107 refs]. *Drug & Alcohol Review* 2006;25:85-96

(182) Baker A, Ivers RG, Bowman J, et al. Where there's smoke, there's fire: high prevalence of smoking among some sub-populations and recommendations for intervention. [Review] [107 refs]. *Drug & Alcohol Review* 2006;25:85-96

(183) Dickens GL, Stubbs JH, Haw CM. Smoking and mental health nurses: a survey of clinical staff in a psychiatric hospital. *Journal of Psychiatric and Mental Health Nursing* 2004;11:445-51

(184) Lawn S, Pols RG. Smoking bans in psychiatric inpatient settings? A review of the research. *Australian & New Zealand Journal of Psychiatry* 2005;39:866-85

(185) Moeller-Saxone K. Quoted in 2020 vision: a nicorette study, published by Pharmacia. 2004.

(186) Walsh RA, Bowman JA, Tzelepis F, et al. Smoking cessation interventions in Australian drug treatment agencies: a national survey of attitudes and practices. *Drug & Alcohol Review* 2005;24:235-44

(187) 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 Nursing* 2006;15:111-8

(188) Lawn S. Australians with mental illness who smoke. *British Journal of Psychiatry* 2001;178:85

(189) Lawn S. Cigarette smoking in psychiatric settings: occupational health, safety, welfare and legal concerns. *Australian and New Zealand Journal of Psychiatry* 2005;39:886-91

(190) Lawn SJ, Pols RG, Barber JG. Smoking and quitting: a qualitative study with community-living psychiatric clients. *Social Science & Medicine* 2002;54:93-104

(191) Walsh RA, Bowman JA, Tzelepis F, et al. Smoking cessation interventions in Australian drug treatment agencies: a national survey of attitudes and practices. *Drug & Alcohol Review* 2005;24:235-44

(192) Thorndike AN, Stafford RS, Rigotti NA. US physicians' treatment of smoking in outpatients with psychiatric diagnoses. *Nicotine & Tobacco Research* 2001;3:85-91

(193) Prochaska JJ, Gill P, Hall SM. Treatment of tobacco use in an inpatient psychiatric setting. *Psychiatric Services* 2004;55:1265-70

(194) Prochaska JJ, Fromont SC, Hall SM. How prepared are psychiatry residents for treating nicotine dependence? *Academic Psychiatry* 2005;29:256-61

(195) Prochaska JJ, Fromont SC, Louie AK, et al. Training in tobacco treatments in psychiatry: a national survey of psychiatry residency training directors. *Academic Psychiatry* 2006;30:372-8

(196) Doran CM, Duszynski KM, Beilby JJ, et al. Use of pharmacotherapies for the management of addictive behaviours in Australian clinical practice. *Addictive Behaviors* 2006;31:1947-58

(197) de Leon J, Tracy J, McCann E, et al. Schizophrenia and tobacco smoking: a replication study in another US psychiatric hospital. *Schizophrenia Research* 2002;56:55-65

(198) de Leon J, Dadvand M, Canuso C, et al. Schizophrenia and smoking: an epidemiological survey in a state hospital. *American Journal of Psychiatry* 1995;152:453-5

(199) Lawn SJ, Pols RG, Barber JG. Smoking and quitting: a qualitative study with community-living psychiatric clients. *Social Science & Medicine* 2002;54:93-104

(200) 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 Nursing* 2006;15:111-8

(201) Droungas A, Ehrman RN, Childress AR, et al. Effect of smoking cues and cigarette availability on craving and smoking behavior. *Addictive Behaviors* 1995;20:657-73

(202) Patkar AA, Vergare MJ, Batra V, et al. Tobacco smoking: current concepts in etiology and treatment. [Review] [120 refs]. *Psychiatry* 2003;66:183-99

(203) Sussman S. Risk factors for and prevention of tobacco use. [Review] [20 refs]. *Pediatric Blood & Cancer* 2005;44:614-9

(204) Agrawal A, Madden PA, Heath AC, et al. Correlates of regular cigarette smoking in a population-based sample of Australian twins. *Addiction* 2005;100:1709-19

(205) Acierno R, Kilpatrick DG, Resnick H, et al. Assault, PTSD, family substance use, and depression as risk factors for cigarette use in youth: findings from the National Survey of Adolescents. *Journal of Traumatic Stress* 2000;13:381-96

(206) Acierno R, Kilpatrick DG, Resnick H, et al. Assault, PTSD, family substance use, and depression as risk factors for cigarette use in youth: findings from the National Survey of Adolescents. *Journal of Traumatic Stress* 2000;13:381-96

(207) Agrawal A, Madden PA, Heath AC, et al. Correlates of regular cigarette smoking in a population-based sample of Australian twins. *Addiction* 2005;100:1709-19

(208) Li MD, Cheng R, Ma JZ, et al. A meta-analysis of estimated genetic and environmental effects on smoking behavior in male and female adult twins. [Review] [43 refs]. *Addiction* 2003;98:23-31

(209) Nandi A, Galea S, Ahern J, et al. Probable cigarette dependence, PTSD, and depression after an urban disaster: results from a population survey of New York City residents 4 months after September 11, 2001. [see comment]. *Psychiatry* 2005;68:299-310

(210) Parslow RA, Jorm AF. Tobacco use after experiencing a major natural disaster: analysis of a longitudinal study of 2063 young adults. *Addiction* 2006;101:1044-50

(211) Feldner MT, Babson KA, Zvolensky MJ. Smoking, traumatic event exposure, and post-traumatic stress: a critical review of the empirical literature. [Review] [120 refs]. *Clinical Psychology Review* 2007;27:14-45

(212) Sussman S. Risk factors for and prevention of tobacco use. [Review] [20 refs]. *Pediatric Blood & Cancer* 2005;44:614-9

(213) Parrott AC. Cigarette-derived nicotine is not a medicine. [Review] [59 refs]. *World Journal of Biological Psychiatry* 2003;4:49-55

(214) Parrott AC. Cigarette-derived nicotine is not a medicine. [Review] [59 refs]. *World Journal of Biological Psychiatry* 2003;4:49-55

(215) Parrott AC. Cigarette-derived nicotine is not a medicine. [Review] [59 refs]. *World Journal of Biological Psychiatry* 2003;4:49-55

(216) Johnson JG, Cohen P, Pine DS, et al. Association between cigarette smoking and anxiety disorders during adolescence and early adulthood. *JAMA* 2000;284:2348-51

(217) Wu LT, Anthony JC. Tobacco smoking and depressed mood in late childhood and early adolescence. *American Journal of Public Health* 1999;89:1837-40

(218) Patton GC, Carlin JB, Coffey C, et al. Depression, anxiety, and smoking initiation: a prospective study over 3 years. *American Journal of Public Health* 1998;88:1518-22

(219) Breslau N, Peterson EL, Schultz LR, et al. Major depression and stages of smoking. A longitudinal investigation. *Archives of General Psychiatry* 1998;55:161-6

(220) Goodman E, Capitman J. Depressive symptoms and cigarette smoking among teens. *Pediatrics* 2000;106:748-55

(221) Breslau N, Peterson EL, Schultz LR, et al. Major depression and stages of smoking. A longitudinal investigation. *Archives of General Psychiatry* 1998;55:161-6

(222) Goodman E, Capitman J. Depressive symptoms and cigarette smoking among teens. *Pediatrics* 2000;106:748-55

(223) Cohen S, Lichtenstein E. Perceived stress, quitting smoking, and smoking relapse. *Health Psychology* 1990;9:466-78

(224) Hughes JR, Gulliver SB, Fenwick JW, et al. Smoking cessation among self-quitters. *Health Psychology* 1992;11:331-4

(225) Carey MP, Kalra DL, Carey KB, et al. Stress and unaided smoking cessation: a prospective investigation. *Journal of Consulting and Clinical Psychology* 1993;61:831-8

(226) West R, Hajek P. What happens to anxiety levels on giving up smoking? *American Journal of Psychiatry* 1997;154:1589-92

(227) Tidey JW, Rohsenow DJ, Kaplan GB, et al. Cigarette smoking topography in smokers with schizophrenia and matched non-psychiatric controls. *Drug & Alcohol Dependence* 2005;80:259-65

(228) Tidey JW, Rohsenow DJ, Kaplan GB, et al. Subjective and physiological responses to smoking cues in smokers with schizophrenia. *Nicotine & Tobacco Research* 2005;7:421-9

(229) Tidey JW, O'Neill SC, Higgins ST. Contingent monetary reinforcement of smoking reductions, with and without transdermal nicotine, in outpatients with schizophrenia. *Experimental & Clinical Psychopharmacology* 2002;10:241-7

(230) Tidey JW, Higgins ST, Bickel WK, et al. Effects of response requirement and the availability of an alternative reinforcer on cigarette smoking by schizophrenics. *Psychopharmacology* 1999;145:52-60

(231) Tidey JW, Rohsenow DJ, Kaplan GB, et al. Subjective and physiological responses to smoking cues in smokers with schizophrenia. *Nicotine & Tobacco Research* 2005;7:421-9

(232) Sussman S. Risk factors for and prevention of tobacco use. [Review] [20 refs]. *Pediatric Blood & Cancer* 2005;44:614-9

(233) Degenhardt L, Hall W. The relationship between tobacco use, substance-use disorders and mental health: results from the National Survey of Mental Health and Well-being. *Nicotine & Tobacco Research* 2001;3:225-34

(234) Picotte DM, Strong DR, Abrantes AM, et al. Family and peer influences on tobacco use among adolescents with psychiatric disorders. *Journal of Nervous & Mental Disease* 2006;194:518-23

(235) Picotte DM, Strong DR, Abrantes AM, et al. Family and peer influences on tobacco use among adolescents with psychiatric disorders. *Journal of Nervous & Mental Disease* 2006;194:518-23

(236) Lawn SJ, Pols RG, Barber JG. Smoking and quitting: a qualitative study with community-living psychiatric clients. *Social Science & Medicine* 2002;54:93-104

(237) Lawn SJ, Pols RG, Barber JG. Smoking and quitting: a qualitative study with community-living psychiatric clients. *Social Science & Medicine* 2002;54:93-104

(238) Lawn SJ, Pols RG, Barber JG. Smoking and quitting: a qualitative study with community-living psychiatric clients. *Social Science & Medicine* 2002;54:93-104

(239) John U, Meyer C, Rumpf HJ, et al. Smoking, nicotine dependence and psychiatric comorbidity - a population-based study including smoking cessation after three years. *Drug & Alcohol Dependence* 2004;76:287-95

(240) Dixon L. Dual diagnosis of substance abuse in schizophrenia: prevalence and impact on outcomes. *Schizophrenia Research* 1999;35 Suppl:93-100

(241) Sussman S. Risk factors for and prevention of tobacco use. [Review] [20 refs]. *Pediatric Blood & Cancer* 2005;44:614-9

(242) Lawn SJ, Pols RG, Barber JG. Smoking and quitting: a qualitative study with community-living psychiatric clients. *Social Science & Medicine* 2002;54:93-104

(243) Spencer C, Castle D, Michie PT. Motivations that maintain substance use among individuals with psychotic disorders. *Schizophrenia Bulletin* 2002;28:233-47

(244) Noordsy DL, Green AI. Pharmacotherapy for schizophrenia and co-occurring substance use disorders. [Review] [54 refs]. *Current Psychiatry Reports* 2003;5:340-6

(245) Sacco KA, Bannon KL, George TP. Nicotinic receptor mechanisms and cognition in normal states and neuropsychiatric disorders. [Review] [190 refs]. *Journal of Psychopharmacology* 2004;18:457-74

(246) Mihailescu S, Drucker-Colin R. Nicotine, brain nicotinic receptors, and neuropsychiatric disorders. [Review] [222 refs]. *Archives of Medical Research* 2000;31:131-44

(247) Dalack GW, Healy DJ, Meador-Woodruff JH. Nicotine dependence in schizophrenia: clinical phenomena and laboratory findings. [Review] [100 refs]. *American Journal of Psychiatry* 1998;155:1490-501

(248) Breslau N, Peterson EL, Schultz LR, et al. Major depression and stages of smoking. A longitudinal investigation. *Archives of General Psychiatry* 1998;55:161-6

(249) Glassman AH, Helzer JE, Covey LS, et al. Smoking, smoking cessation, and major depression. *JAMA* 1990;264:1546-9

(250) Glass RM. Blue mood, blackened lungs. Depression and smoking. *JAMA* 1990;264:1583-4

(251) Hall SM, Munoz RF, Reus VI, et al. Nicotine, negative affect, and depression. *Journal of Consulting & Clinical Psychology* 1993;61:761-7

(252) Kendler KS, Neale MC, MacLean CJ, et al. Smoking and major depression: a causal analysis. *Archives of General Psychiatry* 1993;50:36-43

(253) Bock BC, Goldstein MG, Marcus BH. Depression following smoking cessation in women. *Journal of Substance Abuse* 1996;8:137-44

(254) Aguilar MC, Gurpegui M, Diaz FJ, et al. Nicotine dependence and symptoms in schizophrenia: naturalistic study of complex interactions. *British Journal of Psychiatry* 2005;186:215-21

(255) Parrott AC. Cigarette-derived nicotine is not a medicine. [Review] [59 refs]. *World Journal of Biological Psychiatry* 2003;4:49-55

(256) Lubman DI, Sundram S. Substance misuse in patients with schizophrenia: a primary care guide. *Medical Journal of Australia* 2003;178:Suppl-5

(257) Parrott AC. Nicotine/cigarette dependency: a cause of depression? *International Journal of Neuropsychopharmacology* 2000;3 (Suppl S1):s324

(258) Ismail K, Sloggett A, De SB. Do common mental disorders increase cigarette smoking? Results from five waves of a population-based panel cohort study. *American Journal of Epidemiology* 2000;152:651-7

(259) Parrott AC. Cigarette-derived nicotine is not a medicine. [Review] [59 refs]. *World Journal of Biological Psychiatry* 2003;4:49-55

(260) Mueser KT, Drake RE, Wallach MA. Dual diagnosis: a review of etiological theories. *Addictive Behaviors 1998*;23:717-34

(261) McMahon RJ. Child and adolescent psychopathology as risk factors for subsequent tobacco use. [Review] [33 refs]. *Nicotine & Tobacco Research* 1999;1:Suppl-50

(262) Hanna EZ, Yi HY, Dufour MC, et al. The relationship of early-onset regular smoking to alcohol use, depression, illicit drug use, and other risky behaviors during early adolescence: results from the youth supplement to the third national health and nutrition examination survey. *Journal of Substance Abuse* 2001;13:265-82

(263) Breslau N, Peterson EL, Schultz LR, et al. Major depression and stages of smoking. A longitudinal investigation. *Archives of General Psychiatry* 1998;55:161-6

(264) Dierker LC, Avenevoli S, Stolar M, et al. Smoking and depression: an examination of mechanisms of comorbidity. *American Journal of Psychiatry* 2002;159:947-53

(265) Fergusson DM, Goodwin RD, Horwood LJ. Major depression and cigarette smoking: results of a 21-year longitudinal study. *Psychological Medicine* 2003;33:1357-67

(266) Goodman E, Capitman J. Depressive symptoms and cigarette smoking among teens. *Pediatrics 2000*;106:748-55

(267) Brook DW, Brook JS, Zhang C, et al. Drug use and the risk of major depressive disorder, alcohol dependence, and substance use disorders. *Archives of General Psychiatry* 2002;59:1039-44

(268) Repetto PB, Caldwell CH, Zimmerman MA. A longitudinal study of the relationship between depressive symptoms and cigarette use among African American adolescents. *Health Psychology* 2005;24:209-19

(269) Hassard Ked. Australia's National Tobacco Campaign evaluation report: every cigarette is doing you damage (Vol.1). Canberra, Australia: Commonwealth Department of Health and Aged Care; 1999.

(270) Baillie AJ, Mattick RP, Hall W. Quitting smoking: estimation by meta-analysis of the rate of unaided smoking cessation. *Australian Journal of Public Health* 1995;19:129-31

(271) US Department of Health and Human Services. The health benefits of smoking cessation: A report of the Surgeon General. Rockville MA: US Department of Health and Human Services. Public Health Service. Centers for Disease Control. Center for Chronic Disease Prevention and Health Promotion. Office of Smoking and Health.; 1990. Report No.: DHHS Publication No.(CDC) YO-K-116.

(272) Addington J. Group treatment for smoking cessation among persons with schizophrenia. [Review] [34 refs]. *Psychiatric Services* 1998;49:925-8

(273) Addington J, El-Guebaly N, Campbell W, et al. Smoking cessation treatment for patients with schizophrenia. *American Journal of Psychiatry* 1998;155:974-6

(274) Addington J, El-Guebaly N, Addington D, et al. Readiness to stop smoking in schizophrenia. *Canadian Journal of Psychiatry - Revue Canadienne de Psychiatrie* 1997;42:49-52

(275) Esterberg ML, Compton MT. Smoking behavior in persons with a schizophrenia-spectrum disorder: a qualitative investigation of the transtheoretical model. *Social Science & Medicine* 2005;61:293-303

(276) Lucksted A, McGuire C, Postrado L, et al. Specifying cigarette smoking and quitting among people with serious mental illness. *American Journal on Addictions* 2004;13:128-38

(277) Richter KP, Gibson CA, Ahluwalia JS, et al. Tobacco use and quit attempts among methadone maintenance clients. *American Journal of Public Health* 2001;91:296-9

(278) Richter KP, Ahluwalia JS. A case for addressing cigarette use in methadone and other opioid treatment programs. [Review] [69 refs]. *Journal of Addictive Diseases* 2000;19:35-52

(279) Addington J, El-Guebaly N, Campbell W, et al. Smoking cessation treatment for patients with schizophrenia. *American Journal of Psychiatry* 1998;155:974-6

(280) Lucksted A, McGuire C, Postrado L, et al. Specifying cigarette smoking and quitting among people with serious mental illness. *American Journal on Addictions* 2004;13:128-38

(281) Etter M, Mohr S, Garin C, et al. Stages of change in smokers with schizophrenia or schizoaffective disorder and in the general population. *Schizophrenia Bulletin* 2004;30:459-68

(282) Sees KL, Clark HW. When to begin smoking cessation in substance abusers. *Journal of Substance Abuse Treatment* 1993;10:189-95

(283) Zullino DF, Besson J, Favrat B, et al. Acceptance of an intended smoking ban in an alcohol dependence clinic. *European Psychiatry: the Journal of the Association of European Psychiatrists* 2003;18:255-7

(284) Zullino DF, Besson J, Schnyder C. Stage of change of cigarette smoking in alcohol-dependent patients. *European Addiction Research* 2000;6:84-90

(285) Carosella 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;24:331-44

(286) Unrod M, Cook T, Myers MG, et al. Smoking cessation efforts among substance abusers with and without psychiatric comorbidity. *Addictive Behaviors* 2004;29:1009-13

(287) Addington J, El-Guebaly N, Addington D, et al. Readiness to stop smoking in schizophrenia. *Canadian Journal of Psychiatry - Revue Canadienne de Psychiatrie* 1997;42:49-52

(288) Prochaska JO, DiClemente CC. Stages of change in the modification of problem behaviors. *Progress in Behavior Modification* 1992;28:183-218

(289) Addington J, El-Guebaly N, Addington D, et al. Readiness to stop smoking in schizophrenia. *Canadian Journal of Psychiatry - Revue Canadienne de Psychiatrie* 1997;42:49-52

(290) Lucksted A, McGuire C, Postrado L, et al. Specifying cigarette smoking and quitting among people with serious mental illness. *American Journal on Addictions* 2004;13:128-38

(291) Richter KP, Gibson CA, Ahluwalia JS, et al. Tobacco use and quit attempts among methadone maintenance clients. *American Journal of Public Health* 2001;91:296-9

(292) Zullino DF, Besson J, Favrat B, et al. Acceptance of an intended smoking ban in an alcohol dependence clinic. *European Psychiatry: the Journal of the Association of European Psychiatrists* 2003;18:255-7

(293) Unrod M, Cook T, Myers MG, et al. Smoking cessation efforts among substance abusers with and without psychiatric comorbidity. *Addictive Behaviors* 2004;29:1009-13

(294) Nahvi S, Richter K, Li X, et al. Cigarette smoking and interest in quitting in methadone maintenance patients. *Addictive Behaviors* 2006;31:2127-34

(295) Kolly S, Besson J, Cornuz J, et al. Stage of change of cigarette smoking in drug dependent patients. *Swiss Medical Weekly* 2004;134:322-5

(296) Green MA, Clarke DE. Smoking reduction & cessation: a hospital based survey of outpatients' attitudes. *Journal of Psychosocial Nursing & Mental Health Services* 2005;43:18-25

(297) Carosella 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;24:331-44

(298) Dickens G, Stubbs J, Popham R, et al. Smoking in a forensic psychiatric service: a survey of inpatients' views. *Journal of Psychiatric & Mental Health Nursing* 2005;12:672-8

(299) Silagy C, Lancaster T, Stead L, et al. Nicotine replacement therapy for smoking cessation. The Cochrane Collaboration; 2006.

(300) Rose JE. Nicotine and nonnicotine factors in cigarette addiction. [Review] [100 refs]. *Psychopharmacology* 2006;184:274-85

(301) Piasecki TM. Relapse to smoking. [Review] [165 refs]. *Clinical Psychology Review* 2006;26:196-215

(302) Piasecki TM. Relapse to smoking. [Review] [165 refs]. *Clinical Psychology Review* 2006;26:196-215

(303) Piasecki TM. Relapse to smoking. [Review] [165 refs]. *Clinical Psychology Review* 2006;26:196-215

(304) Fiore M, Novotny TE, Pierce JP. Methods used to quit smoking in the United States. Do cessation programs help? *JAMA* 1990;263:2760-5

(305) Siahpush M, Borland R, Scollo M. Factors associated with smoking cessation in a national sample of Australians. *Nicotine & Tobacco Research* 2003;5:597-602

(306) Piasecki TM. Relapse to smoking. [Review] [165 refs]. *Clinical Psychology Review* 2006;26:196-215

(307) Lucksted A, McGuire C, Postrado L, et al. Specifying cigarette smoking and quitting among people with serious mental illness. *American Journal on Addictions* 2004;13:128-38

(308) Lasser K, Boyd JW, Woolhandler S, et al. Smoking and mental illness: A population-based prevalence study. *JAMA* 2000;284:2606-10

(309) Karam-Hage M, Pomerleau CS, Pomerleau OF, et al. Unaided smoking cessation among smokers in treatment for alcohol dependence. *Addictive Behaviors* 2005;30:1247-53

(310) Chou KR, Chen R, Lee JF, et al. The effectiveness of nicotine-patch therapy for smoking cessation in patients with schizophrenia. *International Journal of Nursing Studies* 2004;41:321-30

(311) Williams JM, Ziedonis DM, Foulds J. A case series of nicotine nasal spray in the treatment of tobacco dependence among patients with schizophrenia. *Psychiatric Services* 2004;55:1064-6

(312) Williams JM, Ziedonis D. Addressing tobacco among individuals with a mental illness or an addiction. [Review] [110 refs]. *Addictive Behaviors* 2004;29:1067-83

(313) Thorsteinsson HS, Gillin JC, Patten CA, et al. The effects of transdermal nicotine therapy for smoking cessation on depressive symptoms in patients with major depression. *Neuropsychopharmacology* 2001;24:350-8

(314) Weiner E, Ball MP, Summerfelt A, et al. Effects of sustained-release bupropion and supportive group therapy on cigarette consumption in patients with schizophrenia. *American Journal of Psychiatry* 2001;158:635-7

(315) Addington J. Group treatment for smoking cessation among persons with schizophrenia. [Review] [34 refs]. *Psychiatric Services* 1998;49:925-8

(316) Addington J, El-Guebaly N, Campbell W, et al. Smoking cessation treatment for patients with schizophrenia. *American Journal of Psychiatry* 1998;155:974-6

(317) George TP, Sernyak MJ, Ziedonis DM, et al. Effects of clozapine on smoking in chronic schizophrenic outpatients. *Journal of Clinical Psychiatry* 1995;56:344-6

(318) Hall SM, Munoz RF, Reus VI. Depression and smoking treatment: a clinical trial of an affect regulation treatment. 1992. Report No.: 119.

(319) Hall SM, Munoz RF, Reus VI. Cognitive-behavioral intervention increases abstinence rates for depressive-history smokers. *Journal of Consulting & Clinical Psychology* 1994;62:141-6

(320) Hall SM, Humfleet GL, Reus VI, et al. Psychological intervention and antidepressant treatment in smoking cessation. *Archives of General Psychiatry* 2002;59:930-6

(321) Kinnunen T, Doherty K, Militello FS, et al. Depression and smoking cessation: characteristics of depressed smokers and effects of nicotine replacement. *Journal of Consulting & Clinical Psychology* 1996;64:791-8

(322) Patten CA, Martin JE, Myers MG, et al. Effectiveness of cognitive-behavioral therapy for smokers with histories of alcohol dependence and depression. *Journal of Studies on Alcohol* 1998;59:327-35

(323) Brown RA, Kahler CW, Niaura R, et al. Cognitive-behavioral treatment for depression in smoking cessation. *Journal of Consulting & Clinical Psychology* 2001;69:471-80

(324) Baker A, Kay-Lambkin F, Bucci S, Haile M, Richmond R, Carr VJ. Intervention for tobacco dependence among people with a mental illness. National Drug and Alcohol Research Centre 2004 [cited 11.6.7 A.D.]; NDARC Technical Report No 192 http://www.med.unsw.edu.au/NDARCWeb.nsf/resources/TR_4/$file/TR.192.pdf

(325) Brown RA, Kahler CW, Zvolensky MJ, et al. Anxiety sensitivity: relationship to negative affect smoking and smoking cessation in smokers with past major depressive disorder. *Addictive Behaviors* 2001;26:887-99

(326) Baker A, Richmond R, Haile M, et al. A randomized controlled trial of a smoking cessation intervention among people with a psychotic disorder. *American Journal of Psychiatry* 2006;163:1934-42

(327) Hughes JR, Stead L, Lancaster T. Antidepressants for smoking cessation. The Cochrane Library 2006

(328) Williams JM, Ziedonis DM, Foulds J. A case series of nicotine nasal spray in the treatment of tobacco dependence among patients with schizophrenia. *Psychiatric Services* 2004;55:1064-6

(329) Bobo JK, McIlvain HE, Lando HA, et al. Effect of smoking cessation counseling on recovery from alcoholism: findings from a randomized community intervention trial. *Addiction* 1998;93:877-87

(330) Burling TA, Burling AS, Latini D. A controlled smoking cessation trial for substance-dependent inpatients. *Journal of Consulting & Clinical Psychology* 2001;69:295-304

(331) Sullivan MA, Covey LS. Current perspectives on smoking cessation among substance abusers. [Review] [67 refs]. *Current Psychiatry Reports* 2002;4:388-96

(332) Friend KB, Pagano ME. Changes in cigarette consumption and drinking outcomes: findings from Project MATCH. *Journal of Substance Abuse Treatmen*t 2005;29:221-9

(333) Sussman S. Smoking cessation among persons in recovery. [Review] [41 refs]. *Substance Use & Misuse* 2002;37:1275-98

(334) Friend KB, Pagano ME. Smoking initiation among nonsmokers during and following treatment for alcohol use disorders. *Journal of Substance Abuse Treatment* 2004;26:219-24

(335) Ferguson JA, Patten CA, Schroeder DR, et al. Predictors of 6-month tobacco abstinence among 1224 cigarette smokers treated for nicotine dependence. *Addictive Behaviors* 2003;28:1203-18

(336) John U, Meyer C, Rumpf HJ, et al. Smoking, nicotine dependence and psychiatric comorbidity - a population-based study including smoking cessation after three years. *Drug & Alcohol Dependence* 2004;76:287-95

(337) Lasser K, Boyd JW, Woolhandler S, et al. Smoking and mental illness: A population-based prevalence study. *JAMA* 2000;284:2606-10

(338) El-Guebaly N, Cathcart J, Currie S, et al. Smoking cessation approaches for persons with mental illness or addictive disorders. [Review] [33 refs]. *Psychiatric Services* 2002;53:1166-70

(339) Hitsman B, Borrelli B, McChargue DE, et al. History of depression and smoking cessation outcome: a meta-analysis. [Review] [42 refs]. *Journal of Consulting & Clinical Psychology* 2003;71:657-63

(340) Hughes JR. Tobacco withdrawal in self-quitters. *Journal of Consulting and Clinical Psychology* 1992;60:689-97

(341) Parrott AC. Cigarette smoking does cause stress. *American Psychologist* 2000;55:1159-60

(342) Parrott AC. Smoking cessation leads to reduced stress, but why? [Review] [17 refs]. *International Journal of the Addictions* 1995;30:1509-16

(343) Piasecki TM, Niaura R, Shadel WG, et al. Smoking withdrawal dynamics in unaided quitters. *Journal of Abnormal Psychology* 2000;109:74-86

(344) Piasecki TM, Jorenby DE, Smith SS, et al. Smoking withdrawal dynamics: Abstinence distress in lapsers and abstainers. *Journal of Abnormal Psychology* 2003;112:3-13

(345) Hughes JR. Clinical significance of tobacco withdrawal. [Review] [36 refs]. *Nicotine & Tobacco Research* 2006;8:153-6

(346) Larsen RJ, Kasimatis M. Individual differences in entrainment of mood to the weekly calendar. *Journal of Personality & Social Psychology* 1990;58:164-71

(347) Parrott AC. Smoking cessation leads to reduced stress, but why?. [Review] [17 refs]. *International Journal of the Addictions* 1995;30:1509-16

(348) Gilbert DG, Gilbert BO, Schultz VL. Withdrawal symptoms: individual differences and similarities across addictive behaviors. *Personality and Individual Differences* 1998;24:351-6

(349) West R, Hajek P. What happens to anxiety levels on giving up smoking? *American Journal of Psychiatry* 1997;154:1589-92

(350) Pomerleau OF, Pomerleau CS, Mehringer AM, et al. Nicotine dependence, depression, and gender: characterizing phenotypes based on withdrawal discomfort, response to smoking, and ability to abstain. *Nicotine & Tobacco Research* 2005;7:91-102

(351) Pomerleau OF, Pomerleau CS, Snedecor SM, et al. Depression, smoking abstinence and HPA function in women smokers. *Human Psychopharmacology* 2004;19:467-76

(352) Pomerleau CS, Zucker AN, Stewart AJ. Patterns of depressive symptomatology in women smokers, ex-smokers, and never-smokers. *Addictive Behaviors* 2003;28:575-82

(353) Pomerleau CS, Marks JL, Pomerleau OF. Who gets what symptom? Effects of psychiatric cofactors and nicotine dependence on patterns of smoking withdrawal symptomatology. *Nicotine & Tobacco Research* 2000;2:275-80

(354) Stage KB, Glassman AH, Covey LS. Depression after smoking cessation: case reports. *Journal of Clinical Psychiatry* 1996;57:467-9

(355) Glassman AH, Covey LS, Stetner F, et al. Smoking cessation and the course of major depression: a follow-up study. *Lancet* 2001;357:1929-32

(356) Dalack GW, Meador-Woodruff JH. Smoking, smoking withdrawal and schizophrenia: case reports and a review of the literature. [Review] [45 refs]. *Schizophrenia Research* 1996;22:133-41

(357) Covey LS, Glassman AH, Stetner F. Major depression following smoking cessation. *American Journal of Psychiatry* 1997;154:263-5

(358) Borrelli B, Niaura R, Keuthen NJ, et al. Development of major depressive disorder during smoking-cessation treatment. *Journal of Clinical Psychiatry* 1996;57:534-8

(359) Killen JD, Fortmann SP, Schatzberg A, et al. Onset of major depression during treatment for nicotine dependence. *Addictive Behaviors* 2003;28:461-70

(360) Glassman AH, Covey LS, Stetner F, et al. Smoking cessation and the course of major depression: a follow-up study. *Lancet* 2001;357:1929-32

(361) Berlin I, Spreux-Varoquaux O, Said S, et al. Effects of past history of major depression on smoking characteristics, monoamine oxidase-A and -B activities and withdrawal symptoms in dependent smokers. *Drug & Alcohol Dependence* 1997;45:31-7

(362) Addington J, El-Guebaly N, Campbell W, et al. Smoking cessation treatment for patients with schizophrenia. *American Journal of Psychiatry* 1998;155:974-6

(363) Dalack GW, Becks L, Hill E, et al. Nicotine withdrawal and psychiatric symptoms in cigarette smokers with schizophrenia. *Neuropsychopharmacology* 1999;21:195-202

(364) Tsoh JY, Humfleet GL, Munoz RF, et al. Development of major depression after treatment for smoking cessation.[erratum appears in Am J Psychiatry 2000 Aug;157(8):1359]. *American Journal of Psychiatry* 2000;157:368-74

(365) Kahler CW, Brown RA, Ramsey SE, et al. Negative mood, depressive symptoms, and major depression after smoking cessation treatment in smokers with a history of major depressive disorder. *Journal of Abnormal Psychology* 2002;111:670-5

(366) Burgess ES, Brown RA, Kahler CW, et al. Patterns of change in depressive symptoms during smoking cessation: who's at risk for relapse? *Journal of Consulting & Clinical Psychology* 2002;70:356-61

(367) Anthony JC, Warner LA, Kessler RC. Comparative epidemiology of dependence on tobacco, alcohol, controlled substances, and inhalants: Basic findings from the National Comorbidity Survey. *Experimental and Clinical Psychopharmacology* 1994;2:244-68

(368) Piasecki TM. Relapse to smoking. [Review] [165 refs]. *Clinical Psychology Review* 2006;26:196-215

(369) McKay JR. Studies of factors in relapse to alcohol, drug and nicotine use: a critical review of methodologies and findings. [Review] [70 refs]. *Journal of Studies on Alcohol* 1999;60:566-76

(370) Lawn SJ, Pols RG, Barber JG. Smoking and quitting: a qualitative study with community-living psychiatric clients. *Social Science & Medicine* 2002;54:93-104

(371) de Leon J. Atypical antipsychotic dosing: the effect of smoking and caffeine. [Review] [6 refs]. *Psychiatric Services* 2004;55:491-3

(372) Desai HD, Seabolt J, Jann MW. Smoking in patients receiving psychotropic medications: a pharmacokinetic perspective. [Review] [93 refs]. *CNS Drugs* 2001;15:469-94

(373) de Leon J. Atypical antipsychotic dosing: the effect of smoking and caffeine. [Review] [6 refs]. *Psychiatric Services* 2004;55:491-3

(374) de Leon J. Atypical antipsychotic dosing: the effect of smoking and caffeine. [Review] [6 refs]. *Psychiatric Services* 2004;55:491-3

(375) Bergemann N, Kopitz J, Kress KR, et al. Plasma amisulpride levels in schizophrenia or schizoaffective disorder. *European Neuropsychopharmacology* 2004;14:245-50

(376) McCarthy RH. Seizures following smoking cessation in a clozapine responder. *Pharmacopsychiatry* 1994;27:210-1

(377) Oyewumi LK. Smoking cessation and clozapine side effects. *Canadian Journal of Psychiatry - Revue Canadienne de Psychiatrie* 1998;43:748

(378) Skogh E, Bengtsson F, Nordin C. Could discontinuing smoking be hazardous for patients administered clozapine medication? A case report. *Therapeutic Drug Monitoring* 1999;21:580-2

(379) Meyer JM. Individual changes in clozapine levels after smoking cessation: results and a predictive model. *Journal of Clinical Psychopharmacology* 2001;21:569-74

(380) Zullino DF, Delessert D, Eap CB, et al. Tobacco and cannabis smoking cessation can lead to intoxication with clozapine or olanzapine. *International Clinical Psychopharmacology* 2002;17:141-3

(381) Bondolfi G, Morel F, Crettol S, et al. Increased clozapine plasma concentrations and side effects induced by smoking cessation in 2 CYP1A2 genotyped patients. *Therapeutic Drug Monitoring* 2005;27:539-43

(382) Bondolfi G, Morel F, Crettol S, et al. Increased clozapine plasma concentrations and side effects induced by smoking cessation in 2 CYP1A2 genotyped patients. *Therapeutic Drug Monitoring* 2005;27:539-43

(383) Evins AE, Deckersbach T, Cather C, et al. Independent effects of tobacco abstinence and bupropion on cognitive function in schizophrenia. *Journal of Clinical Psychiatry* 2005;66:1184-90

(384) George TP, Sernyak MJ, Ziedonis DM, et al. Effects of clozapine on smoking in chronic schizophrenic outpatients. *Journal of Clinical Psychiatry* 1995;56:344-6

(385) Procyshyn RM, Ihsan N, Thompson D. A comparison of smoking behaviours between patients treated with clozapine and depot neuroleptics. *International Clinical Psychopharmacology* 2001;16:291-4

(386) McEvoy J, Freudenreich O, McGee M, et al. Clozapine decreases smoking in patients with chronic schizophrenia. *Biological Psychiatry* 1995;37:550-2

(387) de Leon J, Diaz FJ, Josiassen RC, et al. Does clozapine decrease smoking? *Progress in Neuro-Psychopharmacology & Biological Psychiatry* 2005;29:757-62

(388) George TP, Ziedonis DM, Feingold A, et al. Nicotine transdermal patch and atypical antipsychotic medications for smoking cessation in schizophrenia. *American Journal of Psychiatry* 2000;157:1835-42

(389) McEvoy JP, Freudenreich O, Levin ED, et al. Haloperidol increases smoking in patients with schizophrenia. *Psychopharmacology* 1995;119:124-6

(390) Noordsy DL, Green AI. Pharmacotherapy for schizophrenia and co-occurring substance use disorders. [Review] [54 refs]. *Current Psychiatry Reports* 2003;5:340-6

(391) El-Guebaly N, Cathcart J, Currie S, et al. Public health and therapeutic aspects of smoking bans in mental health and addiction settings. [Review] [58 refs]. *Psychiatric Services* 2002;53:1617-22

(392) Kitabayashi Y, Narumoto J, Shibata K, et al. Effect of institutional smoking prohibition on Japanese inpatients with chronic schizophrenia. *Nihon Arukoru Yakubutsu Igakkai Zasshi* 2006;41:128-33

(393) Royal Australian College of General Practitioners. Smoking cessation guidelines for Australian general practice. Royal Australian College of General Practitioners; 2007.

(394) de Leon J, Diaz FJ. A meta-analysis of worldwide studies demonstrates an association between schizophrenia and tobacco smoking behaviors. *Schizophrenia Research* 2005;76:135-57

(395) Beratis S, Katrivanou A, Gourzis P. Factors affecting smoking in schizophrenia. *Comprehensive Psychiatry* 2001;42:393-402

(396) Bowman JA, Walsh RA. Smoking intervention within alcohol and other drug treatment services: a selective review with suggestions for practical management. [Review] [59 refs]. *Drug & Alcohol Review* 2003;22:73-82

(397) Farrell M, Howes S, Taylor C, et al. Substance misuse and psychiatric comorbidity: an overview of the OPCS National Psychiatric Morbidity Survey. *International Review of Psychiatry* 2003;15:43-9

(398) Hitsman B, Borrelli B, McChargue DE, et al. History of depression and smoking cessation outcome: a meta-analysis. [Review] [42 refs]. *Journal of Consulting & Clinical Psychology* 2003;71:657-63

(399) Glassman AH. Cigarette smoking: implications for psychiatric illness. *American Journal of Psychiatry* 1993;150:546-53

(400) Lasser K, Boyd JW, Woolhandler S, et al. Smoking and mental illness: A population-based prevalence study. *JAMA* 2000;284:2606-10

(401) 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 Nursing* 2006;15:111-8

(402) Rich D, Knowlden S. Midas tobacco project: mental health goes smoke free. South West Sydney Area Health Srvice: Midas program 2004 http://www.swsahs.nsw.gov.au/areaser/Midas/Tobaccomh.asp#Introduction

(403) Neuman MD, Bitton A, Glantz SA. Tobacco industry influence on the definition of tobacco related disorders by the American Psychiatric Association. [Review] [61 refs]. *Tobacco Control* 2005;14:328-37

(404) Parrott AC. Cigarette-derived nicotine is not a medicine. [Review] [59 refs]. *World Journal of Biological Psychiatry* 2003;4:49-55

(405) Srinivasan TN, Thara R. Smoking in schizophrenia - all is not biological. *Schizophrenia Research* 2002;56:67-74

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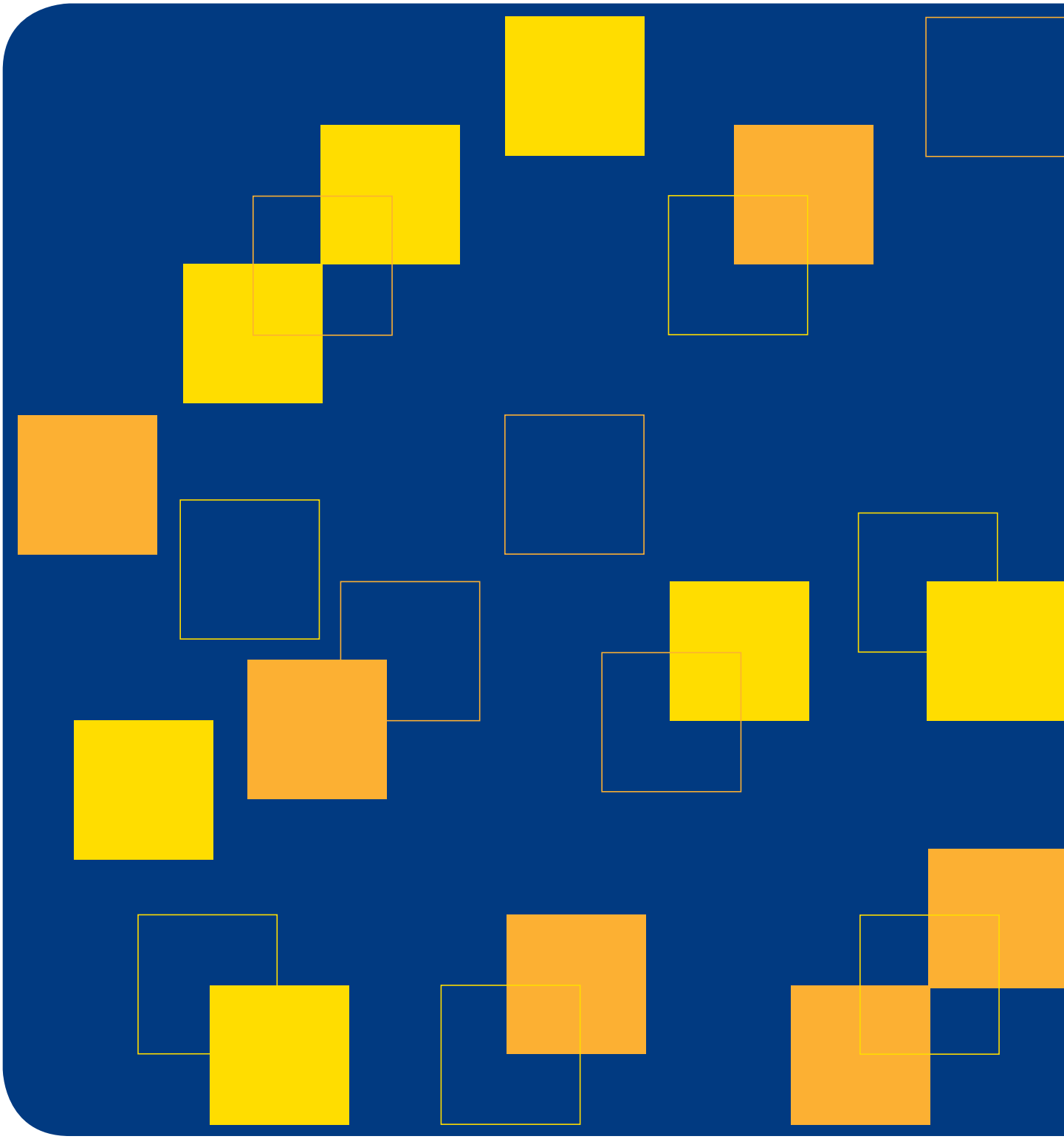

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