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# Investigating changes in patients' smoking behaviour, tobacco dependence and motivation to stop smoking following a 'smoke-free' mental health inpatient stay: results from a longitudinal survey in England

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## Abstract

Introduction: In line with national guidance, mental health Trusts in England are implementing complete smokefree policies. We investigated inpatients' changes in smoking behaviour, tobacco dependence, vaping and motivation to stop smoking between pre-admission and post-discharge.

Methods: We surveyed acute adult mental health inpatients from 14 wards in three mental health Trusts in England in 2019. Structured face-to-face and telephone interviews with patients who smoked on or during admission were conducted during the admission period and at 1 week and 1 month after discharge. Data on smoking status; daily cigarette consumption; Heaviness of Smoking Index (HSI); Strength of Urges to Smoke (SUTS); Motivation to Stop Smoking (MTSS) and vaping were collected and analysed using regression and probit models.

Results: Inpatient smoking prevalence was 51.9%, and a total of 152 of all 555 eligible smokers (27%) were recruited. Attrition was high: 49.3% at the first, and 50.7% at the second follow-up interview. Changes in self-reported smoking status, motivation to quit and vaping did not change significantly over the study period. Cigarette consumption ($p<0.001$) and Heaviness of Smoking Index ($p<0.001$) modestly reduced. Frequency and strength of urges to smoke ($p=0.011$ and 0.012, respectively) decreased modestly after discharge but were scored as high by 57% and 60% of participants during admission respectively. Just over half (56%) reported being offered smoking cessation support on admission.

Conclusions: This study identified very modest changes in smoking-related outcomes during and after admission and indicates major challenges to smokefree policy implementation, including limited support for patients who smoke.

Keywords:

Tobacco, smoking, smoking cessation, mental health, smokefree policy, inpatient settings

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## Implications:

Despite mental health Trusts in England having developed and implemented smokefree policies to meet national guidelines, adherence to these policies and provision of effective smoking cessation and temporary abstinence support for inpatients admitted to acute adult mental health wards appear to be limited. Patients who smoke on admission are likely to continue to do so during admission and after discharge, and only very modest change in smoking behaviours appears to take place. Important opportunities to promote smoking cessation in this population are missed. Barriers to effective support need to be identified and addressed.

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## Introduction

Tobacco smoking is the leading preventable cause of morbidity and mortality in the United Kingdom (UK). While smoking prevalence in the general population has declined steadily over recent decades[1], no clear downward trend in smoking rates has been observed among people with mental illness[2,3]. Smoking rates in this population are above 30%[2] but can reach 70% in some subgroups, such as hospitalised patients with severe mental illness (SMI)[2,4]. With between 10 and 20 years of life lost largely to smoking-related disease, smoking has been recognised as one of the major contributors to health inequalities in this population[5,6].

The strong links between smoking and mental illness are influenced by complex neurobiological, psychosocial and genetic factors[7,8]. However, contrary to common belief, people with SMI are generally as motivated to quit as the general population[9] and able to do so using evidence-based approaches recommended for the general population[10]. Notably, there is now strong evidence that quitting smoking improves rather than exacerbates symptoms of mental illness, as was often presumed[11]. Until recently, smoking remained deeply embedded in the culture of mental health settings[2,12], where it has been considered a coping mechanism or to have other therapeutic functions, with clinicians often reluctant to address smoking among their patients[2,13]. Patients were often said to 'enter mental health settings as non-smokers and leave as smokers'[14], and pre-existing smokers tended to increase their cigarette consumption during an inpatient stay[15].

The 2013 joint Royal College of Physicians & Royal College of Psychiatrists report[2] and guidance from the UK National Institute for Health and Care Excellence (NICE)[16] have highlighted the need to address this 'smoking culture' and resulting health inequalities in mental health settings. In addition to the legal requirement to ban indoor smoking in NHS treatment settings that came into force with the *Health Act 2006* and was implemented in mental health settings in England in 2008, the NICE guidance recommends that all mental health settings be entirely smokefree, with no smoking breaks facilitated anywhere on the premises and evidence-based treatment for temporary abstinence and smoking cessation made available to all patients[16]. This aligns with increasing global efforts to make hospitals, including mental health settings, smokefree to promote the health of patients, staff and visitors (https://www.tobaccofreehealthcare.org/). In England, mental health Trusts provide a comprehensive range of health and social care services for people with mental illness as part of the National Health Service (NHS). Mental health Trusts are still in the process of implementing the guidance[17], in line with recent UK tobacco control and national health policies[18,19]. Very little is known about the impact on patients' smoking behaviour.



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We now report a longitudinal survey assessing potential changes in smoking status, daily cigarette consumption, vaping, level of tobacco dependence, urges to smoke, and motivation to stop smoking before, during and after admission to a 'smokefree' mental health inpatient stay.

## Methods

**Settings and participants:**

A longitudinal survey was conducted on acute adult mental health inpatient wards in three mental health Trusts (labelled A, B and C) in the north of England, serving a study population of approximately 3 million people in a mix of urban and rural settings across a number of counties. Trusts A, B and C provided acute adult mental health care for inpatients on 16, 3 and 5 wards, respectively. A total of 14 acute adult mental health wards were included in the study: six from Trust A, three from Trust B, and five from Trust C, all based in Yorkshire.

All three Trusts had policies stipulating patients should be advised of the smokefree policy before admission wherever possible and offered evidence-based pharmacological and behavioural support to stop or abstain from smoking on and after admission. Pharmacological support in all Trusts included access to a comprehensive range of Nicotine Replacement Therapy (NRT) products (e.g. gum, patches, lozenges, inhaler) for either single or combination therapy. In Trusts B and C, patients additionally had access to Varenicline. All Trusts offered evidence-based behavioural smoking cessation/abstinence support through specialist-trained inhouse stop smoking advisors. In Trusts A and B, smoking was not to be facilitated or permitted anywhere on Trust premises. Both Trusts permitted the use of electronic cigarettes in designated indoor areas and outdoors; Trust A also routinely offered free electronic cigarettes to patients who smoked on admission. In Trust C, patients were not allowed to smoke indoors, but were allowed to do so in courtyards, gardens or on other outdoor Trust premises. Indoor use of electronic cigarettes was not permitted in Trust C.

Patients admitted to the 14 study wards between February and September 2019 were eligible to participate if they were over 18 years old, had been identified as cigarette smokers on or after admission based on Trusts' standard admission questions ('Do you smoke tobacco?' or 'Are you a smoker?'), were deemed to have capacity to provide informed study consent and considered well enough to take part in the study by the multidisciplinary ward team.

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**Procedures**

Recruitment of survey participants on each study ward was led by an academic researcher and a team of research nurses, in liaison with ward managers and teams. New eligible patients were identified at least twice per week and invited to take part, with Participant Information Sheets provided by study and ward teams. Patients who indicated an interest in taking part were approached by the study team to answer questions where required, with written informed consent taken after a 24-hour cool off period. The first structured interview was conducted face to face with participants during their stay on the inpatient ward, administering questions relating to both pre- and post-admission smoking and vaping behaviours and smoking-related outcome measures. Participants were followed up at two time points: one week after discharge, at which point data were also collected retrospectively on smoking status 'on the day of discharge', and one month after discharge, using telephone interviews. For the more common than expected cases where a) length of stay after the first interview exceeded four further weeks, or b) patients were re-admitted within the data collection period, we conducted the follow-up interview(s) on the wards to maximise data collection. Questionnaires were administered by researchers and research nurses (face-to-face and on the telephone) and took between 15 and 25 minutes to complete. Participants were offered high street shopping vouchers worth £20, provided after completion of the second follow-up interview, to incentivise participation.

**Measures**

We developed bespoke questionnaires for each time point to collect outcome data on smoking status, cigarette consumption, Heaviness of Smoking Index (HSI)[20], time spent with and strength of urges to smoke (SUTS)[21], Motivation to Stop Smoking (MTSS)[22], smoking-related support offered and accepted during admission and after discharge (including Nicotine Replacement Therapy and behavioural support), and electronic cigarette use ('How often do you currently use an electronic cigarette or vaping device?', with response options a) Daily or almost daily, b) Less than daily, but at least once a week, c) Less than weekly, but at least once a month, d) Less than monthly or e) Not at all) at each time point). Demographic data (gender, age, ethnicity, employment status), information on the 'mental health care cluster', indicating broad diagnostic working categories, and data on smoking, vaping and quitting history were also collected. Data on total admission and smoking prevalence figures (i.e. patients recorded as smokers on admission) were retrieved from all wards.

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**Sample size**

We aimed to recruit at least 104 patients over a period of six months. Based on our[23] and other[24] relevant tobacco research studies with people with severe mental illness (SMI), we expected to be able to involve up 90 patients (~85%) in the incentivised follow-up interviews. This size of survey would have enabled us to estimate the proportions of smoking cessation at the second follow-up within a margin of error of <10%.

**Statistical analysis**

The number and proportion of patients attending each follow-up interview is presented by Trust (Figure 1), along with whether the interview was attended on or off the ward. Patient demographics, smoking history and smoking support offered were summarised descriptively. Continuous variables were summarised using the mean, standard deviation, median, minimum and maximum. Categorical variables were summarised as counts and percentages.

Outcome data at each time point were summarised descriptively by Trust. The dependence of outcome data on time point overall (across all Trusts) was analysed using a mixed effect logistic regression repeated measures model for binary outcomes or a mixed effect linear regression repeated measures model for continuous outcomes. Responses to the single item MTSS (Motivation To Stop Scale) were re-coded into three higher level categories (no wish to quit, general wish to quit with no clear intentions, and clear intention to quit expressed) and analysed using a mixed effect ordinal probit regression repeated measures model. Trust as a variable was adjusted for as a fixed effect, while patient was adjusted for as a random effect. A mixed effect ordinal probit regression repeated measures model was also used for the HSI. Participants with a Heaviness of Smoking Index (HSI) higher than four points were classed as having a high HSI, those with a HSI between two and four points were classed as having a moderate HSI, while those with a HSI less than two points were classed as having a low HIS (https://datashare.nida.nih.gov/instrument/heaviness-of-smoking-index). In addition, the mean and standard deviation of the HSI scores at each time point were calculated. The use of mixed effect models meant that the data was implicitly assumed to be missing at random. The advantage of this is that participants with missing outcome data at one or more time points were included in the model, which would not have been the case if outcome data had been analysed using repeated measures ANOVA. For each outcome, the null hypothesis that the outcome did not change over the study period was formally tested and the corresponding p-value presented. A 5% significance level was used. All statistical analyses were carried out using Stata version 16.0. For smoking status, an additional model was applied using the Russell Standard[25], i.e. assuming



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those with missing smoking status were smoking. For electronic cigarette use, responses were re-coded into a binary variable (current/non-current use), with responses of 'daily or almost daily' and 'less than daily but at least once a week' defined as current use.

## Results

Since there were no major differences in outcomes between Trusts, all results are presented as aggregates. Details on results by individual Trust are available in the supplementary materials.

**Smoking prevalence, patient recruitment and interview attendance**

A total of 555 smokers (246, 175 and 134 in Trust A, B and C, respectively) were admitted to the wards during the study period (February 2019 to September 2019), 152 (27%) of whom 152 were recruited (68 (28%), 29 (17%) and 55 (41%) in Trust A, B and C, respectively). The overall smoking prevalence among all 1060 patients admitted during the study period was 52.4% (555/1060); 55.8% in Trust A, 57.2% in Trust B, and 42.8% in Trust C. The decision to recruit substantially above our original target of 104 was taken early on in the study process, as attrition was higher than expected.

All recruited patients completed the baseline interview, 77 (50.7%) attended the one week post-discharge follow-up interview, and 75 (49.3%) attended the one month post-discharge follow-up interview (Figure 1). Overall, 62 (40.8%) patients attended both follow-up interviews, while the same number (62; 40.8%) did not provide any follow-up data. The number and percentage of patients who did not provide any follow-up data at Trust A was 43 (63.2%), compared to 10 (34.5%) and 9 (16.4%) at Trusts B and C, respectively.

**Patient demographics and prior smoking history**

Table 1 and

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Table ***2*** give information on patient demographics and prior smoking history respectively. Over three quarters of patients (115; 76%) reported having tried to quit smoking in the past, and nearly half (67; 44%) reported living with others who smoke. Well over a third (44; 38%) had used NRT in a previous quit attempt, but only one patient reported having received behavioural support from a trained advisor. Only 11 patients (10%) of those who reported a previous quit attempt reported having used electronic cigarettes as a support to quit smoking.

**Smoking treatment offered**

Just over half of participants (85; 56%) reported having been offered pharmacological or behavioural support on admission, a very similar number to those recalling being asked about their smoking status on admission (83; 55%). Participants reported largely being offered NRT (65; 77%), with very few (8; 9.4%) being offered specialist behavioural support from internal staff, and the same number, (8; 9.4%), being offered electronic cigarettes (most of which in Trust A, as per policy), respectively. Details are presented in Table 3.

**Changes in smoking status, behaviour and attitudes, and e-cigarette use following admission**

There was evidence that cigarette consumption ($p<0.001$), Heaviness of Smoking Index ($p<0.001$), frequency and strength of urges to smoke ($p=0.011$ and 0.012, respectively) were dependent on time point and reduced overall very modestly over the study period (Table 4). The mean HSI scores before admission and after admission were 3.0 (SD 1.5) and 2.4 (SD 1.6) respectively, while the mean HSI scores at one week post-discharge and one month post-discharge were 2.5 (SD 1.7) and 2.4 (SD 1.5). Two participants (1.3%) who identified as smokers at first interview reported not having smoked daily before admission; five participants (3.3%) reported not smoking daily at the time of first interview (but had been recorded as smokers on admission). Two patients (2.8%) reported not being daily smokers on the day of discharge; four (5.2%) and six (8.0%) patients reported this one week and one month after discharge.

# Discussion

This study shows that despite implementation of smokefree policies in three mental health Trusts, nearly all patients who were admitted as smokers continued to smoke during and after admission, and a small number took up smoking. Changes to smoking behaviour, including cigarette consumption, were small overall and appeared to take place mainly after discharge from the ward - not, as expected, during a 'smokefree' hospital stay.



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To the best of our knowledge, this is the first longitudinal UK study to investigate changes in patients' smoking and vaping behaviour, tobacco dependence and motivation to quit following admission to and discharge from a mental health inpatient stay in the context of national guideline implementation. Our results point towards serious challenges with smokefree policy implementation on acute adult mental health inpatient wards. They indicate that little has changed since first studies investigating smokefree policy implementation in mental health Trusts in the UK were first conducted around the time new legislation came into force[15,26-29], and after NICE guidance was published[29-31]. They also support findings from a recent survey of mental health Trusts in England that investigated the degree to which NICE smokefree policy recommendations had been implemented. It identified that within mental health inpatient services, non-compliance with smokefree restrictions was universal: all mental health trusts surveyed reported patients smoking in areas where smoking was not permitted[17]. Notably, all participating Trusts reported that smokefree policies had been implemented and NRT provided to smokers during admission[17]. Our results suggest that the discrepancy between policy and patient experience can be substantial. Although our findings are based on research from only three mental health Trusts out of 54 nationwide, our study population was drawn from a comprehensive mix of ethnically diverse urban and rural local populations totalling over 3 million people served in our participating Trusts' catchment areas. They are thus likely to be relevant for the wider UK population of mental health inpatients across NHS mental health Trusts.

**Study limitations**

Findings from this study need to be interpreted in the light of several limitations, including selection bias resulting from partly low recruitment and high attrition rates across our study population, and reporting bias in self-reported outcome measures. As in other studies in this population, the most severely ill inpatients will have been excluded from participation, based on considerations relating to mental capacity to give informed consent, or because the multidisciplinary team would not have considered them suitable to be approached for inclusion for other reasons related to the acuity of their illness. It is therefore likely that patients who were not invited to participate often included those who were most unwell and unable to leave the ward, for example when detained without leave under the Mental Health Act. It is arguable that some of these patients might have abstained from smoking for a period of time following admission owing to lack of opportunity to smoke, which would not have been captured by our data. Further research in this area could explore this.

Attrition rates at follow-up were substantially higher than expected based on our own[23] and other relevant US-based[24] research, meaning that results of our hypothesis tests and



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estimates of proportions in relation to changes over the study period are sensitive to the validity of the missing at random assumption made in the analyses. In contrast to previous experience with other study populations with SMI, who had been community-dwelling rather than inpatients[23], we experienced challenges in following up patients despite incentives offered for interview completion. Research involving people receiving inpatient acute mental health care is a vastly neglected area, and further consideration of barriers and facilitators to engagement in research follow-up, including characteristics of successful incentives, is required. A further complication arose from the circumstance that in Trust C in particular, the length of stay for patients was much longer than discharge information had indicated before the study started. This resulted in our inability to collect 'post-discharge' data for a substantial proportion of participants within the planned time frame (see figure 1), and led to the pragmatic decision to collect follow-up data on the ward if necessary to avoid the loss of opportunity to collect any relevant data for long stay participants at all.

The challenges we encountered in recruitment and retention suggest that related estimates informing study designs in SMI inpatient populations should perhaps be more conservative than those in other SMI populations. Further limitations to our study relate to the heterogeneity of study settings, between and within Trusts, which adds complexity to the interpretation of some findings but reflects varied national practice in mental health Trusts[17,28]. Moreover, self-reported interview data were not triangulated, for example through auditing clinical patient records, as this could not be achieved within the resource and governance framework of this study.

**Tobacco dependence treatment and support**

Over half of all patients admitted to the participating Trusts during the study period were smokers. While this is a lower estimate than that obtained from earlier UK-based mental health inpatient studies[2,6,15,32], it still more than triples current UK smoking prevalence figures in the general population and indicates the importance of providing comprehensive tobacco-related support. Our findings of modest reductions in cigarette consumption, Heaviness of Smoking Index, and frequency and strength of urges to smoke after discharge are broadly in line with results from a systematic review of international studies investigating the impact of mental health hospitalisation on smoking outcomes[33]. The review included 14 overall heterogeneous observational studies, some of which are very small, and concludes that hospitalisation in a smokefree mental health treatment environment may have positive effects on patients' smoking behaviour, attitudes and beliefs until up to three months post discharge. Most studies included in the review relate to partial and incomplete smokefree policies implemented in the respective study settings, not dissimilar to the policy context in



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our study setting at Trust C. For studies investigating the impact of comprehensive smokefree policies (akin to Trusts A and B), the review reported more substantial changes in patients' smoking behaviours during the inpatient stay in terms of smoking cessation, reduction, and motivation to quit. Our study failed to replicate these results – it was evident that smokefree polices were not implemented as intended according to Trusts' smokefree policies, and that consistent and comprehensive tobacco-related support was not part of the patient experience. Daily smoking was universal in all three study Trusts, irrespective of policies.

Smokefree policy implementation and adherence challenges were reflected in findings that evidence-based pharmacological and behavioural support on and after admission to a ward was not consistently offered, with overall only about half of participants reporting having been asked about their smoking status and offered support to abstain from or quit smoking on admission. Nearly 30% of participants who did not report being asked about smoking status on admission recalled being asked at another point during their inpatient stay, when they might have arguably received support offers too – we did not collect this data. Importantly, over half of smokers reported high frequency and high strength of urges to smoke during their admission. This conveys a lack of appropriate management of tobacco dependence and withdrawal symptoms. Even though our study participants reported smoking during the inpatient stay, they were arguably likely to have altered their smoking patterns compared to pre-admission smoking behaviours and to experience withdrawal symptoms - for example when restricted to leave the ward (e.g. in the evening times or during the night, or during busy times in the day). Partial implementation of smokefree policies, as seen in our study settings, clearly does not avoid problems related to managing tobacco dependence, but potentially compounds them[31,34]. Unrecognised and untreated nicotine withdrawal is a problem with particularly serious consequences in people with acute SMI, as it can be mistaken for symptoms of mental illness, confound adequate treatment of those, and even result in emergency psychotropic medication being administered inappropriately[2]. It is likely that this may potentially particularly affect those who are most unwell (and may not able to leave the ward to smoke due to being formally detained).

In our study, there was a notable absence of reports that varenicline had been offered as smoking cessation medication in our study population at any point before, during and after admission to hospital in the two Trusts whose formularies included this medication. Reluctance of clinicians to prescribe these evidence-based treatments for patients with mental illness is well-documented and, in light of their safety and effectiveness in this population[10,35], constitutes another source of tobacco-related inequality that requires to be



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addressed. Based on UK clinical guidelines[16], all mental health settings should provide for and encourage the use of evidence-based smoking cessation medications, including varenicline and bupropion, to help smokers quit.

The potential role of electronic cigarettes in supporting smokers with SMI to abstain or quit is now well recognised and promoted[36] and was reflected in reports of nearly 10% of participants who had used vaping as a means to support quit attempts before. Around one third of patients in our sample reported using electronic cigarettes before, during and after admission. Reflecting the national picture[17], participating Trusts supported vaping to varying degrees: one Trust actively encouraged it through the provision of electronic cigarettes after admission, while another permitted vaping indoors and outdoors, and the third restricted it to outdoor areas only. This study was not designed to investigate between-Trust differences in smoking and vaping behaviour and was too small to do so meaningfully. Future research could focus on vaping-related aspects of mental health inpatient admissions, including the impact of electronic cigarette provision during the inpatient stay on post-discharge smoking and quitting behaviours.

Notably, the majority of smokers in our study expressed either a firm intention or the wish to stop smoking at each point of data collection, with no statistical difference in motivation scores detected between admission and post-discharge time points. This finding is important, because it counters the common misconception that people with mental illness 'don't want to quit'[2] when in fact their motivation is comparable to that of the general population[9]. Moreover, it demonstrates that motivation to quit does persist during an inpatient admission and should therefore be optimally supported. Inpatient admission is still often cited by mental health professionals as an inopportune or inappropriate time to encourage or help smokers with mental illness quit[12,27]. Overcoming persistent misconceptions and other barriers to promoting and achieving smoking cessation and abstinence in the context of and after an inpatient stay should be a policy and research priority.

**Smokefree mental health settings – progress in small steps**

Despite the substantial challenges highlighted above, it is important to note that change has taken place in mental health settings in England since mental health Trusts have been committed to smokefree policy implementation. Based on this study, mental health patients do not generally appear to 'enter hospital as non-smokers and come out as smokers' anymore, as previously noted[14]. Adherence to policies and provision of adequate support to smokers is limited at present, but the first step change has taken place for this particularly



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disadvantaged population. The notion of progress in (small) steps is supported by the smoking prevalence figures in this study, which, at just over 50%, were overall lower than expected based on the only existing large but older inpatient population survey[4] and more recent data from small inpatient studies[33], suggesting figures around 70%. Over three quarters of our participants reported having tried to quit smoking in the past, often using multiple attempts, not uncommonly with longer periods of abstinence spanning several months. Seeing as the study population comprised patients from a variety of rural and urban settings spanning a wide geographic area in the north of England, it is possible that these figures are at least broadly reflecting the national picture. In light of evidence that prevalence figures are stagnating among people with mental illness while they keep falling among those without[3,37], thus causing the tobacco-related health gap in this group to widen, these are encouraging findings that may indicate a shifting trend. They also highlight the importance of the provision of appropriate support to meet the needs of smokers from this population.

In conclusion, this longitudinal survey identified very modest changes in smoking behaviour and related outcomes in smokers admitted to an acute mental health inpatient stay over time. It indicated major challenges to effective smokefree policy implementation, including limited access to consistent comprehensive support for patients who smoke. Acknowledging challenges, engaging in open discourse with all stakeholders about how these can be addressed, and adopting models that have shown to be successful[38] (albeit in acute hospital settings) seems paramount if the potential of smokefree policies in terms of changing and saving smokers' lives is to be realised. The 2020 Covid-19 pandemic and its emerging links with smoking in terms of infection control and higher risks of experiencing severe or fatal courses of the illness once infected[39] add particular urgency to this matter. Without the development of effective strategies to promote and support smoking abstinence and cessation and adherence to smokefree policies along the patient and carer pathway, opportunities to narrow the tobacco-related health gap will keep being missed, and a new Covid-19-related dimension of inequality for people with SMI[40] may be introduced.

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## Declarations of Interest

None of the authors have any conflicts of interest to declare.

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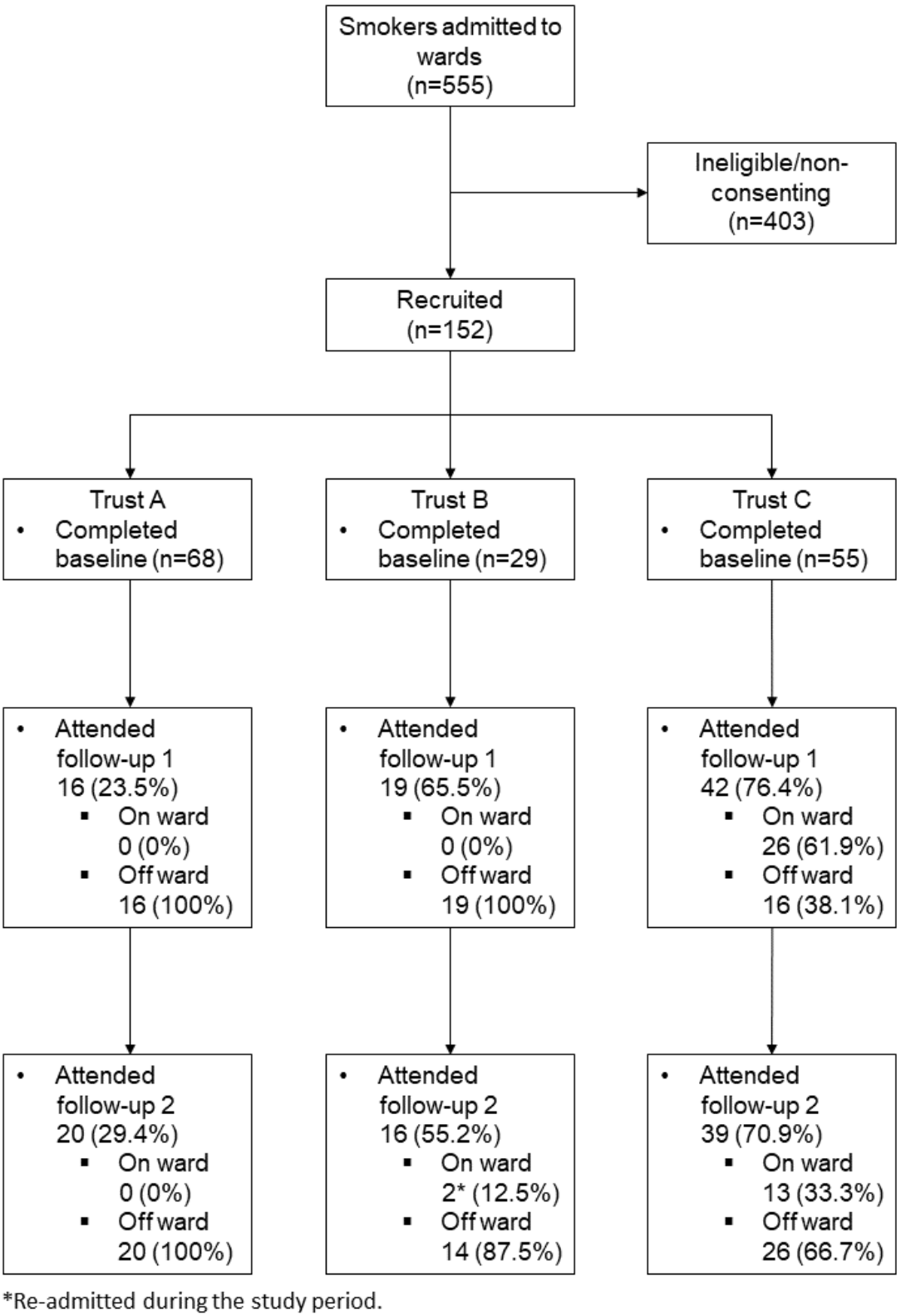
# Tables and Figures

**Figure 1:** Patient flow diagram




*Re-admitted during the study period.

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**Table 1:** Patient characteristics

| | **All participants (n=152)** |
|---|---|
| Age in years n (%) | 149 (98.0) |
| Mean (SD) | 37.1 (12.2) |
| Median (Min, Max) | 35 (18, 70) |
| Gender | |
| Male | 103 (67.8) |
| Female | 48 (31.6) |
| Missing | 1 (0.7) |
| Ethnic group | |
| White | 122 (80.3) |
| Black/Black British | 14 (9.2) |
| Mixed ethnic background | 7 (4.6) |
| Asian | 5 (3.3) |
| Other ethnic group | 3 (2.0) |
| Missing | 1 (0.7) |
| Highest level of education | |
| None | 22 (14.5) |
| GCSE or equivalent (ISCED Level 2) | 45 (29.6) |
| A Levels or equivalent (ISCED Level 3) | 34 (22.4) |
| Bachelor's Degree or higher | 20 (13.2) |
| Other | 23 (15.1) |
| Missing | 8 (5.3) |
| Employment status | |
| Unemployed less than one year | 28 (18.4) |
| Unemployed more than one year | 32 (21.1) |
| Unable to return to work | 63 (41.4) |
| Employed | 16 (10.5) |
| Other | 11 (7.2) |
| Missing | 2 (1.3) |
| MH care cluster | |
| Ongoing or recurrent psychosis | 34 (22.4) |
| Psychotic crisis | 29 (19.1) |
| First episode psychosis | 16 (10.5) |
| Non-psychotic chaotic and challenging disorders | 14 (9.2) |
| Psychosis and affective disorder | 13 (8.6) |
| Other† | 34 (22.4) |
| Unknown | 12 (7.9) |
| Length of stay on ward before baseline interview | |
| Less than 7 days | 44 (28.9) |
| 7-14 days | 47 (30.9) |
| 15-28 days | 29 (19.1) |
| More than 28 days | 30 (19.7) |
| Missing | 2 (1.3) |

†Includes the following MH care clusters: Common Mental health Problems, Non-Psychotic, Non-Psychotic Disorder of Over-Valued Ideas, Enduring Non-Psychotic disorders, Psychotic Crisis, Severe Psychotic Depression and Dual Diagnosis.

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**Table 2:** Prior smoking and quitting history

| | **All participants (n=152)** |
|---|---|
| Age started smoking | |
| n (%) | 150 (98.7) |
| Mean (SD) | 16.4 (6.1) |
| Median (Min, Max) | 15 (6, 44) |
| Type of cigarettes used n (%) | |
| Factory made | 56 (36.8) |
| Hand-rolled | 74 (48.7) |
| Both | 18 (11.8) |
| Other | 1 (0.7) |
| None | 1 (0.7) |
| Missing | 2 (1.3) |
| Lives with someone who smokes n (%) | |
| Yes | 67 (44.1) |
| No | 84 (55.3) |
| Missing | 1 (0.7) |
| Previous quit attempt n (%) | |
| Yes | 115 (75.7) |
| No | 36 (23.7) |
| Missing | 1 (0.7) |
| Number of previous quit attempts | |
| n (%) | 90 (78.3) |
| Mean (SD) | 3.5 (4.5) |
| Median (Min, Max) | 2 (1, 30) |
| Support used in previous quit attempts n (%) | |
| NRT | 44 (38.3) |
| Champix (Varenicline) | 3 (2.6) |
| Zyban (Bupropion) | 0 (0) |
| Behavioural support with a trained advisor | 1 (0.9) |
| Referral to local Stop Smoking Service | 3 (2.6) |
| E-cigarette | 11 (9.6) |
| Other | 19 (16.5) |
| None | 42 (36.4) |
| Missing | 8 (7.0) |
| Longest period of abstinence months | |
| n (%) | 105 (91.3) |
| Mean (SD) | 14.7 (35.8) |
| Median (Min, Max) | 3.0 (0, 216) |

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**Table 3:** Smoking cessation support overall and by trust

| | **All participants (n=152)** |
|---|---|
| Patient aware they were coming to a smoke free environment n (%) | |
| Yes | 89 (58.6) |
| No | 58 (38.2) |
| Don't know | 4 (2.6) |
| Missing | 1 (0.7) |
| Asked about smoking status at time of admission n (%) | |
| Yes | 83 (54.6) |
| No | 42 (27.6) |
| Don't remember | 27 (17.8) |
| Asked about smoking status at any other point n (%) | |
| Yes | 12 (28.6) |
| No | 27 (64.3) |
| Don't remember | 3 (7.1) |
| Offered support to stop smoking n (%) | |
| Yes | 85 (55.9) |
| No | 65 (42.8) |
| Missing | 2 (1.3) |
| Type of support offered n (%) | |
| NRT | 65 (76.5) |
| Champix | 0 (0) |
| Zyban (Bupropion) | 0 (0) |
| Specialist treatment from someone that works on the ward | 8 (9.4) |
| Specialist treatment from someone that works outside the ward for a stop smoking service | 1 (1.2) |
| E-cigarettes* | 8 (9.4) |
| Other | 13 (15.3) |
| None | 8 (9.4) |
| Missing | 1 (1.2) |
| Accepted support to stop smoking n (% of those who were offered support) | |
| Yes | 41 (48.2) |
| No | 43 (50.6) |
| Missing | 1 (1.2) |
| Type of support accepted n (%) | |
| NRT | 35 (85.4) |
| Champix | 0 (0) |
| Zyban (Bupropion) | 0 (0) |
| Specialist treatment from someone that works on the ward | 2 (4.9) |
| Specialist treatment from someone that works outside the ward for a stop smoking service | 0 (0) |
| E-cigarettes* | 4 (9.8) |
| Other | 8 (19.5) |
| Missing | 0 (0) |
| Type of NRT offered (multiple answers possible) n (%) | |
| Nicotine gum | 13 (20.0) |
| Nicotine patches | 18 (27.7) |
| Lozenges | 4 (6.2) |
| Inhaler | 16 (24.6) |
| Nasal spray | 1 (1.5) |
| Oral spray | 4 (6.2) |
| Microtab | 4 (6.2) |
| None of the above/missing | 31 (47.7) |
| Type of NRT accepted (multiple answers possible) n (%) | |
| Nicotine gum | 8 (22.9) |
| Nicotine patches | 14 (40.0) |
| Lozenges | 3 (8.6) |
| Inhaler | 13 (37.1) |
| Nasal spray | 0 (0) |
| Oral spray | 2 (5.7) |
| Microtab | 3 (8.6) |
| None of the above/missing | 2 (5.7) |

* Trust A only (see details on policies in methods section)



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**Table 4:** Change over time in smoking status, smoking behaviour and attitudes, and e-cigarette use overall and by trust

| | **All participants (n=152)** | **p-value** |
|---|---|---|
| Self-reported as smoker n (%) | | |
| Before admission to hospital | 150 (98.7) | 0.105* |
| After admission (on ward) | 147 (96.7) | 0.465† |
| Day of discharge (if discharged)^ | 69 (97.2) | |
| One week after discharge^ | 73 (94.8) | |
| One month after discharge^ | 69 (92.0) | |
| Number of cigarettes smoked/day | | |
| N (% of those who attended interview) | | |
| Mean (SD) | | |
| Median (Min, Max) | | |
| Before admission to hospital | 144 (94.7) | <0.001 |
| | 17.9 (13.0) | |
| | 15 (0, 60) | |
| After admission (on ward) | 141 (92.8) | |
| | 14.5 (10.8) | |
| | 12 (0, 60) | |
| Day of discharge (if discharged) | 63 (81.8) | |
| | 14.9 (11.7) | |
| | 10 (0, 60) | |
| One week post-discharge^ | 74 (96.1) | |
| | 13.4 (11.1) | |
| | 10 (0, 60) | |
| One month post-discharge^ | 73 (97.3) | |
| | 11.8 (9.1) | |
| | 10 (0, 45) | |
| HSI n (%) | | |
| Before admission | | |
| High | 17 (12.1) | <0.001 |
| Medium | 104 (74.3) | |
| Low | 19 (13.6) | |
| After admission (on ward) | | |
| High | 14 (10.4) | |
| Medium | 81 (60.0) | |
| Low | 40 (29.6) | |
| One week post-discharge | | |
| High | 6 (8.8) | |
| Medium | 41 (60.3) | |
| Low | 21 (30.9) | |
| One month post-discharge | | |
| High | 4 (6.0) | |
| Medium | 46 (68.7) | |
| Low | 17 (25.4) | |
| High frequency of urges to smoke n (%) | | |
| After admission (on ward) | 75 (57.3) | 0.011 |
| One week post-discharge | 30 (46.2) | |
| One month post-discharge | 25 (36.2) | |
| High strength of urges to smoke n (%) | | |
| After admission (on ward) | 91 (60.3) | 0.012 |
| One week post-discharge | 32 (41.6) | |
| One month post-discharge | 31 (43.7) | |
| Motivation to stop smoking n (%) | | |
| After admission | | |
| Expresses intention to stop | 15 (10.2) | 0.497 |
| Would like to stop | 69 (46.9) | |
| Does not want to stop | 63 (42.9) | |
| One week post-discharge | | |
| Expresses intention to stop | 7 (9.9) | |

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| | All participants (n=152) | p-value |
|---|---|---|
| Would like to stop | 39 (54.9) | |
| Does not want to stop | 25 (35.2) | |
| One month post-discharge | | |
| Expresses intention to stop | 9 (13.2) | |
| Would like to stop | 36 (52.9) | |
| Does not want to stop | 23 (33.8) | |
| Reported e-cigarette use n (%) | | |
| Before admission to hospital | 47 (31.8) | 0.473 |
| After admission (on ward) | 45 (38.5) | |
| One week post-discharge | 24 (31.2) | |
| One month post-discharge | 27 (36.5) | |

^ as described in the methods section, data collection was planned to take place one week/one month after discharge, but a proportion of patients with a very long stay (see figure 1) were interviewed in the ward setting instead

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