# Impact of a total smoking ban in a high secure hospital

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**Aims and method** To assess the impact of a total smoking ban in a high secure psychiatric hospital. Staff and patients were surveyed before and after implementation. Data were collected on untoward incidents, seclusions, nicotine replacement therapy and changes in psychotropic medication.

**Results** Of the 298 patients in the hospital for the evaluation period, 72.8% were smokers before the ban. There were no significant differences in rates of seclusion before and after the ban and only one significant comparison ($P = 0.01$) showed an increase in untoward incidents for smokers. There were no significant increases in the use of psychotropic medication after the ban.

**Clinical implications** With adequate preparation, it is possible to implement a total smoking ban in a high secure psychiatric setting without serious negative consequences.

**Declaration of interest** None.

Smoking causes almost 90% of deaths from lung cancer, about 80% of deaths from bronchitis and emphysema, and approximately 17% of deaths from heart disease. It increases the risk of developing cancer of the mouth, lip, throat, bladder, kidney, stomach, liver and cervix.[1]

Implementing smoke-free policies in mental health settings presents a challenge.[2] Smoking is more prevalent among people with mental health problems than the general population,[3] particularly among those with severe mental illness.[4] Smokers with mental health problems are also more likely to smoke heavily and show signs of more severe nicotine dependence.[5]

Barriers to reduction of smoking in in-patient psychiatric settings include anxiety that smoking cessation could lead to deterioration in mental health and behaviour. There are high rates of smoking in mental healthcare professionals,[6] some of whom have negative attitudes towards smoke-free policies, with a significant minority believing that there was some therapeutic benefit from patients being allowed to smoke.[7]

The Health Act 2006 required that all indoor and substantially enclosed outdoor workplaces and public places in England and Wales became smoke-free by 1 July 2007. Residential mental health settings were given a temporary exemption for 1 year only.

Nottinghamshire Healthcare National Health Service (NHS) Trust introduced a total smoking ban for all mental health units within the Trust on 31 March 2007. This included Rampton Hospital, a high secure, long-stay psychiatric hospital for patients with complex mental health disorders who are a grave and immediate danger to the public or themselves (the majority have committed serious offences). Rampton Hospital was the first high secure hospital in the UK to become smoke-free.

A previous survey showed that approximately 70% of patients in Rampton Hospital were smokers and most were heavy smokers.[8] Three months before the hospital became smoke-free, patients were informed about the new smoke-free policy and were offered help to stop smoking, including nicotine replacement therapy. Extensive preparations were implemented before the ban including staff training and information for both staff and patients. Individual support was provided for patients by nursing staff. It was made clear that the ban would be universal and apply to staff in the workplace as well as patients. These were among the salient factors that were later to be identified by Campion *et al*[9] as crucial for the successful implementation of a smoke-free policy.

When the smoke-free policy was introduced, tobacco and ignition sources became prohibited for patients, staff and visitors, and this was rigorously enforced in the hospital. On the weekend of the policy introduction, all wards were fully staffed and additional activities were provided as a distraction.

We report a retrospective evaluation of the impact of the smoking ban. The evaluation met the criteria for a service evaluation as defined by the National Patient Safety Agency[8] as it was designed and conducted solely to define or judge current care. It involved analysis of existing data and the use of simple questionnaires. The aim was to evaluate the impact of a total smoking ban in buildings and grounds in a high secure psychiatric hospital.

## Method

The total ban in Rampton Hospital was implemented from midnight on 31 March 2007. We collected data before and after the ban on:

- survey of staff and patients
- untoward incidents and seclusions
- changes in psychotropic medication
- nicotine replacement therapy.

### Staff and patient survey

A postal survey was undertaken of all staff and patients on their views on the ban both before (February 2007) and after implementation (July 2007), using a questionnaire specially developed for the purpose at Rampton Hospital.

### Untoward incidents and seclusions

Data were obtained from the hospital risk department on untoward incidents including self-harm (threats or actual), verbal abuse and verbal aggression or threats, physical aggression (attempted or actual) and damage to property. In addition, we obtained data on untoward incidents of sufficient severity to require the patient to be placed in seclusion. Seclusion of a patient is defined in the Department of Health Code of Practice as 'the supervised confinement of a patient in a room, which may be locked. Its sole aim is to contain severely disturbed behaviour which is likely to cause harm to others' (p. 122).[10]

We compared the number of seclusions in the month before the ban (March 2007) with the number of seclusions in the first month of the ban (April 2007) for those who had been smokers and for non-smokers. We carried out a similar comparison of seclusions for the months of December 2006 before the ban and July 2007 after the ban. The incidents that led to seclusions were categorised as threatening behaviour, attacks on staff and attacks on fellow patients. A similar strategy was used to analyse the data on all incidents.

### Changes in psychotropic medication

Changes in psychotropic medication usage were obtained by scrutinising medication charts and from the hospital pharmacy database. Data were collected on regular and as required (PRN) antipsychotic and benzodiazepine medications for the months of December 2006 and March 2007 as baseline. Post-implementation data were obtained for April and July 2007.

The average daily dose of each medication was expressed as a percentage of the maximum *British National Formulary* (BNF) dose. For each patient, the daily percentages of the maximum BNF dose for each type of medication for the month were added together and then divided by the number of days in the month. If there were two or more medications in the same category, the data for these were summed.

We compared smokers' and non-smokers' use of four classes of psychotropic medication: regular antipsychotics, regular benzodiazepines, PRN antipsychotics, PRN benzodiazepines, comparing March with April and December with July using the *t*-test.

### Nicotine replacement therapy

The number of patients receiving nicotine replacement therapy between December 2006 and July 2007 were recorded in the pharmacy database and these data were used in our evaluation.

## Results

There were 340 resident patients in the hospital during the 8-month evaluation period. Of these, 42 patients were transferred elsewhere or were admitted to the hospital during this period. A total of 298 patients were resident in the hospital for the whole 8-month evaluation period, 217 of whom were smokers before the ban (72.8%). Only seven patients quit smoking in anticipation of the implementation of the smoke-free policy. Patients either made unsuccessful quit attempts or made no quit attempts before the policy was introduced.

### Response rate

The pre-ban questionnaire was sent to 340 patients who were resident in the hospital in February 2007. Of these, 175 patients replied (51% response rate); 89% of the respondents were male and 70% reported being smokers. In June 2007, the second questionnaire was sent to the 328 patients resident at the time, of whom 115 replied (35% response rate); 85% were male and 87% reported being smokers before the ban.

The pre-ban questionnaire was sent to 1862 members of staff and 1038 responded (55.7% response rate); 46% of the respondents were male and 23% reported being smokers; 61% of the respondents were nurses. A total of 1946 questionnaires were sent to staff after the ban and 670 members of staff responded (34% response rate); 38% of the respondents were male, 22% reported being smokers and 54% were nurses.

### Views of the ban among staff and patients

Before the ban, 40/175 patients (22.9%) and 528/1038 staff (50.9%) were in favour of the ban. After the implementation of the ban, the percentage of patients in favour of the ban had increased to 29/115 (25.2%) and the percentage of staff in favour of the ban had increased to 404/670 (60.3%).

Before the ban, 93/175 of patients (53.1%) believed their mental health would be adversely affected by the ban and 47/175 thought their physical health would be adversely affected (26.9%). However, after the ban, 45/115 of patients felt their mental health (39.1%) and 29/115 thought their physical health (25.2%) had been adversely affected.

Before the ban, 573/1038 of all staff (55.2%) and 409/538 of nursing staff (76%) were concerned that patients would be more aggressive if they could not smoke. However, after the ban, only 100/670 of all staff (14.9%) and 69/286 of nurses (24.1%) felt the smoking ban had made patients more aggressive.

Before the ban, 491/1038 of all staff (47.3%) and 359/538 of nurses (66.7%) thought patients were more likely to self-harm if they could not smoke. After the ban, only 55/670 of all staff (8.2%) and 36/286 of nurses (12.6%) believed that patients had self-harmed as a result of the ban. Before the ban, 477/1038 of all staff (46%) and 362/538 of nurses (67.3%) thought patients would need more medication because they could not smoke, but after the ban only 85/670 of all staff (12.7%) and 66/286 of nurses (23.1%) thought that patients had needed more medication because of the smoking ban.

### Untoward incidents

Table 1 shows the number of incidents for the four time periods, for smokers, non-smokers and all patients. Table 2 shows the number of seclusions as a result of severe untoward incidents.

Analyses were carried out using $\chi^2$-test of paired results, comparing the months of March and April 2007, December 2006 and July 2007, for both pre-ban smokers and non-smokers. Only one result was significant – the comparison of number of incidents for December and July. This showed significantly more incidents for pre-ban smokers in July than in December ($P = 0.01$, d.f. = 1). There were no significant results for comparisons of numbers of seclusions between pre-ban smokers or non-smokers for either time period comparison.

The hospital security department reported finding contraband tobacco and ignition sources on seven occasions after the ban. However, a full search of all patient areas was not carried out at the point of introduction of the ban and the majority of patients were simply asked to voluntarily surrender their smoking materials.

An analysis of the fire alarm record showed no incidents attributable to illicit smoking between December 2006 and July 2007 inclusive. There were no incidents of major indiscipline such as riots, hostage-taking or rooftop protests in the 4 months following the ban. Three patients sought to challenge the legality of the ban in the courts but this challenge has been rejected.

**Table 1** Violent incidents in pre-ban smokers and non-smokers before and after the ban

| | December 2006 | March 2007 | April 2007 | July 2007 |
|---|---|---|---|---|
| Pre-ban smokers | | | | |
| Self-harm | 48 | 61 | 61 | 60 |
| Verbal abuse | 84 | 95 | 85 | 99 |
| Physical aggression | 25 | 22 | 30 | 34 |
| Damage to property | 1 | 2 | 2 | 5 |
| Total | 158 | 180 | 178 | 198 |
| Pre-ban non-smokers | | | | |
| Self-harm | 27 | 21 | 20 | 26 |
| Verbal abuse | 46 | 32 | 32 | 33 |
| Physical aggression | 38 | 56 | 58 | 22 |
| Damage to property | 1 | 1 | 2 | 2 |
| Total | 112 | 110 | 112 | 83 |
| All patients | | | | |
| Self-harm | 75 | 82 | 81 | 86 |
| Verbal abuse | 130 | 127 | 117 | 132 |
| Physical aggression | 63 | 78 | 88 | 56 |
| Damage to property | 2 | 3 | 4 | 7 |
| Total | 270 | 290 | 290 | 281 |

### Changes in psychotropic medication

A comparison was made of pre-ban smokers' and non-smokers' use of four classes of psychotropic medication: regular antipsychotic medication, regular benzodiazepines, PRN antipsychotic medication, and PRN benzodiazepines. We compared March with April and December with July, using the *t*-test. Table 3 shows the results of these analyses in terms of mean doses for smokers and Table 4 shows the results for non-smokers. As described earlier, the unit of calculation is the dose of medication expressed as a percentage of the maximum BNF limit. The only statistically significant result ($P$=0.025) was a decline in mean dose of regular antipsychotic medication in smokers from March to April.

### Nicotine replacement therapy

A total of 149 patients commenced nicotine replacement therapy between December 2006 and March 2007. An additional 18 patients commenced the therapy after the ban.

## Discussion

The implementation of a smoke-free policy in Rampton Hospital provided a rare opportunity to evaluate the impact of a total smoking ban in a highly controlled environment. Unlike other health facilities in the UK, it was not possible for patients to go outside the buildings or grounds to smoke, because of security restrictions. As a high secure hospital, effective search policies and procedures were already present to prevent contraband items entering the hospital and this was extended to tobacco and smoking-related materials.

However, owing to the opportunistic nature of this evaluation, there were limits to the data that were available for evaluation; moreover, data were available only for four

**Table 2** Episodes of seclusion of pre-ban smokers and non-smokers before and after the ban

| | December 2006 | March 2007 | April 2007 | July 2007 |
|---|---|---|---|---|
| Pre-ban smokers | | | | |
| Threatening behaviour | 20 | 17 | 26 | 40 |
| Attacking staff | 4 | 6 | 7 | 8 |
| Attacking fellow patient | 2 | 4 | 5 | 6 |
| Total | 26 | 27 | 38 | 54 |
| Pre-ban non-smokers | | | | |
| Threatening behaviour | 9 | 23 | 19 | 6 |
| Attacking staff | 3 | 5 | 6 | 8 |
| Attacking fellow patient | 0 | 1 | 1 | 1 |
| Total | 12 | 29 | 26 | 15 |
| All patients | | | | |
| Threatening behaviour | 29 | 40 | 45 | 40 |
| Attacking staff | 7 | 11 | 13 | 16 |
| Attacking fellow patient | 2 | 5 | 6 | 7 |
| Total | 38 | 56 | 64 | 63 |

**Table 3** Pre-ban smokers: comparison of mean dose of medication in the two study periods

| | Patients on medication *n* | Mean (s.d.) | s.e. | 95% CI | *t* | d.f. | *P*[a] |
|---|---|---|---|---|---|---|---|
| Regular antipsychotics | | | | | | | |
| March | 166 | 64.06 (39.38) | 3.06 | 0.37 to 5.42 | 2.27 | 165 | 0.025 |
| April | 166 | 61.16 (37.37) | 2.90 | | | | |
| Regular benzodiazepines | | | | | | | |
| March | 8 | 66.79 (80.37) | 28.41 | −12.57 to 16.08 | 0.29 | 7 | 0.78 |
| April | 8 | 65.03 (89.62) | 31.68 | | | | |
| PRN antipsychotics | | | | | | | |
| March | 27 | 2.76 (2.70) | 0.52 | −0.68 to 0.98 | 0.37 | 26 | 0.71 |
| April | 27 | 2.61 (2.16) | 0.41 | | | | |
| PRN benzodiazepines | | | | | | | |
| March | 21 | 8.55 (7.84) | 1.71 | −10.34 to 1.28 | −1.63 | 20 | 0.12 |
| April | 21 | 13.08 (16.77) | 3.66 | | | | |
| Regular antipsychotics | | | | | | | |
| December | 158 | 64.96 (38.99) | 3.10 | −0.8 to 7.86 | 1.93 | 157 | 0.055 |
| July | 158 | 61.07 (36.86) | 2.93 | | | | |
| Regular benzodiazepines | | | | | | | |
| December | 8 | 51.38 (46.65) | 16.49 | −51.73 to 18.90 | −1.10 | 7 | 0.31 |
| July | 8 | 67.80 (84.94) | 30.03 | | | | |
| PRN antipsychotics | | | | | | | |
| December | 14 | 1.83 (1.26) | 0.33 | −1.74 to 0.81 | −0.79 | 13 | 0.44 |
| July | 14 | 2.29 (2.28) | 0.61 | | | | |
| PRN benzodiazepines | | | | | | | |
| December | 9 | 10.78 (7.43) | 2.48 | −14.70 to 8.64 | −0.60 | 8 | 0.57 |
| July | 9 | 13.81 (14.41) | 4.80 | | | | |

PRN, as required.
a. Two-tailed.

**Table 4** Pre-ban non-smokers: comparison of mean dose of medication in the two study periods

| | Patients on medication *n* | Mean (s.d.) | s.e. | 95% CI | *t* | d.f. | *P*[a] |
|---|---|---|---|---|---|---|---|
| Regular antipsychotics | | | | | | | |
| March | 56 | 62.90 (40.21) | 5.37 | −0.81 to 0.72 | −0.13 | 55 | 0.90 |
| April | 56 | 62.95 (40.37) | 5.39 | | | | |
| Regular benzodiazepines | | | | | | | |
| March | 3 | 52.04 (41.87) | 24.17 | −3.32 to 5.34 | 1.00 | 2 | 0.42 |
| April | 3 | 51.03 (42.94) | 24.79 | | | | |
| PRN antipsychotics | | | | | | | |
| March | 4 | 1.18 (1.01) | 0.50 | −7.66 to 0.68 | −2.66 | 3 | 0.08 |
| April | 4 | 4.67 (2.78) | 1.39 | | | | |
| PRN benzodiazepines | | | | | | | |
| March | 6 | 9.32 (8.08) | 3.30 | −7.57 to 0.56 | −2.22 | 5 | 0.08 |
| April | 6 | 12.82 (9.86) | 4.02 | | | | |
| Regular antipsychotics | | | | | | | |
| December | 53 | 63.32 (38.57) | 5.30 | −5.07 to 1.16 | −1.26 | 52 | 0.21 |
| July | 53 | 65.28 (41.01) | 5.63 | | | | |
| Regular benzodiazepines | | | | | | | |
| December | 3 | 56.06 (38.06) | 21.97 | −26.99 to 43.34 | 1.00 | 2 | 0.42 |
| July | 3 | 47.88 (46.68) | 26.89 | | | | |
| PRN antipsychotics | | | | | | | |
| December | 3 | 3.40 (4.07) | 2.35 | −10.62 to 16.85 | 0.71 | 2 | 0.55 |
| July | 3 | 1.29 (1.69) | 0.98 | | | | |
| PRN benzodiazepines | | | | | | | |
| December | 4 | 11.49 (9.73) | 4.86 | −9.69 to 23.40 | 1.32 | 3 | 0.28 |
| July | 4 | 4.64 (1.37) | 0.69 | | | | |

PRN, as required.
a. Two-tailed.

time periods. The statistically significant result for the comparison of December and July incidents may be an artefact of a potentially seasonal drop in incidents in the period before Christmas.

We are not in a position to say whether any patients were transferred or discharged during the study period for reasons connected with the smoking ban but we consider the number to be few, if any. Wishing to smoke tobacco or deterioration in behaviour would not normally be considered a sufficient reason for leaving the hospital.

Staff concerns about patients' aggression, self-harm and increased need for medication decreased after the ban, but were consistently higher among nurses. A major problem with these data is that because the questionnaires were anonymous it was not possible to link the pre-ban responses to the post-ban responses for either patients or staff. It is possible that those staff members and patients who responded to the pre-ban questionnaire represented biased samples (i.e. of those who were more hostile to the ban), whereas those who responded to the post-ban questionnaire were more pro-ban. This potential source of bias could account for any changes in favour of the ban.

Despite the fears of staff and patients, the transition from a smoking environment to a non-smoking environment went smoothly. Our results do not show a marked increase in use of psychotropic medication, self-harm or behavioural disturbance as a result of the smoking ban. This evaluation replicates the findings of Hempel *et al*,[11] who reported a similar uneventful transition to a non-smoking environment in a maximum security hospital in the USA. However, in another paper[12] we describe one of the few potential problems of abrupt smoking cessation, which was an increase in clozapine plasma levels for individuals who quit smoking.

Cormac & McNally[13] have described the strategy used to implement the total ban on smoking, which was applied at Rampton Hospital. This strategy could be applied in other psychiatric settings. What is now required is a long-term evaluation of the health benefits of smoke-free environments to patients in Rampton Hospital and other long-stay NHS facilities.

This evaluation supports taking a robust approach to tackling smoking in psychiatric settings and should give confidence to those considering the implementation of a total rather than partial smoking ban in their psychiatric service.

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