Determining rates of smoking cessation advice delivered during hospitalisation and smoking cessation rates 3 months post discharge: a two-hospital survey

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ABSTRACT
Background: Hospitalisation is an ideal time to implement smoking cessation interventions. However, little is known about the extent to which inpatients receive such advice, or the impact it has on motivation to quit and quitting behaviours post-hospitalisation.

Aims: This study aimed to determine the prevalence of smoking and cessation advice received by inpatients in two teaching hospitals in Ireland, and the impact of cessation advice on smoking at 3 months post discharge.

Methods: We surveyed 1001 inpatients across two hospital sites, over a six-month period. Demographic details, clinical history, smoking history, motivation to quit, cigarette dependence, and recent quitting history were assessed.

Results: Prevalence of smoking within the sample was 23.4% (235/1001). Only 32% (75/235) of smokers reported that smoking cessation was discussed during admission. Smokers' mean Fagerström nicotine-dependence score was 3.7 (SD = 2.7), indicating low dependence levels. At 3 months, 17% (25/146) of smokers reported smoking cessation. Provision of smoking cessation advice during hospitalisation was associated with higher motivation to quit (OR = 2.79, 95% CI 2.12–3.68), and successful quit behaviour for confirmed (OR = 1.98, 95% CI 1.55–2.53) and self-reported quitters (OR = 1.47, 95% CI 1.3–1.66)

Conclusions: This observational study finds that provision of brief cessation advice and smoking status documentation was suboptimal. Where advice was given, it was associated with enhanced motivation to quit and increased quit rates. These findings, along with low dependence scores, suggest that systematic provision of low-intensity cessation interventions could significantly enhance quit rates in hospitalised smokers.

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Introduction

Tobacco use is the leading global cause of preventable death (Bridgehead International, 2011; Carter et al., 2015; Siegel et al., 2015). Ireland has a national adult smoking prevalence of 21.5% (Health Service Executive, 2013a), and approximately 6500 deaths annually in Ireland are attributable to smoking (Brugha et al., 2009). The benefits of smoking cessation are well established, with successful cessation related to increased 10-year life expectancy, and reduced burden of major chronic diseases (Bridgehead International, 2011). Smoking cessation interventions are thus one of the most cost-effective healthcare interventions (Bridgehead International, 2011).

Hospitalisation provides a particularly good opportunity to provide smoking cessation advice for a number of reasons. Most hospital campuses implement smoke-free policies (Health Service Executive, 2014); individuals may have higher receptivity to cessation advice due to ill health (Ohakim et al., 2014), and withdrawal symptoms can be effectively managed (Rigotti et al., 2014). Delivery of smoking cessation advice by healthcare professionals has been consistently shown to increase quit attempts and cessation rates (Freund et al., 2009; Rice & Stead, 2008; Rigotti et al., 2014; Stead, Bergson, & Lancaster, 2008), with high-intensity behavioural counselling interventions associated with a risk ratio (RR) of 1.37 for increased smoking cessation rates post discharge. The addition of pharmacotherapy to an intensive behavioural counselling intervention increased the RR to 1.54 for hospitalised smokers (Rigotti, Clair, Munafo, & Stead, 2012). Even brief cessation advice, provided in parallel with nicotine replacement therapy and supportive contact for at least 1 month post discharge, has been associated with an almost twofold increased likelihood of sustained cessation at 6 months post discharge (Rigotti et al., 2014).

Despite its proven effectiveness, provision of smoking cessation advice to hospital inpatients remains suboptimal (Bartels, McGee, Morgan, McElvaney, & Doyle, 2011; Freund et al., 2009; Ohakim et al., 2014 Raupach, Merker, Hasenfuss, Andreas, & Pipe, 2011; Rigotti et al., 2012), with low delivery of cessation advice attributed to poor systematic approaches to service provision, including time constraints in delivery of cessation advice, lack of training to appropriately counsel smoking patients, and attitudes of healthcare professionals towards cessation advice (Thy, Boker, Gallefoss, & Bakke, 2007; Vogt, Hall, & Marteau, 2005). A recent report published by the Irish Department of Health highlighted a lack of evidence on the extent and nature of provision of smoking cessation services within the Irish health system (Department of Health, 2013). National quit rates are furthermore currently unavailable, so it is unknown how effective current services are (Currie et al., 2010). National guidelines also recommend that documentation of smoking status should be mandatory for all individuals engaging with health services (Health Service Executive, 2013b). There is little evidence on systematic documentation of smoking status internationally, with one recent UK study reporting a hospital-wide rate of 75% for documentation of smoking status (Murray, Leonardi-Bee, Marsh, Jayes, & Britton, 2012), but current Irish documentation rates of smoking status are unknown.

The aims of this observational study were to examine provision of service delivery for smoking cessation by determining the proportion of patients who report receiving cessation advice and by assessing the documentation of smoking status and quit advice in medical charts. We also examined nicotine-dependence levels, and the association between receipt of in-hospital cessation advice and motivation to quit and quitting behaviours 3 months later.
Method

Participants and setting

The survey was conducted in two teaching hospitals in north Dublin city, serving a population of approximately 580,000. Both hospitals employed a hospital-wide smoke-free policy. During the study neither hospital employed a standard Nicotine Replacement Therapy (NRT) provision policy upon admission to hospital. All eligible inpatients in the two sites were surveyed over a 19-week period from 20th February 2014 to 3rd July 2014. Patients were excluded if they were under 18 years of age, were unable to complete the interview (e.g. due to patient fatigue), unable to provide informed consent, unable to speak English, comatose or cognitively impaired (according to ward staff assessment), or were infected with a resistant transmissible organism (e.g. methicillin-resistant Staphylococcus aureus or Vancomycin-resistant Enterococci positive), in accordance with infection-control procedures at both hospital sites. Patient eligibility was assessed by the ward managers in each ward in accordance with the eligibility criteria.

Procedure

Baseline

The study received ethical approval from the Beaumont Hospital Ethics (Medical Research) Committee and the Connolly Hospital Research Ethics Committee. Eligible inpatients were informed of the study and its purpose, and were provided with patient information leaflets and then asked to provide informed consent. They were then interviewed by one of the researchers, which lasted for approximately 10 minutes. Participants identified as non-smokers were asked to participate anonymously in order to collect comparative data regarding demographics, reasons for admission, and history of smoking. Current smokers were those who had smoked more than 100 cigarettes in their lives and were currently smoking regularly; recent smokers were those who had smoked more than 100 cigarettes in their lives but had stopped smoking completely in the 12 months prior to hospital admission; ex-smokers were those who had smoked more than 100 cigarettes in their lives but had stopped smoking completely for more than 12 months prior to hospital admission; and non-smokers were those who had never smoked a minimum of 100 cigarettes in their lives. Participants identified as smokers also responded to questions regarding their smoking behaviour, including: amount of cigarette consumption; pack–years (number of packs of cigarettes smoked per day multiplied by number of years the person has smoked), age at smoking initiation; degree of interest in quitting smoking (“Are you currently – trying to quit; actively planning to quit; thinking about quitting but not planning to; not thinking about quitting”); number of attempts to quit smoking (“how many times have you tried to quit in the past year?”); degree of interest in receiving smoking cessation advice (“Would you like to receive smoking cessation advice while in hospital?”); whether they received smoking cessation advice during hospital admission (“Has someone discussed smoking with you during this admission?”); and their perceived need for assistance in quitting smoking (“Would you like to receive smoking cessation advice while in hospital?”).

Nicotine dependence. Level of nicotine dependence was determined with the Fagerström Test for Nicotine Dependence (FTND) (Fagerstrom, Russ, Yu, Yunis, & Foulds,
Scores on the FTND range from 0 to 10, with higher scores indicating higher nicotine dependence.

Motivation to quit. Motivation to stop smoking was measured using the Motivation To Stop Scale (MTSS) (Kotz, Brown, & West, 2013), a single-item measure which measures motivation to give up smoking, a variable which has been previously correlated with attempts to quit smoking (Kotz et al., 2013).

Chart audit. Hospital charts for participants identified as smokers were reviewed to determine whether patients’ smoking status was recorded, and whether delivery of smoking cessation advice was recorded, including NRT prescription or referral to smoking cessation service, or equivalent.

Three-month follow-up
All participants identified as smokers during the baseline survey, and who provided a contact telephone number, were contacted for follow-up at 3 months following the date of participation in the baseline survey. The follow-up survey assessed quit behaviour in the 3 months since hospital admission. To assess smoking status, participants were asked “In the past three months, have you quit smoking?” For those reporting smoking at 3 months, the number of attempts to quit smoking, degree of interest in receiving smoking cessation advice, MTSS score at 3 months, and engagement with a health professional regarding smoking cessation were assessed.

Significant attempts were made to contact participants during follow-up, with telephone calls made a total of six times for those who did not answer the calls: two morning calls (9am–12pm), two afternoon calls (1pm–5pm); and two evening calls (5pm–8pm) were conducted over a two-week period. If contact was not established at the end of the two-week period, participants were recorded as non-contacts (McBride, Morgan, & McGee, 2012). Where a telephone number was found to be out of service, alternative phone numbers were searched for on hospital electronic records to verify the correct telephone number before recording the participant as a non-contact.

The primary outcome for quitters was objectively validated tobacco abstinence at 3 months post-hospitalisation. Abstinence was defined as abstinence from any tobacco product, excluding e-cigarettes. Self-reported abstinence was validated by inviting participants to take a carbon monoxide (CO) test, using a hand-held breath CO monitor (Clement Clarke International Ltd™). The test was conducted either in the participant’s home or in the hospital outpatient setting, depending on patient preference. Participants living outside of the catchment area of the recruitment sites were not invited to take part in CO testing for feasibility reasons. Self-reported abstinence was validated with a CO reading of less than 10 ppm, in accordance with manufacturer guidelines. This cut-off score reflects the cut-off recommended as part of NICE guidelines for smoking cessation (National Institute for Health and Care Excellence [NICE], 2013).

Statistical analysis
Descriptive statistics, chi-square ($\chi^2$) tests, and logistic regression analyses were used to assess the differences between smokers and non-smokers on demographic variables. Continuous variables were presented as means (standard deviation [SD]) for normally
distributed variables and medians (inter-quartile range [IQR]) if data were skewed. Cate-
egorical and binary variables were presented as frequencies and proportions. For the prediction of quit behaviour at 3 months post-hospitalisation, the specified outcomes in logistic regression modelling were quit behaviour and quit attempts. Regression modelling for quit behaviour was repeated for confirmed quitters and self-reported quitters. Considerations for modelling sample size were applied to avoid over-fitting of the models and subsequent production of biased estimates of effect size (Babyak, 2004; Green, 1991). Given the low numbers meeting the outcomes of interest at 3-month follow-up, adjusted analyses was not possible and crude Odds Ratios (OR) are reported. Intention-to-treat (ITT) analysis was performed based on initial recruitment during hos-
pitalisation and is reported in the Results section, with only those deceased at 3-month follow-up excluded from analysis. Data were analysed using Stata Version 12. As data are clustered by site, Huber–White-robust standard error estimates were used in all ana-
lyses (Williams, 2000).

Results

Between 20th February 2014 and 3rd July 2014, 1764 hospital inpatients were assessed for study participation and 1001 (57%) met study inclusion criteria (Figure 1). Of these, 651 (65%) had smoked at least 100 cigarettes in their lives. Current smokers accounted for 235 (23.5%) of the sample, with 60 (6%) classified as recent quitters, and 356 (35.6%) classified as ex-smokers. Of the current smokers, 28 (11.9%) were trying to abstain from smoking whilst hospitalised. Of the 235 smokers, 27 (11%) declined to provide contact details for follow-up at 3 months.

Baseline characteristics

Current smokers and non-smokers, including recent quitters and ex-smokers, were com-
pared on baseline demographic and clinical variables (Table 1). The mean age of the par-
ticipants was 59 years, 50% were men, and 61% of the sample had secondary-level education. Approximately half of the sample were retired (51%) and married or cohabiting (50%). The most common type of admission was under general surgery (22%), followed by general medicine (16%) and cardiology (15%). Smokers were significantly younger than non-smokers (50 years vs. 62 years; \( p < .001 \)), and were also less likely to have private health insurance (11% vs 19%; \( p < .001 \)), or be in full-time employment (35% vs 17%, \( p < .001 \)).

Baseline nicotine dependence and motivation to quit

For smokers, the mean level of nicotine-dependence score was 3.7 (±2.69) on the FTND, highlighting low nicotine dependence in this sample of smokers. Mean pack–year score was 22.83 (±21.52). Mean MTSS score was 2.9 (±1.83), indicating that motivation was moderate overall, with only 16% of smokers stating that they did not want to stop smoking.
Delivery of smoking cessation advice

Pre-hospitalisation
Fifty-six per cent of current smokers and 52% of recent quitters reported receiving smoking cessation advice in the past year, with 9% of current smokers and 8% of recent quitters not coming into contact with a health professional in the previous year.

Hospitalisation
Just over one-fifth (21%) of current smokers reported that they would like to receive smoking cessation advice while in hospital. Just under one-third of current smokers (32%) reported that a health professional discussed smoking cessation with them during their current hospital admission, with only one participant reporting discussing smoking cessation with a smoking cessation officer. There was a significant association between wanting to receive smoking cessation advice and actual receipt of smoking cessation advice during hospitalisation ($\chi^2 = 8.6, p = .003$). Of those who recalled the type of cessation advice given (67/235), 13% recalled being offered NRT, and 3% were referred to a smoking cessation officer in the community. The remainder of the participants recalled receiving general advice to quit for the sake of their health (84%). Smoking cessation advice was most commonly offered to general surgical patients (20%), followed by cardiology patients (19%).

Figure 1. Flow diagram of recruitment.
Table 1. Baseline sample characteristics by current smoking status.

|                        | Overall N (%) | Current smokers N = 235 (%) | Non-smokers N = 766 (%) | Odds Ratio ($\chi^2$) | 95% CI (df) | $p$ value |
|------------------------|---------------|-----------------------------|-------------------------|-----------------------|-------------|-----------|
| Age, mean (±SD)        | 59.38 (10.84%)| 50.32 (17.83%)              | 62.16 (18.27%)          | .97                   | .96–.97     | <.001     |
| Men (%)                | 503 (50.25%)  | 138 (58.72%)                | 365 (47.65%)            | .64                   | .55–.74     | <.001     |
| Private insurance      | 170 (16.98%)  | 26 (11.06%)                 | 144 (18.80%)            | .54                   | .41–.71     | <.001     |
| Education              |               |                             |                         |                       |             |           |
| Primary or less (ref)  | 212 (21.18%)  | 44 (18.72%)                 | 168 (21.93%)            | $\chi^2 = 3.07$       | df = 2      | .38       |
| Secondary              | 607 (60.64%)  | 153 (65.11%)                | 454 (59.27%)            |                       |             |           |
| Tertiary               | 173 (17.28%)  | 37 (17.74%)                 | 136 (17.75%)            |                       |             |           |
| Employment             |               |                             |                         |                       |             |           |
| Working (ref)          | 275 (27.53%)  | 79 (33.61%)                 | 169 (22.06%)            | $\chi^2 = 60.07$      | df = 2      | <.001     |
| Unemployed             | 210 (21.02%)  | 83 (35.32%)                 | 127 (16.57%)            |                       |             |           |
| Retired                | 514 (51.45%)  | 72 (30.64%)                 | 442 (57.7%)             |                       |             |           |
| Marital status         |               |                             |                         |                       |             |           |
| Single (ref)           | 244 (24.38%)  | 81 (34.47%)                 | 163 (21.28%)            | $\chi^2 = 17.02$      | df = 2      | <.001     |
| Married/cohabiting     | 498 (49.75%)  | 100 (42.55%)                | 398 (51.96%)            |                       |             |           |
| Separated/widowed      | 259 (25.87%)  | 54 (22.98%)                 | 205 (26.76%)            |                       |             |           |
| Consultant specialty   |               |                             |                         |                       |             |           |
| General surgery        | 218 (21.91%)  | 66 (25.53%)                 | 152 (19.84%)            | $\chi^2 = 24.16$      | df = 9      | .004      |
| General medicine       | 161 (16.18%)  | 40 (17.02%)                 | 121 (15.79%)            |                       |             |           |
| Cardiology             | 151 (15.18%)  | 23 (9.79%)                  | 128 (16.71%)            |                       |             |           |
| Neurology              | 127 (12.76%)  | 40 (17.02%)                 | 87 (11.36%)             |                       |             |           |
| Respiratory            | 123 (12.36%)  | 19 (8.09%)                  | 104 (13.58%)            |                       |             |           |
| Orthopaedic            | 60 (6.03%)    | 13 (5.53%)                  | 47 (6.36%)              |                       |             |           |
| Oncology               | 55 (5.53%)    | 11 (4.68%)                  | 44 (18.72%)             |                       |             |           |
| Renal                  | 45 (4.52%)    | 14 (5.96%)                  | 31 (13.19%)             |                       |             |           |
| Geriatric medicine     | 30 (3.02%)    | 4 (1.7%)                    | 26 (3.39%)              |                       |             |           |
| Other                  | 25 (2.51%)    | 5 (2.13%)                   | 20 (2.61%)              |                       |             |           |
| Length of hospital stay (median, inter-quartile range) |        |                             |                         |                       |             |           |
| Emergency admissions   | 561 (65.1%)   | 152 (64.68%)                | 499 (65.14%)            | .98                   | .94–1.01    | .22       |
Documentation of smoking status

Smoking status was documented for 132 (57%) of all current smokers. Documentation of delivery of smoking cessation advice was evident in only 2% \((n = 5)\) of cases.

Quit attempts in the past 12 months

Forty-seven per cent of current smokers reported a recent quit attempt in the 12 months prior to hospital admission, with 12% stating that they were currently trying to quit, and 20% actively planning to quit. For those who reported a recent quit attempt, a number of methods to support cessation were described. Forty-seven per cent described using will-power alone, 38% reported using over the counter NRT supports including a patch, gum, spray, or inhaler, 22.5% reported using an e-cigarette, and 4.5% reported using prescription NRT. Of those using over the counter NRT supports, 43% reported using more than one type of product.

Smoking cessation at 3-month follow-up

Three-month follow-up completion rate was 70% \((146/208)\), with reasons for non-completion outlined in Figure 1. Telephone follow-ups were completed with 146 smokers, and of those 25 (14%) had given up smoking, 5 (3%) of whom had switched to the use of an e-cigarette, giving a 17% smoking cessation rate at 3 months post-hospitalisation. Participants lost to follow-up were more likely to be older \((OR = 1.02, p < .001, 95\% CI 1.01–1.04)\) and less likely to be female \((OR = .59, p < .001, 95\% CI 0.46–0.74)\), but did not differ from those followed up on insurance status or education (data not shown). Amongst self-reported quitters, 68% \((17/25)\) completed the CO breath monitoring test (Figure 1). The self-reported quitter group did not differ from the confirmed quitter group on age, gender, type of admission, education, employment status, marital status, FTND, MTSS, or pack–years.

Twenty-nine per cent indicated that they had reduced their level of smoking consumption, and 3% reported that they had increased the amount smoked since hospitalisation. Smoking abstinence was verified on CO breath testing in 17 self-reported quitters, with 16/17 cases confirmed as abstinent from smoking (5.8% misreporting rate).

Amongst non-quitters \((n = 121)\), 31% \((37/121)\) had attempted to quit smoking in the 3 months following hospital admission. Only 8/121 reported using NRT such as a patch or gum during the quit attempt, with 8/121 reporting the use of an e-cigarette as a cessation aid. Mean 3-month MTSS score was reduced from baseline MTSS to 2.2 \((±1.67)\), with 40% actively trying to or planning to quit smoking. For non-quitters, 21% \((26/121)\) had discussed smoking cessation with a health professional in the 3 months following hospital admission: 54% with a hospital doctor; 38% with a GP; and 3% with a smoking cessation officer.

Predictors of quit behaviour at 3 months post-hospitalisation

Unadjusted logistic regression analysis for the prediction of quit behaviour at 3 months is presented in Table 2. A number of factors were related to quit behaviour. In particular,
motivation to quit and previous quit attempts were related to successful quit behaviour at 3 months, with higher MTSS scores evidencing a greater than twofold increase for confirmed quitters (OR = 2.33) and an OR of 1.66 for self-reported quitters in ITT analyses. Importantly, those who received smoking cessation advice during hospitalisation were twice as likely to be confirmed as abstinent from smoking or self-reported as abstinent at 3-month follow-up as those who did not receive cessation advice whilst in hospital. Per-protocol analysis agreed with the ITT analysis (Table 2).

For those still smoking at 3-month follow-up, unadjusted logistic regression was conducted to examine factors related to self-reported quit attempts in the 3 months following hospital admission. Those with higher MTSS scores at baseline were more likely to have had a quit attempt since discharge. Interestingly, those who received smoking cessation advice during hospitalisation had higher MTSS scores at 3 months (OR = 2.79, 95% CI 2.12–3.68, p < .001), indicating that receiving cessation advice during hospital stay increased longer-term motivation to quit smoking.

**Discussion**

This study examined the patient experience of the delivery of smoking cessation advice to hospitalised smokers in an Irish context. We report three major findings of relevance to smoking cessation care. First, provision of cessation advice is poor during hospitalisation; two-thirds of smokers report receiving no advice. Second, the low nicotine-dependence levels and high motivation to quit scores seen in some participants suggest that low-intensity cessation interventions can make a significant impact. Third, receiving cessation advice was associated with higher quit behaviours and motivation to quit at 3-month
follow-up. Twenty-three per cent of hospital inpatients were identified as current smokers, and of these only 32% received smoking cessation advice during their hospital stay. Hospital documentation for smoking was also found to be poor, with smoking status documented in just over half of the smokers. Documentation of delivery of smoking cessation advice was evident in only 2% of the cases even though advice was delivered to a third of smokers, highlighting the lack of systematic procedures for hospital-delivered smoking cessation. A recent survey of standard tobacco dependence treatment systems across 121 countries highlighted that mandatory reporting of inpatient smoking status was only present in 22% of the countries (Pine-Abata et al., 2013), indicating that perhaps addressing smoking status and smoking cessation during hospitalisation is not a priority during inpatient care internationally. The Irish Health Service Executive advise that every individual engaging with health services should be asked about their smoking status, and furthermore have this documented. They also advise that identified smokers should be advised to quit and offered further cessation support (Health Service Executive, 2013b). The findings presented here suggest that these standards are currently not being achieved, and highlight the need for organisational change strategies for the delivery of smoking cessation services.

Level of nicotine dependence was not associated with quit behaviour or quit attempts 3 months following hospital discharge, and overall the cohort demonstrated low nicotine dependence. Evidence from population-level data suggests an inverse correlation between nicotine dependence and smoking prevalence (Fagerstrom & Furberg, 2008), with current smokers consequently termed ‘hardened smokers’, or resistant to quitting, and thought to be more difficult to help quit smoking (Irvin & Brandon, 2000). The findings presented here do not lend support to the ‘hardening hypothesis’ (Warner & Burns, 2003), which suggests that low-intensity interventions may have success in achieving smoking abstinence for those with low levels of dependence. Increased motivation to quit smoking has also been associated with increased quit attempts (Borland et al., 2010; Vangeli, Stapleton, Smit, Borland, & West, 2011; Zhou et al., 2009); therefore low-intensity interventions which focus on enhancing motivation to quit may increase intervention success by enhancing quit behaviour. It is important to acknowledge that some smokers may need more intensive support. For example, those with high nicotine dependence or depressive symptoms have been found to have reduced level of success with smoking cessation (Doyle et al., 2014; Ho, Alnashri, Rohde, Murphy, & Doyle, 2015).

Encouragingly, delivery of smoking cessation advice during hospitalisation increased twofold the likelihood of smoking abstinence at 3 months post discharge, and furthermore increased motivation to quit amongst those still smoking. The finding that those who received even brief cessation advice such as generic instruction to quit were more likely to quit is not novel, and further highlights the effectiveness of brief hospital-delivered interventions for smoking cessation (Aveyard, Begh, Parsons, & West, 2012). Given that only 3% of smokers were referred to a specialist cessation service and most smokers who received cessation advice reported receipt of generic instruction to quit for the sake of their health, it seems that hospitalised patients are a motivated group amenable to intervention (Murray et al., 2012). Qualitative data further highlight that patients are open and receptive to receiving smoking cessation interventions during hospitalisation, with most patients reporting re-evaluation of their smoking behaviour as a result of ill health and subsequent hospitalisation (Bains, Britton, Marsh, Jayes, & Murray, 2013).
Furthermore, higher motivation to quit is associated with successful cessation (Kotz et al., 2013). Improvements in routine implementation of current guidelines, including the delivery of even brief advice by healthcare professionals, coupled with high patient motivation, may see an increase in smoking abstinence rates following hospitalisation.

These findings represent the experience of two teaching hospitals serving an urban population. These findings may not be representative of smoking cessation services in other hospitals in Ireland; however, there are no reasons to believe that they differ systematically from other Irish hospitals. Additional limitations to this study include potential recall and response bias, and small sample size for quitters at 3 months. The exclusion criteria were designed to ensure that no patient who was cognitively impaired, seriously unwell, or infectious was put under undue strain during hospitalisation by being approached to take part in a research study. This may have led to a restricted cohort of potential participants; however, our eligibility criteria and response rate are similar to previous work in this area (Ohakim et al., 2014). The short time-frame for follow-up in this sample may not be sensitive to assess sustained smoking cessation rates, although it is important to note that findings were similar for ITT and per-protocol analysis. Assessment of documentation of smoking status amongst hospitalised non-smokers would strengthen the reliability of chart review to assess smoking status. CO testing for all self-reported quitters was also not feasible in this study.

A systematic review and meta-analysis of the effectiveness of interventions to increase routine provision of smoking cessation care in hospitals reported that multi-strategic approaches, including the combination of staff training, educational meetings, staff reminders, and written resources, were associated with moderate increases in cessation care delivery, although the demonstrated increases were still below recommended levels of care provision (Freund et al., 2009). National data report that there are currently 20 Whole Time Equivalent posts in Ireland (equating to approximately 55 personnel) for provision of specialist smoking cessation services (Department of Health, 2013). However, in this analysis, only two individuals received cessation advice by a specialist smoking cessation officer during hospitalisation, suggesting deficiencies in systematic, routine identification and referral of smokers to specialist services, and a lack of awareness by front-line healthcare professionals of such services. Recent evidence supports this hypothesis, with a national survey of approximately 750 healthcare staff reporting that only 29% of medical/dental healthcare workers in the Health Service Executive were aware of smoking cessation services (OhAiseadha, Killeen, Howell, & Saunders, 2015). Given the demonstrated success internationally for multi-strategic programmes for smoking cessation, it is suggested that future research focuses on improving the delivery of more intensive, multi-strategic approaches to smoking cessation within the Irish health system.

Our study underlines the significant prevalence of smoking among hospital inpatients, and documents poor management of smoking cessation during hospitalisation, particularly for documentation of smoking status, and the provision of cessation advice. Subsequent quit rates following hospitalisation were documented as low in Ireland. These findings highlight the need for a routine, hospital-wide systematic approach delivery of cessation advice to hospitalised smokers, particularly to those who are motivated to stop smoking.
List of abbreviations
FTND Fagerström Test for Nicotine Dependence
MTSS Motivation To Stop Scale
CO Carbon Monoxide
IQR Inter-Quartile Range
SD Standard Deviation
OR Odds Ratio

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