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Maintaining abstinence from smoking after a period of enforced abstinence: considerations of non-compliance and the significance of reduced smoking [Psychological Medicine, 2018, **48**, 669–678]

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We read with interest the article by Brose and colleagues describing the findings of a systematic review and meta-analysis, entitled: 'Maintaining abstinence from smoking after a period of enforced abstinence – systematic review, meta-analysis and analysis of behaviour change techniques with a focus on mental health' (Brose *et al.*, 2018). This article endeavoured to review interventions to maintain smoking abstinence post-discharge from smoke-free institutions, with a focus on people with mental health problems. The review included studies of smokers in smoke-free prisons, inpatient mental health units and substance use treatment centres. Despite typically high rates of relapse following discharge from such facilities, the authors encouragingly conclude pharmacotherapy and/or behavioural support can help to maintain abstinence, compared with standard care (relative risk of verified point-prevalence smoking abstinence at longest follow up = 2.06, 95% confidence interval 1.30–3.27). As a secondary outcome, the authors reported most of the studies that measured cigarette consumption among those that relapsed found a decrease in consumption following discharge, compared with pre-admission levels. There are two points relating to this review that we believe warrant further discussion. Firstly, the assumption that participants in the included studies were indeed 'smoke-free' during admission or incarceration, and secondly, the significance of the finding of reduced cigarette consumption post-discharge.

The majority of studies included in this review acted on the premise that participants remained abstinent from smoking while in the prescribed smoke-free facilities. Two studies recorded contraband smoking while on the unit – one using technician assessment (Gariti *et al.*, 2002) and the other using self-report (Joseph, 1993), although neither mentioned whether biochemical verification occurred. Stuyt (2015) reported that random breath carbon monoxide testing was utilised in the treatment facility studied, however rates of compliance with the ban were not reported. This is important, as there is evidence to suggest many people do not adhere to smoking bans. Stockings *et al.* (2015) reported 83.5% of patients in an inpatient psychiatric facility in Australia were non-compliant with a total smoking ban. Another study found over three-quarters of smokers in a United States prison continued to smoke despite a smoke-free policy (Cropsey and Kristeller, 2005). High rates of non-adherence are not altogether surprising, considering the modest provision of cessation support documented in smoke-free facilities. Stockings *et al.* (2015) found only 20% of inpatient smokers received optimal nicotine replacement therapy. Additionally, a survey conducted in two large smoke-free hospitals in Australia found 40% of staff offered nicotine replacement therapy 'never' or 'rarely' to patients (McCrabb *et al.*, 2017). High levels of non-compliance with smoking bans could introduce problems with measuring the effects of interventions designed at maintaining abstinence beyond release. Discouragingly high apparent relapse rates may underestimate the potential effectiveness of interventions in improving abstinence, if people are in fact continuing to smoke while in smoke-free facilities. The modest effect reported by Brose *et al.* (2018) of interventions in maintaining abstinence should be interpreted with this in mind. Furthermore, future research in this area should consider incorporating verified measurements of smoking during time in smoke-free facilities. This will enable more accurate assessment of interventions aimed at achieving cessation beyond discharge.

In the review by Brose and coworkers, all but one (Jonas and Eagle, 1991) of the studies that measured change in cigarette consumption reported reduced consumption following discharge (Joseph, 1993; Gariti *et al.*, 2002; Strong *et al.*, 2012; Stockings *et al.*, 2014). This is common to findings from other studies examining smoking habits after periods of enforced abstinence (Azevedo *et al.*, 2010; Puljevic *et al.*, 2018), and warrants further discussion for three main reasons.

Firstly, the role of compensation should be considered. It is known that, when faced with a situation of reduced nicotine, smokers compensate by increasing smoking behaviour (Hughes and Carpenter, 2005; Scherer and Lee, 2014). In this way, total nicotine and smoke exposure levels

are at least partially maintained. It is therefore likely the population in question receive a more modest reduction in total smoke exposure after discharge from smoke-free facilities than suggested by the reported reduction in cigarettes per day (CPD). All but one of the reviewed studies (Gariti *et al.*, 2002) measured change in tobacco consumption based on CPD, without biochemical verification. In light of compensatory behaviours, the degree of reduction in smoke exposure based on CPD alone is likely to be overestimated.

Secondly, if there is a reduction in total smoking even despite compensation, is this likely to be beneficial to health? The health impacts of reduced smoking remain contested, with two recent systematic reviews (Hughes and Carpenter, 2006; Pisinger and Godtfredsen, 2007) unable to conclude whether there is an associated decrease in smoking-related disease or mortality. Biological delays and compensatory smoking have been proposed as possible reasons for the lack of detectable health benefits (Hughes and Carpenter, 2006; Pisinger and Godtfredsen, 2007).

Lastly, any health benefit potentially conferred by a reduction in smoking is likely to be diminished if reduction is not maintained. Evidence suggests few people are able to maintain reduced levels of smoking long-term (Hughes and Carpenter, 2005), however reduced smoking has been associated with an increased probability of future cessation (Hughes and Carpenter, 2006). This would have clear implications for health, and points to a need for longer follow-up to determine whether reduced smoking translates to future cessation in this group.

In summary, we agree with the authors that more research into efforts to reduce relapse after a period of enforced abstinence is required, particularly in populations with high mental health comorbidity. There is also a critical need for efforts to support smoking cessation within smoke-free facilities, and future research should consider verifying abstinence during periods in smoke-free facilities. In addition, biochemical verification should be used to accurately quantify reductions in smoke exposure following discharge, and longer follow-up should be incorporated to determine long-term smoking patterns. Such research will be important in guiding practice to optimise the health benefits of smoke-free policies, and to address the health needs of a substantially disadvantaged group.

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