THE MEDICAL MANAGEMENT OF INPATIENTS WITH TOBACCO DEPENDENCY

Supplementary material 1: Measuring levels of tobacco dependency, cumulative exposure and carbon monoxide levels

Measuring levels of dependency. There are a number of validated measures of nicotine dependence. The best known of these is the Fagerstrom Test of Cigarette Dependence which is scored between zero and ten with the higher number indicating higher dependence (1). A shortened version of the Fagerstrom Test is the Heaviness of Smoking Index, Table 1 (2). This consists of the two questions from the Fagerstrom Test that are the most predictive of high nicotine dependence. It is scored from zero to six with higher scores indicating higher nicotine dependence.

Table 1: Heaviness of smoking Index

Heaviness of smoking index			Score
1	How soon after you wake up do you smoke your first cigarette?	Within 5 minutes 6-30 minutes 31-60 minutes More than 60 minutes	3 2 1 0
2	How many cigarettes per day do you usually smoke? _____ per day	10 or less 11 to 20 21 to 30	1 2 3
		Total (maximum 6)	

Measure cumulative exposure to tobacco smoke. This can be documented using an approximation of 'pack-years' smoked as the unit of measurement. Smoking 20 cigarettes per day for 1 year is equal to one pack year. So a patient that has smoked 20 cigarettes for 20 years has a 20 pack year history. A patient that has smoked 40 cigarettes for 20 years has a forty pack year history. A patient that has smoked 10 cigarettes per day for 20 years has a ten pack year history.

CO measurement in the identification & treatment of tobacco dependency. Carbon monoxide is a colourless, odourless, tasteless poisonous gas present in cigarette smoke. It has a short half-life (usually undetectable around 24 hours after the last cigarette), with elimination becoming slower as the concentration decreases. It is therefore a useful marker of regular smoking. Hand-held CO machines measure the concentration of CO in exhaled breath. CO monitors produce a numerical value in 'parts per million' (ppm) which equates to the number of CO molecules in one million parts of air. Raised CO readings usually indicate tobacco smoking and would normally be checked in the context of motivational support for people attempting or

exploring a quit (see Table 2). There are however other reasons for a raised CO such poorly ventilated cooking or heating appliances, inhalation of fumes from faulty exhausts, and exposure to high levels of second-hand smoke exposure. Lactose intolerance can also result in raised exhaled CO levels.

Carbon monoxide (CO) monitoring is a valuable motivational tool for people who smoke (3). It provides patients with visible proof of the harm caused by smoking tobacco and it gives them a measure with which to chart their progress while working on stopping smoking. Usually CO measurement will be used as a tool by tobacco dependency specialists/practitioners. However, it is helpful for hospital clinicians to know about and be able to explain the role of CO readings to patients to increase engagement in CO monitoring.

Table 2: Interpretation of exhaled CO levels

CO level	**Interpretation of Readings**
20ppm+	Indicative of high levels of tobacco 'smoking' i.e. high nicotine dependence
10-20ppm	Indicative of ongoing tobacco smoking
5-9ppm	Suggestive of ongoing exposure to smoked tobacco
1-4ppm	Indicative of no recent smoking / non-smoker

References:

1. Fagerstrom K. Determinants of tobacco use and renaming the FTND to the Fagerstrom Test for Cigarette Dependence. Nicotine Tob Res. 2012;14(1):75-8.
2. Heatherton TF, Kozlowski LT, Frecker RC, Rickert W, Robinson J. Measuring the heaviness of smoking: using self-reported time to the first cigarette of the day and number of cigarettes smoked per day. Br J Addict. 1989;84(7):791-9.
3. Baxter N. Getting the basics right: why a carbon monoxide test is an essential part of a GP and practice nurse's kit https://www.pcrs-uk.org/sites/pcrs-uk.org/files/CarbonMonoxideTesting.pdf2016