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26.6.3 Smoking cessation 6533 with a BMI greater than 40 kg/m2, may be referred for specialist review and considered for bariatric services. Several different surgical techniques are available, with losses ranging from 10 to 15 kg for gastric bands to over 20 kg for gastric bypass with correspondingly greater improvements in health. Long-term follow-up of matched populations shows significant reductions in the inci- dence of diabetes, myocardial infarction, and stroke, and in overall mortality rates. Prognosis Given the linear associations between adiposity and risk of morbidity and mortality, weight loss should proportionally reduce risk of future ill health. However, there is much less data on the associ- ation between weight loss and long-term health outcomes than there is on the association of excess weight and health risk. A systematic review of trials examining the association between change in weight and change in blood pressure reported that each kilogram lost reduced systolic blood pressure by 1 mm of mer- cury, although a systematic review and meta-analysis of studies with a follow-up of longer than 12 months found a smaller benefit. Similarly, a systematic review and meta-analysis of studies on the association between weight loss and change in lipids confirmed the linear association we might expect between reducing weight and re- ductions in triglycerides, LDL, and total cholesterol and increases in HDL cholesterol. In patients with type 2 diabetes, weight loss of about 5 kg is associated with a reduction in fasting blood glucose of about 0.2 mmol/litre at 12 months. The strongest evidence for a causal association between losing weight and improved health comes from clinical trials. Systematic reviews of these show that relatively brief weight loss programmes reduce the incidence of diabetes by half in the following few years, despite some weight regain. Two trials with long-term follow-up found that the benefit of the weight loss programme persisted to at least 10 years, even if the weight lost was later regained. Other studies show weight loss induced symptomatic improvements in clinical conditions such as sleep apnoea, atrial fibrillation, and non-alcoholic fatty liver disease. While weight regain is common after all interventions, there are health benefits from even short periods of reduced weight. Moreover, with each weight loss attempt, a proportion of people will succeed in making long-term changes to their eating and activity, a situation analogous to interventions for smoking cessation. Conclusions There is growing evidence that a range of interventions offered to patients by medical practitioners can achieve at least short-

term weight loss and clinical benefits. While bariatric surgery may be the most effective intervention for individuals with very high BMI and at significant risk of comorbidities, there is a less costly, but pressing need to provide access as part of routine medical care to effective weight management services for the large proportion of the population who are obese. Treating obesity is a cost-effective intervention to reduce the burden of a host of comorbid conditions at a population level. FURTHER READING Aveyard P, et al. (2016). Screening and brief intervention for obesity in primary care: a parallel, two-arm, randomised trial. Lancet, 388, 2492–500. Dietz WH, et al. (2015). Management of obesity: improvement of health-care training and systems for prevention and care. Lancet, 385, 2521–33. Jensen MD, et al. (2014). AHA/ACC/TOS guideline for the management of overweight and obesity in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and The Obesity Society. J Am Coll Cardiol, 63, 2985–3023. Royal College of Physicians (2015). Action on obesity: comprehensive care for all. https://www.rcplondon.ac.uk/sites/default/files/action- on-obesity.pdf Wormser D, et al. (2011). Separate and combined associations of body- mass index and abdominal adiposity with cardiovascular disease: col- laborative analysis of 58 prospective studies. Lancet, 377, 1085–95. 26.6.3 Smoking cessation Paul Aveyard ESSENTIALS Smoking is harmful to health. The main harms are cardiovascular dis- ease, lung cancer, and chronic obstructive pulmonary disease. Most people who smoke start in their teens, and some become addicted. Stopping smoking may be prompted by public policy or price rises, and while physicians have a role in lobbying for these, the main op- portunity a physician has to help their patients stop smoking is during the medical consultation. Advising the patient to stop has some effect, but is more likely to be effective when combined with practical help, the best form of which is regular face-to-face meetings to support the patient combined with drugs that reduce craving. Helping a patient to stop smoking greatly reduces their risk of illness and early death. Introduction Tobacco smoking is the world’s leading cause of drug-related harm. The rise and fall of smoking in a population can been seen as occurring in four stages: in stage one the rate of smoking is low and confined to men, with correspondingly low morbidity and mortality. In the second stage, the rate rises rapidly among men and starts among women. By the third stage, the rate rises rapidly in women and morbidity and mortality become evident. In the fourth stage, there is a legacy of tobacco-related harm, which drives tobacco con- trol, which reduces the rate of smoking. Countries like the United Kingdom are in the fourth of these stages, with rates of smoking now falling rapidly; in 2016, only 17% of adults and 3% of young people smoke. However, smoking remains a major public health problem. Most patients and all doctors know that smoking is harmful and that stopping smoking is a good thing. This chapter reviews evidence for

 benefits of stopping smoking and outlines how doctors can inter- vene most effectively to help their patients to do this. Smoking behaviour Initiation of smoking Most people start smoking in adolescence. This observation is often ascribed to peer pressure, and there is strong evidence that a person is more likely to smoke if they are part of a social network in which others smoke. It is doubtful that the influence is directly due to pres- sure from a proselytizing minority of smokers systematically re- cruiting into its ranks; indeed, there is evidence that pressure works the other way, with young people who start smoking being pres- surized to desist by their nonsmoking peers. Nevertheless, there is clear evidence that smoking starts as an act of social affiliation with a strong social meaning in adolescence. Tobacco addiction In many countries, most people have tried smoking cigarettes but only a few people persist. There is strong evidence from twin and adoption studies that what determines who

continues to smoke is explained gen- etically, as with other drugs of addiction. Furthermore, the propensity to successfully stop smoking also appears to be explained genetically. Although candidate genes are associated with smoking persistence, their individual effects are weak, implying that complex polygenetic mechanisms are responsible for this unfortunate inheritance. Smoking is largely maintained by addiction. Most people who smoke and live in countries where smoking is stigmatized show signs of dependence. Nicotine is the principal vehicle of addiction to cigarettes, though nicotine is not particularly liable to cause de- pendence without being associated with other aspects of smoking behaviour. These may be regarded as secondary reinforcers and in- clude the 'catch' of smoke in the throat. This may be why few people become addicted to nicotine without having smoked cigarettes. The volatile components of cigarette smoke carry the nicotine into the lungs where it is absorbed in the alveoli and rapidly transported to the brain. Here it binds to acetylcholine receptors in the ventral tegmental area. These neurons project to the nucleus accumbens where they lead to dopamine release in the core and shell, inducing pleasure and habit-related learning. Regular smoking leads to neuroadaptation of this pathway, which helps maintain the behav- iour. Nicotine is rapidly metabolized by the liver to nonpsychoactive compounds. Consequently, regular smokers come to experience a nicotine hunger when they have not smoked for a while, creating a drive to smoke. In addition, nicotine withdrawal induces a mild to moderate aversive state of negative affect and irritability. The culmination of these mechanisms is that people who smoke typically experience unwilled impulses to smoke in situations where they characteristically smoked in the past. When a person decides to stop smoking, these impulses are experienced as cravings. The strength and frequency of cravings decreases over about six weeks, but this period varies greatly. The aim of smoking cessation treat- ment is to drive down the strength of urges to smoke and to support people's commitment and ability to resist them. The learnt response to cues that give rise to the urge to smoke are unlearnt as long as smoking is not reinstated. Maintaining abstinence then becomes easier. Consequently, the critical period in which smokers need sup- port not to return to smoking is the first few months of abstinence. Risks of continued smoking and benefits of cessation Smoking remains a highly dangerous behaviour. A lifetime of smoking reduces average life expectancy by 10 years. People who smoke have approximately double the risk of death at any given age and there is a dose-response relationship with amount smoked. Smoking causes this excess morbidity and mortality by three main routes. These are, in order of importance, cardiovascular disease (CVD) (principally ischaemic heart disease and stroke), lung cancer, and chronic obstructive pulmonary disease (COPD). • The risk of CVD is increased three fold in smokers during middle age. Importantly, for the risk of CVD, light smoking is almost as hazardous as heavy smoking. Cessation quickly reduces this risk; it is halved in the first year and falls to that of a lifelong nonsmoker after 10 years. • The risk of lung cancer has a very steep dose-response relationship with amount smoked; it increases risk 20-fold in heavy smokers. Stopping smoking at any age reduces the risk of developing lung cancer. • People who smoke are three to five times more likely to suffer from COPD. As many as 30% of lifelong smokers will develop COPD. Stopping smoking reverts the rate of decline of lung func- tion to that of nonsmokers and is the only treatment known to achieve this. The net effect of both the cumulative damage from smoking and the remarkable benefits of cessation mean that we can say that for every day a person smokes after the age of 35 years that person will lose six hours of life. This evidence underlines the imperative of stopping smoking before middle age and how important it is for physicians to help their patients to do this (Table 26.6.3.1). Helping people to stop smoking Public health interventions for smoking cessation The main reason people stop smoking is concern about the effect on their health, though in many countries the price of cigarettes is also a factor.

Public policy measures can support cessation by influencing the acceptability, affordability, and availability of cigar- ettes, and many countries have enacted tobacco control legislation
Table 26.6.3.1 Years of life gained from stopping smoking at various ages relative to people who continue smoking throughout life in the British Doctors Study Age when stopping smoking Years of life gained 25–34 years 10 35–44 years 9 45–54 years 6 55–64 years 3

26.6.3 Smoking cessation 6535 and policies. These measures are described in the world's first public health policy document, the World Health Organization (WHO)'s Framework Convention on Tobacco Control. • While measures such as banning smoking in public places are mainly intended to protect nonsmokers from harm, they also reduce the perceived acceptability of smoking indoors at home and in general. • Specific tobacco taxes are levied in almost all countries, with many committed to above inflation price increases. Increasing price is probably the single most effective prompt for cessation and is par- ticularly motivating when the price increases create 'left digit ef- fects' (e.g. from £6.xx to £7.xx for a pack of cigarettes). • Warnings on packets, particularly graphic warnings, and the removal of branding logos from cigarette packs affect people's perceptions of the acceptability of smoking and lead to some people stopping. Governments do not automatically adopt these policies. They come about only because physicians and others lobby for them, hence physicians have a key role in advocacy in this area. Physician-delivered interventions for smoking cessation Physicians have a directly therapeutic role in supporting their pa- tients' efforts to quit smoking. The first and most direct way of doing this is to advise patients to stop smoking because of the adverse effects on their health. Giving this advice has been the cornerstone of guide- lines on helping people stop, because there is clear evidence from a meta-analysis of trials that it is effective in promoting attempts to quit smoking. However, the same meta-analysis also found that not only advising but also offering help to stop smoking was even more effective. It is therefore best for physicians to offer advice about the harm resulting from smoking and to offer the patient help to stop. The help should include both psychological support and drug therapy. These are effective both alone and together in improving the chance of successful cessation. Without help, half of all quit attempts fail within a week and only about 5% of attempts are successful at six months. Psychological support Psychological support helps achieve smoking cessation by keeping people committed to the goal that they have set themselves. It can also help patients to use strategies to make cessation easier, such as removing or avoiding the cues that prompt them to smoke. Self- help resources, such as booklets, are only modestly more effective than no support. More intensive support provided without direct personal contact, such as by automated text messages or via online self-help programmes, is also only modestly effective. Many coun- tries provide quitlines and trials suggest that access to a quitline also modestly boosts success. However, probably the most effective ways of providing psychological support for stopping is by regular sched- uled face-to-face meetings, either individually or in groups. Drugs to aid smoking cessation The effectiveness of drugs in helping patients achieve cessation relates directly to the degree to which they suppress the urge to smoke. Three drugs are in widespread use: bupropion, nicotine replacement therapy (NRT), and varenicline. A network meta- analysis of randomized controlled trials shows that the two most effective pharmacotherapies are varenicline and combination NRT. Combination NRT means using two forms of NRT together, usually a nicotine patch for long-term suppression of urges, together with a short-acting form of NRT that suppresses the urge to smoke when administered acutely. The use of these drugs doubles the chance of successful cessation. While all medications have adverse effects, those of smoking ces- sation medication must be compared with the adverse effects of con- tinued smoking. The main adverse effects are as follows: • Bupropion causes fits in one in 1000 users, which is the most ser- ious

adverse event. Around 1 in 10 users cease treatment due to adverse events, principally insomnia, headache, dry mouth, and gastrointestinal upset. • Nicotine replacement causes irritation at the site of administra- tion (i.e. skin or mouth irritation). • Varenicline has been associated with psychological disturbance in case reports but not in controlled studies. It commonly causes nausea and insomnia. Discontinuation due to adverse events oc- curs in around 1 in 20 users. Electronic cigarettes Electronic cigarettes have become popular in recent years. The few trials so far published suggest that they function as well as conven- tional NRT. Undoubtedly the rapid increase in popularity of this ap- proach is likely to lead to product development, which may increase the appeal still further and increase the efficacy of these and other al- ternative nicotine delivery devices. While we clearly lack long-term epidemiological data on their continued use, analyses of the vapour produced suggests there are no particular reasons to be concerned about the health risks for smokers switching to electronic cigarettes. Conclusions Many people who smoke try and fail to stop smoking. However, most will succeed in the end, and the sooner they do so the greater the chance of avoiding the harms that result from smoking. Repeated attempts to help them with advice, ongoing face-to-face support, and effective pharma- cotherapy offer the best opportunities to help them stop and avoid the harm to their health that would result from continuing to smoke. FURTHER READING Mechanisms of addiction to tobacco West R, Brown J (2013). Theory of addiction, 2nd edition. Addiction Press, Wiley Blackwell, London. Assisting cessation Aveyard P, Raw M (2012). Improving smoking cessation at the indi- vidual level. Tobacco Control, 21, 252–7. Aveyard P, et al. (2012). Brief opportunistic smoking cessation inter- ventions: a systematic review and meta-analysis to compare advice to quit and offer of assistance. Addiction, 107, 1066–73. Hartmann-Boyce J, Aveyard P (2016). Therapeutics: pharmacotherapy for smoking cessation. BMJ, 352, i571. Harms from smoking and benefits of smoking cessation Pirie K, et al. (2013). The 21st century hazards of smoking and benefits of stopping: a prospective study of one million women in the UK. Lancet, 381, 133–41.

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