Smoking and Other Health Conditions

ASH Fact Sheet | August 2025

Contents

Plain English Summary

It is well-known that smoking causes cancer, lung disease and heart disease, and that smoking while pregnant can harm the unborn child. Smoking harms nearly every single organ in the body and also causes a range of other diseases.

In this factsheet, we discuss the links between smoking and:

- Diabetes
- Eye diseases
- Mouth diseases
- Multiple Sclerosis (MS)
- Meningitis and septicaemia
- Dementia

You have a lower risk of some forms of these diseases if you've never smoked than if you smoke now. For most of these diseases, people who have quit smoking have a lower risk than people who still smoke. Sometimes, quitting smoking after you develop the disease can still improve symptoms.

Introduction

Smoking is the leading cause of premature, preventable death globally.[1] [2] Tobacco kills up to two-thirds of its long-term users, which equates to 8 million deaths a year globally.[2] [3] As well as being lethal, smoking harms nearly every organ of the body and affects a person's overall health.[4] It is well-known that smoking causes cancer, lung disease and heart disease, and that smoking while pregnant can harm foetal development. This factsheet lists some of the other health impacts of smoking: diabetes, eye and mouth diseases, multiple sclerosis, meningococcal disease causing meningitis and septicaemia, and dementia.

See also:

ASH Factsheet: Smoking and Cancer

ASH Factsheet: Smoking, the Heart and Circulation

ASH Factsheet: Smoking and Respiratory Disease

ASH Factsheet: Smoking, Pregnancy and Fertility

ASH Factsheet: Smoking and Mental Health

Smoking and Diabetes

Diabetes is a metabolic condition which causes increased glucose levels in the blood.[5] It can happen either when your body doesn't produce enough insulin or the insulin you are producing, doesn't properly control blood sugar. There are two main types of diabetes, Type 1 and Type 2. Nine in ten people with diabetes have Type 2, which tends to develop gradually as people get older, usually after the age of 40. But more and more people every year are being diagnosed at a much younger age.[6]

Cigarette smoking is one of the most important modifiable risk factor for type 2 diabetes.[7] Smoking is associated with a 30-40% increased risk of type 2 diabetes, and passive smoking also increases the risk of developing diabetes.[8] [4] A study published in 2018 shows that there is a clear dose-response relationship with diabetes and the amount smoked or the earlier a person started smoking.[9] According to the Surgeon General's Report, there are several ways in which smoking may increase a person's risk for developing type 2 diabetes, but this is not yet fully understood.[4]

As well as increasing the chances of developing diabetes, smoking puts people who do have type 1 or type 2 diabetes at higher risk of developing complications.[10] [11] People with type 1 and type 2 diabetes who smoke are more likely to die prematurely than those who don't smoke.[12] Smoking can make managing type 2 diabetes and regulating insulin levels more difficult because high levels of nicotine can lessen the effectiveness of insulin, causing smokers to need more insulin to regulate blood sugar levels.[13]

Smoking and Eye Disease

Diseases of the eye cause vision loss, which can make everyday activities such as reading, driving and watching television difficult or impossible. Smoking can cause or exacerbate several major eye conditions, including age-related macular degeneration, cataracts, diabetic retinopathy, thyroid eye disease and optic neuropathy. Smoking during pregnancy can cause severe birth defects of the eye.

Age related macular degeneration (AMD) is a degenerative condition which makes the central area of vision blurred, dark and distorted. People who smoke are up to four times more likely to have AMD than people who have never smoked.[14] Smoking at least doubles the risk of developing AMD, which tends to develop earlier in people who smoke.[15] This is because cigarette smoke has toxic effects on the retina.[16 17 18]

A cataract is a clouding in the lens of the eye that causes blurred vision and, if left untreated, can lead to vision loss. Smoking is a major risk factor in the development of cataracts.[19] Smoking leads to around a 3-fold increase in the risk of cataract development.[20] The risk of developing cataracts increases with the amount smoked and cataracts are more severe in people who smoke heavily.[21]

Diabetic retinopathy is an eye complication associated with diabetes in which the blood vessels that supply the retina are damaged by high blood sugar levels. It can eventually cause blindness.[22] People who have type 1 diabetes may be more likely to develop diabetic retinopathy if they smoke.[23] Smoking may be associated with slightly lower likelihood of developing diabetic retinopathy in people with type 2 diabetes. However, the risks of smoking to people with diabetes enormously outweigh any such unusual results.

Thyroid eye disease (TED), is an autoimmune disease which can cause the eyes to be pushed forward ('staring' or 'bulging' eyes) and the eyes and eyelids to become swollen.[24] There is strong evidence of an association between smoking and the development of thyroid eye disease, which is related to the number of cigarettes smoked per day.[25 26] People with Graves' disease who smoke have a four-fold increased risk of developing the condition, when compared to non-smokers.[27]

Optic neuropathy is damage to the optic nerve, which transmits visual information from the retina to the brain. There are two types, anterior ischaemic optic neuropathy (AION), a type of optic neuropathy which results in sudden loss of vision, often leading to permanent blindness,[28] and Leber's hereditary optic neuropathy (LHON) is a mitochondrially inherited disease leading to loss of central vision.[29] There is some evidence suggesting that smoking may play a role in developing both AION[30] and LHON.[31]

Maternal smoking has been found to increase the risk of a number of eye defects in unborn children including: astigmatism (misshapen eyes), anophthalmia (absence of eye), microphthalmia (abnormally small eyes), strabismus (crossed eyes), esotropia (both eyes turned inwards), exotropia (eyes turned outwards) and optic nerve hypoplasia (underdeveloped or absent optic nerve).[32 33 34]

Smoking and Oral Health

Smoking can severely harm the mouth, causing damage to bones and increasing the risk of oral cancer. Mouth problems from smoking also include several aesthetic or more minor issues such as stained teeth, halitosis, tooth caries and tooth loss.[35 36 37]

The US Surgeon General concludes that tobacco use in any form is one of the major causes of oral cancer, accounting for more than 90% of cases.[4] The most common place for oral cancers to occur are the tongue (20%), the gingiva (gums) (18%), floor of mouth (12%), lip (11%) and salivary gland (8%).[38] Cigarette smokers have over a three-fold increased risk of oral cancer compared to individuals who have never smoked.[39 40] Smoking cessation reduces the risk of oral cancer and other diseases of the mouth.[41] However, there is some evidence to suggest that it may take at least twenty years for the risk to fall to that of never smokers.

Periodontitis is a type of gum disease can lead to tooth loss, bone loss, impaired wound healing, impaired taste and bad breath. It has been estimated that people who smoke have between a 5 fold and 20 fold increased risk of periodontal disease.[42] There is good evidence to suggest that quitting smoking reduces the risk of periodontal disease.[43] However, it can be many years before a former smoker's risk of tooth loss falls to that of a never smoker.

Smoking cigars, cigarillos and pipes poses similar risks to the mouth as smoking cigarettes.[44 45 46] The risks of mouth disease from using smokeless tobacco (eg snus or chewing tobacco) are also substantial.[47 48]

See also:
ASH Factsheet: Smoking and Cancer

Smoking and Multiple Sclerosis

Multiple Sclerosis (MS) is a neurological condition that affects the brain and spinal cord. The nerves in the brain and spinal cord are protected by substance called myelin; but in people with MS, the immune system wrongly identifies myelin as a foreign body and attacks it, causing inflammation and damage. The loss of myelin leaves nerves exposed to direct damage. This direct damage to causes an increase in disability that becomes noticeable over time.[49]

Increasing evidence shows that smoking is a risk factor for developing MS, and evidence suggests smoking rates are higher among people with MS than the general population, although the exact mechanism for this is currently unclear.[50] Recent studies have suggested smoking can increase risks of developing MS by as much as 50%. A 2016 meta-analysis including nearly 20,000 cases of MS found that both current and former smokers had an elevated risk of developing MS.[51] This is supported by a 2017 systematic review and meta-analysis which found strong evidence of a causal role for smoking in development of MS.[52]

There is tentative evidence that passive exposure to smoke raises the risk for MS.[53 54] Alongside being a risk factor for the development of MS, there is evidence that smoking can worsen the disability progression associated with MS.[55] A systematic review of the association between smoking and MS, looking at papers published between 1965 and 2018, found that: "patients with MS who smoke have higher rates of disease activity, faster rates of brain atrophy, and a greater disability burden."[56]

Smoking, Meningitis and Septicaemia

Meningococcal disease (MD) is an infection caused by bacteria known as meningococcus. Infection can occur at any age but young children, teenagers and those with impaired immune systems are especially susceptible.[57] It can cause two major illnesses: meningitis and septicaemia. Meningitis refers to the swelling of the meninges, the protective membrane layers surrounding the brain and spinal cord. Septicaemia, on the other hand, is a severe blood infection, which can trigger sepsis. Both meningitis and septicaemia are life-threatening medical emergencies, and they can occur individually or together. They can also be caused by infections other than MD.

Research has established that there is a dose–response relationship between smoking and the risk of meningococcal disease in all age groups.[58 59] It has been estimated that smoking is responsible for half of all cases of MD.[60 61] Exposure to second-hand smoke, especially among children, is also a clear risk factor for developing MD.[61]

One explanation for the increased rates of meningococcal disease in smokers and passive smokers may lie in the increased ability of bacteria to adhere to and multiply on the mucosa cells of the nasopharynx.[62 63] This may mean that smokers are more likely to carry and transmit the MD bacteria.[64] Furthermore, smoking is also a known risk factor for infection in general, so it is likely that this is a contributing factor in the link between tobacco use and MD.[65 66]

Smoking and Dementia

Dementia is an umbrella term a for a range of progressive neurodegenerative conditions which are characterised by symptoms such as memory loss, difficulties with thinking, problem-solving or language (cognitive function).[67] The most common causes of dementia are Alzheimer's disease, vascular dementia, frontotemporal dementia and dementia with Lewy bodies.[68] It can be caused by a combination of different types which is sometimes referred to as mixed dementia.[69] The risk of dementia increases strongly with age. In all types of dementia, nerve cells are destroyed, damaging the brain.[70]

There is now strong evidence that smoking is associated with an increased risk of dementia.[71 72] A 2017 Lancet Commission on dementia risk ranked smoking third among 9 modifiable risk factors for dementia.[73] The WHO estimates that 14% of cases of Alzheimer's disease worldwide are potentially attributable to smoking.[74] Studies also suggest that in those exposed to second hand tobacco smoke over many years there may be a dose-response relationship between the level of exposure and the risk of dementia.[75 76 77]

Selection bias may affect the outcome of some studies since a higher proportion of smokers die prematurely.[78] Therefore, it is possible that the association between smoking as a risk factor for dementia has been obscured in the past.[79]

Some studies conducted in the early 1990s had suggested that smoking had a protective effect against dementia, particularly Alzheimer's disease. This idea was perpetuated by the tobacco industry which influenced a number of studies examining smoking and mental health disorders. The theory has now been discredited.[80]

Current understanding of the mechanistic links between smoking and dementia is limited. Nevertheless, chronic exposure to cigarette smoke has been linked to oxidative stress which may speed up the onset of dementia.[81] Smoking also increases the risk of developing risk factors for Alzheimer's disease such as stroke and hypertension.[82]

See also:
ASH Factsheet: Smoking and Mental Health

References

Please cite as: Action on Smoking and Health (ASH). *Smoking and Other Health Conditions.* 2025.

Online links last checked March 2025.

[1] Centers for Disease Control and Prevention Tobacco Free. **Fast Facts and Fact Sheets.**

[2] World Health Organisation. **Tobacco Fact sheet.**

[3] WHO **Global report on trends in prevalence of tobacco use 2000-2025.** Third edition.

[4] National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health. **The Health Consequences of Smoking—50 Years of Progress: A Report of the Surgeon General.** 2014

[5] Diabetes UK. **About Diabetes**.

[6] NHS England News. **NHS identifies over half a million more people at risk of type 2 diabetes in a Year 2024**

[7] Maddatu J, Anderson-Baucum E, Evans-Molina C. **Smoking and the risk of type 2 diabetes.** Transl Res. 2017

[8] Pan A, Wang Y, Talaei M, Hu FB, Wu T. **Relation of active, passive, and quitting smoking with incident type 2 diabetes: a systematic review and meta-analysis.** Lancet Diabetes Endocrinol. 2015

[9] Liu, XinChen, Junshi et al. **Smoking and smoking cessation in relation to risk of diabetes in Chinese men and women: a 9-year prospective study of 0·5 million people.** The Lancet Public Health. 2018

[10] Jiang N, Huang F, Zhang X. **Smoking and the risk of diabetic nephropathy in patients with type 1 and type 2 diabetes: a meta-analysis of observational studies.** Oncotarget. 2017

[11] Hammes HP, Kerner W, Hofer S, Kordonouri O, Raile K, Holl RW. **Diabetic retinopathy in type 1 diabetes-a contemporary analysis of 8,784 patients.** Diabetologia. 2011

[12] Qin R, Chen T, Lou Q et al. **Excess risk of mortality and cardiovascular events associated with smoking among patients with diabetes: meta-analysis of observational prospective studies.** International Journal of Cardiology. 2013

[13] Arnaud Chiolero, David Faeh, Fred Paccaud, Jacques Cornuz, **Consequences of smoking for body weight, body fat distribution, and insulin resistance.** The American Journal of Clinical Nutrition. 2008

[14] Macular Society. **Smoking and sight loss.**

[15] Yu SS, Tang X, Ho YS, Chang RC, Chiu K. **Links between the brain and retina: The effects of cigarette smoking-induced age-related changes in Alzheimer's disease and macular degeneration. Frontiers in neurology.** 2016

[16] Thornton J, Edwards R, Mitchell P, Harrison RA, Buchan I, Kelly SP. **Smoking and age-related macular degeneration: a review of association.** Eye. 2005

[17] Velilla S et al. **Smoking and age-related macular degeneration: review and update.** J Ophthalmol. 2013.

[18] Alice LY, Birke K, Burger J, Welge-Lussen U. **Biological effects of cigarettes smoke in cultured human retinal pigment epithelial cells.** PloS one. 2012

[19] Hodge WG, Whitcher JP, Satariano W. **Risk factors for age-related cataracts.** Epidemiologic reviews. 1995.

[20] Kelly S, Thornton J, Edwards R, Sahu A, Harrison R. **Smoking and cataract: review of causal association.** Journal of Cataract & Refractive Surgery. 2005

[21] Robman L, Taylor H. **External factors in the development of cataract.** Eye. 2005

[22] NHS. **Overview, Diabetic retinopathy.** NHS.

[23] Cai, X., Chen, Y., Yang, W. et al. **The association of smoking and risk of diabetic retinopathy in patients with type 1 and type 2 diabetes: a meta-analysis.** Endocrine. 2018

[24] British Thyroid Foundation. **Thyroid Eye Disease.**

[25] Wiersinga WM. **Smoking and Thyroid.** Clin Endocrinol. 2013

[26] Thornton, J., Kelly, S., Harrison, R. et al. **Cigarette smoking and thyroid eye disease: a systematic review.** Eye. 2007

[27] Hegedüs L, Brix TH, Vestergaard P. **Relationship between cigarette smoking and Graves' ophthalmopathy.** Journal of endocrinological investigation. 2004

[28] Medscape. **Anterior Ischemic Optic Neuropathy (AION).**

[29] Man PY, Turnbull DM, Chinnery PF. **Leber hereditary optic neuropathy.** Journal of medical genetics. 2002

[30] Sophia M. Chung, Creston A. Gay, John A. McCrary. **Nonarteritic Ischemic Optic Neuropathy: The Impact of Tobacco Use.** Ophthalmology. 1994

[31] Kirkman MA, Yu-Wai-Man P, Korsten A, Leonhardt M, Dimitriadis K, De Coo IF, Klopstock T, Chinnery PF. **Gene–environment interactions in Leber hereditary optic neuropathy.** Brain. 2009

[32] Hackshaw A, Rodeck C, Boniface S. **Maternal smoking in pregnancy and birth defects: a systematic review based on 173 687 malformed cases and 11.7 million controls.** Human reproduction update. 2011

[33] McKean-Cowdin R, Varma R, Cotter SA, Tarczy-Hornoch K, Borchert MS, Lin JH, Wen G, Azen SP, Torres M, Tielsch JM, Friedman DS. **Risk factors for astigmatism in preschool children: the multi-ethnic pediatric eye disease and Baltimore pediatric eye disease studies.** Ophthalmology. 2011

[34] Pueyo V, Güerri N, Oros D, Valle S, Tuquet H, González I, Ferrer C, Pablo LE. **Effects of smoking during pregnancy on the optic nerve neurodevelopment.** Early human development. 2011

[35] Johnson N, Bain C. **Tobacco intervention: Tobacco and oral disease.** British Dental Journal 2000

[36] Asmussen, E Hansen EK. **Surface discoloration of restorative resins in relation to surface softening and oral hygiene.** European Journal of Oral Sciences. 1986

[37] Dept of Health & Human Services. **Oral health in America: a report of the Surgeon General.** Rockville, MD: National Institute of Dental and Craniofacial Research, National Institutes of Health 2000

[38] National Cancer Institute & Institute of Dental Research Guide for health professionals. **Tobacco Effects In The Mouth.** DIANE Publishing. 2004

[39] Gandini S, Botteri E, Iodice S, et al. **Tobacco smoking and cancer: A meta-analysis.** International Journal of Cancer 2008

[40] Scully C, Warnakulasuriya S. **The role of the dental team in preventing and diagnosing cancer: 4. Risk factor reduction: tobacco cessation.** Dental update. 2005

[41] Warnakulasuriya S, Dietrich T, Bornstein MM, et al. **Oral health risks of tobacco use and effects of cessation.** International Dental Journal. 2010

[42] Bergström J. **Tobacco smoking and chronic destructive periodontal disease.** Odontology 2004

[43] Duarte PM, Nogueira CFP, Silva SM, Pannuti CM, Schey KC, Miranda TS. **Impact of Smoking Cessation on Periodontal Tissues.** Int Dent J. 2022

[44] Wyss A, Hashibe M, Chuang SC, Lee YC et al. **Cigarette, cigar, and pipe smoking and the risk of head and neck cancers: pooled analysis in the International Head and Neck Cancer Epidemiology Consortium.** Am J Epidemiol. 2013

[45] Jyoti Malhotra, Claire Borron, Neal D. Freedman et al. **Association between Cigar or Pipe Smoking and Cancer Risk in Men: A Pooled Analysis of Five Cohort Studies.** Cancer Prev Res (Phila). 2017

[46] Albandar JM, Streckfus CF, Adesanya MR, Winn DM. **Cigar, pipe, and cigarette smoking as risk factors for periodontal disease and tooth loss.** J Periodontol. 2000

[47] Critchley JA, Unal B. **Health effects associated with smokeless tobacco: a systematic review.** Thorax. 2003

[48] The US Surgeon General. **The Health Consequences of Using Smokeless Tobacco.** 1986

[49] MS Society **What is MS?**

[50] Degelman ML, Herman KM. **Smoking and multiple sclerosis: a systematic review and meta-analysis using the Bradford Hill criteria for causation.** Mult Scler Relat Disord. 2017

[51] Zhang P. Wang R. Li Z. Wang Y. Gao C. Lv X. et al. **The risk of smoking on multiple sclerosis: a meta-analysis based on 20,626 cases from case-control and cohort studies.** PeerJ. 2016

[52] Degelman ML, Herman KM. **Smoking and multiple sclerosis: A systematic review and meta-analysis using the Bradford Hill criteria for causation.** Mult Scler Relat Disord. 2017

[53] Hedström AK, Bäärnhielm M, Olsson T, Alfredsson L. **Exposure to environmental tobacco smoke is associated with increased risk for multiple sclerosis.** Mult Scler. 2011

[54] Mikaeloff Y, Caridade G, Tardieu M, Suissa S. KIDS EP study group. **Parental smoking at home and the risk of childhood-onset multiple sclerosis in children.** Brain. 2007

[55] Sundström, P., and L. Nyström. **Smoking Worsens the Prognosis in Multiple Sclerosis.** Multiple Sclerosis Journal. 2008

[56] Rosso M, Chitnis T. **Association Between Cigarette Smoking and Multiple Sclerosis: A Review.** JAMA Neurol. 2020

[57] Meningitis Research Foundation. **Meningococcal Meningitis.**

[58] Spyromitrou-Xioufi P, Tsirigotaki M, Ladomenou F. **Risk factors for meningococcal disease in children and adolescents: a systematic review and META-analysis.** Eur J Pediatr. 2020

[59] Harrison LH, Pass MA, Mendelsohn AB, et al. **Invasive Meningococcal Disease in Adolescents and Young Adults.** JAMA. 2001

[60] Nuorti JP, Butler JC, Farley MM, Harrison LH, McGeer A, Kolczak MS, Breiman RF. **Cigarette smoking and invasive pneumococcal disease. Active Bacterial Core Surveillance Team.** N Engl J Med. 2000

[61] Murray RL, Britton J, Leonardi-Bee J. **Second hand smoke exposure and the risk of invasive meningococcal disease in children: systematic review and meta-analysis.** BMC public health. 2012

[62] El Ahmer OR, Essery SD, Saadi AT, Raza MW, Ogilvie MM, Weir DM, Blackwell CC. **The effect of cigarette smoke on adherence of respiratory pathogens to buccal epithelial cells.** FEMS Immunology & Medical Microbiology. 1999

[63] Yazdankhah SP, Caugant DA. **Neisseria meningitidis: an overview of the carriage state.** Journal of medical microbiology. 2004

[64] Pietro G Coen, Joanna Tully, James M Stuart, Deborah Ashby, Russell M Viner, Robert Booy. **Is it exposure to cigarette smoke or to smokers which increases the risk of meningococcal disease in teenagers?** International Journal of Epidemiology. 2006

[65] Arcavi L, Benowitz N. **Cigarette smoking and infection.** Arch Intern Med. 2004

[66] Garmendia J, Morey P, Bengoechea JA. **Impact of cigarette smoke exposure on host–bacterial pathogen interactions.** European Respiratory Journal. 2012

[67] NHS. **What is dementia.**

[68] Ljubenkov PA, Geschwind MD. **Dementia.** Semin Neurol. 2016

[69] Custodio, N et al. **Mixed dementia: A review of the evidence.** Dement Neuropsychologia. 2017

[70] World Health Organisation. **Dementia.**

[71] Choi D, Choi S, Park SM. **Effect of smoking cessation on the risk of dementia: a longitudinal study.** Annals of Clinical and Translational Neurology. 2018

[72] Zhong G, Wang Y, Zhang Y, Guo JJ, Zhao Y. **Smoking is associated with an increased risk of dementia: a meta-analysis of prospective cohort studies with investigation of potential effect modifiers.** PloS one. 2015

[73] Livingston G, Sommerlad A, Orgeta V, Costafreda SG, Huntley J, Ames D, Ballard C, Banerjee S, Burns A, Cohen-Mansfield J, Cooper C. **Dementia prevention, intervention, and care.** The Lancet. 2017

[74] McKenzie J, Bhatti L, Tursan d'Espaignet E. **WHO Tobacco Knowledge Summaries: Tobacco and dementia.** WHO. 2014

[75] Chen R, Hu Z, Orton S, Chen RL, Wei L. **Association of passive smoking with cognitive impairment in nonsmoking older adults: a systematic literature review and a new study of Chinese cohort.** Journal of Geriatric Psychiatry and Neurology. 2013

[76] Barnes DE, Haight TJ, Mehta KM, Carlson MC, Kuller LH, Tager IB. **Secondhand smoke, vascular disease, and dementia incidence: findings from the cardiovascular health cognition study**. American journal of epidemiology. 2010

[77] Llewellyn DJ, Lang IA, Langa KM, Naughton F, Matthews FE. **Exposure to secondhand smoke and cognitive impairment in non-smokers: national cross sectional study with cotinine measurement.** BMJ. 2009

[78] Hernán MA, Alonso A, Logroscino G. Commentary: **Cigarette Smoking and Dementia: Potential Selection Bias in the Elderly.** Epidemiology. 2008

[79] Durazzo TC, Mattsson N, Weiner MW. **Alzheimer's Disease Neuroimaging Initiative: Smoking and increased Alzheimer's disease risk: a review of potential mechanisms.** Alzheimers Dement. 2014

[80] Cataldo JK, Prochaska JJ, Glantz SA. **Cigarette smoking is a risk factor for Alzheimer's Disease: an analysis controlling for tobacco industry affiliation.** Journal of Alzheimer's disease. 2010

[81] Durazzo TC, Mattsson N, Weiner MW. **Alzheimer's Disease Neuroimaging Initiative. Smoking and increased Alzheimer's disease risk: a review of potential mechanisms.** Alzheimers Dement. 2014

[82] Alzheimer's Society. **Does smoking increase your chance of dementia?**