

Cancer Prevention Must Begin Earlier: A Life-Course Perspective**Naveed Shuja¹**

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Cancer Prevention Must Begin Earlier: A Life-Course Perspective:

Cancer prevention is often treated as a concern of middle and older age, with screening and lifestyle counselling beginning only after major risks have developed. However, cancer results from the long-term interaction of genetic susceptibility, ageing, environmental exposures, social conditions and health behaviours. Prevention should therefore begin before carcinogenic exposures accumulate and precancerous changes appear [1,2].

A life-course approach recognizes that cancer risk is shaped from preconception and childhood through adolescence, adulthood and old age. Malignant transformation may follow decades of inflammation, infection, hormonal stimulation, immune dysfunction, poor nutrition and exposure to carcinogens. Opportunities for prevention therefore exist throughout life, not only when screening becomes appropriate [3,4].

Prevention may begin during pregnancy. Maternal nutrition, obesity, smoking, pollution and occupational exposures can influence fetal development and later biological susceptibility. Protecting maternal health, improving antenatal nutrition and reducing harmful exposures should therefore be considered part of long-term disease prevention [5,6].

Childhood is another important period because dietary preferences, physical activity, sleep patterns and attitudes toward tobacco are often established early. Childhood obesity, ultraviolet exposure, second-hand smoke, polluted air, contaminated water and household chemicals may produce cumulative health effects [7,8]. Families and

schools can reduce these risks by providing nutritious food, safe physical activity, sun-protection education, smoke-free environments and age-appropriate health information [9,10].

Adolescence is marked by experimentation and growing independence. Tobacco use, vaping, alcohol consumption, unhealthy diets, inactivity and tanning may begin during this period and become difficult to reverse. Prevention should therefore create supportive environments rather than relying only on warnings [11].

Vaccination demonstrates how cancer can be prevented decades before diagnosis. HPV vaccination reduces the risk of cervical and other cancers, while hepatitis B vaccination lowers the risk of chronic infection and liver cancer. Barriers such as misinformation, cost, stigma and limited access must be addressed as public-health priorities [12].

Early adulthood is also frequently overlooked. During this stage, individuals enter workplaces, adopt independent eating and sleeping habits, become less active and may encounter occupational carcinogens. Preventive services in universities, workplaces, healthcare settings and communities should include vaccination, smoking cessation, nutritional counselling, physical activity, occupational protection and assessment of hereditary cancer risk [13,14].

Cancer prevention is not solely a matter of personal discipline. Access to healthy food, clean air, safe workplaces and healthcare is strongly influenced by social, commercial and political conditions. Population-level measures such as tobacco taxation, smoke-free laws,

vaccination programmes, pollution control, workplace safety, school nutrition policies and improved access to care are therefore essential, particularly for disadvantaged communities [15,16].

Screening remains important but should be viewed as one component of a broader prevention continuum. Mammography, cervical screening, colorectal screening and lung cancer screening can detect disease earlier, but they cannot reverse decades of harmful exposure. Prevention should begin long before the first screening encounter [3-6].

Healthcare systems should integrate prevention across all ages. Paediatric care should address vaccination, healthy weight, sun protection and tobacco exposure. Adolescent services should include sexual health, vaccines and substance-use prevention. Adult primary care should incorporate lifestyle support, family-history assessment and timely screening, while geriatric care should consider functional status, life expectancy and patient preferences [7-10].

Research should also adopt a longer-term perspective. More longitudinal studies are needed to examine how childhood nutrition, obesity, infections, pollution, occupational exposures, reproductive factors and social adversity interact over time. Particular attention should be given to vulnerable biological periods such as puberty, pregnancy, menopause and ageing [1,3,5-9].

This approach is especially important in low- and middle-income countries, where infection-related cancers coexist with cancers associated with smoking, obesity, inactivity, dietary change and pollution. Prevention strategies should be affordable, culturally appropriate and integrated into maternal health, vaccination, infectious-disease and primary-care services, supported by reliable cancer registries [1,2,5,8].

Early prevention also promotes equity by reducing differences in exposure and access to care. Universal vaccination, healthy schools, clean air, safe employment and accessible primary care can prevent inequalities from becoming established across generations [11,12].

The central message is clear: midlife is too late for cancer prevention to begin. Prevention should start with healthy pregnancies, continue through safe childhoods and informed adolescence, and remain part of adult and older-age healthcare. It requires coordinated action across oncology, primary care, education, occupational health, environmental policy and social services [1,13-16].

The greatest future reduction in cancer burden may come not from a single new treatment or diagnostic tool, but from acting decades earlier—before vulnerability becomes disease and prevention becomes rescue [1-5].

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REFERENCES:

1. Bever AM, Song M. Early-life exposures and adulthood cancer risk: a life course perspective. *J Natl Cancer Inst.* 2023;115(1):4-7. doi: 10.1093/jnci/djac193.
2. Jensen BW, Aarestrup J, Blond K, Jørgensen ME, Renahan AG, Vistisen D, et al. Childhood body mass index trajectories, adult-onset type 2 diabetes, and obesity-related cancers. *J Natl Cancer Inst.* 2023;115(1):43-51. doi: 10.1093/jnci/djac192.
3. Aarestrup J, Bjerregaard LG, Meyle KD, Pedersen DC, Gjørde LK, Jensen BW, et al. Birthweight, childhood overweight, height and growth and adult cancer risks: a review of studies using the Copenhagen School Health Records Register. *Int J Obes (Lond).* 2020;44(7):1546-1560. doi: 10.1038/s41366-020-0523-9.
4. Ugai T, Sasamoto N, Lee HY, Ando M, Song M, Tamimi RM, et al. Is early-onset cancer an emerging global epidemic? Current evidence and future implications. *Nat Rev Clin Oncol.* 2022;19(10):656-673. doi: 10.1038/s41571-022-00672-8.
5. Marley AR, Domingues A, Ghosh T, Turcotte LM, Spector LG. Maternal body mass index, diabetes, and gestational weight gain and risk for pediatric cancer in offspring: a systematic review and meta-analysis. *JNCI Cancer Spectr.* 2022;6(2):pkac020. doi: 10.1093/jncics/pkac020.
6. Mohammadian Khonsari N, Shahrestanaki E, Ehsani A, Asadi S, Sokoty L, Mohammadpoor Nami S, et al. Association of childhood and adolescence obesity with incidence and mortality of adulthood cancers: a systematic review and meta-analysis. *Front Endocrinol (Lausanne).* 2023;14:1069164. doi: 10.3389/fendo.2023.1069164.
7. Castle PE, Faupel-Badger JM, Umar A, Rebbeck TR. A proposed framework and lexicon for cancer prevention. *Cancer Discov.* 2024;14(4):594-599. doi: 10.1158/2159-8290.CD-23-1492.
8. GBD 2019 Cancer Risk Factors Collaborators. The global burden of cancer attributable to risk factors, 2010-19: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet.* 2022;400(10352):563-591. doi: 10.1016/S0140-6736(22)01438-6.
9. Clinton SK, Giovannucci EL, Hursting SD. The World Cancer Research Fund/American Institute for Cancer Research Third Expert Report on diet, nutrition, physical activity, and cancer: impact and future directions. *J Nutr.* 2020;150(4):663-671. doi: 10.1093/jn/nxz268.
10. Rumgay H, Shield K, Charvat H, Ferrari P, Sompaisarn B, Obot I, et al. Global burden of cancer in 2020 attributable to alcohol consumption: a population-based study. *Lancet Oncol.* 2021;22(8):1071-1080. doi: 10.1016/S1470-2045(21)00279-5.
11. Falcato M, Soldan K, Ndlela B, Sasieni P. Effect of the HPV vaccination programme on incidence of cervical cancer and grade 3 cervical intraepithelial neoplasia by socioeconomic deprivation in England: population-based observational study. *BMJ.* 2024;385:e077341. doi: 10.1136/bmj-2023-077341.
12. Falcato M, Castañón A, Ndlela B, Checchi M, Soldan K, Lopez-Bernal J, et al. The effects of the national HPV vaccination programme in England, UK, on cervical cancer and grade 3 cervical intraepithelial neoplasia incidence: a register-based observational study. *Lancet.* 2021;398(10316):2084-2092. doi: 10.1016/S0140-6736(21)02178-4.
13. Cao M, Fan J, Lu L, Fan C, Wang Y, Chen T, et al. Long-term outcome of prevention of liver cancer by hepatitis B vaccine: results from a randomized controlled trial with 37 years of follow-up. *Cancer Lett.* 2022;536:215652. doi: 10.1016/j.canlet.2022.215652.

14. Sim WMB, Zeng MX, Rojas-Garcia A. The effectiveness of educational programmes in promoting sun protection among children under the age of 18: a systematic review and meta-analysis. *J Eur Acad Dermatol Venereol*. 2021;35(11):2154-2165. doi: 10.1111/jdv.17599.
15. Reyes-Marcelino G, Wang R, Gultekin S, Humphreys L, Smit AK, Sharman AR, et al. School-based interventions to improve sun-safe knowledge, attitudes and behaviors in childhood and adolescence: a systematic review. *Prev Med*. 2021;146:106459. doi: 10.1016/j.ypmed.2021.106459.
16. Xiong X, Zhang S, Liao X, Du J, Zheng W, Hu S, et al. An umbrella review of the evidence associating occupational carcinogens and cancer risk at 19 anatomical sites. *Environ Pollut*. 2024;345:123531. doi: 10.1016/j.envpol.2024.123531.

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