An Economic perspective on the global burden of dental caries

Marko Vujicic*, and Stefan Listl** for the ACFF Make Cavities History Taskforce

Dental caries is associated with an economic cost, stemming from the amount spent directly on treating the disease as well as on the indirect costs associated with lost productivity. The indirect costs include mainly lost productivity to the economy due to absenteeism at work. We are not aware of any previously published analyses that estimate the economic burden of caries globally. Accordingly, we adopt a simple yet intuitive approach relying on previously published estimates of the global burden of disease for oral conditions and the global economic impact of dental diseases. We parse out the specific contribution of caries to derive the economic cost of caries worldwide.

The global burden of disease project quantifies the health loss to society stemming from various communicable and non-communicable diseases. This includes estimates for dental diseases, which include caries, periodontal disease, tooth loss, and all other conditions combined. According to the most recent data, caries directly accounts for 15% of the total global burden of dental disease[1]. However, caries is closely linked with both periodontal disease and, especially, tooth loss. A recent study quantified the link between untreated caries and tooth loss, estimating that 52% of tooth loss is actually attributed to untreated caries[2]. If we take account of this link and attribute 52% of the burden of disease for tooth loss to caries, we can conclude that an estimated 45% of the global burden of dental disease is directly or indirectly attributable to untreated caries. We are not aware of similar research that quantifies the link between caries and periodontal disease and, therefore, we do not attribute any of the burden of disease for periodontitis to caries in our estimate. Accordingly, our estimate should be considered a lower bound.

According to the most recent analysis available, the global economic cost of dental diseases is $544 billion, with $357 billion accounted for by direct costs of treatment and $187 billion in productivity losses[3] to the economy. If we assume that 45% of this economic burden can be attributed to caries, the resulting estimate is a global economic burden of caries of $245 billion. This includes an estimated $161 billion in direct treatment costs for caries and an estimated $84 billion in indirect productivity losses for caries.

Our estimates are subject to important limitations. For example, we assume that both treatment costs and indirect costs for caries, periodontal disease, and tooth loss are distributed in proportion to the burden of disease (i.e. disability adjusted life years) for these conditions. This ignores any differences in how much it costs to reduce burden of disease associated with caries versus tooth loss. However, we know of no analysis that sheds light on whether this is a significant empirical issue. In addition, our estimates are in 2015 dollars, as the underlying estimates of burden of disease we draw on are from 2015.

References

1- Kassebaum, NJ, Smith, AG, Bernabé, E, Fleming, TD, Reynolds, AE, Vos, T, Murray, CJ, Marcenes, W; GBD 2015 Oral Health Collaborators. 2017. Global, regional, and national prevalence, incidence, and disability-adjusted life years for oral conditions for 195 countries, 1990–2015: a systematic analysis for the global burden of diseases, injuries, and risk factors. J Dent Res. 96(4):380–387.
2- Passarelli PC, Pagnoni S, Piccirillo GB, et al. Reasons for Tooth Extractions and Related Risk Factors in Adult Patients: A Cohort Study. Int J Environ Res Public Health. 2020;17(7):2575. Published 2020 Apr 9. doi:10.3390/ijerph1707257
3- Righolt AJ, Jevdjevic M, Marcenes W, Listl S. Global-, regional-, and country-level economic impacts of dental diseases in 2015. J Dent Res. 2018;97(5):501-507.

* Dr Marko Vujicic-Chief Economist & Vice President, Health Policy Institute, American Dental Association.
** Professor Stefan Listl- Department of Dentistry - Quality and Safety of Oral Healthcare, Radboud University Medical Center, Nijmegen, The Netherlands & Section for Translational Health Economics, Department of Conservative Dentistry, Heidelberg University, Heidelberg, Germany.