Author’s response to reviews

Title: Needs-based workforce planning for the oral health workforce - development and application of a model for estimating the supply of and requirement for dentists

Authors:

Susan Ahern (susan.ahern@ucc.ie)

Noel Woods (n.woods@ucc.ie)

Olivier Kalmus (Olivier.Kalmus@med.uni-heidelberg.de)

Stephen Birch (stephen.birch@uq.edu.au)

Stefan Listl (Stefan.Listl@radboudumc.nl)

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Reviewer’s response to reviews:

Reviewer #1: I believe that this article can be published as is but it can be strengthened with a more in-depth discussion on requirements.

1. In the limitations the growth in cosmetic services as opposed to clinical need is identified but more explanation of the impact on the modelling would be useful.

Response: Agreed. While the paper does explain that the model presented specifically relates to workforce planning in the context of needs-based requirements for oral health care and recognises the limitation in not accounting for the growth in demand for cosmetic services, we have added the following text in the ‘Conclusions’ section (page 15, lines 14-18) to emphasize the impact of the provision of cosmetic services on modelling: "The model presented has been developed with a focus mainly on public provision of dental care according to population oral health needs. For areas of dentistry showing recent increasing demand, such as cosmetic dentistry, which may or may not be considered for public provision of dental care in the future, the model can be extended accordingly to incorporate different types of services."

2. The increasing role of dental teams in which the client sees the dental hygienist more often than the dentist is not discussed. As the model of oral care changes there will be an impact on the supply and requirement.
Response: The model assumption that all dental services will be delivered by dentists is recognised as a limitation on page 14 (lines 20-22). The role of other oral health care providers is acknowledged in the 'Conclusions' section and the paper explains that further development of the model could incorporate skill mix changes. (page 15, lines 19-21). We have also added to the discussion section with the following text to highlight the debate around the role of dental care professionals: “. . . acknowledge that there is increasing debate about the role of dental care professionals and the types of care they can effectively and efficiently deliver.”

3. Changing technology (implants for example) will have an impact on the market for dental services. The type of financing for dental services is also an important factor.

Response: These important factors are acknowledged, albeit they will be specific to a particular setting and should be incorporated in further development of the tool for country/setting specific follow-up work. However we have included the following text in the ‘Conclusions’ section (page 15, lines 18-19) “Additionally, the model is amenable to take account of technological advances in dentistry.”

4. It is clear that this team of researchers is aware of all these points. It may be helpful for readers who are less versed in this type of models to have a good understanding of what other data and information will be required for policy decisions on oral health providers

Response: Agreed. We believe we have highlighted the problems with data availability and the resulting implications for successful needs-based oral health workforce planning in the paper (page 14, lines 7-17).

However we have further emphasised the importance of specific data for effective workforce planning with the following text in the ‘Discussion’ section (page 14, lines 17-19) “If future dental workforces are to contribute efficiently to population wellbeing, there is a pressing need for more comprehensive monitoring of the inputs, outputs and outcomes associated with the provision of dental care.”

Reviewer #2: This is an interesting paper on an important topic. It is clearly presented and should be published to make an important contribution to the literature. It would, however, benefit from a number of minor changes prior to publication.

1. Abstract: the authors may wish to reflect on whether this is really a hypothetical model, when using real Irish data?
Response: We acknowledge this point and have revised the title to exclude the word 'hypothetical'. However a substantial amount of model input information is still based on hypothetical data, so the respective descriptions in the manuscript will have to remain unchanged.

2. **Method:** please note Ireland excludes Northern Ireland.

Response: Acknowledged. We have included ‘Republic of Ireland’ at the first reference to Ireland (page 8, lines 7) to make this clear.

3. **Discussion:** the authors may wish to develop the following points to enhance the discussion

* Recognise the challenges of the Irish system where there is limited public sector care. In fact, this is a major issue for many countries.

Response: The main aim of this paper is to demonstrate the feasibility of producing an oral health needs-based workforce planning simulation tool. It is not intended for the paper to serve to highlight the specifics of the Irish oral health system and Irish data has been solely used for the purpose of operationalising the model. As stated in the paper (page 6, lines 15-19), we chose to use the Eurobarometer data as it is available for many European countries and therefore any of these countries could have been the subject of the hypothetical model. However, we have included the following text in the ‘Conclusions’ section (page 15, lines 14-18) to be clear on what we’ve produced in this paper. "The model presented has been developed with a focus mainly on public provision of dental care according to population oral health needs..."

* Given that dentistry is largely delivered by independent providers, this impacts on the nature and volume of data available on what the workforce do, for how much of the week, and where; hence presenting a big challenge to modelling future workforce needs.

Response: Agreed. We have highlighted the paucity of available data to populate such models in the 'Discussion' section (page 14, lines 7 & 10-17) and the impact that this has on successfully implementing effective needs-based workforce planning. However we have also added to this with the following text (page 14, lines 8-10): “Additionally, given the fact that dentistry is largely delivered by independent providers, there are challenges faced in obtaining more detailed information about the working practices of oral healthcare providers"
* Greece is interesting but may just have challenges of overproduction and under provision of state care. The inclusion of this 'story' could be more effectively woven into the discourse.

Response: Agreed. However, as stated above the purpose of this paper is to demonstrate the feasibility of producing an oral health needs-based workforce planning simulation tool and not to delve into the specifics of the oral health system in any particular country. However we have included the following text in the ‘Discussion’ section (page 12, lines 18-21): “The situation in Greece highlights the complexities associated with the provision of integrated health services and workforce planning in trying to balance publicly and privately provided oral healthcare to ensure the oral health needs of the population are comprehensively served.”

4. Figure 1: be clear about where this relates to numbers or whole-time equivalents or 'either'

Response: Have included a footnote in Figure 1 which highlights that the 'Adjusted' boxes relate to FTE.

5. Figure 2: this is a generic pattern and that should be clarified. It would be helpful to have a more complete legend to identify what parameters are used. Was this based on the full European data or the Irish data? This should be clear from examination of the figure

Response: Have amended the title to make it clear that this is based on Irish data.

6. Accessory file: should be available to readers.

Response: Ok.