

## **APPENDICES**

Appendix 1a: Methodology to determine waterpipe session duration data and group waterpipe behaviour

Inclusion criteria were any descriptive studies from the Eastern Mediterranean Region (EMR) without age or gender restrictions. As the review sought population level data on waterpipe smoking pattern behaviour, to maintain applicability the EMR was the focus of this review.

Ideally, only studies involving young people would be included, however based on pilot searches it was understood that this would return very few studies if none at all, so the search was opened to studies conducted among participants of all ages. Outcome measures included waterpipe session duration and any outcomes relating to group waterpipe smoking behaviours, such as the proportion of solo versus group use, or the number of people sharing the same pipe per session. These outcomes are not generally considered main outcome measures in epidemiological studies, so a low threshold for full-text screening was taken.

Exclusion criteria included studies that did not distinguish waterpipe tobacco smoking from other forms of tobacco use, studies about non-tobacco forms of waterpipe use, studies reported as abstracts and for which a full text could not be identified, and studies that reported on the use of the far east Asian waterpipe, a distinctly different product which is used in a different way to the waterpipe commonly smoked in the EMR.

In June 2015 Medline, Embase and ISI Web of Science were searched with no language or date restrictions using synonyms and spelling variations of the terms “waterpipe”, “hookah”, “shisha”, “narghile” and other culturally-specific terms. Included studies’ citation lists were hand-searched to find additional studies. The search terms and results are shown below:

Search terms	Medline	Embase	Web of Science
1. (?alyan or ?arg?ile* or ?arkeela* or calean or goza or hookah or “hubbl* bubbl*” or “hubbl*-bubbl*” or huqqa* or hukka* or sheesha* or shisha* or waterpipe or “water-pipe” or “water pipe”).ti.ab	944	1,100	46,593
2. (smoking/ or tobacco/ or tobacco products/ or tobacco use/) or (cigar* or tobacco or smok* or nicotine).ti.ab	297,103	412,090	1,212,281
3. (1 and 2)	766	886	1,173

Note: search terms followed by ‘/’ refer to Medline Medical Subject Heading (MESH terms); search terms followed by ‘**ti.ab**’ refers to searches title and abstract fields (Medline and Embase only); Web of Science searches are by topic (search code “TS=”); MESH terms do not exist for waterpipe smoking

Title and abstracts of captured citations were screened to identify potentially eligible studies, of which the full texts were retrieved and screened. Data from full texts were abstracted using a standardised and pilot-tested screening form, which included information on the methodology (study design, sampling frame, sample size calculation, sampling method, recruitment method, administration method, validity of tool, pilot testing of tool) population and setting (country, participants, setting, time of study, N sampled, N participated, N analysed, response rate), the outcomes, sources of funding and declarations of competing interests. Studies were assessed for quality and risk of bias using the GRADE framework.

Appendix 1b: Methodology to seek equivalence between cigarette and waterpipe toxicant exposure

Inclusion criteria were any descriptive or analytical studies from any region without age or gender restrictions. Again, the broadness of the geographical and age criteria for inclusion were justified on the basis that there were very few studies, if none at all, on waterpipe toxicant exposure from the EMR. Given the aim of this literature search was not to retrieve population-level data, the search had no geographical restrictions. Outcome measures included the changes in the levels of any named toxicant (e.g. nicotine, carbon monoxide etc)

during a waterpipe tobacco smoking session. The study had to also compare the change in waterpipe toxicant level to the change in cigarette toxicant level. Exclusion criteria were identical for the first review (Appendix 1) but additionally excluded studies that did not compare the toxicant exposure from waterpipe tobacco smoking to cigarette smoking, and those not conducted in humans. The electronic databases searched were as described in Appendix 1. Data abstraction included information on the methodology (study design, toxicant, weight of waterpipe tobacco used, waterpipe charcoal type, pattern of waterpipe behaviour, cigarette type, pattern of cigarette behaviour, control group, recruitment method, validity of tool and pilot-testing), population and setting (country, participants, tobacco abstinence before study, setting, indoor/outdoor, year of study, N sampled, N participated, N analysed, response rate and analysis type), and outcomes. Studies were assessed for quality and risk of bias using the GRADE framework.

Appendix 1c: Study flow for both literature reviews

