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World Health Organization Methodology to Prioritize Emerging Infectious Diseases in Need of Research and Development

Technical Appendix 4

Multicriteria Decision Analysis

MCDA techniques can be compensatory or non-compensatory (*1*). Compensatory MCDA allow trade-offs between criteria whereas non-compensatory do not. According to Baltussen and Niessen 2006, MCDA compensatory methods are more suitable for use for public health purpose (*2*). Several MCDA compensatory techniques have been used for the prioritization of infectious diseases (*3*–*11*). One such technique is the Analytic Hierarchy Process (AHP) developed by Thomas Saaty (*12*).

AHP uses pair-wise comparisons based on expert judgement that directly incorporates expert knowledge (*13*). Saito et al. 2015 highlighted the ability of the AHP to enable an expert group "*to make trade-off and establish priorities among qualitative and quantitative inputs"*. This is particularly useful in animal and human health where many characteristics remain unclear or unknown (*13*).

Five past disease prioritization studies used AHP for criteria weighting but used different approaches for disease scoring (*8*–*11*,*14*). Zoonoses prioritization in Japan made use of a rating mode with absolute measures (*11*). A classical AHP scoring by pair-wise comparison was used for prioritization of animal infectious diseases in Chile (*9*). A decision tool to score diseases through a set of qualitative questions in the absence of expert opinion was developed by the CDC (*8*), and used recently in Kenya (*10*) and Ethiopia (*14*).

None of the past implementations of AHP were a good fit for the specific needs of the R&D Blueprint disease scoring. As a result, the WHO methodology includes a tailored

implementation of the AHP, using pair-wise comparisons for weighting criteria, but makes use of a different disease scoring process.

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