Key Points to Guide Decision Making for Prioritisation of Vaccine Development in the context of an emergency response to an epidemic or pandemic

Technical feasibility[1]

Criterion	Low feasibility	Medium feasibility	High feasibility
Provenance of pathogen	No understanding of provenance	Some understanding of provenance, with limited understanding of epidemiology	Known disease, with well understood epidemiology
Similarity to known pathogen	Dissimilar, at least in initial analysis, to any known pathogen	From a known family of pathogens	Closely related to a well characterized pathogen
Can the pathogen be cultured in a laboratory	Very difficult to culture	Possible to culture, but lengthy and difficult process	Can be cultured
Complexity and size of pathogen	Large and complex pathogen	Medium sized pathogen	Small and simple pathogen
Antigenic diversity	High genetic diversity, with high mutation rate and lack of annotated genomic data	Some genetic diversity with moderate mutation rate	Little genetic diversity, with low mutation rate. Large amounts of well annotated genomic data available
Biomarkers for safety/efficacy	No understanding of biomarkers for safety or efficacy	Some understanding of biomarkers that may relate to safety/efficacy	Clear understanding of biomarkers for both safety and efficacy
Host-immune response	No known cases of natural immunity, and pathogen is immune modulatory	Some cases of natural immunity, but unclear whether this is durable and protective. Pathogen is generally perceived as not being immune modulatory	Cases of natural immunity which are both durable and protective, pathogen is not immune modulatory, and neutralising antibodies are protective
Available model organisms, including human challenge models	Lack of suitable animal model, and/or suitable human challenge model	Suitable animal model and/or suitable human challenge model may require some development	Suitable animal model, and/or suitable human challenge model is available

[1] The feasibility of developing a vaccine in response to a previously unknown pathogen during the course of the first outbreak is low. However, the first outbreak will provide important information which will enable vaccine development for future outbreaks.

Public health value

Criterion	Low priority	Medium priority	High priority
Infectivity or rate of spread of pathogen	Rapid spread with high attack rate [2]	Moderate rate of spread and attack rate	Pathogen is poorly transmitted, spread is very slow, and attack rate is low
Case fatality rate/disability burden	Low case fatality rate/ disability burden	Moderate case fatality rate/disability burden	High case fatality rate/disability burden
Infectivity before symptom onset	Not infectious before the onset of symptoms	May be infectious before the onset of disease	Highly infectious before disease onset
Environmental factors	Environmental factors are easily modulated	Moderately difficult to address environmental factors	Environmental factors cannot be modulated
Geographical spread	Small isolated pockets of disease	Moderately spread	Large disseminated disease outbreak
Target population	Lack of clarity on target population, with the level of prevention that is acceptable/desirable unclear	Some clarity on target population and level of prevention desirable	Clarity on target population and level of prevention desirable
Availability of potential alternatives to vaccination	There are good alternatives to vaccination currently available which can be rapidly deployed to control the disease outbreak	Effective alternatives to vaccination could be rapidly developed	Effective alternatives to vaccination are not currently available and are not on the horizon

Time scale and cost of development

Criterion	Low priority	Medium priority	High priority
Available vaccine candidate(s)	No vaccine in development and route map for getting to Phase I trials not yet developed	Promising candidates exist, and means of rapidly developing to Phase I can be identified	Suitable vaccine may be in late stages of development

[2] Low priority except where there is the potential to prevent a pandemic by vaccinating populations outside the affected country(s). These pathogens may be a priority for vaccine development in advance of an outbreak.