

How can science inform our response to Ebola virus disease?

Note of a consultation held on 7 October 2014

BACKGROUND

To inform and improve disease control measures in the current Ebola outbreak in West Africa and for the future, WHO must ensure the integration of relevant scientific work from different disciplines, particularly with respect to those events that affect our ability to understand and manage them. This involves not only the promotion of knowledge sharing and collaboration, but also the coordination and facilitation of studies that will close important gaps in knowledge. A consultation on the science of Ebola was convened to obtain the overview necessary to achieve this integration of knowledge. This is a brief note of the initial discussion of the group, which was convened by teleconference.

While WHO has already convened groups to advise on specific topics such as vaccines, therapeutics, and infection prevention and control, the purpose of this group is broader; it is not intended to supplant or oversee the narrower focus of these other groups.

The objectives of the group are to review the current state of scientific knowledge about virology, diagnostics, clinical features, epidemiology, and the impact of disease control measures on the evolution of the outbreak; to identify gaps and priorities for research; and to inform the development of a longer-term research agenda on haemorrhagic fevers.

The group's observations will be used to assist WHO in its assessment of future directions and action in the response, through:

- determining whether changes in the current control strategy are warranted, either immediately or after more robust data have been accumulated
- facilitating or coordinating the gathering of data needed to achieve a more profound understanding of the situation for decision-making.

SUMMARY

After a review of Declarations of Interest identified no obstacles to participation among the discussants, the group shared information about work in progress, especially updates with broad potential to have an effect on the current outbreak. Experts discussed priority areas for research, topics that need to be addressed, and questions that need to be answered, both for immediate implementation and for the longer term. Most of the questions will benefit from input across many disciplines. Some key issues identified are listed below. Some of these reflect work underway, and others indicate areas for focused studies or R&D.

Clinical management and therapeutics

- Patient management strategies, including strategies for basic supportive care
- Selection and timing of therapeutic interventions, including evaluation of those now being used in the field and drugs employed for other conditions that may be efficacious
- Improving patient outcomes and reducing long-term sequelae

Diagnostics

- Development of rapid diagnostic tests

Epidemiology

- Characteristics of cases
- Geographic mapping of the case fatality rate
- Characteristics of survivors
- Active versus passive case finding
- Molecular epidemiology and implications for the response
- Modes of transmission

Virology, molecular epidemiology, and immunology

- Sequencing of the virus and comparison of isolates from different areas to assess variation, evolution, mutation, and transmissibility of the virus
- Immunopathology in survivors and non-survivors
- Immunological and genetic characteristics of survivors, and characterisation of neutralising antibodies
- Infectivity, sites of viral replication, and patterns of virus shedding

Behavioural and socio-cultural factors

- Knowledge, attitudes and behaviours in the affected communities and how these can inform the design of interventions to interrupt community transmission
- Community responses to vaccine and treatment trials, and interventions to improve community engagement in clinical studies
- Social factors, environmental constraints, and their impact on safe use and tolerability of appropriate personal protective equipment for healthcare and other settings
- Behavioural and social determinants of infection
- Implementation studies

CONCLUSION

The discussions identified the importance of advocacy and facilitation to encourage:

- The real-time sharing of information and data, including information on the interventions being implemented in the field
- Improved access to clinical isolates for sequencing
- The development and evaluation of interventions in the field that are cheap, simple, and easy to scale up
- Expediting regulatory and governance procedures to accelerate the process of research, development, implementation and evaluation
- Work that will lead to robust recommendations to inform critical decisions to improve outbreak response
- Work that will have a long-term impact, beyond the duration of this outbreak

It was noted that consideration must be given to the potential impact of research initiatives on operations in the field, owing to limited resources. Various operational improvements could facilitate both the response efforts and important research, for example, permitting a more comprehensive follow-up of convalescent patients.

NEXT STEPS

The group will meet through a series of conference calls, with a face-to-face meeting scheduled in mid-November 2014. The approach will involve background reviews and scoping discussions to address specific research themes.

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