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Organisation mondiale de la Santé**

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**Communicable disease prevention and control:
Smallpox eradication - destruction of
variola virus stocks**

Report by the Director-General

This report contains a brief outline of one of the major issues remaining after the declaration of the global eradication of smallpox in 1980 - the retention or destruction of the last known stocks of variola virus. The attention of the Board is drawn to the recommendation of the *Ad Hoc* Committee on Orthopoxvirus Infections to destroy these stocks of variola virus.

BACKGROUND

1. Since the global eradication of smallpox was declared on 8 May 1980, the stock of variola viruses has been gradually reduced and is now restricted to two laboratories. Until 1994 these were the two WHO collaborating centres on smallpox and other poxvirus infections designated at the Centers for Disease Control and Prevention, Atlanta, Georgia, USA, and at the Institute for Viral Preparations, Moscow, Russian Federation. In December 1994, WHO was informed of the transfer of the stock from Moscow to the Russian State Research Centre of Virology and Biotechnology, Koltsovo, Novosibirsk Region, Russian Federation. The safety aspects of this centre were reviewed by a WHO team of biosafety and orthopoxvirus experts inspecting the facilities in June 1995.
2. The members of the Committee on Orthopoxvirus Infections which met in March 1986 unanimously recommended the destruction of the virus stocks kept in the two laboratories. The Committee noted that the variola gene pool could be cloned into non-expressing sites of bacterial plasmids for future studies of variola virus and that archival records of variola virus would be satisfied by such cloned DNA. The Committee also considered that the cloned DNA would provide sufficient reference material to resolve any future diagnostic problem involving suspected smallpox.
3. The meeting of the *Ad Hoc* Committee on Orthopoxvirus Infections in December 1990 confirmed the recommendation and proposed a deadline of 31 December 1993 for the destruction. The Committee recommended that, in the meantime, the complete nucleotide sequence of the genome of at least one variola virus strain should be determined. It considered that the sequence information might represent a useful and potentially safer record than the cloned material for archival purposes.

STOCKS OF VARIOLA VIRUS: RECENT DEVELOPMENTS

4. The WHO Technical Committee on the Analysis of Nucleotide Sequences of Variola Virus Genomes reviewed the data obtained in the sequencing project at a meeting in January 1994. It acknowledged that the information obtained in the project exceeded the minimum requested by WHO.

5. The publication of the *Ad Hoc* Committee's recommendation to destroy the variola viruses had, however, given rise to mixed reactions among the public and in the scientific community. In view of the controversy over this crucial subject and the fact that the destruction of the virus is irrevocable, WHO once more asked the advice of the *Ad Hoc* Committee on Orthopoxvirus Infections, bearing in mind the arguments raised since the meeting in December 1990.

6. The *Ad Hoc* Committee discussed the issues related to the destruction of the last stocks of variola virus thoroughly during a meeting on 9 September 1994. It unanimously agreed that at some date all remaining stocks of variola and whitepox viruses, viral genomic DNA and clinical specimens and other material containing infectious material should be destroyed.¹

7. There was debate over the date on which destruction should occur. The majority of members of the *Ad Hoc* Committee favoured early destruction and considered that the genomic sequence information from several strains of variola virus, with the availability of other sequences cloned in bacterial plasmids, satisfied the need for an archival record of the virus. They noted that these cloned DNA fragments would provide sufficient reference material to resolve any future diagnostic problem involving suspected smallpox and allowed for future studies of properties of variola virus genes and proteins. They also stressed that escape of variola virus from the laboratory would be a serious risk to the increasing proportion of the population that lacks immunity to smallpox. Destruction of the stocks of variola virus kept in the two WHO collaborating centres was seen as the last step in the complete and final global eradication of smallpox.

8. Members of the *Ad Hoc* Committee (2/10) in favour of postponing destruction of the virus recommended that the archival storage of variola virus be continued for a further five years. They considered that the rapid advances in science and technology now occurring would enable new questions to be addressed in the future and that it was therefore too early to take this irrevocable step.

9. In conclusion, the majority (8/10) of the members of the *Ad Hoc* Committee on Orthopoxvirus Infections recommended that the remaining stocks of variola virus, including whitepox virus, viral genomic DNA and clinical specimens and other materials containing infectious variola virus held in the WHO collaborating centres for smallpox and other poxvirus infections, should be destroyed. Recommendations on the procedure for destroying the variola virus, the establishment of a commission for the certification of the destruction and the text of the certificate can be found in the report of the Committee. The *Ad Hoc* Committee has not been consulted since the transfer of the stocks from the collaborating centre in Moscow to the Russian State Research Centre of Virology and Biotechnology, Koltsovo, Novosibirsk Region, Russian Federation.

KEEPING OF CLONED MATERIAL

10. Cloned DNA fragments of the variola virus genome are themselves not infectious but safe and provide a useful resource and tool for analysing variola virus genes and protein structure and function. The majority (9/10) of the members of the *Ad Hoc* Committee recommended that such cloned material be kept. The Committee also recommended the establishment of two international repositories for the storage, maintenance,

¹ The report of the meeting (document CDS/BVI/94.3) is available in English.

distribution and monitoring of the cloned DNA fragments of the variola virus genome - one at the WHO Collaborating Centre for Smallpox and other Poxvirus Infections, Centers for Disease Control and Prevention, Atlanta, Georgia, USA and the second at the Russian State Research Centre of Virology and Biotechnology, Koltsovo, Novosibirsk Region, Russian Federation.

RESERVE OF SMALLPOX VACCINE

11. The *Ad Hoc* Committee also recommended that 500 000 doses of smallpox vaccine should be kept by WHO in case of an emergency and that the smallpox vaccine seed virus (vaccinia virus strain Lister Elstree) be maintained in the WHO Collaborating Centre on Smallpox Vaccine at the National Institute of Public Health and Environmental Protection, Bilthoven, Netherlands.

ACTION BY THE EXECUTIVE BOARD

12. The Executive Board is invited to consider appropriate action on this issue.

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