



*Smallpox Virus  
Lab, New*

LABORATORIES WITH VARIOLA VIRUS STOCKS<sup>a</sup>

The risk is well understood by members of the Global Commission and was dramatically demonstrated by the events of August 1978 in Birmingham, England.

1. Laboratories Known to Hold Variola Virus

Over the past several years WHO has made an effort to find out which laboratories were holding variola virus, and where appropriate, to persuade the responsible officials to transfer their stocks to a WHO Collaborating Centre or destroy them. The following steps have been taken:

(a) In 1976 WHO Regional Offices requested national health authorities of member countries to contact laboratories and specifically identify those holding variola virus. All 181 countries and territories except Democratic Kampuchea responded.

(b) The WHO World List of Laboratories was reviewed; 216 laboratories doing virological work were contacted.

(c) A literature search back to 1950 led to the identification of 40 laboratories that had published on variola that were not otherwise detected.

(d) Contact was made between SME, WHO, and 825 individual laboratories.

As a result of all these efforts 76 laboratories were identified that held variola virus. Since 1976, 65 of these laboratories have transferred or destroyed their strains.

The number of laboratories now known to be holding variola virus stocks is set out in Table 1.<sup>b</sup>

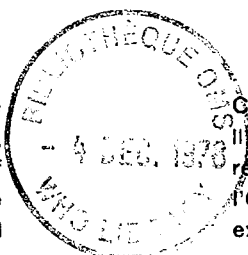
2. Unknown Potential Laboratory Repositories of Variola Virus

There may be two kinds of unknown repositories of variola virus stocks: laboratories concerned with bacteriological warfare, if such exist; and diagnostic laboratories in previously endemic areas where strains isolated years ago may still be deposited (and forgotten about) in deep-freeze cabinets. There is no solution to the first, hypothetical problem; to help solve the second, it may be useful for WHO to publish in the local medical journals of all previously endemic countries an article (or editorial) on smallpox eradication with special mention of the risks of the forgotten storage of variola strains in diagnostic laboratories.

<sup>a</sup> Prepared by SME, WHO HQ.

<sup>b</sup> On 21 November 1978 confirmation was received by cable that all variola virus strains previously held at the National Institute of Health, Tokyo, Japan had either been transferred to CDC, Atlanta, USA or destroyed.

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### 3. Long-term Laboratory Requirements

The occurrence of human monkeypox and the occasional diagnosis of "suspect smallpox" will not cease with the declaration by WHO that smallpox has been globally eradicated. In addition, the discovery of whitepox virus in wild animals in Zaire means that further isolation of this virus from animals or from man is not impossible. For these reasons, at least one WHO Collaborating Centre, able and willing to study any such viral isolates, must be maintained for a substantial period, say ten years in the first instance. This laboratory would need to have appropriate laboratory security facilities for handling variola virus, it would need to maintain a collection of representative orthopoxviruses, and it would need to maintain personnel with expertise in genome and polypeptide analysis of poxviruses as well as in standard virological procedures.

It is suggested that the most appropriate place for such work would be the laboratories of CDC, Atlanta. If the Global Commission believes that more than one laboratory should be maintained, other possibilities (if arrangements are made to ensure laboratory security and special technical skills) are the Institute for Viral Preparations, Moscow (No. 7 of Table 1) and the St. Mary's Hospital Laboratories, London (No. 8 of Table 1). These laboratories have had extensive experience in the area of poxvirus research as WHO Collaborating Centres during the last 15 years.

### 4. Other Laboratories Currently Holding Variola Virus

Apart from the Collaborating Centre(s) just described, there is no scientific reason why any other laboratory should retain stocks of variola or whitepox virus or carry out experiments with these viruses. Six of the other eight laboratories listed in Table 1 are holding variola virus for archival purposes only. Three (Nos. 9, 10 and 11 of Table 1) plan to destroy or transfer their stocks in the near future, and it is understood that two others (Nos. 4 and 5 of Table 1) may do likewise.

There remain three known laboratories (countries) in which there are problems about variola virus storage and use:

(a) The National Institute of Virology in South Africa (No. 1 of Table 1) which is reluctant to destroy its stocks because it is uncertain whether its nationals would have access to other laboratories to work on variola virus, or obtain stocks for experiments in its own high-security laboratory, if this were ever required.

(b) There is said to be "more than one" laboratory in China (No. 3 of Table 1) that holds variola virus stocks; it is not known where these are or whether the material is being held for archival purposes or for experimental studies.

(c) The laboratory in Munich, Federal Republic of Germany (No. 2 of Table 1) continues to use variola virus in animal (monkey) experiments designed to test the efficiency of an "attenuated" strain of vaccinia virus that is being developed for human primary vaccination. The director of the laboratory insists that this work should continue and he has the support of the relevant Bavarian authorities.

Further approaches by WHO to the appropriate officials in the governments of South Africa, China and Federal Republic of Germany may result in agreements to transfer or destroy variola virus stocks in one or more of these laboratories. It is suggested that such approaches should be made periodically. But another stratagem may be required, at least for South Africa and China. One possibility is outlined below.

5. Long-term Storage Under WHO Control

Two requirements for long-term (more than ten years) storage of variola virus stocks (prudent for "insurance" purposes) are security against stealing (e.g. by terrorists) and international (WHO) control of access. Both might be achieved by the storage of several replicate sets of key representative variola viruses in a deep-freeze cabinet in the vaults of a bank, perhaps in Switzerland, accessed only by permission of the Director-General of WHO. Such stocks would be recognized as the property of all countries of the world, rather than of any one country, and could be maintained indefinitely as an insurance even after the Collaborating Centre(s) (section 3) closed.

6. Vaccination Policy in Institutions Holding (or Using) Variola Virus

An immediate problem, highlighted by the London, 1973, and Birmingham, 1978, episodes, is vaccination policy in institutions where variola virus is stored or is being used in current research. The standard policy in most laboratories working with any orthopoxvirus (including vaccinia) is to require regular vaccination of all laboratory staff every three years. Perhaps in laboratories working with variola virus vaccination should be an annual event. Does the Global Commission consider that laboratories holding (but not working with) variola virus should insist on regular vaccination of all employees? If so, how frequently? In either of the above circumstances, how extensive should vaccination coverage be - all employees in the laboratory itself, in the building housing the laboratory, in the institution as a whole? And should families of relevant workers also be vaccinated?

Table 1 - Laboratories Retaining Variola Virus (11 November 1978)

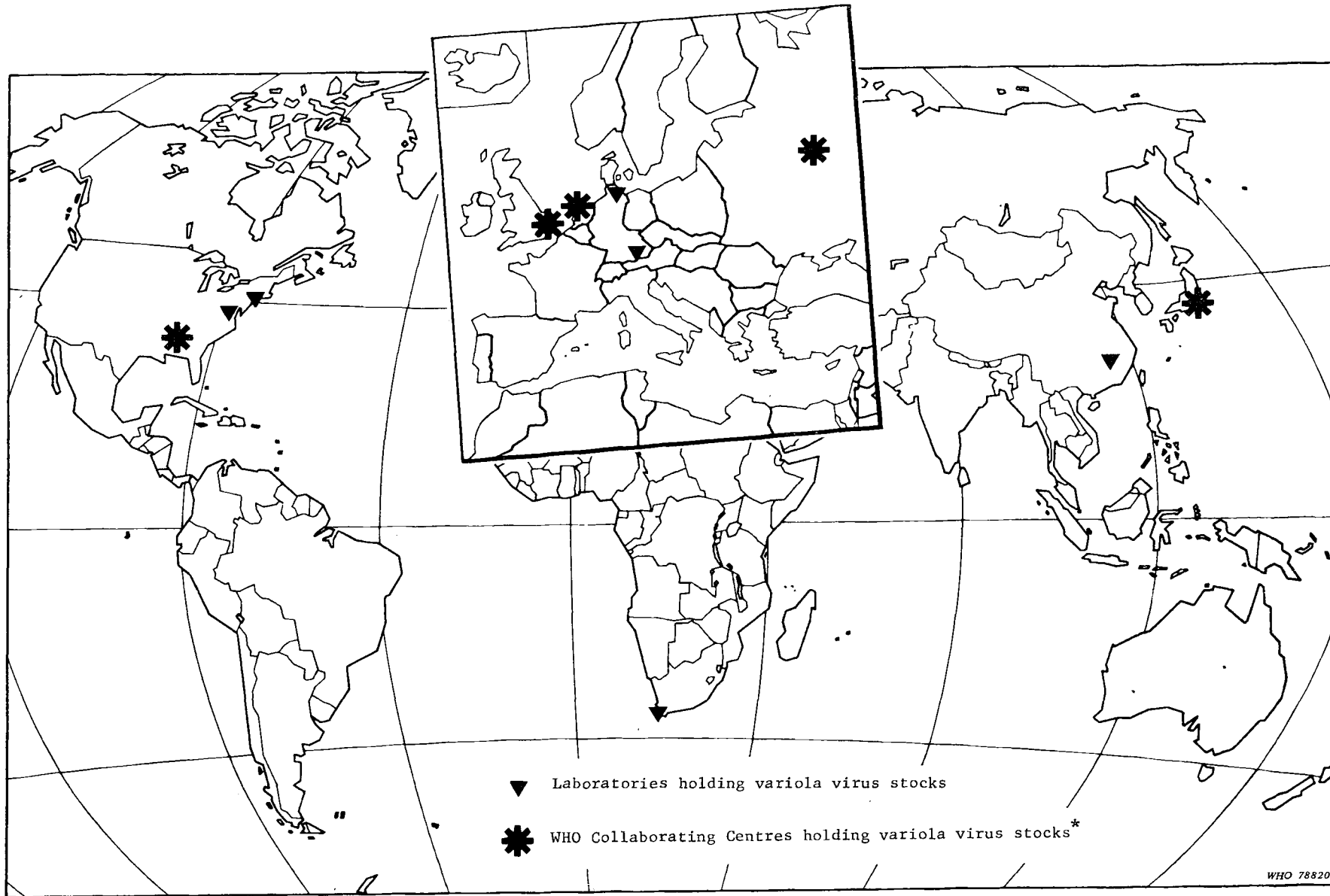
Laboratory	City/Country	Purpose			Visit by Global Commission or WHO	Comment
		Archival	Research	Unknown		
1. National Institute of Virology	Sandringham, South Africa	x			February, October 1978 (Dr Fenner)	Strains in locked box, not in use. Current premises do not meet WHO standards, but maximum containment laboratory being constructed (not for variola virus, but stocks could be stored there). Destruction of strains is a political decision and is under consideration.
2. Bayerische Landesimfanstalt	Munich, FRG		x		December 1977 (Dr Wehrle)	Security inadequate during animal experiments with variola virus. State health department supports position of laboratory to retain variola virus
3. More than one laboratory	China			x		Negotiations in progress
4. American Type Culture Collection	Rockville, USA <sup>a/</sup>	x			Postponed to 1979 (if necessary)	Strains kept locked. Commercial repository of microbiological cultures.
5. United States Army Medical Research Institute for Infectious Diseases	Frederich, USA <sup>a/</sup>	x			Postponed to 1979 (if necessary)	Strains kept in maximum security facility

Laboratory	City/Country	Purpose			Visit by Global Commission or WHO	Comment
		Archival	Research	Unknown		
6. <u>Center for Disease Control</u>	Atlanta, USA <sup>a/</sup>	x	x		June 1978 (Dr Breman)	Meets WHO criteria
7. <u>Research Institute of Viral Preparations</u>	Moscow, USSR	x			June 1978 (Dr Arita)	Major modifications planned
8. <u>St. Mary's Hospital Medical School</u>	London, UK	x	x		May 1978 (Dr Netter, Dr Richardson)	Meets WHO criteria (double door autoclave being negotiated).
9. <u>Rijks Instituut voor de Volksgezondheid</u>	Bilthoven, Netherlands	x			Postponed	Planning to transfer or destroy at the time of or before global eradication is certified
10. <u>Institute für Schiffs- und-Tropenkrankheiten</u>	Hamburg, FRG	x			May 1977 (Dr Netter, Dr Richardson)	Meets WHO standards. Planning to transfer or destroy at the time of global eradication is certified
11. <u>National Institute of Health</u>	Tokyo, Japan	x				To transfer to CDC towards end of November 1978

           underlined laboratory indicates WHO Collaborating Centre.

a/ Representatives from laboratories in USA met with national authorities in October 1978 to develop plans for variola virus storage. Negotiations in progress to have all U.S. strains at CDC.

LOCATION OF ELEVEN LABORATORIES KNOWN TO BE HOLDING VARIOLA VIRUS STOCKS



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