



SMALLPOX VACCINE STOCKS

Smallpox Eradication Unit, WHO, Geneva
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In October 1977 the Consultation on Worldwide Certification of Smallpox Eradication recommended that:

"Provision should be made by WHO for storage of approximately 300 million doses of smallpox vaccine distributed among at least three locations. Further study should be carried out on the need for and distribution of emergency vaccine stocks."

Previous sources of vaccine

From 1967 to the present, 390 054 000 doses of vaccine have been contributed to WHO's Voluntary Fund for Health Promotion from 26 countries (Table 1). This excludes bilateral donations of at least 1 000 000 000 doses supplied directly during this period.

Vaccine consumption

As smallpox incidence has decreased the amounts of vaccine distributed by WHO have decreased from some 40 000 000 doses per year to 20 000 000 doses in 1976 and 1977. As of end October, 15 000 000 doses had been distributed in 1978. The demand for vaccine may be expected to decrease further.

Vaccine supply as of end October

	Multipuncture doses	Jet injector doses
Doses on hand in Geneva	20 228 000	6 106 000
Pledged		
India	10 000 000	
Iran	4 000 000	

The USSR is currently considering a request from the Director-General for a contribution of 75 000 000 doses

Vaccination devices on hand in Geneva:

4 890 000	bifurcated needles
6	ped-o-jets

Thus, currently we may estimate an input of:

on hand	20 000 000
pledged	14 000 000
requested	75 000 000
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	109 000 000 doses
less an outlay of 1978/1979	20 000 000 doses



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leaving a balance of about 90 000 000 doses for an emergency reserve stock. Based on previous amounts distributed through WHO this should be a reasonable emergency reserve.

It should be noted that beginning in 1980 (assuming the present certification schedule is met) there are no plans for WHO to supply smallpox vaccine except in an emergency situation. Parenthetically, smallpox is not included in the Expanded Programme on Immunization (EPI).

Sites of vaccine reserve

1. Geneva, Switzerland. To cover Africa. Facilities and procedures for rapid despatch established.
2. New Delhi, India. To cover Asia. Cold storage facilities under construction at the WHO Regional Office are expected to be completed by the end of 1978.
3. Undetermined. To cover Central and South America.

Vaccine quality

All vaccine utilized in the global programme has met WHO standards for potency and stability since 1970. Vaccine stocks are retitled at regular intervals to ensure there has been no loss in potency. Vaccine is stored in Geneva, and will be stored in New Delhi, at -20°C. Conservation at this temperature can be expected to maintain vaccine potency over long periods (Table 2).

Emergency vaccine reserves - additional considerations

With the eradication of smallpox we may expect the abolition of routine smallpox vaccination and the requirement for international vaccination certificates. However, we may also expect that vaccine may continue to be produced, on a small scale, for vaccinating military, hospital, laboratory and certain other categories of personnel. Also, certain countries may maintain their own vaccine reserves, thus the proposed WHO vaccine reserve could be considered as an emergency reserve primarily for developing countries.

It should be remembered that to recommence smallpox vaccine production requires facilities, knowledge, and seed virus and the continuing availability of a testing facility to assure quality control.

TABLE 1. SMALLPOX VACCINE CONTRIBUTIONS TO VFHP (000's OF DOSES)
BY YEAR OF RECEIPT

Country	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	Total
Argentina						1 000	753	1 000						1 753
Belgium			98	69	1 053	1 020	1 000	1 000	1 100	1 000	1 000	1 000		8 340
Brazil						5 750	2 500	2 750						11 000
Canada			200	2 024	15 343	4 729	18 139	3 184						43 419
China - Taiwan				200										400
Columbia						33	143	125						301
Czechoslovakia		600						250						850
Germany, Democratic Republic									1 000		490			1 490
Finland					176			177	156	54				563
Guinea								1 753	100					1 853
Hungary		500		500	500		250			500				2 750
India												15 000		15 000
Iran							2 000	5 000	5 000	5 000	2 000	4 000		23 000
Kenya			3 000	3 000	1 900	500	1 875	1 325	1 559	2 950				14 550
Netherlands	1 000	1 000	924	936	956	968	734	73		952		1 958		11 060
New Zealand		250	250		250	300								1 050
Peru						300								300
Philippines			50	200										250
Sweden					1 000			500	500					2 000
Switzerland	2 311	3 236	2 326		2 326	2 326	2 068	2 583	2 326					19 502
Thailand	100	100			200									400
USA	15 250	16 283	14 875	26 230	27 362	25 000	25 000	25 000	25 000	25 000	2 418			225 000
USSR	1 000				600	1 000								2 600
Yugoslavia														5
Jordan	5													
Institute Pourquier (France)		100		100										200
Grand Total	19 666	22 069	21 723	33 259	51 666	42 926	54 462	43 720	36 741	35 456	6 408	21 958		390 054

TABLE 2. SMALLPOX VACCINE POTENCY AFTER LONG-TERM STORAGE AT DIFFERENT TEMPERATURES

Institution	Batch No.	Date of preparation	Original virus content p.f.u./ml	Storage temperature	Year	Results of latest retesting		
						Storage period	Virus content p.f.u./ml	Heat stability test (37°C)
Swiss Serum and Vaccine Institute, Bern, Switzerland	ZL 4695	19.4.66	1.10 ⁸	-20°C	1976	10 years	1.13.10 ⁸	after 4 weeks 7.08.10 ⁷
	ZL 8885	8.9.70	2.6.10 ⁸	-20°C	1976	6 years	2.97.10 ⁸	7.9.10 ⁷
	Total 20	1966-1974		-20°C	1976	6-10 years	Satisfactory	Satisfactory
	ZL 10180	20.6.72	2.4.10 ⁸	+4°C	1976	4 years	1.84.10 ⁸	
Rijks Instituut voor de Volksgezondheid, Netherlands	Total 7 batches	1972-1973	unknown	+4°C	1976	3 1/2 - 4 1/2 years	Satisfactory	Satisfactory
Wyeth Laboratories Inc. USA	177501	24.4.63	unknown	+5°C	4.1974	11 years	10 ^{8.2}	unknown
	181902	12.11.63	"	(till 1970)	4.1974	11 years	10 ^{8.2}	"
	185901	20.3.64	"	-20°C	4.1974	10 years	10 ^{8.1}	"
	206001	29.10.65	"	(from 1970)	4.1974	9 years	10 ^{7.8}	"
Connaught Laboratories Limited, Canada	Total 7	1963-1965	"		4.1974	9-11 years	10 ^{7.8} -10 ^{8.2}	"
	1517-11	24.3.71	unknown	+4°C	15.8.78	7 years	8.02	after 4 weeks 10 ^{7.89}
	1517-12	24.3.71	"	+4°C	"	7 years	10 ^{8.05}	10 ^{7.95}
	1517-11 1517-12	24.3.71 24.3.71	" "	from 1976 -20°C -20°C	" "	2 years After 5 years at +4°C	8.09 10 ^{8.07}	
Lister Institute of Preventive Medicine, England	700	1963	8.3	-15°C	1976	13 years	7.6	after 4 weeks 10 ^{7.7}
	701	"	10 ^{8.0}	"	"	13 years	10 ^{7.9}	10 ^{7.3}
	703	"	10 ^{8.1}	"	"	13 years	10 ^{7.6}	10 ^{7.4}
	705	"	10 ^{8.3}	"	"	13 years	10 ^{8.1}	10 ^{8.1}
	707	"	10 ^{8.4}	"	"	13 years	10 ^{8.2}	10 ^{7.9}
	709	"	10 ^{8.5}	"	"	13 years	10 ^{8.2}	10 ^{7.7}
								(mean loss 0.27)