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ERADICATION OF SMALLPOX

Report submitted by the Government of the USSR

The prophylaxis of smallpox is based on the classic observation by Jenner (1798) that inoculation with smallpox vaccine protects human beings against this disease.

As early as 1806, the USA president Thomas Jefferson (1745-1826) said in his letter to Jenner: "It is owing to your discovery... that in the future the peoples of the world will learn about this disgusting smallpox disease only from ancient traditions". This prophecy has not as yet been accomplished even nowadays, despite great progress in many branches of human activity. Smallpox is still one of the 6 diseases subject to international conventions, a dark shadow on humanity, and the eradication of this pernicious infection is still a matter of concern to vast numbers of people in the five continents.

Before proceeding to set forth our proposals, some mention should be made of our experience in eradicating naturally occurring smallpox in the USSR. In the Soviet Union this disease was eradicated over 20 years ago as a result of rigorously applied measures. Under the system followed in our country, great attention is paid to the health education of the population and to its active participation in carrying out prophylactic measures. The same principle applies in regard to the basic measure for the prevention and control of smallpox, namely, compulsory vaccination of all citizens of the USSR: vaccination during the first year of life and revaccination at 5th, 11th and 18-20 years of age. The relevant law (decree) was promulgated in 1919 and re-promulgated with some additions in

1939. Under this law, the Republics of the Union and the local administrations are authorized within the boundaries of their territory to issue compulsory regulations for the carrying out of extra vaccinations against smallpox. As a rule such measures are adopted when there is a danger of the disease being brought in from outside and they are generally of a temporary nature. This peculiarity of the Soviet law is of great importance as it increases the responsibility of local authorities in protecting the population against smallpox and stimulates the vigilance of the local medical and sanitary organizations in the proper direction. The existence of large numbers of non-vaccinated persons is regarded as a danger to the rest of the population.

Regular and emergency vaccinations against smallpox, being strictly regulated by law, do not, as a rule, involve any increase in the percentage of anomalies or complications in the vaccination process.

The law on compulsory vaccination against smallpox ensures that the localities are supplied in good time with the requisite quantity of high grade effective smallpox vaccine and with the necessary funds for prophylactic measures.

As a government measure, this law is of great educational value for the people.

Mention should also be made of the fact that the Soviet Union has industrial plants producing high grade smallpox vaccine (vacuum dried preparation).

As a result of the combined efforts of the scientific and practical institutions of the USSR, the research work headed by Professor M. I. Morozov and by other workers of the N. F. Jamalea Institute of Epidemiology and Microbiology has made possible the production of a dry smallpox vaccine of extremely high quality as regards its vaccination capacity, virulence and immunogenic properties, as well

as resistance to heat and intense solar radiation. It can be stored for a long time which greatly facilitates the eradication of smallpox in areas with a warm and subtropical climate, such as the Crimea, Transcaucasus and the Republics of Middle Asia.

Despite the great progress made throughout the world in reducing and eradicating infectious diseases, smallpox still remains in many countries a very wide-spread infection, although the incidence of the disease shows a marked tendency to decrease. The table below gives some data on the incidence of smallpox over a period of eleven years, namely, from 1946 to 1957 (Table 1).

In compiling this table, use was made of the material provided by the Director-General at the 21st session of the Executive Board as well as of exidemiological and demographic reports. Even if one allows for the fact that these data may be incomplete, it will nevertheless be recognized that:

(a) smallpox incidence decreases slowly, that is to say only by 16 per cent. in 10 years, and probably even less;

(b) the disease is mainly concentrated in Africa and Asia;

(c) periodic invasions of smallpox as well as epidemic outbreaks of this disease occur in a number of countries of Asia, Africa, America and Europe. Within recent years, even in Western Europe 50-100 cases per annum have been recorded (Table No. 2).

(d) Smallpox mortality is still high, the number of persons who died from this disease in 1955-1956 being 13 000 and 17 000 respectively (Table No. 1).

Smallpox vaccination on a large scale is carried out every year in various countries. Thus, in 1954 the number of vaccinations in those countries which have submitted information (88) amounted to over 73 millions (Table No. 3).

However, in some countries, particularly in those where smallpox is endemic, vaccination covers only part of the population, while large groups of people remain susceptible to this disease.

Thus, in Ceylon with its 8 600 000 population 243 000 persons were vaccinated in 1954; in the Federation of Malaya with a population of 6 058 000-250 000 (1954); and in Burma with a population of 19 000 000-762 000 (1954).

Owing to the small number of vaccinations in Asia, South America and Africa, the principal traditional smallpox foci have not yet been eradicated and are a constant danger to the adjacent countries. The countries which are free from smallpox have therefore to make considerable efforts and spend large sums in vaccinating and revaccinating the population in order to provide constant strong immunity against this disease.

Meanwhile, the modern status of medical science and health protection is such that the eradication of smallpox throughout the world is a practical possibility with a minimal expenditure and within a relatively limited period of time. To this end it is not necessary to immunize simultaneously the whole population of the world because:

(a) a considerable number of countries carry out more or less regular smallpox vaccinations of the population so that most of the people in these countries are immune to smallpox;

(b) there is another group of countries which, although not practising regular smallpox vaccinations, are only sporadically afflicted with this disease, either on account of their favourable epidemic environment or their geographical isolation (islands).

Thus, the problem of smallpox eradication throughout the world is to a large extent reduced to the eradication of the principal endemic foci of this disease

by means of the vaccination of the whole population. Our proposal envisages therefore the elaboration of a programme for the eradication of smallpox over a period of 3-5 years.

The anti-smallpox campaign should be initiated in the countries most infected with the disease.

In view of the progress made in the USSR in eradicating smallpox, we submit the proposal that our system be recommended as a basis in countries with endemic foci. As regards the Leister system, which is used mainly in England as a prophylactic measure against smallpox, it is very inadequate for the above-mentioned countries. This system consists, as is well known, in prompt identification of the disease, special notification, isolation, quarantine (usually for fourteen days), disinfection measures and eradication of flies, but it does not provide for compulsory vaccination. In view of the latter it cannot be regarded as the basic system, although it can certainly be recommended wherever, for any serious reasons, compulsory smallpox vaccination cannot be carried out.

It should be emphasized that a sufficient number of well vaccinated people affords good protection for unvaccinated persons with decreasing immunity, in so far as the vaccinated individuals prevent the spread of the disease just as spaces between buildings stop fire spreading in an inhabited locality.

To ensure successful vaccination in 1959 it is necessary to carry out already in 1958 large scale preparatory work on the drawing up of a detailed plan for smallpox eradication through vaccination.

This plan should include the following items:

(a) the placing of orders by WHO with national biological firms (factories, plants) for the preparation during 1958-1960 of adequate quantities of smallpox vaccine;

(b) the training of smallpox vaccinators among the local population of the countries where vaccination is planned;

(c) the securing of funds from local sources as well as from WHO allocations for the purchase of vaccine and for the remuneration of the vaccinators and the directing personnel.

After the completion of the first series of vaccinations, provision should be made for additional vaccination of the population in the foci where the disease still occurs. As regards revaccination, time-limits should be planned for each country, with due regard to special conditions applying in each case.

To achieve the greatest possible success in all countries and especially in those situated in the tropics and subtropics, it would be best to carry out vaccination in the cool season of the year. The vaccine should be dry and of good quality. In addition to vaccination, the Leister system should be used as fully as possible: together with vaccination it will greatly accelerate the eradication of smallpox.

It is also necessary to get scientific workers in all countries to carry out research with a view to improving smallpox vaccine so as to provide an inexpensive vaccine with high immunagenic potency and stability. The co-operation of all practical workers is also necessary for the carrying out of the prophylactic measures.

It should also be noted that our proposals are strongly supported by economic considerations.

It is quite clear that the cost of non-coordinated smallpox vaccination carried out in various countries over a number of years exceed the sums that would be required for a co-ordinated campaign against smallpox in endemic areas.

There can be no doubt that if our proposals are accepted and medical workers in every country do their best, smallpox, which has been the scourge of mankind for centuries, will be practically eradicated within five years. As regards its complete eradication throughout the world, we think that this can be achieved within the next ten years

TABLE 1. NUMBER OF PERSONS WHO DIED FROM SMALLPOX

	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956
Asia	68536	46613	57494	42258	94060	200608	57656	2204	14238	10773	15813
Africa	4624	3047	3224	3275	5661	3475	3717	1052	2313	2152	1272
America	1480	1692	3627	3947	4954	2131	1743	655	604	1	-
Europe	146	84	33	21	17	15	7	9	0	22	-
Australia	0	0	0	0	0	-	-	-	0	-	-
Total	74786	51436	64378	49501	104692	206229	63123	3920	17155	12948	17085

SMALLPOX INCIDENCE THROUGHOUT THE CONTINENTS OF THE WORLD

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
Asia	101352	97729	248151	451554	108440	53674	57974	51846	62470	96441
Africa	25603	25838	37879	27317	31665	21392	26322	23140	17651	31986
America	30063	17908	20538	9038	8948	7382	11429	7638	5528	3688
Europe	373	101	108	160	247	40	57	88	-	13
Oceania	-	-	3	-	-	-	-	-	-	-
Total	157391	141576	306679	488069	149300	82488	95782	82712	85649	132128

Compiled from WHO data (EB21/WP/21) of 24 January 1958.

TABLE 2. SMALLPOX INCIDENCE IN EUROPE

Country	Years 1947	1948	1949	1950	1951	1952	1953	1954	1955	1956
Belgium	29	1	1	-	-	-	-	-	3	-
Spain	35	20	4	2	3	1	1	2	-	-
France	47	3	2	-	-	75	-	15	87	-
Italy	42	9	4	1	-	-	-	-	-	-
Holland	-	-	-	-	52	-	-	40	-	-
Portugal	853	336	54	65	78	36	9	-	-	-
England and Wales	78	-	19	8	27	135	30	-	-	-

- no incidence

TABLE 3. NUMBER OF VACCINATIONS AGAINST SMALLPOX THROUGHOUT THE WORLD ACCORDING TO 1954 DATA

Continent	Total number of countries	Number of countries which submitted information	Number of vaccinations in countries which submitted information
Asia	42	20	27 125 432
Africa	40	21	29 376 618
America	39	21	6,135 709
Europe	35	23	11,005.528
Australia	22	3	10 651
Total	178	88	73 653 938

Remarks

(1) In those countries where there is no information for 1954, the data for the nearest year have been taken (1953 or 1952)

(2) Not included are the data for such large countries as USSR, China, USA, India, Argentina Indonesia, Brazil, Federal Republic of Germany, German Democratic Republic, etc.