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## Introduction

Ever since recorded history smallpox has been a public health problem in many parts of the world and, despite the discovery a century and a half ago of the effective means of protection by vaccination, many endemic foci are still to be found scattered in three of the five continents.

From the available data on reported smallpox, some three million cases and more than one million deaths have been recorded from all over the world during the last two decades. Furthermore, it must be strongly emphasized that the reported incidence by no means reveals the actual situation, since much smallpox occurs either undetected or unrecorded. In fact, the disease continues to be a permanent threat to the lives of millions of people, as well as a continuous menace to all countries. Only by intensifying and co-ordinating the efforts for the eradication of the disease at both national and international levels, can that menace be discarded.

The World Health Organization has, ever since its creation, been reviewing and studying the smallpox situation as one of the communicable diseases needing priority attention. WHO has sponsored research work to improve the quality of the vaccine, organized conferences and training courses, granted fellowships and provided consultants in the field. The Director-General, in compliance with the World Health Assembly's resolutions, has assisted countries where smallpox is present in organizing and implementing eradication campaigns. It is only when national efforts to eradicate the disease are successfully conducted and co-ordinated in each and all endemic areas of the world that the international problem of smallpox can be eventually solved.

Trade and pilgrim routes influencing the spread of smallpox

Smallpox was already known in old times to follow trade and pilgrim routes. Numerous records of historical events describe how the disease was introduced in inhabited localities by travellers, and how intensive the outbreaks were sometimes. Only those inhabitants who had survived previous attacks were spared or, at most, suffered a new mild infection. The repeated introduction of smallpox into communities by travellers and visitors from infected areas gave great concern to the people everywhere. Apprehending the possibility that a newcomer to their town or village be infected with smallpox, the inhabitants carefully watched from a distance the face of the stranger, not only for the sole purpose of identifying him but also to try and discover the dreaded skin lesions on his face. When slave trade was flourishing some centuries ago slaves, and particularly the young females, showing pock scars were offered at much higher prices than others susceptible to smallpox and its ill-effects.

In modern times things have changed. With the introduction of vaccination the number of susceptibles has considerably diminished in most countries of the world and many countries have achieved eradication by this means. However, the presence of endemic foci scattered here and there in some areas, in addition to the continuously increasing volume of international traffic, expose those countries that have eradicated the disease to the danger of introduction of smallpox and to outbreaks of varying severity whenever their populations are inadequately immunized.

The vaccination status of the inhabitants of a country and the stage of development of its health services will determine the fate of a newly introduced infection and the severity of any subsequent outbreak. In 1956 and 1957 smallpox cases were brought in and secondary foci started in several Eastern Mediterranean countries which were free from smallpox for two or more consecutive years: Aden Colony and Protectorate 71 cases; Bahrein 68 cases; Kuwait 31 cases; Lebanon 192 cases; Muscat and Oman 26 cases; Trucial Oman 3 cases; UAR (Egypt) 1 case; UAR (Syria) 41 cases; Quatar 6 cases. In the rest of the world only four similar foci were reported, three in Europe and one in South East Asia (Ceylon). In 1959 a group of about 150 Senegalians en route for the Mecca Pilgrimage arrived in Egypt by land and halted in a suburb of Cairo. An

outbreak of smallpox occurred attacking on the whole 31 persons, including 6 Senegalians. On investigating the source of infection it was learned from the group of travellers that they had had similar attacks of the disease all along their journey. They travelled across a large part of Africa and managed to pass undisturbed through weak and often non-existing quarantine barriers, a condition generally met with along lengthy country boundaries lying on desert or bush terrain and extremely difficult to control.

The Sudan, one of the main gateways to Mecca for African pilgrims, has again and again reported smallpox imported cases mostly notified from areas alongside the main routes used by pilgrims coming from West and Central Africa. These examples of smallpox epidemiological events happening in some countries due to external sources of infection, are no doubt significant of conditions expected to be met with in and around smallpox endemic areas and particularly in adjacent countries with weak and often difficult to control quarantine barriers.

Application of the International Sanitary Regulations in "endemic" and other areas

Weak and often non-existing quarantine barriers are amongst other important factors which affect the extent of smallpox. The inadequate application of the International Sanitary Regulations, as noticed in a number of countries, provides a possible channel by which the disease could be introduced in other parts of the world.

Quarantine measures of control are the responsibility of the public health authorities of a country and all matters related to the application of the International Sanitary Regulations are usually entrusted to medical officers and sanitarians, when such a group of specialized staff is available to meet the requirements of the quarantine activities in the country. In countries whose health services are still in a developing stage it is not always easy to find the sufficient number of right men to put in the right places, particularly in those countries having to attend to a number of sea, air and land quarantine control units. International certificates of vaccination against smallpox require, in addition to a qualified medical practitioner's signature, an "approved stamp" to be valid; a doubtful protection, leading to a questionable validity, has on occasions lead to subsequent serious results. Special

attention should be given by countries where smallpox is present to the proper vaccination of travellers, as the bearer of an international certificate of vaccination should under no circumstances be a potential danger for spreading the disease. Under the provisions of Article 30 of the Regulations countries have the obligation to prevent the departure of any infected person or suspect. This obligation could most easily be fulfilled by requiring travellers, departing from an area or a country where smallpox is present, to possess a valid smallpox vaccination certificate.

Countries where smallpox has been eradicated need to give special attention to the vaccination status of travellers arriving from smallpox infected areas. The Regulations permit countries to require valid smallpox vaccination certificates of such travellers. It is likewise important for personnel who come in contact with travellers to maintain a high level of immunity against smallpox by repeated vaccination.

Countries with long land boundaries difficult to control at all crossing points have, nevertheless, succeeded in attending to the great majority of travellers by placing quarantine control posts on the main international routes crossing their boundaries. The closing of borders between adjacent territories to prevent the introduction of smallpox - a measure not permitted under the Regulations - should not be resorted to; such an action would only encourage and lead to trespassing practices so difficult to control. The importance of a close co-operation between the responsible health officials of adjacent countries cannot be over-estimated whenever quarantine control measures are to be conducted to protect their respective inhabitants. The World Health Organization's International Quarantine Service, in addition to its regional offices, has on many occasions advised countries on ways and means of improving their control measures in conformity with the International Sanitary Regulations.

Co-ordination of smallpox eradication programmes in a region

Countries in the same region, and particularly adjacent territories whose populations have social and by tradition similar habits, usually present common health problems and the effective control of their communicable diseases largely depends on the degree of development of the respective health services.

For the eradication of communicable diseases, an additional strong effort will be needed to plan, organize and conduct a national campaign. The experience gained by countries which have implemented successful eradication campaigns, and the results obtained from pilot projects carried out in some areas, would be invaluable to all those health authorities of countries desiring to participate in the world-wide move to eradicate smallpox.

Eradication programmes, with some variations in the administrative and technical procedures necessitated by existing local conditions, are generally conducted on similar lines in neighbouring countries. The close co-operation between countries in the same region and, whenever possible, concerted action in eradication programmes would, no doubt, be of great advantage to all health authorities concerned. The World Health Organization, whilst continuing to offer technical guidance pertaining to eradication programmes hopes, by sponsoring inter-regional conferences on smallpox, to co-ordinate campaign activities at regional levels as an important step towards the total eradication of the disease.

## Conclusions

In this short paper an endeavour has been made to bring to light some international aspects with regard to smallpox. The control measures as applied in different countries for smallpox show varying degrees of intensity. In a number of countries where the disease has for many years been eradicated and is no more a major health problem, the health authorities have mitigated their routine vaccination programmes to a point of waning immunity in their inhabitants. Other countries which have recently succeeded in bringing the disease under control but whose vicinity to smallpox infected areas exposes their populations to the possible introduction of the disease, are conducting regular periodic vaccination programmes in order to maintain a high degree of immunity in their inhabitants.

In modern times, with the increasing volume of international traffic and rapid means of communications, all countries throughout the world are gradually becoming equally exposed to the possibility of introduction of smallpox. That exposure becomes more evident when travellers come from infected areas where the International Sanitary Regulations are inadequately applied. The vaccination

status of a country's population will continue to be its main safeguard against smallpox until the eradication campaigns in infected areas are completed.

The achievement of a world-wide eradication campaign can be attained and should be given priority attention by all countries concerned; the international involvement is widening so long as the disease is still present in some parts of the world. Every day 90 000 human beings are being added to the world's population and each year millions are losing their vaccination immunity and becoming once again susceptibles. Their protection is needed. The weapon used in the combat of smallpox is extremely effective and there is no reason why the target of eradication could not be reached. National efforts towards achieving eradication will not only serve the individual populations but will also receive the blessings of the world at large.