

ASSESSMENT OF SURVEILLANCE SYSTEMS IN WEST AFRICA

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INTRODUCTION

We have evaluated several surveillance systems during the past year in conjunction with the Phase I (attack phase) assessments in Dahomey, Gabon, Northern Nigeria, Niger and Togo. While we used several different evaluation techniques, we found that much of our most useful information was obtained from a simple review of the existing system as outlined below.

Special terms are employed in this paper to characterize three levels of the surveillance system. The "central receiving unit", at the highest level; is the unit to which all others send their reports and is often represented by the statistical unit of the Ministry of Health. The centres which report to the central receiving unit have been called "reporting centers". Most countries have 30 to 50 such centers, all of which are usually required to submit weekly telegraphic and monthly written reports to the central reporting unit. Reporting "sub-sites" are also referred to. These are medical facilities, such as dispensaries, which are supervised by the person in charge of the "reporting center." Although these sub-sites are expected to send word to the centre if a disease such as smallpox is detected, in many countries they do not submit routine reports to the centre.

METHODS

A complete and accurate description of the existing surveillance system is requisite for carrying out an evaluation. We sought, to determine which were the designated reporting centres, what diseases they were required to report, and how they were to report them. We also inquired how the designated centre obtained information from the sub-sites which were responsible to it, and asked what was done once the information had been received (or had not been received) at the country's central receiving unit.

We then reviewed the surveillance records which were available at the country's central receiving unit as one indication of how closely the system conformed in practice to the description provided. This type of review does not usually require more than half a day or a day to complete. A list of all reporting centres is made, and for each reporting period the centre is either marked as having reported or not. We have generally done this for a two year period. With these basic data, calculations can be made as to what percentage of expected reports are being received. In certain countries, all centres eventually report, but many are weeks to months late in doing so. For this reason it is helpful to make an arbitrary definition of what constitutes a late report and to classify each report as to whether or not it was on time. This can be done in conjunction with the analysis of the number of reports received from each centre.

Thirdly, we inspected as many of the reporting centres and sub-sites as time permitted. At each, we talked with the person in charge of submitting reports, and compared his description of his responsibilities with the description we had obtained at the central receiving unit. We asked to see the records of reports which the centre had submitted to the central unit as well as the records of reports which had been received by the centre itself from its sub-sites.

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While the methods just described allow one to evaluate a country's surveillance system from the point of view of the appropriateness of the theoretical system to the country's needs and resources and to evaluate how closely the actual system corresponds to the theoretical system, they do not offer a means of quantitating what proportion of the actual cases of a given disease are being detected. For certain diseases, such as measles, one anticipates that the reported cases represent only a fraction of the actual cases. For an eradication programme, such as smallpox, where it is important to know about every case, one would like to have a measure of the sensitivity of the reporting system, and one would like to be able to determine whether changes which have been introduced in the reporting system have, in fact, had the desired effect of increasing that sensitivity.

Unfortunately, the measurement of the sensitivity of a surveillance system can be difficult. For smallpox, we have used assessment sample surveys to gather information on the incidence of smallpox scars in children under five years of age. By making certain assumptions, an estimate can be made of the total number of cases of smallpox which have occurred in the country during the past five years and this estimate can be compared to the number of cases which the country has reported during this period. Similar estimates can be made of the number of cases which have occurred during the past one year, and compared to the reported cases for this year. These two sets of data can then be compared to determine whether the reporting system has functioned better or worse during the past year than it has functioned over the past five years.

This technique should be regarded as being still in its developmental stages. In the three surveys in which we have employed it, the results have suggested that certain facial scars left by diseases other than smallpox may have been mistakenly diagnosed by assessors as being smallpox. We do not yet know whether this source of error can be eliminated by more careful training, which would assure that the criterion used, (the presence on the face of five or more pock marks of at least two millimetres in diameter), was rigidly adhered to, or whether a certain degree of error is inherent in the technique. In support of the latter possibility, it seems likely that certain diseases, such as chickenpox and acne, could occasionally cause facial scarring which would meet the criteria mentioned above. This is not a problem for countries experiencing a high incidence of smallpox in the under five year age group, since the number of errors in diagnosis would be small in relation to the number of cases of smallpox in which a correct diagnosis was made. As the incidence of smallpox scars decreases, however, such errors may cause a marked distortion of the results. If such errors are indeed inherent in this technique, its applicability in West Africa may be limited.

Let me hasten to add, however, that I believe we should continue to use the method in future terminal assessments, although as much to evaluate the method as to evaluate the surveillance system, and I believe that the criterion we have used for smallpox scars is a good one. In particular, countries which have reported no cases of smallpox ought to look for smallpox scars whenever surveys are done. When persons who were born since the country has considered itself to be smallpox-free are found with suspect facial scars of smallpox, an investigation should be conducted to determine when and where the person fell ill and whether a trail can be followed which would lead to the discovery of fresh cases. With all of West Africa on the verge of being smallpox-free, the diagnosis of smallpox scars in any resident born after May 1969, should be an obvious cause for concern.

## RESULTS

In all of the countries evaluated in which smallpox had been recently endemic, there was evidence to suggest that the disease either had been or was at that time being under-reported. In two countries the assessment teams found cases of active smallpox among the villages which had, by chance, fallen into their sample survey. These cases

had not been detected by the country's surveillance system. In three other countries, the smallpox scar rates in children under five years of age suggested that cases which had been reported by these countries represented less than 30% of the cases which had actually occurred in the past five years.

There are several causes for not reporting cases of smallpox and many are not easily remedied in a short period of time. Discussions with health personnel who were responsible in various countries for sending reports from the reporting centres to the central receiving unit suggested that reporting of all diseases might be improved if these personnel could be made aware of the importance of this aspect of their work. While the knowledge that someone is checking their reports is one stimulus, it would seem possible and desirable to devise health education materials which would emphasize the critical role that the reporting personnel play in the functioning of the surveillance system and which would point out the critical role that the system itself plays in the functioning of the country's preventive medical services.

The major lapse in reporting exists between the sub-site, which is often staffed by personnel with limited education, and the reporting centre, and not between the reporting centre and the central receiving unit. Records reviewed at the central unit showed that the individual reporting centres were, by and large, submitting reports on a regular basis while we were rarely able to find records at the reporting centres which indicated that they received reports from their sub-sites. None of the reporting centres had a formal system for monitoring the receipt of reports from their sub-sites.

Our feeling was that the key man in the system was the man at the reporting centre level. In general, personnel at this level seemed to have enough motivation and education to be responsive to efforts to improve reporting practices, and usually seemed to be in a position of sufficient authority to stimulate better reporting from the village and sub-site levels.

Most of the central receiving units did not monitor the receipt of their reports closely. The usual system was to file incoming reports from all the reporting centres chronologically in a single folder. One unit, however, had designated a separate folder for each reporting centre. At the close of the reporting period, they reviewed these folders and extracted those lacking current reports for follow-up action. This was the only unit visited where vigorous follow-up action was being taken.

The information transmitted by the surveillance systems in the countries visited appeared to be adequate to meet their needs with regard to smallpox, but inadequate with regard to measles. Because all smallpox cases are to be investigated, the details of age, sex, vaccination status, etc., can be supplied on a special investigation form; the telegraphic report fulfills its function by giving the location and number of cases detected.

Prior to the institution of measles vaccination programmes, information concerning the location and number of measles cases fulfilled most needs and telegraphic reporting was not usually indicated. Since the advent of measles vaccination programmes, however, the situation has changed and measles reporting should also be changed.

Measles should be one of the diseases included in the weekly telegraphic reporting system. Most countries will be able to achieve measles control in urban and densely populated rural zones where yearly vaccination campaigns can be carried out, but most countries will also have certain rural zones where vaccination teams can only return every two or three years. In these latter zones, measles epidemics can be expected. With a weekly telegraphic reporting system, such epidemics can be identified at their onset and vaccination may be sent to prevent further spread.

In the rural areas, if a rigid vaccination schedule is maintained with no regard to the occurrence of measles, the teams may frequently find themselves vaccinating areas just after they have experienced an epidemic. In this situation, the team is accomplishing little. Having already had its measles epidemic, the community in question is safe until another pool of susceptible children has built up, and the team will be wasting a large proportion of its measles vaccine by giving it to children who have already had the disease. The team would be far more effective if it postponed the vaccination of that particular community, and turned its attention to areas which have had no recent measles outbreak or to those in which measles was just beginning.

Measles cases should also be reported by age and by vaccination status. This information is too detailed to be included in the weekly telegraphic reports for which the location and number of cases is the only immediately required information but it should be furnished monthly by the reporting centres. Forms have been devised which make the collection and transmission of this data an easy matter. Such information is highly relevant to the execution of effective vaccination programmes. The age indicates whether or not the majority of the cases were in the target group for vaccination during the last measles campaign. If most were less than six months of age at this time, this indicates that the pool of susceptible children has grown large enough to support an outbreak and that vaccination cycles, planned for that community, should in the future be shorter than the time which had elapsed between the last campaign and the onset of the first outbreaks. However, if most of the cases were six months of age or older at the time of the campaign, two possibilities exist: either these children were missed by the programme, indicating that future campaigns would require better organization, or they were vaccinated by the teams but remained susceptible to measles following vaccination. In the latter instance, refrigeration or vaccination techniques might have been faulty. By knowing whether most of the cases did or did not have a history of measles vaccination, one can distinguish between these two alternatives, and take appropriate action.

#### SUMMARY

1. Several surveillance systems have been evaluated during the past year in conjunction with Phase 1 assessments. The most useful information has been obtained by determining how the particular system being evaluated was supposed to function in theory and then comparing that description with a study of the system as it actually functioned. This has been done by reviewing the records available at the central receiving unit and by conducting interviews and examining records at the reporting centres and sub-sites. Estimates of the sensitivity of the surveillance systems in detecting smallpox cases were made by the method used requires further evaluation before it can be recommended.
2. These evaluations indicated that, in countries recently endemic, smallpox was under-reported. The largest communications gap in the surveillance systems appeared to exist between the sub-site and the reporting centre. It is suggested that attention be given to methods which would make the person at the reporting centre level more aware of the importance of his job, in the hope that he can stimulate better reporting from the sub-sites responsible to him. Reporting centres should begin a formal system of monitoring the receipt of reports from their sub-sites, and the central receiving units should similarly monitor reports from the reporting centres. Although the information transmitted was adequate with regard to cases of smallpox it did not meet the countries' needs with regard to cases of measles. It is suggested that all countries use the weekly telegraphic system to report on the location and number of measles cases which have occurred, and to use a written report, which could be submitted on a monthly basis, to specify the age and vaccination status of measles cases.