

BEIRUT

MOBILIZATION OF HEALTH MANPOWER TO MEET HEALTH NEEDS:  
LESSONS LEARNED FROM THE SMALLPOX ERADICATION PROGRAM

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On October 26, 1977, over 18 months ago, the last known naturally-occurring case of smallpox became ill. Since then, thousands of health workers in the recently endemic countries have searched from village to village and house to house in an effort to detect other cases. A reward of \$1,000 has been offered to anyone reporting a case. Tens of thousands of persons who were ill with skin rashes have been screened. Thousands of specimens have been examined in WHO laboratories. None have been smallpox. However, as you know, two further cases of smallpox occurred in August of last year, in Birmingham, England, as a result of an accident in a laboratory. The accident, though tragic, dramatized the potential risk of spread as a result of laboratory infection. It emphasized the need to reduce the number of laboratories retaining smallpox virus and to insure that each provides maximum safety measures. Today, smallpox virus is retained by only 7 laboratories and only one is conducting research. By the end of the year, the number of laboratories retaining smallpox virus should be reduced to four. In October of this year, International Commissions to certify smallpox eradication will be visiting the last endemic countries in the horn of Africa. Based on reports of work already documented, it is fully expected that on October 26 of this year, it will be possible to certify that these countries are smallpox-free and that global smallpox eradication has been achieved - the first disease ever to have been eradicated.

Are there lessons to be learned from this program which may be applicable to others? It is surprising to me today to find individuals who insist that the smallpox eradication program provides little or nothing which might be of value to other programs. They argue that the program was a vertical one of a unique type, rigidly controlled by WHO Headquarters staff in Geneva; that it was heavily financed; and that it relied on an army of single purpose health workers. In brief, they ask, how could the program possibly have failed? What possible relevance could it have to primary health care provided by basic health workers? It is important, I believe, to examine these beliefs in the context of the history of the program and its development and in the context of what is meant by primary health care.

Global smallpox eradication - what might now seem to have been so simple and so certain was regarded as anything but that in 1966, when the program was decided by the World Health Assembly. At that time, there probably was not more than a handful who believed it to be a realistic goal. The Director-General of WHO himself, both privately and publicly,

stated repeatedly that smallpox eradication was impossible. Only one of WHO's Regional Directors supported the program at that time. The scientific community, the public health community were no less persuaded or committed. Illustrative of WHO's attitude is that those of us in the Smallpox Eradication Unit were explicitly instructed never to refer publicly to the ten-year time target which the Assembly had suggested since it was believed that this target would ultimately and inevitably prove embarrassing to WHO and its member countries. Indeed, that ten-year time target was missed - but by less than ten months.

There are few, even today, who appreciate how little financial support the smallpox program was given. The regular budget of WHO provided \$2.5 million. If you divide that by 50, the number of countries in which programs had to be conducted, you will realize that this amounts to only \$50,000 per country. We actively solicited donations and many eventually were received. They were extremely difficult to obtain. How much international assistance was provided? Including the amount from WHO's regular budget, from bilateral contributions, from contributions of money and vaccine to WHO, the total amount of international support of all types averaged just over \$8.0 million per year. It was pathetically little - less than half of what was being spent, for example, in one year in Ethiopia for malaria eradication alone. The program was not lavishly financed. Quite the contrary. With so little money available, there was no choice but to depend heavily on developing full participation of those in the existing health services. I am amused when I am asked as I frequently am, as to what the hundreds of thousands of smallpox workers will do when smallpox is eradicated. The armies of smallpox workers never existed. Staff exclusively devoted to smallpox were, at most, a few thousand persons. Yet, so far as we could tell, the smallpox program did not displace other health activities. Surprisingly, we found in country after country substantial numbers of reasonably well-trained people on government payrolls, ostensibly doing one task or another, but who, in fact, were without real supervision or direction, with minimal or no drugs, vaccines or equipment, who were disinterested and disillusioned. I would say candidly that it was exceptional to find health staff who were performing at more than 5% to 10% of capacity. Thus, lack of manpower was rarely a problem and I suspect the situation is similar today.

Now, we are concerned with the development of preventive and curative programs for which funds are limited and which must depend on better utilization of those in the existing health services and of village volunteers. This is precisely the problem we faced in the smallpox eradication program.

Let me then reflect with you as to principles which, in retrospect, I feel were essential to the successful culmination of the smallpox program. You may judge as to whether they are applicable to programs of primary health care.

I believe that the single most important factor in the success of any program is to obtain the most competent, imaginative leadership possible

at every level and to support and encourage those concerned. I know this was true in smallpox eradication. It was no less true at CDC, where I had worked before and similarly, it holds true at Johns Hopkins where I work now. It seems perfectly obvious. But how much time do directors of health services or program directors spend in identifying, recruiting, and supporting the best possible people that can be found to undertake a given task? How much time is spent with those who have been recruited in working with them to help them do the best possible job of which they are capable? How often do we transfer, fire or otherwise displace those who are unable to do the job they are supposed to do? To all three questions - I can say that in most programs, very little time is devoted to this task. If one has competent people who are encouraged to be imaginative and to take leadership roles, one can have an excellent program even though funds are limited and planning is mediocre. But with a superbly planned and well-financed program, mediocre personnel produce a mediocre program and they will never do better than this.

In the smallpox program we worked hard to identify and to recruit the best possible people both for WHO and in the countries. We prized intelligence, motivation and vigor far more than we did experience. A retiring Director of Health Services from a country, more often than not, was a liability. He was frequently fixed in his ways, often reluctant to go into the field to try to better understand the problems and the needs and rarely willing to work the necessary long hours to set a program in motion and to keep it going. Younger people generally proved more innovative, ready to try new approaches, and more willing to travel frequently into the field to talk with workers at all levels to determine what really was being achieved and to learn from others how the job could be done better.

Leadership, in the health field, is like leadership in an army. It cannot be exercised from behind a desk. We insisted that all of our WHO smallpox staff spend at least one-third of the time in the field. With WHO staff traveling frequently in the field, national staff usually did so, too. I myself spent from 50% to 75% of my time outside of Geneva. From country program directors, from field supervisors and from local health workers we learned better ways to conduct the program. We developed principles and broad guidelines and then encouraged national program leaders to adapt and to innovate. We encouraged leadership. I'm proud to say that no two national smallpox programs were identical. In fact, many programs changed so much from year to year that a person returning after a year's absence often required reorientation. Ideas in regard to better ways to achieve our objectives came from persons at all different levels. In fact, I can identify only one innovative idea which originated in Geneva. To those who assert that smallpox eradication succeeded because it was rigidly directed from Geneva, I would counter by saying that it was as successful as it was because it was not rigidly directed from Geneva. Our objective was to foster leadership and leaders emerged. The malaria eradication program is a lesson in contrast. Those responsible for malaria eradication developed extensive, detailed manuals which described exactly what each person should do at each level, precisely what forms should be completed, what maps should be prepared and hung on

the wall at district level, national level, etc. The methods were rigid and expected to be applied in the same manner for every area - in every country. Is it surprising that malaria leadership progressively withered, that competent, imaginative people left the program to those willing to do exactly what the manual called for? Different programs and different problems called for different solutions but those who thought they knew better approaches were rarely permitted to try them. What was written in the manuals was actually referred to as "dogma" and all were expected to follow it to the letter.

I believe that a second principle of critical importance to the smallpox program was an insistence that every program have a method for assessment and evaluation and that the data obtained be used in guiding the execution of the program. Again, the methods differed from country to country but the principles were the same. Our ultimate goal was to reach "0" cases of smallpox. To determine our degree of success in progressing toward that goal, we needed to develop a reporting network to measure the number of cases which were occurring. Data regarding the cases needed to be carefully studied and analyzed to determine where and why cases were occurring. Each case of smallpox had to be regarded as a failure. By determining among which groups cases were occurring, better methods for vaccination and containment could be developed.

To obtain reports of cases, we needed the cooperation of health staff at every level. Again and again we learned that an order signed by the Minister or Director of Health Services demanding that all health staff report cases of smallpox accomplished nothing. In most countries, health personnel are accustomed to receiving hundreds of orders, instructions and requests. Rarely does anyone check to see if they are being followed. What proved most effective in a number of smallpox programs was to constitute a surveillance team of two to four persons to visit each health center, hospital and dispensary on a regular basis. The team would explain the nature of the program, what was expected of the health staff and would request them to send a report each week as to whether or not cases were detected. They distributed vaccine and instructed health staff in proper techniques for vaccination and preserving the vaccine. Each team was responsible for visiting all such health units in a population of between two and five million persons. Only after repeated visits did the teams achieve reasonable levels of cooperation. When cases of smallpox were reported, health staff went with the teams to investigate the reported cases, to discover additional cases and outbreaks and to vaccinate the villagers. In this manner, they received training while working. A surprising number became highly motivated and began on their own to undertake special programs of case-finding and vaccination.

To sustain the interest of all the staff, we felt it was important to keep them informed about progress and to convey to them new techniques and approaches which others were using. Monthly, biweekly, sometimes weekly reports were regularly distributed - surveillance reports which described what was happening. Perhaps, this approach would seem to be an obvious one but, in fact, before 1967, no one expressed the least

interest in reporting and in the numbers of cases which were occurring. Attention was focused entirely on the numbers of vaccinations performed. Through surveillance we learned, for example, that few people who had ever been vaccinated, i.e., had a vaccination scar, got smallpox. The vaccine protected for a far longer time than anybody imagined. Accordingly, it was possible to shift our emphasis from vaccinating everyone to an approach which emphasized primary vaccination.

Our principal form of assessment was directed toward ascertaining how well we were doing in reaching our primary objective - "0" cases of smallpox. What we termed secondary assessment was also employed. In the countries conducting systematic vaccination programs, assessment teams visited between 5% and 15% of all villages which had been vaccinated to verify the results reported. In many areas, a practical objective was established that after a team had visited, 80% of those under five years of age should have a vaccination scar on their arms. We had learned by experience that if 80% of those under five years had a vaccination scar, older persons would have an even higher proportion with vaccination scars. Evaluating only those under five years of age was easier because they were most likely to be at home and thus were most accessible. In many countries, the idea of assessment was not easily accepted. For example, to assign two capable supervisors with a vehicle simply to check how others were doing seemed a waste of manpower and money. The effect of the continuing assessment, however, was striking. The performance of field workers was always far better when they knew that someone was checking their work - that someone cared enough to check their work was in many areas an entirely new concept. I remember well in one country that vaccination coverage when assessment first began was about 50%. Within two months after an assessment team began work, it approached 90%. On several occasions, assessment teams found no vaccination takes and on investigation found that the vaccine was not potent. Corrective measures were promptly taken. In contrast, I could describe costly national measles vaccination programs in two African countries in which no assessment was performed. Major measles epidemics occurred within a year after the program concluded. Investigation revealed that little if any of the vaccine was potent. Continuing evaluation of every program is mandatory and this information must be continually monitored and employed in providing guidance and new direction to the program's operations.

I believe that a third key principle of importance - and one as apparently obvious as the others - is that the responsibilities of village workers in particular need to be clearly defined and that each worker must clearly understand what he is expected to do. In every program, this was the lesson which was most difficult to understand and to implement. Let me illustrate by mistakes which we made. In the early stages of the program, when cases of smallpox were discovered in a village, a containment team was given the responsibility to go to the village and vaccinate it. This would seem perfectly straightforward. In practice, the workers would arrive about 9:00 in the morning, vaccinate from house to house and in the market and return home about 4:00 or 5:00 in the afternoon. They would report that they had vaccinated everyone. And, indeed, it

was usual to find that they had vaccinated everyone who was in the village at that time. However, many villagers were in the field, some of the children were at school and others were at markets in other towns. During the following weeks when active cases were still present in the village, visitors from other villages would visit and become infected. In consequence, outbreaks continued for weeks and months. A more detailed plan - more specific instructions - were obviously necessary. These plans gradually evolved over time and differed from area to area. A typical plan called for the team leader first to sit down with the village leaders to explain what they proposed to do and to request that the village leaders accompany the team from house to house. At each house, a number was painted on the door for identification and a list was made of all residents. When this task was completed, vaccination was begun. Frequently, village volunteers were trained to vaccinate and to serve as guards at infected houses. The team was instructed to stay overnight in the village so that those who were at the market or in the field during the day could be reached. They were told that each day, they should move from house to house to inquire if there were visitors. If there were, they were to list them in the book and to vaccinate them. With detailed, specific instructions such as these and an assessment team to insure that they were carefully followed, outbreaks stopped promptly.

I could provide other illustrations at each administrative level in which the productivity and efficiency rapidly and dramatically improved when each individual knew what his responsibilities were and knew that someone really cared as to whether or not he was performing them.

The indicator I use as to whether or not a program is well enough defined for it to be carried out is quite simply whether I, as a supervisor, could explain to a village worker what it is he is supposed to do when he walks into a village. If, as in so many programs I have seen, all I can say is "give health education," "improve sanitation," "give nutrition advice" - then I know that neither the worker nor the program will achieve anything.

To convey direction such as this requires continuing analysis of what is being achieved - continuing education of each worker at each level to be certain he understands what he is to do - continuing discussion with the workers themselves to help them overcome obstacles and to learn from them better ways to achieve the program's objectives. And this, in smallpox eradication, was a never-ending task.

To reiterate the three principles which I believe constituted the foundation of the smallpox program's success -

1. Leadership
2. Assessment, evaluation, surveillance
3. Clear definition of responsibilities and tasks

Does this apply to primary health care? Absolutely. Slogans such as "Health for all by the year 2000"; definitions of primary health care such as decided in Alma Atta, represent slogans and philosophy. To

undertake programs, one needs more than slogans and philosophy - one must define what it is that is to be achieved, how one is to measure one's progress in achieving it and how to provide the leadership to do it.

I would venture to say that there is today in virtually every country sufficient manpower to permit dramatic progress to be made - that the limiting factor is not money but sensible plans and intelligent management.