David J. Sencer CDC Museum

ORAL HISTORY COLLECTION

The Reminiscences of

Thomas M. Mack, MD, MPH

DAVID J. SENCER
CDC MUSEUM
ORAL HISTORY PROGRAM

2008

PREFACE

The following oral history is the result of an interview with Dr. Thomas M. Mack conducted by Melissa McSwegin on July 11, 2008. It was recorded in video as part of the oral history collection of the David J. Sencer CDC Museum.

The interviews in the oral history collection provide insight into turning points and lessons learned in polio eradication and how they are remembered. Views and opinions shared here represent the individual interviewee and do not reflect the views of the Centers for Disease Control and Prevention.

This transcript represents a spoken exchange and reads differently than written prose. It privileges the interviewee's intended meaning, and the interviewee has reviewed, edited, and approved its content. Clarifying text appears in brackets. The transcript has been edited based on guidelines adapted from the Chicago Manual of Style.

Video recordings are available. For more information please visit www.globalhealthchronicles.org.

MCSWEGIN: This is an interview with Dr. Thomas Mack on July 11, 2008, at the Centers for Disease Control and Prevention in Atlanta, Georgia, about his role in the smallpox eradication campaign. The interviewer is Melissa McSwegin. With this interview, we are hoping to capture for future generations the memories of participants and their families involved in eradicating smallpox. This is an incredibly important and historic achievement, and we want to hear about your experience. I have some questions to guide you, but please feel free to recount any special stories or anecdotes that you remember about events or people.

The legal agreement you signed says that you are donated the oral history to the US Federal Government, and it will be in the public domain. For the record, could you please state your full name and that you know you are being recorded? **[00:01:00]**

MACK: My name is Thomas Mack, MD, and I know I am being recorded.

MCSWEGIN: Okay. Thank you.

[INTERRUPTION]

MCSWEGIN: To start out with, can you talk about how your education and upbringing led you to a career in public health?

MACK: [Laughs] Well, okay. I was raised on a ranch in western Nevada. I needed to get away from home to go to college, so I scanned—I set up a surveyance scheme for scholarships, and I got a scholarship to a very good school in Minnesota, Carleton College, a liberal arts college. At the time that I started out there, I thought I probably would go into zoology somewhere. But because many of the people who were my friends at Carleton were going into medicine, I decided that there was no reason why, if they could, I couldn't. I applied to medical school, and went to Columbia Medical School [Columbia University Vagelos College of Physicians and Surgeons]. **[00:02:00]**

Because I've always been interested in places and languages, in differences between groups of people, I presumed in medical school that I would go into infectious disease, and was rather adept at diagnosis and treatment in medical school. Went on to an internship in internal medicine, and then a residency in internal medicine at the University of Washington. Because I was interested in infectious disease and the differences between people, I thought I would go to CDC. I entered the CDC class of—I guess it would be '64 or '65. I went in '64, and I guess it was the class of '65. When I went, I was arbitrarily assigned to the smallpox unit, which was, in fact, the beginning unit devoted to smallpox at CDC. **[00:03:02]**

We were involved in studying vaccination efficacy and the dangers of vaccination, and from literature, something about smallpox epidemiology, although, of course, there hadn't been any smallpox transmission in the United States for decades. We looked at the historical record of smallpox in the United States, and I began being interested in importations of smallpox into Europe, which I later published about.

Then the opportunity came up for me to go to Pakistan by friendly relationship between [Dr. Alexander D.] Alex Langmuir and a person at the University of Maryland who had what was then called an ICMR [phonetic]. I forget the actual meaning of the letters, but basically it was an organization to study tropical disease in a foreign country, funded by American sources. **[00:04:02]**

They were situated in Lahore, Pakistan, with a Pakistani institution with whom they allegedly were cooperating. They had a place to study, and a set of facilities supported by USAID [United States Agency for International Development] in Lahore. In—it must have been January 1964 [*sic*], my wife and young son set out for Pakistan. When our plane was over the Atlantic, the war between Pakistan and India erupted. There were dogfights over Lahore between jets from the two countries. I was told not to go any farther, to stay in Copenhagen [Denmark], where my wife was from. I was sent on a few small assignments locally. **[00:05:02]**

Then sent with [Dr. Ralph H.] Rafe Henderson to West Africa to organize the agreements between smallpox eradication and measles control programs at CDC and the French-speaking countries of West Africa. Rafe and I went to each of the French-speaking, Francophone, countries of West Africa, attempting to do just that, with moderate success, I would say, and some initial embarrassments, which, I suppose, should have been described in the context of African epidemiology rather than Asian. **[00:05:45]**

One of the things that happened to us was that when we first arrived, we were both very tired from a long flight from Marseille [France], and we were both very hungry, because we didn't get any food. We were met by the French officer from the French organization in Bobo-Dioulasso [Burkina Faso]. Met with a long string of rapid French welcoming us. Finally, he took us to our place of sleeping, and we took a detour, and went and got a big breakfast. We went back and were preparing to go to bed, and he showed up, telling us basically that he had invited us to his house for dinner. We went with him to his dinner, just after eating a full meal by mistake.

Anyway, we did in fact go to all of the Francophone countries, and then I went back to Copenhagen and awaited permission to go on to Pakistan. By the time that we went on to Pakistan, my wife had delivered a second child in Denmark. We took a three-week-old baby, and my three-year-old—four-year-old—three-year-old son—two-year-old son, I guess, to Lahore, Pakistan. **[00:07:01]**

It was more or less determined by virtue of my original assignment that I was going to be studying smallpox, and I was excited about that. But I had to overcome a number of—I suppose you'd call them obstacles—to do that. The first thing was that most of the people from the University of Maryland were bench scientists, and they were interested in certain aspects of tropical disease from the standpoint of laboratory investigation. There were no bona fide epidemiologists. Then some people who were trained in chronic disease epidemiology showed up, whose methodology was set piece case control and cohort studies, with very carefully, set out in advance, statistical goals, which were just simply not amenable to studying outbreaks of smallpox, which occurred in places unpredictably specified. **[00:08:11]**

There was a fellow who joined me in Lahore from the University of Maryland named David [B.] Thomas. David and I basically worked together for the next two and a half years. We collectively decided that we would try to solve several specific questions. One was, could we identify the most efficient groups of people, demographically speaking, to vaccinate in order to halt transmission? Demographically meaning age groups and gender, and anything else that was pertinent. We also wanted to know whether or not the descriptive epidemiology of smallpox occurrence led to any other suggestions about more rapid eradication. **[00:09:03]**

Also, we had to set up methods of ascertainment and surveillance, so it took a while before we actually could convince the chronic disease epidemiologists and the laboratory bench scientists that we were basically going out as outbreak investigators rather than doing set piece epidemiology. Once we got that settled, then we had to talk to people out of a truck or a Jeep equivalent, a Land Rover, on a regular basis.

Then we had to find somebody to go with us. I began taking lessons in Hindustani and Urdu, but quickly learned and realized that while Urdu was the national language of Pakistan, nobody in Lahore or in the areas that I was going to go spoke Urdu as a regular language. They spoke Punjabi. **[00:10:01]**

Nobody was willing to teach Punjabi, so I learned some Urdu, and I managed to use it in Karachi [Pakistan] and India from time to time, but only a little bit in the field. We had to learn how to understand the responses to questions in Punjabi.

The second problem was that we—as in most developing countries, a person who is willing to work as a subordinate staff person in the field is usually a person who has been trained as a driver or a laboratory technician, and has a certain degree of self-importance, and also a certain value that is attached to the presence of a job. The likelihood of continuing a job is associated in the minds of such people, oftentimes, with pleasing the people who you're working for. **[00:10:55]**

That meant, in this case, very often, that instead of translating what the respondent had actually said in Punjabi, we were told what the translator thought we would most like to hear. We had to go through a number of people—or I had to go through a number of people to try and solve that problem. I finally found one wonderful guy who, throughout the next two and a half years, acted as translator in a very accurate way, and told us sad things when we needed to hear sad things, and good things when we needed to hear good things. He quickly learned what it was we were trying to do, and became very inventive and thoughtful in his formulation of questions to people. **[00:11:45]**

Basically, several times a week, we would get in the Land Rover and go out to villages, which we had been previously told there might be smallpox in, and followed each village back to the next villages where there might be smallpox, until we found an outbreak, or we actually surveyed the available outbreaks, took the necessary information, and continued. Over the course of the ensuing two and a half years, we basically investigated a hundred outbreaks of smallpox, interviewed every family member of a case, if not the case themselves, tried to learn how the

outbreak had begun and where the person who entered the village to spread the disease had come from, and how the disease had spread within the village.

Then we set up subsequent—in the last year that we were there—very similar studies in what was then East Pakistan, now Bangladesh. This was prior to the war between East and West Pakistan, prior to the formulation of Bangladesh as a country, and were similarly successful in investigating outbreaks in Bangladesh. **[00:13:09]**

When we were finished, we had learned several things. We learned that in West Pakistan, the people who started the outbreak were almost always children, which had been taken by their mothers to visit the mother's family in another village, and had been infected in that other village, and thereby concluded that vaccinating schoolchildren or preschool children would be the most effective way of getting rid of smallpox in West Pakistan, and, of course, the least expensive way. Because to go out and try and vaccinate men in the fields, and to spend the time necessary to talk to women in purdah, of whom there were a minority in the villages, into permitting vaccination would be very difficult and very costly. School-based and preschool-based programs of vaccination would have been very effective. **[00:14:06]**

The second thing we learned was that it was very clear from the seasonal distribution of smallpox that smallpox was an incredibly seasonal event in West Pakistan. There were periods during the wet season where, in the whole province of Punjab, which is where we were working, and actually, probably, in West Pakistan as a whole, there were really only two or three villages where smallpox existed. I tried to convince the Pakistani authorities that if we could have the

cooperation of one military patrol or two patrols, we could probably eliminate smallpox from Pakistan within a year. But this was not a credible proposition to anybody, and we didn't have particular clout to be able to convince people that that was the case, so it never happened. **[00:15:06]**

The third thing we could clearly conclude from the studies in Pakistan—and they were also corroborated by later examination of the importations to Europe—was that smallpox was really not a very infectious disease away from the bedside. Almost everybody who contracted smallpox had been exposed at the bedside, or the charpoy side, or within the room of a person who had smallpox. People who lived meters away, or down the path, down the stream, or anywhere else in the village, normally were not exposed, and did not contract disease, which meant that while the disease was very infectious within a short period of space, it was not infectious over a long period of space, which has lots of implications for smallpox importations subsequently. It also had serious connotations for eradication efforts. **[00:16:11]**

We went to Pakistan in 1964, or we started out in 1964, were there in—no, that's not true. We started out in January of '65. I was mistaken. Came back in the spring of '68, at which time eradication efforts in West Africa were underway, but certainly no efforts in Pakistan had begun. There were efforts in India that were underway. I never actually had a direct role in the eradication program itself in either Africa or Asia, even though all this work was done in Asia. Now you should begin your questions, if you have any. **[00:17:01]**

MCSWEGIN: [Laughs] You've talked quite a bit about brokering agreements between the governments and all the parties involved in the program. What did you find to be the most challenging aspect of that work?

MACK: There were a couple of—obviously, it was very challenging to take a Land Rover and go out into an area the size of a middle-sized American state, just restricting ourselves to one district. We actually did begin by taking three or four districts, and studying smallpox wherever we could find them, but we decided that we wanted to be comprehensive and study every outbreak of smallpox which occurred in one district, which was composed of about a million people. We did that over the course of one full year. Then we studied a lot of other outbreaks in other districts. **[00:17:58]**

Of course, Pakistan is not necessarily the easiest place to get around in. We had lots of Land Rovers mired in mud that had to be pulled out by bullocks. We had—driving up and down the Grand Trunk Road, which was the main road that the English built between the northern part of Pakistan all the way down past Delhi. It was a two-lane road, and most Pakistani farmers were using bullock carts, and there were buses, which were piled high on the top of the bus with people, as well as inside the bus, which traveled at breakneck speed on the two-lane road. That was fairly dangerous every day. **[00:18:44]**

We had a few real scares. One of them came about because the military major, the Pakistani army major—or I guess he was a colonel—who happened to be the director of the Pakistani collaborative agency, where no effective science, at that time, was really being done—people

were holding down jobs, and they were doing a few minor things, but nothing that anybody would get excited about scientifically. He was a former malariologist with the Pakistani army. Unfortunately, I think he probably was very close to being a paranoid schizophrenic. He, over the course of the time I was there, became more and more angry that he was not given more power and more money to dispose of. Actually, his opinions were not being sought by the leaders of the institute that I was associated with. I don't know what all the basis for his anger was. **[00:19:51]**

I have it on good authority that he began hiring what in Pakistan were called goondas, which really were thugs, who would beat up the Pakistani employees of the Americans on occasion. Not every day, but just occasionally, just to keep everybody a little bit frightened. One day, I came back after having been out all day long, from about four o'clock in the morning to about eight o'clock at night, where we had worked up a couple of outbreaks. We spent most of our time off the Grand Trunk Road, fortunately, because we got back again, and as we pulled to a stop in the compound of the institute, the brakes were failing. When we investigated the brakes, somebody had put sand in the brakes. Had we been on the Grand Trunk Road, and had we had to stop very suddenly for a bus or a bullock cart, we would have been in real trouble. That was a fortunate event. **[00:21:00]**

I had one other scare of a different kind. We were in a Land Rover, and it was just my driver and I. We were in Sialkot district, which was maybe 150 miles north of where we normally were working. We were looking for a small village where we had been told that there was an outbreak. We came over a hill. As we came over the hill and started down the other side of the hill, one

could see right ahead of us another hill, and there was another Land Rover sitting on the top of the hill, facing to the left. **[00:21:46]**

The people who were sitting in the other Land Rover had Sikh pagris on, Sikh headwear. That meant that they were Indian army and not Pakistani army, which means that we had crossed over the border by mistake, without realizing it. Had they seen us and stopped us, and confronted us, I'm sure that I would have been an Indian jail as a spy, because at that time, there was still intermittent activity between India and Pakistan.

Those were the only two times, I think, I could—well, there were other times when we had very frustrating times, but those times got my adrenaline flowing a little more than the others. [Laughs] My three-year-old son got chickenpox. That didn't frighten me very much, because I knew a lot about smallpox, and I knew he was protected, and I knew there was no smallpox around. But my wife was not as easily convinced that there was no problem. We got over that in a few days. **[00:23:00]**

MCSWEGIN: What were some of the other challenges that you faced having your family with you while you were in Pakistan?

MACK: Pakistani is not the easiest country to live in for Westerners. We had a lot of good Pakistani friends, but invariably, they were male friends. It was impossible for me to actually meet any Pakistani female friends, except for professionals. There were one or two professionals who worked with us. Some of them were Bengali, because this was at the time when both sides

of Pakistan were in the same country. There were one or two who were Punjabi, but they were, of course, very different than the ordinary Punjabi wife. We really didn't have any close family friends. **[00:23:51]**

When you would go into a landowner's house—I should say, when we'd go to a village, we would ordinarily be greeted by—in a small village—by what's called a zamindar, who is the man who basically is the major landowner of the village farmland. A lot of the people who worked in a given village would be people who were essentially sharecroppers, people who worked the land for a percentage of the return, and the rest went to the zamindar.

We would always be greeted with offers of something to eat or drink. If it was tea, that was okay. It was lassi. Lassi is a yogurt-like milk product. You can get it at any Indian restaurant now. Lassi is fine, but the problem is that there was no ice in villages in Pakistan at that time, except when it was brought in on the back of a bicycle after a twenty-mile ride. **[00:25:00]**

A large cake of ice on the back of a bicycle after twenty miles would turn into a U-shaped cake of ice, and very often, it would be filthy. If you cut off some of the ice to put in the lassi, all you're doing is contaminating the lassi with the dirt and buffalo stool that's collected on the sides of the road, so we were a little afraid of that. I didn't have any undue disease experiences in Pakistan, but I certainly was alert to it and tried to figure out the most politic way of getting around that problem. We usually would either take a sip or two and then surreptitiously drop the rest somewhere, or do something else of that nature. **[00:25:51]**

I had a funny experience, not in Pakistan but in India, relating to tea, actually. I was visiting New Delhi for a purpose of visiting collaborators. I went into a teahouse in Delhi, and sat down, and for lunch ordered a vegetable cutlet and a cup of tea. You eat communally at most places. A young Sikh came over and sat down across from me at the table. He hemmed and hawed, and it looked like he wanted to speak. He ordered tea, but his tea, he drank it clear. No Punjabi drinks tea clear normally, because it's always actually brewed with the milk in it.

Just to break the conversation, I asked him where he learned to drink his tea that way. He said, oh, he'd worked in Afghanistan for a while. Then he hemmed and hawed a little bit more, and he said, "You're an American?" I said, "Yes." He said, "I was going to go study in America, and the Indian government was going to pay my way, but I never got to go." I said, "Oh, that's too bad." **[00:27:07]**

There was a silence for a minute, and then I said, "Where were you going to study?" He said, "Minden, Nevada." Now, Minden, Nevada, is a town of two hundred people, and it's my hometown. He must have been the only Indian who had ever heard the word Minden, Nevada, and I was the only person from Minden, Nevada, in Asia, as far as I know. I looked around, thinking that somebody had set me up. But it turns out they hadn't. When I asked him what he was going to study, it turns out he was a crop duster, and there was a school for crop dusters at the airport just outside of Minden. He was going to go study in Minden, Nevada. [Laughter] **[00:27:55]**

I started to say, my family didn't really get to meet any of the Punjabis, but it really wasn't as bad as it sounds, because my wife was Danish, and we became good friends with people who worked in the Danish and Scandinavian aid organizations. We saw them a fair amount and had some social time with them. Of course, there were a couple of Americans who worked in the institute that we got to know. That was okay. She worked as a librarian at the institute for a short period of time. It turned out to be all right.

We enjoyed our time. We met a number of Pakistanis who were married to Danes, and got to know those couples together. Subsequently, I've gotten to know many Pakistanis. But I think, on average, there are probably other places that we could have enjoyed socially much more. But Pakistan was a very vibrant country, and it had many interesting things, and we took many interesting trips up to the north into the mountains, as well as to India. That was fun. **[00:29:06]**

As I left Pakistan, I went to WHO [World Health Organisation], and I was introduced to the Indonesian minister of health [*sic*], a woman named Julie Sulianti [Saroso]. She told me that she was very happy that I was going to come to Jakarta [Indonesia] and live for a couple of years, which was news to me. It turned out that [Dr. Donald Ainslie] D. A. [Henderson] had offered my services to Indonesia for running the eradication program in Indonesia. Unfortunately, we had already decided that we wanted to go back to the States and live, so I had to turn that down.

MCSWEGIN: What would you say were the top factors that led to the success of the eradication campaign? **[00:29:54]**

MACK: Oh, there's no question about what the top factors were. I could use the word epidemiology, but that's unfair. Epidemiology is basically good sense with numbers. That includes the topic of surveillance. If I had to name one thing, it was surveillance. Surveillance, of course, led to judicious application of vaccination, and in the case of the eradication programs, normally it was done on the basis of a circle of eradication around what was thought to be the group at risk, as judged from previous cases.

I guess a better question to ask is, why hadn't eradication occurred before? I told you that it was my conclusion from both Europe and Pakistan that smallpox really didn't spread very far outside the bedside, and that's still my belief. **[00:30:58]**

Why hadn't it been eradicated in Pakistan and India before? Well, I would start out by saying that it certainly had been eradicated in many, many poor countries. Thailand, Egypt, Guatemala, lots of places without many resources. Smallpox was amenable to eradication on its own if there was some form of response to the presence of cases.

It turns out that the British left a legacy in south Asia, which was unfortunate. They managed to leave both countries with practices that tied the reporting of smallpox to the vaccinator and the person responsible for vaccinating. Of course, if smallpox occurred in a district, and a vaccinator was told about it, he had two choices. He could hope that it went away on its own, or he could report it and get in trouble, because he shouldn't have permitted any unvaccinated people. **[00:32:02]**

That in tandem with the fact that very often, the vaccination was done with a very dangerous—I shouldn't say dangerous, but very hurtful circular vaccinator, which was a set of teeth, which went around like this, and carved a circle out of the skin, and was very painful and left a very commonly infected, large wound. It was usually done twice or three times. People paid vaccinators not to vaccinate their children. A very large proportion of people went unvaccinated who should have been vaccinated. Then smallpox occurred and was spread. The vaccinator had to report it, and he would get in trouble. Had that not happened, I think it might have disappeared from Pakistan before that. **[00:32:51]**

But in any case, certainly surveillance and ring vaccination were the two arms that led to eradication. I guess I should say, good management and very effective politics. D. A., of course, as a politician, convincing people and getting colleagues at WHO to be equally good politicians, convincing countries that eradication was feasible, made a huge difference.

MCSWEGIN: How would you say that your experience with the smallpox campaign affected your life and career, and afterwards?

MACK: Well, I certainly learned a lot about infectious disease epidemiology. While I turned to chronic disease after returning to the States—when I came back to the States, I was appointed on the faculty of the Harvard School of Public Health [now Harvard T. H. Chan School of Public Health] in the division of epidemiology. I was the only person there that had any infectious disease experience or knowledge, so I had to teach infectious disease epidemiology, and I have always done that ever since, and have had some occasional practice, as well. **[00:34:13]**

It certainly added to my enthusiasm for knowing about the differences between people, because that's the basis for descriptive epidemiology, whether you're doing cancer or infectious disease. It certainly formulated my career in epidemiology, which has now been, what, forty years. I've used the same principles of surveillance to set up a population-based cancer registry and run it in Los Angeles County [California]. In fact, interesting enough, David Thomas did exactly the same thing in Seattle [Washington]. We both ran population-based cancer registries, and did etiologic research on various cancers and other diseases over the years. **[00:35:00]**

I think more than—I, I think, was special because I started out at CDC and went into academic epidemiology. There really is a big difference between the two. CDC epidemiology is basically practical public health, prevention oriented. Academic epidemiology is much more causal epidemiology, trying to understand the causal relationships between environmental exposures and disease, or genetic exposures and disease. They're both very important, but to forget exactly how you implement prevention based on knowledge is something that academic epidemiologists have only gradually learned on an individual basis, whereas CDC, that's the fundamental approach that you start with. Putting the two things together, I think, has been very useful for me over my career. **[00:36:00]**

Much to my surprise, after nine-eleven [September 11, 2001, terrorist attacks], smallpox became a matter of great concern. I was the person who had written the most papers on smallpox epidemiology by that time. The people at CDC who were more concerned with eradication had a couple papers, but they didn't really describe much more than their experience in eradication,

whereas we were much more systematic in the way approached the topics. I looked at the European outbreaks in much the same way. All that was water over the dam until nine-eleven, and then, all of a sudden, the analysis of the European outbreaks became a topic of great interest. **[00:36:52]**

I've written papers in the *New England Journal of Medicine* and in *Lancet*, discussing the relationship of smallpox to dangers from terrorism, and smallpox to SARS [severe acute respiratory syndrome], and other infectious diseases which have represented threats. In fact, I think SARS experience in Toronto [Canada] and in the Asian cities constitutes, perhaps, the best evidence that smallpox is not really a terribly important terrorist threat, because it would very quickly be taken care of by ordinary good public health methods.

MCSWEGIN: Is there anything else that you would like to add about your experience?

MACK: Well, it will take me a while to think of anything I haven't said.

MCSWEGIN: [Laughs] Well, thank you very much for your comments and sharing your experience today. I appreciate it.

MACK: Sure.

[END OF SESSION]