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"A Changing World: Smallpox, Ebola, Measles – what's next?"
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It is a privilege to be with you today to meet once again with graduates who are veterans of the great vintage years for Oberlin graduates – 1949, 1950, and 1951. Have there ever been three better classes? And there is much more to each of us now than there was 65 years ago. Wisdom certainly -- but also hearing aids, glasses, stents, new teeth, metallic joints, a bit of paint and a few patches. Like an old building. And there are constants to remind us of the past – Tappan Square in the verdant Oberlin spring, an especially welcome all too brief period, falling between the long, damp, dismal Oberlin winters – and the arrival back on the scene of the Cleveland Indians – our ever hopeful Cleveland Indians.

MY OBERLIN YEARS

I am particularly grateful for my years at Oberlin as they motivated me to embark on an unexpected career whose theme has been public health but with a central role in one infectious disease drama after another. Epidemics and crises caused by smallpox, polio, measles, Ebola, and bird flu—each has generated international levels of high anxiety with international implications. During most of the dramas, I found myself unexpectedly at or near the pivotal centers of action. It has been like a series of Forrest Gump adventures in which, as you may recall, Gump repeatedly found himself unexpectedly in the midst of one historic situation after another. And so it was as decisions were made in 1966 to eradicate smallpox; and then polio in 1988; in deciding national strategies to cope with biological weapons in 2001; and then with the fearsome bird influenza in 2005. And finally, Ebola. Each of these events precipitated important initiatives in policy and practice. Oberlin provided the turning point that set me on the route I took.

I came to Oberlin with expectations of being a family physician – a clear direction as perceived by immigrant Scotch-Canadian parents and an elder physician uncle -- a sort of clan chief. Events at Oberlin, however, soon indicated that there were other directions that warranted exploration. In my sophomore year, I was asked to be an Editor of the college yearbook, the Hi-O-Hi. Its annual creation was a popular tradition at that time and the books were purchased by a substantial proportion of students. For the four impecunious principal editors, it offered a welcome stipend. There was scope for imagination because the faculty adviser, a genial English professor, exhibited little interest in editorial content or policy. We were given remarkable latitude in what we included. There were some 60 self-motivated students – writers, photographers, proof readers, artists, cartoonists, and others. The book provided creative opportunities such as a painter might wish. There was a canvas (a book to be created), a palette of colors (a creative multi-talented student group), and many possible conceptualizations of a final product. I suspect that there close to 60 views expressed about every significant issue. In 1949, we introduced, an unprecedented tidal wave of photographs, the first ever 4 color pictures of the campus, cartoon figures, and a graphic map of the college. The book achieved an All-American rating.

For me, the exhilaration of creation with a working team offered a new dimension for a career. And, as it turned out, there was an added bonus in the person of the Managing Editor – Nana Bragg – talented but quite contentious or so it seemed to me. We settled our differences in 1951 by getting married. Our 65th anniversary is due next year. We have decided to give it another year.

My senior year at Oberlin offered yet another challenge – creation of something entirely new on the campus. My roommate and I, with friends who knew electronics, started a radio station -- still extant today, I am told. It was an opportunity to explore untrodden paths. One notable path was to purchase an official car -- strictly for station use, of course. It was the only student car on campus. It made me realize that while there have to be rules, there have to be exceptions to rules, especially for new ventures.

Once again I was surprised by the considerable latent talent, creativity, and numbers of individuals with innovative ideas who are eager to contribute to a program or project that offers substance and promise.

SMALLPOX ERADICATION

My Oberlin-acquired precepts in program creation and execution were critical elements as the World Health Organization's smallpox eradication campaign began in January 1967. That year there were 43 infected countries – 10 million cases and 2 million deaths.

How important was smallpox? Throughout history, smallpox has been recognized as the most disastrous of all the pestilences– far more serious than plague or cholera or yellow fever, for example. It could spread in any season. Patients experienced high fever and the pain one experiences with a boil but the boil-like smallpox pustules covered the body and were inside the mouth and over the tongue—20 to 30% died; many were blinded. It is the only disease for which there were native deities -- in China, India, Nigeria, Japan. A vaccine for smallpox had been discovered in the 18th century but the vaccine was difficult to produce and did not withstand heat well. However, all countries, including the U.S. used whatever quantity and quality of vaccine they had so as to lessen the severity of the recurrent smallpox epidemics. The last case of smallpox In the U.S. was 1949 but through 1972, all children had to be vaccinated before school entry. Such was the fear that a case of smallpox might be imported and initiate an epidemic. Vaccination certificates were required for international travel. Some argued for an intensive global campaign to eradicate the disease. Most were doubtful of such an effort given the pathetic state of health services in most parts of the world. Moreover, no disease had ever been eradicated.

In 1966, the World Health Assembly debated the initiative. There was a vote: 60 nations approved it; 58 did not; 12 abstained. Despite a majority of only two votes, WHO was directed to proceed. The Director General was personally opposed and deeply concerned about the likely criticism of WHO and his leadership if it failed. He blamed the U.S. for pressing this initiative and decided to have an American head the program so that, when the program failed, the U.S., rather than WHO, would bear substantial criticism.

I was informed that I had been selected to be the program director. At that time, I was at the CDC (the Communicable Disease Center) with responsibility for virus diseases, smallpox being one. I was ordered to go to Geneva for 18 months to get the eradication program started – it turned out to be 11 years. It was a daunting challenge. Fifty countries would require programs in an area extending from Brazil across Africa and Asia to Indonesia. The WHO

budget provided, on average, $50,000 per country – not enough even to purchase the needed vaccine. The staff consisted of 10 people at headquarters and eventually, an average of 150 international staff in the field. There was no internet. Direction and coordination of this far-flung program was a challenge as our only communication was by mail or by personal visit.

The program strategy comprised two parts. One was to improve vaccination coverage but more important was a simple strategy we called surveillance-containment. We sought to obtain a report of cases every week from each health center and hospital. Until this time, only a few health units in developing countries regularly reported information about infectious diseases to national authorities. As we began, we had little knowledge of where smallpox was present or the numbers of cases. Two years or more of diligent persuasion were required before we began to receive usable reports from most health units. When cases were reported, teams of two or three would visit the patient's house and vaccinate the contacts and those living within a ring of perhaps 25 to 30 houses. The explanation to staff: if a house is on fire, one puts water on the fire; one doesn't spray water all over the village.

International support was sparse. Many countries respected the Assembly's decision for a global eradication effort and provided some staff and funds from national budgets. For more intensive programs, we relied primarily on seemingly endless persuasion to gain needed local respect and support. A remarkable example was 1973, a crisis year in India. Progress had stalled in this vast country of 550 million people. Epidemics were continuing despite all efforts to control them. Outbreaks were not being found quickly enough. With government, a plan was agreed whereby a village by village, later a house-by-house search would be conducted during a 10 day period. The effort was to detect outbreaks earlier so that they be could be more effectively contained. The goal was for 125,000 local staff to visit every house in India in 10 days time. An unsuccessful 12 year program ended smallpox less than a year after the new strategy began.

The world's last case occurred in Somalia in 1977—just 9 months and 26 days beyond the global 10 year target. A disease infecting 10 million persons each year and killing 2 million had been eradicated. The program was hailed as one of the greatest medical achievements in the 20th century.

More than this, it epitomized the potential for international cooperation. Over the 10 years of the program, some 850 international staff from 25 countries served for periods of 3 months to 10 years. The two strongest supporters were the Soviet Union and the U.S; their bond of cooperation remained strong throughout the most volatile days of the Cold War.

THE EXPANDED PROGRAM OF IMMUNIZATION

There was another important dimension. To assure eradication, it had been essential that programs for case detection and vaccination extend to the furthest reaches of every country and to all citizens. For most countries, this was the first deliberate program to focus on equity in providing a public health benefit to everyone.

Success with mobile teams In Africa dramatized the potential for mass vaccination provided there was support from local leaders. We learned that a vaccinator could average 500 vaccinations per day with coverage exceeding 90%. It raised the possibility of widespread use of other important vaccines which were then available– DPT (diphtheria, pertussis, tetanus), measles and oral polio vaccines. A program was endorsed by the World Health Assembly in 1974 the Expanded Program on Immunization (EPI). UNICEF offered special support and

Rotary International agreed to provide oral poliovaccine. The goal was to achieve 80% coverage by 1990 among those less than 5 years of age. For most developing countries at that time, vaccine coverage was then about 5 to 15%. The goal was substantially achieved.

POLIO AND MEASLES

With WHO leadership, EPI progressed rapidly in the Americas. In 1985, a program for polio elimination from the Western Hemisphere was proposed. Six years later (1991) the last case occurred. In 1988, the World Health Assembly decided on global poliomyelitis eradication as a global objective. Today, only two countries have cases -- Afghanistan and Pakistan—blocked for the moment by the Taliban.

Measles became a second target for elimination from the Western Hemisphere, and, miraculously, the last indigenous cases were discovered and contained in 2002. Some imported cases continued to occur among unvaccinated children from Europe or Japan. With active surveillance the small outbreaks were quickly stopped. But this year, Disneyland provided a deluge of cases which have been difficult to control due primarily to resistance by ill-informed parents. Thus, polio eradication is blocked by the Taliban of Asia and measles elimination in the Western Hemisphere by the ill-informed Moms of North America.

UNEXPECTED GOOD NEWS

Last week came the good news that rubella (sometimes called German measles) had been certified as having been eliminated from the Western Hemisphere. As you know, rubella is a mild disease– nowhere near as severe as measles. The principal effect of the virus is on the unborn infant when the mother contracts the disease. In 1969, a vaccine became available but five years before this, there was a particularly devastating epidemic in the U.S. It resulted in 12.5 million cases. Of 20,000 children born alive, 2100 died soon after birth; 12,000 were deaf; 3580 were blind: and 1800 had permanent mental disabilities. The last known case in the Western Hemisphere occurred 6 years ago.

EBOLA

Finally, in this ever-changing virus world, I will mention Ebola. It is a new virus to us and undoubtedly the harbinger of other viruses that will emerge as urban populations grow rapidly across the world, as crowded settlements in tropical rain forests increase in number, as migrants and travelers become ever more numerous. To date, more than 25,000 cases of Ebola have occurred in 3 countries of West Africa; 10,000 have died. The first cases in this outbreak were detected in December 2014. The virus was unknown until 1976 but some 10 to12 small outbreaks have subsequently occurred. It now appears that the virus has a permanent residence in bat colonies across Central Africa. Thus, there is reason to expect continuing outbreaks as a human is infected by a bat and subsequently transmits the virus through close contact with others.

The present West African epidemic is centered in three countries-- Guinea, Sierra Leone, and Liberia. There could not be a more favorable site for virus proliferation. The three countries are the most densely populated in Africa. A decade of civil wars has left each with a dismal political and economic environment, inadequate health facilities, limited transportation, poor roads and few health professionals. They have only limited provisions for treatment and isolation. Funeral rituals provide further fuel. Large numbers attend rituals that involve washing and touching the dead body. Explosive outbreaks of 50 or more cases have resulted.

The epidemic could have been stopped long before this but WHO, other agencies, and governments simply didn't intervene in time. Stringent restrictions on travel are still in place but the economies have been shredded. Urgent research for vaccines and drugs are in progress but it is likely that months to a year or more will elapse before effective products are available.

The Ebola epidemic again makes the case that there is a need for far more investment in preparedness measures in our own country, in health and social development in all developing countries but especially in a continent as populous and poor as Africa. Meanwhile we have HIV/AIDS as a recurrent reminder that there are other microbial agents with which we have yet to fully contain despite our best efforts. Meanwhile, we can expect a steadily increasing number of what we call emerging viruses. For those who are not up on current news: there is, even now, a devastating new bird influenza virus which is sweeping through the Mid-West of the United States. The virus, called H5N1 can totally wipe out an infected chicken or turkey flock in 2 to 3 days. Its spread can only be stopped by early slaughter of flocks hopefully before the virus can spread. Iowa which produces 20% of the country's eggs, has now destroyed more than 40% of its egg-laying hens. So far, 33 million chickens and turkeys have been killed in an ever-widening group of states particularly those along the Great Central Flyway. Meanwhile, China, Japan, and Mexico have barred poultry imports from the U.S.

It is clear that the world is changing in many ways and we must be part of that One World. Oberlin graduates have been and are playing a major role in the rapidly changing international world and no less in this country. There are now more and more complex and interesting challenges begging for more innovative skills. My principal regret is that I am not embarking on another career.