IN MEMORIAM

DONALD AINSLEE HENDERSON, 1928-2016

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ON AUGUST 19, DA HENDERSON, leader of the successful-against-all-odds World Health Organization's global eradication campaign against smallpox, died at the age of 87. My colleagues and I at our Center will miss him very much. I wanted to reflect on some of the amazing things he did in his life and on a few of the personal characteristics that helped him contribute so much for so long.

Leadership Jobs at CDC and WHO

DA got his start in public health when he joined the Epidemic Intelligence Service at CDC in 1955. He learned the art and science of epidemiology and disease surveillance from the master of the field at that time, Alex Langmuir. He was the first editor of the *Morbidity and Mortality Weekly Report* (MMWR), what was then and is now the most important regular CDC and public health report on new disease outbreaks. He did well and became chief of viral disease surveillance at CDC in 1960, leading or participating in countless and varied outbreak responses, doing what he referred to as shoe-leather epidemiology. He loved that work.

In 1966 he was offered and accepted the job in Geneva to direct the WHO smallpox eradication program. WHO's attempts to end malaria and yellow fever had not succeeded, and so smallpox eradication too seemed like a hopeless assignment to many. His CDC boss and mentor Langmuir was at first furious that he had accepted it and wanted nothing to do with it.

At the start of the program, 31 countries had smallpox circulating endemically, and 12 more had importations to deal with. DA and his team had to fix a number of serious problems. The vaccine being used was of highly variable quality and was made in different countries, so they had to work hard to bring up the quality so it could be reliable and effective. They also needed to work through a more efficient

way of vaccinating people, and after trying a number of alternatives, they embraced the newly invented bifurcated needle and its low-tech, high-efficiency delivery of vaccine. Instead of pursuing mass vaccination in all countries, they settled on a program of "surveillance containment," in which they would actively search (surveillance) village by village for smallpox cases. When they found a case, they would pursue containment by vaccinating all the potential contacts of that case, in an effort called ring vaccination. Since children were often the most observant, they were the ones who often led the way to discovering new smallpox cases.

DA and his team had to manage a program that was globally distributed with very few resources. They had 9 people in Geneva to manage the whole international effort, in a time with limited phones and no faxes, emails, or internet. To do this they delegated great responsibility to program managers on the ground in country. They also needed to draw talent into the program. To do this, DA set a requirement that anyone working on the smallpox program needed to spend at least 3 weeks per month in the field. This effectively winnowed the program and allowed the infusion of new, committed people. At the start of the program, they had set a target for eradication of 10 years. They ended up missing that target by only a few weeks, with the last case found in Somalia in 1977.

Johns Hopkins and the Federal Government

As the smallpox program was ending, DA was asked to interview for the job of dean of the Johns Hopkins School of Public Health, the most respected school of public health in the US and perhaps the world. He thanked them for the invitation, but told them he wasn't interested because he didn't think that schools of public health were graduating students that were valuable in the practice of

public health. This exchange convinced Hopkins that DA was exactly who they wanted to run their school, and they persuaded him that they were in agreement with his vision on how to evolve the mission of the school. He served as dean from 1977 to 1990 and helped the school move more students into doing public health work in the field around the world.

After his stint at Hopkins, DA worked for the administrations of President George H. W. Bush in the Office of Science and Technology Policy, President Clinton in HHS, and then President George W. Bush as the first director of the Office of Public Health Emergency Preparedness at HHS in the time immediately following the events of September 11, 2001. He had a role in a range of important national policy deliberations and decisions over those years, and he influenced the thinking and careers of many who worked on infectious disease and biosecurity issues in government.

Founding a New Center

In the late 1990s, DA became increasingly concerned about the lack of national preparedness for deliberate biological threats, such as anthrax or smallpox being released deliberately by a group or a country. He was watching the rise of new kinds of terrorist groups, the growing power of biology, and the absence of any thinking or discussion of these issues in universities, the private sector, or in the public. The work that was going on related to these issues was being done by small numbers of people in government.

In 1998, when he was nearing the age of 70 and at a time of life when some others might be slowing down a bit, he started winding up to take on these new issues. He started a new Center at Johns Hopkins that would bring university expertise to bear on issues of biosecurity and would work to help governments to better prevent, prepare for, and respond to these issues. This is when I met DA and started working with him at this new Center.

In the years that followed, the Center would recruit many talented people from infectious disease, emergency medicine, public health, epidemiology, biological sciences, law, social science, critical care, and much more. It would go on to work on issues of anthrax, smallpox, and many other possible agents of bioterrorism, as well as West Nile virus, SARS, pandemic flu, MERS, 2009 H1N1, Ebola, Zika, and preparedness issues well outside of infectious disease crises.

When DA went into government after 9/11, Tara O'Toole became the Center's director, and the Center was recruited to UPMC and the Schools of Medicine and Public Health at the University of Pittsburgh. DA rejoined the Center when he left the US government, contributing to many of the Center's efforts and to the thinking and professional development of the many people who spent time in the organization. I am certainly biased, but I would say that the Center that DA founded in 1998 has helped shape the field and done a whole lot of good.

During these years he also received countless distinctions for his life's work, including the Presidential Medal of

Freedom, Thailand's Prince Mahidol Award for Public Health, Taiwan's highest Civilian Honor, the National Medal of Science, the NAS Public Welfare Medal, and the Japan Prize. At the time of his death, DA was a distinguished scholar at the UPMC Center for Health Security and a professor of public health and medicine.

Recipes for Success in Life

DA had too many strengths to name here, but a few stories help illustrate some of them.

Not long after I met DA, I went with him to NIH, where he was giving a talk on smallpox vaccine science. He was speaking to an audience of perhaps 100 scientists, and he was using overhead transparencies as part of his talk (the predecessor to Power Point slides). The power went out mid-talk and no back-up lights came on. The auditorium was in a windowless basement, and it was so dark no one could even see their hand in front of their own face. DA paused for about 3 seconds and then just continued on with his presentation in a pitch black room without even referencing the power failure or the darkness. No one in the room said a thing. He pressed on for 15 minutes, speaking into the darkness until the power came back on, and then he continued on to complete his presentation. The room was captivated throughout. This moment says a lot about how DA approached problems generally. He kept his eye on the big challenge at hand. He didn't get distracted along the way. He was steady when things around him got rocky. He could make do without electricity if he needed to.

Another principle: DA wanted people in positions of knowledge and responsibility to take a position when the time and circumstances called for it. In thinking through technical problems and public health guidance, he would say that we can't leave it for others to have to make judgments on the fly later, under pressure, without knowing what we ourselves would advise. He would say, "You have more information now than people in the field will have later. Let them know what you would do."

DA placed a high priority on making things happen. He used to tell Center project teams, "It's great that we have gotten this far, but what is ultimately important is the *final inch*. We can't lose energy or get distracted or disheartened. We need to make sure this gets done, and sometimes the final inch is the hardest part."

For readers of this journal, it's important to remember that DA was co-editor of the journal for many years. Some editors in that position might be content to hear summaries or synopses of the work under consideration for publication. But DA came to editorial meetings prepared. He read every paper, made notes on them, leaned into it, had recommendations for how to strengthen them. The authors and readers of this journal have benefited directly from his comments, reviews, and suggestions.

It's also important to say that DA would regularly gush about his family. He and Nana were married in their 20s and were an amazing twosome all these years later, highly

supportive of each other, even while they might both be racing to finish their own copies of a Sunday *New York Times* crossword puzzle. His children were close witnesses to the smallpox eradication adventure in Geneva, where public health officials from around the world would come to their house when they came through town. DA would give this advice to others: Don't be absent in a faraway job when your kids are growing up. He loved his kids and they were close to him, as was clear by the good care they gave him when he was sick at the end of his life.

Finally, DA generously made time to meet with the rising generation. Even while his wisdom was being sought by the US government, reporters, philanthropists, and foreign leaders, he made himself available to students of

public health considering their futures and to mid-career academics thinking about their next contributions. He was always ready to talk about public health and what problems needed attention now. Always ready to charge an audience of young students with a call to go out and improve public health and science.

For all these reasons and many more, DA had an enormous impact not only on global health, but also on countless people who have been working in this field since the 1950s. He should be and will be lionized in the annals of human health and science for his role in eradicating smallpox. And we will also remember him for the good and generous things he did on a personal level for the many whose lives he touched.