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From Berdsk to Burma: Lessons (and Adventures) in Global Health Diplomacy

Jason Rao

THE landing gear came out with a groan as we descended to a snow-covered runway in Novosibirsk, Siberia. The pilot's voice crackled over the intercom; my translator leaned over and said, "The temperature is minus forty degrees." I asked, "Celsius or Fahrenheit?" She responded, "Both. It's cold."

I had been on the job for three days before they sent me to Russia. I was a Department of State "Diplomacy Fellow," a scientist now working in the Office of Cooperative Threat Reduction (CTR). Until then, I had been a postdoctoral research fellow at the National Institutes of Health, having finished graduate school at the Johns Hopkins School of Medicine a year earlier. I wasn't prepared for the cold, or for the decade of science diplomacy I was about to begin.

It was winter 2002, and America was still reeling from 9/11 and the recent anthrax attacks. While years later the FBI investigation (known as "Amerithrax") would lead to a U.S. bioweapons researcher, many believed the source came from abroad. Congress was eager to respond, and the 9/11 Emergency Supplemental Appropriations Act allocated new funding to my office (\$30 million, in addition to the \$60 million we received annually). The legislation directed us "to engage and redirect former biological weapons scientists and the bio-production facilities in Russia to peaceful work." The appropriation language included the large-scale facilities in Russia, once part of the secret Soviet bioweapons program and

capable of producing tons of biological weapons, that had not yet been “opened” to outsiders. We were to open them. There was also a push for involving industry partners, in an effort to advance new drugs and vaccines. We called the new program the “BioIndustry Initiative,” or BII.

Within a week of joining the Department of State, I found myself in Siberia, talking with fellow scientists, many of whom trained their entire careers to make bioweapons to kill Americans. Thanks to the pioneering efforts of Senators Sam Nunn and Richard Lugar and the CTR programs at the Department of State and Department of Defense, these conversations were surprisingly easy. I was starting within a well-established framework and a wealth of positive, hard-earned relationships in Russia. Most notably, the International Science and Technology Center (ISTC) in Moscow, which was the main source of grants funding to scientists formerly involved with weapons of mass destruction (WMD), had proven incredibly effective in the early days of U.S.-Russian collaboration. The ISTC not only helped reduce WMD proliferation, but also created hundreds of partnerships between U.S. and Russian scientists. I was a scientist, I had the ISTC framework, and I had *a lot* of money. How hard could it be to open a former bioweapons production facility in Russia?

The challenges, it turned out, were vast and most impressive in their complexity. Since the time of ISTC’s creation in the 1990s, the Russian economy had blossomed, and the mission of emergency “redirection” of scientists had become less urgent and less palatable. Many in Russia found the purpose of the ISTC offensive and were outspoken in questioning its motives, suggesting that the center was there only to spy. Back home, the conversation focused on self-sustainability, as both a measure of our success and as a long-overdue exit strategy. The ISTC was not designed to last forever, but at the same time, important work was yet to be done for the ISTC, both with regard to nonproliferation and as a proven vehicle for scientific partnership. Further complicating our mission was the fact that biological weapons, in particular the large-scale production facilities, remained a very sensitive issue in Russia. While chemical weapons destruction and nuclear nonproliferation programs were a bit more established, bio was off-limits for most discussions between government counterparts.

While the ISTC adapted to the political and economic changes as well as any large international organization—maintaining truly impressive success in building scientific partnerships—the optics of the ISTC remained problematic in Russia. Under a new economic framework, Russian policy makers looked toward their scientific enterprise in a new way, focusing on innovation, entrepreneurship, business development, and commercialization. Meanwhile, U.S. policy makers maintained nonproliferation as the first objective in CTR’s scientific cooperation.

On the ground, this meant we had to show the value of scientific partnership in meeting national security as well as economic development goals to both countries. We worked within and between these bureaucracies, leveraging BII to forge new relationships with our Russian counterparts, and to reshape CTR’s narrative away

from its origins in WMD “threat reduction,” and as well as the donor-recipient optics of the ISTC. While political rhetoric was strained, as scientists we thrived. At institutes once infamous for their secret weapons programs, we established internationally recognized disease surveillance sites, published in top journals, and even helped create platforms for novel drugs and vaccines. In time, we were ready to approach the notoriously massive bio-production facility mentioned in our legislation, located in the remote town of Berdsk. This facility became the cornerstone of our work under BII.

Berdsk gained infamy after Russian defectors, once working at the secret bioweapons facilities known as “Biopreparat,” spoke of the facility as the crown jewel of the Soviet bioweapons enterprise. Berdsk was once the final stop in the Soviet bioweapons pipeline, where pathogens that had been optimized as weapons in research facilities were sent for production in enormous quantities. Concerns were heightened after the 1992 trilateral agreement among the United States, the United Kingdom, and Russia on biological weapons verification failed, and inspectors found hardened, large-scale, bio-production capabilities but were not allowed to visit key portions of the site. Despite multiple attempts, outsiders, particularly delegations from the ISTC or the U.S. government, had never been given access to Berdsk.

Since driving to the plant and knocking on the front door didn’t work (we tried), our work focused on networking across the sixteen (or more) former Biopreparat research facilities, many of which had been receiving ISTC support. We brought leaders of all the institutes together in a collaborative framework to discuss current challenges and opportunities. This was a shift in approach and allowed for discussion (and debate) in an open forum. It also helped gain a new appreciation for the current state of affairs for former Biopreparat institutes, which had been essentially cut off from funding after the collapse of the Soviet system. Directors were trying to keep their institutions afloat, pursuing an updated and decidedly more peaceful mission in science, with few funding opportunities. We developed competitive grants programs and even loan programs for what they needed most: market research, business plans, and strategic patenting. Through this effort, we reinforced peer review and competitive awards to identify the best science. We spent time at each institute and assisted with matchmaking to industry partners. We added value in new ways.

The ISTC had been set up to give R&D grants and in some ways had replaced the Soviet funding system, where peer review was secondary to an institute’s status as a weapons facility. The ISTC was a phenomenal success in stabilizing the research network after the economic collapse of the Soviet system, but it was not geared for the transition into the free market that the institutes now faced. Through BII, we joined the ISTC in its efforts to act as a catalyst toward the institutes’ self-sustainability, promoting transparency and nonproliferation and generating new partnerships with the United States to address shared health challenges.

Novel collaborations in cancer therapy, influenza surveillance, and tuberculosis diagnostics, to name just a few, were realized through this work.

In time, we were introduced to the new owners of the Berdsk Biologics Plant. After a long week of work in Kazan, a beautiful city in the south of Russia, we were invited to go fishing on a stretch of the Volga that wound around the historic city. Not having done that in years of visits for project management, we finally agreed to stay an extra day and see the infamous Volga firsthand. We were picked up by our hosts promptly at seven o'clock in the morning. As we stepped onto the large boat, a dozen Russians gathered around an ornate table laid out for us with platters of thinly sliced fish, herbs, vegetables, salads, and, of course, vodka. The conversation flowed naturally. It was one of many, many meals where I was reminded how much we have in common with our Russian friends, and how deeply I admire and respect their views, values, and friendship. After the usual toasting ritual, I spoke with one particularly engaging Russian scientist for hours about his activism during the fall, the hard-fought transition under President Mikhail Gorbachev, and his current work in transforming legacy factories into proper commercial enterprises. I told him I was in a similar line of work and asked where his facility was. He said, "Berdsk." We didn't catch a single fish that day, but by the end of the boat ride I had an invitation to see all of the Berdsk bio-production facility.

It was the start to a long and meaningful partnership. We learned that Berdsk, like many others, had gone bankrupt, was removed from the list of state-owned enterprises, and had essentially been auctioned off to private investors. The Berdsk production facility still employed more than two hundred trained weapons scientists, and, because of its massive size, was operating at a loss. Products included basic animal feed premixes, biopesticides, and enzymes for alcohol production.

Like all of the Soviet biological weapons production facilities, Berdsk was designed like a matryoshka doll. From the outside, there appeared to be a "clean" production site with large-scale fermentors making common products for commercial use. The inner layer revealed high containment capabilities and additional fermentors in large rooms under negative air pressure, for weapons production. As at Stepnogorsk (the equally large facility the U.S. Department of Defense dismantled in Kazakhstan), the goal would be to remove the biological weapons production side. However, BII had the added objective of leaving behind a sustainable business in the "clean" side as well, so that the hundreds of scientists wouldn't become unemployed, potentially increasing the nonproliferation risk in the wake of total dismantlement.

The key to opening the doors at Berdsk would be to add value; the challenge was to do so in a way that also met the nonproliferation objective. The first step was to invite Berdsk management to industry matchmaking events to better understand our program, build personal relationships, and explore the opportunities for

collaboration. Through these interactions, it became clear that the people running Berdsk did not have an understanding of the market it was in and that the plant's production cycle had significant inefficiencies. BII offered to help, using a group of talented young Russian market research experts who understood (as well as anyone could at the time) the current business environment in Russia and the potential for such a facility. Together, they developed a business plan with Berdsk staff, as well as a plant optimization plan to address everything from energy consumption to filtration and strain optimization. The Berdsk leaders were impressed, and BII was invited to join in the reconfiguration of the Berdsk production facility.

Touring the entire facility at Berdsk uncovered massive production capability, with dozens of 63,000L fermentors, many sealed and preserved for future use. Over the next four years, the BII-Berdsk team dismantled the dedicated biological weapons infrastructure and converted the "clean side" to an efficient and transparent bio-production facility. Notably, all costs were shared. Berdsk paid for all of the dismantlement, and BII brought in modern equipment and trainers who had a range of technical expertise. The dedicated bioweapons buildings were gutted, fermentors completely removed and dismantled, and scientists trained for modern work. New collaborations with the United States, leading to new products and expanded regional markets, naturally grew from the modernization of the plant, and today the plant at Berdsk is a profitable enterprise and a CTR success story.

Our mission was never a secret; we were transparent and explicit in our nonproliferation mandate. The approach of addressing a realistically defined biological threat, one we *shared* with Russia instead of making Russia part of the threat, resonated with all. Our secret was to make the programs mutually beneficial. Following the principles of Nunn-Lugar, the legislation that led to creation of the Cooperative Threat Reduction program, the main thrust of BII was partnership.

Cost sharing was paramount, as it removed the donor-recipient mentality and ensured greater productivity from partners. Scientific peer review and merit-driven competition were essential to realizing the potential of the research and breaking free from the "old" system. Working within as well as outside formal government channels, to bring America's greatest strength to the table—our vast S&T (science and technology) enterprise and our experience in innovation and entrepreneurship—was critical. At the same time, local Russian experts were equally valuable, bringing insights that outsiders simply couldn't have.

By changing the approach to "threat reduction," BII also changed the conversation, moving away from the Cold War boundaries toward the pressing issues of economic development and global health security. We developed an open and honest collaboration, built on the premise of respect and mutual benefit. It became clear that "threat reduction," focused solely on traditional security measures, "bio-risk management," and pathogen security, would not only fail, but also continue to offend our counterparts.

We found that developing shared, mutually beneficial goals toward meeting the broader challenges in health security—and thus supporting the core objectives of the life sciences—was far more effective than traditional biosecurity measures alone in reducing “dual use” proliferation threats and led to real gains in science (and, of course, diplomacy). Instead of looking at satellite images of facilities, we visited them, and we were invited back. We built confidence in each other’s intentions through scientific and professional exchange, gaining unprecedented access and making meaningful strides in transparency. In turn, the program sparked economic development, often in the most remote and economically depressed regions of Russia, and helped advance the development of new therapeutics along the way.

Today, the BII program has long since been shut down. Many of the lessons learned became the model for CTR expansion outside the former Soviet Union and the basis for “CTR 2.0.” Lessons were applied to CTR’s early work in Indonesia, the Philippines, and Pakistan (under a new program we called the Biosecurity Engagement Program). As for the ISTC, after years of threatening, the Russians recently announced their intent to formally withdraw as a partner. As the United States embarks on a new relationship with Russia, under the U.S.-Russia Bilateral Presidential Commission, with innovation, security, and science and technology remaining in the forefront of the dialogue, these lessons are more relevant than ever. The White House Office of Science and Technology Policy is pursuing a serious effort in collaborating with Russia on science and innovation, topics that have resonated with both countries and may lead to economic growth, job creation, and even become a fruitful avenue to address the more contentious issues of security and nonproliferation.

In February 2012, more than a decade since the days of the BioIndustry Initiative, I had an opportunity to travel to the “front lines” of diplomacy: Myanmar (Burma). Working outside the government, I joined a delegation of scientists to this fascinating country, which was beginning to open to the world after decades of isolation under a corrupt military junta. Like so many of the isolated communities of scientists we had met over the years—from Berdsk, to Baghdad, to Sana’a, to Peshawar—we were greeted with true enthusiasm. Countless opportunities to partner and contribute to what is clearly a new day for Myanmar arose as we moved from ministry to ministry, discussing the milieu of challenges the country faces. Each discussion seemed to end with the same conclusion: economic development was vital, and the need for scientific and technical collaboration essential.

As Myanmar prepares for the onslaught of foreign aid that comes with its recent strides in political reform, early gains in economic development to prove the merit of reform are critical. Technical aid, focused on Myanmar’s domestic needs, not the metrics of the donors alone, could be most impactful.

The response from the Ministry of Health made perhaps the greatest impression. It was clear in discussions that Myanmar has an enormous public health crisis, and the minister was embracing collaboration at all levels; something very new for a Myanmar government. After an enthusiastic and thoughtful first meeting with the minister, we were told that the broader Ministry of Health response to our visit was so great that a separate event was to be held the next day to meet key staff for a longer discussion. We arrived to find more than fifty representatives from all divisions in the Ministry of Health, all of whom spoke perfect English and were eager to talk. From the short introduction made by each of the attendees, we were struck how many had studied in the United States, particularly at Johns Hopkins (my alma mater). After welcoming remarks, the floor was opened for discussion. One of the ministry officials, sitting on the edge of his seat with his hand waving, anxiously leaned forward to ask the first question: “Dr. Rao, thank you for coming to Myanmar. We have read about your work, and we would like to express interest in the BioIndustry Initiative; this is what we need in Myanmar.”

Of course, he didn't mean threat reduction. **SD**