

Outbreak Prevention and Mitigation in Ukraine

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One year ago, the Russian invasion of Ukraine marked an inflection point for me. As an infectious disease specialist and former U.S. Senate Health Policy Advisor, my career has addressed both infectious threats and our struggle to achieve public consensus and action on health. From HIV to COVID, we have been slow to learn.

Even as support for Ukraine increased last year, infectious disease response and prevention efforts appeared limited at best, despite facing what was becoming the largest European conflict since World War II. This compelled me to tap savings to fund an effort which grew from a one week fact-finding visit to six months working to assist Ukrainian, U.S., and international governmental partners to help preserve and improve health in a chaotic, underfunded, and violent environment. That effort is ongoing. I hope this account will aid your understanding of the resilience and spirit of the Ukrainian people, the needs and challenges they face, and what individuals and government can do to ensure Ukrainians can both prevail in preserving their nation and prosper in peace.

Prelude

As the COVID pandemic began, I was preparing to travel to Ukraine to join colleagues in a U.S.-sponsored collaboration with Ukrainian scientists. As I reviewed the infectious disease situation in Ukraine in preparation for the trip, my concerns grew. While the nation's immunization rates had recently improved, these remained substantially lower than in the EU, while its prevalence of infections such as tuberculosis, hepatitis, and HIV was markedly higher. In 2020, Ukraine had just brought a [major measles epidemic](#) under control – but not until over 115,000 cases were recorded. The subsequent COVID-related postponement of our trip would later prove costly as the Russian invasion began.



Pre-2022 casualties since 2014 include over 14000 dead

Ukraine has been resisting Russian aggression since 2014, and casualties were expected to escalate rapidly in a more extensive war. Civilians [can comprise up to 90 percent](#) of the casualties of conflict. Infection has long been a major contributor, and [its impact often eclipses that of traumatic injury](#). This was the case for U.S. armed forces through the end of World War I. Trauma only became the predominant driver of casualty in American troops with the onset of World War II, when the development of antibiotic drugs and mandatory immunization vastly decreased infections.



War injured are ubiquitous

Those two major advances have been significantly compromised. [Waning immunization levels](#) and [rising antibiotic resistance](#) in pathogens are now global concerns. Ukraine's level of [antibiotic resistance](#) is substantial and has been reported to be spreading into Europe, while a [host of factors](#) have compromised the nation's immunization efforts. Eight years of aggression by Russia, economic stress, corruption, anti-vaccine sentiment, and Russian-supported disinformation campaigns have all impeded vaccination. For example, in 2008 a single post-immunization death unrelated to vaccination was followed by a decline in the rate of measles immunization from 95 to just 41 percent. Then after some rebound, the 2014 Russian invasion

disrupted government vaccine acquisition, and immunization plummeted yet again. Though there has been recent progress, among children under 14 years of age approximately half of immunizations were missed. In some years, as few as 1 in 5 children received a needed vaccine. Today Ukraine's [immunization rates remain significantly below those of the European Union](#).

In an effort to help address response and prevention, I joined with others in what sometimes resembles a “crowd-sourced” war. Two years into the COVID pandemic, [many of my colleagues hoped](#) that some lessons would be implemented to improve prevention and response. We have been sorely disappointed.

Arriving in Ukraine in June, my first task was to do an “on the ground” assessment. Objectives included meeting with government officials, NGOs, and health professionals to better understand the impacts of the conflict, how the health system was functioning, and how we could contribute to minimize the impact of infectious disease. One colleague offered an observation in advance. He noted that over many years working in outbreak response, when he would query individuals in agencies and organizations regarding what action had been taken to address a threat, he was often informed, “We’ve got this”. He told me every time he heard that, he knew they didn’t.

A different war

On arrival in Ukraine in June, those words often rang true. The displacement of millions of Ukrainians has been well-portrayed, as well as much of the trauma and suffering. Yet in studying a variety of operations, such as refugee services, both protocol and its execution were often problematic. I soon learned that some government resources had been reallocated in order to cope with the invasion, and those diversions created some new crises. And as an impressive stream of volunteers streamed into Ukraine from abroad, problems in coordination, efficacy, and even integrity were apparent. The chaos and reality of war was clearly evident. Just as the United States was a bit behind the curve in its military assistance, it lagged further in medical response. I was stunned to arrive in June, only to find a paucity of direct U.S. engagement. U.S. personnel had been relocated at the onset of the conflict, and many worked remotely through much of 2022. While communications continued, one misses a lot when not “in country”. Remarkably, U.S. State Department travel advisories and evacuation announcements did not prevent many Americans from volunteering in humanitarian efforts, and in some cases, even engaging in military service.

It came as no surprise to some friends and colleagues that the week I had originally planned in country was quickly extended. I had been given a long list of needs, and I knew I could immediately engage to help address some of those. I simply couldn’t leave. The one week trip to forge a partnership quickly morphed into a longer term commitment. All this was in a war of the sort many of our parents and grandparents would recognize.



Street poster in Lviv



Uniform outfitting mixed with children's toys

One morning as I was speaking with friends in our hotel lobby, an air raid ensued just as the desk clerk began playing big band music from the early 1940s. The music seemed to underscore just how reminiscent this war is of the two World Wars. Despite technology ranging from smartphones to computerized weaponry to satellite imagery – men and women are still dying in trenches and being displaced from their homes. This is far from the sort of conflict the West anticipated in Europe. It has predominately been a ground war, largely fought with vintage weaponry, and with stunning devastation. Volunteers serving in uniformed services are often largely self-equipped, and at the onset many simply receive “[a rifle and 120 bullets](#)”. Some U.S. veterans who have volunteered were surprised that one cannot simply summon tactical air support, or a prompt and sophisticated evacuation to advanced medical care for those wounded. This can be a harsh environment, yet complaints are rare.



Housing destruction in Bucha

Yet as Ukraine slowly expels its invader, this certainly isn't the war that Russia anticipated. Its response to waning military effectiveness has been to increase focus on a softer target: Ukraine's civilian population. That began early with [devastating attacks](#) on housing and hospitals, including damaging the nation's water supplies and sanitation. Over 14 million Ukrainians were displaced from their homes, with [7.8 million of those now outside Ukraine](#). Russia has targeted Ukraine's power grid as well – even when doing so poses a risk of nuclear disaster.

On October 10, Russia began escalating its attacks against Ukraine's [power infrastructure](#), and its capacity was reduced by half. Now, limited power and heat combine with crowding, impaired sanitation, limited medical care, and economic and psychological stress – conditions highly conducive to infectious epidemics. The oft-cited example of the [1918 H1N1 flu pandemic](#) has become a trite warning of how war and infection can synergize to cause tens of millions of deaths.

Immediate impacts

At the onset, one response to the invasion was the redistribution of funds from government ministries in order to meet urgent defense needs. While understandable, the side effects of that sometimes caused shortages of resources such as diagnostics and therapeutics critical to address outbreaks. Prevention was similarly impacted. Immunization is challenging in wartime, yet even obtaining vaccines for routine scheduled immunizations proved challenging last year. I have been stunned, as such impediments could have been avoided if the U.S. Congress had made some specific appropriations for civil assistance – an appeal I made repeatedly. Reliance on all funds “trickling down” through agencies to meet urgent needs proved that some pandemic lessons simply haven't been learned.

Major health consequences of conflict

A year ago, three concerns loomed large. The first was the immediate threat of infection, given the [abundance of natural pathogens in Ukraine](#). Resurgent epidemics could range from another wave of measles, to replication of cholera outbreaks of the past.

A second concern is that any spread of infectious epidemics to EU and NATO countries would not only increase the toll of disease, but could negatively impact support for Ukraine. The third is that a substantial burden of infectious disease will impair Ukraine’s post-war recovery and integration into the European Union. The war can be won, yet the peace might be lost.

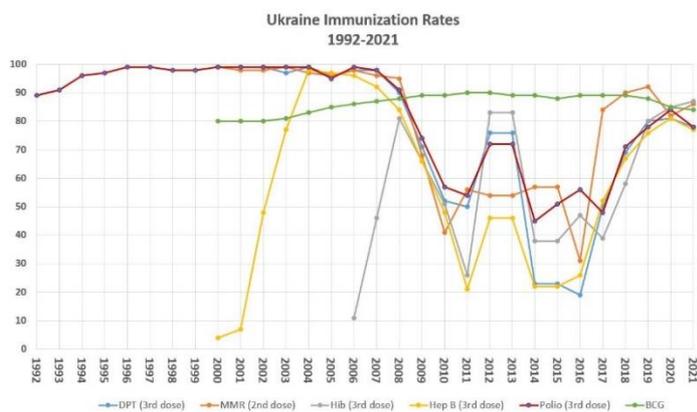
In six months on the ground, I have seen the impact of conflict. Unsurprisingly, outbreaks of intestinal disorders are rising. Some infections are more concerning, such as a substantial increase in new cases of tuberculosis. As public health surveillance continues in a challenging environment, we also recognize that individuals coping with war conditions are less likely to seek screening or treatment. Those who do, tend to do so because they are suffering more severe or advanced illness. We are left to speculate what waves of infection may be coming.

Triaging

I constantly acknowledge the imperatives which war imposes. A bullet or bomb has immediate impact. The first thing I was handed in Kyiv was a tourniquet – a gift from a colleague who remarked, “You might need this...” Yet it remains indisputable that we pay a high price when the scope of health care becomes so extremely constrained that disease can flourish. The simple fact is that we are seeing a substantial increase in some infections. It is notable that COVID has already taken the lives of [over 110,000 Ukrainians](#), even as a more infectious variant is now headed towards a besieged populace in which [less than half have been fully vaccinated](#). It is clear that multiple wartime challenges must be managed. One must be able to ‘walk and chew gum at the same time’.

Ukrainians adapt in the most inspiring ways. As electrical power was lost, my local coffeehouse had a generator in place in two days. Yes, light was a problem, but the coffee was hot, the cold case kept cold, and rechargeable lights and laptops sufficed for work. One just put a coat on. Being a child of parents who lived through the Great Depression and a World War, this seemed second nature. You charge your batteries – you pull out a backpack stove or a generator – you use a cellphone, a satellite phone, or a Starlink to communicate. You just get it done. As the British have said, “Keep calm and carry on”.

So we strive to triage risks, and improve as we respond. The perfect cannot be the enemy of the good. If I hadn’t lived and worked in this environment, I’d be hearing much more often that we simply cannot do the very things which we must. Yet it is not rocket science to run a quick diagnostic test, prescribe a needed medication, hook up a generator to refrigerate medical supplies, or ensure basic primary care. Implementation is what is needed most, not grand scientific breakthroughs.



Low immunization rates from 2009-2018 places millions of children at risk



A typical work environment...generators at work

Outbreak Prevention and Mitigation

Just as expected, gaining firsthand knowledge helped in shaping objectives. Three key needs are evident, in order to “get ahead of the curve” to both prevent and mitigate infectious threats.

The first of these is support for response. It is understandable that a massive invasion necessitated dedication of resources to repel it. Unfortunately that also compromised some critical functions such as the acquisition of medical supplies – just as it did back in 2014. Diagnostics and therapeutics are needed, as well as mobile units to enable delivery of services in a nation in which over [1100 health facilities have been damaged or destroyed](#). In both conflicts and natural disasters, such resources simply must be available from the outset – not after a delay of a year or more.



Hospital destruction in Irpin

A second key priority is the prevention of infectious outbreaks. That is predominantly accomplished by immunization. Ukraine has struggled to raise vaccination rates, even with a modest [immunization schedule](#) which is quite limited compared to those of EU nations. While the annual rates of scheduled immunization have recently improved, those do not reflect the accumulated missed immunizations in millions of children who were not fully vaccinated in past years. Most noteworthy is that the accumulated immunization deficit among the generation under 14 years of age appears at least ten times greater than a single year of routine immunization. The use of “catch up” vaccination is essential.

A third area of need lies in the area of technical and policy support. This ranges from bolstering epidemiology and risk assessment, to improving technology and health professions training, to addressing impediments to immunization. Many of the challenges Ukraine confronts are shared by many highly developed countries – from anti-vaccine sentiment to implementing rapid data-driven response. Global health will benefit from our efforts to implement solutions in Ukraine.



With colleagues in Kyiv

My position in this war is a unique one. With years of training and experience in clinical infectious diseases, and more than a few serving as a senior policy advisor in the U.S. government, my best service doesn’t involve either carrying a sidearm or staffing a medical unit. Instead it is in working with other health professionals to provide technical, policy and other assistance – and that involves working with U.S. and Ukrainian governments as well as UN agencies and international partners. Understandably, that involves navigating political, security and other issues which can constrain sharing some information. This is a time of war.

I have been privileged to work with others to confront some rather “inconvenient truths” regarding the health crisis confronting us. It is critical to understand that the aggression of this war is focused on the entire populace of Ukraine, and a sustained victory will not be achieved by military means alone. Ignoring that fact would bring only a hollow conclusion to the conflict, one in which Russia is expelled, but Ukraine languishes in its recovery and development.

A central issue in both war and infectious outbreaks is their kinetic nature. Prevention can avert massive casualties – but it can be a very tough sell. Yet once containment of the threat is lost, a distinctive difference emerges. In war, one or both parties can still choose to yield, to bring an end to the conflict. In contrast, pathogens don't care. Infection continues to spread, just as it did as the 1918 influenza pandemic as it grew to claim an [estimated 50 million lives](#).

The COVID pandemic revealed a myriad of critical public health deficiencies in the control of infectious disease. Mechanisms to address these have been proposed, notably by the World Health Organization (WHO) to achieve an accord on [pandemic prevention, preparedness, and response](#). Planning, funding and implementation of such an agreement is likely to involve years of effort and involve considerable political wrangling. I am not holding my breath. We need action today.



Family park scene – a break from conflict

A focus on study and technical development can become a diversion. It is critical to note that technology-centric strategies have limited utility in addressing some key drivers of epidemic risk. Instability and conflict are synergizing with antibiotic resistance, antivaccine sentiment, weakness in supply chains, and a simple failure to provide the material support required. Resources and implementation must be prioritized.

We already have the tools at hand. An immediate strategy must focus on ensuring rapid and effective response, and enhancing prevention via immunization efforts which will address vaccination deficits...particularly in Ukraine's children.

A comprehensive multiyear effort to do that carries a cost of approximately \$95 million. That represents just [¼ of 1 percent](#) of the \$33.4 billion in U.S. civil assistance funding extended in the last year. This would not only confront current risks, but also support recovery and the integration of Ukraine within EU health standards. And as infections know no boundaries, such investment also represents self-interest for those of us in NATO and EU countries.

Throughout the last half of 2022, I briefed congressional staff regarding both the nature of response and prevention needs, as well as the essential aspect of targeting funding to purpose. Recommendations and budget had been formulated in bilateral consultation, as well as including discussion with UN agencies. I returned from Ukraine in December in order to discuss these with members of Congress. Ultimately substantial funds were appropriated, but yet again not targeted to purpose. In contrast, defense assistance is far more specific. This again evidences our failure to learn from the pandemic experience. Delayed action can be costly.

I have continued working to promote this effort, as without such action it is difficult to envision a Ukraine which sustains its resilience, achieves recovery, and prospers as a free nation in Europe. This pursuit has consumed most of 2022 for me, and relied on both modest personal savings and a few donors. One of the gratifying aspects of my war experience has been the small and largely unknown humanitarian groups I have come to know – most of whom have also stepped into a breach in this war environment which otherwise might not be filled.

To do otherwise could result in a very different ending as Ukraine could win the war, yet lose the peace. Such a tragic outcome must be averted.

Time is not on our side.