

Humanitarian Assistance and Disaster Relief: A Cultural Journey of Applied Hope

Eric Rasmussen, MD, MDM, FACP

School of Public Health, University of Washington, Seattle
550 Uptown Court, Suite 527
Kirkland, WA 98033
Tel: (360) 621-3592
Email: RasmuE@UW.edu

Author Note

This article is an historical overview that incorporates a wide range of healthcare and logistics sectors addressed as a unified and coherent whole. The author shaped the article's content through extensive conversations with friends and expert colleagues in disaster medicine across the globe and from nearly 70 sources. The author is grateful for and acknowledges the contributions of those who assisted with its formation and its editing. The opinions in this article are those of the author alone and do not reflect necessarily the official positions of the University of Washington School of Public Health or other institutions the author serves. For the record, the author acknowledges his professional association with several institutions including: iRespond, Infinitum Humanitarian Systems, InSTEDD, and GeoShip. The author is Chief Medical Officer at Briotech and a Senior Fellow at the Rocky Mountain Institute, the Institute for Human-Machine Cognition, and The Atlantic Council. However, the author declares no financial conflicts of interest about this article's content and direction.

Abstract

The history of efforts to care for one another in disasters is rich with examples of compassion, intelligence, courage, and creativity. The improving ability to capture lessons from such disasters has created a robust academic discipline around humanitarian assistance while stimulating the development of useful tools, techniques, and legislation. The wickedly difficult problems now faced across the spectrum of human and planetary health require harvesting a broader and deeper understanding of systems and relationships from the past, and then applying that complexity lens to the future. This review addresses a few of those historical milestones, and something of the systemic relationships the world is now untangling, to help guide the next steps.

Keywords: Humanitarian assistance, disaster relief response, HA/DR, mirror neurons, sapiens, Vesuvius, Lisbon, earthquake, flood, pandemic, typhoon, hurricane, United Nations, UNHCR, UNICEF, COE, ICRC, Code of Conduct, Don Berwick, Skip Burkle, climate change, Wicked Problems, planetary health.

Introduction

No matter the cause of a disaster--earthquake, fire, cyclone, famine, flood, pandemic or war--those whose lives have been upended require medical care, water, food, shelter, and information. They may also need communications systems restored and the power back on. They need their homes, farms, and cities cleaned up. They need transportation to get to safe places. They need to regain a sense that all will again, someday, be well.

When a disaster has overwhelmed the capacity of a people to respond effectively, they trust others to come help and that trust is usually well-placed. It can be argued that the most valuable advance in humanitarian assistance to a disaster in the past 50 years has been the professional organization of that hoped-for outside response. What humanity has designed over the past six decades is a structured and collaborative response capability, with science, engineering, and sociology informing a process that rests on a bedrock of trained responders communicating frequently and well.

Since the Second World War, such humanitarian assistance has evolved from an ad hoc, local response into a discipline and a profession. Henry Dunant's International Committee of the Red Cross was the proof needed that independent organizations could work with governments and philanthropies to urgently provide for the unexpected needs of thousands of fellow humans. That first example has now evolved into thousands of organizations and a highly capable part of our global society.

To be clear about the definitions used in the next few pages, humanitarian assistance is often a relatively short-term effort, and often in urgent response to a catastrophic event. It is intended to "save lives, alleviate suffering, and maintain human dignity" (WHO/EHA, 2002) in relief operations, while laying the groundwork for a longer recovery and the inception of reconstruction.

Wise Kindness

The human species is called *Homo sapiens*. Sapiens, in Latin, means "wise." If that is true--if human beings are wise--then the value our society places on compassion and connection may be reflecting that wisdom. Human beings are drawn to caring for others and value those who do that caring well. There are few areas of human endeavor more respected than humanitarian assistance, and in the volatility that is the modern news cycle, those who continue to serve others in the face of pandemics, storms, earthquakes, and conflict are justly celebrated.

That impulse to help, to lend assistance to those in need, to sacrifice a little of one's self for the good of humanity, is deeply entrenched in the societal norms that cross most of our ordinary boundaries. Documents and stories from 3,000 years in our past, and from virtually every culture on the globe, make it clear that caring for others is an important component of an ethical life and a part of any successful society.

In 2021, however, there is a thread running through the political fabric of the world that argues "me and mine matter more." It is an argument that says donated resources are wasted if they go to those in distress who are not a part of our own family, clan, or tribe. It is not a new thought and has appeared in waves over the past few centuries--sometimes through persuasive

cultural or political memes and sometimes through a single voice with both power and an agenda. But that self-centeredness has proven time and again to be short-sighted, counter-productive, and eventually destructive to the fabric of the society in which it arose.

Humanitarian assistance, and its circumstantial subset, disaster relief, is often, and rightly, considered separately from the politics of the nation. It began as a recognized and coordinated effort in remote history, driven in part by religious exhortations and in part by geopolitical pragmatism. Religious teachings in virtually every culture are consistent in noting we should take care of each other and that those who have a lot should help those who have little. It has also been valuable to recognize that those who struggle for the basics of existence will often envy those who live in safety and plenty and that source of tension can be eased through compassionate action.

Between commands for kindness and compassion echoed in every major religion, and the desire to relieve suffering in others to keep them from breaking down your door, a set of behavioral expectations arose. Those early behaviors have become a mature humanitarian assistance process in the 21st century, but the field is bedeviled by funding shortfalls, misinformation campaigns by malign actors, overwhelming need day-to-day, and an increasingly daunting list of global grand challenges.



Drowned houses, New Orleans, Hurricane Katrina, 2005

Mirror Neurons Promote Care for One Another

The German philosopher Immanuel Kant, writing around the time of the American Revolution, asked a number of deep questions about the human condition. One was “What ought I to do?” It turns out that a person’s impressions of what they *ought to do* are surprisingly influenced by what others are doing nearby. Despite internal belief systems shaping one’s values and ethics, actions are also significantly influenced by others who are close and/or connected. There are some subtle neuro-social cues that had not been recognized until recently and are still not well-understood.

Beginning in 1994, Di Pellegrino and colleagues published a series of papers describing the presence of “mirror neurons” in primate brains, including humans (Ferrari & Rizzolatti, 2014). Mirror neurons are seen to fire in the brain either when one performs an action or watches someone else perform that same action. When watching someone else, the neuron fires as if watching ourselves perform an action in a mirror. Mirror neurons apparently help individuals establish empathy. They help one to recognize grief, fear, joy, and physical discomfort. In a sense, mirror neurons make somewhat true the sympathetic phrase “I feel your pain.”

With anatomic structures in neuroanatomy that seem to subconsciously register another’s suffering, and with lessons from stories pervasive in global culture, humanity has gradually added an ethos of altruism and compassion to how humans form societies; an enhancing of social competence allowing individuals to live together well. Human beings have gained collaborative skills in crop cultivation, learned to raise domesticated livestock to ensure there is enough protein for all, and developed shared water management to help entire regions thrive. Collaboration has become more important than competition, and the result, post-Renaissance, has been steady improvements in lifespans and governance.

The governance piece has proven especially important. By the 18th century, writers such as Voltaire, Rousseau, and Kant were taking note of the fragility of the people surrounding them. They noted that, during floods and droughts, the poor died in disproportionate numbers, and that almost any social disturbance broke the links that kept the poor and vulnerable relatively safe. It was not a new discovery, of course, but it was now becoming clear that perhaps it did not have to be that way.

The change in perspective during the Enlightenment (roughly 1715-1789) shifted the view of natural disasters from a deistic explanation to a naturalistic and scientific explanation. That alteration moved disasters from an act of God for which blame was proffered and both guilt and contrition appropriate, to a natural, though tragic, part of the earth’s cycles for which no blame was attached and relief could be freely offered without offending God. That change also meant that risks could be assessed and mitigation strategies pursued.

The science and engineering around natural disasters improved rapidly as epidemiology became a science and public health expanded as a formal responsibility of government. With the efforts of the London epidemiologist John Snow in the 1850s, a critical link between drinking water contaminated by human waste and illness was made. That set off a chain of events that soon led to remarkable improvements in health and safety, even for the most vulnerable.

Historical Advances

Vesuvius, Lisbon, and San Francisco

The eruption of the Vesuvius volcano in AD 79 erased Herculaneum and Pompeii from the map in less than three days. In the midst of the lava rivers and dense smoke, Pliny the Elder took ships to the stricken city, with burning rocks still falling from the sky, and died during the rescue efforts. His nephew's description in a letter is the only eyewitness account of the day (Jones, 2001).

The 1755 Lisbon earthquake is thought to have been a magnitude 8.4 and it killed tens of thousands while causing a tsunami 3,500 miles away in Brazil. The Portuguese Prime Minister in Lisbon, a man named Pombal, survived buildings collapsing around him and rapidly established relief and rehabilitation efforts. He provided food, water, and medical care for the living, cleared the city of corpses, and established order in the aftermath of a catastrophe that changed the face of Europe. It is one of our earliest examples of coordinated disaster relief (Shrady, 2008).

The 1906 San Francisco earthquake was one of the worst urban natural disasters in modern history. The quake was serious, but the damage from shaking was dwarfed by the firestorm, probably from ruptured gas mains, that consumed 80% of the city over the next four days. The fire destroyed 25,000 buildings across 490 city blocks. William James, the renowned psychologist, traveled from Stanford University to San Francisco to view the response. He described finding calm, pragmatic, capable, and industrious survivors from all classes supporting each other and establishing communities in the ruins (James & James, 1911).

The San Francisco earthquake was an early window into the psychology of survivors. William James' original expectation of a city helpless, grief-stricken, and immobilized by despair proved profoundly wrong, and his descriptions--including the first photographic and video evidence of a natural disaster ever acquired--shaped the field of humanitarian assistance.

1917 Halifax

The 1917 Halifax Explosion is believed to be the largest human-caused non-nuclear explosion in history. In early December a munitions ship filled with hundreds of barrels of aviation fuel and 3,000 tons of TNT caught fire in Halifax Harbor about 8:45am and exploded 20 minutes later. At least 1,600 people were killed instantly, and hundreds more were blinded when the windows through which they were watching the ship burn were shattered by a blast wave traveling faster than a rifle bullet. More than 12,000 buildings were completely destroyed and the blast was heard 130 miles away (McAlister, Marble, & Murray, 2017).

The Halifax Relief Commission was formed by noon, three hours after the blast, coordinating medical response, food, clothing, shelter, and transportation. A telegraph operator had sent a warning moments before he died in the blast and firefighters soon began arriving from all over the Northeast. Local military personnel awaiting transfer to the European war became emergency workers under the Commission. More than a dozen trains carried the wounded to other cities within the first eight hours. An American steamship nearby was converted to a hospital ship by nightfall, staffed by Canadians, Brits, and Americans. The coroner established a morgue the first afternoon and implemented an identity system for the body parts.

Articles

The complexity of the response, in the middle of World War I and with German U-boats known to be offshore, was complicated by a blizzard 24 hours after the explosion that dropped 16 inches of snow on Halifax. The extrication of the wounded from the rubble, firefighting, transport, communication, food, water, shelter, information flow, and everything else had to take place with visibility in the city less than 100 feet, with landmarks rapidly disappearing under the snow, and temperatures well below freezing.

The tools and systems formed in that Halifax event served as a model for humanitarian response coordination and were later used in acute natural disaster responses around the world. The dissemination of information took on new importance. Interagency coordination became a skill. Civil-Military Operations policies were formed. Eye injuries became a focus for the new Canadian Institute for the Blind. The care of injured children led to pioneering work in the newly-formed specialty of pediatric surgery. The exposure of social fault lines in the population of Halifax led to new legislation around public health and maternity care.

1918 Global Influenza Pandemic

Appearing in February 1918, and continuing to April 1920, the global influenza pandemic was the most lethal event, in absolute numbers, in the history of humanity. Not even the Black Death comes close to the number of lives lost (Taubenberger, Hultin, & Morens, 2007).

The first cases were noted at Camp Funston, Kansas, and in New York City. World War I was at its peak and media censors blocked most of the early reports. The early cases demonstrated the virus was especially hard on those under age 40, with healthy immune systems. It triggered a cytokine storm that ravaged organ systems, much like today's coronavirus.

The first wave, in early 1918, was relatively mild, with mortality not much above baseline. The second wave, beginning in August, was far more deadly, and there were at least two more waves beyond that. The total number infected seems to have been about 500 million; about 1 person in 3 alive at the time. The final death toll is still unclear and estimates range from 17 million to 100 million, but either number would make it among the worst pandemics in history. In India, 5% of the population died. In Tahiti, 13% of the population died in one month. In Western Samoa, 22% died within two months. In Bristol Bay, Canada, 40% of the population died. In most cases the dead were young adults, with 99% of those in the U.S. under age 65.

News of the war, then raging in its fourth year, far outstripped the news of the pandemic. Outbreaks of infectious diseases like smallpox, typhus, polio, and dengue were common and routinely killed tens of thousands. Censorship kept the severity of the outbreaks suppressed, and the causative organism, an H1N1 strain of viral influenza, was not identified until 1933.

The pandemic of 1918 was, in a sense, buried under the history of World War I, but the lessons it has subsequently taught in microbiology, epidemiology, vital statistics reporting, the impact of war on public health practice, and the damage media can do in the face of uncertain understanding and a dearth of answers, has proven valuable. Subsequent viral pandemics, including the current coronavirus causing COVID-19, have reinforced the value of non-pharmacological interventions like social distancing, handwashing, masks, and area disinfection.

1931 Yangtze Flood

The Yangtze Flood in China, between July and November 1931, is usually considered the worst single natural catastrophe of the 20th century, discounting pandemics and famines. Though the event is not well-known, modern casualty estimates, including acute drownings and later deaths from famine and disease, exceed three million dead over the course of six months (Li, 2019).

At its peak, the flood covered an area the size of New York, New Jersey, and Connecticut combined, and the high-water mark was 53 feet above average. That year the new Kuomintang Government under Chiang Kai-shek was facing a Japanese invasion of Manchuria, an internal civil war was raging in China between the Communists of Mao and the Nationalists in power, the world was mired in a global Depression, and the scope and scale of the flood was remarkable even by Yangtze standards.

Despite the many complicating factors, the political response set a new standard for humanitarian assistance and disaster relief. Humanitarian aid arrived from all over the world, particularly from the Chinese diaspora in the United States and Southeast Asia. The Pulitzer-prize winning author Pearl S. Buck wrote short stories to encourage charitable donations.

Within weeks of the initial rains, a National Flood Relief Commission was established. Its members included the brother-in-law of the President Chiang Kai-shek, the Minister of Health, a renowned Chinese epidemiologist, American public health specialists, and an American hydraulic engineer. The famous aviator Charles Lindbergh was commissioned to perform aerial surveys of the flood zones (*Yangtze Flood Relief*, 1931-32, 1932).

The coordination of relief was described as “remarkable” at the time. The Commission employed more than a million laborers to build a levee around the affected areas in the first half of 1932. The levee, if straight, would have been six feet high and six feet wide and encircled the world at the equator. The new Commission received assistance from the international League of Nations, forerunner to the United Nations. This was the first time a single international body comprised of national governments had assisted in disaster response.

There were further advances in disaster response over the subsequent decades. These include improved civil-military co-operation in Bangladesh during *Operation Sea Angel* in 1971, the 1994 cholera outbreak mitigation strategies implemented in the Rwandan refugee camps in Zaire, the cellular communication protocols developed during the 2005 Banda Aceh tsunami response, and the remarkable coordination employed for the more than 40 Urban Search and Rescue Teams that responded to the Port au Prince Earthquake in 2010.

The 20th Century and Humanitarian Assistance Coming of Age

Those examples show a procession of advances to the modern day; but less than a decade after the Yangtze flood, the world was again mired in a global war. In the decades after World War II, the post-war colonial independence movements had removed some constraints on behavior and a few nations collapsed under the weight of their sudden freedom. The colonial suppression of education and a failure to prepare competent bureaucracies led to struggles that

Articles

soon let loose ethnic rivalries. New nations collapsed into decades of dictatorships that looked much like the fascism recently defeated.

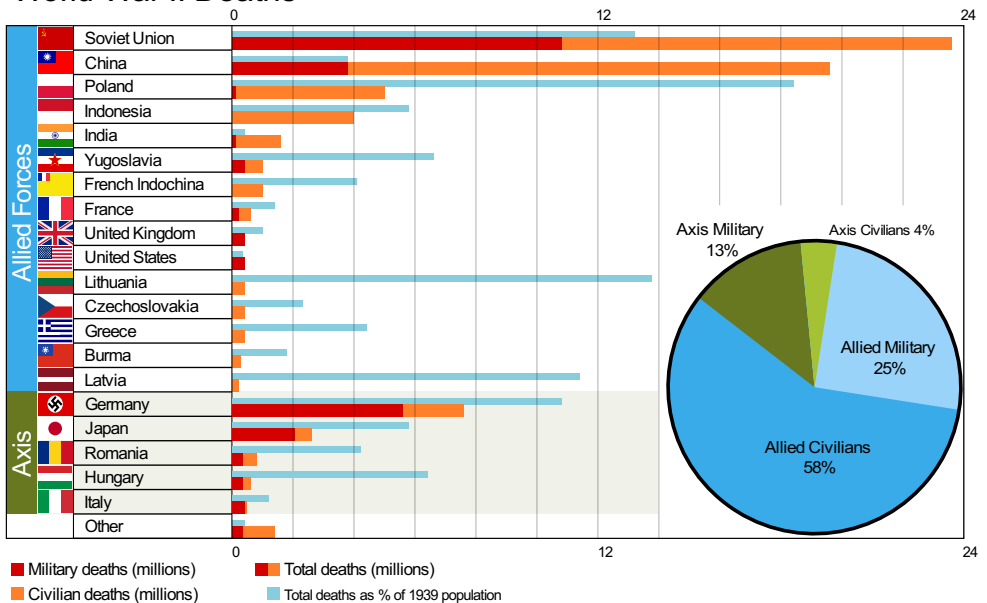
However, as Steven Pinker has noted across 840 pages of compelling evidence in *Better Angels of our Nature* (2011) and later in *Enlightenment Now* (2018), such a bleak summary may be an incomplete assessment of the 20th century. Much happened in those 100 years that improved the lot of hundreds of millions in every corner of the earth.

As Pinker documents, the 7.3 billion members of the human family are living in a time less violent, more equitable, and with longer lifespans and less abject poverty, than at any time in human history.

Pinker's numbers are compelling, but nuanced, because it is also true that much of humanity is precariously balanced, and the world, whether rich or poor, faces staggeringly difficult challenges over the coming decades. Fortunately, as Peter Diamandis is fond of saying, there are four billion minds coming online in the coming decade, at gigabit speeds, and at near-zero cost for connectivity. Many of them are going to have useful ideas we need.

Events in the mid-20th century established a framework for academic and practical learning about humanitarian assistance and disaster relief just as the madness of two world wars had created a desperate need for that framework in every corner of the globe. The Allies had won, but at a cost that had exceeded any single event in human history.

World War II Deaths



World War II deaths. Obtained from

https://upload.wikimedia.org/wikipedia/commons/f/f1/World_War_II_Casualties2.svg

Those costs are not metaphorical. At the end of World War II more than 65% of the entire global population was again living in abject poverty by any modern measure ("Historical Poverty Around the World," 2020). The U.S. had suffered almost 300,000 dead, a terrible toll, but tiny Romania had as many dead as the United States. Ukraine lost 5.2 million and the Soviet Union lost 11 million (Suppan, 2019).

By 1945 there was a profound desire to learn from the two wars that had broken the world. An international peace broker was needed.

The United Nations

With documentation of atrocities unfolding in the months following the end of the Second World War, those charged with the creation of the United Nations also created agencies charged with the care of the war's survivors. The United Nations International Children's Emergency Fund (UNICEF) was created almost immediately in 1946. The agency eventually charged with the care of the displaced, the UN High Commission for Refugees (UNHCR), was created in 1947.

That it took until 1947 to administratively stabilize such an obvious need is a testimony to the political and ethical complexities of humanitarian action. There had been an agency created by the United States in 1943, before the establishing of the post-war United Nations, confusingly called *The United Nations Relief and Rehabilitation Administration* (UNRRA) (Salvatici, 2012).

UNRRA only lasted four years but distributed \$4 billion worth of goods including water, food, fuel, shelter, clothing, medicine, tools, and farm implements. It employed 12,000 and, at its peak, sheltered seven million people in more than 800 resettlement camps. It was disbanded in 1947 and the new, independent, and international United Nations created an agency to take over the task called the International Refugee Organization (IRO). The IRO was plagued by issues associated with whom they were tasked to help--and not to help. The IRO Constitution defined expelled "persons of German ethnic origin" as individuals who would not be "the concern of the IRO." That excluded a group larger than everyone else who needed help in Europe put together.

The IRO was soon disbanded and UNHCR (United Nations High Commissioner for Refugees) absorbed their responsibilities. UNHCR, however, was intensely controversial and only constituted to last three years because there was concern over the implications of establishing a "permanent body" for refugee management. Despite the hesitation, UNHCR persisted, and gradually had its mandate extended and its European focus expanded to other continents, but it had no global reach until 1967.

UNHCR has always been an agency understaffed for its mandate and, in 2020, that is truer than at any time since the end of World War II. There are now 80 million people forcibly displaced from their homes and 32 million of them are children. More than half are internally displaced people (IDPs) within their country, so not technically "refugees," and they are often displaced because they are persecuted by their own government, and so "of international concern"--but national sovereignty prevails. Of note, UNHCR has only 17,300 employees spread across 135 countries to care for 80 million people. In comparison, that's almost exactly the number of employees in the New York City Fire Department.

The result of UNHCR's enlarging mandate for humanitarian support over the past 70 years of recurrent humanitarian distress, while never having enough staff, soon led to the expansion of "implementing partners." Those partners developed as non-governmental organizations (NGOs) supported by donor agencies--public and private. The resulting ecosystem is a large part of the modern humanitarian assistance and disaster relief community.

Shaping the Modern Era

The International Committee of the Red Cross

Henri Dunant's impassioned 1859 plea to care for the wounded in war, *A Memory of Solferino* (American National Red Cross. District of Columbia & Dunant, 1959), led to the formation of the International Committee of the Red Cross, or ICRC. The ICRC now has a larger remit than just caring for the wounded, and their three Nobel Prizes testify to the effectiveness of their work. They were the first internationally recognized humanitarian aid organization, and they are firmly grounded in what are now known as the humanitarian principles.

Humanitarian Principles

There are four Humanitarian Principles, developed with that same Red Cross, that have been adopted by the United Nations General Assembly (Forsythe, 2005):

1. Humanity

The principle of humanity means that all humankind shall be treated humanely and equally in all circumstances by saving lives and alleviating suffering, while ensuring respect for the individual. It is the fundamental principle of humanitarian response.

2. Neutrality

Provision of humanitarian assistance must be impartial and without discrimination on the basis of nationality, race, gender, religion, political opinion or class. It must be based on need alone. Priority must be given to the most urgent cases of distress.

3. Impartiality

Not to take sides in hostilities or engage at any time in controversies of a political, racial, religious or ideological nature.

4. Independence

Humanitarian agencies must formulate and implement their own policies independently of government policies or actions.

Those four principles guide humanitarian action across the spectrum of global and national policy, legislation, and law, but, while admirable, they are so broad they can sometimes hamper practical interpretation.

The International Red Cross and Red Crescent Movement is an umbrella organization that consists of the International Committee of the Red Cross, the International Federation of Red

Cross and Red Crescent Societies, and the 191 National Red Cross and Red Crescent Societies. The American Red Cross, for example, is one of the national members of the Federation.

Generally speaking, the Committee (ICRC) is created to guide and protect those in and around conflict, and the Federation (IFRC) with its many National Societies, is engaged in disaster response and humanitarian aid separate from war. Both of them together have created a Code of Conduct that is somewhat more practical for the field than the Humanitarian Principles.

The Red Cross Code of Conduct

In 1992, the IFRC was asked to create a set of ethical guidelines for non-governmental organizations and donor agencies to use when considering programs, projects, and deployments into disaster areas. A draft *Code of Conduct* was adopted in 1994 and there are now more than 600 organizational signatories ("Code of Conduct," 1994).

The Code has ten *Principal Commitments* that are built on the four Humanitarian Principles, enlarging on the use of local capacity, respect for local culture and custom, risk mitigation, and accountability.

With these cascading sets of guidelines, the *Humanitarian Principles and the Code of Conduct*, the practice of humanitarian assistance moved into a new realm, demanding a professionalism that extended beyond a simple desire to help. It became a legitimate academic discipline that harvested Lessons Learned from past mistakes and successes, informed training, developed techniques and procedures, embraced technology where it fit, and slowly began to form a cadre of professionals. And none were more professional, or more influential, than Frederick "Skip" Burkle, MD, MPH.

Dr. Skip Burkle and the Center of Excellence

Dr. Frederick "Skip" Burkle is, justifiably, a legend in the disaster response community and his Wikipedia entry details only a small portion of why. His expertise, experience, courage, and diplomacy have shaped the professionalism of humanitarian assistance and disaster relief like no other. In January 2017, WADEM (the World Association for Disaster and Emergency Medicine) named its biennial Award for *Global Leadership in Emergency Public Health* in honor of Dr. Burkle ("WADEM Burkle Award," 2020). This Journal knows Dr. Burkle well and details of his historical achievements and current interests are available from multiple sources.

In 1994 Dr. Burkle was selected to lead the first *Center of Excellence in Disaster Management and Humanitarian Assistance* (COE) at Tripler Army Medical Center in Honolulu, Hawaii. The Center was created with a focus on improving civil-military coordination in disasters through education, science, innovation, and diplomacy and proved a significant success. The COE was the first American center to offer the ICRC's HELP Course (*Health Emergencies in Large Populations*), and the HART course (*Health Assistance Response Training*). They were also the first American institution to be designated a *Collaborating Center for Civil-Military Engagement* by the World Health Organization in Geneva. While other institutions may have been established earlier, the work done by Burkle and the COE established the academic standard for humanitarian assistance and disaster response (Subbarao *et al.*, 2008).

The Work Still to be Done *Evaluating Disasters*

Each class of disaster has a set of particular requirements, but every disaster is fundamentally the same in foundational needs: Medical care, water, shelter, food, energy, communication, transportation, and security are the basics. Gary Strong, the Defense Advanced Research Projects Agency (DARPA) Program Manager for whom the *Strong Angel* series of international disaster response demonstrations was named, noted “Yes, of course they need all of those things, but they need information first.” (Kruse, 2000). His point, he explained, was that none of those things can be effectively delivered to a population in need until that population understands where to go to get them, and when, and what is available and for how long, and what they should have with them, and so forth. Information is the first step.



Earthquake aftermath, Kathmandu, Nepal, 12 May 2015

Much of what has transpired in the humanitarian community since the advent of the digital age has been addressing that problem of information; deciphering how to most effectively use all the many communication tools now available--from bullhorns to mobile apps to encrypted satellite links and space-based population displacement tracking--to accomplish the most basic of goals: telling people in need where to get help and getting those who can help to the people who need them. The communication needs and other technical resource requirements vary somewhat depending on circumstance, but they are bedrock.

Population and Climate

In times of crisis, people have always banded together to help one another, but over the last 200 years, as the human population doubled, then doubled again, and yet again, more people have found themselves in the paths of more disasters. During the past 15 years, an increasing number of those disasters have been related to climate change. Within the literature climate change is sometimes referred to as “The Great Exacerbator” --whatever had happened in the past or could be expected in the future, climate change will probably make it worse.

Climate change is going to be the greatest challenge the world has ever faced and its impact is here now. In June of 2020, a massive Arctic oil spill, dumping thousands of tons of diesel fuel into a river, was caused by the buckling of “permafrost” no longer permanently frozen (“Arctic Circle Oil Spill Prompts Putin to Declare State of Emergency,”). In early July of 2020 the city of Verkhoyansk in northern Siberia, a city known as one of the coldest on earth, hit 100.4 degrees Fahrenheit. Las Vegas, Nevada was the same temperature that day (Record-breaking Siberian heatwave ‘result of human-caused climate change’).

Women and Natural Disasters

Research on losses in natural disasters has revealed a disproportionate impact on women (Cutter, 2017). In daytime earthquakes in some poor regions, for example, women may be more likely to be home during a dwelling collapse. In cyclonic storms that result in a storm surge, women are statistically less likely to know how to swim. Gender-based violence after natural disasters, too, has been well-studied and has multiple reasons: Societal norms are disrupted, law enforcement is distracted, and displacement leads to a loss of community protection. Women are often more financially precarious than men, sometimes with childcare responsibilities that impair their ability to earn enough for water, food, and shelter. If food, water, or shelter



Aftermath of Hurricane Matthew in Jeremie, Haiti, September, 2016

are scarce, sexual bargaining and exploitation happens. That can, in turn, result in sexually transmitted diseases, traumatic injury, social shunning, and lifelong psychological damage. There are research centers evaluating the best methods for minimizing gender risk and impact disparity, like the *Gender and Disaster Network* at Northumbria University in the United Kingdom, but there is still a great deal of work to be done.

Complex Humanitarian Emergencies

Complex Humanitarian Emergencies (CHEs) are a special class of humanitarian catastrophe that is comprised of simultaneous chronic poverty + conflict + (usually) a natural disaster. They occur when an acute disaster is layered on chronic instability (Williams & Downes, 2017).

Examples of complex humanitarian emergencies in 2021 include Yemen, Haiti, Venezuela, Syria, and the Democratic Republic of the Congo. Each of these countries has been experiencing surge in violence, has significant poverty, has faced many challenges with governance, and has multiple layers of vulnerability within its population. Fortunately, there are, as with gender issues, multiple academic centers working on techniques, procedures, and tools for the mitigating of such CHEs, and effective strategies are appearing.

Wicked Problems

There are disasters--acute discrete events that require assistance to help a population get back to stability. There are complex humanitarian emergencies--those involve long-term economic or resource shortfalls, usually complicated by active conflict, which then suffers an acute event like a storm, earthquake, or pandemic. And then there are *Wicked Problems* (Steel *et al.*, 2017).

For the humanitarian community in 2020, the world is filled to the brim with these Wicked Problems. By the Rittel and Weber 1973 definition, Wicked Problems are:

1. unstable
2. socially complex
3. difficult to name
4. contradictory in nature
5. organizationally complex
6. incompletely understood
7. interdependent with other issues
8. known for creating recurrent policy failures
9. rich with unforeseen interventional consequences
10. require behavioral modification from several directions
11. require significant compromise from many stakeholders

Climate change, social inequality, resource allocation, and other issues in various global locations are examples of these problems. It is not hard to list more. Each is a tangled web of risk, tragedy, competing interests, and profound consequences if left unsolved.

As noted for gender vulnerabilities and complex emergencies, there are academic institutions and useful books that describe methods for addressing Wicked Problems effectively. That is helpful because a surprising number of Wicked Problems are emerging as fragile communities become more exposed to population pressures, resource shortfalls, ethnic tension, environmental degradation, biodiversity loss, and climate change.

Better Vision, Better Strategies, Better Tools



Disaster management phases. Obtained from: <https://www.itu.int/en/ITU-D/Emergency-Telecommunications/PublishingImages/phases-dm.png>

The Disaster Management Cycle has four phases: Mitigation, Preparedness, Response, and Recovery. Good research has shown that the preparedness and mitigation phases have, by far, the greatest Return on Investment (ROI). Studies after Hurricane Katrina revealed that mitigation strategies to reduce risk would have paid a 12:1 investment in New Orleans (Dane, 2013). In other words, for every dollar spent on shoring up the river dikes and ensuring an adequate flood control spillway, \$12 in relief and reconstruction costs would have been saved. Other studies in other disasters have confirmed that the “preparedness” ROI far surpasses investment in any other phase.

Articles

Once a disaster has happened, it is the task of the response-and-relief professionals to ease the suffering and minimize the misery such tragedies bring. That is a complex and expensive endeavor, so investing in efforts that make the disaster less likely to happen in the first place is a far more effective use of money. There is some good thinking on how to do that in the writings of Don Berwick.

In the June 12, 2020 issue of the *Journal of the American Medical Association*, Dr. Berwick, previously Administrator of the U.S. Centers for Medicare and Medicaid Services and now at the Institute for Healthcare Improvement in Boston, published a Viewpoint entitled “The Moral Determinants of Health” (Berwick, 2020). In it he makes a compelling case for healthcare professionals to take on the social determinants of health as an integral part of what it means to provide care. He notes that, from mid-town Manhattan to the South Bronx, life expectancy drops 10 years--6 months for every minute on the subway. In Chicago, between the Loop and the west side of the city, the difference in life expectancy is 16 years.

Berwick quotes a study that, if every trace of heart disease could be magically eradicated, the leading cause of death in America, life expectancy would only increase by 4 years. That is only 25% of the life-expectancy effect found in living in the richer parts of Chicago rather than the poorer ones. Let us remember that those appalling statistics reflect political choices. The tired, poor, and huddled masses do not have to be, and the same is true for disaster vulnerability. Human beings often know how to reduce risk; but often choose not to provide the necessary resources.



Water ready for distribution, New Orleans, Hurricane Katrina response, 2005

Better Tools

When teams deploy to an acute event, or when staff first establish a displacement camp for new refugees, there are foundational requirements that need to be addressed. Clean drinking water is usually the most acute need, then all else can be addressed in parallel.

Gary Strong noted that “...they need information first.” And that is a useful paradigm. Apps like Mustr help keep disaster teams in contact when deployed and street medic teams linked when working protest sites. OpenStreetMap.org and the Working Group on Worldwide Human Geography Data (WWHGD.org) provide free maps and other free resources to help navigate a ruined landscape. What3Words.com has done a remarkable job at labeling every 10-foot square on the earth--mountain, jungle, desert, island, and ocean--with a unique three-word identity making it easy to describe the precise location of a measles case in a refugee camp, a damaged water pump, a mass grave, an endangered species of flower, or a cholera clinic on the Red Sea in Yemen. The front door of the Emergency Department at Harborview Medical Center in Seattle, for example, is *ships.fruit.void*. What3Words is free.

Field Ready.org is using 3D printing to create needed tools on site in the middle of a disaster. GeoShip.is and IconBuild.com are creating small, beautiful, resilient, and long-term housing units that can be built in a day. Infinitum Humanitarian Systems is creating WARP community water purification systems being used in the Yucatan rainforest, in Yemen, and on Kwajalein Atoll. Briotech is creating a cheap, pure, and safe disinfectant that inactivates the pandemic coronavirus (SARS-CoV2) and is being used by the Navajo Nation, in Shanghai COVID-19 hospitals, and in Ebola clinics in the Congo. iRespond is creating no-touch privacy-protected biometric identity systems for Burmese refugee camps in Thailand and for HIV clinics in Mali and Myanmar. There are a host of tools being used by disaster teams to support survivors on every continent and many languages, and more are appearing. Some, notably, are now being designed by those who need the help.

Conclusion

We are *Homo sapiens*. the wise ones, and there is wisdom at the heart of humanitarian action. We know that disaster preparedness is smarter and cheaper and kinder than disaster response. We know that helping a population gain the tools to become “smart, strong, brave, gentle, and good” makes society work better, stay calmer, become healthier, learn more, care for one another, gain justified confidence, develop mutual trust, fall less far and bounce back better when hazards become disasters. Don Berwick has described some of what is needed to help communities get where they would all like to be, and his advice is not just for healthcare providers. It is for all of us as humanitarians. We would do well to consider Kant’s “moral law within” and act accordingly.

It can be argued that no natural disaster is truly natural anymore. There is a technical component, a human-made component, to everything, even if it is only the density of the human population at risk, the human-driven loss of upstream forests to stop a flood, the human-driven loss of prairie root systems to stop topsoil loss, or the loss of offshore mangroves that once reduced the impact of a storm surge.

Articles

It all does seem daunting, but we know how far we have come since Vesuvius, Lisbon, Solferino, and San Francisco. As humanitarian professionals--in healthcare, transportation, logistics, communication, shelter, food, and water--we are deploying frequently, learning constantly, and trying to cultivate wisdom to be shared with our fellow-travelers so we can all continue to meet the mounting needs we face daily. As a profession, we are not optimists, but we are not pessimists, either. We are following Amory Lovins at the Rocky Mountain Institute and learning our work can be defined as "Applied Hope."

References

- American National Red Cross. District of Columbia, C., & Dunant, H. (1959). *A memory of Solferino*. Washington, D.C.: Washington, D.C.: American National Red Cross.
- Arctic Circle Oil Spill Prompts Putin to Declare State of Emergency. (04 June 2020). *BBC World*. Retrieved from <https://www.bbc.com/news/world-europe-52915807>
- Being a Report of the Executive Secretary to the Yangtze Flood Relief Committee of the Commission*. (1932). Beijing, China: Yangtze Flood Relief Commission
- Berwick, D. M. (2020). The Moral Determinants of Health. *JAMA*. doi:10.1001/jama.2020.11129
- Code of Conduct for the International Red Cross and Red Crescent Movement and Non-Governmental Organizations (NGOs) in Disaster Relief. (1994). In. ICRC, Geneva.
- Cutter, S. L. (2017). The forgotten casualties redux: Women, children, and disaster risk. *Global Environmental Change*, 42, 117-121. doi:10.1016/j.gloenvcha.2016.12.010
- Dane, S. E. (2013). Beyond the Storms: Strengthening Preparedness, Response, & Resilience in the 21st Century. *Journal of Strategic Security*, 6(2), 32-45. doi:10.5038/1944-0472.6.2.3
- Ferrari, P. F., & Rizzolatti, G. (2014). Mirror neuron research: the past and the future. *Philos Trans R Soc Lond B Biol Sci*, 369(1644), 20130169. doi:10.1098/rstb.2013.0169
- Forsythe, D. P. (2005). *The humanitarians: the International Committee of the Red Cross*: Cambridge University Press.
- Historical Poverty Around the World. (2020). Retrieved from <https://ourworldindata.org/extreme-poverty#historical-poverty-around-the-world>
- James, W., & James, H. (1911). *Memories and Studies*: Longmans, Green.
- Jones, N. F. (2001). Pliny the Younger's Vesuvius "Letters" (6.16 and 6.20). *The Classical World*, 95(1), 31-48. doi:10.2307/4352621
- Kruse, J. (2000). *Strong Angel Hotwash Notes*. Retrieved from Third Fleet, US Navy, San Diego, CA.

- Li, L. M. (2019). The Nature of Disaster in China: The 1931 Yangzi River Flood by Chris Courtney (review). *Journal of Interdisciplinary History*, 50(2), 310-311. doi:10.1162/jinh_r_01437
- McAlister, C. N., Marble, A. E., & Murray, T. J. (2017). The 1917 Halifax Explosion: the first coordinated local civilian medical response to disaster in Canada. *Canadian Journal of Surgery. Journal canadien de chirurgie*, 60(6), 372-374. doi:10.1503/cjs.016317
- Record-breaking Siberian heatwave 'result of human-caused climate change'. (16 Jul 2020). *BBC World*. Retrieved from <https://www.bbc.co.uk/newsround/53428503>
- Salvatici, S. (2012). 'Help the People to Help Themselves': UNRRA Relief Workers and European Displaced Persons. *Journal of Refugee Studies*, 25(3), 428-451. doi:10.1093/jrs/fes019
- Shrady, N. (2008). *The last day : wrath, ruin, and reason in the great Lisbon Earthquake of 1755*. New York: New York : Viking.
- Steel, B., Lach, D., Weber, E. P., Steel, B., Lach, D., & Weber, E. P. (2017). *New Strategies for Wicked Problems : Science and Solutions in the 21st Century*. Corvallis: Corvallis : Oregon State University Press.
- Subbarao, I., Lyznicki, J. M., Hsu, E. B., Gebbie, K. M., Markenson, D., Barzansky, B., . . . James, J. J. (2008). A consensus-based educational framework and competency set for the discipline of disaster medicine and public health preparedness. *Disaster Med Public Health Prep*, 2(1), 57-68. doi:10.1097/DMP.0b013e31816564af
- Suppan, A. (2019). The Death Tolls In World War II. In *Hitler - Beneš - Tito* (pp. 733-738): Austrian Academy of Sciences Press.
- Taubenberger, J. K., Hultin, J. V., & Morens, D. M. (2007). Discovery and characterization of the 1918 pandemic influenza virus in historical context. *Antiviral therapy*, 12(4 Pt B), 581-591. Retrieved from <https://pubmed.ncbi.nlm.nih.gov/17944266>
- WADDEM Burkle Award. (2020). Retrieved from <https://wadem.org/about/awards/>
- WHO/EHA. (2002). WHO Disaster and Emergencies Definitions. In WHO (Ed.). Addis Ababa: Pan African Training Center.
- Williams, H., & Downes, E. (2017). Development of a Course on Complex Humanitarian Emergencies: Preparation