

## Sustainable Healthcare Systems During and After Conflict

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# Sustainable Healthcare Systems During and After Conflict

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## Abstract

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## **Sustainable Healthcare Systems During and After Conflict**

Timely delivery of competent healthcare is a basic human right. The United Nations (UN) published its *Universal Declaration of Human Rights* in 1948, stating:

Everyone has the right to a standard of living for the health and well-being of himself and his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control.<sup>1</sup>

Poor governance, armed conflict, and unstable natural environments are among many “circumstances beyond [the] control” of most people.<sup>2</sup> Such eternal “circumstances” present some of the most difficult challenges to sustain effective healthcare delivery, alongside limited therapeutic options and incomplete understanding of mechanisms underlying many diseases.<sup>3</sup> Manmade and natural disasters in contested environments present particularly “ill-defined, wicked, planning problems”.<sup>4</sup> Applying the past–present–future lens method, this project describes sustainable, whole-of-society approaches to raise an isolated healthcare delivery system to the 21<sup>st</sup> Century standard of care, with a focus on the isolated healthcare system of the Democratic People’s Republic of Korea (DPRK, or “North Korea”). Best practices for stability operations in a contested environment include clear strategic vision, competent cultural understanding, and agile coordinated responses.

### **Obedience and Rebellion in the Context of Governance**

Healthcare is a responsibility shared by people with their government (which regulates it) and with nongovernmental and private organizations (which enable it). Good governance can be briefly defined as the processes of public decision-making and resource management which maximize basic human rights and other common interests.<sup>5</sup> Ineffective governance has often contributed to war or armed conflict below

the level of war. British colonies in North America during the 18<sup>th</sup> Century exemplified armed rebellion against ineffective governance. Colonial Americans in their United States *Declaration of Independence* (1776) enshrined “Life” among the “unalienable Rights” given to all people and to be protected by government.<sup>6</sup> The *Declaration of Independence* observed:

Prudence, indeed, will dictate that Governments long established should not be changed for light and transient causes; and accordingly all experience hath shewn [sic], that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed.<sup>6</sup>

The Founding Fathers’ description of “sufferable evils” could be applied to most North Koreans, who have become “accustomed” to the domineering national cult fostered by three generations of the Kim dynasty since the late 1940s. Institutional incentives for submissive obedience in North Korea, combined with severe punishments for even perceived dissent by any individual, have made it highly unlikely that the Kim regime would topple by popular revolt, despite hope for such an outcome.<sup>7</sup> It is reasonable to expect that the Kim regime likely neglects healthcare rights since all other human rights are neglected. Medical examinations of escapees from North Korea support this conclusion.<sup>8,9</sup>

During the early 1960s, the social psychologist Stanley Milgram empirically confirmed the ordinary human tendency to obey orders from authority—even authority simply perceived as legitimate—to act destructively against innocent individuals.<sup>10</sup> Other professionals subsequently confirmed this psychological tendency to obedience exists across genders, cultures, and nations.<sup>11</sup> Unfortunately, a handful of countries tacitly support North Korea’s despotic governance and its Westphalian sovereignty, thwarting severe sanctions imposed against North Korea by the UN Security Council over many

decades.<sup>12,13</sup>

Echoing the U.S. Founding Fathers, changing the “long established” North Korean government would require serious cause, despite its persistent threats and disruptive behaviors toward other nations.<sup>14-16</sup> Potential paths to collapse of the Kim regime include serious violations of the 1953 Korean Armistice Agreement (e.g., act or acts of war against a U.S. ally or the U.S. itself), other manmade cataclysm (e.g., nuclear event on the Korean Peninsula), or a major natural disaster in North Korea.<sup>17</sup> Regardless how the Kim regime might collapse, such events could create profound humanitarian crises due to its avowed nuclear weapons capability and the indoctrination of millions of North Koreans to mistrust foreigners, especially the U.S. and her close allies.<sup>18</sup> Indo-Pacific stakeholders would likely expect massive humanitarian assistance and disaster relief (HADR) from the UN and nongovernmental entities (NGOs) if the North Korean government collapsed for any reason.<sup>19</sup>

#### Public Health Risks from North Korea

Despotic governance, decades of isolation from state-of-the-art healthcare, and international sanctions have yielded major health disparities in North Korea (compared to South Korea).<sup>9</sup> Poor population health in any region places others worldwide at risk due to the interrelatedness of modern physical and social environments. Currently, infectious diseases can spread by human migration across North Korea’s borders with China, Russia, and South Korea, or overseas to Japan, or by commercial flights between Pyongyang and either Beijing or Ulaanbaatar, Mongolia. Recent North Korean refugees in South Korea have displayed tuberculosis and viral hepatitis as the leading infectious diseases of concern.<sup>20</sup> *Plasmodium vivax* malaria has been endemic to the Korea Peninsula for centuries.<sup>21</sup> Post-traumatic stress disorder and depression have

affected North Korean escapees in South Korea.<sup>22</sup> A healthy North Korean population is in the common interest, not just of East Asia but also the broader world.

### The Ring of Fire and Natural Indo-Pacific Disasters

In addition to political risks, North Korea sits in the Indo-Pacific region, an area uniquely vulnerable to natural and manmade disasters. Such disasters display every feature of “wicked” or “tricky” problems (Table 1, next page).<sup>23</sup> The Ring of Fire refers to volcanoes formed along the tectonic borders of the Pacific basin, where 90% of the world’s earthquakes occur.<sup>24</sup> The UN reported that over 40% of the 3,979 disasters that occurred worldwide between 2005-14 took place within the Indo-Pacific region.<sup>25</sup> Indo-Pacific disasters between 2005-14 affected 1.4 billion people (≈80% of those affected globally) with loss of over 500,000 lives (nearly 60% of global deaths) and inflicted economic damage exceeding \$523 billion (45% of global total).<sup>25</sup>

Super Typhoon Haiyan (known locally as Yolanda) hit the Philippines on November 8, 2013, as one of the most powerful storms ever recorded on Earth.<sup>26</sup> Subsequent civil-military coordination among 58 countries and 29 foreign militaries provided effective HADR.<sup>27</sup> By April 2014, using a UN Cluster Approach to disaster management, the Philippine National Disaster Risk Reduction and Management Council estimated that 6,293 people had been killed, 28,689 people injured, and more than 4 million displaced by this storm which ultimately affected over 16 million, according to the U.S. Agency for International Development (USAID).<sup>27</sup>

Table 1. Examples of “Wicked” or “Tricky” Features of Indo-Pacific Disasters<sup>4,23</sup>

Feature	Manmade Disasters	Natural Disasters
“No definitive formulation”	Nuclear threats can originate from many personal (e.g., Kim Jong-un, extremists) or political sources (e.g., thwarted sanctions on North Korea; Indo-Pakistani tension)	Problem could be inadequate structures for nuclear reactor containment, insufficient housing distant from threats, delayed evacuation of local populace, etc.
“No stopping rule”	Many North Korean elites could seek to assume Kim’s role if he were absent, thus perpetuating threats	How much of a society’s electrical grid must be functioning to define recovery after a disaster?
“Good/bad solutions, not true/false ones”	Elite decision makers are not adequately impacted by UN sanctions to produce safer North Korean policies; sanctions decrease chance of North Korea public support for Western democracy	Prepositioning relief assets only estimates the likely sites and kinds of natural impact; exact site, timing, and severity of impact is unpredictable
“No immediate and ultimate test of a solution”	Oral potassium iodide prophylaxis may be given too late after a radioiodine exposure and would be ineffective against other radioisotopes released	Efficacy of a seawall or other structural design to mitigate a future disaster is ultimately tested by natural forces
“Limited or no ability to learn by trial-and-error”	Prophylaxis must be given in a timely manner, but notification of nuclear event may be unreliable (e.g., delayed or incomplete)	Only post hoc analysis can confirm efficacy of disaster mitigation strategies; “large public works are effectively irreversible” <sup>23</sup>
“Lack enumerable set of potential solutions or well-described set of permissible operations”	Is any degree of nuclearization in North Korea acceptable (e.g., if a new regime reunites with South Korea)?	Is it politically feasible to move vulnerable populations away from threats? Is it possible to discourage settlements in underdeveloped environments as populations grow?
“Essentially unique”	Future UN occupation of North Korea might resemble 1945-51 Allied Occupation of Japan but would differ significantly; Korean denuclearization would be distinct from Iranian version	2011 Tohoku earthquake and tsunami with resultant Fukushima nuclear disaster in Japan; 2013 Super Typhoon Haiyan (Yolanda) in the Philippines
“Can be considered to be a symptom of another problem”	Current DPRK regime may reflect historic Korean fear of invasion or domination by non-Koreans, greed and narcissism of Kim dynasty, Chinese desire for status quo, etc.	Increased impact of natural disasters may be symptom of climate change, inadequate development of infrastructure, overpopulation of littoral zones, etc.
“Existence of a discrepancy can be explained in many ways”; “choice [bias] determines the nature of its resolution”	Nuclear proliferation in DPRK could reflect popular fear of foreign invasion, or psychological narcissism of Kim Jong-un, or both, or neither (perhaps it reflects rational Chinese desire for buffer regime continuity and status quo)	Climate change vs. architectural design defects vs. personal resiliency in the face of natural forces
“Planner has no right to be wrong”	Any nuclear detonation on civilians would be unforgivable with respect to actors who either attacked or failed to protect them	Mass death or displacement of people is unacceptable

On March 11, 2011, the Great East Japan Earthquake attained Richter magnitude 9.0, was centered 130 km offshore, and created a 15-meter tsunami.<sup>28</sup> This tsunami disabled power cooling three nuclear reactors at the Fukushima Daiichi station of the Tokyo Electric Power Company. These nuclear cores melted over days 1-3, then over days 4-6 released high radioactivity exceeding 940 PBq of <sup>131</sup>I equivalents (or approximately 25,405 Sv).<sup>28,\*</sup> Routine mammography delivers an effective radiation dose of 0.0004 Sv to a woman.<sup>29</sup> Sudden radiation exposure to 4.5 Sv will kill half the people exposed within 60 days (without medical intervention).<sup>30</sup> Due to the cow–milk–human pathway for absorption and transmission of radioiodine contaminant, exposed children are at greatest risk for carcinogenic effects.<sup>31</sup>

Most of the Fukushima radioactivity dispersed eastward over open ocean, yet the radioiodine released caused 59 Japanese children to develop thyroid cancer by September 2013.<sup>32,33</sup> No deaths or cases of acute radiation sickness have yet been attributed directly to Fukushima’s radioactivity. Evacuation of over 100,000 people contributed to over 1,000 deaths.<sup>28</sup> Official anxiety and miscommunication has delayed complete return of the former residents to Fukushima.<sup>34</sup>

The unstable physical environment along the Ring of Fire contributes to the “wicked” or “tricky” problems of manmade and natural disasters in the volatile, uncertain, complex, and ambiguous (VUCA) environment of the Indo-Pacific region.<sup>4,35-37</sup> Most sobering, the frequency and severity of natural disasters appear to be increasing as consequences of climate change.<sup>38</sup> Universally adopted, the disaster management cycle provides a framework to mitigate before disasters, prepare for them, respond to

\*One becquerel (Bq) is the radioactivity generated from one nuclear decay per second. One sievert (Sv) and one gray (Gy) represent 1 joule of energy per kilogram of matter. Technically, the sievert measures equivalent *biologic* effect from exposure, while gray quantifies *physical* energy.

them, and recover from them (Figure 1).<sup>39</sup> Despite the VUCA traits of North Korea, regime collapse would present the specific challenge of reconstituting its national healthcare system in a contested environment. It is worth considering historic experiences by occupation forces and diplomats who applied cultural understanding while stabilizing healthcare systems in contested areas.



Figure 1. The Disaster Management Cycle<sup>39</sup>

#### Traditional Cultures in Japan vs. Korea

For millennia the Japanese people have maintained a strong, unique cultural identity, even before “the Yayoi migration brought wet rice agriculture from Korea beginning approximately 2,300 years ago”.<sup>40-42</sup> Limited contact with foreigners and minimal immigration reinforced centuries of cultural identity on the Japanese home islands. Between the Meiji Restoration of imperial rule in 1868 and the surrender announced on August 15, 1945, the Japanese people deferred absolutely to the imperial dynasty.<sup>43</sup> For two millennia as the world’s oldest dynasty, Japanese emperors on their patrilineal Chrysanthemum Throne enjoyed privileges usually associated with divinity.<sup>44</sup>

Like the Japanese, traditional Koreans have maintained a distinct culture for millennia on the Korean Peninsula.<sup>45</sup> Traditional Japanese and Korean cultures superficially share some traits. Individual conformity to societal norms, subservience of

individual identity to group harmony, and obedience to the central authority of an individual leader are common to both cultures. Traditional Japanese and recent North Korean cultures differ profoundly in religion (Shintoism vs. agnostic regime worship), governance (advanced democracy vs. Stalinesque dictatorship), and other fundamental aspects. Moreover, South Koreans in the Republic of Korea have been favorably influenced by substantial exposure to foreigners for decades, in sharp contrast to the isolated North Koreans. Differences and similarities between Japanese culture during World War II and current North Korean culture make the 1945-52 Allied occupation of Japan relevant to a future scenario of regime collapse in North Korea. The origins of Japan's conversion from bitter wartime enemy of the U.S. to its close treaty ally warrant reflection.

Table 2. Contemporary Leadership Related to Potential Indo-Pacific Disasters<sup>35-37</sup>

<b>Environmental Trait</b>	<b>Leadership Trait</b>	<b>Leadership Examples for Disaster Mitigation (M), Preparation (P), Response (Rs), and Recovery (Rc)</b>
volatility	vision	Timely press releases from legitimate sources (Rs); continuous UN diplomacy (M,P); UN's Sendai Framework for Disaster Risk Reduction (2015-2030) (M,P); 1998 Malé Declaration on Control and Prevention of Air Pollution and its Likely Transboundary Effects for South Asia (M)
uncertainty	understanding	Natural disasters are more likely than manmade nuclear attack (M, P); nuclear events would be most traumatic physically and psychologically (Rs, Rc)
complexity	clarity	Denuclearization of North Korea as end state defined by UN Security Council resolutions and 2017 U.S. National Security Strategy (P); Joint Regulations regarding displaced persons (P, Rs, Rc)
ambiguity	agility	Joint training exercises among regional actors throughout the disaster cycle (M, P); stabilization of North Korean healthcare system (Rc); State Partnership Program of National Guard Bureau (M, P)

Public Health Experience During the Allied Occupation of Japan (1945-52)

Vision, understanding, clarity, and agility comprise the leadership traits critical to securing a VUCA environment, though an all-inclusive list of solutions cannot be generated for a “tricky” problem (Table 2).<sup>35</sup> Colonel Crawford F. Sams, M.D., of the

U.S. Army exemplified such leadership as he directed public health and welfare during the Allied Occupation of Japan.

COL (Dr.) Sams arrived in Yokohama, Japan, on August 30, 1945, aboard the *USS Sturgeon* with senior officers and representatives of General MacArthur's forward headquarters, the United Kingdom (UK), Australia, the Netherlands, and Russia. COL (Dr.) Sams toured a small police hospital on his first day in Occupied Japan, just two weeks after announcement of the Japanese surrender. He was "shock[ed]" to discover that three Japanese physicians had remained "behind as a last gesture of defiance" after all patients and staff had been evacuated to the countryside "because it was expected that when the barbaric Americans arrived they would all be killed".<sup>46</sup> Such behavior would have been incompatible with the Geneva Conventions as well as the code of conduct for all healthcare professionals. Even the perceptions of physicians can harden under wartime conditions, as documented from the American Civil War.<sup>47</sup>

By October 2, 1945, Supreme Command for the Allied Powers in East Asia (SCAP), under the command of General MacArthur, was designated for the occupation and national governance of Japan.<sup>48</sup> SCAP deferred matters of subnational governance to the prefectural and local governments. SCAP staff sections matched the national ministries and national government of Japan, with special sections for functions unique to enemy occupation (e.g., Civil Property Custodian, Civil Reparations).<sup>49</sup> GEN MacArthur granted COL Sams's selfless request to defer promotion to brigadier general, so that COL Sams could remain as chief of the Public Health and Welfare Section (PHW).<sup>50</sup> COL Sams performed his duties until the occupation ended in 1952 to ensure implementation of strategic plans for the Japanese public health system. PHW's historic

stabilization outcomes remain inspiring (Table 3)!<sup>51</sup>

Table 3. Major Public Health and Welfare Outcomes During the Occupation of Japan (1945-52)<sup>51</sup>

School lunch program served powdered milk (45,000 tons per annum) to 8 million children
Two national smallpox vaccination campaigns; 17,000 cases in 1945-46 dropped to 5 in 1950
Discovery that smallpox vaccine did not confer lifelong immunity
Saved U.S. taxpayers ≈\$627M (adjusted for 2017 value) by funding “egg settings and a few hundred tons of chicken feed” for local typhus vaccine production at lower cost than importing millions of typhus vaccine doses
Quarantine services at repatriation ports (including 233,000 people held at Uraga) and prohibition of shellfish procurement from Tokyo Bay eradicated cholera in Japan
Discovery that murine typhus acquired from rat fleas during winter was naturally passed by human lice over the winter months to create epidemic typhus in May; discovered murine and epidemic typhus are manifestations of a single disease, not two diseases as previously thought
Starting from 2 sanitary engineers in 1945, trained ≈160 sanitary engineers, 870 sanitarians, and 360,000 sanitary team members for house-to-house sanitation, insect and rodent control, home chlorination of wells (only 25% had municipal water supplies in 1945), etc.
Tuberculosis no longer leading cause of death after importing 50,000,000 grams of streptomycin per year for treatment program
Medical training reform through a new Council on Medical Education (e.g., new hospital-based internships, first legalization of cadavers to teach anatomy, first clinical pathological teaching conferences); first medical examiners to perform autopsies; first peer-reviewed journal published by Japan Medical Association in January 1947; national medical licensure to support uniform first class standards
Death rate from dysentery in 1951 fell below prewar rate to 17.6 deaths per 100,000 population

What were PHW’s best practices? COL Sams purposefully limited the size of his PHW team to no more than 150 people at any given time, consistent with current management practice.<sup>52</sup> From his first day in Japan until his redeployment home in 1952, COL Sams and later his team rapidly evaluated existing assets and programs, while building effective relationships with key lay and professional leaders across Japan and Allied countries. PHW initiatives reinforced other lines of effort by SCAP. Since PHW was “the first staff section engaged in programs that required action at all levels of government, as [its] programs affected the entire population,” PHW prepared the “first standing operating instructions for military government teams in their conduct of surveillance [which] were finally published as the pattern pertaining to all fields involving nationwide compliance”.<sup>53</sup>

PHW created health center districts as a new echelon of government that extended from the 46 prefectural governments to coordinate local health and welfare departments.<sup>54</sup> Rather than organize these new districts by geographic area, COL Sams stated, “A population unit of approximately 100,000 people was selected as the manageable size to constitute a health center district.”<sup>55</sup> After “extensive planning” the Japanese Diet passed a new Health Center Law on September 5, 1947, authorizing 800 health center districts.<sup>55</sup> Each district initially sustained 12 services (Table 4). Beginning with a demonstration model center in Tokyo, 46 model centers (at least one per prefecture) had been established by the end of 1948, and 742 highly effective centers existed by the end of the occupation in 1952 (Table 5).<sup>55</sup> In larger metropolitan regions, a city health department was established to supervise the district health officers.<sup>55</sup>

Tables 4 and 5. Public Health Services Provided at 724 Health Center Districts in Occupied Japan (1947-52)<sup>55</sup>

Public health nursing	Activities	1948	1951
Maternal and child hygiene	Health consultations	3,400,000	5,600,000
Public health statistics	Public health nurse visits	382,000	2,300,000
Public health laboratory services	Health education attendees	2,900,000	21,000,000
Dental hygiene	Food & milk inspections	705,000	3,100,000
Nutritional services			
Sanitation and hygiene, including meat and food inspection			
Health education			
Communicable disease control			
Medical social service			
Venereal disease control, including diagnosis and treatment			
Tuberculosis control			

Novel, PHW-designed systems for collection and analysis of health and welfare statistics formed the enduring foundation of the universally admired, state-of-the-art, public health operations in Japan today.<sup>56</sup> Multiple successful PHW initiatives enabled many other stabilization activities by the occupation partners. These governance

successes attest to best practices of clear strategic *vision*, competent cultural *understanding*, *clear* communication campaigns, and *agile* partnerships designed to stabilize the recently contested VUCA environment and transition it to civil authority.<sup>35,36</sup>

Occupation authorities encountered persistent subversion by Russian, Japanese, and American communists. The communists published propaganda in the free press to amplify any potentially disruptive issue routinely encountered in complex stability operations, such as staphylococcal contamination of one soybean flour import.<sup>57</sup> Attempting to sabotage a vaccination campaign, one communist agent deliberately contaminated a vial of vaccine with virulent human tubercle bacilli.<sup>58</sup> His sabotage infected many Japanese children with active tuberculosis!<sup>58</sup> COL Sams's thorough investigation resulted in successful prosecution for this heinous crime against vulnerable innocents. As expected, the communists attempted to organize labor unions to take over governmental activities (e.g., the Tokyo Health Department) and even non-governmental activities (e.g., hospitals managed by the Japanese Red Cross hospitals).<sup>59</sup> Unified efforts by COL Sams and GEN MacArthur at the national level frustrated such subversion.<sup>59</sup>

#### Cultural Competence During Allied Occupation of Japan (1945-52)

Among many salient cultural lessons on the job, COL Sams described "men behind the bamboo screen".<sup>60</sup> On multiple occasions, members of the Japanese elite invited COL Sams to dine in their homes. After the meal and attendant social customs, most household members would withdraw, closing the bamboo screens which traditionally divide the interior of Japanese homes. Then, the male heads of these influential households would probe COL Sams regarding the intentions of SCAP. Japanese leaders were pleasantly surprised to learn about selfless PHW programs to

feed, vaccinate, and care for the Japanese people. After COL Sams shared data confirming the benefits of SCAP's public health and welfare programs, these "men behind the bamboo screen" communicated with other community leaders to ensure financial and political support for PHW initiatives.<sup>60</sup> Cultural competence of multiple PHW team members contributed significantly to SCAP's strategy for "peace and democracy".<sup>61</sup> Cultural competence in a healthcare context can be trained at any age based on recent experience.<sup>62</sup>

The war weary Japanese people wrote thousands of letters addressed to GEN MacArthur during the Occupation.<sup>61</sup> Along with routine requests for information or assistance to repatriate loved ones, the Japanese people wrote disdainfully about many of their wartime leaders who had plunged Japan into World War II. Resembling their continued devotion to Emperor Hirohito, the Japanese public expressed profound respect and gratitude for GEN MacArthur and initial SCAP reforms.<sup>61</sup> Such cultural phenomena enabled SCAP's benign yet savvy strategies to reconstruct a peacetime Japanese economy as well as enduring good governance. In a relatively short time, Japan converted from enemy to democratic ally. Ten years after the 1945 surrender, Emperor Hirohito composed this *waka* poem reflecting his feelings toward World War II:

Awakened from sleep while on a trip  
My heart choked  
With memories of things a decade ago<sup>63</sup>

Hirohito could never forget the nuclear detonations upon Hiroshima and Nagasaki on August 6 and 9, 1945, which instantly killed over 120,000 Japanese and injured tens of thousands more.<sup>64</sup> He knew the Japanese government had rejected the Allied demand for surrender in the Potsdam Declaration of July 26, 1945, just days before the nuclear attacks.

## Hearts and Minds in Contemporary North Korean Culture

Like the wartime Japanese officials in July 1945, Kim Jong-un of North Korea to date shows no convincing signs of epiphany for peace or even negotiated reconciliation with the UN. Unlike the weakened Japanese government in August 1945 however, Kim Jong-un deters invasion by placing Seoul and other major population centers at risk of mass attacks. People in need before, during, and after a major disaster usually request or accept foreign aid. The European Commission provided €300,000 in response to North Korea's rare open request for aid (in English!) after August 2016 floods from Typhoon Lionrock reportedly killed 100 North Koreans.<sup>65</sup> Kim's unwillingness to respond for even a relatively small number of North Koreans (under 500) affected by the 2016 floods highlighted his regime's corruption.<sup>65</sup>

The Kim dynasty has perversely shaped the hearts and minds of most North Koreans to maintain its official ideology of *juche*, which ironically translates to "self-reliance".<sup>66</sup> The Kim dynasty has long diverted national resources for its military, forcing the North Korean people to rely on themselves for basic needs. Many North Korean escapees have expressed culture shock on an individual level even in South Korea as they attempted to adjust to Western-style culture and freedom. Such adjustment shock would be epic on a national level if over 25 million North Koreans suddenly found themselves without their "accustomed" governance.<sup>6</sup> Harkening to grass roots apprehension during the unification of East and West Germany (1989-91), planners must reconcile high expectations among South Koreans and North Koreans after disaster sweeps across the Korean Peninsula.<sup>67</sup>

In the aftermath of war, would the North Korean people capitulate to coalition forces in any way resembling how the Japanese surrendered in 1945? This is another

“wicked” or “tricky” problem. The unpredictable future public opinion of North Koreans may differ substantially from the war weariness of Japanese in August 1945.<sup>23</sup>

Contemplating a stabilization scenario for North Korea after war, even a casual observer would predict subversive acts by individuals loyal to the Kim dynasty, those seeking personal gains or political power, and those acting as proxies for foreign actors competing with the U.S. The counterinsurgency in Iraq since 2003 underscores the high danger of naively believing that coalition forces would be welcomed as liberators.

Flow of Korean refugees into ethnic Korean enclaves in southern China would complicate the humanitarian crisis. Safe havens in China and/or Russia for cross-border attacks by subversive agents and Kim loyalists could sustain insurgency on the Korean Peninsula for decades after regime collapse. Political planning for the transition of North Korea to civil authority will be complex and must consider various options, including a new independent government (likely non-*juche* and non-communist), versus unification under the Seoul-based democracy, versus other variations.

#### Healthcare to Win Hearts and Minds During Stabilization Operations

Wicked problems deserve blessed solutions. Fortunately, successful healthcare delivery has repeatedly influenced “hearts and minds” to favor occupying power since first applied explicitly in 1895 during the Black Flags Rebellion along the Chinese–Indochina border.<sup>68</sup> Counterinsurgency falls primarily under the jurisdiction of military and civilian police forces. British success with healthcare delivery during its prolonged counterinsurgency in the Malayan Emergency of 1948-60 appeared to depend on “the background of British rule and organisation [sic], a loyal police force and the established policy that self-government would be granted as soon as possible”.<sup>69</sup> Combined loyalty of the civilian and military government enabled a relatively small British force to control

and influence the larger Malayan population.<sup>70</sup>

On a cautionary cultural note, the phrase “hearts and minds” became pejorative shorthand among some observers regarding U.S. counterinsurgency policy soon after the major 2001 attacks on the U.S.<sup>71</sup> The *New Testament* stated, “And the peace of God, which transcends all understanding, will guard your hearts and your minds in Christ Jesus.”<sup>72</sup> This Christian phrasing possibly inspired John Adams, veteran of the American Revolutionary War and second U.S. President, who wrote in 1818 that:

The Revolution was in the minds and hearts of the people; a change in their religious sentiments of their duties and obligations... This radical change in the principles, opinions, sentiments, and affections of the people, was the real American Revolution.<sup>73</sup>

President Adams likely inspired U.S. President Lyndon Johnson, who frequently used the phrase “hearts and minds” or a variation of it to describe his Viet Nam campaign beginning in May 1965.<sup>74</sup> Though no religion has been adopted by a majority of South Koreans, Christian evangelism would likely counter a future insurgency in Korea.<sup>75</sup> In 2007 the Taliban captured 23 naïve Christian evangelists from South Korea in Afghanistan and killed two of them, resulting in a 6-week hostage crisis.<sup>76</sup> Widespread public criticism of the evangelists erupted in South Korea media upon their return home.<sup>76</sup>

Economic strain, diseases, cultural incongruity, refugee illiteracy, and other social challenges would significantly complicate stable transition to a new civil authority in North Korea. Rapidly improved healthcare should help the North Korean people and improve world opinion of North Korea. What health problems can be reasonably expected in contested areas?

## Expected Public Health Concerns in Contested Areas

Epidemic typhus, typhoid fever, cholera, and sexually transmitted infections (formerly called venereal diseases) have composed the classic infectious diseases during stability operations since antiquity.<sup>77,78</sup> Flies, lice, rats, mosquitos, and other vectors will spread disease until sanitation and mortuary affairs substantially manage the filth of any contested area.<sup>79</sup>

Though surprisingly unanticipated by Allied planners, the combination of refugees, a typhus epidemic, and severe food shortage disrupted Allied operations in Italy during the winter of 1943-44.<sup>80</sup> Over 14,000 refugees per month passed through the Fifth Army area after the Anzio landing began on January 22, 1944.<sup>81</sup> By spring 1944 the Fifth Army was feeding 200,000 civilians.<sup>81</sup> Among 84 million Japanese during the initial year of Allied Occupation of Japan between 1945-46, tuberculosis and enteric diseases led the causes of death.<sup>82</sup>

Combat ineffectiveness of Soviet forces occupying Afghanistan (1979-89) and Russian forces in Chechnya (1994-96) resulted largely from inadequate nutrition, contaminated water sources, unclean clothes and bathing facilities, and poor field hygiene among troops and unit cooks.<sup>83</sup> A Soviet soldier occupying Afghanistan was issued three sets of underwear to be changed weekly, but often received just one set that was then worn for months on end, encouraging human lice and associated typhus.<sup>84</sup> North Korean prisoners of war (1950-53) and escapees (1953-present) have displayed severe parasitosis and other clinical signs of malnutrition.<sup>9</sup>

## Potential Nuclear Disasters Related to North Korea

On August 8, 2017, *The Washington Post* reported analysis completed by July 28 by the U.S. Defense Intelligence Agency that “North Korea [had] produced

[miniaturized] nuclear weapons for ballistic missile delivery, to include delivery by ICBM-class missiles”.<sup>85</sup> On August 10, open sources could *not* specify the confidence level (low, medium, or high) ascribed by U.S. agencies to this analysis.<sup>86</sup> On August 29, North Korea launched a ballistic missile over Japan, which triggered widespread civil defense warnings there before crashing into the Pacific Ocean.<sup>87</sup> The next day, UN Secretary-General António Guterres condemned this latest launch as yet another violation of multiple UN Security Council Resolutions (e.g., SCR 1718 of 2006, SCR 2371 of 2016, etc.).<sup>88</sup> On September 3, North Korea reiterated its claim to have detonated a miniaturized hydrogen bomb underground at Punggye-ri. That same day, nearby seismic activity registered magnitude 6.3.<sup>89</sup> Norwegian analysts estimated a detonation consistent with a yield of 120 kilotons, or about six times the power of a North Korean detonation in September 2016.<sup>90</sup> Only Russian and Chinese concerns for collapse of the Kim regime softened subsequent UN sanctions.<sup>91</sup>

Nuclear detonations—larger than the 15 kilotons yielded upon Hiroshima or the 21 kilotons upon Nagasaki—could massively contaminate multiple environments with long-standing radioactivity.<sup>92</sup> Tired mountain syndrome may exist from tunnel collapses related to nuclear detonations under Mount Mantap.<sup>93</sup> The Mount Paektu volcano could erupt along the Korea–China border, since it recently displayed partial melt of its undercrust and seismic activity.<sup>94</sup> Most concerning, violent extremist organizations could obtain nuclear weapons materiel.<sup>95</sup>

Mitigating, Preventing, Responding to, and Recovering from Nuclear Disaster

*Time* to allow radioactive decay, physical *distance*, and a combination of physical and pharmaceutical *shielding* are the only ways to protect life from radioactive damage. Two decades after physical containment of the Chernobyl nuclear reactor destroyed in

1986, subsequent gaps in the Chernobyl Shelter still posed significant occupational risk of inhaled radioactivity for future reconstruction.<sup>96</sup> Prepositioning of household potassium iodide (KI) pharmaceuticals as well as timely detection and public notification have been essential for effective oral KI prophylaxis to protect against thyroid cancer from radioiodine.<sup>97</sup>

That said, after the 2011 Great East Japan Earthquake and Tsunami damaged Fukushima Daiichi Nuclear Power Plant 1, emergency and radiation workers deployed to contaminated areas appear to have been substantially protected by just-in-time deployment of KI for oral administration, personal protective equipment, and other occupational safety interventions.<sup>98</sup> Current nuclear weapons can release combinations of strontium, plutonium, or uranium radioisotopes. Other than KI against radioiodine, there are no pharmaceutical agents known to be effective prophylactic shields against radioisotopes.

After any clinically significant radiation exposure, lifelong monitoring and complex environmental epidemiology are essential to assess potential long-term health consequences and to intervene further. Airborne monitoring of radioactive xenon and isotopes may detect underground leaks from tired mountains.<sup>99</sup> The U.S. National Nuclear Security Administration (NNSA) and International Atomic Energy Agency (IAEA) possess and disseminate the deepest expertise for management of nuclear emergencies.<sup>100,101</sup> IAEA is in the advanced drafting stage for its *Protection Strategy in Response to a Radiological or Nuclear Emergency*, a document designed to promote preparedness among its Member States.<sup>102</sup>

#### Stabilizing the Iraqi Healthcare System (2003-11)

Recent stability operations in Iraq provided insights relevant to future

reconstruction of a national healthcare system in a contested environment. Like North Korea, Iraq under Saddam Hussein endured decades of UN sanctions until 2003. Iraqi health indicators had deteriorated dramatically after 1990. The infant, child, and maternal mortality rates had doubled by 2003 due to poverty, widespread malnutrition, infectious diseases from inadequate sanitation, and non-communicable diseases.<sup>103</sup> By early 2003 nearly 60% of the Iraqi population of 24.5 million was solely dependent on food distributed by the government each month.<sup>103</sup> The daily ration was raised to 2,215 kilocalories in July 2002, sustained by the Oil-for-Food Programme (OFFP) established by the UN in 1995.<sup>103</sup> The World Health Organization (WHO) led the Health Coordination Group in 2003 as an umbrella entity to plan and implement a coordinated international response to health problems in Iraq.<sup>104</sup> The international coalition invaded Iraq on March 20, 2003, and insurgents subsequently contested civil authorities.

A new Iraqi Ministry of Health (MoH) organized ten working groups and a steering committee between October 2003 and January 2004 to develop a “clear vision”.<sup>105</sup> In 2004, less than 45% of Iraqis polled across Iraq viewed healthcare among the top three political priorities, placing security and employment as more pressing public concerns.<sup>106</sup> Nevertheless, the Iraqi MoH, Kurdish MoH, multiple NGOs, UN agencies, private philanthropists, USAID, and other government agencies proceeded to stabilize and improve the Iraqi healthcare system.

Iraqi MoH officials and staff, Advisory Committees representing leaders of the Iraqi health professions, UN agencies, the World Bank, and major donors met during the summer of 2004 to re-assess the current health situation and develop future strategies. By December 2004, the Iraqi MoH published its vision for 2004-07 identifying

five action areas: “1) meeting urgent needs and improving services; 2) strengthening management; 3) developing and implementing a 4-year plan for reconstruction; 4) training and capacity building; 5) mobilising resources [sic].”<sup>107</sup>

Competent healthcare providers who can access state-of-the-art training compose one essential component of effective healthcare. The Iraqi MoH and UN estimated that approximately 18,000 of the 34,000 registered physicians had left Iraq by 2003, primarily for Jordan, Syria, and Lebanon.<sup>108</sup> USAID funded a highly novel, targeted development program (nearly \$3,000,000 from December 2007 through November 2009) via an NGO partnering with the Iraqi MoH. This program was the first ever to provide volunteer (unsalaried) faculty as trainers for a national healthcare system stabilizing a contested environment. One could have called it ‘doctors without paychecks’. This program enabled continuing medical education (CME) and professional development of physicians in Iraq at the post-graduate level. Twenty-seven seasoned medical faculty from U.S. and British institutions delivered professional development via three CME centers established in Arbil, Baghdad, and Basrah between 2007-10. Donated time and efforts were valued in excess of \$500,000 and leveraged other private and public resources.<sup>109</sup> These efforts trained 2,857 Iraqi medical professionals (double the original goal) via 39 face-to-face courses, conferences, and seminars distributed across all 18 Iraqi governates.<sup>109</sup> No participant or faculty volunteer sustained injury during travel or attendance, despite high conflict across Iraq during 2007-10.<sup>109</sup> Iraqi and Kurdish MoH authorities prioritized the topics for training based on assessed needs, which enabled faculty to implement training with highest relevance to Iraqi audiences and matters, using internationally accepted health standards.

CME events in the U.S. require written tests of knowledge before and after each event to enable self-assessment of learning and improve subsequent training, in accordance with guidelines of the Accreditation Council on Graduate Medical Education and American Medical Association. Many Iraqi physicians displayed relatively low (<70% correct) raw scores on post-event tests during 2007-10, consistent with limited English proficiency and decades of professional isolation.<sup>110</sup> Many Iraqi physicians refused to take these voluntary tests, even anonymously. Individuals expressed fear that test results might be used by Iraqi or Kurdish authorities to justify adverse disciplinary actions or termination of employment. Despite official and unofficial reassurances that these tests were intended only for self-assessment and curricular development, such echoes from the former totalitarian regime of Saddam Hussein reminded all involved of the long road ahead for reconstruction of Iraqi society.

Other efforts improved Iraqi professionalism. A new telemedicine network linked Iraqi healthcare professionals in real-time to educational events in the U.S. and United Kingdom.<sup>110</sup> Private philanthropy equipped five studios for this national network in Baghdad, Arbil, Mosul, Ramadi, and Basrah. Weekly, one-hour telemedicine courses began broadcasting by July 2009. These programs also reached medical students and enabled programs originating in Iraq or overseas. Countless mentoring and professional relationships developed from the reconstruction efforts.

One Iraqi educator recently suggested that shortening the duration of undergraduate medical education in developing countries would address their physician labor shortages.<sup>111</sup> That such a debate originates from Iraq is one sign of recovery in its academic system. It remains untested whether clinical competency would suffer from

shortening undergraduate medical education if post-graduate training remained the same.

After withdrawal of Coalition forces in late 2011, ongoing sectarian violence increased markedly in Iraq, exacerbated by the war in Iraq and Syria with the terrorists of Al Dawla al-Islamyia fil Iraq wa'al Sham (Da'ish).<sup>112</sup> Disability-adjusted life-years (DALYs) measure overall disease burden, expressed as years lost to illness, disability, or death.<sup>113</sup> A large international analysis led by an Iranian author concluded that, due primarily to war, Iraqi overall DALYs for 315 diseases did not improve substantially between 2005 and 2015, though it fell from 47,300 to 43,400.<sup>114</sup> As of 2015, the Iraqi ratio of observed to expected DALYs for the top ten causes of death and injury remained over 1,000.<sup>114</sup> Health advances gained from stability operations regressed rapidly after Coalition forces withdrew in 2011.

#### Considerations for North Korean Disasters

Like Iraq, the Kim regime could collapse in association with a major disaster. To mitigate Indo-Pacific disasters, the UN coordinates existing partnerships, regional alliances, and assets for HADR under the 2015 Sendai Framework for Disaster Risk Reduction.<sup>115</sup> Alliances and partners include the Association of Southeast Asian Nations (ASEAN) and the WHO. Multiple lines of effort can mitigate, prevent, respond to, or recover from Indo-Pacific disasters. Conceivably, seaborne assets of at least seven nations could rapidly respond to a major disaster in East Asia (Table 6). Permanent stationing of several thousand UN troops in South Korea since the 1953 Korean Armistice Agreement has effectively prevented major conventional invasion from North Korea.

Table 6. Seagoing Military Treatment Facilities Potentially Available for East Asian Disasters<sup>116</sup>

Navy	Name	Commission	Past Operations	Homeport(s)	Full Clinical Operations (partial list of capabilities)
USN	<i>Nimitz</i> -class aircraft carriers	1975-2009 10 total	Worldwide	Various	53 hospital beds & 3 ICUs per carrier
Marshall Islands	<i>Yenisey</i>	1985	PACOM	Majuro	Former Russian bulk carrier; 100 beds; 7 ORs; helipad
Vietnam	<i>Khanh Hoa</i> HQ561	1987	PACOM	South China Sea Fleet	General cargo ship; 12 medical staff; 20 beds
PLAN	<i>Nanyun</i> 832	1980s	PACOM	South China Sea Fleet	Modified 150-ton Qionghsha-class attack transport
PLAN	<i>Nankang</i> 833	1980s	PACOM	South China Sea Fleet	Modified 150-ton Qionghsha-class attack transport
USN	<i>Mercy</i> hospital ship	1987	PACOM, NORTHCOM	San Diego CA	61 civilian; 1214 military 1000 beds; 12 ORs; morgue; blood bank
USN	<i>Comfort</i> hospital ship	1987	NORTHCOM, SOUTHCOM	Norfolk VA	63 civilian, 956 hospital staff, 258 support staff; 1000 beds; 12 ORs; morgue; blood bank
Chile	<i>Sargento Aldea</i> amphibious assault LSDH-91	1990; Chilean since 2011	Chile	Valparaiso, Chile	160 crew; 2 ORs; 3300 tons (vehicles and other equipment); 4 AS332L Super Puma helicopters
USN	<i>Wasp</i> -class LHD amphibious assault ships	1989-present 8 total	Worldwide	Various	46 beds expandable to 600; 6 ORs; 14 ICUs; 4 battle dressing stations; blood bank
USN	<i>Whidbey Island</i> -class dock landing (LSD)	1985-92 8 total	Worldwide	Various; <i>Ashland</i> and <i>Germantown</i> at Sasebo, Japan	8 beds each; succeeded by <i>Harpers Ferry</i> class
USN	<i>Harpers Ferry</i> -class dock landing (LSD)	1995-98 4 total	Worldwide	San Diego CA (2); Little Creek VA (2)	11 beds each
USN	<i>San Antonio</i> -class amphibious transport (LPD)	2006-present 9 active of 12 planned	Worldwide	Various, including <i>Green Bay</i> at Sasebo, Japan	24 beds each
PLAN	Project 320	purchased 2007	PACOM	Unspecified	Retrofit underway of former Russian hospital ship <i>Ob</i>
Indonesia	KRI <i>Dr Soeharso</i>	2007	PACOM	Surabaya, East Java	Converted landing ship
PLAN	<i>Peace Ark</i> 866 peacetime / <i>Dai san dao hao</i> wartime	2008	PACOM, SOUTHCOM	Hubei, China	Z-8JH passenger aircraft 500 beds; 35 ICUs, 12 ORs
USN	<i>America</i> -class amphibious assault (LHA)	2014-present 1 active of 11 planned	Worldwide	Various	24 beds; 2 ORs
Australia	<i>Canberra</i> -class LHD	2014-present 1 active of 2 planned	SOUTHCOM	Fleet Base East	Expandable hospital ward; 2 ORs; largest vessels in Australian history
PLAN	Ship 865	pending	PACOM	Sanya, Hainan Island	30,000-ton container ship converted to 14 modular medical units with helipad

Table legend: USN, US Navy; PLAN: People's Liberation Army Navy (China); LHD: Landing Helicopter Dock Ship; LHA: Landing Helicopter Assault Ship; ICU: intensive care unit; OR: operating room; LPD: Amphibious Transport Dock Ship; LSD: Dock Landing Ship; PACOM: U.S. Pacific Command; NORTHCOM: U.S. Northern Command; SOUTHCOM: U.S. Southern Command

In addition to deployments of antiballistic missile defense technology in South Korea, Japan, and Guam, the National Defense Authorization Act for fiscal year 2018 (NDAA2018) provides \$8.5 billion for the Missile Defense Agency, which was \$630,000,000 above the Administration's request.<sup>117</sup> NDAA2018 clarifies U.S. funding and policy for all-hazards responses.<sup>118</sup> Elevating Singapore to full partner status in the State Partnership Program of the National Guard could strengthen regional stability. Prudent coordination of cyber defenses among the U.S. and her allies remains wise.

### Conclusion

Best practices for healthcare stability operations in a contested environment include clear strategic vision, competent cultural understanding, and agile coordinated responses. Frequent and culturally effective engagements with legitimate authorities are essential to partner effectively with emerging civil authorities to mitigate, prevent, respond to, and recover from major disasters.

Over the past 15 years, seeds for future recovery have been sowed in North Korea by a multi-NGO vaccination program,<sup>119</sup> Finnish pediatric dentists,<sup>120</sup> and biannual visits by physicians of Korean descent.<sup>121</sup> Future elements of an effective North Korean healthcare system can build on these relationships by applying historic and recent best practices. A future initiative could conceivably introduce cold-resistant rice strains, since ancient rice strains have been estimated to provide 43% of staple food production in North Korea.<sup>122</sup> Due to ease of transport, storage, and reconstitution, powdered milk proved to be the most practical protein supplement during the Occupation of Japan, when the diet was dependent upon rice.<sup>51</sup> Powdered milk remains suitable, acceptable, and feasible as a protein source with negligible risk.<sup>123</sup>

During the past decade, the U.S. Congress authorized over \$350 billion off-budget for disaster relief on an *ad hoc* basis as disasters occurred in the homeland and overseas.<sup>124</sup> Since disasters will always occur, Congress should replace *ad hoc* funding with on-budget processes, enable the private sector to invest tax-free in disaster recovery, and reform the National Flood Insurance Program.<sup>124</sup> Reform of the Stafford Act (1988) and Sandy Recovery Improvement Act (2013) should lift limitations on rebuilding after a domestic disaster so that infrastructure can be rebuilt with “the latest advances in resiliency, efficiency and functionality”.<sup>124</sup> Applying knowledge obtained from historical and recent disasters enables planning for timely delivery of effective healthcare related to future disasters.

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