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Providing Ethical Healthcare in Resource-Poor Environments

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Abstract The ethics of providing health care in resource-poor environments is a complex topic. It implies two related questions: *What can we do with the resources on hand? Of all the things we can do, which ones should we do?* "Resource-poor" (i.e., resource-challenged, resource-constrained) environments are situations in which clinicians, organizations, or healthcare systems have the knowledge and skills, but not the means, to carry out highly effective and beneficial interventions. Determinants of a population's health often rely less on disease and injury management than on recognizing and meeting their basic needs. Many of the world's people with the greatest health problems live in fragile contexts and remote areas. Their access to food, safe water, personal safety, improved sanitation facilities, and health care remains elusive, with availability often based on socioeconomic status, gender, ethnicity, or geography. Of course, ethical international healthcare work also requires an understanding of the illnesses and injuries that most frequently plague the population. To function ethically and to know both what can and what should be done with available resources, individuals and organizations involved in international healthcare must be experienced, adaptable, culturally sensitive, inspired, situationally aware, beneficent, courageous, honest, and fair.

Keywords Resource poor · Virtues · Developing countries · International health · Global health · Ethics

The ethics of providing health care in resource-poor environments is a complex and confusing topic. It implies two related questions: *What can we do with the resources on hand? Of all the things we can do, which ones should we do?* Resource-poor settings encompass multiple environments, cultures, scenarios, actors, and types of

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interventions. To provide some clarification in this paper, I first discuss the scope of what constitutes "resource-poor environments" and briefly describe commonly encountered ethical issues. What follows are the healthcare needs in these environments and questions related to possible interventions; namely, should we intervene and, if so, when and how should we do so? I then discuss ethical issues related to the different types of individuals and organizations that provide the care.

The examples noted are actual situations or composites synthesized from actual cases and experiences that my colleagues or I have encountered in these environments. In some instances, they represent true ethical dilemmas, but are as likely to illustrate other personal and professional issues that are common in resource-poor circumstances. As in other publications, I have omitted full identifying details or citations about these situations, since doing so might cause difficulties or even hazards for the individuals involved (Iserson et al. 2012).

Scope of "Resource-Poor" Environments

For purposes of this paper, "resource-poor," or resource-challenged or resource-constrained (Geiling et al. 2014), environments are situations in which clinicians, organizations, or healthcare systems have the knowledge and skills, but not the resources, to carry out highly effective and beneficial interventions. Resource-poor environments may be categorized as: (1) no healthcare-dedicated resources, (2) limited resources, and (3) limited resources with possible referral to higher care capability (Geiling et al. 2014).

While resource-poor settings connote the world's least developed countries, not all areas of these countries have limited access to healthcare resources. Indeed, significant modern healthcare advances have emanated from countries such as Mexico, Brazil, India, and Egypt. More importantly, resource-poor situations can occur anywhere: even in highly developed and wealthy countries, resource deficiencies may exist temporarily after widespread natural or man-made disasters due to local shortages or outages of normally available equipment or personnel. Moreover, routine shortages arise in rural hospitals, clinics, and public health agencies, while large swathes of thinly populated areas often have little or no health care services. Resource-poor environments also exist at remote, isolated sites (e.g., wilderness areas, airplanes, ships, and spacecraft) and in combat conditions, war-torn areas, and refugee camps.

However, this description of "resource-poor" raises a number of questions that are worth considering as you read this and the accompanying articles.

1. When is "resource-poor" a cultural construct? Do local healthcare workers, public health officials, and the public perceive that their healthcare system is "resource poor," or is that only a view from the outside?
2. What healthcare resources are most often lacking? To what do we compare the available resources?
3. Are countries resource-poor due to the presence of widespread endemic and frequent epidemic diseases or because of their deficient resources?

The world's nations have recognized these and related problems, first in the United Nations' Millennium Development Goals for 2015 (although none were achieved, progress was made in many key indicators), and in the subsequent Sustainable Development Goals for 2030 (United Nations 2016).

Health Needs in Resource-Poor Environments

Before discussing ethical issues related to providing health care in resource-poor settings, it behooves us to examine how resource deficits relate to health needs.

We often think too narrowly about what constitutes the health needs in resource-poor environments. Nevertheless, there is a moral imperative to visualize the big picture, even if its components are less dramatic than providing individual medical care. Determinants of a population's health often rely less on disease and injury management than on water availability, food security, and safety. Many of the world's people with the most health problems live in fragile contexts and remote areas. Their access to food, safe water, improved sanitation facilities, and health care remains elusive, with availability often based on socioeconomic status, gender, ethnicity, or geography (United Nations 2015, pp. 8, 23). These situations have been termed "chronic or cyclical disasters" that "occur over decades and generations with little change. For large portions of the world's populations, these conditions not only produce water and food insecurity, but also debilitating and life-threatening endemic diseases and the subset of neglected tropical diseases; and displacement from countries or homes, making them refugees or internally displaced persons"(Iserson 2014a, p. 232). For these people living in areas ravaged by war or civil instability, safety may be the overriding concern.

Water Insecurity

Water insecurity is defined as a population's inability to "safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability" (United Nations University Institute 2013). At present, "water scarcity affects more than 40% of people around the world, and it is projected to increase. Water scarcity already affects every continent and hinders the sustainability of natural resources as well as economic and social development" (United Nations 2015, p. 55).

According to the United Nations, "The proportion of water resources a country uses is affected by national water policies and water scarcity. Scarcity can be physical (lack of water of sufficient quality), economic (lack of adequate infrastructure, due to financial, technical or other constraints) or institutional (lack of institutions for a reliable, secure and equitable supply of water)" (United Nations 2015, p. 55).

Countries or regions that withdraw 25% of their renewable freshwater resources for use by agriculture, municipalities and industries experience physical water

stress. For example, in 2011, "41 countries experienced water stress, up from 36 in 1998. Of these, 10 countries—from the Arabian Peninsula, Northern Africa and Central Asia—withdrew more than 100% of renewable freshwater resources. Once a country reaches a withdrawal level above 100%, it starts depleting its renewable groundwater resources, relying on non-renewable fossil groundwater or non-conventional sources of water, such as desalinated water, wastewater and agricultural drainage water"(United Nations 2015, p. 55).

"A water crisis occurs when the available potable, unpolluted water within a region is less than needed. About 5.6 billion people (2011), or 80% of the world's population live in areas with threats to water security" (Gilbert 2010)… Diarrhea due to contaminated water is 'the biggest killer of children in sub-Saharan Africākilling more than AIDS, tuberculosis (TB) and malaria combined.' (Institute for Human Rights)" (Iserson 2014a, p. 232).

Crops and livestock need water to grow, making water also vital for food security (see below). Agriculture uses more water worldwide than any other purpose, with irrigation consuming nearly 70% of all fresh water appropriated for human use (United Nations 2012).

Food Insecurity

In many rural areas of the world, food security is tied to "access to natural resources, including water, that are necessary to produce food. The UN General Assembly declared access to clean drinking water and sanitation as a human right on 28 July 2010"(United Nations Department of Economic and Social Affairs).

The definition of food insecurity is one in which, over a period of time, "people lack secure access to sufficient amounts of safe and nutritious food for normal growth and development and an active and healthy life (food availability). It may be caused by the unavailability of food, insufficient purchasing power, inappropriate distribution (food access) or inadequate use of food at the household level," often due to inadequate water and sanitation (food use). Food insecurity, poor conditions of health and sanitation, and inappropriate care and feeding practices are the major causes of poor nutritional status. Food insecurity may be chronic, seasonal, or transitory. "Undernourished" or "chronic hunger" means "food intake that is insufficient to meet dietary energy requirements continuously (Food and Agriculture of the United Nations 2015, p. 53). The United Nations Food and Agriculture Organization (FAO) estimates that 33 of 193 countries have critically inadequate food supplies (Iserson 2014a).

At present, the United Nations estimates that one in nine people (795 million) have food insecurity, with most residing in developing regions (United Nations 2017). Sub-Saharan Africa has the highest prevalence of undernourishment, around one in four people, and has not made much progress in recent years. Southern Asia has also made slow progress in hunger reduction (Food and Agriculture of the United Nations 2015).

Safety

War and civil unrest, both forms of politically motivated violence, consistently diminish a population's health. Aside from general social disruption and psychic terror, these unstable conditions increase water and food insecurity and decrease the ability to provide preventive and acute care for illnesses and injuries.

Similar to decisions to provide aid after a natural disaster, the choice to use military interventions or threats to stop or prevent wars often depends on the slant and intensity with which the media cover the violence and a potential intervening nation's emotional investment and perceived ethnic ties to those involved. It also may depend on national and international political gamesmanship and the economics and logistics of supplying troops (Iserson 2014a).

Disease/Injury Prevention and Treatment

Public health officials use disease and injury incidence and prevalence to gauge a population's health in comparison to prior years and to other populations. The key indicators typically include infant, childhood, and maternal mortality and average lifespan. In resource-poor environments, these indicators reveal poor population health due to inadequate diet, unclean water, violence, and infectious diseases.

Preventing or treating the world's major infectious diseases requires organized public health efforts. Since these efforts usually do not produce dramatic short-term effects, they are not as glamorous as delivering individual medical care. Yet people living in resource-poor regions of the world suffer from debilitating and life-threatening endemic diseases that rarely affect those in developed countries. According to the World Health Organization (WHO), "Endemic infectious diseases are those that remain prevalent in a particular locality, region, or population without the need for external inputs. The best-known examples are tuberculosis and malaria, both of which run rampant in the most-impoverished countries." These regions are also beset by many lesser known, "neglected tropical diseases" (NTDs) that are, for the most part, ignored because climate, vectors, and reservoir hosts restrict them primarily to tropical regions (World Health Organization 2010). Even though NTDs cause millions of years' worth of disability (Table 1), those involved in providing health care to these areas have "largely ignored the WHO-recommended strategic interventions that could control, prevent and even eliminate various NTDs. These measures include preventive chemotherapy; intensified case management; vector control; provision of safe water, sanitation and hygiene; and veterinary public health" (Iserson 2014a, p. 233).

Ethical Issues for Different Types of Healthcare Providers in Resource-poor Environments

While many of the moral and ethical dilemmas in international medicine are the same as or similar to those faced in all clinical settings, the ''Western'' response to ethical dilemmas may need to be modified when working in different cultures.

Table 1 Global neglected tropical disease disability-adjusted life years (DALYs) 2015 (Hotez et al. 2014; Molyneaux et al. 2017)

Disease	DALYS (million)	Deaths/year
Snakebite	UNK	96,000
Soil-transmitted helminthiasis (Totals)	5.19	2700
Hookworm	3.23	0
Ascariasis	1.32	2700
Trichuriasis	0.64	0
Leishmaniasis/visceral	3.32	51,600
Schistosomiasis	3.31	11,700
Rabies	1.46	26,000–55,000
Dengue/dengue hemorrhagic fever	0.83	3000–4200
Human african trypanosomiasis	0.56	9100
Chagas disease	0.55	10,300
Cysticercosis (high incidence epilepsy)	0.5	0
Onchocerciasis	0.43	0
Trachoma (avoidable blindness)	0.33	0
Echinococcosis	0.14	1,200
ALL NTDs	47.90	152,000

DALYs represent the years of life lost (YLLs) plus the years lived with disability (YLDs). YLLs are the age-sex-country-time-specific estimates of mortality by cause, with death calculated using standardized rates at each age. YLDs are calculated as the prevalence of disabling sequelae, by age, sex, and cause (Murray et al. 2013)

Basic ethical principles apply in every culture within the context of their patient and community values. Recognizing cultural uniqueness (an aspect of the politically correct term ''cultural sensitivity'') dictates that ethical issues need to be approached with an awareness of local mores. Most commonly, these issues include the release of medical information; a patient or family's refusal of treatment; the determination of futility for patients with terminal conditions; and involvement with group, elder, or family decision-makers. For example, in a rural Asian community, a woman demanded that she not be told a diagnosis, but only wanted her eldest son to be informed. Similarly, in rural Africa, a child's parents required that their tribal chief make a decision about where the boy would go to have his fracture treated. Neither of these conformed to the common Western tradition of how to implement ethical norms, but it adhered to prevailing cultural norms and continued to follow the ethical principle of autonomy while respecting their culture, societal norms, and personhood (ten Have 2011; Iserson et al. 2012).

It is helpful to ask why those tasked with delivering health care to resource-poor areas do not always provide ethically optimal interventions. Failures to do so can stem from the need for self-promotion, from issues raised by politics (internal, local, or national); from inadequate funding, lack of expertise, poor or remote management, or hubris; or from questions about safety/security.

The availability of funding, in particular, generally plays a key role: "Interventions in chronic crises are both altruistic and highly political, and they generally focus on the UN's sustainable development goals (SDGs)… While world pressure and an obligation to fulfill international promises have played a role in trying to meet the MDG objectives, the major impetus has been the availability of a large amount of money. Generally, non-governmental organizations (NGOs) are the 'boots on the ground' that can make progress toward meeting the MDG objectives, and most NGOs follow the money" (Iserson 2014a, p. 233).

The nature of their work, their motivations for being in resource-poor environments and the scope of their activities vary greatly among healthcare providers, who include individual clinicians, organizations, NGOs, corporations, governments, and supragovernmental agencies. This leads to great variance in what constitutes an appropriate mission and in what virtues they need to complete their mission in an ethically appropriate manner. In this sense, virtues are what help guide providers toward ethically correct action (or inaction).

How can, do, and should different international actors intervene? We begin by examining different players' potential roles. We then examine the virtues and characteristics of optimal healthcare professionals working in international medicine.

Individual Clinicians

We can divide this category into three general groups:

1. *Local providers* In areas where they are present, local providers constitute the bulwark of the healthcare system—both in normal and in crisis circumstances. The unavailability of potentially available optimal healthcare interventions often frustrates them, and they often must rely on intermittent donations of varying quality for their medications, equipment, consumables, and supplies. In nearly every system, they also must battle corruption and bureaucracy in their healthcare systems. So, why do they stay? The reasons vary with the individual and relate to their personal and professional ethics. While comfort with their own culture often plays a role, more commonly providers stay to fulfill family responsibilities or out of a sense of duty to their patients and their country. Of course, others have visa and licensure issues to resolve when trying to practice elsewhere. Those who have overcome this difficulty have produced a medical brain drain in many of these countries.
2. *Situational providers* Clinicians may find themselves, intentionally or accidentally, in situations where they might provide care in resource-poor environments. Whether they do so depends on their personal and professional ethos, perceived risks, and worldview. These situations may include isolated environments, such as medical incidents on airplanes or ships, natural or manmade disasters, and participation with international organizations, search and rescue teams, and combat military teams. Altruism is often the clinician's primary motivation in intervening or participating in these activities. Such providers may want to evaluate their actions based on the basic virtues of the

optimal international medicine healthcare provider, as described later in the article.

3. *Itinerant providers* Similar in many respects to Situational Providers, these individuals usually, but not always, operate through NGOs of various sizes and capacities. They provide episodic and inconsistent "hit-and-run" medical treatment or surgery. Rather than providing an ongoing care program, they suddenly appear, provide some services, and then disappear—frequently failing to provide necessary follow-up treatment. Their mere presence often undermines the population's confidence in local practitioners (Iserson 2012). These practitioners' motivations are usually admirable, but their execution leaves much to be desired. In recent years, some of the groups providing itinerant care have introduced formal collaboration with local practitioners and patient follow-up, making their services much more palatable.

International Responders

There are several types of international responder groups. We can describe them in relation to their funding source and governance, which often differentiates their missions. Most international responder groups, such as NGOs, mainly provide on-site medical assistance to a general population. Other, often better-funded groups, such as multinational corporations, are primarily concerned with the welfare of their employees or, in the case of governmental (various aid missions and the military) and supragovernmental (e.g., United Nations, WHO) agencies, about general population welfare, potential disease transmission, and socio-political and economic effects on large populations.

When do international groups respond? "The ideal criteria for intervention are needs driven: interventions should occur when an infusion of resources will prevent human suffering, or at least help suffering populations regain stability. Yet, experience shows that media coverage, political expediency, the organizations' pre-set agendas and available resources actually guide interventions" (Iserson 2014a, p. 234).

NGOs

Non-governmental organizations constitute a wide variety of large and small groups whose stated missions are, most often, to provide needed healthcare resources to augment those currently available. Some groups attempt to enhance resources at one location, while the largest work in various sites, albeit with different focuses. Some prominent groups offer valuable surgery for congenital maxillofacial and women's anogenital lesions. Some of these groups now both teach local surgeons their most common techniques and provide appropriate postoperative follow-up (sometimes via the internet). The most prominent NGOs (e.g., Red Cross-Red Crescent Societies, Project HOPE, and International Rescue Committee) often focus on disaster, including war, relief.

While NGOs often provide needed services, they "have not yet developed customary mechanisms for reporting on their activities" and rarely have ways to measure their cost-effectiveness (Spar and Dail 2002, p. 173). This lack of accountability and transparency can lead to ethically dubious practices. Many of the largest NGOs, for example, solicit funds during both acute and chronic humanitarian catastrophes using images of starving babies and bloated corpses coupled with overblown statistics, a practice informally dubbed "disaster porn." As Charny wrote, "Repeated use of these images has dulled the public to real suffering, while encouraging the public to view people as unable to solve their own problems" (Charny 1997). While ethical guidelines exist for fundraising, even the most reputable organizations still use these unsavory methods to flood social media as soon as a disaster occurs. Also troubling, many of these NGOs apportion a large part of their donations for organizational overhead, rather than for patient benefit (Association of Fundraising Professionals 2006; Iserson 2014a).

Corporations

Corporations primarily involve themselves in providing healthcare to resource-poor areas to advance their business interests. While companies may occasionally provide grants and equipment to areas in need, their primary mission is to supply services to their employees located in remote locations, including, on occasion, their families, and, if deemed politically necessary, the surrounding community. Their ethical responsibility is straightforward: to provide well-trained healthcare personnel, equipment, supplies, consultants available via telecommunications, and urgent evacuation, if needed. However, even the largest and best-financed companies do not always fulfill these ethical obligations (Iserson 2013b).

Governments

There appear to be few instances in which governments provide services or assets to either domestic or foreign resource-poor regions other than to provide for or to protect their own citizens (i.e., from global epidemics) or to advance their geopolitical aims. They most often provide services independently, but may also work through NGOs and supragovernmental agencies.

Supragovernmental Agencies

Supragovernmental organizations, such as the WHO or the United Nations, were formed, in part, to lessen healthcare disparities around the world. While their effectiveness varies over time and with the regions and problems involved, they generally make measurable progress. Unfortunately, geopolitics rather than necessity often intrudes on their work.

Ethical Virtues Needed to Work in Resource-poor Environments

Whether serving as individuals, in small groups, or in major organizations, healthcare professionals that provide clinical, public health, or administrative services in resource-poor settings should optimally employ ethical virtues that can guide them through the complex and sometimes unique ethical situations they may confront.

Unfortunately, the primary ethical codes governing global healthcare interventions relate to disasters, rather than the more common interventions for chronic, ongoing healthcare crises. "These codes include the *International Red Cross (ICRC)/Red Crescent Code* (International Federation of Red Cross 2017), for all types of disasters; the Sphere Project's *Humanitarian Charter* (Sphere Project website), primarily for conflict-related situations; and the individual codes of many disaster-assistance organizations" (Iserson 2014a, pp. 234–235).

At its core, the ethical nature of international healthcare comes down to the individual provider. How we act depends on our moral compass, innate character, and personal or group virtues (Table 2). The balance of this paper will describe nine of these virtues as well as related cases in international healthcare.

Experienced

The experience and expertise of health care professionals lends credibility to all their activities in international settings and, most importantly, helps prevent them from doing harm (nonmaleficence). Whether they work clinically, in public health policy development and implementation, or in administration, their fund of knowledge instills confidence in their patients, co-workers, and students. Expertise

Table 2 Characteristics of ethically aware clinicians in resource-poor environments

· *Experienced* (well respected; clinical, administration, and/or public health; know locally common injuries and illnesses; know limitations using available resources)	· *Situationally aware* (safety/protection measures; provide good judgment and leadership; calm under stress)
· *Adaptable* (can adjust to resource scarcity and stressors; flexible; improvises)	· *Beneficent* (intention to do well for patients and the healthcare system)
· *Culturally sensitive* (adaptable to different cultures; resists culture shock & reverse culture shock; non-judgmental)	· *Courageous* (personally and professionally)
· *Inspired* (creative problem-solving, vision; sustainable changes; energetic)	· *Honest/truthful* (fidelity)
	· *Fair/equitable* (distributive justice; limited available resources)

Rather than adhering to a customary formula for virtues or principles, this (admittedly incomplete) list of virtues reflects the need to function ethically in global health care. Many, of course, are virtues embodied in all good healthcare providers

helps them exude a needed air of calm, even in unusual or disastrous situations. For example, when a 3-year-old jaguar attack victim suddenly appeared at the country's large general hospital, the initial treating team relied on the visiting consultant's experience in treating multiple trauma patients to intervene calmly and quickly (Iserson and Francis 2015).

Often, clinicians can adapt their broad clinical experience to new situations, learning from both local practitioners and scholarly sources. At a rural African district hospital, a visiting physician had qualms about whether he could provide adequate care (beneficence) when tasked with supervising the large "children's building," overcrowded with very ill pediatric patients. He had treated neither cerebral malaria, of which there were multiple cases, nor the nutritional disasters of marasmus and kwashiorkor, which comprised nearly one-third of the patients. However, his prior experience with caring for critically ill children gave him the confidence to treat his patients successfully by quickly learning about the diseases, both from reading and from the pediatric nurses, experienced in treating both disorders.

Experience also informs practitioners when (and how) to ask for remote consultation. Using the internet, clinicians can consult specialists using written descriptions, audio, photographs, and, if the bandwidth is sufficient, video or a live feed.

Adaptable

Providing the best healthcare possible is the goal of all clinicians deployed to resource-poor regions. However, they must pair good intentions with flexibility and improvisation to achieve that goal. Not only do many clinicians find themselves working outside their areas of expertise, but they are also often shocked and unprepared for the conditions they encounter in disaster areas and resource-poor regions as compared with their normal high-tech health care systems. And even these systems can become resource-challenged, as providers in the developed world "do not expect that the power will fail, a fire will ignite, the computer system will crash, a flood will inundate their facility, or an epidemic will erupt. Yet these events occur on a routine basis" (Iserson 2016, p. 3).

Whenever possible, clinicians should be prepared to maximize benefit by finding or improvising solutions to the issues that arise—and then showing the local clinicians how to use the same solution in the future. For example, when no x-ray viewbox existed in a Ghanaian district hospital (yes, they still use films in most of the world), the visiting clinician designed a simple viewbox that hospital workers could make from local materials (Iserson and Tiimob 2011). In rural Zambia, a lightbulb was used as an infant warmer, while alternative equipment was used in Guyana for lateral canthotomies (scalpels instead of iris scissors) and in the Arctic for dental extractions (electrician's tools and the captain's chair) (Iserson 2013a; Iserson et al. 2016; Iserson 2016). In all three cases, thinking of novel solutions not only benefitted the patients, but also demonstrated methods that local clinicians could use in the future.

Less improvisation than an unusual application, hypnosis was employed by a visiting physician for pediatric patient fracture reduction in rural Mexico when the local clinicians were not providing anesthesia (Iserson 1999). In the resource-poor settings of wilderness search and rescue, the same clinician used hypnosis for fracture-dislocation reductions so that the team could safely evacuate patients from the field without needing drug-induced sedation (Iserson 1991).

Culturally Sensitive

An ability to adapt to different cultures is an integral part of ethical international medicine practice. Healthcare professionals will work amidst different languages, unusual medical terms, strange foods, regional customs, novel religious practices, and different types of uniforms and clothing (Iserson 2015). Practitioners must be adaptable, respecting and enjoying these differences, while trying to blend in with the locals as much as possible. They also must learn the skills to use available tools appropriately, such as interpreters, which are often needed even if the practitioner speaks the "official" language (Iserson 2014b).

While different cultural norms exist throughout the world, ethical relativism does not; that is, there is no difference in ethical values—although they may be ranked and implemented differently. For example, communities often express personal autonomy through delegating it to others, such as family members or tribal elders. In resource-poor regions, however, local healthcare standards may differ markedly from those normally used by Western practitioners. It is important for visiting clinicians to respect rather than undermine the local caregivers. They will continue providing care long after the visitors have left. Differences in healthcare standards normally result from inadequate infrastructure, equipment, supplies, and access to higher levels of care.

Novices often want to make rapid changes in the local healthcare system or practices. Not only do changes occur very slowly, they may not be possible—at least without significant assistance, local support, and funding. Rather than disrupting the normal healthcare system or providers, international health care practitioners must work with them, teaching skills and knowledge that they can use within their system to benefit patients.

When they arise in resource-poor areas, ethical dilemmas and interventions often parallel those seen in developed countries. For example, in the operating room in rural Ghana, a woman in danger of dying of a massive hemoperitoneum suddenly refused anesthesia unless the surgeons could guarantee that they would tie her tubes. Since she was in shock and they were unsure of what they would find in her abdomen, they refused to guarantee that. At a stalemate, the visiting clinician asked if she had been given true informed consent—that is, the information that she would die within about 20 minutes (a generous estimate) if surgery were not done immediately. As soon as she learned that, she consented to surgery (Punguyire and Iserson 2011).

In many cultures, autonomy means that the patient cedes decision-making authority to the family (communitarianism) or to an elder. While this sounds

straightforward, clinicians often find this the most difficult cultural element with which they must deal. When, for example, a village chief in rural Africa demanded that the hospital release a teenage boy with a mid-femur fracture so that he could take him to a traditional "bone healer," the clinicians patiently tried to explain how bad the outcomes were likely to be. (The little research shows that such outcomes are atrocious.) Unsuccessful in their persuasion, they conformed to regional custom and released the child. Similar non-autonomous decision-making may result from corporate or organizational interference, although it is far from communitarian (Iserson 2013b).

Also difficult, if not devastating, to clinicians newly deployed to a resource-poor area is their realization that people will die that would have lived in a more developed country's healthcare system. As they try to help critically ill or injured patients, it is common to hear, "If only I were seeing them in my hospital" (Iserson 2014b). Even if new providers do not verbalize this thought, experienced clinicians should proactively counsel them against adopting this attitude. Working in resource-poor environments means understanding and living within the system's limitations if they cannot alter them.

Inspired

Ethical interventions in resource-poor regions of the world, with the exception of crisis responses, involve encouraging sustainable change in the healthcare system. This requires creative, visionary, inventive, resourceful, and ingenious individuals. As the old proverb goes, "Give a man a fish and you feed him for a day; teach a man to fish and you feed him for a lifetime."

An ethical intervention also requires clinicians who are willing to subsume their personal goal of providing direct patient care to that of leaving a sustainable outcome after the visit has ended. Such an outcome involves sharing knowledge, teaching, assisting clinicians and trainees, and mentoring both the senior and junior clinicians. Mentoring can occur at any level. For example, in a sub-Saharan district hospital, the visiting clinician mentored a highly talented "orderly," and subsequently recommended him for the position of assistant hospital administrator (a position he obtained).

Some clinicians provide research and writing assistance, both on site and remotely. In many resource-poor regions, local clinicians may have publishable ideas or research but need guidance in structuring and writing out their ideas in a publication format. Visiting clinicians have also assisted local providers in preparing the materials necessary to obtain the degrees they needed for advancement.

Other interventions include guiding the local or national healthcare systems toward international agencies and resources that are willing to provide substantial long-term assistance. These include RadAid (imaging), the American Society of Clinical Pathology (laboratory), free on-line medical libraries, donated medical equipment suppliers, and specialty organizations that can provide memberships, databases, intermittent on-site specialists, and low-cost or on-line conferences.

While huge system changes take time to occur, helping local systems access available help can go a long way toward eventually improving resource-poor healthcare systems.

Situationally Aware

Healthcare providers in resource-poor settings must often take responsibility for small or large teams. To do this ethically requires helping ensure team members' safety and developing contingency plans if things go awry. Performing these tasks constitutes situational awareness, the ability to identify, process, and comprehend information about the environment that might affect the team. All deployed organizations and individuals should have these learned skills. However, those in charge must stay aware of potentially unstable environmental and geopolitical situations so that they can develop and implement emergency actions and evacuation plans when necessary. As a routine, they must provide their team with safe food, water, lodging, work environment, and transportation. They are also morally responsible for generating liaisons with other people and groups.

The following examples illustrate situational awareness in action. A small healthcare team deployed to South Sudan not only was housed in a gated and guarded compound, but also was tied to a United Nations-based system used to warn of existential threats and to provide information on how to respond if they occurred. On a working vessel in the Arctic, designated personnel ran drills to prepare for any unexpected boarding. They also held precautionary safety briefings before any potentially hazardous activity, with any team member able to stop the activity ("safety stops") if he or she felt it was unsafe (Iserson 2013b). When the government deployed medical disaster teams to devastated areas after Hurricane Katrina, not only did they receive security protection, but they were also in contact with their base weather station, which pulled them out when another hurricane was approaching the area.

Situational awareness must also extend to individual health and safety. Clinicians that encounter markedly different environments often experience culture shock, which can produce depression and abnormal behavior. Experienced leaders have a responsibility to be aware of each team member's mental state and provide the necessary support. They should also proactively counsel team members about the inevitable "reverse culture shock" when they return home (Iserson 2014b). Team leaders and organizations must also make provisions to supply team members with emergency medications that might otherwise not be available, such as HIV prophylaxis in the event of a needle stick.

Beneficent

Both clinicians and international healthcare organizations are motivated by the desire to provide beneficial health care and to improve health systems. This mission, contained in the Hippocratic Oath, is the bedrock of medical ethics. Coupled with

altruism, most clinicians assume international medical positions because of their selfless concern for others' well-being.

While the norm is beneficence, especially for individual clinicians, experience demonstrates that many large humanitarian organizations invest more energy in public relations activities than in providing valuable assistance. This violates a standard of international aid, which dictates that outside agencies (except in the case of crisis response) provide the tools necessary to improve local professionals' healthcare delivery. For example, a combined military–NGO team organizes trips to provide healthcare to different Latin American and South Pacific locations every few years. Rather than helping the local populations to improve their healthcare systems, the team's stated goal is to "grind out" as many patients as possible and to generate interesting photographs that prove their efficacy to governmental and private funders. In contrast, some large pediatric surgical teams, after receiving negative feedback, have altered their international medical practices so that they actively teach techniques to local surgeons as well as to do remote patient follow-up. Moreover, they have trained local teams, which in turn train teaching surgeons in other countries.

Courageous

Courage is defined as doing something that frightens you. The initial fears for most clinicians who plan to work internationally involve working and living in austere environments, encountering unusual medical conditions, and exposure to physical dangers and serious infectious diseases. These are all real risks, but they can be managed with foresight and planning (Iserson 2014b). The courage to overcome these fears is a virtue that clinicians must cultivate to be effective in global health.

Personal courage is often required when facing austere living conditions, strange foods, working in a foreign language, unusual "creepy crawlies," infectious diseases, and, occasionally, physically dangerous situations. None of these is usually a life threat, but they can be annoying. Living in a tent, a converted trailer, a shack, or a cramped room with many others—often without a fan, let alone air conditioning—can make life difficult. Working, and especially living, in guarded dwellings can be nerve-wracking. Falling ill in these settings, such as with diarrhea, the more serious malaria, or through a motor vehicle crash, can be daunting. However, identifying these issues and planning your treatment and evacuation strategies can help overcome these fears.

Advance planning and knowledge of local healthcare capabilities came in handy after a clinician received a diagnosis of severe *P. falciparum* malaria in South Sudan. Rather than attempting an evacuation to a higher level of care, local clinicians provided the available treatment, intravenous quinine. Remaining in situ and receiving maximal local treatment turned out to be consistent with WHO recommendations.

Professional courage often means working at the edge of or beyond your clinical comfort zone. It may include treating patients with diseases or injuries normally seen by other specialists, which raises concerns of nonmaleficence. Although this is

a natural fear of those embarking on new international assignments, experienced clinicians find that they can often safely extend their expertise into other areas. If they need help, useful resources are available (Iserson 2016) and most resource-poor population centers now have internet access. From another perspective, if you are the most experienced clinician available, beneficence suggests that you attempt to do the best that you can.

Another aspect of professional courage may be confronting organizational leadership to benefit patients. For example, after clinicians resuscitated a patient to full neurological status from cardiac arrest, the supervising, off-site leadership refused to authorize an adequate medical evacuation. Taking a professional risk, the clinician barraged them with demands for the proper type of flight. Eventually, they approved appropriate personnel and equipment to transfer the patient to a site where he could receive invasive cardiac care (Iserson 2013b).

On a routine basis, clinicians working in the resource-poor setting with wilderness search and rescue teams prepare to constantly face dangers to save lives. Such dangers include those from the hazardous environment in which they work (e.g., caves, flooded rivers, remote mountains and deserts), the weather (e.g., temperature extremes, lightening storms), and dangerous animals (Iserson 1988).

Honest/Truthful

Personal and organizational integrity is, arguably, the most valuable asset in implementing goals when working in resource-poor areas. Local populations in these settings often view "helpers" from wealthier countries with suspicion. They are also acutely sensitive to dishonest interactions. A policy of consistent, but sensitive, honesty with patients, families, staff, and administrators solidifies confidence in both the person/organization and the information that they transmit.

At the administrative level (e.g., clinic and hospital administrators, public health officers, government officials), clearly and honestly describing the mission, particularly the available resources and expertise and what you plan to accomplish, is imperative. If the organization is religious, do you intend to proselytize in any way? If you will conduct research, do you plan to share the results and is the population expected to benefit? As of July 2018, clinical research studies submitted to any International Committee of Medical Journal Editors journal must include a statement about data sharing (Taichman et al. 2017).

As a core principle, deployed personnel should never use their power and status to abuse a population. This principle often has been violated. For example, according to a United Nations report, U.N. peacekeepers "routinely trade money and resources for sex with desperate women and children… with the majority of cases reported in Liberia, Haiti, the Democratic Republic of Congo and South Sudan. It said the victims of the abuses, a third of whom were children, were paid with cash, jewellery, mobile phones and food to have sex with peacekeepers" (Laing 2015). (In 2016, the UN official who revealed this quit after the agency did not sanction the perpetrators.)

In many settings, clinicians do not routinely provide patients with the information necessary to make an informed decision. Providing this level of information, however, promotes patient trust. For example, when only expired thrombolytic medication was available in Guyana to treat acute myocardial infarctions, the question arose whether to use it—even though it was considered to be safe for the patient. The resolution revolved around informed consent. Clinicians explained the situation to the patients; all requested the medication and most improved clinically.

When a resource is not available at all, there is no need for triage. In Guyana, for example, over the past decade there has been no snake antivenin, rabies immune globulin, tetanus immune globulin, and thrombolytics appropriate for embolic strokes. The practice is to inform patients who would normally receive one those medications of the lack of availability so that there is full transparency.

Fair/Equitable (Limited Resources)

The demand for medications, medical supplies, and healthcare equipment relates to patient need, which may be increased in resource-poor settings. To maintain trust, not only must clinicians and system managers distribute available resources fairly, but the distribution system must also be transparent and equitable.

This requires a triage system, usually based on the principle of distributive justice, which clinicians operationally interpret as utility. As Moskop wrote, "Triage systems recognize that, because resources are scarce in relation to needs, the needs of some patients will be subordinated to those of others, in an effort to achieve the greatest overall benefit. Thus, a triage system grounded in the principle of utility may direct physicians to deny care to a severely injured but salvageable patient in order to devote the resources that would have been required to save that patient to the task of saving multiple other seriously injured patients"(Moskop and Iserson 2007, p. 285).

A shortage of functioning ventilators to assist patients needing breathing support affects much of the developing world. Where they do exist, they are in short supply. Clinicians' protocol is generally to provide ventilators to patients with the best chance of benefitting (survival) with the least amount of time using the machine. In a poor South American country, for example, clinicians usually provide the few available ventilators to patients needing them for short-term recovery after surgery, to otherwise healthy people with short-term need for artificial ventilation, or to those without a known cause for their acute respiratory failure. In situations without ventilators, medical teams recruit family members to ventilate patients manually (bag-valve endotracheal tube) over the short term until the patient improves or a ventilator becomes available.

Equitable clinicians use similar utility protocols to distribute intensive care unit beds (or to keep patients in the emergency department where no ICU exists), limited medications and equipment, laboratory tests, blood for transfusion, and transportation to a higher level of treatment. In rural sub-Saharan Africa, for example, a large regional hospital with many seriously ill and injured patients had no x-ray capability. Since the nearest unit was 50 miles away and an overcrowded ambulance

transported patients only every few days, clinicians had not only to triage those patients to be sent for imaging, but also to carefully explain to those who were left behind how the decisions were made. Even with more resources, Arctic and Antarctic medical practice required similar decisions and explanations, although costs, danger, and severe weather were often the significant factors (Iserson 2013b).

Conclusions

In resource-poor settings, ethical clinicians with the appropriate virtues can provide relevant answers to the following questions: What can we do with the resources on hand? Of all the things we can do, which ones should we do? Ethical international healthcare work requires an understanding not only of a population's overall basic health needs, including scarcities of water, food, and security, but also of the illnesses and injuries that most frequently plague them. To function ethically and optimally, individuals and organizations involved in international healthcare must be experienced, adaptable, culturally sensitive, inspired, situationally aware, beneficent, courageous, honest, and fair.

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