Brandon S. Russell

Professor Byron Good

Introduction to Global Medicine

28 May 2013

The History of Medical Innovation in Global Health Interventions

Biomedical innovation – the discovery and development of new methods of diagnosing and treating diseases – is inextricably linked from the practice of modern medicine. News programs and popular science publications routinely highlight "the next big thing" that will revolutionize human healthcare: molecular diagnostics, targeted therapeutics, personalized medicine, and other assorted buzzwords. In many ways, today's physicians, particularly those at top-tier institutions, are equal parts healthcare providers and scientists. The same cannot be said of medical care delivered in resourced limited, global health, and humanitarian settings – or can it? Such settings are typically plagued by myriad social and infrastructural barriers to high quality care: pervasive physical and emotional insecurity, crippling poverty, and frameworks of structural violence. Subsistence economic practices that focus only on basic needs (and often still fail to meet those) are the norm. Accordingly, the image of medical care that is most often associated with such situations is far removed from today's Western standard of care. Rather than white lab coats, test tubes, and computers, we picture tattered clothes, hand-me-down supplies, and flashlights. Makeshift, outdated, or broken equipment is the norm; local remedies supplement or even supplant the "standard" therapies that are unavailable. In place of the physician-scientist, there is the physician-activist, the lone do-gooder that relies on altruism and ingenuity to make do with what is available. Whether the care is called rudimentary or culturally appropriate, the message is clear: it may not be new or innovative, but it is better than nothing.

Jean-Hervé Bradol and Marc Le Pape (2011), physicians with Médecins Sans Frontières, described the common perception as such:

> Most people think that humanitarian medical intervention is charity medicine using outdated tools—vaccines, diagnostics, and drugs—developed in rich countries that will soon be replaced by a new generation of medical products. Humanitarian medicine is seen as a means of recycling secondhand products for use in precarious situations, not as a source of innovation. (p. 3)

Is this assessment fair or accurate? How closely does our stereotypical image of medical humanitarianism resemble the reality of the practice of global health? Is it true that innovation and research breakthroughs have no place in such situations? These questions motivate this undertaking. The goal of this paper is to critically evaluate the role that research and innovation play in global health practice. In order to do so, we will utilize a historical perspective, tracking the development of the relationship between innovation and medical humanitarianism across three time periods. As we will see, these periods are separated chronologically, conceptually, and functionally. That is, in addition to belonging to distinct time periods, these divisions differ greatly in the ways that they broadly conceive of the role of humanitarianism and that they incorporate – or explicitly do not incorporate – research, development, and innovation. We will first examine the beginnings of the innovation-humanitarianism relationship by focusing on the Colonial period, which was characterized by a heavy emphasis on the idea of a "laboratory of the colonies" (Keller, 2007 p. 65) in which the spaces and objects of humanitarian medical intervention were used as a physical testing ground for new technologies. We will then move to the modern period, spanning roughly the past 50 years, which was defined by its emphasis on culturally appropriate and/or cost-effective interventions, porting existing and sometimes outdated technologies to the realm of aid. Finally, we will look to the future of the relationship

between innovation and intervention by examining recent initiatives and mission statements, highlighting the growing emphasis on capacity building, bottom-up innovation, and interventions designed both by and for those in need. Our analysis will follow both the transition of the aid recipient from object to subject, as well as the evolution of innovation from a weapon of control to an integral part of aid. Importantly, this paper aims to be both descriptive and prescriptive: by tracking the development of medical innovation in humanitarian spaces, and by situating it within a historical framework, we hope to guide its future directions.

The birth of humanitarianism as a practice is typically situated "in the hundred years following 1750" (Haskell, 1985 p. 339), a period that roughly corresponds to the latter half of the European Colonial Period. This is of course not to suggest that altruism, compassion, or intervention did not exist before this time period. Cooperation and mutual aid are defining characteristics of human civilization, and have existed for essentially as long as humans have. There have always been individuals helping one another, whether motivated by kinship, mutual benefit, compassion, or any of dozens of other factors. What we refer to here is rather the appearance of entire frameworks of aid, coordinated, far-reaching efforts to improve the lives of others. These may collectively be referred to as "humanitarian sensibility" (Haskell, 1985), and consisted of "an unprecedented wave of humanitarian reform…new attitudes…on how to deter criminals, relieve the poor, cure the insane, school the young, and deal with primitive peoples" (Haskell, 1985 p. 339). Of particular importance for our analysis are the attempts to cure the insane and deal with primitive peoples, as these two missions overlap both chronologically and philosophically. Curing the insane was conducted under the banner of psychiatry, which traces the birth of its modern incarnation to French physician Philippe Pinel (b. 1745, d. 1826). Richard Keller (2007) describes the profession's foundational myth as such:

As the legend goes, in a fit of utopian fervor, Pinel brought the ideals of liberty, equality, and fraternity to those most marginalized of *citoyens*, replacing the bonds of the insane with the invisible chains of the asylum and its injunction to moral responsibility. Arguing that these chained "beasts" were so unmanageable "only because we have deprived them of air and freedom," Pinel sought to reconfigure the clinical relationship as one between doctor and patient, rather than one between trainer and animal. (p. 21)

We see the new humanitarian sensibility clearly reflected in this account, which credits a sudden realization of the universality of the rights to liberty and equality with sparking the recasting of mental illness in line with the classical language of diseases, patients, and physicians. This is clearly innovation: the creation of a whole new way of thinking and a whole new medical discipline. The impulse for humanitarian action can thus drive innovation – a point we will consider again when we examine the future of the relationship between the two.

What is important to emphasize here is that this new humanitarian sensibility also sparked changes in international policies, particularly those for dealing with primitive peoples (i.e. Colonialism). As Vanessa Pupavac (2010) explains, "British humanitarianism was historically entangled with British imperial expansion" (p. 130) and "for many, imperial rule was an extension of the moral and social responsibilities of a paternalistic domestic order" (p. 132). In this way we can see the chronological and philosophical overlap of the new humanitarian sensibility with Colonialism, as well as their mutual overlap with the burgeoning medical field of psychiatry. All three shared a common inspiration, and all three could point to a desire to improve the lives of fellow human beings to justify their activities. At the same time, they all share a more nefarious aspect, explained by the fact that paternalistic concerns and interventions can easily become tools of control. As Michel Foucault (1977) argues, the goal of such new sentiments and reforms as those championed by Pinel was "not to punish less, but to punish

better; to punish with an attenuated severity perhaps, but in order to punish with more universality and necessity; to insert the power to punish more deeply into the social body" (p. 82). As we will soon see in detail, innovation is not always a tool for good.

One may now rightly ask if these developments truly count as biomedical innovations, and if so, whether these concerns are as problematic as we describe. After all, one might argue, there were still very real physical improvements to the lives of individuals created under the banners of humanitarianism, psychiatry, and Colonialism. Are philosophical and psychosocial concerns about the nature of punishment and the mindset of reformers worth considering? We argue that they are, not only for their own sake, but also because these problems manifest in very real ways. The physical, functional union of humanitarianism, psychiatry, and Colonialism is best demonstrated by the practice of psychiatry in the colonies of French North Africa, which Richard Keller chronicled in *Colonial Madness*. As Keller explains, ideas of civic responsibility to tame and treat the savage Muslim played as much a role in motivating Colonial psychiatrists as did sentimental concern for the suffering of fellow human beings. The commonly held, even medically justified belief was that the "primitive" citizens of the colonies were broadly "less than" full Western citizens: less intelligent, less civilized, less human. The colonies were "spaces of exception" (Michel Agier, 2010) where the rules of Western society did not apply. As such:

> The colonial setting offered an ideal laboratory for experimentation with new techniques that alternately aimed either at the body or at a pathological social fabric as the principal locus of insanity, efforts that merged closely with efforts at the medical and social engineering of colonial space. (Keller, 2007 p. 95)

Just as modern scientists and physicians use non-human animals to develop new technologies to help mankind, so too did colonial psychiatrists in French North Africa use their less-than-human patients to test new technologies before exporting them "back home" for use on real humans

(that is, citizens of Western societies). In this way, the impulse for medical innovation found a

valuable tool in the new practice of humanitarianism, which provided both access to resources

and a moral justification for even the most heinous of activities; whatever atrocities were

committed, they were also done in the name of aid, driven by the impulse to improve the tools

available to cure the insane and deal with the primitive. Humanitarianism became a tool of

medical science rather than an independent endeavor, and the citizens of the colonies became

objects of medical experimentation rather than the subjects of aid. Innovation was thus wrought

upon the recipients of what we would today call global health practices, often violently:

> While French doctors pursued animal tests…electroshock immediately became a bedrock
>
> of therapy…[One doctor] also tested the limits of the therapy, experimenting widely on
>
> tubercular patients—despite the frequent complication of lung abscesses—and also with
>
> pregnant women and cardiac patients to determine the feasibility of application even where
>
> ECT was strongly contraindicated. Concerning his trials with tubercular patients… 22
>
> percent mortality rate was promising enough to merit further study (Keller, 2007 p. 105)

Such stories highlight the dangerously physical consequences of the close association between

aid and control. These activities were pervasively damaging: in addition to the immediate

physical harm inflicted, they cultivated a fear and distrust of outside intervention that still

hampers work today. The history of medical innovation in humanitarian interventions is far from

blameless, and there is ample historical "baggage" that must be addressed moving forward.

As Colonialism declined in the late 1800s, precursor notions of globalization proliferated

in the early 1900s, and dozens of newly independent nations comprising the Global South rose to

international attention in the mid 1900s, a new type of humanitarian sensibility began to flourish.

Embodied by groups like the United Nations (est. 1945) and the World Health Organization (est.

1948), this sensibility emphasized shared humanity and equal rights. The impetus for aid and

intervention was no longer a civic responsibility to bolster lesser populations, but a moral responsibility to ensure equal rights. Medical care was an attractive domain for expressing and achieving these sentiments, as rallying cries of "high quality healthcare for all" provided clear, quantifiable metrics by which to judge interventions. The philosophy and the goal were clear: all people deserved the same quality of healthcare that people in the Global North had. Such sentiments are echoed in the creation of Médecins Sans Frontières (est. 1971) and in the World Health Organization's "Health for All" campaign, which WHO Director General Halfdan Mahler (1981) described thusly:

> "Health for All" means that health is to be brought within reach of everyone in a given
> country. And by "health" is meant a personal state of wellbeing, not just the availability
> of health services—a state of health that enables a person to lead a socially and
> economically productive life. (p. 6)

The goal was thus clear: export the same level of healthcare found in the North to the people of the South. What role would medical innovation play in this endeavor? Does "health" as defined here require the latest and greatest technology? The WHO position on the matter was clear:

> We just cannot afford to continue the indiscriminate use of the present methods...We
> must break the chains of dependence on unproved, oversophisticated, and overcostly
> health technology by developing another kind of technology that is more appropriate
> because it is technically sound, culturally acceptable, and financially feasible. (p. 10)

In other words, new breakthroughs, cutting edge technology, and innovation *in situ* were not appropriate for the developing world. Humanitarianism and related efforts to advance global health should divorce themselves from innovation, eschewing new technologies that were really just crutches for the medical practice. Effort and money should be directed at proven, well established, cost-effective (and therefore, in many cases, very old) methods. This philosophy

underlay (and some would say continues to underlie), for example, the emphasis on sputum smear microscopy as the only appropriate method for diagnosing tuberculosis despite its severe limitations in sensitivity: it was cheap, it was easy, and it worked (sometimes).

The emphasis on such often rudimentary methods was justified by arguments of cost-effectiveness, scale, and progress: some improvement was better than no improvement; as a thought exercise, one may draw a parallel to the arguments made to justify new psychiatric techniques despite Foucault's criticisms. Beyond this point, there is again a real, physical reason to criticize this emphasis on "appropriate technology." As physicians Anne Becker (2013, February 21) and Joia Mukherjee (2013, March 14) have observed, notions of cost-effectiveness and appropriate technology have often been used as so-called code words to justify the denial of useful but ostensibly (though not always actually) expensive technologies to the developing world. The situation is further complicated by the fact that what organizations identify as appropriate may not always be effective in practice. Reflecting on the "Health for All" campaign, Robert Malkin (2007) observed that:

> [I]t was argued that the technologies needed to carry out the major desired interventions (oral rehydration solutions, food supplements, antibiotics, vector control agents, water pumps, latrines) were known, effective, and inexpensive. Despite some early success, the "Health for All by 2000" campaign was largely a failure…Vaccines could not be stored effectively because the cold chain technology required fuel and maintenance, oral rehydration therapy did not cure diarrhea and was then rejected by the patients, vector control agents created resistant strains and were perceived to damage the environment, water pumps broke and could not be repaired in remote areas, and latrines became disease-concentration points when they were not properly maintained…One of the major health care technology lessons of the "Health for All by 2000" campaign is that being

known, effective, and inexpensive is not a sufficient set of criteria to guarantee successful

implementation of a health care technology in the developing world. (p. 568)

These failures teach a difficult lesson: although people may be equal in their rights, they are not

equal in their needs, and although national borders may not present philosophical barriers to the

right to healthcare, they do present physical barriers to its implementation. What works in one

country will not always work in another country, and what is tried-and-true in the North cannot

always be packaged up and dropped neatly and successfully in the South. Proclamations of

appropriateness made by people far removed from the physical reality of the population they

intend to help not only cast doubt on the "equality" of those people – after all, if we all deserve

high quality healthcare, why must it be segmented to exclude some interventions? – they also

frequently fail to take into account the local cultural, political, and infrastructural factors that

ultimately determine success. Rather than guaranteeing widespread access to "good enough"

healthcare, eschewing medical innovation can actually exacerbate existing inequalities.

This reality has formed the basis of recent efforts to rethink the role of innovation and

research in global health settings. In particular, these efforts have sought to highlight the

outcome gap, the common name for a phenomenon in which those in wealthy countries benefit

far more from new technologies than those in poor countries. As Paul Farmer (2004) explains:

[T]he research enterprise is fundamentally a transnational one. It is also a fundamentally

inegalitarian exercise in the sense that medicine and science are expanding rapidly, but in

a social context of growing global inequality, which ensures that the fruits of medicine

and science are not available to many who need them most. (p. 25)

Addressing this gap "constitutes the chief human rights challenge of the 21st century" (p. 28) and

"calls for new and better technologies" (p. 28). As we have seen, these technologies cannot

simply be the same ones developed in the North, nor can they be developed in a vacuum without

sensitivity to the unique setting in which they will be enacted. Complicating matters further, the "obvious" solution of simply providing financial and monetary aid falls short by failing to provide lasting change and introducing unintended harmful side effects. Critiquing the tunnel-vision focus on AIDS of the early 2000s, Paul Farmer and Laurie Garrett (2007) noted that "an influx of AIDS money has drawn attention away from other health problems of the poor, weakened public health systems, contributed to a brain drain, and failed to reach those most in need." A final complication is contributed by recognizing the difference between "filling the gap" and "fixing the gap." As explained by physician Lisa Hirschorn (2013, March 7), the difference between these two types of solutions lies in implementing an improvement vs. making an improvement permanent; a typical example is the "lone wolf" reformer, who enacts change and improves outcomes, but (unintentionally) reopens the gap by departing – often because of the previously mentioned brain drain. In this way, true solutions cannot come from isolated individuals, no matter how well intentioned their actions may be. Solutions must be system wide. The key, in the words of Paul Farmer, is not heroic care, but a heroic system (2013, April 14).

Reflecting on these challenges and complications, several questions come to mind. What should we do? What are we doing? How do we create solutions that permanently narrow the outcome gap? Whether it is phrased as capacity building, sustainable intervention, or bottom-up innovation, the answer from the humanitarian world is clear: solutions must be designed in places of need, by people in need, and for people in need. Medical innovation must once again become a tool of humanitarianism, but in a fundamentally different way than we saw in its early history. Rather than being objects of intervention, the citizens of the South must become its subjects. In doing so, we can ensure not only that the technologies developed are truly appropriate (as opposed to "appropriate" in the judgment of a policy-maker from the North), but also that there are systems in place for their delivery – that is, the "equity plans" that Paul Farmer

described as essential (2004, p.28). These goals and strategies are reflected in the mission statements, development reports, and strategic planning documents of many prominent NGOs and global health organizations. The usual methodology for such interventions is not to provide simply healthcare or resources or manpower, but to provide a comprehensive system that allows innovation to be generated *in situ* and become self-sustaining. Frequently this goal entails multiple types of aid and development taking place simultaneously: not just building a new hospital, but also training local physicians to staff it and providing research and startup grants to preempt brain drain. Buzzwords such as "integrated" and "sustainable" are used to reflect the fact that these interventions seek to fix the gap, rather than simply fill it.

Practical examples of such programs can be found in the Gates Foundation's Grand Challenges for Global Health initiative (Bhan, Singh, Upshur, Singer, & Daar, 2007), the Canadian Society for International Health's Coalition for Global Health Research – Canada (Delisle, Roberts, Munro, Jones, & Gyorkos, 2005), and the National Institutes of Health's Office of Technology Transfer (Salicrup & Rohrbaugh, 2005). All of these organizations offer grants as well as educational and technical support for researchers in the South to conduct need-driven translational research that addresses local problems. Importantly, they also emphasize the need to involve the local community at all steps of the process. That emphasis in particular is both novel and essential, as most development efforts have eliminated community involvement and bases of care because they often have lower return on investment (in purely economic terms) than more traditional areas of economic development investment (Farmer, 2013, April 4). Describing the approach of the NIH, Luis Salicrup and Mark Rohrbaugh (2005) explained:

> The OTT has found that a holistic and flexible approach to international technology
>
> transfer is required, removing the possibility of developing the donor-recipient paradigm
>
> in which there are unequal partnerships, and consequent problems with trust, commitment,

and reliability. It involves direct participation of local scientists and managers from

indigent countries with whom we conduct development agreements as well as flexibility

and determination on our part. (p. 2)

The role of medical innovation in global health is complicated, covering a large history and

occupying greatly different levels of priority at various times. Innovation has, at various times,

been treated as a weapon of control, as an unnecessary or dangerous distraction, and as the key to

eliminating disparities in global healthcare qualities. Despite strongly held, disparate opinions and

convincing arguments from all sides, one thing remains constant: innovation is an integral part of

the modern practice of medicine, and it is here to stay. Attempts to divorce innovation from

global health only serve to differentiate global health from "domestic health," South from North,

them from us. Doing so is a fundamentally divisive endeavor that espouses – perhaps

unintentionally, but no less strongly – not only different needs, but also different rights for those

in the developing world. Such an approach reifies the power deficit of those in need, leading

eventually to a road where atrocities can be justified by hollow appeals to "better than nothing"

arguments. To move forward, global health actors must approach and treat innovation with its full

nuance: neither anathema nor panacea, but a tool that presents us with both immense power and

immense responsibility.

Works Cited

Agier, M. (2010) *Managing the Undesirables*. Translated by D. Fernbach. Cambridge, UK: Polity Press. Original work published in 2008.

Bhan, A., Singh, J. A., Upshur, R. E. G., Singer, P. A., & Daar, A. S. (2007) Grand Challenges in Global Health: Engaging Civil Society Organizations in Biomedical Research in Developing Countries. *PLoS Medicine* 4(9): 1456-1459.

Becker, A. (2013, February 21) Experiences in Global Mental Health Programs for Young People: Experiences in Fiji and Haiti. *HST 934: Introduction to Global Medicine*. Lecture conducted from Harvard Medical School, Boston, MA.

Bradol, J.-H. & Le Pape, M. (2011) Innovation? In *Medical Innovations in Humanitarian Situations: The Work of Médecins Sans Frontières* (pp. 3-21). Edited by J.-H. Bradol & C. Vidal. Translated by C. Brasher, N. Friedman, P. B. Smith, K. Stokes, & K. Tucker. USA: MSF-USA. Original work published in 2009.

Delisle, H., Roberts, J. H., Munro, M., Jones, L., & Gyorkos, T. W. (2005) The Role of NGOs in Global Health Research for Development. *Health Research Policy and Systems* 3(3).

Farmer, P. (2004) Rethinking Medical Ethics: A View from Below. *Developing World Bioethics* 4(1): 17-41.

Farmer, P. & Garrett, L. (2007, March/April) From "Marvelous Momentum" to Health Care for All: Success Is Possible With the Right Programs. *Foreign Affairs*.

Farmer, P. (2013, April 4) Challenging Orthodoxies. *HST 934: Introduction to Global Medicine*. Lecture conducted from Harvard Medical School, Boston, MA.

Foucault, M. (1977) *Discipline and Punish: The Birth of the Prison*. Translated by A. Sheridan. New York: Penguin Press. Original work published in 1975.

Haskell, T. (1985) Capitalism and the Origins of the Humanitarian Sensibility, Part 1. *The American Historical Review* 90(2): 339-361.

Hirschorn, L. (2013, March 7) Using Quality Improvement Approaches in the Development of HIV Treatment Programs in Low Resource Settings. *HST 934: Introduction to Global Medicine*. Lecture conducted from Harvard Medical School, Boston, MA.

Keller, R. (2007) *Colonial Madness*. Chicago, IL: The University of Chicago Press.

Mahler, H. (1981) The Meaning of "Health for All by the Year 2000". *World Health Forum* (2)1: 5-22.

Malkin, R. (2007) Design of Health Care Technologies for the Developing World. *Annual Review of Biomedical Engineering* 9: 567-587.

Mukerjee, J. (2013, March 14) Challenges of Providing Quality Medical Services in a Large International Health Organization: Reflections on Serving as Medical Directory of Partners in Health. *HST 934: Introduction to Global Medicine*. Lecture conducted from Harvard Medical School, Boston, MA.

Salicrup, L. A. & Rohrbaugh, M. L. (2005) Partnerships in Technology Transfer: An Innovative Program to Enhance Biomedical Research and Global Health. International *Microbiology* 8: 1-3

Pupavec, V. (2010) Between Compassion and Conservatism: A Genealogy of Humanitarian Sensibilities. In *Contemporary States of Emergency: The Politics of Military and Humanitarian Interventions* (pp. 129-149). Edited by D. Fassin and M. Pandolfi. New York: Zone Books.