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VOLUME 41

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Editor

Physicians at War

The Dual-Loyalties Challenge

Springer

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ISBN: 978-1-4020-6911-6 e-ISBN: 978-1-4020-6912-3

Library of Congress Control Number: 2008922459

Printed on acid-free paper

9 8 7 6 5 4 3 2 1

springer.com

To military physicians, for your humanity, compassion, and service

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Introduction

Physicians at War: The Dual-Loyalties Challenge†

Fritz Allhoff‡

1 Introduction

This project began during the 2004–2005 academic year, when I was on a research fellowship at the Institute for Ethics of the American Medical Association (AMA). Just after I began the fellowship, two articles were published in *The Lancet* by Steve Miles in which he discussed alleged violations of military medical ethics that may have transpired through physician involvement in hostile interrogations.[1,2] Then, right before the holiday break, we received notice that the *New England Journal of Medicine* would be publishing a similar essay by Gregg Bloche and Jonathan Marks, in its first issue of 2005.[3] The American Medical Association in general, and the Institute for Ethics in particular, was extremely concerned about Miles's papers and the forthcoming one by Bloche and Marks. Not only were these extremely visible publications, but many thought that the allegations they contained were of grave ethical concern. The AMA, which publishes *The Code of Medical Ethics*, takes very seriously the moral status of the medical profession and therefore was very interested in these articles. (Recently, the AMA's Council on Ethical and Judicial Affairs published an opinion on physician involvement in interrogation,[4] which represents the culmination of its thinking on these topics.)

† I thank Marcus Adams for comments on the penultimate draft of this paper.

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[1] Steven H. Miles, "Abu Ghraib: Its Legacy for Military Medicine," *The Lancet* 364.9435 (2004): 725–729.

[2] Steve H. Miles, "Military Medicine and Human Rights," *The Lancet* 364.9448 (2004): 1851–1852.

[3] M. Gregg Bloche and Jonathan H. Marks, "When Doctors Go to War," *New England Journal of Medicine* 352.1 (January 6, 2005): 3–6.

[4] The Council on Ethical and Judicial Affairs, CEJA Report 10, A-06, "Physician Participation in Interrogation" (American Medical Association, 2006). Reprinted in this volume, pp. 261–271.

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Having already had a background in some elements of military ethics, and the torture debate in particular,[5] my fellowship year quickly evolved to explore physician involvement in interrogations. One element of this project was to research some of the underlying moral issues, though another was to talk to those responsible for military ethics (including military medical ethics) education. This research led me to speak with those teaching military ethics at the US Military Academy at West Point, the US Naval Academy, and the US Air Force Academy, as well as those teaching military medical ethics at US Army Medical Department Center & School (Fort Sam Houston) and the Uniformed Services University of the Health Sciences (Bethesda, Maryland). After I left the AMA, I was also able to spend some time at the Australian Defence Force Academy (Canberra, Australia). In all cases, I was extremely impressed with the professionalism and commitment to ethics that was displayed at each of these training academies.

When starting the research, however, one of the first things that I noticed was how little academic work had been done in military medical ethics. The Borden Institute, an agency of the US Army Medical Department Center & School, had produced two outstanding books which were meant to be used as textbooks for the teaching of military medical ethics.[6] Steve Miles[7] and Michael Gross[8] have each written books about these topics, though these emerged, at least in part, from the previously mentioned journal articles of 2004. Finally, a symposium was held in a prestigious bioethics journal, *Cambridge Quarterly of Healthcare Ethics* (2006).[9] The point, though, is that few discussions regarding military medical ethics have been held until the past few years. As a final programmatic note, the topic of physician involvement in interrogations was afforded the plenary session at the largest biomedical ethics conference of the year, the American Society of Bioethics and the Humanities (2005). This session was somewhat unbalanced, however, insofar as all three speakers argued for exactly the same conclusion (i.e., there was no conservative or dissenting voice), though a response panel aimed to remediate this shortcoming. It was at this meeting that I met Fritz Schmuhl of Springer, who encouraged the production of this volume, particularly given the interest in the two sessions at that meeting.

In the remainder of this introduction, I would like to provide a discussion of some of the frameworks and issues that appear in this volume (§2) and then to provide a

[5]See, for example, Fritz Allhoff, "Terrorism and Torture," *International Journal of Applied Philosophy* 17.1 (2003): 105–18. See also Fritz Allhoff, "A Defense of Torture: Separation of Cases, Ticking Time-Bombs, and Moral Justification," *International Journal of Applied Philosophy* 19.2 (2006): 243–64.

[6]Office of the Surgeon General, Department of the Army, United States of America, *Military Medical Ethics,* 2 vols. (Bethesda, MD: Department of Defense, Office of the Surgeon General, US Army, Borden Institute, 2003).

[7]Steven H. Miles, *Oath Betrayed: Torture, Medical Complicity, and the War on Terror* (New York: Random House, 2006).

[8]Michael L. Gross, *Bioethics and Armed Conflict* (Cambridge, MA: MIT Press, 2006).

[9]I authored an essay in this symposium; see Fritz Allhoff, "Physician Involvement in Hostile Interrogations," *Cambridge Quarterly of Healthcare Ethics* 15 (2006): 392–402. Reprinted in this volume, pp. 91–104.

discussion of how some of these issues might be resolved (§3); the essays in the volume explore these frameworks, issues, and resolutions in greater detail.

2 The Dual-Loyalties Challenge

The motivating premise behind this volume is that, in times of armed conflict, physicians can arguably be subject to dual-loyalties. This concept has been explored in greater detail elsewhere[10] but, for present purposes, we might understand it as the existence of simultaneous obligations which might come into conflict with each other. While dual-loyalties can generalize to all sorts of contexts, our present concern is with the ones that apply to physicians during armed conflict. In these scenarios, physicians have medical obligations to those in medical need. We could ground such obligations in various ways, but the most straightforward way is to acknowledge the medical duties of beneficence and non-malfeasance, both of which have been traditional foundations of medical ethics. According to these duties, physicians are morally bound to render aid insofar as they can and not to (intentionally) make anyone medically worse off.

Such medical duties, however, might come into conflict with non-medical duties, and there are such non-medical duties that we would expect to be expressly manifest during times of war. For example, military physicians are subject to the chain of command and therefore have an obligation to obey their orders. To be sure, it might not *always* be the case that following orders from the chain of command is morally obligatory, but we can presumably suppose that, at least in the cases of just war, there is a (defeasible) reason—which we could cache out in terms of military efficiency, for example—for obeying commands and that, therefore, such commands have some sort of positive moral status. Second, the physician, in virtue of medical training, might be able to promote national security or, more nebulously, the greater good, and therefore absorb the associative moral obligations.

Of course, these non-medical obligations could precisely oppose the medical obligations previously mentioned. Consider, for example, physician participation in weapons development, which is covered in Part III of this volume. We can easily imagine cases wherein physicians are operating on the just side in a conflict against an evil regime and that their expertise could be applied to chemical or biological weapons; we could further imagine that such weapons would be effective against the enemy and lead to a quicker dissolution of the conflict. With such weapons, it could be the case that there would be fewer casualties overall—perhaps by shortening the war—or even that the existence of such weapons would be psychologically debilitating enough to the enemy that the conflict could rapidly come to an end. If this is a terrorist regime, then national security could legitimize the development of

[10]See, for example, Physicians for Human Rights and the School of Public Health and Primary Health Care, University of Cape Town, Health Sciences Faculty, *Dual-loyalty Human Rights in Health Professional Practice: Proposed Guidelines & Institutional Mechanisms.* Excerpts reprinted in this volume, pp. 15–38. See also the other essays in Unit I.

the weapons or, regardless, such weapons might serve the greater good—including the citizenry, present and future, which falls under the dissolved evil regime—and therefore be morally justified. But, despite the moral considerations that would count in favor of such weapons development, there are contrary considerations that would inveigh against it. In particular, the development of weapons could violate the physician obligation of non-malfeasance since those weapons would be used to harm some individuals.[11] What, then, should physicians do? Are they morally permitted to participate in weapons development?

Before moving on to a more general discussion of these challenges, let me point out some other specific contexts in which such challenges arise. Many of these are covered in this volume, but I will briefly mention them in this section. In particular, we could see the above frameworks also applying in the following: physician involvement in torture (Part II) and battlefield triage/medical neutrality (Part IV). Starting with torturous interrogations, it could easily be the case that such interrogations serve important military objectives, and that medical knowledge could make the interrogations more expedient, perhaps by conducting them in ways that invoke physical or psychological vulnerabilities of the interrogatee. Again, though, any application of medical knowledge that makes the interrogatee worse off than he/she otherwise would have been could be viewed as problematic when viewed through the lens of medical ethics.[12] Therefore, this is another instance of the dual-loyalties conundrum.

Finally, consider some of the issues that physicians might face on the battlefield. In particular, I have battlefield triage and medical neutrality in mind. The scenario in these cases is that there are some number of individuals in need of medical attention such that the demand for such attention exceeds the supply. Some decision, then, must be made about how those resources should be allocated. Medical obligations would suggest that these decisions should be made on medical grounds alone: resources should be invested in ways to optimize (medical) outcomes. Just to take an example, imagine that there are two wounded soldiers, one of ours and one of the enemy and that there are only resources to tend to one of them. Imagine, further, that the enemy is slightly worse off, though both are very much in need. Medically, it could easily be the case that treatment should be provided to the enemy, since he is less likely to survive absent medical care. The other soldier, however, is on *our side*. Should the physician tend to the enemy, despite the fact that this could lead to the death of an allied comrade? Or, more generally, should physicians exercise (political) *neutrality* when making medical decisions? What if the injured enemy were a high-ranking officer who could be an important strategic asset? It could be the case that resuscitating such an offer could, ultimately, lead to the realization of various

[11] In my own view, this conclusion does not follow since I think that non-malfeasance should be understood in an aggregative mode: if physicians harm a few people such that more people are not harmed later—through, let's say, continued military conflict—it seems to me that such an act is not just licensed, but rather required by an appeal to non-malfeasance. This is an unpopular view that I will not develop here, but see Allhoff (2003) for related discussion.

[12] In fact, this is precisely the view taken by the AMA in its report. See pp. 261–271, this volume. For a dissent, see my essay, pp. 91–104.

military objectives; we could further stipulate that such objectives had moral significance. If the physician chooses to save the enemy officer over our private, is this *fair*? If such an officer were *less* in medical need then, despite the military advantages, then it would seem medical virtues would mandate the treatment of the private, though this could have adverse consequences for key military objectives. These questions can become even murkier when we abstract away from "micro" decisions (e.g., save this person or that one) and try to achieve some clarity about the general triage practices that should be endorsed; in any case, such situations can clearly manifest the dual-loyalties concern.

3 Addressing the Challenge

In the previous section, I introduced the notion of the dual-loyalties challenge and showed how it could be instantiated in various contexts: weapons development, torture, and battlefield triage/medical neutrality. In this section, I want to consider various ways to remediate the challenge, and I take it that there are, conceptually, four different options here. First, we could hold that medical and non-medical values are *commensurable* and that, in any given case, we just have to make adjudications about which pull more strongly. Second and third, we could hold that these values are *incommensurable*, but that one or the other set of values does not apply. One option is that non-medical obligations are patently irrelevant to medical decision making; the other is that medical obligations are inappropriate in these contexts. Fourth, we might say that the values are incommensurable, yet all apply. It is not clear to me how this fourth option is a *solution* to the challenge as it merely posits intractability. And I think, therefore, that it is simply implausible: we all believe that there are right and wrong courses of action in the scenarios mentioned in §2, and I want to suggest that we all believe this because one of the first three options listed must be correct.

The first option is the one that might seem the most straightforward: we acknowledge the existence of conflicting obligations, and then we just have to figure out which set carries more weight (while accepting the countervailing force of the contrary). So we could say, for example, that it is *prima facie* bad for physicians to develop weapons while, at the same time, allowing that complicity in weapons programs could nevertheless be justified if the stakes were high enough. As more lives hung in the balance, as the enemy regime were more evil, or as all other options had been exhausted, we might postulate increasing moral merit in physicians developing these weapons. Absent such features, though, perhaps there would not be sufficient countervailing moral weight for physician involvement in such a program given their medical obligations.

This line is not without problems, both epistemic and metaphysical. Regarding the epistemic ones, we simply do now *know* how many lives might be at stake, or what the consequences will be of us having (or not having) chemical or biological weapons. Metaphysically, we might meaningfully ask how many lives are *worth* a single transgression against non-malfeasance, and thence beckons the specter of incommensurability. The epistemic worries, though, are just that, epistemic: whether we *know* the

relevant stakes, it hardly follows that there does not *exist* some proper course of action, and we then have to do the best we can to determine what it is. The commensurability problem is a difficult one as well, and people choosing this approach to resolving the challenge will surely owe us an account of their thinking in this regard.

Let me also point out another answer that might present itself here, which is more empirical than conceptual. In setting up the above challenges (in §2), I made various suppositions, and people might simply deny that any of these is reasonable. For example, in the torturous interrogation case, I asked that we consider an interrogation that advanced the greater good, despite its transgression of medical virtues. It is certainly an open possibility here to deny that such an interrogation is *possible*, perhaps by denying the plausibility of any sort of utility forecast that would justify the interrogation. In the torture debate more generally, this is a common line,[13] though I think that there are responses.[14] This approach, then, admits of the commensurability of the conflicting obligations while, at the same time, denying that there will ever be much pull coming from one of the directions; a quick look at the literature would suggest that the non-medical obligations are more commonly thought to be the impotent ones. Regardless, I think that this is the approach that it most intuitive, though there is some work to be done regarding how the commensurability would be understood.

Second, we could resolve the challenge by saying that one of the two directions (necessarily, as opposed to contingently) exerts no pull. The more common direction that this would take is to deny that extra-medical considerations can have any import on medical considerations. This strategy is one that we might appropriate, in a different context, to Michael Walzer.[15] Walzer has postulated "spheres of justice" exist such that we can only make distributions of resources within some sphere based on considerations internal to it, rather than to some distributive logic that would be motivated from some other sphere. In applying that structure to our context, it would therefore be inappropriate to make decisions regarding *medicine* by appeal to *extra-medical* considerations: medicine occupies its own sphere of justice and, therefore, medical decisions must be based on medical considerations alone. Note, then, that this view is patently is one of incommensurability: it does not *matter*, for example, whether there are tremendous extra-medical benefits to be gained through some action that violates tenets of medical justice since the former are inadmissible regarding considerations of the latter. On this view, there is no dual-loyalties challenge since there are no *dual* loyalties in the first place: physicians must make medical decisions based *solely* on medical considerations and chains of command, national security,

[13] See, for example, Jean Maria Arrigo, "A Utilitarian Argument against Torture," *Science and Engineering Ethics* 10.3 (2004):1–30. See also Matthew Wynia, "Consequentialism and Harsh Interrogations," *American Journal of Bioethics* 5. 1 (2005): 4–6.

[14] See, for example, Fritz Allhoff, "A Defense of Torture: Separation of Cases, Ticking Time-Bombs, and Moral Justification," *International Journal of Applied Philosophy* 19.2 (2006): 243–64.

[15] Michael Walzer, *Spheres of Justice* (New York: Basic Books, 1983).

and the greater good are impotent against such considerations. While Walzer did not explicitly apply his framework to this present context, such an application is nevertheless fairly straightforward.

This view is not without problems, though many people will nevertheless find it compelling. As far as I can tell, the most pressing objection would have to do with how we individuate different spheres. As I laid it out in the previous paragraph, the medical sphere was conveniently insulated from the non-medical realm, and this insulation provided a solution to the dual-loyalties challenge. However, this structure could receive pressure in either of two directions. First, we might wonder whether this medical sphere is *too small*. In fact, the reason it offers a solution to the dual-loyalties challenge is that it is precisely of the scope that would do so and, therefore, might be thought to be idiosyncratic or *ad hoc*. What is so special about medicine such that it gets its own sphere of justice? The postulation of such a sphere almost seems to be question-begging against "greater good" considerations, since it eliminates those considerations out of hand (e.g., by asserting a sphere which they cannot penetrate). We could certainly carve up the spheres differently, and maybe "greater good" could be some such sphere, of which medicine were a proper part. Regardless, it would seem that the postulation of some sphere needs to be *motivated* in some way, and it is not clear to me what the motivation for a medical sphere would be.[16] Conversely, maybe the medical sphere is *too big* (as opposed to too small). If there is a medical sphere, there could very well be sub-medical spheres: just as some features set off the medical sphere from others, features within it might be used to set off facets of it from itself. The problem would then be that this conception of spheres could lead to a sufficiently high number of them such that they would not be useful in particular cases. Regardless, the proponents of spheres will have to say something about *why* there is a sphere of medicine and why it does not either get subsumed under a bigger sphere or fracture into multiple smaller ones; only such a compelling story here would preserve the merits of this answer.

Finally, we could resolve the dual-loyalties challenge in the third way, which is again to deny that there are dual loyalties at all. While the spheres of justice approach negates the relevance of extra-medical obligations, a converse approach holds that *only* extra-medical obligations are admissible and that medical obligations do not apply. Again, this line would deny that there is a dual-loyalties *challenge* since there would not be competing obligations at all. This is undoubtedly the least popular of all the options and, as far as I can tell, I am the only person who defends it.[17] The idea here is that medical obligations apply only to *physicians* and that there is conceptual space for medically-trained military functionaries who are nonetheless not physicians.[18] Physicians are members of the medical *profession*, and this carries with it various moral features. For example, they have taken an oath

[16] In the book (and in subsequent literature), this topic is explored, though I take it to continue to be one that assails the position.

[17] See Allhoff(2006), pp. 395–400. Reprinted in this volume, pp. 96–104 [section entitled "Are Medically Trained Interrogators *Physicians*?"].

[18] I acknowledge that, despite this contention, the title of this volume nevertheless invokes 'physicians'. I do this most proximately for ease of use, but also in recognition of the consensus view on this issue.

to abide by various features of that profession, including providing care for those in need. But we could easily imagine medically trained personnel who are not members of this profession: they may never have taken the oath nor ever planned to provide positive medical services. Rather, they could use their medical training in an adversarial way, such as through the development of weapons or through participation in hostile interrogations.

I want to suggest that medical obligations do not apply to these people, whom I take to be something other than physicians. The contrary view would have to hold that, *regardless* of these people's non-participation in the medical profession, the obligations nevertheless attach to them. I think that this line is problematic for various reasons, and provide those arguments later in this volume. A second critique of this position—which came out as a response to my paper and is therefore not considered within it—is that the people that I would otherwise exempt from medical obligations are, *in fact*, physicians: they *have* taken the associative oaths and *are* members of the medical profession. I do not disagree with this claim, but it does nothing to erode the conceptual space that I aim to delimit. Rather, it seems completely possible to me that military physicians could *opt out* of the profession, and that some of their obligations would thereafter dissolve. (Some, however, would not, such as the obligation to preserve confidences obtained through participation in the profession.) Furthermore, there is no reason that these personnel had to take whatever oaths would ground medical obligations: we could easily imagine a medically-trained force that completely rejects these values altogether.

In this introduction, I have discussed briefly the issues that motivate and constitute the volume. In §2, I introduced the notion of the dual-loyalties challenge, which is further discussed in Part I. I also introduced some particular issues in which this challenge is manifest: physicians and torture (Part II); physicians and weapons development (Part III); and physicians on the battlefield (Part IV). Each of these parts comprises papers which explore the associative dimensions in greater detail, and display a range of different perspectives thereof. In §3, I discussed various options to resolve the dual-loyalties challenge; these are also variously considered throughout the following essays. At the end of the volume, I have included three appendices, which are statements published by the World Health Organization and the American Medical Association regarding physician involvement in armed conflict.

Thank you for your interest in this project; I hope that you find the following essays engaging and provocative!

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Armed Conflict and Value Conflict: Case Studies in Biological Weapons[1]

Michael J. Selgelid

1 Introduction

This paper provides ethical analysis of two case studies arising in the context of biological weapons. The first concerns what is commonly known as "the dual-use dilemma", which arises when knowledge gleaned from scientific research can be used for both good and bad purposes. Scientific discoveries that constitute important advances in science and medicine, for example, may sometimes facilitate biological weapons development. For well-intentioned researchers, this creates difficult choices about whether or not to publish findings that could be used for harmful purposes by malevolent actors. Society or the government must likewise make tough choices about whether and/or how to regulate dual-use research and the dissemination of information that results from such research. For both individual scientists and the government, the dual-use dilemma poses a conflict between the protection of security, on the one hand, and the promotion of science and medicine, on the other. In the context of governmental regulation, the protection of security may also conflict with the protection of liberties such as academic freedom and freedom of speech.

The second case study considers conflicting values associated with public health care measures that might be called for in the actual event of a bioterrorist attack with a contagious infectious disease. In such a scenario, coercive (and potentially harmful) measures such as quarantine may be required in order to protect public health. Health workers and policy makers would then be faced with a conflict between the (more libertarian or deontological) aim to protect the rights and well-being of individual patients, on the one hand, and the (more utilitarian) aim to promote the greater good of society on the other.

In both case studies, I conclude that we should seek balance between the values at stake rather than attributing absolute priority to—or having overriding loyalty towards—one value or another. I offer specific policy recommendations for striking such a balance in practice.

[1]I thank the Brocher Foundation in Hermance, and the Institute for Biomedical Ethics at the University of Geneva, in Switzerland, for hosting me as a visiting researcher during the period this paper was written.

F. Allhoff (ed.), *Physicians at War: The Dual-Loyalties Challenge*.

2 Dual-Use Research[2]

2.1 Ethics and Genetics

Given all of the attention to ethical, legal and social issues (ELSI) associated with genetics, it is ironic that so little bioethics discourse has focused on the implications of genetic science with respect to biological weapons development. The lack of attention to this topic is partly revealed by the fact that, despite all the links that are drawn between genetics and atomic weapons, Robert Cooke-Deegan's canonical history of the Human Genome Project—*The Gene Wars*,[3] which explicitly includes coverage of the politics and ethical debate surrounding the new genetics, and which even includes a chapter titled "Genes and the Bomb"—never mentions (discussion or debate about) the biological weapons implications of genetics. It is commonly said that the power of genetics is comparable to the power of atomic physics, and that we need more ethical discussion and reflection about the former than the latter received when the first atomic bombs were made and used—the idea being that more socially responsible decisions about science should be made in genetics than were made in the context of nuclear energy. The usual topics of ELSI genetics discourse, however, reveal that the power of genetics with regard to weapons development is not what those concerned with the ethics of genetics usually have in mind.

Another link between genetics and atomic weapons is that important origins of the Human Genome Project are found in the US Department of Energy—and the Los Alamos labs where the first atomic bombs were made. Such organizations were interested in genetics partly because they wanted to learn about radiation's effects on genes. Given these organizations' explicit concern with (albeit nuclear) weapons of mass destruction—not to mention these organizations' governmental and military affiliations—one expects that those involved would have recognized and thought about the weapons potential of the genetics revolution very early on. The absence of biological weapons discussion in Cooke-Deegan's history, however, is telling.

One wonders if it was a mere oversight (on the part of key historical actors) that there has not already been more academic and public discussion about the weapons implications of genetics. Rather than drawing cynical conclusions about conspiracy, for now I merely highlight this lacuna as a historical curiosity. Proper historical investigation and analysis (beyond the scope of this paper) is required to explain it.

Further evidence, aside from Cooke-Deegan's book, that such a gap exists is provided by the ELSI genetics literature more generally. Initial controversy surrounded the worry that recombinant DNA might pose environmental hazards. More

[2] The following discussion of dual-use draws heavily from Michael J. Selgelid, "A Tale of Two Studies: Ethics, Bioterrorism, and the Censorship of Science," *Hastings Center Report* 37.3 (2007): 35–43.

[3] Robert Cooke-Deegan, *The Gene Wars: Science, Politics, and the Human Genome* (New York: Norton, 1994). The discussion that follows is not meant to critique Cooke-Deegan's work.

recent debate has focused on things like genetic determinism, genetic testing, discrimination by employers and insurance companies, selective reproduction, genetic enhancement, cloning, stem cell research, DNA fingerprinting, and the patenting of DNA sequences. That these have to date been *the* standard topics is quickly revealed by examination of titles, tables of contents, and indexes of texts concerned with ethical, legal, and social implications of genetics. At the time of this writing (in 2007), a huge number of journal articles and books on ethics and genetics have been written; but these include little if any discussion of genetics' potential role in weapons-making.

Though hardly discussed among bioethicists, meanwhile, the weapons implications of genetics could turn out to be *the* most serious consequence of the genetics revolution. This is implied by what is said in an unclassified CIA document titled "The Darker Bioweapons Future":

> A panel of life sciences experts convened for the Strategic Assessments Group by the National Academy of Sciences concluded that advances in biotechnology ... have the potential to create a much more dangerous biological warfare (BW) threat. The panel noted [that t]he effects of some of these [genetically] engineered biological agents could be worse than any disease known to man.[4]

This is no small claim, and it originates from eminent scientists rather than the CIA itself.

2.2 The Bioweapons Threat

Why do experts take the biological weapons threat so seriously?

Biological weapons have a long history including, among other things, ancient Greeks and Romans poisoning enemy wells with carrion; Tartars catapulting plague victims' bodies over enemy walls on the Crimean Peninsula during the 14th century; the British Army's provision of smallpox-laden blankets to American Indians in the 1800s; Germany's use of anthrax against livestock during the First World War; and Japan's bombing of China with plague during the Second World War. More recent incidents include activities of cult organizations such as the Rajneeshee which poisoned salad bars in The Dalles (Oregon) with *Salmonella* in 1984; and Aum Shinrikyo, which launched a number of (unsuccessful) anthrax attacks in Japan during the 1990s.[5] Last but not least were the anthrax attacks that killed five people in the US, shortly after the events of 11 September 2001. History reveals that humans can be all-to-willing to use biological weapons.

[4] Central Intelligence Agency, "The Darker Bioweapons Future," 3 November 2003, http://www.fas.org/irp/cia/product/bw1103.pdf, cited 4 June 2007.

[5] See Judith Miller, Stephen Engelberg, and William Broad, *Germs: The Ultimate Weapon* (London: Simon & Schuster, 2001).

A second concern relates to proliferation. Until its collapse in the early 1990s, the former Soviet Union ran an enormous illegal biological weapons program employing 60,000 workers.[6] Known as "Biopreparat", this program had the capacity to produce hundreds (or, in some cases, thousands) of tons of anthrax, plague, smallpox, Marburg virus, and numerous other biological weapons agents.[7] Soviet scientists also attempted to create novel pathogens for weapons purposes. One project aimed at development of a "chimera" hybrid between smallpox and Ebola; the goal was a microbe as contagious as the former and as deadly as the latter. The program allegedly successfully developed vaccine-resistant strains of anthrax and drug-resistant strains of anthrax, glanders, and plague.[8] The whereabouts of most of the scientists who worked for this program are now unknown. Also unknown is what happened to the vast supply of Soviet bioweapons stocks. Not to mention the instability that followed collapse of the Soviet empire, proliferation is a serious concern given that biological weapons agents are so small, especially in comparison with nuclear weapons.

A final reason for fear about biological weapons—illustrated by the story of Biopreparat and also by the CIA claim above—is that recent scientific progress may revolutionize biological weapons-making. This is partly because of the "dual-use" aspect of biomedical science: the very same developments that may lead to advancements in medicine—e.g., genetic sequencing and genetic engineering—can also (often enough) lead to advancements in biological weapons-making. This problem is compounded by the fact that there is a long history of complete openness and the free sharing of information in the life sciences. Potentially dangerous information is routinely published in the life science literature. Biology here contrasts sharply with physics, where there is a long tradition of secrecy—and where discoveries with nuclear weapons implications are automatically "born classified".[9]

2.3 *Controversial Cases*

Questions about how to regulate the conduct of "dual-use" research and the dissemination of information regarding potentially dangerous discoveries have thus become paramount in debates about biosecurity.[10] Much of the debate has focused

[6] Ken Alibek and Stephen Handelman, *Biohazard: The Chilling True Story of the Largest Covert Biological Weapons Program in the World—Told from the Inside be the Man Who Ran it* (New York: Delta, 1999).

[7] Miller et al., *Germs*.

[8] Alibek and Handelman, *Biohazard*.

[9] National Research Council, *Biotechnology Research in an Age of Terrorism* (Washington, DC: National Academies Press, 2004).

[10] Such debate has to date been dominated by science and security communities, rather than ethicists.

on a number of recently published studies. Australian scientists in Canberra, for example, used standard genetic engineering techniques to insert the IL-4 (interleukin) gene into the mousepox virus.[11] Their hope was that the altered virus would sterilize mice and thus provide means of pest control. They accidentally discovered, however, that they had produced a superstrain of mousepox in the process. The altered virus killed both mice that were naturally resistant to, and mice that had been vaccinated against, ordinary strains of mousepox (which is a close cousin of smallpox). They published their results in the *Journal of Virology* in 2001. In a second study, American researchers at the State University of New York (SUNY) at Stony Brook artificially synthesized a "live" polio virus from scratch. They strung together commercial available strands of DNA, purchased over the Internet, in correspondence with the map of the RNA polio genome, which is published on the Internet. The addition of protein resulted in a live virus that paralyzed and killed mice. *Science* published the study in 2002.[12] A third study, published in *Science* in 2005,[13] used similar techniques of genetic engineering and synthetic biology to reconstruct the 1918 flu virus, which killed between 20 and 100 million people. In all three of these cases, the published studies included description of materials and methods used.

All three studies lead to complaint by critics who claimed that publishing studies like these both alerts bioterrorists to new possible ways of producing biological weapons and, worse, actually provides them with explicit instructions—"recipes", "roadmaps", or "blueprints"—for doing so.[14] The mousepox technique, for example, might provide means for production of vaccine-resistant smallpox. This would be serious because there is no treatment for smallpox; vaccine is our only defense against it. Even ordinary smallpox already tops lists of feared biological weapons agents. Smallpox is believed to have killed more people than any other infectious disease in history. In the 20th century alone, it killed between 300 and 500 million people—three times more than were killed by all the wars of that period.[15] An implication of the polio study is that it may allow bioterrorists to construct dangerous pathogens that they might not otherwise have access to. There are fears that the technique could be used to construct smallpox or Ebola, for example. The flu study,

[11] Ronald J. Jackson, Alistair J. Ramsay, Carina D. Christensen, Sandra Beaton, Diana F. Hall, and Ian A. Ramshaw, "Expression of Mouse Interleukin-4 by a Recombinant Ectromelia Virus Suppresses Cytolytic Lymphocyte Responses and Overcomes Genetic Resistance to Mousepox," *Journal of Virology* 75.3 (2001): 1205–1210.

[12] Jeronimo Cello, Aniko V. Paul, and Eckard Wimmer, "Chemical Synthesis of Poliovirus cDNA: Generation of Infectious Virus in the Absence of Natural Template," *Science* 297 (2002): 1016–1018.

[13] Jocelyn Kaiser, "Resurrected Influenza Virus Yields Secrets of Deadly 1918 Pandemic," *Science* 310 (2005): 28–29.

[14] The three examples discussed above have been among the most high-profile cases; but they are by no means the only studies that have aroused this kind of controversy in recent years.

[15] Michael B. A. Oldstone, *Viruses, Plagues, and History* (New York: Oxford University Press, 1998).

finally, might enable aspiring bioterrorists to construct and unleash the virus responsible for one of the worst epidemics in human history.

In all three cases, the scientists and editors involved defended their actions. Although they understood the potential dangers, they argued that the benefits outweighed the risks of publication. In the mousepox and polio studies, for example, they claimed it was important to alert the scientific community that new possibilities for bioweapons development had been discovered. The scientific community, they claimed, needs to be aware of these possibilities in order to recognize the importance of developing protections—e.g., new treatments and vaccines—against them. In the case of the 1918 flu reconstruction, the public health imperative of studying the virus was said to outweigh risks of bioterrorism, especially in light of current concerns about H5N1 (avian influenza)—and because it is just a matter of time until the next naturally occurring major flu pandemic will strike (regardless of what happens with H5N1). This study may facilitate development of new treatments and vaccines that would not be possible if key scientific achievements are kept secret.

In response to the complaint that at least the materials and methods sections of the articles should have been altered or omitted, defenders of publication appealed to the importance of open communication in science. Scientific methodology requires replication and verification of others' findings—but this would not be possible if detailed description of materials and methods are not provided in published studies. Scientific progress would be compromised if this kind of information is withheld from publication.

2.4 Policy

Despite all the controversy about whether or not these and other studies should have been published, there is now widespread agreement that dual-use research poses important dangers that must be addressed. In the aftermath of the mousepox and polio studies—and the events surrounding September 11, which heightened fears about terrorism—a great amount of dialogue regarding dual-use research ensued between scientists, editors, and security experts.[16] Outcomes include a number of important statements, reports, and guidelines. Another outcome was the formation of the National Science Advisory Board for Biosecurity (NSABB) in the US in 2004.

In 2003 a joint "Statement on Scientific Publication and Security" of the "Journal Editors and Authors Group" was simultaneously published by *Science, Nature*, the *Proceedings of the National Academy of Sciences*, and the American Society for Microbiology journals. It addition to reiterating the importance of "publishing manuscripts … in sufficient detail to permit reproducibility" and the importance of sometimes publishing studies with bioweapons implications in order

[16] Much of this dialogue took place in advance of the above-mentioned flu publication.

to facilitate biodefense preparations, it states that journals will implement policy to screen manuscripts that raise security issues, and that editors will reject or modify—i.e., censor—manuscripts when "the potential harm of publication outweighs the potential societal benefits."[17]

Though the censorship of science should not be taken lightly, we should all agree that censorship may sometimes be appropriate. There are at least imaginable cases where publication could be disastrous. If scientists discover a cheap and easy way of making smallpox—or some new microbe just as contagious, deadly, and untreatable—then instructions for doing so is surely not information we would want in the public domain. I imagine and hope that almost no one disagrees with this.

For those who agree that censorship would—imaginably at least—sometimes be called for, a more difficult question is what the process of censorship should be. Should the government decide what gets censored, for example, or should we rely on voluntary self-governance of the scientific community? Scientific progress matters, but security matters too; and neither goal should be given absolute priority over the other. It is safe to say that a consensus has emerged that a system is wanted for striking a balance between these two kinds of goals.[18] In a landmark treatise on dual-use research widely known as "The Fink Report", the US National Research Council has taken the stance that this balance should be achieved through reliance on voluntary self-governance of the scientific community—its concern being that governmental control over what gets published in science would stall important areas of scientific research.[19]

In resonance with much of what is said by the NRC, the Council on Ethical and Judicial Affairs (CEJA) of the American Medical Association (AMA) apparently claims that scientists are, furthermore, in the best position to judge which discoveries should or should not be published. In discussion of new AMA "Guidelines to Prevent Malevolent Use of Biomedical Research", CEJA claims that:

> Although this is an undoubtedly complicated undertaking, physician-researchers, who possess profound knowledge of their research and of human health and disease, are arguably in the best position to assess the potential for and the ramifications of misapplications of their research.[20]

If correct, this might provide additional support for the idea that voluntary self-governance of the scientific community would provide appropriate means to control what gets published in science.

[17] Journal Editors and Authors Group, "Uncensored Exchange of Scientific Results," *Proceedings of the National Academy of Sciences* 100.4 (18 February 2003): 1464, www.pnas.org/cgi/doi/10.1073/pnas.0630491100, cited 4 June 2007.

[18] See National Science Advisory Board for Biosecurity (NSABB), http://biosecurity-board.gov, cited 4 June 2007.

[19] National Research Council, *Biotechnology Research in an Age of Terrorism.*

[20] Shane K. Green, Sara Taub, Karine Morin, and Daniel Higginson for the Council on Ethical and Judicial Affairs of the American Medical Association, "Guidelines to Prevent Malevolent Use of Biomedical Research," *Cambridge Quarterly of Healthcare Ethics* 15 (2006): 435.

NRC guidelines, meanwhile, have apparently been followed and (with the possible exception of federally-funded research subject to classification)[21] the status quo in the US involves reliance upon voluntary self-governance. The NSABB was established in 2004 to "provide advice and guidance to the federal government"[22] regarding dual-use research. The establishment of this advisory board followed a recommendation of the NRC. Though part of its role has been to review scientific papers raising security issues, referral of cases to the NSABB is voluntary and its conclusions (about the advisability of publication in any given case) are not legally binding. The *Science* paper on the 1918 flu reconstruction was sent to the NSABB for review in 2005. Though NSABB members unanimously agreed that the paper should be published, *Science* editor-in-chief Donald Kennedy subsequently wrote that, unless the paper was classified, the magazine would have published it "even if the NSABB had voted otherwise".[23]

2.5 *A Balanced Solution*

Conflicting values surround questions about communication of dual-use information. A system involving minimal governmental restriction may be best at promoting liberty and the advancement of science—but this may have costs in terms of security. A more restrictive system, on the other hand, may promote security, but this would have costs in terms of liberty and scientific advance.[24] As there is no good reason to give absolute priority to the promotion of liberty and scientific advance over security, or vice versa, the censorship process should aim to strike a balance between both kinds of values without being biased towards either. Decision-makers, furthermore, should have sufficient expertise to evaluate the extent to which both kinds of values are threatened and/or likely to be promoted by their choices.

The scientific community is right to be wary about governmental censorship. Given what they do for a living, it is not unlikely that bureaucrats and security

[21] Classification of biological research is not an option except when the research is federally funded. This contrasts with nuclear research with weapons implications, where discoveries are automatically "born" classified whether or not funded by the US government. See National Research Council, *Biotechnology Research in an Age of Terrorism*.

[22] See NSABB, http://biosecurity-board.gov, cited 4 June 2007.

[23] Donald Kennedy, "Better Never Than Late," *Science* 310 (2005): 195.

[24] For further consideration of policy options, see Seumas Miller and Michael J. Selgelid, *Ethical and Philosophical Implications of the Dual-Use Dilemma in the Biological Sciences* (Canberra, Australia: Centre for Applied Philosophy and Public Ethics [CAPPE], The Australian National University, and Charles Sturt University, 2006). That project resulted from a CAPPE consultation with the Australian Department of Prime Minister and Cabinet, National Security and Technology Unit. It involved collaboration with Antony Della-Porta, Christian Enemark, Peter Kerr, and Ian Ramshaw. An excerpt from the report is included in this volume. My thinking about the dual-use dilemma has benefited from participation in that project.

experts would be biased in favor of security values over scientific values. There is also reason to doubt that governmental decision makers will always have sufficient expertise to judge the scientific importance of publishing studies they might want to censor. An additional worry about the censorship of science by government is that this would be one more step down the path of liberty infringement in the name of the war on terrorism—and that governmental censorship would threaten academic freedom and freedom of speech more generally.

The current reliance on voluntary self-governance of the scientific community, however, is unacceptable as well. Just as bureaucrats are likely to be biased in favor of security protection over scientific progress, scientists are likely to be biased in favor of the promotion of science over security. Another problem with voluntary self-governance is that clear conflicts of interest will occur. Because career advancement in academia requires a strong publication record, individual scientists will have self-interested reasons for publishing their work even when security risks arise. Just as bureaucrats may lack sufficient expertise to judge the scientific importance of publication, finally, scientists will generally lack expertise for judging the security risks of publication. Scientists simply are not usually security experts. Most have had little or no training whatsoever in security studies. Scientists might be best able to evaluate the scientific implications of their discoveries, but *security* implications are something different. Scientists might be best able to determine the likelihood, for example, that the mousepox technique could be used to produce to vaccine-resistant smallpox—and they might be best able to determine what the public health implications of a smallpox attack would be. But scientists do not have any special knowledge or skill to determine what the security implications of a smallpox attack would be.

Last, but not least, scientists are sometimes systematically denied information crucial to risk assessment. Rather than a mere hypothetical possibility, this is true for one of the cases that has been central to biosecurity debates about censorship—i.e., the mousepox study.[25] The risk of that publication (partly) depends on the likelihood that would-be bioterrorists have access to the smallpox virus. In order to employ the mousepox genetic engineering technique on smallpox, a bioterrorist must possess the smallpox virus to begin with. All of the world's samples of smallpox are, however, officially supposed to be safe-and-secure at the Centers for Disease Control and Prevention in Atlanta and at a similar facility in the former Soviet Union. It is possible that there has been proliferation from Soviet weapons stocks of smallpox, but any details about this are classified information that scientists generally lack access to. Scientists are thus denied information essential to estimating the risk of the mousepox publication. In the crucial case of the mousepox study, the AMA suggestion that scientists are "in the best position to assess the potential for and the ramifications of misapplications of their research"[26] should thus be flatly rejected.

[25] This point, however, was apparently unnoticed by the main parties to the debate in question.

[26] Green et al., "Guidelines to Prevent Malevolent Use."

What would be a better solution? We want a decision body that embodies both security and science *values* (without being biased towards either) and security and science *expertise* (to a sufficiently high degree). This might be achieved by providing decision making authority to a mixed panel of experts, all of whom are granted high-level security clearance. Such a panel could be constituted by members half of whom work for government and half of whom are civilians, and half of whom are security experts and half of whom are scientists. Twenty-five percent of members would be governmental security experts, 25% would be governmental scientists, 25% would be civilian security experts, and 25% would be civilian scientists.[27] Members of each group could be nominated by salient organizations they represent. Governmental members could be nominated by the Department of Health and Human Services, the Department of Homeland Security, the Department of Defense, and/or the CIA. Civilian members could be nominated by the National Academies, and so on. To avoid inclusion of biased members with extreme values and narrow expertise, each organization could be given veto power over the nominations of other groups' members. Referral of research that meets criteria specified by the panel would be required—e.g., via implementation of a binding code of scientific conduct—and the decisions of the panel would be required by law.

Though I have here sketched a domestic solution,[28] the dangers of dual-use research are global in nature—and so an international solution is ultimately needed. As with other global public goods problems,[29] international governance may ultimately be required to solve this problem. In the absence of international government, an international treaty could require that a system along the lines of that described above is implemented within signatory states and/or that an international panel along the lines of that described above is established and given regulatory authority over what gets published within signatory states.

3 Coercive Social Distancing: Isolation and Quarantine

Above we considered value conflict arising in the context of research with weapons implications. Value conflict may likewise arise in the actual event of a biological attack with a contagious infectious disease.[30] Depending on the disease and the extent to which it is contagious and deadly, standard public health care measures for containing the outbreak may involve coercive measures such as isolation or

[27] Selgelid, "A Tale of Two Studies." I here suggest these four categories for the sake of simplicity. A better panel would include some ethicists!

[28] My main purpose has been to reject NRC recommendations regarding voluntary self-governance and to argue that the status quo in the US in unacceptable.

[29] Both scientific knowledge and security can plausibly be considered global public goods.

[30] The following discussion of social distancing draws heavily from Michael Selgelid, "Ethics of Infectious Disease Control," in *The Encyclopedia of Public Health*, ed. H. Kristian Heggenhougen (Amsterdam, The Netherlands: Elsevier, forthcoming).

quarantine of infected individuals, those suspected to be infected, and/or those who have been exposed. In this case, the goal to promote the greater good of society in the way of public health (and security) may conflict with the goal to protect the rights and liberties of individuals. Mandatory confinement would conflict with the right to freedom of movement; and quarantine may conflict with the most basic right of all—i.e., the right to life. The quarantine of an airplane containing passengers with a contagious deadly disease, for example, may lead to the infection—and death—of previously uninfected passengers who are confined in close proximity with those who are infected.

Does this mean that coercive social distancing measures such as isolation and quarantine would be unethical or wrong? Not necessarily. We should again seek to strike a balance between conflicting goods in the context in question. Individual rights and liberties matter. We should not ride roughshod over individuals in the name of public health. This would involve utilitarian thinking that most philosophers, policy makers, and ordinary citizens reject upon reflection. The goal to promote (utility in the way of) public health matters, but it should not be given absolute priority.

Individual rights and liberties, however, should not be given absolute priority either. If a catastrophic epidemic would result from the maximal protection of individual rights and liberties, then individual rights and liberties must be compromised. Even arch-libertarian Robert Nozick hints that we may need to violate "side-constraints" (i.e., human rights) when this is necessary to avoid "catastrophic moral horror".[31] Though it should be considered an extreme or exceptional measure, there is no reason to in principle rule out quarantine altogether, even if it sometimes ends up killing innocent people, just as there is no ethical reason to rule out participation in (just) war—which also inevitably involves compromise of innocent individuals' rights, including the right to life. If quarantine, despite its costs to individuals held in confinement, is required to enable prevention or minimization of what would otherwise be an enormous public health (and security) disaster, then it may be considered an acceptable and necessary, though unfortunate, means of responding to a bioterrorist attack.

The ethical questions, then, are: who should have ultimate authority to impose quarantine[32] and how can quarantine decisions be made in a responsible, rational, well-informed, balanced manner? Principles regarding the ethical acceptability of quarantine should arguably include the following. First, an extreme measure such as this should not be employed unless there are compelling reasons to believe that it would be an effective means of controlling disease in the circumstances under consideration. While authors such as George Annas deny that quarantine actually works,[33] this is of course an empirical question. We should avoid making and/or

[31] Robert Nozick, *Anarchy, State, and Utopia* (New York: Basis Books, 1974), 30n.

[32] Answers to this first question are beyond the scope of this paper, but see Lawrence O. Gostin et al., "Model State Emergency Health Powers Act" (21 December 2001), http://www.publichealthlaw.net/MSEHPA/MSEHPA2.pdf, cited 4 June 2007.

[33] George J. Annas, *American Bioethics: Crossing Human Rights and Health Law Boundaries* (New York: Oxford University Press, 2005).

accepting sweeping empirical claims in the absence of empirical evidence. There are historical cases—such as that of American Samoa during the 1918–1919 flu pandemic—where coercive social distancing measures appear to have been highly effective.[34] The evidence for or against the effectiveness of quarantine warrants further study. Given the difficulty of conducting controlled studies in the context of quarantine, however, it will not be easy to conclusively demonstrate whether or not quarantine would be effective in any given circumstance, and greater uncertainty will arise in the case of unknown novel pathogens. There is an ethical imperative, in any case, that researchers with relevant expertise further examine this issue as best they can; relevant information is required for solving ethical/policy questions as well as questions that are more purely concerned with public health science.

Second, mandatory quarantine should not be employed unless it is actually required. If alternative, less restrictive means are available to achieve the same ends regarding public health protection, then these should be employed instead. If voluntary quarantine, for example, would likely be just as effective as mandatory quarantine, then the latter should not be imposed. Mandatory quarantine should only be used as a last resort.[35]

Third, an extreme measure such as quarantine should not be imposed unless consequences of failing to do so would be great. It would be wrong to think that rights violations and the imposition of harms on individuals are justified whenever this would lead to a net payoff for society as a whole. The maximal promotion of public health should not be the sole goal of ethical public health policy. Ethical public health policy should aim to balance the goal to promote public health with other legitimate aims such as respecting the rights and protecting the well-being of individuals. Some have argued that perhaps less public health justification would be required for the imposition of quarantine in the event of a bioterrorist attack in comparison with a naturally occurring outbreak of an infectious disease—because the goal to fight the evil of terrorism provides additional justification in the former circumstance.[36] This plausible idea warrants further discussion. The stakes would in any case still need to be high, all things considered, in order for draconian liberty infringing measures to be legitimate.

Fourth, for quarantine to be ethically acceptable, it must be implemented in an equitable manner. It would be unjust, that is, if quarantine is used (as it often has been in the past) in a discriminatory fashion against those who are already socially

[34] Alfred W. Crosby, *Americas Forgotten Pandemic: The Influenza of 1918*, 2nd ed. (Cambridge: Cambridge University Press, 2003). The important case of American Samoa reveals that we should reject the often heard claim that measures like quarantine would/could only have an early and minor role in the event of a major flu pandemic. That might be true in places like the US, but demographic context matters here—and islands, at least, are a different story.

[35] Lawrence O. Gostin, "Public Health Strategies for Pandemic Influenza," *JAMA* 295 (2006): 1700–1704.

[36] Evan S. Michelson, "Individual Freedom or Collective Welfare? An Analysis of Quarantine as Response to Global Infectious Disease," In *Ethics and Infectious Disease*, eds. Michael J. Selgelid, Margaret P. Battin, and Charles B. Smith (Oxford: Blackwell, 2006).

marginalized or disempowered. One could argue that the grounds for imposing quarantine must be strongest when those being considered for confinement are members of the worst-off groups in society. Just as research ethics guidelines give special protection to those who are vulnerable, that is, quarantine guidelines should arguably do the same.

Fifth, quarantine, if implemented, should be made as minimally burdensome as possible. Insofar as is feasible, those confined should be provided with basic necessities such as food, water, comfort, and healthcare. A sixth, and related, point is that those who suffer quarantine for the benefit of society should be compensated in return. It would be wrong if confined individuals are expected to themselves suffer a disproportionate amount of the burden required for the protection of society as a whole. The burdens associated with epidemic disease are shared more fairly if those who make sacrifices by succumbing to quarantine are provided with compensation for doing so. If there are limited amounts of medicine and vaccine available, for example, then those who have been quarantined may deserve special priority when allocation decisions about medical resources are made. Those confined will also deserve financial compensation for inconvenience, missed work, and so on. In addition to compensating coerced victims for harms/losses suffered, it might be appropriate to provide them with additional (financial) rewards. If a net social dividend results from liberty infringement, then part of this should be allocated to those who make this possible by succumbing to coercion. This is a matter of reciprocity.[37] A benefit of putting a compensation/reward scheme into place is that this would likely enhance trust in—and thus cooperation with—the public health system.[38] It is widely acknowledged that trust is important for public health systems to succeed.

The best way to address anticipated potential conflict between the goal to promote public health and the goal to respect individual rights and liberties would be to bypass the conflict altogether—by avoiding situations were quarantine would be necessary to public health protection. Greater availability of wide-spectrum vaccines and anti-infective treatments[39] would make quarantine less necessary in general. The need to confine people would arise less often if we were better able to vaccinate and treat people. It is well known that the pharmaceutical industry, however, has largely neglected anti-infective research and development (R&D) in comparison with more profitable areas of drug development (e.g., of lifestyle drugs and drugs for chronic disease). Increased governmental financing of R&D for vaccines and anti-infective treatments could promote both public health protection (against bioterrorism and naturally occurring outbreaks of disease) and the protection of individual liberties at the very same time.

[37] University of Toronto Joint Centre for Bioethics, Pandemic Influenza Working Group, "Stand on Guard for Thee: Ethical Considerations in Preparedness Planning for Pandemic Influenza" (2005), http://www.utoronto.ca/jcb/home/documents/pandemic.pdf, cited 4 June 2007.

[38] Theresa Ly. "Pandemic and Public Health Controls: Towards an Equitable Compensation System," forthcoming.

[39] Such as antibiotics and antivirals.

4 Conclusion

I have shown how conflicting values arise in two different contexts involving biological weapons: dual-use research with weapons implications, and the use of coercive social distancing measures in the event of a bioterrorist attack. In both cases I argue that, rather than attributing absolute priority to one value or another, we should aim to strike a balance between the conflicting values at stake. In both cases I provide specific policy recommendations for striking such a balance in practice. In the case of dual-use research, I argue against NRC recommendations regarding voluntary self-governance of the scientific community regarding matters of censorship—and that the current status quo in the US is unacceptable. In the case of coercive social distancing measures, I enumerate principles to be followed when making decisions about isolation and quarantine—and I argue that the need to employ such measures would arise less often if the government provided more funding for R&D of vaccines and anti-infective treatments.

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