

From Cases to Capacity? A Critical Reflection on the Role of ‘Ethical Dilemmas’ in the Development of Dual-Use Governance

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Abstract The dual-use issue is often framed as a series of paralyzing ‘dilemmas’ facing the scientific community as well as institutions which support innovation. While this conceptualization of the dual-use issue can be useful in certain contexts (such as in awareness-raising and as part of educational activities directed at the scientific community) its usefulness is more limited when reflecting on the governance and politics of the dual-use issue. Within this paper, key shortcomings of the dilemma framing are outlined. It is argued that many of the issues raised in the most recent debates about ‘dual-use’ bird flu research remain unresolved. This includes questions about the trajectories of certain lines of research, as well as broader trends in the practice and governance of science. This leads to difficult questions about current approaches to the dual-use issue within the US, as well as internationally.

Keywords Dual-use · Ethics · H5N1 · Risk · Bio-weapons · New and emerging science and technologies · Governance

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Introduction

Over the previous decade there have been periodic and at times disconnected discussions in national and international policy forums about the need to manage the ‘dual-use’ potential of cutting-edge biotechnology and research. This issue essentially revolves around the prospect that the very same developments in technological capabilities, innovation practices and scientific understanding can be used for both beneficial and hostile purposes. Developing governance responses to this issue is notoriously difficult and is complicated by a fractured and nebulous multi-level and global political landscape. For over a decade, however, academics, policy shapers and institutions have articulated a need for the development of a broad range of institutional and political capacities to respond to the dual-use issue, particularly in the context of the biological and toxin weapons convention. This is often referred to as the idea of a ‘web of prevention’ (Rappert and McLeish 2007). Within this paper, we problematize a specific way of thinking about the dual-use issue which has been particularly prominent in the US dual-use discourse since at least 2004, and which potentially undermines the goal of such a web (Whitman 2010: 2; Dando 2011). Specifically, we argue against framing the dual-use issue as a series of ‘ethical dilemmas’ facing the scientific community and those which support it. In this understanding there tends to be a pro and con type analysis of wisdom of censoring or stifling specific pieces research and emerging technology in the name of security. This involves a conflict between obligations to promote good and not to do harm (Miller and Selgelid 2007).

The ‘ethical dilemma’ conceptualization of the dual-use issue has uses in certain policy contexts, specifically in awareness-raising and education in the scientific community (Novossiolova et al. 2012). However, the usefulness of this conceptualization is much more limited when reflecting on questions about how dual-use issues should be governed. This is because there are two key shortcomings of this style of reasoning. The first, is that social science researcher observations do not support the idea that dual-use issues are currently likely to be identified and experienced as dual-use ‘dilemmas’ in a strict sense by key agents and institutions (such as scientists). The second is that framing dual-use concerns about specific pieces of science and technology as a single ‘dilemma’ requiring a solution is potentially distracting from the need for more fundamental changes in the politics and practice of dual-use governance. Such sentiments are not new, and have been expressed by academics (Whitman 2010; Dando 2011; Kelle 2012a, b). Added to this stakeholders within the Biological and Toxin Weapons Convention (BWTC) forum have also been eager to highlight the need for broader reforms in response to the dual-use issue (Pax Christi International 2012; VERTIC 2012).

This paper begins by outlining the origins of the concept of the dual-use ‘dilemma’ and its manifestation in twenty-first century discussions. The article subsequently highlights the limitations of this framing when thinking about the governance of dual-use issues. To this end, the paper examines the recent events surrounding the moratorium on H5N1 research and the subsequent re-evaluation of publication and information dissemination policies. It is hoped that this paper will introduce those working on the interface between science, policy and ethics to the complex and challenging nature of the

dual-use issue. It is also hoped that this work will, in a modest way, contribute to the development of thinking in a way which de-emphasizes the idea of dual-use being an unresolvable (and perhaps ungovernable) ethical dilemma and encourages thinking about progressive approaches to minimizing the misuse potential of life sciences.

A Critique of the Dual-Use Dilemma Concept

There are essentially three types of academic discussion of dual-use dilemmas that are currently evident within the dual-use literature. The first begins by conceptualizing the dual-use issue as an ethical question; this involves a philosophical and normative evaluation of the responsibilities of those involved in scientific research to prevent the misuse of research and emerging technologies. This type of research has been advocated as a potential means to clarify central concepts associated with assigning moral responsibility to those involved in dual-use governance, with a particular focus on the responsibilities of scientists (Miller and Selgelid 2007; Ehni 2008; Kuhlau et al. 2008; Spier 2009; Forge 2010).

The second discussion relates the use of ethical concepts in developing and providing educational material directed at responsible behavior, particularly within the scientific community. In this context, there is often an emphasis on the distinction between ‘ethics theory’ and ‘ethical practice’ within the scientific community at a practical level (Rappert 2010; Novossiolova and Sture 2012). This work has outlined challenges as well as strategies for the development, promulgation and delivery of educational material. Researchers associated with the University Of Bradford have been particularly active in this regard.¹

The final discussion focuses on the reason that certain framings of the dual-use issue have come to dominate in policy contexts, as well as the discernible consequences of this framing on the way that policy is formed and practiced. Within this approach it is argued that the ‘dilemma’ concept is associated with a particular problem framing of the dual-use issue which has political significance (Rappert 2007; Whitman 2010; Van der Bruggen 2012; Kelle 2012a, b). This critique reflects a broader trend in New and Emerging Science and Technology (NEST) assessment regimes. As science, technology and society scholars have highlighted, bioethical discussions around new and emerging technologies are tightly inter-wound with political struggles between stakeholders (see for example Jasanoff 2005). These critiques have also typically made recommendations to conceptualize the issue in a way which will facilitate better governance. For example, with regard to the field of Synthetic Biology, Kelle has suggested the use of a matrix heuristic which includes five intervention points (such as the lead scientists on research projects or the research premises), each of which can be made subject to a range of governance activities (such as community-level awareness-raising initiatives to international agreements) (Kelle 2009, 2012a, b).

It is this final area of discussion to which this paper is intended to contribute. In the following section, two criticisms of ‘dual-use dilemma’ thinking are outlined;

¹ There are substantial resources freely available on their website: <http://www.brad.ac.uk/bioethics>.

the first is the mismatch between this concept and social science researcher observations about how dual-use issues are identified and experienced. The second relates to the utility of the concept when thinking about the politics of governing the dual-use issue.

The ‘Dilemma’ Framing of the Dual-Use Issue

The idea that science and technology can be utilized for both good and bad purposes is not new. However, over the previous decade, the issue has been discussed by an increasing number of policy shapers as an issue requiring a response, and in an increasing number of forums. There are several key drivers which have underpinned the emergence of the issue. This includes: the increased significance accorded to the prospects of bioterror and bio-warfare within the previous decade, the globalizing and decentralizing dynamics of biotechnology innovation, and the increasing significance of precautionary and anticipatory rationales in the governance of cutting edge science and technology. Such developments have been reflected within the regime tasked with preventing the misuse of the life sciences, the BTWC, which has become a forum in which stakeholders have discussed the dual-use issue² since the sixth review conference of 2006 (van der Bruggen 2012). A key theme to civil society contributions has been the need for a web of measures address the dual-use issue (Feakes et al. 2007: 2–5). In pursuit of this goal the Red Cross launched the ‘Weapons and Humanity’ appeal in 2002. The International Committee of the Red Cross (ICRC) developed the concept of the ‘web of prevention’, designed to contribute to minimizing the risks of the life sciences being used for hostile purposes. Since this time, state parties to the BTWC, civil society groups, and academics have voiced the need for a web of measures to address the dual-use issue (Feakes et al. 2007). Such webs incorporate a wide range of activities, such as: fostering awareness in relation to the issues of state-level and terrorist misuse; ensuring the continued development of biosafety and biosecurity across the globe; improving current mechanisms of export controls covering dual-use goods and information; ensuring state biodefense research programs are both transparent and proportionate; developing technologies which would help to track the perpetrators of biological terrorism; and institutionalizing the incorporation of scientific expertise into systematic reviews of fields with dual-use potential. However, there are political challenges associated with implementing such responses. This has meant that conceptualizations of the dual-use issue and the response required have often been much more narrow and pragmatic than those activities listed above. In particular, there has been a focus within both US and European policy discourses on the role of the scientific community, as well as on existing systems of ethical and biosafety review in identifying and managing dual-use concerns. Since at least 2004 the life sciences have often been referred to as a dual-use ‘dilemma’ which faces

² The Biological Weapons Prevention Project brings together several Non-Governmental Organisations (NGOs) and has coordinated NGO inputs in the policy discussions on the BTWC convention, including the dual-use issue since 2003: www.bwpp.org.

those who practice and support innovation within policy material. This was reflected in the US National Research Council (NRC) report, 'Biotechnology Research in an Age of Terrorism', which suggested, 'biotechnology represents a *dual use dilemma* in which the same technologies can be used legitimately for human betterment and misused for bioterrorism' (National Research Council 2004: 15, author's italics). Since this time, the term 'dual-use dilemma' has also been taken up in other policy material within the US and Europe (Whitman 2010: 8), as well as by pioneering ethicists who have addressed the dual-use issue. Miller and Selgelid argue:

A dual-use dilemma is an ethical dilemma, and an ethical dilemma for the researcher as well as for those (e.g., governments) who have the power or authority to assist or impede the researcher's work. It is an ethical dilemma since it is about promoting good in the context of the potential for also causing harm, e.g., the promotion of health in the context of providing the wherewithal for the killing of innocents. It is an ethical dilemma for the researcher not because he or she is aiming at anything other than a good outcome; typically, the researcher intends no harm, but only good. Rather, the dilemma arises for the researcher because of the potential actions of others (Miller and Selgelid 2007: 524).

Whitman argues that, while the dual-use issue is often labeled a dilemma within policy literature, this is misleading with regard to how the dual-use issue is experienced and responded to by key stake-holders such as the scientific community. He points out that dual-use issues do not tend to be experienced by scientists or key institutions as a paralyzing ethical paradox involving the conflict between the monolithic imperatives of beneficence and non-maleficence. Instead, he points out that dual-use issues tend to be assessed with prevailing cost-benefit assessment rationales (Whitman 2010). This observation raises broader, but no less important questions about political processes which underpin evaluations of dual-use issues. We develop this line of enquiry in the following sections, with a focus on the absence of 'real world' applicability and political legitimacy of the dilemma framing in the contemporary political context.

Absence of 'Real World' Applicability ...

The first argument is that innovation occurs in a political context which can undermine the ability of scientists and institutions to comprehend and respond to dual-use dilemmas. Whitman (2010: 9) has highlighted that structural factors tend to be underplayed when others make claims about agents' ethical responsibilities. This includes claims about how scientists and institutions identify, evaluate and respond to single scientific and technical developments for dual-use potential. Added to this, scholars of innovation processes have gone further by raising the issue of directionality, pointing to how social agencies shape and steer the overall purposes of innovation. As Stirling has stated,

the form and orientation taken by science and technology are no longer seen as inevitable, unitary, and awaiting discovery in Nature. Instead, they are

increasingly recognized to be open to individual creativity, collective ingenuity, economic priorities, cultural values, institutional interests, stakeholder negotiation, and the exercise of power (Stirling 2008: 263).

Such thinking has been reflected by scholars examining the idea of ascribing moral responsibility to the scientific community and distributing responsibility within this community (see Kuhlau et al. 2008; Ehni 2008). It has also been articulated with specific reference to the idea of a web of prevention by academics (Bezuidenhout 2012) as well as NGO submissions to the BTWC (Pax Christi 2012). This work also corresponds with a number of other studies looking at ethics in other contexts including business (for example Pritchard and Karasick 1973; Downey et al. 1975), as well as research and development innovation (for example Abbey and Dickson 1983). Specifically in relation to ethical responsibilities in the context of a web of prevention, Bezuidenhout argues:

One area of the web debate which is less commonly addressed is that of the structural prerequisites necessary to support the implementation of any dual-use initiatives. These include laboratory infrastructure and culture as well as extra-laboratory (infra)structures such as waste disposal and border controls (Bezuidenhout 2012)

In relation to the idea of ‘dual-use dilemmas’, such work reveals many of the practical reasons why scientists and institutions do not experience ‘dilemmas’, and in fact tend to remain ignorant to issues of potential concern, or else rationalize and externalize potential ‘dilemmas’ from their daily working lives (Whitman 2010: 17). Indeed, experiences in the development and implementation of educational initiatives, including ethical and professional codes for scientists, have illuminated many of these challenges (Rappert 2010).

Absence of Political Legitimacy ...

Since the publication of the highly influential report ‘Biotechnology Research in an Age of Terrorism’ by the US NRC, local institutional review of the dual-use implications of research has been advocated as a primary means to address the issue of dual-use research. This includes research taking place in the context of cutting-edge fields such as synthetic biology, in which developments in technology and research are tightly inter-wound. Such an approach should lead to a rise in the number of ‘dual-use dilemmas’ experienced within the scientific community, which would then need to be resolved through review processes. However, there are two key criticisms of this approach which threaten to undermine the legitimacy of such a model in the long term. The first is the existence of entrenched values, pressures and ignorance within the scientific community. So far there has only been a handful of experiments which are publicly known to have been identified as being of potential dual-use concern (Zmorzynska et al. 2011: 375). Such a situation will continue to underpin skepticism of the ability of the scientific community to police itself. The second type of skepticism relates to the idea that the dual-use issue may require broader political negotiations of the trajectories and practice of biotechnology

innovation. Framing the dual-use issue as involving a series of local level dilemmas addressed on a case by case basis potentially externalizes a lot of questions about the governance of dual-use issues which cannot be addressed at a local level. This, for example, includes questions about whether certain types of research should ever be supported by other institutions, or more long term concerns about certain research trajectories which foreseeably raise dual-use challenges in the long term. Addressing such questions as true ethical dilemmas would require broader reviews at a higher political level.

In the context of the increasing significance of ‘up-stream’ and anticipatory approaches to the governance of science and technology, such criticisms will continue to be accorded significance by the public, as well as by civil society actors involved in the BTWC in the foreseeable future. Furthermore, these debates have long since moved beyond federally funded research, which has been the primary focus of discussions of local level oversight.

Case in Point: The Influenza Virus subtype H5N1 Research and the Limits of the ‘Dual Use Dilemma’

These issues have been significant in recent discussions about two cases of research conducted on H5N1, funded by the National Institute of Allergy and Infectious Diseases (NIAID). One research project was led by Ron Fouchier of the Erasmus Medical Center in Rotterdam, the Netherlands, and another by Yoshihiro Kawaoka of the School of Veterinary Medicine at the University of Wisconsin, US. Both papers include a description of a mutated version of the H5N1 which gained transmissibility between mammals through airborne droplets during the experimental process. In November 2011 this research was subject to a review by the National Science Advisory Board for Biosecurity (NSABB), a US advisory board charged with advising the US government on dual-use policy. The NSABB made two primary recommendations (NIH 2011). The first involved redacting some of the information, which the NSABB believed could potentially lead to the direct misuse of the research. The second was for the inclusion of information on the public health significance of the research, as well as for details of relevant existing systems of biosecurity oversight. The NSABB also called on the US government to encourage authors to submit a letter to journals regarding the dual-use research issue. This should then have been the end of it, as the ‘dilemma’ had been identified and deliberated, and a decision arrived at and eventually supported by the National Institutes of Health (NIH). However, four factors came into play which led to further political debate. The first was the announcement by the editor of *Science* that they would only redact publications once the US government had

set forth a written, transparent plan to ensure that any information that is omitted from the publication will be provided to all those responsible scientists who request it, as part of their legitimate efforts to improve public health and safety (Alberts 2011).

Such sentiments resonated with long-standing concerns within the scientific community about the censorship of research in the name of national security. The second factor which came into play was the internationalization of the debate. This was initiated by the World Health Organisation (WHO), who expressed concern that these recent experiments could potentially undermine existing international agreements about the sharing of pandemic flu virus samples for research purposes, as well as the benefits of such research. This tied into long-standing concerns within the international public health community about the securitization of health (Kelle 2007). The WHO publicly stated that it would host international talks on the issue. The third factor was the growing media coverage which looked to spur public outcries over such research (Brean 2012; The New York Times 2012). Finally, leaders of the research community questioned the decision of the NSABB on technical grounds, through official, as well as public channels (Palese and Wang 2012; Implementation Support Unit 2011: 4).

In response the influenza community announced a 60 day hiatus on influenza research while key stakeholders took stock, and also wrote to the NSABB requesting that it review its decision on H5N1 research. The hiatus went on to be extended for over a year, as parts of the US government and the international community juggled with the issue. This included debates in Holland about the decision made by the Dutch government to request that Fouchier apply for an export permit in order to present his research abroad. There were also a series of conferences internationally; the one that would prove to be most important was a technical meeting held by the WHO in February 2012. The report that came out of this meeting supported the experiments in question being published in full (WHO 2012). The NSABB responded to these developments by revising its findings, the NSABB unanimously recommended that this revised Kawaoka manuscript should be communicated in full. The NSABB also recommended, in a 12–6 decision, the communication of the data, methods, and conclusions presented in the revised Fouchier manuscript (National Scientific Advisory Board for Biosecurity 2012). This judgment was based on two factors: first, that the ‘revised manuscripts do not appear to provide information that would immediately enable misuse of the research in ways that would endanger public health or national security’; and second, that ‘new evidence has emerged that underscores the fact that understanding specific mutations may improve international surveillance and public health and safety’ (National Scientific Advisory Board for Biosecurity 2012). This turnaround from the NSABB sparked some controversy, particularly in relation to the ‘neutrality’ and expected role of the NSABB (Maher 2012).

The following section examines these developments in the context of our argument that the dual-use dilemma framing is a problematic approach to thinking about the governance of dual-use issues.

Absence of Real World Applicability of the Dilemma Framing of Dual-Use Issues ...

In this example there is no evidence of an ethical dilemma per se for those directly involved with the research. On the contrary, security-related concerns appear to

have been a moot point from the perspective of the practicing scientists. Indeed, as has noted elsewhere, ‘Fouchier did not blithely wade into his flu experiments, as some news reports have claimed, but followed all rules governing biosecurity in the Netherlands’ (Garret 2012). It would appear that these scientists, having followed existing biosafety and biosecurity governance practices covering research funding in the US and laboratory biosafety and biosecurity in Holland to the letter, had no ethical qualms in relation to the issue. Indeed, at an event at the Royal Society, Fouchier argued that the research ‘should have been done, and should have been published’ (Royal Society 2012). Further to this, he stated that while he did agree with ‘forward-looking governance, the biosecurity community should have a role in regulating research settings but not the research agenda’ (Royal Society 2012). This statement reflects a broader cultural norm, where many of the existing scientific community externalize the process of weighing up the values of ‘risk’ and ‘benefit’ from the research process.

Bearing in mind our accepted definition of a dilemma as constituting a paralyzing moment, on the surface the moratorium does suggest that this existed at community level. However, closer inspection reveals that the motivation for such a moratorium was a largely a result of politicization, rather than ethical qualms at the level of the scientists and supporting institutions. The moratorium came after, and not before, the NSABB decision and the political fall-out which ensued.

Absence of Political Legitimacy ...

The H5N1 case illustrates that when dual-use issues do emerge, it is often as a political struggle between a broader—and in this case highly polarized—set of stakeholders. On the one hand, the representatives of the scientific community made a number of bold statements advocating such research and its publication; certainly the remarks of Peter Palese, one of the scientists who worked on the reconstruction of the 1918 flu virus suggest as much:

The more danger a pathogen poses, the more important it is to study it (under appropriate containment conditions), and to share the results with the scientific community. Slowing down the scientific enterprise will not ‘protect’ the public — it only makes us more vulnerable (Palese 2012).

On the other hand, some of the security community responded with equal vehemence. As one researcher from A US National Laboratory publicly stated:

Fundamentally, the way biological research is done needs to change. ... And if increased security hampers scientific research and progress in influenza virus or other pathogen research, so be it. Significantly worse things could happen (Murillo 2012).

These comments reflected unresolved political questions beyond that of the immediate research concern. While some discussion focused primarily on the particulars of the H5N1 research case (Implementation Support Unit 2011), others were quick to point out more fundamental problems with existing political realities surrounding dual-use governance (Kelle 2012a, b; Faden and Karron 2012).

Political disagreement was also reflected within the NSABB, with one member arguing that the Advisory Board's second decision 'represented a very one sided picture of the risk–benefit of the dissemination of the information in these manuscripts based on inadequate threat assessment' (Osterholm 2012). Indeed, the NSABB has become the subject of such discussions precisely because dual-use problem cases do not constitute well defined dilemmas, in which a binding decision can be made by a single actor. The discussions about the role of the NSABB in particular remind us that this institution, to use a dissenting NSABB member's words, found itself in 'uncharted scientific and public policy waters' (Osterholm 2012). This is evidence that deeper political questions need to be addressed about what we want improved when it comes to the politics of dual-use governance, and what the substantive issues of political discussion. Indeed, such dissatisfaction is already clear among some of those involved with the most recent episode in dual-use politics. One member of the NSABB suggested that some key questions were, 'how should work on these new agents proceed? How many labs should be working along these same directions? How should this work be communicated now and in the future?' (Lynn Enquist interview in Kohen and Malakoff 2012). This then, demonstrates the extent to which broader questions about the trajectories and practice of life science research are ever present within this domain, and do not have simple answers.

Concluding Thoughts

In this paper, it has been highlighted that while the dual-use dilemma framing has its uses in some governance activities, the concept is potentially constraining when thinking about responding to the issue of the potential hostile misuse of the life sciences. The dual-use issue is broader and deeper than the dual-use dilemma framing would suggest. It is broader in the sense that the issue is not a simple dichotomy revolving around a single experiment. As has become clear in previous years in work by the NSABB and others, the research process has multiple stages, from research design and funding application through to publication. The dual-use issue is relevant to all actors who impact on these stages. This includes funders, universities, private industry as well as publishers. Second, the issue is deeper, as it involves institutionalized norms and practices, including national and international models of scientific governance and funding. It is all too easy to forget in the heat of the moment, in debates such as that which emerged recently about H5N1, that these episodes are incidences of broader unresolved political debates relating to how societies engage with 'up-stream' evaluation of new and emerging life science research, as well as how best to manage the growing biodefense research imperative.

This brings us back to sentiments expressed about the current approach to dual-use governance raised by Dando a few months before the most recent episode in dual-use politics:

There are two major problems with today's approach to dual use: what it focuses our attention on, and what this focus is likely to make us omit when we consider biosecurity policies (Dando 2011).

It is with this critical eye that we should evaluate responses from the community and government to the recent episode of dual-use politics over the coming months, as well as the responses motivated by similar episodes in the coming years.

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