Pandemic Preparedness and Response, and the 2009 H1N1 Influenza: Crisis

Management and Public Policy Insights

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Summary

From the 1990s and onward, governments and global health actors have dedicated resources and policy attention to threats from emerging infectious diseases, particularly those with pandemic (i.e., global epidemic) potential. Between April 2009 and August 2010, the world experienced the first pandemic in this new era of global preparedness, the 2009 H1N1 influenza pandemic. In line with expectations generated during preparedness efforts in the preceding years, the 2009 H1N1 outbreak consisted of the rapid spread of a novel influenza virus. At the urging of the World Health Organization (WHO) in the years prior to 2009, governments had written pandemic plans for what to do if a pandemic influenza occurred. Some had also taken costly steps to improve response capacity by stockpiling anti-viral drugs developed against influenza viruses, pre-purchasing vaccines (which, in turn, led pharmaceutical companies to develop pandemic influenza vaccine models and production capacity), asking domestic health care institutions and other organizations to write their own specific pandemic plans, and running live exercises based on constructed scenarios. Aside from departments and agencies of national governments, these preparations involved international organizations, private companies, local governments, hospitals, and health care professionals.

How can social science scholarship make use of policies and actions related to pandemic preparedness and response, and 2009 H1N1 responses in particular, to generate

new insights? The existing literatures on pandemic preparedness and responses to the 2009 H1N1 pandemic illustrate that sites of similarity and difference in pandemic preparedness and response offer opportunities for practical guidance and theory development about crisis management and public policy, and policy learning between jurisdictions. Because many jurisdictions and governmental actors were involved, pandemic preparations during the early 2000s and responses to the 2009 H1N1 influenza pandemic offer rich grounds for comparative social science as well as transboundary crisis management research. This includes opportunities to identify whether and how crises involve unique or relatively ordinary political dynamics. It also involves unusual opportunities for learning between jurisdictions that dealt with related issues. Government preparations and responses were often informed by biomedical experts and officials who were networked with each other, as well as by international public health organizations such as the WHO. Yet the loci of preparedness and response were national governments, and implementation relied on local hospitals and health care professionals. Hence, the intense period of pandemic preparedness and response between about 2000 and 2010 pitted the isomorphic forces of uniform biology and international collaboration against the differentiating forces of human societies.

Social scientific accounts of bio-securitisation have charted the emerging awareness of new and untreatable infectious diseases and the pandemic preparedness efforts that followed. Firstly, public health scholars and agencies have been increasingly concerned from about 1990 with general bio-security linked to numerous disease threats, both natural and man-made. This informed a turn from public health science and policy practice that relied on actuarial statistics about existing diseases to use of scenarios and simulations with projected (or imagined) threats. Secondly, new disease-fighting prospects presented opportunities for entrepreneurial political and public administrative bodies to 'securitise' infectious disease threats in the late 1990s and early 2000s, implying greater empowerment of some agencies

and groups within policy systems. Finally, influenza gained a particularly prominent role as a ‘natural’ biosecurity threat as major powers dedicated significant resources to managing the risks of bioterror after September 2001. In subsequent pandemic preparedness efforts, potentially very deadly and contagious influenza became the world community’s primary focus.

In turn, the 2009 H1N1 influenza pandemic occurred in the wake of this historic surge in global and national pandemic and, more broadly, biosecurity preparedness efforts. The pandemic led to responses from almost every government in the world throughout 2009 and into 2010, as well as international organisations for public health and medicines. In the wake of the pandemic, formal and scholarly reviews of ‘lessons learned’ sought to inform and influence next steps in pandemic preparedness using the rich panoply of 2009 H1N1 response successes and failures. These generally show that many of the problems often identified in crisis response were repeated in pandemic response. But they also suggest that the rich and varied pandemic experiences offer potential to spread good crisis management practice between jurisdictions, rather than just between events within one jurisdiction.

Finally, the 2009 H1N1 pandemic experience allowed careful and in-depth studies of policy-making dynamics relevant to political science, public policy, and public administration theory. Interest-based politics (‘politics-as-usual’) offers partial explanations of the 2009 H1N1 responses as they do for many public policies. However, the studies of 2009 H1N1 response-making reveal that science and scientific advice (‘unusual’ politics because scientists are often sidelined in day-to-day policy-making) strongly shaped 2009 H1N1 responses in some contexts. Hence, some of the pandemic response experiences offer insights that are otherwise hard to empirically verify into how sciences (or scientific advisors and networks) become powerful and use power when they have it. As mentioned, the numerous national pandemic response processes during 2009 generated sharply differing

pandemic responses. Notably, this was true even between relatively similar countries (e.g., EU Member States) and, indeed, sub-national regions (e.g., US States). It was also true even when policy-making was dominated by epidemiological and medical experts (e.g., countries in North-western Europe). The studies show that global and national scientific leaders, and the pandemic response guidance or policies they made, relied mostly on pre-pandemic established ideas and practices (national ideational trajectories, or paradigms) in their pandemic response decisions. While data about 2009 H1N1 were generated and shared internationally, and government agencies and experts in numerous settings engaged in intense deliberation and sensemaking about 2009 H1N1, such emerging information and knowledge only affected global and national responses slowly (if ever), and at most, as course alterations.

Keywords: Pandemic influenza, 2009 H1N1, Preparedness and response, Biosecurity, Transboundary crisis management, Health policy and administration, Science and policy-making

Pandemic Preparedness and Response as Sites for Social Science Research

The 2009 H1N1 ‘swine’ influenza pandemic was a testing moment for public health agencies across the world. The World Health Organization (WHO), reviewing European responses, observed that: “Although the 2009-2010 influenza pandemic was of low severity compared with those of the 20th century, this was the first ever opportunity for Member States to implement a ‘for-real’ pandemic response, drawing on plans made and planning activities undertaken in the preceding few years” (WHO Regional Office for Europe & University of Nottingham 2010, p. 4). The numerous global and national preparations mentioned were occasioned by bioterrorism incidents in 2001 soon after the infamous 9/11 plane crashes,

severe H5N1 bird flu outbreaks in 1997 and 2003 to 2005, and the emergence of the Severe Acute Respiratory Syndrome (SARS) in 2003 (Collier & Lakoff, 2016; Lakoff, 2008).

Hence, 2009 H1N1 became and remains a key locus for evaluations and other reflections on effective preparedness and response to widespread and fast spreading infectious diseases, and more generally, transboundary crises (Ansell, Boin, & Keller, 2010).

Social scientists have also seen potentials for theoretical insights based on 2009 H1N1 experiences. They can step back from the ‘what works best’ question that animates evaluations to seek meanings or explanations among the pandemic experiences. Hence, social scientists have studied pandemic influenza preparedness and responses to 2009 H1N1 to discover why preparations and responses were what they were or to understand their relationships to their contexts. In turn, such insights can contribute to broader theorization of policy-making and public administration. In particular, the rapid global spread of the 2009 H1N1 virus offered innumerable interactions between transnational isomorphic pressures and national or local particularities. This creates many opportunities for comparative research.

This essay reviews organisational (meso-level) and national and international governmental (macro-level) explanations and interpretations of pandemic preparedness and the 2009 H1N1 responses (less attention is given here to micro-level studies of how particular professionals or citizens responded; for work on pandemic-related decisions of consumers or medical professionals, see, e.g., Seale et al. 2011; Stern 2009; Rachiotis et al. 2010; Bone et al. 2010). Because pandemic preparedness and response were global, the related experiences are rare in scope and scale. Hence, the preparations for pandemic influenza in years prior to 2009 and from responses to the actual 2009 H1N1 pandemic provide comparable records for developing or testing political science and public administration theories. As the following sections illustrate, the records on pandemic preparedness and response have informed scholarship on biothreats and biosecurity. The 2009 H1N1 experience has also enabled close

studies of inner workings of specific public health agencies (such as the WHO) and of political systems developing pandemic responses. Of broad theoretical interest may also be the insights gained from the 2009 H1N1 responses about policy-making influenced by science and scientific experts.

This essay's first section describes the pandemic's chronology and some of its government preparedness and response context. The second section discusses the utility of the 2009 H1N1 record as a context or source of cases for social scientific studies of politics, public administration, and crisis management. The third section reviews the growth in global and national pandemic preparedness prior to 2009, emphasising the link to more general bio-securitisation. The fourth section discusses practical insights about pandemic response that have been derived from the 2009 H1N1 response experience, emphasising that lessons from earlier crises were repeated in 2009, and the unusual potential for learning between jurisdictions rather than only between events. The fifth section discusses and reviews explanations of pandemic responses at the global and national levels, emphasising the impact of interest-based politics that is often seen in public policy-making as well as the strong impact of science and scientific experts, which is less common. The final section offers concluding observations and remarks.

Contours of the 2009 H1N1 Pandemic

The 2009 H1N1-A 'swine' influenza (2009 H1N1) came to global attention in April 2009 and remained a key concern for many governments across the world until the early months of 2010 (A. Keller, 2019; Stoto, 2015). On 25 April, the WHO declared the first-ever 'Public Health Event of International Concern' under the 2005 International Health Regulations. Mexico and the United States had both officially notified the WHO during April that a single novel strain of type H1N1-A influenza had been detected in multiple locations within their

respective borders during March and April (for a description of the outbreak investigation, see WHO Director-General, 2011, pp. 51-54). Because there were outbreaks of the same novel flu in multiple locations across two countries, government restrictions on peoples' movements in and out of the affected areas could not contain further spread of the disease. Indeed, national health authorities across every continent detected outbreaks of the novel H1N1 flu during subsequent weeks. On 11 June, WHO declared that the outbreak had become a full-scale global epidemic, that is, a pandemic (in turn, the WHO declared the end of the H1N1 pandemic in August 2010).

The 2009 H1N1 outbreak and spread were simultaneously anticipated and surprising. Beginning in 1999, the WHO and other international health groupings had encouraged national governments to increase their preparedness for pandemic influenza. Several events precipitated and reinforced this urging (Kamradt-Scott & McInnes, 2012; Lakoff, 2008; Simonson, 2010). In 1997, a novel strain of H5N1 'bird' influenza that broke out in Hong Kong among poultry workers had killed 6 of the 18 patients. The saving grace was that only people in contact with live birds had contracted the disease rather than people who had not. Flu is likely to spread very quickly if humans can infect each other. The deadly H5N1 strain re-emerged during 2003 to 2005 in Hong Kong and elsewhere, with devastating outcomes among the handful of people infected, again through direct contact with living birds. These outbreaks demonstrated the mortal dangers of some novel flu strains, and fears that H5N1 would mutate to become transmissible between humans animated debates among infectious disease specialists and policy advisors. In addition, records of the devastating 'Spanish Flu' pandemic of 1918 to 1920 show the catastrophic potential of a pandemic created by a novel flu strain.

Added impetus to the fear of novel flu came from further diseases events. A bioterror incident in late September 2001 raised biological threats on government agendas and budgets

in many countries (Simonson, 2010). Few weeks after the infamous 9/11 plane hijackings and crashes orchestrated by Al Qaeda, an at the time unknown assailant mailed spores of anthrax to several offices in the US Congress. While these anthrax mailings ultimately turned out to be unconnected to Al Qaeda, their timing nevertheless associated infectious diseases and the threat of terrorism. Next, the 2003 outbreak of Severe Acute Respiratory Syndrome (SARS) across many parts of Asia and North America underscored that existing health care systems and public health intelligence networks were vulnerable to rapidly spreading infectious diseases (Lawson & Xu, 2009). Indeed, the 2003 SARS experiences led directly to a significant overhaul of the IHR in 2005 (A. Keller, 2019).

By 2009, international public health organisations and national governments across much of the world had drafted pandemic response plans (of the WHO's 194 Member States, at least 127 had national pandemic flu plans in place prior to April 2009; most of these were published during 2005 and 2006 (WHO, 2011a)). Despite such preparations, 2009 H1N1 when it came was not everywhere nor entirely the event that planners had anticipated. Health agencies and experts across much of the world endured months of uncertainty about 2009 H1N1's actual severity (i.e., how deadly and how difficult the novel influenza could be for individual patients and for population groups), with particularly strong divergences between the experiences in Mexico and elsewhere. As patient histories accumulated from around the world in mid-2009, and particularly from the Southern Hemisphere where the novel H1N1 virus first reached epidemic spread due to autumn and winter temperatures, the new H1N1 strain seemed significantly less deadly for the total population than the much-feared H5N1 (Stoto, 2015). But some experts feared that when winter arrived in the Northern Hemisphere, the second 'wave' of 2009 H1N1 infections would bring more severe symptoms and outcomes than those generally found in first wave of infections after the April outbreak.

In addition, the demographic profile of affected populations was different from the norm in annually recurring influenza (i.e., seasonal flu). Rather than strongly impacting older people as seasonal flus tend to do, many of the patients most adversely affected by 2009 H1N1 were relatively young and without health conditions that usually predispose people to life threatening effects of flu. Hence, a WHO review reported that for some Member States “the prevention, containment and impact-reduction measures that had been planned were not entirely applicable to the 2009 H1N1 pandemic, which caused less severe disease, but disease that was more easily transmitted” (WHO Director-General, 2011, p. 85).

Responding to 2009 H1N1 also proved to be a different process than some had anticipated. In preparations, the prospect of a rapidly spreading killer pandemic influenza raised the possibility that effective response required urgent and immediate, all-out efforts from public health agencies, health care providers, border protection agencies, and other government and private actors. Hence, when the alarm bell rang on 25 April 2009, public health agencies in many countries and international health organisations went on high alert, instituting 24-hour rosters for staff and other emergency (but unsustainable in the long term) measures (Baekkeskov, 2017). But as described previously, the early wave of 2009 H1N1 turned out not to be catastrophic at the population level. Much like in seasonal influenza, most affected people caught 2009 H1N1 during late autumn and early winter (e.g., Amato-Gauci et al., 2011). That is, for most of the world’s population, the brunt of 2009 H1N1 in terms of people becoming ill happened many months after the April outbreak rather than during the high-alert stage in the months immediately following the PHEIC announcement on 25 April (this development resembled earlier H1N1 outbreaks and responses, most notably an infamous case in the United States in 1976 that was incisively analysed by Neustadt and Fineberg; 1978). Responding to 2009 H1N1 required public health authorities and health care

givers to run a proverbial marathon, rather than a sprint, and it required many agencies and organisations to adjust to unanticipated challenges despite years of preparing for a pandemic.

In return, the duration of the build-up to the WHO's 11 June 2009 pandemic declaration (from April) and the several months before most of the world's countries had widespread H1N1 epidemics (in and after October when temperatures turned sufficiently cold to ease flu virus transmission) allowed producers to develop and distribute vaccines to several Northern Hemisphere countries in time to affect pandemic severity and spread (Mereckiene et al., 2012; WHO Director-General, 2011). Developing and producing pandemic flu vaccines with technology available in 2009 was known to take four to six months. Vaccinations were expected to take about two weeks to fully protect recipients. So vaccinating target population groups (typically, people at risk of complications from flu) by late autumn or early winter was important for effective coverage. In addition, some pharmaceutical manufacturers had established development and production capacity based on advance purchase agreements for pandemic flu vaccines with several countries, particularly highly resourced states in western Europe, North America, and eastern Asia. These preparations enabled rapid ramp-up of 2009 H1N1 vaccine development when the novel virus was discovered in April, and vaccine contracting between governments and manufacturers during June and July 2009. In countries with contracts for vaccines, vaccination campaigns kicked off as deliveries began in late October and early November.

The race to timely pandemic vaccinations also accentuated the world's inequities in access to medicines. Outside of western Europe, North America, and eastern Asia, where countries had not made arrangements with producers or depended on donations of vaccines from better resourced countries, vaccines often arrived too late or not at all (e.g., WHO Director-General, 2011). The WHO attempted to redistribute vaccines from countries with unused vaccines to those without vaccines. But the first donations became available in

December 2009 (i.e., mid-winter in the Northern Hemisphere), which was the height of the pandemic's spread in most populations (WHO, 2011b, p. 1). Hence, the 2009 H1N1 vaccine donations were generally too late to significantly protect recipient populations against the pandemic. Similarly, anti-viral medications, which were used during 2009 to treat patients who had already contracted 2009 H1N1, were stockpiled before 2009 by several governments and released for domestic consumption during the pandemic. But they were in short supply for anyone else during 2009 (WHO Director-General, 2011). To the extent that such pharmaceutical interventions were important pandemic responses, these inequities in access during 2009 suggests that global capacity to effectively combat pandemics was inadequate. Large populations were without protections needed to mitigate or halt 2009 H1N1 spread, which meant that infections continued, and the pandemic flu mostly took its natural course.

For Political Science, A Case of What?

As a site for political science research, the 2009 H1N1 experience is rich with data on and tests of political systems and public organisations responding to crises. As previously described, the event was simultaneous and global, in the sense that 2009 H1N1 broke out in many countries across many continents around May 2009. It was also national and local, in the sense that national and local health and other agencies and health providers were involved in addressing the virus and mitigating its effects on population health and social processes connected to this (e.g., Stoto & Higdon, 2015). Governments also expended extraordinary funds and efforts because of 2009 H1N1 to support interventions (e.g., Pasquini-Descomps, Brender, & Maradan, 2019). Government leaders and bureaucrats were drawn into public discourse during the pandemic and in its aftermath (e.g., Baekkeskov & Öberg, 2016; Baekkeskov & Rubin, 2014). Pharmaceutical producers' income statements were changed by revenues from antiviral drugs and vaccines (e.g., Vilhelmsson & Mulinari, 2018). Millions of

individuals' lives were directly affected, by the H1N1 flu, vaccinations, anti-viral courses, school closures, travel restrictions, temperature screenings at checkpoints, quarantines, or isolation in homes or hospitals.

Responses to 2009 H1N1 and the pandemic preparations in the years preceding the event illustrate that such experiences can be similar between contexts in some ways and different in others (Baekkeskov, 2015b; Stoto, 2015). Many polities, large and small, across multiple continents, and democratic and authoritarian, planned for and used the “cornerstone” (WHO, 2005, p. 279) intervention of mass vaccination as a key pandemic flu response. At the same time, vaccination policy responses could differ substantially, even between similar and interconnected countries such as those of the EU (Mereckiene et al., 2010). For instance, some EU countries (e.g., Sweden and Finland) decided to offer vaccination to their whole population, while other countries (Latvia and Poland) decided not to offer vaccination at all. Even within federal contexts, such as the United States, local responses could vary in substantial ways (Stoto & Higdon, 2015).

Since observed similarities and variations were substantial, the pandemic record offers opportunity to unpack what public policy variation means in more detail. For instance, comparing the two vastly different contexts of China and Bulgaria, Baekkeskov shows that many variations in their pandemic responses could better be described as differences in ‘degree’ rather than ‘kind’ (Baekkeskov, 2015b). As examples, both countries – or regions within them – used school closings. But China’s closings were in the pandemic’s early period – May and June – while Bulgaria’s were at the height of its national H1N1 epidemic in November. School closings in China were also used sporadically at province or city level (incidentally, this was also true in the US; Klaiman et al. 2015). Those in Bulgaria were nationally decided and coordinated. Both countries wanted mass vaccination campaigns, but these varied substantially. China’s vaccination campaign occurred from October and onward

and was heavily targeted toward at-risk groups. Bulgaria developed target groups for vaccination, but only received vaccine deliveries in February 2010, which was well after the epidemic peak in the late autumn and early winter. Vaccines were then made available to people in Bulgaria who wanted them, but there was no national campaign to persuade people to take vaccination or to reach vulnerable groups. China also quarantined groups of foreign visitors in several cities, while Bulgaria did not quarantine anyone (indeed, China's use of quarantines as a 2009 H1N1 response was probably unusually extensive when compared to most countries'; MacPhail, 2014). These and other national responses are easily recognized as instruments that are common across the world. For instance, school closings and vaccination campaigns are common subcategories of non-pharmaceutical and pharmaceutical interventions, respectively. But clearly, Bulgaria and China made different picks from the common kit of policy instruments, in terms of degree (whether, when, and how much) to use known kinds of intervention.

Methodologically, the 2009 H1N1 pandemic has the useful feature that it offers controls for potentially important explanations of policy and administrative variations between contexts. Because the virus was everywhere the same organism, biological differences cannot account for differences in the way that governments or people responded to the pandemic. The disease spread very rapidly across the globe in late April and early May 2009, and hence, the timing of the outbreak was similar in many places. In addition, because influenza incidence in populations tends to be at its maximum from late autumn through winter, each hemisphere is more or less constant in terms of when 'waves' of pandemic influenza infections occurred. Finally, as previously discussed, most countries (i.e., WHO Member States) developed their pandemic response plans within a few years of one another, and mostly during 2005 and 2006 (WHO, 2011a). Variations in preparations and responses are thus difficult to explain using disease biology or policy timing alone.

In addition to these natural controls at the global level, some social characteristics of the global public health community provided isomorphism. Variations and similarities in pandemic responses occurred in a world where much effort had been expended to generate a common push for pandemic preparedness alongside extensive international influenza networks and information sharing mechanisms (e.g., Kamradt-Scott 2012). In the WHO, national health agencies, and individual specialists in virology, epidemiology, and pharmacology could find one global meeting and reference point for appropriate public health and intervention standards. In addition, the disciplines involved are exemplars of what Peter Haas and others long ago dubbed “epistemic communities” (Dunlop, 2013; Haas, 1992). That is, these networks of experts transcend national boundaries to share scientific methods, results, theories validated by these, and policy purposes that have direct bearing on answers to what public interventions are most likely to mitigate pandemic influenza. Finally, in addition to the formal professional ties between agencies and experts, public health professionals who work for governments meet regularly in WHO, regional (e.g., European Union) or leading national (e.g., the US Centers for Disease Control and Prevention), and scientific fora. Many specialists with expertise relevant to pandemic influenza preparedness and response are also personally connected in informal networks that span the globe, by way of ties formed during their training and subsequent collaborations and meeting activities (MacPhail, 2014). Information about pandemic disease characteristics and knowledge of interventions to cope with these are thus globally shared and have the potential to be continually updated as science advances (though global sharing does not necessarily mean global agreement on pandemic policies; see the previous section on the 2009 pandemic’s contours, and the section below on explanations of 2009 H1N1 responses).

The global forces – disease biology, timing, and institutional guidance – interacted with national authority and resources and local (‘street-level’) implementation. As the

comparison of Bulgaria and China suggests, a general result of this interaction may have been that the public health response ‘tool box’ was shared by many jurisdictions, but that instruments were actually selected and used differently to counter 2009’s novel H1N1 virus. The WHO had a central role in shaping pandemic preparedness by way of issuing pandemic preparedness guidelines prior to 2009, organizing information exchange networks and expert meetings related to pandemics and associated interventions, offering outlets for research, co-sponsoring conferences, and more. Hence, the many policy and practice variations that in fact were on display in pandemic preparedness and responses show, for instance, that a single virus can have many meanings (MacPhail, 2014) and can generate different complexities when it encounters contextually specific factors (Keller et al., 2012). Yet cross-cutting similarities such as reliance in many contexts on vaccination and other recognisable instrument types show that culture and complexity offer insufficient accounts of all policy and practice. As a case – or a source of cases – for political science research, pandemic preparedness and responses are thus a rich empirical site.

Given this essay’s focus on pandemic-related policy-making and public administration, its remainder primarily reviews pandemic preparedness before 2009 and the 2009 H1N1 pandemic as sources of cases of crisis management by governments. The essay presents positive rather than normative analysis, in the sense that it seeks to describe preparedness and response processes and to summarize the best supported explanations of these, rather than to evaluate them and make recommendations for future best practice.

The Growth in Pandemic Preparedness Prior to 2009

Tracing and analysing much of the history and emergence of pandemic flu preparedness, Lakoff, sometimes writing with Collier, concludes that pandemic preparedness emerged in the early 2000s as one part of a larger movement from the late 1980s and onward toward a

merger of traditional public health and national security (Collier & Lakoff, 2016; Lakoff, 2008, 2015). The resulting field, which Lakoff and Collier alternatively name ‘biosecurity’ or ‘public health security’, has involved growing amounts of government funding and activity, as well as a ‘reassemblage’ of departments, agencies, networks, and stakeholders in society. Biosecurity is not confined strictly to public health or defence bodies. A major concern in biothreat preparedness is food safety, and so encompasses food regulatory bodies as well as agricultural producers and their organisations. Nor is biosecurity purely national. UN bodies and other international forums and actors are involved, as meeting places, as agents of national principals, or as drivers at their own initiative. Indeed, as previously suggested, in the years before 2009 international bodies and national agencies in a multitude of countries created pandemic influenza guidelines and plans, and other preparedness measures.

In Lakoff’s view, the key innovation in biothreat preparedness is to supplant the traditional public health focus on statistical analyses of present disease trends in human populations with various kinds of exercises and analyses borrowed from military analyses that offer plausible ideas about the dimensions and effects of essentially unpredictable catastrophes (Lakoff, 2008, 2010). Hence, rather than detecting existing disease patterns, biosecurity analyses use devices such as scenario construction, field exercises, and computer simulations based on assumptions. In turn, intervention selections by policy-makers in the biosecurity field lean less on cost-benefit analyses using historical (actuarial) health data than on worst-case scenarios and simulation outputs. That is, biothreat interventions are not necessarily weighed for their known benefits and harms to human health as much as they are directed toward mitigating potential but essentially unknown catastrophes. To the extent that Lakoff’s characterization of general biothreat preparedness was accurate in the subfield of pandemic preparedness prior to 2009, public health agencies and departments tasked with pandemic preparedness were relying not just on historical data about past pandemics, but

equally or more on mathematical models of how alternative interventions would affect key health outcomes, as well as on active scenario construction and live exercises involving many actors within countries and beyond. Hence, the pandemic plans and other preparations were likely to be built on intelligently imagined rather than systematic historical data.

Making use of securitisation theory developed in international relations (IR), Kamradt-Scott and McInnes have elucidated the securitisation of pandemic influenza in particular (Kamradt-Scott & McInnes, 2012). In contrast to Lakoff's conceptualisation, which understands securitisation as a device to supplant traditional public health with military-style practices (see above), securitisation in the IR tradition focuses on supplanting 'normal' with 'extra-ordinary' politics. In turn, Kamradt-Scott and McInnes adopt the concept of 'speech acts', or framing, to identify when securitisation of pandemic influenza occurred. The study suggests that the pandemic threat has been securitised and 'de-securitised' several times over several centuries, and it argues that the latest securitisation occurred "around the turn of the millennium" (*ibid.*, p. S100). During those years, important individual leaders and organisations framed pandemic influenza as a threat to not just human health but also social and economic stability. On the back of this (re)framing of pandemic influenza, international and national pandemic preparedness efforts were boosted with significant additional organisational and budgetary resources.

An important contrast between the medical anthropological and global health political science understandings of the growth of pandemic preparedness is their links to wider trends. In Lakoff's work, the emergence of pandemic preparedness appears as just one instance of the more general growth in biothreat preparedness of the past few decades. Kamradt-Scott and McInnes trace fears about influenza pandemics much further back in time, but are somewhat obscure about pandemic preparedness' connections with and interdependence upon other biothreats (notably, however, in other work, Kamradt-Scott does examine the

WHO's push for biosecurity in more general terms, and also the securitisation of other health issues; e.g., Kamradt-Scott 2015). Given the broader rise of biosecurity, the literature remains short on comparisons between disease efforts and explanation of the apparently dominant position in governments' public health crisis preparedness that influenza enjoyed from the late 1990s through the pandemic in 2009.

Study of the role of global health issue networks by Shiffman and his collaborators suggests ways in which pandemic influenza may have become the most important natural biothreat in the first years of this millennium (Shiffman, Quissell, et al., 2016; Shiffman, Schmitz, et al., 2016). While not focused on pandemic influenza specifically, their studies show how networks come together around public health issues. These networks consist of individuals as well as organizations, and span jurisdictional, administrative, and disciplinary boundaries. The workings of these networks, they contend, steers how much attention political systems pay to the issues, that is, the issues' status on national and global policy agendas.

Shiffman et al's health issue network studies dovetail well with some descriptions of how pandemic influenza became a key focus among biothreat policy-makers in the years after 2001. For instance, former Assistant Secretary in the U.S. Department of Health and Human Services Stewart Simonson, responsible for US public health emergency preparedness in the early part of the 2000s, has used his personal experiences and recollections to describe the rise of pandemic flu preparedness (Simonson, 2010). He traces linkages from anthrax mailings to the US Senate in late September 2001, which made 'biodefense' an integral part of the more general 'war on terror', to the rise of pandemic influenza preparedness as a key component of biodefense in the US and globally. A key driver in Simonson's account of this development are numerous conversations and discussions – and hence, networks – among senior officials and senior public health experts

in the US and other G7 governments as well as the WHO and EU. The account suggests that these senior-level conversations introduced the notion that pandemic influenza was a critical threat. And the work of the network within governments and intergovernmental forums transformed this ranking into global policy action.

Detailed study has yet to trace all links in these chains. But Shiffman et al.'s empirical studies and theoretical framework (Shiffman, Quissell, et al., 2016) make such network explanations plausible. Vertical connections between influenza experts and policy-makers, in combination with horizontal connections between powerful countries and international bodies, can have coalesced into the importance of the pandemic influenza threat in biothreat preparedness, and its precedence over other sometimes deadly infectious diseases (such as drug-resistant tuberculosis, Malaria, HIV/AIDS, and Ebola) and even weaponised biothreats (such as anthrax or smallpox).

Finally, pandemic preparedness and response are quintessential examples of transboundary crisis management. Ansell, Keller, and Boin identify and unpack transboundary challenges and their implications for crisis governance (Ansell et al., 2010). The high 'transboundariness' of pandemic flu is an important feature of preparedness and of response. By their nature, influenza viruses cross national borders. They live and proliferate inside human and animal bodies, and they spread easily between those bodies when these are in close proximity. Flu viruses easily cheat inspection (e.g., heat monitors at borders that look for people running a fever) because many carriers show no signs of carrying them (i.e., carriers are often 'asymptomatic'). This means that the key infectious disease control strategy of containment is ineffectual. Human travel, farm animal transport, and wild animal migration are all pathways through which influenza viruses spread across the borders between jurisdictions. As Ansell, Keller, and Boin explain, such characteristics of the threat mean that national governments' efforts to mitigate pandemic influenza are highly

interdependent. One country's response significantly affects how an emerging pandemic flu impacts on its neighbouring countries' population health. In turn, interdependent actors can coordinate their actions in at least two ways: by pooling resources, and by taking complementary actions. Conversely, interdependent jurisdictions also have great potential to obstruct one another's initiatives, by duplicating efforts or taking actions that counteract others'.

In the light of pandemic influenzas' transboundary character, efforts to generate and guide pandemic preparedness can be about more than transfers of national security protocols into public health administration, more than framing pandemic influenza as an extraordinary security threat, and more than global issue networks' successes in generating political attention for their issues. It can also be a genuine attempt to coordinate efforts across boundaries so that pandemic influenza preparations and responses of one actor will help rather than hurt those of another.

'Lessons' from 2009 H1N1 Responses

Numerous instruments for epidemic and crisis management were put to the test by 2009 H1N1. Many post-pandemic evaluations commissioned by national governments and international health organizations have looked at pandemic preparations and responses. While such analyses have context-specific and sometimes political goals, they are worth considering in comparison to lessons from earlier crises as well as for insights about what political systems prioritise and ignore in pandemic reviews.

After-action reports (AARs) on governments' 2009 H1N1 response processes (i.e., evaluations) yield insights about the modes of response that public health department and agency administrators and managers engaged in. There is no extant metareview of the official 2009 H1N1 response AARs. To illustrate how the AARs could evaluate the 2009 H1N1

experience, the following discussion considers secondary literature on single cases and AARs produced for specific North American and European contexts.

The discussion is informed by Donahue and Tuohy's comparison of AARs across several crises, which identifies a number of general issues that are repeatedly identified but never solved (Donahue & Tuohy, 2006). To identify lessons from crises, Donahue and Tuohy reviewed 21 AARs issued between 2002 and 2006 on a variety of crises in the US context. They also interviewed and conducted focus groups with US crisis management professionals. The resulting analysis identified poor leadership and lack of coordination, weak planning, failed communication among crisis responders and with the public, and constrained resources as 'lessons' that are repeated, and hence, rarely 'learned'.

Similar 'lessons' emerged in post-pandemic AARs from different countries and regions. During the 2009 H1N1 pandemic, coordination between agencies and countries could be challenging. As an eminently 'transboundary' event, the outbreak of a novel influenza such as 2009 H1N1 and its subsequent spread to become a pandemic present processes where coordination between organisations, sectors, and countries affects response effectiveness (Ansell et al., 2010). Hence, some international-level evaluations of 2009 H1N1 response have focused in part on the extent and qualities of coordination between countries. For instance, the evaluation commissioned by the WHO Regional Office for Europe concludes that "multi-sectoral/multi-agency" pandemic planning and "assistance and leadership from the WHO" are important (WHO Regional Office for Europe & University of Nottingham 2010, p. 15). Indeed, "coordination" should be one of six "essential considerations" for pandemic preparedness at the national level (*ibid.*). The two AARs commissioned by the European Commission considered international coordination among EU Member States in several ways, and found varied results depending on the specific issue or type of coordination (European Commission, Crismart, & Health Protection Agency,

2010; European Commission & Health Protection Agency, 2010). Given the importance of international coordination in a pandemic, there could be a surprising lack of focus on such considerations in some national-level AARs. For instance, Canada's AAR lauds its "Health Portfolio[']s...close collaboration" with the WHO and other "international regulatory counterparts" on vaccine issues (Public Health Agency of Canada 2010, pp. 3-4), yet just one of the review's 34 recommendations concerns interaction beyond the national level ("[r]eview Health Portfolio management of international [stakeholder] relationships", *ibid.*, p. 6). As another example, Norway's AAR criticised aspects of the coordination among domestic agencies and local authorities, and several of its 25 recommendations concern such issues (DSB 2010, pp. 20-21). Yet it offers little discussion or no recommendations on Norway's interactions with neighbouring jurisdictions or international bodies.

Uncertainty about 2009 H1N1's disease characteristics and severity (in particular its mortality and morbidity rates) were pronounced during the first months following the April outbreak (this is usual: uncertainty, along with urgency and an existential threat, characterizes many crises; Boin & 't Hart, 2003). These uncertainties could lead key health agencies to change their signals and guidelines. In the United States, for instance, the Centers for Disease Control and Prevention (CDC) drastically changed its guidelines for school closures three times within three weeks of the outbreak in late April (Klaiman et al., 2015). These shifts led to some confusion and consternation in US school districts and inconsistencies between local school closure policies. Hence, some US school districts closed schools to stem the spread of H1N1, but most did not.

Business continuity could conflict with pandemic management. The prolonged character of managing 2009 H1N1, rather than a brief if intense emergency, meant that everyday operations and tasks had to be resumed and accommodated through most of the pandemic. This could challenge the departments, agencies, and health care providers

responsible for pandemic response (e.g., European Commission & Health Protection Agency 2010, pp. 27-28). Staff had to find ways to balance their response roles with their routine work. For instance, in some agencies and departments in the United States, managers had to solve difficult dilemmas between maintaining staffing needed for established programs and their organization's demands for pandemic response staffing under its Incident Command Structure (Lewis et al., 2015).

Communications from public health authorities to critical audiences is another important theme in several post-pandemic AARs. Audiences of importance to pandemic response effectiveness included health care professionals and at-risk population groups. In some circumstances, the public or their elected representatives could be pivotal. Studies of 2009 pandemic responses suggest that communications by government and health authorities influenced public adherence to critical response programs, most notably uptake of pandemic vaccination (Baekkeskov & Öberg, 2017; Burton-Jeangros, 2019; Crosier, Mcvey, & French, 2014). Yet post-pandemic AARs reached different conclusions about communication qualities in different jurisdictions. For instance, the UK's evaluation found the government's communication strategy successful because it built "public awareness and understanding of pandemic influenza" and kept "the media informed and engaged" (Hine, 2010, pp. 14-15). In contrast, evaluation of Italy's communication strategy found it to be "a major problem" because it failed to dispel public uncertainty about the severity of the disease and to inform health care workers of the details of vaccination and other medical interventions (Rizzo et al. 2010, pp. 6-7). As in other crises, significant lessons emerged from the 2009 pandemic about communication between actors and the public. In addition, the unusual fact that many jurisdictions were responding simultaneously suggests that the pandemic experiences offer strong potential for learning between countries (*cf.* Crosier et al., 2014).

As previously suggested, these examples of challenges identified in 2009 H1N1 AARs have much in common with issues often identified in the wake of crises. Indeed, such repetition of old lessons across several international and national post-pandemic reviews raises the possibility that the 2009-2010 pandemic was just another crisis, with few unique insights to offer government practitioners, or policy and public administration scholars and students. Yet the pervasive character of a global infectious disease event such as 2009 H1N1 is unusual. The prospect of learning between jurisdictions (rather than just between crises) could make comparisons between both jurisdictions' experiences of pandemic preparedness and experiences of responding to 2009 H1N1 into major sources of crisis management innovation and improvement.

In such comparisons, a key issue becomes whether policies that work well in one context can be transferred elsewhere. As in policy transfers and learning more generally (e.g. Stone, 1999), the possibility of learning from other countries' pandemic experiences raises unresolved questions for research that aims to improve public policy. Were variations between jurisdictions in pandemic preparations and 2009 pandemic response appropriate? If so, which were appropriate? Or are contexts so unique that each needs to customize responses to make them as effective as they can be? Similarly, can one size fit most? Or does each place require its own bespoke tools to manage a pandemic, or is there one commonly effective tool box for pandemic response? Given standard human biology, many of the same pandemic flu interventions seem likely to work everywhere, for instance, to mitigate symptoms or halt spread (e.g., vaccines and anti-virals tend to work for human health). Given varied human societies, organizational and social constructs that work in one place may work in similar places but not in others (e.g., affording medicines is likely in rich but not in poor countries, and implementing social controls such as quarantines is more feasible where civil rights have little protection than in those with strong protections).

As described previously, the 2009 H1N1 record shows even similar jurisdictions behaving as if the biology of their respective populations were significantly different (e.g., EU countries chose very different levels of vaccination). It also shows that some very different societies made choices from the same box of tools at the level of non-pharmaceutical options that make demands on society (e.g., school closings in Bulgaria and China). Hence, jurisdictions' 2009 H1N1 experiences show that pandemic response choices can turn on social, economic, and political forces that have been described and theorized by studies of crisis management, policy-making, and other social decision processes. This general point is not surprising to most social scientists. But the evidence is worth displaying and explicating to discern specific mechanisms at work, and to illustrate to powerful communities in public health policy and related areas how social logics can influence their work. As the subsequent sections show, social scientific explanations of the 2009 H1N1 response choices offer several insights into which among social factors may prove important to transnational or multi-locational crisis and epidemic management.

Explaining 2009 H1N1 Responses

Does pandemic response entail unusual politics? While pandemic responses and their determinants are inherently interesting to researchers and policy-makers concerned with public health, their importance as subjects for political and other social science would be improved if they had unusual characteristics. Similarly, for crisis management scholarship, pandemic management would be particularly interesting if it departed in some way from the generic. This section's review of scholarship suggests that while politics-as-usual can help a great deal to understand 2009 H1N1 responses, the role of science and scientific advice was more important in some contexts than it is generally in policy-making or crisis management. Hence, pandemic response-making is not necessarily politics as usual.

Of interest to students and scholars may be that some aggregate international arguments about why jurisdictions may have selected their 2009 H1N1 responses have not been thoroughly studied, perhaps because systematic aggregate data on national pandemic responses is limited. Nevertheless, some basic patterns are likely. In the aggregate, 2009 H1N1 pandemic responses might have varied systematically with factors such as wealth, health systems, and general health characteristics of populations. Greater national wealth enables governments to purchase more of financially costly interventions such as anti-viral drugs and vaccines (and individual income would matter where access to medical treatments required individuals to pay). Universal health care systems may create different pandemic flu health risk profiles for populations than health systems based purely on private insurance and care. Jurisdictions with populations that tend to be vulnerable to influenza (e.g., with many children or elderly) could be expected to take more precautions than those with more protected populations (e.g., with few children or elderly).

Political scientists, medical anthropologists, and other social scientists have looked closely at political, social, and cultural drivers of 2009 H1N1 responses through in-depth analyses of carefully selected cases. Such studies have produced thorough descriptions of pandemic responses in the selected jurisdictions, in ways that analyses focusing only on quantifiable statistics cannot. In addition, they uncover logical links and dynamics that contributed to response development. To investigate whether and how unusual the politics of 2009 H1N1 pandemic response-making was, the remainder of this section looks first at the role of political factors that often influence policy-making. It then considers the role of science and scientific advice in determining pandemic responses because a pandemic such as 2009 H1N1 is a biomedical crisis. This raises the potential for science and scientific advice to have unusual influence and power in shaping policy.

Politics as usual – Political leaders, Interest Group power, and Bureau self-interest

Preparing for and responding to pandemics are eminently political endeavours. Health care and treatment resources must be allocated. Scarce vaccines or antiviral medications can be given to some people, which excludes others. Some individuals may be placed in isolation or quarantine. Public venues such as schools and shopping centres may be ordered to close, for periods of time. Borders may be closed, and travellers stranded. That is, health risks and social and economic costs will be distributed by the pandemic response decisions of physicians, nurses, hospitals, vaccination administrators, school authorities, commercial enterprises, police, and other public authorities. There will be winners and losers, and conflicts between them.

In turn, as in most social processes, powerful interest groupings have stakes in pandemic preparations and responses. Pandemic flu vaccines and antiviral drugs are manufactured by multinational pharmaceutical corporations and represent very substantial investments as well as opportunities for sales. Physicians and nurses are frontline workers in a pandemic and in many contexts have professional interest organisations that exert great influence on national health policies. Health care corporations or bureaucracies are similarly involved. Population sub-groups tend to be particularly vulnerable to the effects of influenza, including pensioners and chronic disease sufferers that are well organised and politically active in some jurisdictions. Finally, the often-powerful bureaucracies that administer global, national, or local policies and programs in health and other affected areas can conceivably make bureau-political moves.

More visibly, political parties and government leaders may take opportunities presented by or react to reputational threats from the pivotal policy decisions during a pandemic (*cf.* Neustadt & Fineberg, 1978). If pandemic issues or an actual outbreak coincide with a general election, pandemic response policies may become election issues. Even in the

absence of coinciding elections, decisions by incumbent leaders can become subjects for the retrospective public discourse on blame for preparation and response mistakes, much as in any post-crisis ‘blame game’ or ‘framing contest’ (Boin, ’T Hart, & McConnell, 2009; Hood, 2010). In turn, anticipation of blame games may influence how political leaders take decisions about and allocate responsibilities for pandemic preparedness and response (Baekkeskov & Rubin, 2017).

Hence, the forces that often influence political decisions plausibly affect pandemic preparations and responses. Indeed, studies of 2009 H1N1 response have suggested that interests of powerful actors and similar political logics played parts in determining how governments or governmental organisations acted.

To study the tactics of pharmaceutical companies and their influence on expert advisers and policy-makers, Vilhelmsson and Mulinari have looked at national procurement of antiviral drugs to be used against pandemic influenza (Vilhelmsson & Mulinari, 2018). Through semi-structured interviews with members of Denmark’s pandemic advisory group and archival materials, they analyse the “lobbying tactics and arguments” used by the company Roche, which supplied the Danish stockpile of antivirals before 2009 H1N1 occurred (*ibid.*, p. 648). The analysis identifies direct and indirect lobbying efforts and arguments used by Roche to influence Denmark’s antiviral purchase decision: a first-come-first-serve rule, and an unfavourable comparison to similar neighbouring countries. The study suggests that these tactics and arguments were also used in Sweden and elsewhere, and that they led governments to purchase antiviral drugs that have questionable efficacy, and in larger quantities than needed. That is, Roche and other pharmaceutical producers were arguably able to influence pandemic preparedness choices in some situations and contexts.

To show that public health agencies’ decisions about pandemic responses can balance expert judgments with agency leaders’ concerns about building a good reputation among key

stakeholders, Baekkeskov has used data from a participant-observer study of an international health agency deciding its 2009 H1N1 responses (Baekkeskov, 2015a, 2017). In several decision cases directly observed in the study or reconstructed using data from semi-structured interviews, the agency leaders' drive to build a stronger image among stakeholders weighed more than specific judgments and concerns among agency experts and ignored staff members' warnings about risks. That is, bureau self-interest influenced some 2009 H1N1 decisions made within the studied public agency; hence, bureau-political logics could shape pandemic responses.

Secondary sources further suggest that politics-as-usual mattered in 2009 H1N1 pandemic response decisions. In a descriptive comparison of EU Member States' vaccination responses, Mereckienė et al reports that Poland and Latvia were alone among the 27 countries in the group to decide not to run a pandemic vaccination campaign (Mereckienė et al. 2010, p. 2). Ewa Kopacz, who was Poland's Minister of Health during 2009, is on record making the decision and going against Polish health agencies' recommendations (Council of Europe 2010: 15). As a medical doctor herself, Kopacz may have had more scientific credibility than politicians generally have. But her specific argument against 2009 H1N1 pandemic vaccination was non-medical: "the conditions proposed by pharmaceutical companies for the purchase of vaccines were unacceptable" in terms of demands on government responsibility-taking and price (*ibid.*).

In addition, an inquiry by the Council of Europe into the WHO's and European health authorities' decisions about declaring a pandemic in June 2009 as well as national governments' vaccine purchases gave credence to "suspicion of undue influence and pressure put on national authorities by the pharmaceutical industry" (Council of Europe 2010: 17). The inquiry arose in part as a reaction to earlier reports in media and medical journals that conflicts of interest existed between some members of expert committees advising the WHO

and these members' consultancies with pharmaceutical providers (Council of Europe 2010). Hence, the Council of Europe found that key 2009 H1N1 pandemic policies could be explained essentially by classical interest group political gambits such as co-optation and lobbying. However, as the next section shows, scholarly studies have found that partisan decisions, interest group gambits, and bureau-political motives offer incomplete explanations of key pandemic responses.

Unusual politics – the Role of Science in Pandemic Preparedness and Response

Students of politics and public administration will not be surprised by the importance of politics-as-usual in the numerous polities across the world that were preparing for pandemics before 2009 and responding to the actual 2009 H1N1 event. But the pandemic was also a moment when governments had good reasons to turn to specialists to devise their preparations and responses through essentially technical processes. In managing a crisis where recognised specialist knowledge is pivotal to solutions, politicians and generalist civil servants may be hard pressed to ignore these specialists. Public health crises such as the 2009 H1N1 pandemic are eminently medical problems, at the individual and population levels.

In turn, medicine and related health and biological fields are highly developed and fast developing scientific endeavours, with substantial organisational and financial resources at their disposal. Medical roles and prerogatives are institutionalized in law, organisations, and budgets in many polities. At the global level, the WHO is the hub for pandemic influenza guidance and information. In developed and many other countries across the world, departments of health and public health agencies are formally responsible for national pandemic planning and response. While staffing in these departments and agencies may vary, epidemiologists and disease specialists trained in biology or medicine are likely to be important players in developing decisions and advice related to pandemics and influenza.

Because epidemiological, virological, and infectious disease medical expertise plausibly matter to decisions about pandemic management, policies adopted to fight the pandemic in 2009 (i.e., responses) might be expected to have been developed through scientific analyses and arguments rather than through interest-based politics or other non-scientific mechanisms. Hence, whether science and scientific advice were particularly important to 2009 H1N1 responses, and how scientific experts developed their responses (or recommendations), have been subjects of several close studies of 2009 pandemic response development.

One focus in this research has been the role and inner workings of the WHO during the 2009 pandemic. In the line of argument of argument presented by the Council of Europe in its post-pandemic review (see the previous sub-section), the WHO was particularly pivotal because its pandemic flu planning guidances to Member States included vaccination as a key policy (e.g., vaccination is “the principal medical intervention for protecting individuals against pandemic influenza”, WHO 2005, p. 277), and because its 11 June 2009 declaration that 2009 H1N1 constituted a pandemic triggered clauses in contracts between several countries and pharmaceutical providers that obliged governments to place orders for pandemic flu vaccines (so-called advance purchase agreements). Hence, both scholarly and public media interest has surrounded the issues of whether and how stakeholder interests and scientific judgments were balanced in the pandemic preparations and 2009 H1N1 responses.

To understand the WHO’s focus on vaccination as the primary strategy against pandemic influenza, Sudeepa Abeysinghe’s work uses analyses of archival materials (Abeysinghe, 2012, 2015). Abeysinghe takes on the claim made by the Council of Europe: that the WHO’s decisions to emphasize vaccination in its guidances for pandemic planning before 2009 and to declare a full-scale (‘level 6’) pandemic on 11 June 2009 were unduly influenced by pharmaceutical producers (by way of expert advisors who were compromised

by conflicts of interest between their advisory responsibilities and their work as consultants for producers). Abeysinghe concludes that the WHO generally viewed vaccination as the key strategy against infectious diseases long before the rise of the pandemic flu threat, and that this view is rooted in the successful historical fights against polio and smallpox rather than in contemporary links between specific individual expert advisors and pharmaceutical producers.

Using an even deeper historical inquiry, Adam Kamradt-Scott has looked closely at the global emphasis on pharmaceutical (vaccines and anti-virals) over non-pharmaceutical (altered behaviour and social distancing) interventions as responses-of-choice to pandemic influenza (Kamradt-Scott, 2013). Kamradt-Scott links the pharmaceutical emphasis ('bias') to the predominance of biomedical sciences generally and in recent decades also the rise of the Evidence-Based Medicine (EBM) movement in shaping the global program for fighting influenza. This development started with a boost in biomedical scientific studies of influenza in the wake of the experience of the 1918-1920 'Spanish Flu' (Kamradt-Scott, 2012). It was reinforced after 1946 through the creation of world and national influenza centres, surveillance networks, and reference laboratories coordinated by the WHO and generally managed and staffed by biomedical scientists (Kamradt-Scott, 2013). Crucially, much of the focus in the labs and networks was and remains on assembling and refining knowledge about influenza viruses that could lead to vaccines, rather than on social or behavioural interventions. In addition, scientific trials and epidemic and pandemic experiences in the 1950s and after have confirmed and reinforced vaccination as "the 'cornerstone' of effective epidemic and pandemic influenza preparedness" (*ibid.* p. 110).

Kamradt-Scott also argues that anti-viral medications have gained a similar stature, but "on the advice of medical practitioners" rather than on the basis of extensive scientific and experiential evidence (*ibid.*, p. 110)(*cf.* Vilhelmsson & Mulinari 2018). In turn,

behavioural and social alternatives to pharmaceutical interventions might be equally efficacious but are not “readily [tested and evaluated] by the [EBM] ‘gold standard’ of RCTs [randomly controlled trials]” (Kamradt-Scott 2013, p. 114). Hence, the pre-eminence of biomedical sciences in the WHO and other parts of the global pandemic influenza governance structure, with their specific understanding of knowledge and valid evidence, biased the support for and selection of responses to the 2009 H1N1 pandemic in favour of vaccines and anti-virals. However, much as Abesinghe, Kamradt-Scott finds little evidence for the critical position of the Council of Europe and national media polemics about the undue influence of pharmaceutical producers’ corporate self-interest in the pandemic preparations and responses.

Focusing on the national level, social science commonly shows that context matters. Societal structures and institutions have decisive and differentiating impacts on decisions and policies, for instance, by empowering different sorts of actors and interests in different places. But when similar kinds of experts are important in many contexts, and when these experts are highly interconnected, share the same information and belong to the same transnational epistemic communities that advance knowledge based on scientific methods, then there are fewer plausible explanations for varying choices. 2009 H1N1 pandemic responses are thus rich grounds for exploring and discovering what steers decisions and policy-making when ‘the’ experts are in control. The centrality of biomedical specialists and science also means that 2009 pandemic responses provided real-world tests of ‘evidence-based policy-making’. Handing choice to scientific experts is a shortcut to evidence-based policy because scientists are easily legitimated as better equipped to make evidence-based decisions than other kinds of decision-makers.

On this background, to understand policy decision-making by public health experts (rather than by the non-specialists discussed in the previous section), Baekkeskov and his

collaborators have studied and compared national processes resulting in 2009 H1N1 vaccination policies, in similar polities with different responses (Baekkeskov, 2015b, 2016b, 2016a; Baekkeskov & Öberg, 2016; Baekkeskov & Rubin, 2014). The work traces and compares Swedish, Dutch, and Danish national response choices to uncover the specific mechanisms driving these.

The research shows that in each of these countries, response development led from specific assumptions about disease severity and vaccination contained in national pandemic plans, through expert deliberations during 2009 that yielded response policy advice, to national decisions about buying vaccines and who to vaccinate. Each national plan was developed prior to any appearance of the 2009 H1N1 virus. The plans' assumptions were based on specific estimations of the pandemic threat made by national epidemiological and biomedical experts, located in the national boards of health and supporting public health institutes. Following the April 2009 outbreak of H1N1, these same agencies, and in many cases the same individual experts, were responsible for steering their respective countries' pandemic responses. But Swedish, Dutch and Danish plans had different definitions of the pandemic threat and principles for using vaccination. These differences were reflected in the advice that the respective national experts developed during the pandemic in 2009 for their respective governments. In turn, each national set of expert advice was translated unaltered into national policy decisions (Baekkeskov shows that the pandemic planning assumptions closely matched national experts' written advice in 2009, which in turn closely matched the policy adopted in each country; 2016a,b).

Hence, science-based judgments at the national level could be decisive (and demonstrably were in Sweden, the Netherlands, and Denmark) for how many and who was vaccinated against the 2009 H1N1 virus (in contrast, the international guidelines and debates were not critical in these national policy processes; and notably, neither Denmark nor

Sweden based decisions on the otherwise widely shared assumption that a pandemic flu would be a ‘killer’ like the Spanish flu or a mutated H5N1; *cf.* Keller et al., 2012). Actual science-led policy-making may thus follow national ideational trajectories more than global epistemic agreement (Baekkeskov, 2016a).

The reviewed in-depth studies of 2009 pandemic vaccination policy-making at the WHO and in some national governments thus suggest that 2009 H1N1 yielded unusual politics alongside interest-based and partisan politics that can be expected in most social decision processes. Biomedical experts and the science they brought to bear had great influence on public policy in the circumstances studied here. In addition, their decisions were made based on deeply established and institutionalized ideas about pandemic influenza and how to manage the diseases. At the level of the WHO, the strong historical association between infectious diseases and medicinal interventions was repeated for pandemic preparedness and the 2009 H1N1 response. At the national level in three very similar countries, national planning assumptions about the pandemic threat and appropriate uses of vaccination created ideational path-dependency that shaped how each country’s pandemic flu experts judged the 2009 pandemic and the vaccination response, and these judgments effectively determined each country’s pandemic vaccination policy. Hence, science and scientific logics can have unusually great power when a pandemic occurs, making 2009 H1N1 responses a valuable source for insights about links between science and policy (worth noting is that while such circumstances are unusual, powerful scientific ideas have also shaped public policy in other crisis situations, such as economic downturns; Hall, 1989).

Conclusions

The global reach of 2009 H1N1 makes the event inherently important as well as a powerful testing ground for theories of politics and public administration, particularly those related to

crisis management, public health governance, and policy-making generally under the influence of experts or science. As described, some scholars have already made use of these experiences to advance our understanding of global health securitisation, science-led and evidence-based policy-making, and public health crisis management. Much more potential exists, such as for political science on multilevel governance or on policy diffusion.

While details of the accounts reviewed in previous sections vary, it is worthwhile to highlight a similarity between several of the explanations of 2009 H1N1 pandemic responses: institutionalisation and institutions were powerful in shaping them. In their various ways, social science studies of 2009 H1N1 support that vaccination policies and other key pandemic responses were path-dependent, rather than purely contingent on the extant threat. That is, rather than being chosen for optimal solution of the new H1N1 problem, even science-led responses were dependent on modes of operation, discourses, and ideas established before 2009. This was true internationally, particularly in and around the WHO. It was also true in national contexts, particularly around public health agencies and departments that steered national response policy-making.

A perennial theme in studies of crisis is the interaction of uncertainty or urgency with other factors in political systems. The impact on response choices of predominant ideas and uncertainty about the actual state of the world is particularly apparent in some of the existing work on 2009 H1N1. Much like crises more generally, the 2009 H1N1 outbreak's rapid progress across the world pressured the WHO and national and local governments to make consequential decisions about pandemic response with limited and inconsistent information about the impact of the novel H1N1 virus on individual and population health (Stoto & Higdon, 2015). In place of satisfactory data about the actual pathogen, decision-makers were compelled to look elsewhere for guidance to the best policy and action choices. While formal

policy-makers were responsible for pandemic responses in a general sense, as previously discussed their search for guidance could mean turning to their national experts.

The available experts were in many cases the virologists, epidemiologists, and medical infectious disease specialists working in the relevant national health agencies or summoned to advise on pandemic flu matters. As noted, politicians and generalist managers are not typically medical doctors or influenza specialists themselves. Nor are crises typically opportunities for political leaders to shine; rather, they are often reputational threats (Baekkeskov & Rubin, 2017; Boin et al., 2009; Hood, 2010). Hence, politicians in many contexts turned to their public health agencies and departments for advice on how to respond to 2009 H1N1. In addition, such departments were in many places formally tasked with pandemic preparedness and response. Finally, as previously discussed, when confronted with policy decisions about 2009 H1N1 response, national and local politicians in many contexts adhered closely to the recommendations they received from their respective health advisors. That is, in the 2009 H1N1 pandemic, uncertainty about what to do could often lead formal policy-makers to delegate actual power to public health agencies and their expert leaders and staff.

While public health agencies and departments, and the biomedical experts who staff them, are undoubtedly better technically equipped than generalists and political leaders to show the way in a pandemic, uncertainty prevailed during much of the 2009 H1N1 outbreak and spread across all settings. Hence, the kinds of information that epidemiologists, virologists, and other relevant experts needed to become confident about the nature of the threat that 2009 H1N1 presented to human and population health took many months to develop. Yet in the assumptions undergirding national pandemic plans and scenario exercises before 2009, national experts had ready-made beliefs (i.e., predominant ideas) that could take the place of actual information about the extant pathogen. Hence, under pressure to decide on

how to advise political leaders, and in lieu of knowledge, national experts could turn to the assumed diseases – that is, the imagined threats – that had informed and were extant in pandemic plans (*cf.* Clarke 1999). In the coincidence of urgency and uncertainty that prevailed while many 2009 H1N1 responses were decided, and as previously discussed, the key assumptions that planners had made before anyone had seen the 2009 H1N1 virus became an important input into how responders understood and managed the situation.

Finally, as previously suggested, when such ideas differed between jurisdictions and when politicians tended to defer to what their experts advised, localities and countries could pursue very different responses to the same outbreak at the same time with equally scientific justifications. Hence, a key suggestion from the impact of predominant ideas and uncertainty upon pandemic responses in 2009 is that seemingly small differences between equally science-based conclusions about the same broad issue can lead to substantial differences between jurisdictions' pandemic responses.

The 2009 H1N1 pandemic was a global event. To understand its progression and impact, existing academic and non-academic analyses have tended to focus on few countries or regions, international organisations, with particular theoretical and methodological choices. Partly, this has to do with the mandate of after-action reports or with the disciplinary relevance of looking at kinds of case study or comparison. Partly, aggregate analyses of the 2009 H1N1 record at the global level, and even at the regional level, are complicated by an absence of high-quality statistical data on national and local 2009 H1N1 pandemic responses. In some of the world's most integrated contexts, costly and difficult efforts were made to collect internationally comparable data on the responses. For instance, a collaborative research venture surveyed the EU's national health authorities in the immediate wake of 2009's H1N1 vaccination campaigns to systematically record and measure the national pandemic vaccination policies (Mereckiene et al., 2010, 2012). Despite this careful focus on a

single kind of response in one of the worlds most integrated regions, the resulting data set has gaps and some inaccuracies. In the US, collecting and aggregating experiences from the different states also proved difficult, and the aggregate picture remains incomplete (Stoto, 2015). In any case, studies relying purely on quantifiable indicators would most likely miss the linkages and dynamics of response processes.

For these reasons, the preferred way to unlock the record on pandemic preparedness and on 2009 H1N1 response has been to dive into specific jurisdictions, reviewing their records, analysing media coverage from the period, and interviewing participants in pandemic preparations and responses while they still recollect what happened. As this essay has shown, rich data has already been utilized for social scientific analyses that chart and sometimes explain pandemic preparations and responses. Yet the opportunity remains to make social scientific use of the rare experiences of 2001 through 2009 when most governments in the world, along with international health organisations and networks, simultaneously prepared for and then mobilised to counter the same immediate threat.

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