



**ANTHROPOLOGY
of the CONTEMPORARY
RESEARCH
COLLABORATORY**

ANDREW LAKOFF

**FROM POPULATION TO
VITAL SYSTEM**

**2007
working paper**

no.7

ANTHROPOLOGY OF THE CONTEMPORARY RESEARCH COLLABORATORY (ARC) AIMS TO DEVELOP NEW TECHNIQUES OF COLLABORATION, MODES OF COMMUNICATION AND TOOLS OF INQUIRY FOR THE HUMAN SCIENCES. AT ARC'S CORE ARE COLLABORATIONS ON SHARED PROBLEMS AND CONCEPTS, INITIALLY FOCUSING ON SECURITY, BIOPOLITICS, AND THE LIFE SCIENCES, AND THE NEW FORMS OF INQUIRY.

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Suggested Citation: Lakoff, Andrew. "From Population to Vital System: National Security and the Changing Object of Public Health," *ARC Working Paper*, No. 7, 2007.

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**From Population to Vital System:
National Security and the Changing Object of Public Health**

Andrew Lakoff

In early 1976, US health officials warned the Ford administration that a new strain of influenza had appeared in the United States, and threatened to become a deadly pandemic. A soldier had died in Fort Dix, and others at the base were infected with the virus. Experts and officials gathered and quickly recommended a plan of action to the President: an urgent, intensive program to immunize the entire US population before the next flu season, at an estimated cost of \$135 million. Such a program had never been tried before – indeed, it had only recently become technically feasible. But given the perceived scale of the swine flu threat and the new possibility of intervention, public health experts were nearly unanimous about the rational course of action: mass vaccination. “If we believe in preventive medicine,” as one infectious disease expert said, “we have no choice.”¹

Three decades later, in the fall of 2005, the attention of the US government was again focused on the threat of pandemic influenza. This time the threat did not come suddenly – public health officials had been warning of its danger with increasing urgency since the appearance of a deadly strain of the virus in Hong Kong in 1997. But it seemed that now a major initiative was possible, in part because of an increasing perception of the seriousness of the threat, as the virus spread globally through poultry stocks and migratory birds; in part as a result of fallout from the administration’s widely perceived failure to respond to Hurricane Katrina. President Bush described the combination of urgency and uncertainty posed by avian flu: “Scientists and doctors cannot tell us where or when the next pandemic will strike, or how severe it will be, but most agree: at some point, we are likely to face another pandemic.”² Or, as a concerned senator put it: “Experts no longer ask if such a pandemic could occur, rather they question when it will occur.”³

In November, the administration unveiled a \$7.1 billion pandemic preparedness strategy described by the Secretary of Health as “the most robust proposal

A number of the ideas in this paper were developed in conversation with Stephen Collier. It has also benefited from ongoing exchanges with Carlo Caduff, Lyle Fearnley, Dale Rose and Paul Rabinow.

¹ Neustadt and Fineberg, *The Epidemic That Never Was*.

² White House Press Release, November 1, 2005: “President Outlines Pandemic Influenza Preparedness and Response.”

³ Senator Kohl, in Senate Special Committee on Aging, Hearing on Pandemic Flu Preparedness, May 25, 2006.

ever made for public health at one time.”⁴ The plan included funds for disease surveillance, stockpiling anti-viral medicine, and new methods of vaccine production. The details of the administration’s plan were sharply criticized in the public health world as overly focused on pharmaceutical interventions, and as under-emphasizing the needs of state and local health agencies. But among various commentators, there was remarkable accord on several points. First, that pandemic planning was an matter of urgent concern; second, that the nation was currently far from adequately prepared for it; and third, that whether or not a pandemic occurred, the process of preparing for it would strengthen readiness for other potential threats. As the senator put it, “even if we are spared from a flu pandemic, the work that we do today will serve us all well in the event of any national emergency.”⁵

Indeed, the flu threat had become a vehicle for a more general form of planning – one oriented toward a variety of potential threats. The Assistant Secretary of Health said, “preparedness for a pandemic makes us a nation better prepared for any and all hazards, manmade or natural.”⁶ But, he warned, such a condition would not come quickly or easily: “preparedness is a journey, not a destination. It’s a journey that must be nationwide, involve federal, state and local leaders in partnership, and include every sector of society.”⁷ As the Secretary put it, “We’re overdue and we’re not as well prepared as we need to be. We’re better prepared than we were yesterday. We’ll be better prepared tomorrow than we are today. It’s a continuum of preparedness.”⁸ The states’ organization of health officers agreed: “Are we fully prepared? Absolutely not. We are more prepared than we were several years ago but not prepared enough.”⁹

Over the course of three decades, a new way of thinking about and acting on disease threat had emerged: it was no longer a question only of prevention, but also – and perhaps even more – one of preparedness. How did this shift happen? How did we become unprepared? By this question I do not mean that we were once prepared and are now less so, but rather, I mean to ask how a norm of preparedness came to structure thought about threats to public health. The story is a complex one, involving the migration of techniques initially

⁴ Mike Leavitt, “Remarks to the Convening of the States on Pandemic Influenza Preparedness,” December 5, 2005.

⁵ Senator Kohl, in Senate Special Committee on Aging, Hearing on Pandemic Flu Preparedness, May 25, 2006.

⁶ John Agwunobi, Testimony to House Government Reform Committee, Hearing on Pandemic Flu Planning, May 11, 2006.

⁷ John O. Agwunabi, testimony to House Government Reform Committee, Hearing on Government Pandemic Flu Planning, May 11, 2006.

⁸ Leavitt testimony, to Senate Special Committee on Aging, Hearing on Pandemic Flu Preparedness, May 25, 2006.

⁹ Selecky, testimony to Joint Hearing on Avian Flu, House Homeland Security Committee, February 8, 2006.

developed in the military and civil defense to other areas of governmental intervention. In this paper, I focus on one particular technique, the scenario-based exercise. I suggest that this technique served two important functions: first, to generate an affect of urgency in the absence of the event itself; and second, to generate knowledge about vulnerabilities in response capability that could then guide intervention. The scenario-based exercise, I will suggest, is exemplary of the rationality underlying the contemporary articulation of national security and public health.

National Security and Public Health

In his March 2006 Congressional testimony on avian flu preparedness, former White House Homeland Security Advisor Richard Falkenrath said: “When viewed in comparison to all other conceivable threats to US national security, the catastrophic disease threat is and for the foreseeable future will remain the greatest danger we face.”¹⁰ Given Falkenrath’s background as an expert in counter-terrorism and nuclear proliferation, this was a striking statement – a clear affirmation that national security strategists must turn their attention to a subject that, until recently, had been in the domain of public health.

As Nicholas King and others have shown, this was by no means the first conjuncture of national security concerns with public health.¹¹ To understand the implications of Falkenrath’s claim – and its distinction from prior such conjunctures – it is useful to analytically disaggregate the concept of “national security.” In other words, to ask: what *type* of security is meant? What are its political objectives and what are its technical methods? This set of questions comes out of a project on contemporary security expertise that I have been engaged in with Stephen Collier. As part of this project, we have sought to develop an analytic grid that distinguishes among different forms of collective security. In developing this grid, we began with a contrast between two familiar forms of collective security, each of which defines a distinctive political obligation and normative rationality (**See Table 1**).¹² “Sovereign state security” dates from the 17th century, and refers to practices oriented to the defense of territorial sovereignty against foreign enemies using military means. “Population security,” which emerged in the 19th century, involves the protection of the national population against regularly occurring internal threats, such as illness, industrial accident, or infirmity. Its exemplary knowledge forms include epidemiology and demography, and its interventions (typically associated with

¹⁰ Falkenrath, Testimony to Senate Committee Committee on Health, Education, Labor and Pensions, March 16, 2006.

¹¹ Nicholas B. King, “Security, Disease, Commerce: Post-colonial Ideologies of Global Health,” in *Social Studies of Science* 32 (2002). See also Fearnley (2005).

¹² Collier and Lakoff, *Vital Systems Security*. ARC Working Paper Series (2006). See www.anthropos-lab.net

Table 1
Forms of Collective Security

	Sovereign State Security	Population Security	Vital Systems Security
Moment of articulation	17 th century territorial monarchies	19 th century urban hygiene	Mid-20 th century civil defense
Normative rationality	Interdiction	Welfare	Preparedness
Types of threat	Adversaries	Regularly occurring events	Unpredictable, potentially catastrophic events
Exemplary form of knowledge	Strategy	Epidemiology, demography	Imaginative enactment
Operation	Deter or defend against enemy	Distribute risk	Gauge vulnerability, develop capability

social welfare) range from social insurance and public health to urban infrastructure development.

However, we found that a number of current security initiatives – such as avian flu preparedness – did not fit neatly into either one of these security frameworks. We have suggested that a third form of collective security, “vital systems security,” has become increasingly central in recent years. This form of security is oriented to a distinctive type of threat: the event whose probability cannot be calculated, but whose consequences are potentially catastrophic. Its object of protection is not the national territory or the population but rather the critical systems that underpin social and economic life. Vital systems security does not develop knowledge about an enemy or about regularly occurring events, but rather uses techniques of imaginative enactment to generate knowledge about system-vulnerabilities. Its interventions are not focused on modulating the living conditions of human beings, but rather on assuring the continuous functioning of these systems.

Vital systems security did not emerge whole cloth, but rather came out of one practice of sovereign state security – civil defense – beginning in the 1960s. Its techniques were initially developed to approach the threat of nuclear attack, but were gradually extended to approach other potential catastrophes, ranging from natural disasters, to technological accidents, terrorist attacks and epidemics of infectious disease.¹³

¹³ For the extension of practices of civil defense to non-nuclear threats, see Andrew Lakoff, “Preparing for the Next Emergency,” *Public Culture* 19:2 (2007).

It should be underlined that these distinctions do not mark epochal shifts: we do not mean to suggest that there has been an overarching transformation from one form of security to another, but rather that these forms operate in dynamic relation to one another – so, for example, the very systems that were developed as the *means* of population security have now, in some cases, become the *targets* of vital systems security. In what follows, I will describe how this occurred in the case of public health. In tracing this story, I want to show that a vital systems approach emerges at the limit point of population security – but that it is constrained in the types of problems it can approach.

Swine flu and the limits of calculability

As part of population security, classical public health was based on the possibility of calculating the probability of disease incidence in a population. The case of nineteenth century Britain is instructive. As George Rosen has shown, British health social reformers carefully tracked the incidence of disease according to differential social locations to make the argument that “health was affected for better or worse by the state of the physical or social environment.”¹⁴ Such knowledge was cumulative and calculative. Reformers gathered and analyzed vital statistics – rates of birth, death, and illness among various classes – in order to demonstrate the economic rationality of disease prevention measures such as the provision of clean water or the removal of waste from streets. Thus, as Chadwick’s famous 1842 Inquiry into sanitary conditions among the working classes argued, “the expenditures necessary to the adoption and maintenance of measures of prevention would ultimately amount to less than the cost of disease now constantly expanded.”¹⁵

If this initial mode of public health intervention emphasized social conditions – sanitation, nutrition, the safety of factories – a next iteration worked more directly on the bodies of the collectivity. The rise of bacteriology in the late nineteenth century led to the systematic practice of immunization against infectious disease. But again, making rational public health interventions required knowledge about the historical pattern of disease incidence in the population. For example, in designing New York City’s vaccination campaign against diphtheria among schoolchildren in the 1920s, it was “necessary to know the natural history of diphtheria within the community: How many children of different ages had already acquired immunity, how many were well carriers,

¹⁴ Rosen, *History of Public Health*, 185. For the French case, see Francois Delaporte, *Disease and Civilization*, and Paul Rabinow, *French Modern: Norms and Forms of the Social Environment*.

¹⁵ Rosen, 187, citing the classic *Report ... on an inquiry into the Sanitary Conditions of the Labouring Population of Great Britain*. Ian Hacking looks to this period to find the moment when a “laws of sickness” were discovered, in part through the use of benefit societies’ actuarial tables. See *The Taming of Chance*.

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and what children were highly susceptible?”¹⁶ Such data were gathered in order to make decisions based on the balance between the expected costs and benefits of a given intervention.

The object of public health knowledge and intervention is the population – as Foucault put it, “a global mass affected by overall pressures of birth, death, production, illness.”¹⁷ These phenomena are not predictable at the level of the individual, but show regularities when tracked within a group of individuals over time. Interventions seek to know and manage these regularities, to decrease mortality and increase longevity: to “optimize a state of life.”¹⁸ For this reason public health expertise has difficulty in rationally approaching events that cannot be mapped through statistical means. What happens when it is faced with the threat of a singular event – one whose probability is not known, but whose consequences could be catastrophic?

The Swine Flu Fiasco

In January 1976, the Centers for Disease Control reported that a soldier at Fort Dix had died of an unfamiliar strain of swine flu. Moreover, there were several other cases of the same flu, and so the virus seemed to be both virulent and capable of human-to-human transmission. Was a pandemic on the horizon? At the time, some experts believed that antigenic shifts leading to deadly pandemics occurred approximately once per decade. The last one had occurred in 1968. In the worst case, this strain might be comparable to the 1918 Spanish Flu, which, it was estimated, had killed over fifty million people worldwide.¹⁹

The possibility of pandemic flu had not been part of the planning process for US health officials. For this reason, it was not immediately clear what options were available. A catastrophe on the scale of 1918 was not predictable, but was possible. Edwin Kilbourne, a leading influenza expert, warned health officials to plan without delay for an imminent natural disaster. Given the tools available, there seemed to be only one possible course of action: vaccination of the entire US population. Such an option would be both expensive and practically daunting. It would mean producing and distributing enough vaccine to immunize over two hundred million people by the next flu season. This was a new technical possibility: only recently could enough flu vaccine be produced in a given year to envision mass immunization. But a decision would have to be made immediately. And there was no way of knowing whether the cases at Fort Dix were signs of an imminent pandemic or a fluke.

¹⁶ Rosen, 312.

¹⁷ Foucault, *Society Must Be Defended*, 243.

¹⁸ *Society Must Be Defended*, p.

¹⁹ This account is based on Richard E. Neustadt and Harvey V. Fineberg, *The Epidemic That Never Was: Policy Making and the Swine Flu Scare*. New York: Vintage, 1983.

Health officials were thus faced – for the first time – with the possibility of intervening in advance of a potential flu pandemic. This situation presented a problem for public health expertise. As we have seen, modern public health institutions had been set up in response to actual – rather than potential – disease incidence. Indeed, they relied on archival knowledge of the timing and location of outbreaks to design effective interventions. For this reason, as the swine flu affair demonstrates, experts had difficulty in approaching a foreseeable, but not statistically calculable event.

On March 10, CDC officials met with the Advisory Committee on Immunization Practices (ACIP). Each year the Committee recommended which viruses to vaccinate against, and which groups to target for vaccination. Since the general population did not have any immunity to this new strain, an immunization plan could not be limited to high-risk groups.²⁰ At the meeting, the group observed: first, there was evidence of a new strain with human-to-human transmission; second, all previous new strains had been followed by pandemics; and third, for the first time there was both knowledge and time to provide for mass immunization, given developments in vaccine production techniques. Some experts also saw an opportunity to demonstrate the importance of preventive medicine, to “strike a blow for epidemiology in the interest in humanity.”²¹ If the plan were immediately put in motion, inoculation could begin by the summer.

One question was raised, but not pursued: under what circumstances might it make sense to produce and then stockpile the vaccine rather than moving straight to mass vaccination? The CDC’s Director David Sencer argued that the virus would spread too quickly and that distribution logistics were too difficult to consider waiting for evidence of an epidemic before beginning vaccination. There was also a concern about future blame: if officials chose not to vaccinate and then there was a deadly pandemic, they would face biting criticism. It would be said that “they had opportunity to save life,” but didn’t take it.²²

Following the meeting, Sencer wrote a strongly worded memorandum to his superiors at the Department of Health summarizing the Committee’s advice. Given what he called a “strong possibility” of widespread swine influenza that could be highly virulent, the Committee recommended a plan to immunize 213 million people in three months, at a cost of \$134 million. The memo’s tone was urgent: “The situation is one of ‘go or no go’... there is barely enough time. ... A

²⁰ As the CDC Director David Sencer later said: “Most people were at risk... An epidemic spreading into a pandemic had to be considered as a possibility.” From the vantage of preventive medicine, “something had to be done.” *Ibid.*, 25.

²¹ *Ibid.*, 26.

²² *Ibid.*, 28.

decision must be made now.”²³ The Secretary of Health then wrote a note to President Ford. In the note, he shifted Sencer’s conditional to the future tense, from possibility into apparent certainty: “There is evidence there will be a major epidemic this coming fall. The indication is that we will see a return of 1918 flu virus that is the most virulent form of flu. In 1918 a half a million people died. The projections are that this virus will kill one million Americans in 1976.”²⁴

Ford consulted a number of leading experts in virology and public health, including Jonas Salk, who urged mass vaccination.²⁵ The President publicly announced the vaccination plan on March 24, saying: “No one knows exactly how serious this threat could be. Nevertheless, we cannot afford to take a chance with the health of the nation.”²⁶ In April the Assistant Secretary testified at House and Senate hearings, citing historical data as evidence of the threat, but hedging on making a prediction: “By reviewing the epidemiology and natural history of this process ... there is a good likelihood that there will be influenza caused by this particular agent.”²⁷

Outside of the administration and its circle of experts there was some criticism of the program. The New Jersey state epidemiologist publicly warned of dangerous side effects. *New York Times* editorials were repeatedly skeptical, accusing the administration of engaging in politics at the expense of science in an election year. In advance of a major meeting of program participants in Atlanta, one cautious expert wrote in to Sencer to recommend stockpiling vaccines, “along the lines of military defense,” and developing “well worked-out contingency plans.”²⁸ The idea was to create a period of potential intervention in anticipation of the event, rather than engaging in immediate intervention. Such an approach would have provided an alternative to mass vaccination. The proposal was not taken seriously: as I will argue below, this type of “preparedness” measure was not, at this stage, part of the conceptual toolkit of public health.

The goal of the program was to start immunizations in August and finish before the end of winter. Field trials of the vaccine launched in April. By June, the epidemic had not yet appeared. At an ACIP meeting in Bethesda that month, virologist Alfred Sabin suggested stockpiling the vaccine. Again, Sencer

²³ *Ibid.*, 30. The memo would prove politically impossible to ignore, given the later possibility of a leak. A Ford advisor recalled discussing options at a meeting with the President, and thinking: “That memo’s a gun to our head.”

²⁴ *Ibid.*, 35.

²⁵ *Ibid.*, 35. Salk saw the program as an “opportunity to fill part of the ‘immunity gap’” – that is, the gap between environmental antigens and populations without antibodies.

²⁶ *Ibid.*, 46.

²⁷ *Ibid.*, 49-50.

²⁸ *Ibid.*, 60.

countered there was “no rational basis for a general ‘stockpiling’ concept:” because of “jet spread,” the flu would move too fast.²⁹

An unexpected blow to the program came shortly thereafter: vaccine manufacturers announced that they would not bottle the vaccine without liability insurance. Insurers were unwilling to offer such coverage, given uncertainties about the health risks of the vaccination program. “These questions defied actuaries. There was no experience... They were in the business to spread risk, not take it.”³⁰ For the program to begin, the government would have to find a way to assure manufacturers that liability risk would be covered.³¹ Once this problem was solved and the program finally began, there were major problems with logistics at the federal level, and wide variability in individual states’ capacity to actually implement the program.

What then became clear was that CDC had not seriously considered how to manage the risk of side effects. On October 11th, three elderly vaccine recipients in Pittsburgh died soon after receiving their shot. CDC’s response did not reassure the public. “We expected deaths,” they announced. Among 70-to-74 year olds, there would be ten to twelve deaths per 100,000 vaccinations. Despite these problems, by December 40 million had been immunized, though they were oddly distributed given the variation in individual states’ execution of the plan. In the middle of the month, however, Minnesota health officials reported multiple cases of Guillain-Barré syndrome, a severe neurological condition, among vaccinees. At this point it was clear that the expected epidemic was not coming, and the program was immediately suspended. The *Times* editorialized: “Swine Flu Fiasco.”

While the program eventually led to a successful policy of routine annual flu vaccinations for high-risk groups, it has generally been cast as an abysmal failure. A major source of the failure, a report later suggested, was a lack of foresight. Health officials did not have contingency plans in place – and so reacted in an ad hoc manner. Thus they were not able to make available to themselves a solution that could have helped: stockpiling in advance, and then – if the epidemic did develop – applying advanced logistics to design a fast method of vaccine distribution. Moreover, they did not envision potential problems such as manufacturers’ liability and varying individual state distribution capacities. Given the rationality of public health prevention, there

²⁹ Earlier in the course of planning, Vice President Rockefeller – to little effect – had mentioned a possible solution to the problem of jet-spread: he suggested that a Pentagon logistics officer would know how to conduct inoculations in two-to-four weeks.

³⁰ *Ibid.*, 77.

³¹ The matter was settled by the outbreak of a fatal illness at the Legionnaires Convention in Philadelphia. Although the illness turned out not to be swine flu, alarm around the episode was enough to enable the passage of legislation requiring that vaccine liability claims be filed against the government rather than manufacturers.

was “no choice” but to go forward with mass vaccination. Public health officials did not have a mechanism to engage in responsible action under conditions of uncertainty.

The Vulnerable System

Interestingly, around the same time a systematic method for dealing flexibly with potential crises was being developed in a very different domain of government. Civil defense had extended its purview from a focus on nuclear catastrophe to a more general form of preparedness for emergencies. In this section I describe the articulation of “crisis management” as a novel approach to uncertain, but potentially catastrophic threats.

An exemplary figure was Robert Kupperman, an applied mathematician who worked in Nixon’s Office of Emergency Preparedness in the early 1970s. A specialist in operations research, Kupperman had come to the OEP from the Institute for Defense Analysis, a civilian think tank that conducted research for the Defense Department. His task was to quantitatively analyze the operations of large socio-technical systems, such as energy, transportation and industrial production. Based in the Systems Evaluation Division of OEP, Kupperman was involved in governmental response to a number of crises in the early 1970s, including the wage-price freeze, Hurricane Agnes, a rash of terrorist attacks, and the energy crisis.

In this context Kupperman developed an interest in the common structure of crisis situations, and in the development of techniques that could be used to prepare for them in advance. He argued that crises, however diverse, shared a certain number of common problems: the paucity of accurate information, the difficulty of communication among decision-makers, and a confusing array of authorities seeking to take charge of the situation. Such situations involved uncertainty about what was unfolding, coupled with an urgent demand for immediate action to alleviate the crisis. Flexibility for decision-makers depended on the extent to which the crisis manager had forecast the situation and invested in preparation for it. The apparent recent increase in numbers of crises demonstrated the contemporary importance of such foresight. “As we begin to recognize the complex problems that threaten every nation with disaster,” he and two colleagues from SED asked, “can we continue to trust the ad hoc processes of instant reaction to muddle through?”³²

Kupperman’s background was in operations research (OR), a relatively new field dating from World War II efforts to introduce quantitative analysis to

³² Kupperman, Wilcox and Smith (1975). “Crisis Management: Some Opportunities,” in *Science* 187, 229.

military practice. OR developed tools for analyzing and optimizing complex systems. This meant first of all seeing multiple, heterogeneous elements as part of a coherent system whose behavior was, as Jay Forrester put it, “a consequence of the interaction of its parts.”³³ For example, in studying the efficiency of allied bombing strategy during World War II, OR analysts gathered detailed data on specific bombing runs, looking at the interconnection and interaction of multiple variables such as altitude, speed, number and formation of bombers, weather and light. “In general,” as historian Thomas Hughes writes, “advocates of the systems approach perceived, conceived of, or created a world made up of systems.”³⁴ The systems view gained prominence in the 1960s in think tanks like the RAND Corporation and in government agencies such as the Defense Department under Robert McNamara.

If early operations researchers were interested in the optimization of systems, Kupperman was most concerned with their potential failure. His experience in the Office of Emergency Preparedness led him toward an emphasis on the vulnerability of critical systems to sudden, unexpected events. After leaving the OEP, he continued to think about how to systematize governmental response to crisis, especially through his work at the Center for Strategic and International Studies. He was co-author, with R. James Woolsey, of a 1984 CSIS Report on “crisis management in a society of networks” called *America’s Hidden Vulnerabilities*. The report argued that the U.S. relied for its well-being on a sophisticated and intricate set of systems, or networks, for energy distribution, communication, and transportation. It noted recent disruptions of these systems, and warned: “A serious potential exists ... for much more serious disabling of networks crucial to life support, economic stability, and national defense.”³⁵

At CSIS, Kupperman and his colleagues sought to persuade national security officials of the problem of system-vulnerability, and the need to develop techniques of contingency planning. One of their approaches was to hold scenario-based simulations of crisis situations, and invite officials to participate.³⁶ The emergency exercise was a tool for demonstrating to leaders the vulnerabilities of vital systems. As he and Woolsey wrote:

If planning has involved the operating teams and managers (as it always should) these critical personnel gain an increased

³³ Jay Forrester, cit. in Thomas Hughes, *Rescuing Prometheus*, 141.

³⁴ Hughes, *Rescuing Prometheus*, 142 (check).

³⁵ Woolsey and Kupperman, *America’s Hidden Vulnerabilities: Crisis Management in a Society of Networks* (1985), 2. For the history of systems-vulnerability thinking, see Stephen J. Collier and Andrew Lakoff, “How ‘Critical Infrastructure’ Became a Security Problem,” in Myriam Dunn, ed., *The Changing Logics of Risk and Security* (Routledge, forthcoming).

³⁶ See, for example, Andrew C. Goldberg, et al, *Leaders and Crisis: the CSIS Crisis Simulations*. CSIS Significant Issues Series, 1987.

understanding of how the system works and, particularly valuable, how it is likely to behave under abnormal conditions. Training with crisis games and emergency exercises will augment this benefit significantly.³⁷

America's Hidden Vulnerabilities listed a number of measures to ensure the continued functioning of vital systems in the event of emergency, including: improving system resilience, building in redundancy, stockpiling spare parts, performing risk analysis as a means of prioritizing resource allocation, and running scenario-based exercises. A final key element of crisis management, according to the Report, was the specification in advance of responsibilities during the crisis situation itself.³⁸

There is, of course, a long history of reflection on how to approach specific crisis situations – extending from early quarantine plans to Cold War civil defense. And the military practice of training simulations or “war games” of course also has a long history. What was perhaps distinctive about Kupperman’s approach was the application of the method of imaginative enactment to the *generic* crisis situation in order to generate knowledge about internal system-vulnerabilities. As we will see, the CSIS method of crisis simulation would eventually help convince national security planners to think seriously about biological threats.

Regulating Viral Traffic

But first: how were the two strands we have been looking at – public health on the one hand, and contingency planning on the other – brought together? The first conjuncture I want to follow is an encounter between military medicine and international health. At a conference of tropical disease specialists in Honolulu in 1989, Col. Llewellyn Legters ran a table-top exercise simulating the outbreak of a deadly and highly contagious virus. Legters, then head of preventive medicine at the Uniformed Services Hospital, had been a Special Forces doctor in Vietnam, where he had treated the first reported case of drug-resistant malaria in 1964.³⁹ His exercise in Honolulu focused on the lack of international public health resources to manage a dangerous outbreak. Its premise was that a pandemic of a novel and horrifying virus – an “airborne Ebola” – had broken out among refugees in war-torn African republic. As the epidemic extended to

³⁷ *AHV*, 16 (check).

³⁸ “Cooperative action during a crisis requires coordinated preparation beforehand with responsibilities clear for resolving differences concerning both the measures to be taken and the accounts to be charged.” *AHV*, 17.

³⁹ Two years later he founded the Field Epidemiological Survey Team to track this strain of malaria in the midst of the war. See Norma Mohr, *Malaria: Evolution of a Killer* (2001).

humanitarian aid workers, initial public health response was tepid, and the disease spread rapidly to the United States.

Participants in the exercise saw that there was no system in place to contain such an outbreak if it occurred. Journalist Laurie Garrett wrote in *Newsday*: “As the hours wore on, most of the scientists gathered in the auditorium seemed to forget that they were playing at war games to see how the United States would respond to the outbreak of a lethal disease. Even though the situation was made up for a fictional place, the response was based on the real world of today’s medical resources and politics.”⁴⁰ After the exercise, Legters announced that “the outbreak has confirmed, in a very dramatic way, just how ill-prepared we are to detect global epidemic disease threats in a timely fashion, and, once detected, to respond appropriately.”⁴¹

Experts in the field were alarmed. As Garrett reported:

I found this scenario very realistic,” said Dr. William Reeves, professor emeritus from the University of California at Berkeley and one of the world’s experts on disease-carrying insect control. “You could take any disease as a model - Ebola, malaria, whatever - and it would reveal the same thing. We aren’t ready. Where are the people? The expertise? The equipment? Some planning needs to be done on this.

Legters’ exercise was exemplary of the problematic of “emerging infectious disease” as it was articulated the late 1980s and early 1990s.⁴² Also in 1989, virologist Stephen Morse and Nobel Prize winner Joshua Lederberg hosted a major conference on the topic, which led to the landmark volume, *Emerging Viruses*.⁴³ Participants in the conference warned of a dangerous intersection: On the one hand, there were a number of new disease threats, including emerging viruses such as AIDS and Ebola as well as newly anti-microbial resistant strains of diseases such as tuberculosis and malaria. On the other hand, the global public health infrastructure had been left to decay, beginning in the late 1960s with the assumption that infectious disease had been conquered. Moreover, the emergence of dangerous new infectious diseases

⁴⁰ Laurie Garrett, “A Medical War Game,” *Newsday*, Jan 23, 1990.

⁴¹ Llewellyn Letgers, et al (1993), “Are We Prepared for a Viral Epidemic Emergency?” in Stephen S. Morse, ed, *Emerging Viruses*.

⁴² As Nicholas King has shown, this vision quickly found prominent adherents in medicine, the life sciences and journalism. Nicholas B. King, “Security, Disease, Commerce: Post-colonial Ideologies of Global Health, in *Social Studies of Science* 32 (2002). One important report was: Institute of Medicine, *Emerging Infections: Microbial Threats to Health in the United States* (1992). Garrett’s *The Coming Plague* and Preston’s *The Hot Zone* both appeared in 1994. Also see Lyle Fearnley, “From Chaos to Controlled Disorder: Syndromic Surveillance, Bioweapons, and the Pathological Future,” *ARC Working Paper* (2005).

⁴³ Stephen S. Morse, ed., *Emerging Viruses* (Oxford, 1993).

could be expected to continue, due to a number of global processes, such as increased travel, urbanization, civil wars and refugee crises, and environmental destruction.

In his chapter of *Emerging Viruses*, Legters argued for a rejuvenation of the field of tropical medicine as the generation trained in World War II retired. He pointed to declining US capability in epidemiology, diagnosis and treatment of tropical disease. The chapter identified both the sources of the new disease threat, along the lines of Morse, and institutional responses that would be necessary to manage it: a global surveillance system to identify the outbreak; a laboratory system to characterize the agent; a reporting system to alert world health community; and academic training of a new generation of tropical disease experts.

Legters' exercise framed the closing chapter of Garrett's best-selling book, *The Coming Plague* (1994). "What the war games revealed," she wrote, "was an appalling state of nonreadiness. Overall, the mood in Honolulu after five hours was grim, even nervous. The failings, weaknesses, and gaps in preparedness were enormous."⁴⁴ But her vision of the source of the problem was broader than that of scientists such as Legters or Henderson. On the one hand, she diagnosed a collapse of the global public health system. Problems included discrepancies in capabilities between different health departments, widespread deficiencies in disease reporting systems, little staff for disease surveillance, and suffering health department laboratories. The international situation was even worse.

At the same time, Garrett argued that global living conditions – poverty, civil war, lack of basic health care – were the source of the emerging disease threat, and that these social problems would need to be addressed in order to provide security against emerging pathogens. She quoted former CDC director William Foege, who argued that new disease emergence was linked to "thirdworldization": the overall status of health care, immunizations, sanitation, education. According to Foege, structural adjustments had worsened the human condition and improved odds for microbes. "It is impossible to ensure a disease-free existence for people in North American and Western Europe without providing similar assurances for residents of Azerbaijan, Cote d'Ivoire and Bangladesh," he said.⁴⁵

But this "population security" orientation to the threat of emerging disease was mostly overshadowed by a more technical focus on strengthening the public

⁴⁴ Garrett, "Searching for Solutions: Preparedness, Surveillance, and the New Understanding," *The Coming Plague*, 594.

⁴⁵ *The Coming Plague*, 609. Similarly, former CDC epidemiologist Joseph McCormick argued that "the links between poverty, lack of basic health care, ecological disturbances, and the emergence of dangerous microbes were so obvious as to be basic tenets of public health."

health system against new pathogens – for example in proposals by epidemiologist DA Henderson for a global disease surveillance system to be managed by the CDC. Henderson was well-known for his leadership of the 1970s smallpox eradication program, which combined techniques of surveillance and containment. He argued for the inevitability of novel pathogen emergence: “mutation and change are facts of nature, that the world is increasingly interdependent, and that human health and survival will be challenged, ad infinitum, by new and mutant microbes, with unpredictable pathophysiological manifestations.”⁴⁶ As a result, he said, “we are uncertain as to what we should keep under surveillance, or even what we should look for.”

As Lyle Fearnley (2005) has shown, Henderson sought to link this new problem to a solution that had been proposed several decades earlier by his mentor, Alexander Langmuir, in the context of the Cold War threat of a bioweapons attack: an integrated global system of disease surveillance.⁴⁷ What we need, Henderson argued, is a system that can detect novelty: in the case of AIDS, such a detection system could have warned early of new virus and put measures in place to prevent its spread. A good disease surveillance system would have three elements: first, units to detect unusual cases; second, a channel to report the occurrence; and third, a capacity to respond to unusual events. He proposed a system of global surveillance units to be run by CDC, and located in peri-urban areas in major cities in the tropics, which could provide a “window on events in surrounding areas.”

Disease as a National Security Threat

At this stage, “emerging infectious disease” – though widely taken up as a public health and biomedical problem – was not yet conceptualized as an issue of national security. This changed a decade later when the emerging infectious disease problematic combined with increased anxiety about bioterrorism. Scenario-based exercises were central to this process.

In the 1990s, accounts began to circulate of a massive, secret Soviet bio-weapons program that had continued throughout the Cold War, and which had employed scores of scientists whose whereabouts were now unknown.⁴⁸ D. A. Henderson was perhaps the first to link the new bioterrorist threat to the

⁴⁶ DA Henderson, “Surveillance Systems,” in Morse, ed., *Emerging Viruses*, 283. See Fearnley (2005) for a detailed analysis.

⁴⁷ As Fearnley notes, Langmuir provided the modern definition of disease surveillance: “continued watchfulness over the distribution and trends of incidence through systematic collection, consolidation and evaluation of morbidity and mortality data and other relevant data.” See Alexander Langmuir, “The Surveillance of Communicable Diseases of National Importance,” *N Engl J Med* vol. 268, no. 4, (24 Jan 1963, 182-3).

⁴⁸ The program was described by one of its leaders, Ken Alibek, in his 1999 book, *Biohazard*.

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problem of emerging diseases.⁴⁹ He argued that his proposed global disease surveillance system would be useful for both types of threat – from emerging diseases and from proliferating bio-weapons knowledge. In 1998, Henderson founded the Johns Hopkins Center for Civilian Biodefense, which became a leading site of knowledge production around the new biosecurity threat.

Dark Winter

The CDC developed a number of initiatives in response to the bioterrorist threat – one of which was a program of global disease surveillance modeled on Henderson’s proposal. Another was the Office of Bioterrorism Preparedness and Response, which provided \$40 million per year in bioterrorism grants to local public health departments. However, critics such as Tara O’Toole of the Hopkins Biodefense Center argued that these measures were not nearly enough.⁵⁰ The question was: how to convince officials of the need to address the problem? This threat was different from what public health experts were accustomed to dealing with: there was no historical record on which to estimate its likelihood of occurrence, or to calculate the most effective intervention measures. Nor was biosecurity a problem that national security experts were trained to think about. What kind of experience could convey a sense of urgency and generate knowledge about necessary interventions?

With O’Toole’s lead, the Hopkins Biosecurity Center entered into a collaboration with Kupperman’s former think tank, the Center for Strategic and International Studies, to design a table-top exercise simulating a smallpox attack on the United States.⁵¹ The exercise, called “Dark Winter,” took place at Andrews Air Force Base in June 2001. It was aimed at influential national security experts and government officials. Participants included Sam Nunn as the President, David Gergen as National Security Advisor, and James Woolsey as Director of the CIA. The exercise took place in three segments over two days, depicting a time span of two weeks after the initial attack. While designers used historical data on the patterns of smallpox outbreaks to design the scenario, the point of using this epidemiological data was not to accurately model probability, but rather to create a plausible story.⁵²

⁴⁹ Fearnley (2005).

⁵⁰ Tara O’Toole. Testimony to House to Committee on Government Affairs, Hearing on FEMA’s Role in Managing Bioterrorist Attacks and the Impact of Public Health Concerns on Bioterrorism Preparedness. July 23, 2001.

⁵¹ A third organization, the ANSER Institute – run by a former Air Force Colonel and specializing in scenario development – lent its technical expertise.

⁵² A critical question, for example, was the transmission rate assumed. The smallpox transmission rate fluctuates widely based on multiple contextual factors. To determine the rate for the exercise, the developers analyzed 34 European cases of smallpox between 1958 and 1973 – and chose the example of an outbreak in Yugoslavia example as their model. Tara O’Toole, Michael Mair, and Thomas V. Inglesby, “Shining Light on ‘Dark Winter’”, *Clinical Infectious Diseases* 2002; 34: 972-83.

The first NSC meeting laid out the situation for Council members. There were reports of an outbreak of smallpox in Oklahoma City, assumed to be the result of a terrorist attack. Initial questions for the Council were technical: “With only 12 million doses of vaccine available, what is the best strategy to contain the outbreak? Should there be a national or a state vaccination policy? Is ring vaccination or mass immunization the best policy?” The problem was that there was not enough information about the scale of the attack to come up with a solution. By the second meeting, the situation looked grim. “Only 1.25 million doses of vaccine remain, and public unrest grows as the vaccine supply dwindles,” read the scenario. “Vaccine distribution efforts vary from state to state, are often chaotic, and lead to violence in some areas.” International borders were closed, leading to food shortages. Meanwhile simulated 24-hour news coverage, shown to participants as video clips, sharply criticized the government’s response. Graphic photographs of American smallpox victims were also shown.

As vaccine stock dwindled further, the prospect of using the National Guard to enforce containment was broached. But who had the authority to make emergency decisions? In one sequence, an NSC member advised the President to federalize the National Guard, as states had begun to seal their borders. Gov. Keating objected:

Keating: “That’s not your function.”

Terwillinger: “Mr. President, this question got settled at Appomattox. You need to federalize the National Guard.”

Nunn: “We’re going to have absolute chaos if we start having war between the federal government and the state government.”

Meanwhile civil unrest grew. “With vaccine in short supply, increasingly anxious crowds mob vaccination clinics,” the scenario continued. “Riots around a vaccination site in Philadelphia left two dead. At another vaccination site, angry citizens overwhelmed vaccinators.”⁵³ By the third meeting, there had been thousands of deaths, and the situation was growing still worse. The exercise ended as the disaster continued to escalate: there was no vaccine remaining and none was expected for four weeks. CSIS Director John Hamre later narrated the final stage: “In the last 48 hours there were 14,000 cases. We now have over 1,000 dead, another 5,000 that we expected to be dead within weeks. There are 200 people who died from the vaccination, because there is a

For a critique, see Ronald Barrett, “Dark Winter and the Spring of 1972: Deflecting the Social Lessons of Smallpox.” *Medical Anthropology*, Vol. 25, No. 2. (June 2006), pp. 171-191.

⁵³ Final Script, *Dark Winter Exercise*, 24.

small percentage [of risk], and we have administered 12 million doses... At this stage the medical system is overwhelmed completely.”⁵⁴

Political influence worked through a process of dissemination. At Congressional hearings on the exercise, participants reported on their experience of Dark Winter. For example, Sam Nunn reflected on the debate over using the National Guard: “It is a terrible dilemma. Because you know that your vaccine is going to give out, and you know the only other strategy is isolation, but you don’t know who to isolate. That is the horror of this situation.” As Hamre said, “We thought that we were going to be spending our time with the mechanisms of government. We ended up spending our time saying, how do we save democracy in America? Because it is that serious, and it is that big.”

The point of the exercise was to give national security officials a *feeling* of how an unprecedented event might unfold. Its circle of influence extended outward through a series of briefings featuring a realistic video portraying the events as they unfolded. Vice President Cheney, DHS Secretary Tom Ridge, and key Congressional leaders were among those briefed. At a Congressional hearing where the video was about to be shown, Rep. Christopher Shays asked Hamre about its affective qualities:

Mr. Shays. Now, I understand there may be some graphic display here.

Mr. Hamre. Sir, there will be graphics as well as some video. This will be shown on these side monitors.

Mr. Shays. I’m told that some of it is not pleasant.

Mr. Hamre. It is not pleasant. Let me also emphasize, sir, this is a simulation. This had frightening qualities of being real, as a matter of fact too real. And because we have television cameras here broadcasting, we want to tell everyone, this did not happen, it was a simulation. But, it had such realism, and we are going to try to show you the sense of realism that came from that today.⁵⁵

Indeed, Shays did react strongly to the video, noting afterwards how nervous he had felt while watching it:

I felt like I’ve been in the middle of a movie, and maybe that’s why I was anxious. I wanted to know how it turned out. And so I asked my staff how did we finally get a handle on it, you know, 12 million vaccines out, the disease spreading? And the response

⁵⁴ “Combating Terrorism: Federal Response to a Biological Weapons Attack. Hearing before the Subcommittee on National Security, Veterans Affairs and International Relations of the Committee on Government Reform. House of Representatives, July 23, 2001.

⁵⁵ “Combating Terrorism” hearing, July 23, 2001.

was we did not get a handle on it. They stopped the exercise before resolution. Kind of scary, huh?

The exercise was successful in that it convinced participants – and later briefing audiences – of the urgent need to plan for a bio-attack. Keating was stunned at the lack of preparedness demonstrated by the exercise: “We think an enemy of the United States could attack us with smallpox or with anthrax...and we really don’t prepare for it, we have no vaccines for it – that’s astonishing.” As Woolsey noted, this was a new type of enemy: “we are used to thinking about health problems as naturally occurring problems outside the framework of a malicious actor.” With disease as tool of attack, “we are in a world we haven’t ever really been in before.”

The exercise demonstrated a number of vulnerabilities. First, officials did not have real-time understanding – “situational awareness” - of the various aspects of the crisis while it unfolded. As the scenario designers wrote, “this lack of information, critical for leaders’ situational awareness in Dark Winter, reflects the fact that few systems exist that can provide a rapid flow of the medical and public health information needed in a public health emergency.”⁵⁶ Second, without adequate stockpiles of medical counter-measures, leaders could not properly manage the crisis. Third, there was a gulf between public health and national security expertise: “It isn’t just [a matter of] buying more vaccine,” said Woolsey. “It’s a question of how we integrate these public health and national security communities in ways that allow us to deal with various facets of the problem.”

Participants had concrete suggestions for improvement. Nunn argued for vaccination of first responders in advance of an attack: “every one of those people you are trying to mobilize is going to have to be vaccinated. You can’t expect them to go in there and expose themselves and their family to smallpox or any other deadly disease without vaccinations.” Hauer, a former New York City emergency manager, spoke of the problem of distributing vaccines in cities: “The logistical infrastructure necessary to vaccinate the people of New York City, Los Angeles, Chicago is just—would be mind-boggling.” But the broader lesson was the need to enact the event in order to plan for it. As Hamre said, “We didn’t have the strategy at the table on how to deal with this, because we have never thought our way through it before, and systematically thinking our way through this kind of a crisis is now going to become a key imperative. It clearly is going to require many more exercises.”

⁵⁶ O’Toole, et al (2002), 980.

Smallpox Vaccination

In looking the deliberations of the CDC's panel of external public health experts, the ACIP, over this period, one can see how the new imperative for bioterrorism preparedness conflicted with the existing rationality of public health. Dale Rose has described this history in detail.⁵⁷ In June 2001, ACIP addressed the question of whether a smallpox vaccination campaign should be implemented. While the Committee laid out a "post-event" plan for containment of the virus in the case of an attack, it did not recommend widespread pre-event vaccination. Indeed, it argued: "The risk of smallpox occurring as a result of a deliberate release by terrorists is considered low, and the population at risk for such an exposure cannot be determined."⁵⁸ ACIP was here faced with an uncertain threat: an event that was conceivable, but which had never occurred, and whose consequences could be catastrophic. Without data on probability, the Committee did not have the means to rationally assess risk.

The events that Fall – the attacks of 9/11 followed by the anthrax letters – intensified the sense of urgency to engage in bioterrorism preparedness. The focus was on specific threats, especially those judged most likely to be used by terrorists, such as anthrax and smallpox. In addition to stockpiling drugs and vaccines, the administration urged the CDC to develop a plan for smallpox vaccination. Apparently the Dark Winter scenario played a role in this decision. In turn, CDC asked ACIP to take the issue up again. Committee members agreed that the traditional model of post-event containment rather than pre-event mass vaccination remained the best overall strategy.

But there remained the question of whether some members of the population – such as healthcare workers – should nonetheless be vaccinated prior to any incidence of the disease. The problem with pre-event vaccination of hundreds of thousands of first responders was that there were known risks from the vaccine itself: if such a program were performed, there would be serious adverse events, including fatalities – in the absence of any incidence of the disease. The transcript of the June 2002 ACIP meeting indicates that the experts were not thinking in terms of plausible scenarios – rather, they needed numbers that could be taken up as part of a statistical risk assessment:

To make ... decisions, the A.C.I.P. needs data. Those on vaccine efficacy and safety are in hand, but not for the risk of the disease. Does anyone have more information that they can share? Without it, should the A.C.I.P. even make this decision...?"

⁵⁷ See Rose, "How did the Smallpox Vaccination Program Come About? Tracing the Emergence of Recent Smallpox Vaccination Thinking." *ARC Working Paper* (Spring 2006).

⁵⁸ *MMWR* 2001, cit. in Rose (2006).

One could calculate the risks of the taking the vaccine, but not the risks of not taking the vaccine – ie. the risk of an attack. The Committee requested more information, but CDC responded: “Some information [on the threat]... could be provided, but the bottom line would be the same as the message being received here today. The C.D.C. Director would not place on this Committee the burden of making a risk assessment. The members were informed as best as possible under the circumstances that the risk is not zero but is perceived to be low.” A smallpox attack was an uncertain probability, high consequence event – one not amenable to treatment with probabilistic calculation. Arguably, the problem of the credibility of knowledge-claims based on scenario planning for public health workers was one factor in the eventual failure of the Smallpox Vaccination Program, which was suspended after reaching less than 10% of its original goal of vaccinating 500,000 healthcare providers. Thus it was still the case – as we saw in the Swine flu episode – that worst-case preparedness was not an intuitive rationale for public health experts. One lesson of the failed smallpox vaccination program, for biosecurity planners, was that simulation exercises would have to be applied more broadly to local public health workers.

The Scenario-Event: Hurricane Katrina and Avian Flu

Until 2005, such preparedness efforts were mostly focused on specific threat agents such as smallpox and anthrax. These efforts were reoriented by the failed governmental response to Hurricane Katrina. For thinkers of preparedness, Katrina served as a “live action” exercise demonstrating gaps in the system of preparedness. The disaster also suggested that while homeland security planners had been focused on the threat of terrorism, the problematic of emergency was much broader: the rubric of “all-hazards planning” that had originally structured FEMA came to the fore.⁵⁹

The problem of avian flu now appeared in a new light – in terms of the vulnerability of the nation’s public health infrastructure. Washington, DC was in a “post-Katrina, pre-pandemic” moment, as one commentator put it.⁶⁰ As a member of the House Homeland Security Committee said, “the pandemic flu scenario is affording us much more time to prepare, but as of today it appears that the nation is poised to repeat a grave error by not heeding the lessons learned from Katrina.”⁶¹ For Sen. Richard Burr, chairman of the Subcommittee on Public Health Preparedness, Katrina “exposed an unstable public health infrastructure at all levels of government during an emergency event.”⁶² Burr argued that the task at hand was akin to Eisenhower’s in constructing the

⁵⁹ See Lakoff, “Preparing for the Next Emergency.”

⁶⁰ Monica Schoch-Spana reference.

⁶¹ Joint Hearing on Avian Flu, House Homeland Security Committee, February 8, 2006.

⁶² Hearing of the Bioterrorism and Public Health Preparedness Subcommittee, Senate Health Education, Labor and Pensions Committee, March 28, 2006.

nation's highway infrastructure: "For the purpose of a national public health and defense we need a national standardized public health system." It would have to do more than prepare for known threats: "The question is, are we smart enough to design a template that enables us to address the threats that we don't know about for tomorrow"?

What were the necessary elements of such a system? These could be seen through an analysis of current gaps in response. Experts and officials collaborated to constitute the elements of a public health system, based on knowledge of its vulnerabilities. "There are multiple holes in our capacity to respond," said Henry Waxman. "We need to increase our vaccine production capacity, strengthen our public health infrastructure, create adequate hospital surge capacity and draft contingency plans that will ensure the continued operation of important government functions."⁶³

For many officials, the most serious problem Katrina had exposed was that of the locus of responsibility in an emergency situation. For some, the problem was the incompetence of federal leadership. For others, it was that local authorities were not up to the task of coordinating response. Former Homeland Security Advisor Richard Falkenrath argued that state and local health authorities would be incapable of coordinating an adequate response to a catastrophic disease event. The Health Department, he testified, "is simply not going to be able to meet the American people's expectation of the federal government in a truly catastrophic disease contingency such as a high lethal pandemic or major bioterrorist attack." He was especially concerned about civil unrest resulting from "shortages in vital, life-saving counter-measures to the disease in question" – the premise of Dark Winter. "I mean something very, very specific, which is to prepare to distribute life-saving medications to extremely large populations, very, very quickly, when they are afraid, because there is a communicable disease out there that they do not know how to deal with."

Falkenrath cited evidence from scenario-based exercises to validate his claim that HHS did not have the operational capabilities to distribute medical supplies in a crisis: "This extraordinary national deficiency was first revealed during the first TOPOFF exercise in May 2000 at which I was an observer," and "in a wide variety of smaller scale table top exercises and simulations." He continued: "The implication is inescapable: the plans, if put to the severe test of a catastrophic disease scenario in the near future, will fail." There was a clear policy implication: the National Response Plan should be amended to assign Emergency Support Function #8 to the military in a catastrophic disease incident, at the order of the president: "Only the Department of Defense has the

⁶³ House Government Reform Committee, Hearing on Government Pandemic Flu Planning, May 11, 2006.

planning, logistics, and personnel resources needed to conduct nationwide medical relief operations in a full-scale catastrophic disease scenario.”⁶⁴

O’Toole drew a different lesson from Katrina: “What we have to do, and what the main point of planning is, as we have learned in all of the emergency preparedness done so far, is that we have to start talking with each other.”⁶⁵ She disagreed with Falkenrath. “I think it would be a big mistake to... plan to put DOD in charge whenever we have a big bad thing happening.” While it is necessary to “rethink federalism,” she argued, the federal role is one of creating infrastructure to enable local response: “What the feds have to do is create the capacity to plug in and that’s where they ought to be focusing on. But I don’t think we want the DOD to suddenly become everybody’s responder in cases of dire need.”⁶⁶

Another suggestion was that local health agencies should do more exercises. A representative of the American College of Emergency Physicians said: “We need to train the hospital and health care workers to more long-term pandemic scenarios. And then we need to take these lessons learned, the best practices and lessons learned, and disseminate.”⁶⁷ The Commissioner of Health of Dutchess County New York testified: “I think over the last five years we’ve built the framework of a system that we can carry forward . . . but we need to strengthen that and continue to have strategic exercises community wide, not just public health departments, but every single community drill to include as many partners as possible so that we can learn from each other.”⁶⁸ And a Virginia state emergency health preparedness official said: “we have been working very closely with DHS in terms of developing metrics as well as with the CDC and DHHS, but we need to assure that we have the exercises and events to test our plans and that’s really the test of preparedness. What we’ve done in Virginia is we’ve used every event as an opportunity to test our plans and we’ve had many.”⁶⁹

By the end of the year, Congress had moved to address the problem of preparedness in a more sustained, integrated way, with the passage of the “The Pandemic and All-Hazards Preparedness Act of 2006.” Even critics of the prior year’s plan hailed the bill’s passage as a “milestone” piece of public health

⁶⁴ Falkenrath, testimony to Senate Committee on Health Education and Labor, March 16, 2006.

⁶⁵ Joint hearing on avian flu, House Homeland Security Committee: Prevention of Nuclear and Biological Attack Subcommittee with Emergency Preparedness, Science and Technology Subcommittee, February 8, 2006.

⁶⁶ Hearing of the Bioterrorism and Public Health Preparedness Subcommittee, Senate Health, Education, Labor and Pensions Committee, March 28, 2006.

⁶⁷ House Homeland Security Committee, February 8, 2006.

⁶⁸ March 28, 2006

⁶⁹ March 28, 2006.

legislation.⁷⁰ The Act included a range of measures, from the reorganization of Federal health administration, to funding for local and state health agencies, the training of epidemiological investigators, and a novel biomedical research initiative. A key issue the Act sought to address was how to create an integrated “system” of public health preparedness, one that extended from disease detection to vaccine production to the relations among the various government agencies that would be charged with response. This system was focused not specifically on pandemic flu, but on a generic form of threat: an unpredictable, but potentially catastrophic disease event.

There was broad agreement that addressing this threat was not simply a matter of public health, but one of national security. While the link between national security and public health was not in itself new, what was distinctive about these measures was the attempt to integrate the institutions, forms of knowledge, and techniques of intervention developed in the period of modern public health into a more general system of preparedness, in the context of a broader security problematic that focused on the vulnerability of “critical infrastructures” to potentially catastrophic events.

Conclusion

In closing, let me return to the comparison, outlined above, between the 1976 Swine Flu campaign and the “pandemic preparedness” measures enacted three decades later. Along with the contrast in their scale, the two technopolitical responses differed profoundly in their approach to disease threat (**see Table 2**). First, the way of conceptualizing the threat to be managed was distinct: the 2005-06 measures were focused not only on the specific threat of a new and virulent strain of influenza, but at the generic “catastrophic disease threat.” Second, the site of intervention differed: whereas the 1976 campaign was aimed at the national population using classical methods of public health, the later plans were aimed at multiple elements of the “public health infrastructure,” both within the United States and globally, including disease surveillance capacity, the ability to produce and distribute counter-measures, and the administrative organization of response. And third, the prominent form of knowledge used to authorize expert claims about needed interventions had changed: rather than the statistical calculation of risk based on the historical incidence of disease, the emphasis of experts was on knowledge gathered through the imaginative enactment of singular events.

⁷⁰ Michael Mair, Beth Maldin and Brad Smith, “Passage of S. 3678: The Pandemic and All-Hazards Preparedness Act,” UPMC, Center for Biosecurity, December 20, 2006.

Table 2
Swine Flu vs. Pandemic Preparedness

	Swine Flu (1976)	Pandemic Preparedness (2006)
Type of threat	Specific	Generic
Normative rationality	Prevention	Preparedness
Target	National population	Public health infrastructure
Form of knowledge	Risk calculation	Imaginative enactment
Technique of intervention	Mass vaccination	Capacity building

It is not that the two forms of security are necessarily in conflict or mutually exclusive: rather, vital systems security operates in reflexive relation to population security, working to define its elements as a “critical infrastructure” whose vulnerabilities must be mitigated. However, if political attention focuses on vital systems security and not on population security, only certain types of problems become visible as possible targets of intervention. Whereas Laurie Garrett had pointed to global living conditions – poverty, access to health care, decent housing – as a key source of the threat of emerging infectious disease, the eventual preparedness measures enacted in response to avian flu focused only on technical response to the potential outbreak.