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THESIS

**COMPLIANCE WITH COMMUNITY MITIGATION AND
INTERVENTIONS IN PANDEMIC INFLUENZA: A
COMMUNITY POLICING STRATEGY**

by

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September 2007

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PANDEMIC INFLUENZA: A COMMUNITY POLICING STRATEGY**

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ABSTRACT

A number of response plans and strategies have been published concerning preparation for an oncoming Pandemic Influenza. The majority of federal guidance and state planning with respect to pandemic preparation focuses excessively on the availability and distribution of effective vaccine and antiviral remedies — pharmaceutical solutions. Effective vaccines, presently unavailable, will not be in production and available for application for at least eight months after the onset of an identified pandemic. Community mitigations and interventions such as school closures, event cancellations, limited travel, quarantine and work at home plans are traditional responses to slowing the spread of a virus. In order to effectively implement these time-tested strategies, voluntary community compliance with interventions becomes exceedingly important. The recent global experience with SARS and current mathematical modeling of virus spread characteristics support community mitigation efforts. The community policing model, having evolved over the last twenty years, provides a pre-existing framework to engage the public in grassroots pandemic education, awareness, planning and problem solving partnerships. The Incident Command System provides a structure for a collaborative, multi-agency approach to successfully implement a community awareness and compliance initiative. Community mitigations will save lives.

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TABLE OF CONTENTS

I.	INTRODUCTION.....	1
A.	PROBLEM STATEMENT	1
B.	RESEARCH QUESTION	4
C.	PRACTICAL SIGNIFICANCE OF PROJECT	4
D.	LITERATURE REVIEW	5
E.	METHODOLOGY	11
II.	THE INTERNATIONAL EXPERIENCE WITH CONTAINMENT	13
A.	THE INTERNATIONAL SARS EXPERIENCE	13
B.	THE CANADIAN EXPERIENCE	15
	1. Strategy for Community Compliance	15
	2. Successful Partnerships	16
C.	THE HONG KONG EXPERIENCE	16
	1. Strategy for Community Compliance	16
	2. Successful Partnerships	17
D.	THE PEOPLE’S REPUBLIC OF CHINA EXPERIENCE.....	17
	1. Community Compliance.....	18
	2. Successful Partnerships	18
E.	INTERNATIONAL ATTITUDES ON PUBLIC COMPLIANCE	18
	1. Survey of Attitudes Concerning Compliance.....	18
	2. Information Flow	19
	3. Confidence in Employers/Wages.....	21
F.	LESSONS LEARNED	21
III.	COMMUNITY MITIGATION STRATEGY AND INTERVENTIONS	23
A.	MITIGATION STRATEGIES USED IN THE 1918 PANDEMIC.....	23
	1. The Importance of Timing: St. Louis vs. Philadelphia.....	24
	2. Indecisiveness and Inaction.....	24
B.	ALL INFLUENZA STRAINS ARE NOT THE SAME	25
C.	MODELING STUDIES AND COMMUNITY INTERVENTIONS	27
	1. Los Alamos National Laboratory Model	28
	2. The University of Hong Kong Study	29
	3. The Sandia Laboratory Model	30
	4. Model Summary.....	30
	5. Consequences of Interventions	31
D.	OBJECTIVES AND STRATEGY FOR COMMUNITY MITIGATION.....	32
	1. The Objectives of Community Mitigation/Intervention Practice..	32
	2. Specific Mitigation and intervention Means.....	32
IV.	VOLUNTARY COMPLIANCE AND SOCIAL TRUST.....	33
A.	WORKING TOWARDS COMPLIANCE	33
B.	SOCIAL TRUST.....	33

1.	Survey on Public Trust.....	33
2.	Truthfulness in Building Community Trust.....	34
C.	PUBLIC PANDEMIC EDUCATION	36
1.	The Harvard Study	36
2.	The Keystone Center Study	38
D.	INFORMATION FLOW.....	40
1.	Communication	41
2.	Community Leaders and Existing Institutions	42
3.	Panic and Fear.....	43
E.	SUMMARY	43
V.	COMMUNITY POLICING/HOMELAND SECURITY POLICING MODEL..	45
A.	PUBLIC HEALTH AND DISEASE MITIGATION.....	45
1.	A Declining Presence of Public Health.....	45
2.	The Importance of Existing Relationships	46
B.	CRITICAL ELEMENTS OF COMMUNITY POLICING	46
1.	Trust Based Partnerships.....	47
2.	Problem Solving	48
C.	THE EVOLUTION OF COMMUNITY POLICING	49
1.	The Original Community Policing	50
2.	Problem Orientated Policing	51
3.	Homeland Security Policing.....	51
D.	COUNTERARGUMENTS.....	54
E.	THE OVERARCHING OBJECTIVES.....	54
VI.	STRATEGIC PLAN FOR ACHIEVING VOLUNTARY COMPLIANCE	57
A.	DEFINING THE PROBLEM.....	57
1.	The Public Challenge.....	58
2.	Government	58
B.	FRAMING THE INTERVENTION COMPLIANCE STRATEGY	59
1.	Strategy Canvas	59
2.	The Framework for Compliance	60
a.	<i>Eliminate</i>	61
b.	<i>Raise</i>	62
c.	<i>Create</i>	62
d.	<i>Reduce</i>	62
C.	A COMMUNITY POLICING ORIENTATED COMPLIANCE TEAM.....	63
D.	INCIDENT COMMAND STRUCTURE.....	63
1.	Unified Command.....	65
2.	Operations	65
3.	Planning	66
4.	Logistics	66
5.	Finance.....	66
E.	PANDEMIC MITIGATION COMPLIANCE OPERATIONS MODEL	67
F.	SUMMARY	67

APPENDIX.....	69
BIBLIOGRAPHY.....	73
INITIAL DISTRIBUTION LIST	81

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LIST OF FIGURES

Figure 1.	Goals of Community Mitigation.....	2
Figure 2.	Values Attributed to International Mitigations.	15
Figure 3.	Philadelphia vs. St Louis.	24
Figure 4.	Intensity of Virus.	26
Figure 5.	Intervention Results.	29
Figure 6.	Who is more trusting.....	35
Figure 7.	Willingness to Cooperate.....	37
Figure 8.	School Closings.	38
Figure 9.	Trust Communication Cycle.....	47
Figure 10.	Problem Solving Cycle.	49
Figure 11.	Homeland security Policing.....	53
Figure 12.	Community Intervention Strategy.	60
Figure 13.	Four Action Framework.....	61
Figure 14.	The ICS – Mitigation Compliance Team Diagram.....	64
Figure 15.	The Operational Model.....	67

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LIST OF TABLES

Table 1.	Annual Vaccine Production Process.....	11
Table 2.	Trusted Sources of Public Health Information.	20
Table 3.	Stakeholders Supporting Intervention.....	39

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I. INTRODUCTION

A. PROBLEM STATEMENT

The present and future existence, availability and potential efficacy of influenza vaccines and antiviral remedies to combat a pandemic are, at best, uncertain.¹ In spite of this fact, state planning for pandemic response seems disproportionately weighted in favor of the use of vaccine and antiviral applications as the centerpiece of most pandemic response planning. While there is little doubt that vaccines, specific to a given influenza strain, would provide the most effective remedy for a global pandemic, such solutions are presently unavailable and will remain elusive until well after the start of a global pandemic.² Complications facing vaccine development and manufacture includes predicting future strains of an influenza virus, shortcomings in manufacturing capacity,³ and the possibility of individuals requiring multiple and extremely expensive antiviral applications.⁴ While vaccine development and related distribution planning will become important at some point in a future pandemic, the emphasis in current planning on presently nonexistent vaccines⁵ and pharmaceutical solutions — to the exclusion of comprehensive community mitigation or intervention planning — is shortsighted. **Figure 1** illustrates this goal of community mitigation.

¹ Center for Disease Control, *Interim Pre-Pandemic Planning Guidance: Community Strategy for Pandemic Influenza Mitigation in the United States* (Washington, DC: U.S. Department of Health and Human Services, 2007), <http://www.pandemicflu.gov/plan/community/commitigation.html> (accessed February 23, 2007).

² Laurie Garrett, “The Next Pandemic?” *Foreign Affairs* July/August 2005, <http://www.foreignaffairs.org/20050701faessay84401/laurie-garrett/the-next-pandemic.html> (accessed November 2, 2006)

³ Staff of the Center for Bio security of UPMC, *National Strategy for Pandemic Influenza and the HHS Pandemic Influenza Plan: Thoughts and Comments*, December 2005 ed., Vol. 3 (Larchmont, NY: Mary Ann Liebert, 2005), 292, <http://www.liebertonline.com/doi/abs/10.1089/bsp.2005.3.292> (accessed July 8, 2007).

⁴ Catherine J. Luke and Kanta Subbarao, “Vaccines for Pandemic Influenza,” *Emerging Infectious Diseases* 12, no. 1 (January 2006, 2006), 68, <http://www.cdc.gov/ncidod/EID/vol12no01/pdfs/05-1147.pdf> (accessed January 27, 2007).

⁵ Staff of the Center for Biosecurity of UPMC, *National Strategy for Pandemic Influenza and the HHS Pandemic Influenza Plan: Thoughts and Comments*, 292.

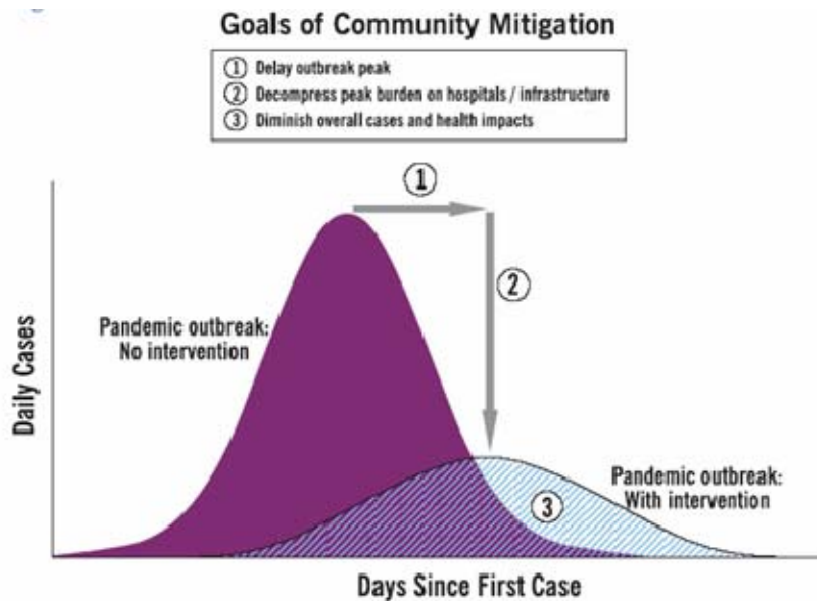


Figure 1. Goals of Community Mitigation.⁶

In flattening of the pandemic peak, several immediate benefits become available for response. The anticipated outcomes are:

- Delay the exponential growth in incident cases and shift the epidemic curve to the right in order to “buy time” for production and distribution of a well-matched pandemic strain vaccine
- Decrease the epidemic peak thereby avoiding/mitigating overwhelming surge requirements in medical treatment
- Reduce the total number of incident cases, thus reducing community morbidity and mortality

Community mitigation and interventions describe a number of overarching efforts to slow or temper the effects of a pandemic. As used in this thesis, mitigations include (alone or used in combinations), the use of school closures, limiting or canceling large

⁶ Center for Disease Control, *Interim Pre-Pandemic Planning Guidance: Community Strategy for Pandemic Influenza Mitigation in the United States*, 18.

public gatherings, closure of airports or mass transit services, implementation of work-at-home plans, the utilization of targeted antiviral prophylaxis (TAP), the use of personal protective equipment, encouraging the use of personal hygiene measures, the isolation of infected individuals and the use of limited or widespread quarantine.⁷ When employed in conjunction with other preventive strategies such as pharmaceutical remedies (when available), many of these measures can be effective complementary tactics in slowing or delaying the spread of a virus.⁸ Some mitigating practices such as quarantine, for example, are well established and accepted public health practices that have been used to slow the spread of disease for hundreds of years.⁹ However, a review of a number of state pandemic plans, including the Massachusetts Pandemic Influenza Plan,¹⁰ reveal fewer resources and inconsistent planning committed in the area of community mitigation and interventions. Should the country experience a pandemic, the majority of response and prevention relies heavily on states' capabilities.¹¹ The inconsistency of state plans with respect to community mitigation and interventions is illustrated in **Appendix 1**. While nearly every state has a vaccine distribution plan, the development of state mitigation efforts is far more inconsistent.

Community mitigation and interventions, when enacted under the stressful conditions of a pandemic, will require significant public support and cooperation from the community itself. A high level of cooperation under such stressful circumstances should only be anticipated after intensive, pre-event public education, open and sustained dialogue, transparency of planning and unprecedented levels of trust between the

⁷ Center for Disease Control, *Interim Pre-Pandemic Planning Guidance*, 19.

⁸ Committee on Modeling Community Containment for Pandemic Influenza, *Modeling Community Containment for Pandemic Influenza: A Letter Report* (Washington, DC: National Academy of Sciences, 2006), <http://books.nap.edu/catalog/11800.html> (accessed January 25, 2007).

⁹ Massachusetts Department of Public Health, *Frequently Asked Questions about Isolation and Quarantine* (Boston, Massachusetts: Commonwealth of Massachusetts, 2005), http://www.mass.gov/dph/cdc/surveillance/iq/iq_faq.pdf (accessed December 17, 2006).

¹⁰ Massachusetts Department of Public Health, *Influenza Pandemic Preparedness Plan* (Boston, Massachusetts: Commonwealth of Massachusetts, 2006), http://www.mass.gov/dph/cdc/epii/flu/pandemic_plan.htm (accessed May 20, 2006).

¹¹ Scott D. Holmberg et al., *State Plans for Containment of Pandemic Influenza* (Triangle Park, N.C.: RTI International, 2006), <http://www.cdc.gov/ncidod/EID/vol12no09/06-0369.htm> (accessed December 22, 2006).

community and the government. Constructing a strategy for effective implementation of containment options and gaining public confidence in their implementation will prove to be a far more challenging obstacle than merely identifying the components of the plan. How to effectively implement community mitigation and intervention strategies through voluntary citizen compliance is a subject largely absent from national dialogue and currently absent from national and state pandemic planning.

B. RESEARCH QUESTION

How can community mitigation practices and intervention preparation be effectively implemented to maximize voluntary citizen compliance with restrictive community mitigation or intervention measures for an oncoming pandemic influenza?

C. PRACTICAL SIGNIFICANCE OF PROJECT

The public health and emergency response literature concerning pandemic influenza generally surrounds the health consequences of the influenza outbreak itself. With just three documented pandemic events in the United States within the past 100 years, pandemics are difficult to evaluate and exceedingly difficult to predict. Morbidity and mortality rates of the three previous pandemic events are well documented, but provide little value in predicting the intensity of future occurrences. Like hurricanes, we can reasonably assume another pandemic is coming, but not predict its scope, intensity or precisely where it will make land. The current literature, until recently, has been generally pessimistic and dismissive of community mitigation and intervention efforts as an effective remedy for pandemic. Much of this pessimism can be directly attributed to the fact that community mitigation and interventions, on a large scale, have never been attempted in the United States and only in rare occurrences throughout world history.

This study proposes an alternative approach and design for constructing and implementing a successful community mitigation strategy in preparation for pandemic influenza. Community policing models in many areas of the country have established a record of achievement in attaining government-public cooperation and problem solving. A community policing approach with extensive public support for community mitigation practices will result in higher and sustained levels of voluntary compliance.

This study should, at a minimum, add some degree of balance and credibility to the consideration and implementation of overall community mitigation strategies. As Homeland Security evolves and we move toward a multi-hazard, collaborative response capability, all remedies and potential solutions to disaster response should be adequately addressed and made available to decision makers. Community containment and interventions may not provide a viable or realistic alternative to every public health emergency or disaster; it may not provide a solution to the next pandemic if such an event is of a mild variety. However, community containment and interventions remain viable alternatives to be exercised by state and federal leadership. The present state pandemic response strategies amount to *hoping for the best* (that a vaccine will be available). A table contained in Appendix 1 illustrates the clear focus on vaccine reliance in 49 states. This table reflects that most all states have vaccine plans while the consistency and planning for containment is far more fragmented and varies greatly from state to state.¹² This thesis points the way to *preparing for the worst* (community mitigation and interventions). If planned deliberately and with integrity, executed efficiently and lead courageously, this thesis proposes that the public is willing to make the necessary and requested sacrifices that will lead to voluntary compliance.

D. LITERATURE REVIEW

A review of the literature concerning pandemic influenza, perhaps in the form of the *Avian or Bird Flu*, or perhaps in another, unanticipated mutation, reveals some recently changing trends. For the past several years, on a weekly basis, new articles, thoughts, studies or theories appear in scholarly journals, as well as in the mainstream media, concerning pandemic influenza. However, significant questions and gaps remain in the literature with respect to our collective national response capability in a worst-case pandemic influenza scenario.

Advancements in American medicine and public health science since the 1918 pandemic have been remarkable, certainly in the area of virology and epidemiology. Those same advances may have inadvertently contributed to a decline in overall

¹² Holmberg et al, *State Plans for Containment of Pandemic Influenza*.

government public health capacity.¹³ As a consequence, overconfidence in medical technology may be lending itself to a false sense of security. Much of the literature and planning concerning pandemic influenza preparation has surrounded the distribution of vaccines. The speed and efficiency of domestic and international travel has also undergone exponential change as well. A global pandemic can now spread at speeds never imagined in 1918.

Writing in the *Journal of the American Medical Association*, Joseph Barbera and colleagues wrote that “historically, quarantine was a recognized public health tool used to manage some infectious disease outbreaks, from the plague epidemic in the 13th century to the influenza epidemics of the 20th century.”¹⁴ Once ordered, enforcement and maintenance of a quarantine order would logically default to law enforcement and possibly to elements of the military as well. The discussion of community interventions and quarantine implementation within response plans at the state and local level is typically ambiguous and disconnected from state to state.¹⁵ ¹⁶ An article attesting to this very inconsistency was written by Scott D. Holmberg and several other contributing authors in a September 2006 article for *Emerging Infectious Diseases* entitled, “State Plans for Containment of Pandemic Influenza.”¹⁷ Holmberg noted that, with respect to state containment policy, “confusion and lack of specificity exist in these posted state plans in proposing practical containment measures in the community.”¹⁸

In our recent history, the SARS outbreak of 2003 presents an example of recent, significant-scale mitigation implementations. But even the SARS experience involves

¹³ National Governor’s Association, *State Strategies for Fully Integrating Public Health into Homeland Security* (Washington, DC: National Governor’s Association, 2005), www.public-health.uiowa.edu/icphp/docs/NGA-Report.pdf (accessed December 15, 2006).

¹⁴ Joseph Barbera et al., “Large-Scale Quarantine Following Biological Terrorism in the United States,” *JAMA* 286 (2001), <http://jama.ama-assn.org/cgi/reprint/286/21/2711> (accessed December 10, 2006).

¹⁵ Holmberg et al., *State Plans for Containment of Pandemic Influenza*, 3.

¹⁶ Lauran Neergaard, “State Pandemic Preparations Vary Widely,” *Washington Post*, December 16, 2006, http://www.washingtonpost.com/wp-dyn/content/article/2006/12/16/AR2006121600404_pf.html (accessed February 22, 2007).

¹⁷ Holmberg et al., *State Plans for Containment of Pandemic Influenza*, 3.

¹⁸ Ibid.

divergent practices. Mark Rothstein and others, writing for the Institute of Bioethics at the University of Louisville, described the Canadian version of quarantine and containment. The Canadian policy, according to Rothstein, made use of an intensive, public educational process while containment success depended heavily on public cooperation.¹⁹ To the extent that it is known, the Rothstein Report attempts to detail the enforcement activity associated with mandated quarantine restrictions in the People's Republic of China (PRC). The literature illustrates that Chinese government officials themselves were held criminally responsible for the enforcement of quarantine orders. Those persons involved in rioting, looting or disrupting the quarantine were subject to increasingly severe levels of punishment up to and including the death penalty.²⁰ Statistics and factual information on its use remains elusive. Nonetheless, it is clear that the Chinese government, at least in terms of posture if not substance, took an aggressive stance toward quarantine and mitigation enforcement. In the United States, government officials tend to avoid discussing the use of force²¹ as a means of intervention enforcement. Consequently, references to community mitigation and interventions as effective tools in present planning remain vague if not avoided completely. Training and education for law enforcement officers concerning public health law and quarantine enforcement is equally vague.

Consistently, the literature expounds the fact that any significant pandemic outbreak will bring about and require coordination at all levels of government since there will likely be considerable jurisdictional overlaps of authority. It is possible, for example, that federal, state and local health authorities would have separate, concurrent legal quarantine power in a particular situation, such as the arrival of an international flight at a

¹⁹ Mark A. Rothstein, et al., *Quarantine and Isolation: Lessons Learned from SARS* (Louisville, Kentucky: Institute for Bioethics, Health Policy and Law University of Louisville School of Medicine, 2003), <http://louisville.edu/medschool/ibhpl/images/pdf/SARS%20REPORT.pdf> (accessed December 15, 2006).

²⁰ Harvard School of Public Health, *In the Case of an Outbreak of Pandemic Flu, Large Majority of Americans Willing to make Major Changes in their Lives* (Boston, MA: Harvard University, 2006), 1-4, <http://www.hsph.harvard.edu/press/releases/press10262006.html> (accessed November 27, 2006).

²¹ Brian Friel, "Bird Flu Fears Raise Quarantine Questions," *National Journal*, October 25, 2005, <http://www.govexec.com/dailyfed/1005/102505nj1.htm> (accessed November 27, 2006).

large city airport.²² Even the guidance documents are vague on these interconnections. The National Response Plan's Biological Incident Annex²³ outlines the responsibility of a governor at the state level to implement distancing or isolation criteria, but also immediately counters that the federal government may be required to intercede to protect the interstate spread of disease. The National Response Plan is the primary mechanism or blueprint for coordination of a federal pandemic response.²⁴ According to the National Response Plan and the Stafford Act, the most likely scenario to engage federal assets would result from a request from states for assistance in enforcement of a local or regional intervention. Under the authority of the Emergency Federal Law Enforcement Assistance Act (42 U.S.C. § 10501), the attorney general may provide law enforcement assistance, including federal personnel, in response to a law enforcement emergency.²⁵

In Massachusetts, the authority for declaring a quarantine and isolation reside in a regulation identified as 105 CMR 300.00. The discussion of enforcing Massachusetts quarantine orders has historically surrounded lesser diseases, or at least those that tend to be isolated and minor in comparison to a global pandemic influenza.²⁶ In Massachusetts, for example, the procedure for enforcement of a quarantine order is best described as civil litigation rather than a criminal process.²⁷ In spite of a plethora of regulations, strategies and plans, there is no substantive discussion concerning how we might engage the public in this discussion of interventions, let alone seek their cooperation.

²² Edward Richards, Richard Goodman and Stacy Milligan, *Quarantine and Police Powers: The Role of Law Enforcement in a Biomedical Crisis* (Washington, DC: Police Executive Research Forum, 2004).

²³ Department of Homeland Security, *National Response Plan* (Washington, DC: United States Department of Homeland Security, 2004), http://www.dhs.gov/xlibrary/assets/NRP_FullText.pdf (accessed December 29, 2006).

²⁴ Homeland Security Council, *National Strategy for Pandemic Influenza Implementation Plan* (Washington, DC: Homeland Security Council, 2006), <https://www.hsdl.org/homesecc/docs/whitehouse/nps11-050406-01.pdf> (accessed December 20, 2006).

²⁵ Ibid.

²⁶ Massachusetts Department of Public Health, *Frequently Asked Questions about Isolation and Quarantine*, 1-11.

²⁷ Ibid.

The majority of Canadians voluntarily complied with quarantine directives during the 2003 SARS experience.²⁸ Cases in which law enforcement were asked to intercede or apprehend a violator were isolated. Similar conclusions concerning public compliance were drawn by Clete DiGiovanni in an article entitled “*Factors Influencing Compliance with Quarantine in Toronto During the 2003 SARS Outbreak.*” DiGiovanni concluded that adherence with the law had less to do with penal consequences than the fear of spreading disease after understanding the consequences.²⁹ A recent Harvard School of Public Health survey³⁰ indicated that the public would be highly cooperative with public health and government officials during a pandemic under certain conditions. These conditions include intensive and comprehensive pre-event education and inclusion of the public in the containment planning process. In May 2007, the Keystone Center published findings³¹ of their recent group study focusing on the potential for voluntary compliance with mitigation efforts. The results of the Keystone Study are encouraging with respect to the potential for voluntary compliance that can be developed with comprehensive planning. There is, however, a significant area of public awareness deficiency cited. The Harvard study indicated that 58 percent of their respondents were not familiar with the meaning of the term “pandemic,” and that a significant proportion had never heard of the term “pandemic” at all.³² Compliance with restrictions cannot be reasonably expected when levels of public ignorance remain at such a level. Such a high proportion of ignorance is also indicative that existing public awareness campaigns are not reaching the intended audience.

²⁸ Rothstein, et al., *Quarantine and Isolation: Lessons Learned from SARS*, 58.

²⁹ Clete DiGiovanni et al., “Factors Influencing Compliance with Quarantine in Toronto during the 2003 SARS Outbreak,” *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science* 2, no. 4 (2004), 3.

³⁰ Harvard School of Public Health, *In the Case of an Outbreak of Pandemic Flu, Large Majority of Americans Willing to make Major Changes in their Lives*, 1.

³¹ Keystone Center, *The Public Engagement Project on Community Control Measures for Pandemic Influenza* (Keystone, CO: The Keystone Center, 2007), http://www.keystone.org/spp/documents/FinalReport1_CommunityControl5_2007.pdf (accessed July 14, 2007).

³² Harvard School of Public Health, *In the Case of an Outbreak of Pandemic Flu, Large Majority of Americans Willing to make Major Changes in their Lives*, 1-4.

Unlike terrorist events or natural disasters, which present a long and detailed history for evaluation, pandemics do not provide the same level of historical data. The literature suggests that predicting what a 21st century pandemic will look like remains, in most respects, a guess.³³ While some sources express skepticism concerning the effectiveness of community containment or interventions on a large scale, all generally agree that pandemic influenza, at its extreme, will tax law enforcement and government resources in unprecedented ways. Voluntary compliance with mitigation efforts would reduce the burden on government for enforcement and allow assets and resources to be more effectively applied to mitigating the devastating effects of a pandemic.

There also appears to be a growing consensus, reflected in the literature, that while close strain vaccines may be available and have some positive consequence, close match, effective vaccines will remain unavailable for as long as nine months to a year after the onset of a pandemic. The United States General Accounting Office (GAO) documented the complexities of vaccine production in detail within a 2000 report titled “*Influenza Pandemic: Plan Needed for Federal and State Response*.”³⁴ **Table 1** illustrates the projected time lapse of vaccine production.

³³ Holmberg et al., *State Plans for Containment of Pandemic Influenza*, 1-6.

³⁴ United States General Accounting Office, *Influenza Pandemic: Plan Needed for Federal and State Response* (Washington, DC: United States General Accounting Office, 2000), <https://www.hsdl.org/homesec/docs/gao/nps11-120203-04.pdf&code=31438a34382c6dd44a17600141d1facd> (accessed November 3, 2006).

Table 1: Annual Vaccine Production Process

Production step	Responsible entity	Time
Develop reference virus strain for production	FDA	4–10 weeks
Manufacture test strains	Vaccine manufacturers	2–4 weeks
Develop potency test reagents ^a	FDA	10–12 weeks
Manufacture and test vaccine	Vaccine manufacturers/FDA	10–12 weeks
Total production time		6–8 months^b

^aReagents are substances that laboratories use to help identify or measure other substances.

^bNumbers higher than total because some steps overlap.

Table 1. Annual Vaccine Production Process. ³⁵

E. METHODOLOGY

This thesis will develop a policy recommendation for obtaining wide compliance with community mitigation and intervention strategy as it relates to pandemic influenza. In attempting to formulate a comprehensive state strategy on community containment best practices, the policy recommendation will consider the influence of federal laws and policy contained within the National Response Plan, selected and highlighted strategies of the Department of Homeland Security, the United States Department of Health and Human Services, the CDC and the state departments of public health.

Through a comprehensive literature review, this study will examine examples of lessons learned, best practices and recommendations for successful implementation of community mitigations and intervention activity. The review will examine innovative and existing ideas in the literature related to community policing and methods encouraging voluntary, community-wide compliance with containment measures.

The law enforcement community has experience with community policing models³⁶ of the late 1990s in obtaining public input and participation in crime reduction

³⁵ United States General Accounting Office, *Influenza Pandemic: Plan Needed for Federal and State Response*, 8.

³⁶ M. H. Moore, "Problem-Solving and Community Policing," *Crime and Justice* 15 (1992), 99–158, <http://www.jstor.org/view/01923234/ap040015/04a00040/0> (accessed January 31, 2007).

and community problem solving. This thesis will examine elements of community policing and its evolution that emphasize community involvement and engagement of the public in planning processes. Research synthesized from the literature review will contribute to improved methods and a model for community intervention and mitigation compliance.

II. THE INTERNATIONAL EXPERIENCE WITH CONTAINMENT

A. THE INTERNATIONAL SARS EXPERIENCE

According to the CDC, quarantine and containment measures employed to delay or mitigate the effects of a spreading virus have proven to be essential lifesaving measures.³⁷ While the United States lacks recent experience with infectious disease on a large scale, several countries throughout the world have experienced a large scale epidemic and have had varying degrees of success with community mitigation and interventions in recent years. In general, there are two approaches to implementing containment measures. The first method is through solicitation of voluntary public compliance and cooperation. This is generally accomplished through intensive public health education, transparency of planning and extensive risk communication. The second means is through forced compliance via unilateral government implementation and strict enforcement of containment and intervention measures. This is typically accomplished with substantial police or military enforcement supported by the threat of fines or possible imprisonment.

The most recent global and international event or experience with an infectious disease occurred in 2003 with the spread of SARS. Spreading rapidly from China and portions of Southeast Asia and ultimately reaching Canada, SARS provides a number of lessons in terms of approach to response and planning. Not the least of those lessons is the relative ease in which an infectious disease transverses the globe in the 21st century. SARS resulted in hundreds of deaths between December 2002 and June of 2003. Absent what Gene Matthews, writing for the “Institute of Public Health Law,” called “old fashioned public health control measures,”³⁸ the mortality rate would have been,

³⁷ United States Center for Disease Control, *Interim Pre-Pandemic Planning Guidance: Community Strategy for Pandemic Influenza Mitigation in the United States*, 1-97.

³⁸ Gene Matthews, *The Public/Private Response to Sudden Disease Outbreak* (Atlanta, Georgia: Institute of Public Health Law, 2005), <http://www.cdcfoundation.org/sitefiles/TorontoReport.pdf> (accessed November 2, 2006).

arguably, of catastrophic proportions. Matthews' reference to public health measures points out that traditional mitigation efforts, such as quarantine or isolation in the SARS experience, proved to be critical elements in saving lives. The relevance of the SARS experience was that there was never an identifiable vaccine or pharmaceutical remedy for SARS. If not for aggressive community containment and intervention actions by several governments, SARS could have possibly resulted in hundreds of thousands of fatalities and spread rapidly beyond the borders of the few infected countries.

Due to failures in international public health communication, SARS spread with virtually no time to pre-plan any strategic response. The governments of China, Hong Kong and Canada had to rapidly construct and implement alternatives to the lack of vaccines. Those remedies consisted of less sophisticated, basic social containment measures. The level of government interdiction or coercion used to enforce quarantines designed to mitigate SARS followed a continuum, with the least restrictive measures employed by the Canadian Government, slightly more restrictive in Hong Kong and the most restrictive government intervention in the People's Republic of China (PRC).

Each of these international experiences contributes something to the global planning currently underway for a pandemic influenza. Each country has a different form of government and traditions that vary from close to that of the United States (Canada) to extremely distinct (PRC). To examine the relative strengths and weaknesses of various approaches, I have compiled an analysis of the research performed by Rothstein et al,³⁹ in comparing the mitigation efforts employed in Canada, Hong Kong and the PRC (**Figure 2**). Across nine categories, I assigned a value from 1 to 10 to reflect the emphasis each country or jurisdiction placed on that particular method of mitigation (1 being the lowest emphasis – 10 the highest emphasis). In the case of the PRC, the data was less forthcoming and available to the international community. As a result, PRC scores were marked low in several categories. **Figure 2** illustrates that the more democratic governments of Canada and Hong Kong had a more engaging style of mitigation. These two countries relied less on the use of police or the military for forced adherence, and far

³⁹ Rothstein et al., *Quarantine and Isolation: Lessons Learned from SARS*.

more on information disclosure, public engagement, partnerships and incentives for compliance. The PRC relied more upon forced compliance, fines and the threat of imprisonment.

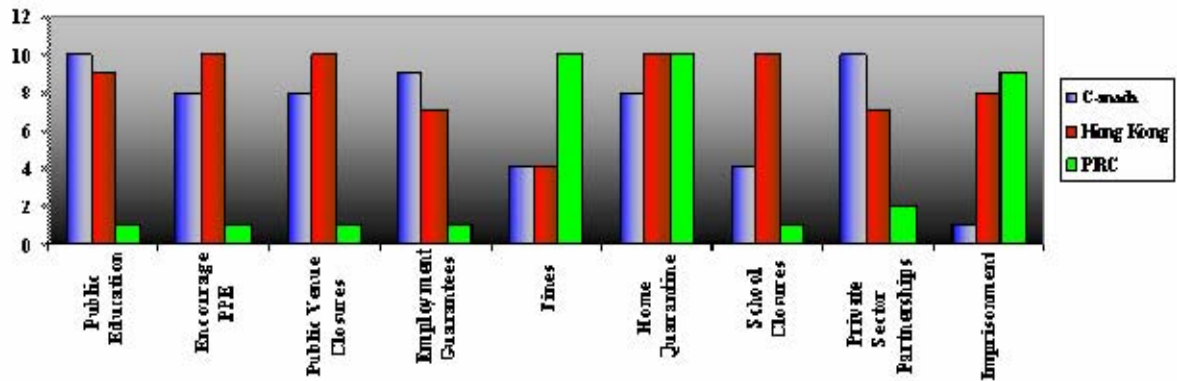


Figure 2. Values Attributed to International Mitigations.

B. THE CANADIAN EXPERIENCE

1. Strategy for Community Compliance

The Canadian experience in achieving compliance with community mitigation and intervention methods requires special attention. As this thesis will propose, education and public engagement in the planning process, particularly in a free, democratic society, is an important component of any compliance strategy. In addition to reaching the required level of awareness, the Canadian strategy was strong because it focused specifically on creating economic and social incentives for compliance.

The provincial and municipal government of Ontario and Toronto, respectively, established an intensive and rapidly deployed SARS educational and informational tools that utilized a variety of creative approaches to mitigation efforts to secure public compliance. In a country as large and diverse as the United States, emulating these approaches may be an essential ingredient for success. Among the incentives extended to

the public were continued insurance coverage,⁴⁰ intensive SARS public awareness programs made available through employers, and government assurances of continued paychecks for employees. Cases in which law enforcement was asked to intercede or apprehend a violator were isolated and generally the exception. Reducing the demand on law enforcement or the military for enforcement is a clear objective of this thesis and an objective obtained in Canada.

2. Successful Partnerships

Containment efforts in Canada became successful, in large part due to communication at a number of levels. One of the effective facets of this effort was the communication between employers and their employees. This will also be an important component in the development of this thesis. Employers assuring employees that jobs and lost wages were secure⁴¹ allowed individuals to focus more intently on health issues than on the concerns of financial and day-to-day subsistence obligations. Financial concern and the security of the family is a universal concern that must be satisfied if we are to expect compliance. When partnerships between government and the private sector were expanded and combined with effective and accurate information exchanges from the government, voluntary compliance appears to have followed. Some of these same experiences were found in Hong Kong as well.

C. THE HONG KONG EXPERIENCE

1. Strategy for Community Compliance

The government of Hong Kong established a dual form of compliance characterized by both stringent government enforcement of quarantine and isolation measures as well as significant investment in public information and education campaigns.⁴² Similar to the Canadian example, creating public awareness and voluntary compliance was an important aspect of the mitigation and intervention strategy. The

⁴⁰ Rothstein et al., *Quarantine and Isolation: Lessons Learned from SARS*.

⁴¹ Matthews, *The Public/Private Response to Sudden Disease Outbreak*, 9.

⁴² Rothstein et al., *Quarantine and Isolation: Lessons Learned from SARS*, 81-82.

government of Hong Kong also recognized that while voluntary compliance was an objective, it was likely that forceful compliance measures would be necessary as well. This is equally important for planning mitigation efforts in the United States. While voluntary compliance is strived for, demonstrating that the government is capable of enforcing interventions will also contribute to compliance.

2. Successful Partnerships

While it is uncertain whether this can be classified as a successful partnership, the Hong Kong government utilized a law known as the *Occupational Safety and Health Ordinance*.⁴³ Under the law, employers were compelled to pay four-fifths of wages during a period of medical leave.⁴⁴ While such a measure cannot be necessarily classified as a cooperative effort between employees and employers, the end result contributed to voluntary compliance of citizens with mitigation efforts. Just as with the Canadian experience, the issue of financial security was a primary concern of the public and required satisfaction.

D. THE PEOPLE’S REPUBLIC OF CHINA EXPERIENCE

The PRC, not surprisingly, took a more rigid and less engaging approach to containment and quarantine during the SARS period. In keeping with tradition, the PRC, at least initially, disclosed little to the outside world in terms of the existence and dispersion of the SARS virus. Years after SARS, much is still unknown in terms of internal mitigation and intervention efforts. The lessons that may be extended from the PRC to the United States are far less relevant just by virtue of the differences in government and social structure.

⁴³ Government of Hong Kong, “OCCUPATIONAL SAFETY AND HEALTH ORDINANCE,” Government of Hong Kong, http://www.legislation.gov.hk/blis_ind.nsf/CurAllEngDoc?OpenView&Start=509&Count=30&Expand=509.1#509.1 (accessed August 19, 2007).

⁴⁴ Rothstein et al., *Quarantine and Isolation: Lessons Learned from SARS*, 83.

1. Community Compliance

In contrast to the Canadian and Hong Kong approach to compliance, the PRC depended on an authoritarian approach. The central government empowered police to make arrests for violation of quarantine and isolation orders.⁴⁵ Unlike Hong Kong or Canada, the PRC made little effort to communicate accurate information with citizens and instead relied upon a more forced compliance method.⁴⁶ The lessons that may be extended from the PRC to the United States are far less relevant just by virtue of the differences in government and social structure.

2. Successful Partnerships

It is difficult to determine the level of cooperation between employees and employers by Western standards. The entire concept or description of a private sector has a different meaning in the PRC than in the preceding examples from Canada or Hong Kong. It is known that the PRC central government issued directives requiring payment of wages for those individuals quarantined,⁴⁷ but there is little information available beyond that.

E. INTERNATIONAL ATTITUDES ON PUBLIC COMPLIANCE

1. Survey of Attitudes Concerning Compliance

To better understand the public perception and acceptance of mitigation and intervention provisions with disease, the Harvard School of Public Health and a group of academic researchers undertook public surveys during 2004 in Hong Kong, Taiwan, Singapore and the United States.⁴⁸ The purpose of the surveys was to measure individual attitudes concerning voluntary compliance with containment and intervention measures for some future virus. Citizens in Hong Kong, Singapore and Taiwan, at the time of the

⁴⁵ Rothstein et al., *Quarantine and Isolation: Lessons Learned from SARS*, 83.

⁴⁶ Ibid.

⁴⁷ Ibid.

⁴⁸ Harvard School of Public Health, *In the Case of an Outbreak of Pandemic Flu, Large Majority of Americans Willing to make Major Changes in their Lives*, 1-4.

survey, had recently experienced the 2003 SARS epidemic and the attempts of government to implement containment and quarantine procedures. While the surveys concluded that there was widespread support for containment or quarantine in certain circumstances,⁴⁹ the information extracted from the study emphasized the criticality of trusted and reliable sources of information concerning containment policy and planning. If approached openly and engaging the public in the process, the surveys suggest that governments might expect substantial voluntary compliance and cooperation with containment procedures.⁵⁰ This is an important point that should resonate in all community mitigation and intervention planning. The respondents to this survey were typically individuals who had recently experienced SARS and, as such, had a recent experience with mitigation and intervention strategy. The issue of public engagement and participation is a consistently important theme.

2. Information Flow

At the core of effective response and compliance in international scenarios was resourceful, consistent and trustworthy information flow. In the Canadian experience with SARS, the Toronto Police initially found themselves bombarded with information of varying credibility⁵¹ concerning the spread of the virus. As time passed and the government became engaged in sorting fact from folklore, those who were asked to submit to quarantine typically did so voluntarily⁵² because they were provided with regular streams of information upon which to make informed decisions. In the case of China, at the other extreme, the government did not share information and made unilateral decisions outside of the public venue. In an age when information (credible and

⁴⁹ Robert J. Blendon et al., "Attitudes Toward the use of Quarantine in A Public Health Emergency in Four Countries," *Health Affairs* 25, no. 2 (2006), <http://content.healthaffairs.org/cgi/content/full/25/2/w15?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&author1=Blendon&andorexactfulltext=and&searchid=1&FIRSTINDEX=0&resourcetype=HWCI>

⁵⁰ Ibid.

⁵¹ Julian Fantino, "2003 SARS Outbreak: The Response of the Toronto Police Service," *The Police Chief*, April 2005, 3, http://policechiefmagazine.org/magazine/index.cfm?fuseaction=print_display&article_id=565&issue_id=42005 (accessed March 26, 2007).

⁵² Rothstein, et al., *Quarantine and Isolation: Lessons Learned from SARS*, 58.

otherwise) is so readily available, it was important for the government to be visible and in the front of all information flowing to the public. If it ever was, the government will never again be a single source of information but, in attempting to influence public decision making, it should be the most available and credible source.

The Harvard School of Public Health survey in **Table 2** illustrates the “trusted sources of information” or institutions that the public would tend to have confidence in when formulating their compliance decisions.⁵³ This was cited in the study as a critical first step in achieving voluntary compliance. Across the four countries studied, it is evident that the most trusted source of information was a physician or health care provider.

Trusted Sources Of Information During An Infectious Disease Outbreak, Four Countries, 2004

	U.S.	Hong Kong	Singapore	Taiwan
Trust “a lot” as a source of useful and accurate information about an outbreak				
Your doctor or other health care professional	78%	79%	82%	81%
Government public health authorities	40 ^{a,b,c}	68 ^{b,c}	77 ^c	54
Newspapers, magazines, TV, or radio	27 ^{a,b}	52 ^c	56 ^c	27
Your employer	30	22	27	30
A family member or friend	52 ^{a,b,c}	33	36	31

SOURCE: Harvard School of Public Health/TNS Survey in Four Regions, 18 November–16 December 2004.

^aSignificantly different from Hong Kong; $p \leq .05$.

^bSignificantly different from Singapore; $p \leq .05$.

^cSignificantly different from Taiwan; $p \leq .05$.

Table 2. Trusted Sources of Public Health Information. ⁵⁴

The small number (27 percent) of respondents in the United States that have trust or faith in the media (newspapers, magazines, TV or radio), though perhaps not surprising, is particularly troubling for current mitigation efforts. Earlier in 2007, the CDC announced that it had begun delivering advertisements and public service announcements to hundreds of United States radio and television outlets. The data in the Harvard survey would suggest that such a strategy, by itself, will be ineffective.

⁵³ Blendon et al., *Attitudes Toward the use of Quarantine in A Public Health Emergency in Four Countries*, 23.

⁵⁴ Ibid.

3. Confidence in Employers/Wages

Aside from the requirements for open and reliable sources of information, an important component of compliance was confidence that wages or jobs would not be lost due to illness or extended leave. The Canadian government moved to ensure that those asked to voluntarily comply with mitigations were assured that the government would assist with lost wages. Citizens became confident that they would not lose their homes or assets due to default while confidence in the mitigation process and voluntary compliance followed.

F. LESSONS LEARNED

While the 2003 global international experience with SARS mitigation efforts provides some insight into the strategies used by several countries, the application of those lessons to pandemic influenza can be observed at several levels. The SARS experience provided the first real application of mitigation strategy of the 21st century. Each of the three countries noted had a different form of government and, in each, the level of citizen participation and consultation with the process varied. Canada was the most open to community participation while the PRC remained the most restrictive and unilateral in its actions.

SARS reinforces that virus and disease transmissions are global events with global health implications, not local or regional issues. The Chinese experience, for example, provides insight into the implications of limited communication, both internally and externally. The Canadian SARS experience provides more applicable lessons for the United States because our countries share more similarities than differences. Hong Kong provides examples for handling mitigation and interventions in densely populated metropolitan areas that are transportation hubs.

Satisfying public needs for openness in planning, basic human needs and ensuring economic security are vital keys to compliance with government efforts. The fact that Toronto was able to quarantine approximately 30,000 people with very little resistance, and almost no need for law enforcement intervention, is a positive indicator that a comprehensive mitigation strategy can be effective on a significant scale.

As opposed to a pandemic that we have had years to prepare for, SARS provided little advanced warning to infected countries. There simply was no time to create elaborate planning or strategy. Much of the responses were ad hoc, while the threat was ongoing. Some tactics failed or were less successful. For example, in a world dominated by the Internet and an abundance of information, even a country as restrictive as the PRC cannot reasonably expect to keep their citizens insulated from global news. One of the objectives that governments may wish to accomplish is to ensure that citizens are getting not simply wholesale, raw information concerning infectious diseases, but rather, the correct information.

SARS, a 21st century public health threat, was extinguished, not by vaccines or antiviral medications, but through community mitigation and, in the case of Canada, extraordinary cooperation and compliance of citizens. That compliance was attained through:

- Transparent and open planning
- Clear and consistent government reporting and briefing
- Government assistance with financial considerations
- Collaborative partnerships between government and the private sector.

III. COMMUNITY MITIGATION STRATEGY AND INTERVENTIONS

In the midst of the 1918 Pandemic Influenza in the United States, several cities successfully employed community mitigations and interventions. Several other cities were not as diligent and suffered devastating consequences of the pandemic. The difference between the respective approaches of St. Louis and Philadelphia provide a valuable reference.

In addition to analyzing U.S. history for mitigation experiences, there have been a number of recently published mathematical models simulating pandemic spread and intervention efforts. These mathematical models generally support the use of community mitigations. Models based upon historical data are increasingly suggesting that a pandemic can be slowed by aggressive and timely interventions.

A. MITIGATION STRATEGIES USED IN THE 1918 PANDEMIC

Two recent studies published by the National Academies of Science in early 2007 examined intervention strategies employed by as many as 17 United States cities during the 1918 pandemic.^{55 56} The results of these studies support the belief that community interventions will have significant impact in reducing the spread of influenza and lessening mortality rates. Mortality rates experienced by cities such as Philadelphia and St. Louis were remarkably disproportionate during the 1918 influenza pandemic. The differences between these cities are more likely attributable to community mitigation efforts and the relative speed in which those restrictions and procedures were implemented by the community leadership at the local level.

⁵⁵ Martin C. Bootsma and Neil M. Ferguson, "The Effect of Public Health Measures on the 1918 Influenza Pandemic in U.S. Cities," *Proceedings of the National Academy of Sciences of the United States of America* 104, no. 18 (April 6, 2007, 2007), 7588-7593, www.pnas.org/cgi/doi/10.1073/pnas.0611071104 (accessed May 2, 2007).

⁵⁶ Richard J. Hatchett, Carter E. Mecher and Marc Lipsitch, "Public Health Interventions and Epidemic Intensity during the 1918 Influenza Pandemic," *Proceedings of the National Academy of Sciences of the United States* 104, no. 18 (April 6, 2007, 2007), 7582-7587, www.pnas.org/cgi/doi/10.1073/pnas.0610941104 (accessed May 2, 2007).

1. The Importance of Timing: St. Louis vs. Philadelphia

School closures, bans on large public gatherings and quarantine of infected households were employed in a number of U.S. cities during the 1918 pandemic.⁵⁷ In particular, social policies in St. Louis and San Francisco, where interventions were quite successful, were compared with Philadelphia, which experienced devastating consequences of the pandemic. The first cases of influenza were reported in Philadelphia on September 17, 1918, but city leadership took no action for approximately 14 days.⁵⁸ In contrast, St. Louis experienced its first cases of influenza on October 5, 1918, and took immediate intervention action with limitations on public gatherings, school closures and limited social contacts.⁵⁹ The consequences were quite compelling. **Figure 3** illustrates the differences in death rates between the two cities in 1918.

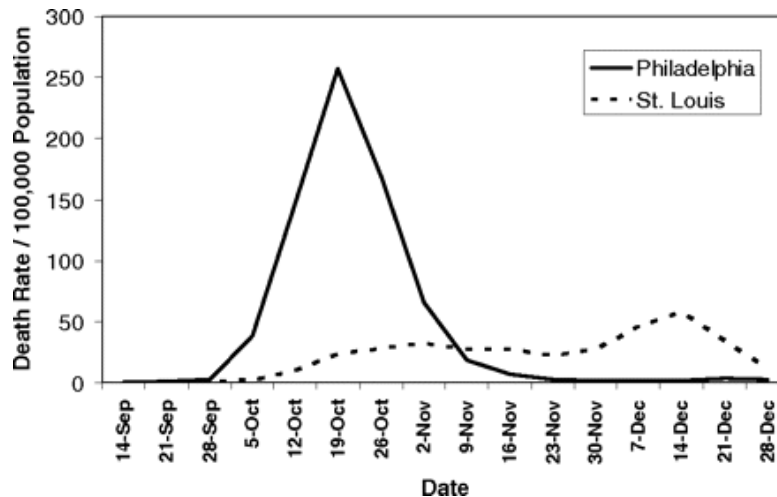


Figure 3. Philadelphia vs. St Louis.⁶⁰

2. Indecisiveness and Inaction

The disastrous consequences of indecisiveness, inaction, and not employing an immediate community intervention strategy in Philadelphia during the 1918 pandemic

⁵⁷ Hatchett et al., "Public Health Interventions."

⁵⁸ Ibid.

⁵⁹ Ibid.

⁶⁰ Ibid.

remain among the most critical lessons we can bring to pandemic preparation today. John M. Barry, in his book, *The Great Influenza*, writes extensively of the death and suffering that overwhelmed many American cities.⁶¹ The descriptions Barry provides of the Philadelphia experiences are particularly compelling and stand out with respect to lessons learned.

During the week of October 16 alone, 4,597 Philadelphians died from influenza or pneumonia, and influenza killed more indirectly. That would be the worst week of the epidemic. But no one knew that at the time. Krusen (the public health director) had too often said the peak had passed. The press had too often spoken of triumph over disease.⁶²

Barry's writing speaks of the lack of leadership and the courage that is required in making difficult decisions. It also addresses the integrity of information flow to the public and the consequences of attempting to regulate the truth.

B. ALL INFLUENZA STRAINS ARE NOT THE SAME

The ease of transmissibility of an infectious disease is determined, for scientific and public health purposes, by an estimation of the number of secondary infections created by a single infected individual.⁶³ In epidemiology, that level of virility or the reproductive value is expressed by the symbol R_0 . The definition of R_0 is "the average number of secondary infections caused by a single, typical infected individual among a completely susceptible population."⁶⁴ The larger R_0 , the more aggressive or more rapidly the disease reproduces and spreads among the susceptible community. Conversely, the lower the numerical value of R_0 , the less virulent the disease. In many cases, as R_0 of a virus is larger, more containment measures or combinations of containment measures will be required to slow the spread to a manageable level.

⁶¹ John M. Barry, *The Great Influenza: The Story of the Deadliest Pandemic in History*, 1st ed. (New York, NY: Penguin Group, 2005), 545.

⁶² *Ibid.*

⁶³ Timothy C. Germann et al., "Mitigation Strategies for Pandemic Influenza in the United States," *Proceedings of the National Academy of Sciences* 103, no. 15 (April 3, 2006), www.pnas.org/cgi/doi/10.1073/pnas.0601266103 (accessed May 2, 2007).

⁶⁴ *Ibid.*

The higher R_0 , the greater the percentage of infected members of the community in a shorter period of time as **Figure 4** illustrates.

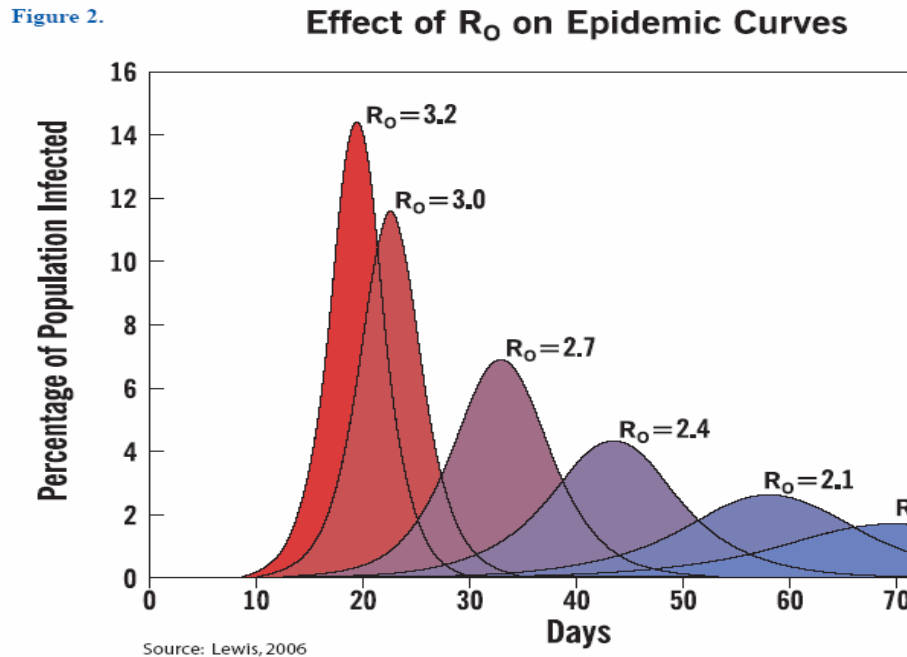


Figure 4. Intensity of Virus.⁶⁵

While the purpose of this thesis is not modeling of infectious disease, knowing and understanding R_0 of a particular influenza strain is important to understanding the aggressiveness of a particular influenza. Ultimately, knowing this factor influences the particular strategy or operational plan for community mitigation efforts. For example, in some circumstances, when R_0 reflects a relatively less aggressive influenza strain, utilizing just a few social interventions such as closing schools or targeted antiviral prophylaxis (TAP) may be enough to slow the pandemic. With a more aggressive strain (higher R_0), the community may have to implement a series of pro-active efforts, such as school closing, TAP, travel restrictions and enforced quarantine, in order to achieve the same level of effectiveness.

⁶⁵ United States Center for Disease Control, *Interim Pre-Pandemic Planning Guidance: Community Strategy for Pandemic Influenza Mitigation in the United States*, 24.

It is important to remember that these suggestions are based on R_0 , that is specific to each individual epidemic and that cannot be known for certain prior to the start of the epidemic itself. In modeling, current estimates of R_0 are derived from extrapolation of data from a limited number of past events and make assumptions (and many times guesses) about future pandemic behavior.⁶⁶ While the predictive certainty of modeling future pandemic behavior is speculative, it cannot be summarily dismissed either. When viewed against historical experiences with pandemic, and more recently with the SARS experience, modeling takes on added value. When combined with active pandemic surveillance data⁶⁷ as it becomes available, the credibility of the model increases.

C. MODELING STUDIES AND COMMUNITY INTERVENTIONS

The models examined in this thesis were chosen based on their assumption of the absence of an effective vaccine (close match) and evaluate the effect that community mitigation efforts will have in terms of the likelihood of lowering peak mortality and morbidity rates.⁶⁸ While there have been a number of pandemic modeling briefs presented and evaluated by the scientific and public health community, I have included a brief summary of three such studies. Presentation of these models comes with two qualifiers. First, there is substantial scientific work at the foundation of mathematical modeling not documented nor intended for this thesis. Secondly, these are three models among many more in existence. The purpose in documenting these three is not in endorsing the work of any group or individual, but simply to highlight that there is substantial support in the scientific community for community mitigation and intervention strategies.

⁶⁶ Committee on Modeling Community Containment for Pandemic Influenza, *Modeling Community Containment for Pandemic Influenza: A Letter Report* (Washington, DC: National Academy of Sciences, 2006), <http://books.nap.edu/catalog/11800.html> (accessed January 25, 2007).

⁶⁷ Ibid.

⁶⁸ Christopher Fraser et al., “Factors that make an Infectious Disease Outbreak Controllable,” *Proceedings of the National Academy of Sciences* 101, no. 16 (April 20, 2004), 6151.

1. Los Alamos National Laboratory Model

In 2006, a joint venture of scientists from the Los Alamos National Laboratory and University of Washington detailed mathematical models of pandemic community intervention strategies at various levels of R_0 .⁶⁹ The model assumes the absence of close match vaccines and contrasts the spread of a pandemic influenza, absent active interventions, with modeling using multiple aggressive pharmaceutical and social interventions.⁷⁰

The Los Alamos Study focused on four proposed mitigation remedies. They included variations of targeted antiviral prophylaxis (TAP), influenza vaccination with available (close strain) vaccines, comprehensive school closures and aggressive restrictions on travel and social distancing measures. When introduced in a timely fashion, the Los Alamos Model projected declines in infection rates when various combinations of interventions were applied. **Figure 5** illustrates results of the Los Alamos study⁷¹ in projecting declines in infection rates when various combinations of interventions are applied. The modeling indicates that administering combinations of various interventions will likely have the most effective result in lowering peak pandemic levels.

⁶⁹ Germann et al., *Mitigation Strategies for Pandemic Influenza in the United States*, 5935-5940.

⁷⁰ Ibid.

⁷¹ Ibid., 5939.

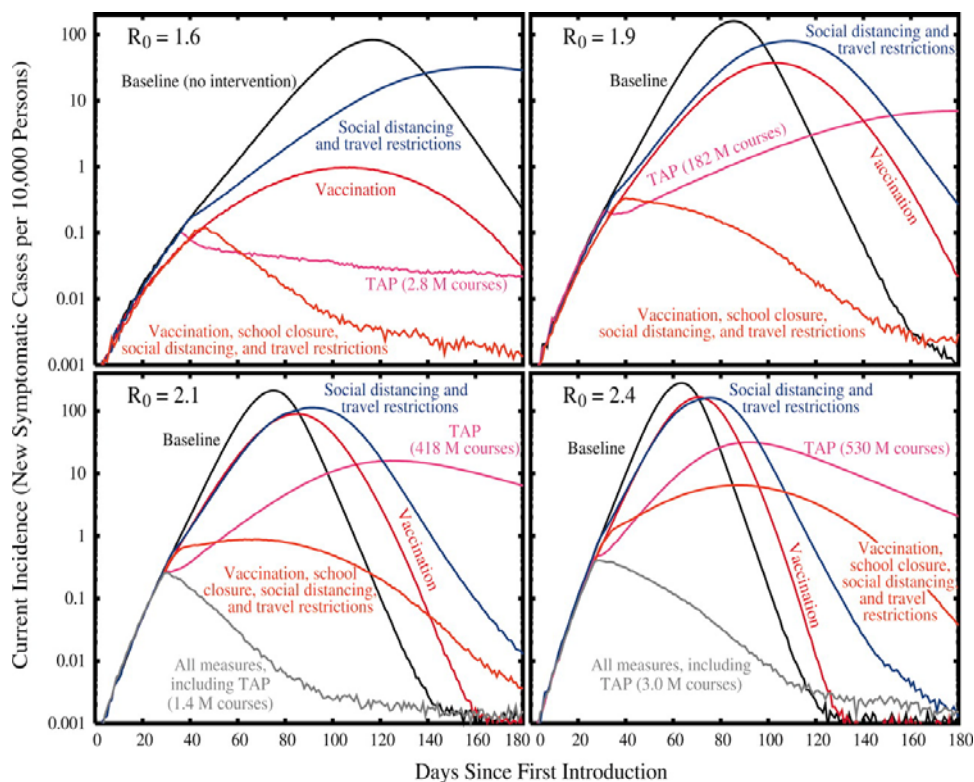


Figure 5. Intervention Results.⁷²

2. The University of Hong Kong Study

On August 8, 2006, a group of four researchers led by Joseph Wu of the University of Hong Kong published findings concerning the modeling of household based intervention strategies with respect to pandemic influenza. The modeling emphasized by Wu recommends combinations of quarantine, isolation of infected individuals and targeted antiviral prophylaxis. The research in this study suggested that, even with compliance levels as moderate as 50 percent, intervention strategies would be effective⁷³ in reducing infection rates and consequently saving lives. The Wu report concluded:

⁷² Germann et al., *Mitigation Strategies for Pandemic Influenza in the United States*, 5935-5940.

⁷³ J. T. Wu et al., "Reducing the Impact of the Next Influenza Pandemic using Household-Based Public Health Interventions," *PLoS Medicine* 3, no. 9 (September 2006), 1536, <http://medicine.plosjournals.org/perlserv/request=index-html?request=get-document&doi=10.1371/journal.pmed.0030361> (accessed May 24, 2007).

National influenza pandemic preparedness plans currently focus on reducing the impact associated with a constant attack rate, rather than on reducing transmission. Our findings suggest that the additional benefits and resource requirements of household-based interventions in reducing average levels of transmission should also be considered, even when expected levels of compliance are only moderate.⁷⁴

3. The Sandia Laboratory Model

Dr. Robert J. Glass and others associated with the Sandia National Laboratory have completed several recent reports on pandemic modeling simulation for the Department of Homeland Security's Infrastructure Protection/Risk Management Division. The Sandia Model explores a social network within a conceived small community. Much of Glass's modeling research, including his 2005 report, *Local Mitigation Strategies for Pandemic Influenza*,⁷⁵ focuses particularly on the networks of children and teenagers as points of high infectious contact. Glass pointed out that "children and teenagers compose only 29 percent of the population yet they are responsible for 59 percent of the infectious contacts, adults for 38 percent and older adults for 3 percent."⁷⁶ Approximately half of infectious contacts are typically children or teenagers among and within their own peers.⁷⁷ Following the logic of the Sandia modeling, restricting the interaction among children and teenagers would have a significant impact on the reduction of virus transmission. The Sandia Model supports the argument concerning school closures as a highly significant mitigation procedure in a pandemic.

4. Model Summary

Each of the modeling studies examined was compiled by respected, scientific research institutions (Sandia Laboratory, Los Alamos National Laboratory and the

⁷⁴ Wu et al., "Reducing the Impact of the Next Influenza Pandemic," 1532.

⁷⁵ R. J. Glass, L. M. Glass and W. E. Beyeler, *Local Mitigation Strategies for Pandemic Influenza* (Albuquerque, NM: National Infrastructure Simulation and Analysis Center, 2005).

⁷⁶ R. J. Glass et al., "Targeted Social Distancing Design for Pandemic Influenza," *Emerging Infectious Diseases* 12, no. 11 (November 2006), 1674, http://www.cdc.gov/ncidod/EID/vol12no11/06-0255.htm?s_cid=eid06_0255_e (accessed May 24, 2007).

⁷⁷ *Ibid.*, 1674.

University of Hong Kong). Each study reached similar conclusions with respect to the projected effectiveness of community interventions. Pandemic modeling, as reflected in these studies suggest that, mitigation and community intervention strategies would likely produce the desired results of lowering morbidity while securing the additional time critical for development of more effective vaccine production. The Sandia Model in particular presents transmissibility of a virus within a new dimension of social network theory. In each model, mitigation and social interventions can have a positive influence on reducing the loss of life and spread of the virus in the absence of an effective vaccine. This becomes an important message in shaping and attempting to influence voluntary citizen compliance.

5. Consequences of Interventions

In 2006, The National Academies sponsored an evaluation of current community containment modeling and the historical record of intervention strategies with respect to pandemic influenza. *The Committee on Modeling Community Containment for Pandemic Influenza* wrote a “Letter Report” detailing their collective findings.⁷⁸ An area upon which the committee focused significant attention was the secondary effects of intervention efforts. Despite the sophistication of mathematical modeling and the extrapolation of data from events such as the 2003 SARS experience or the consequences of the 1918 Pandemic, there are apt to be significant questions concerning the viability and effectiveness of intervention schemes. All interventions have secondary effects or consequences that may not be fully explored or evaluated before the time comes to implement them.⁷⁹ For example, school closures may create significant and unanticipated child care issues for families. Children left unattended create entirely new sets of issues that communities are required to solve. Early identification and discussion of these issues will be an important part of candid pre-event planning. Public understanding of the consequences is another important component in formulating compliance.

⁷⁸ Committee on Modeling Community Containment for Pandemic Influenza, *Modeling Community Containment for Pandemic Influenza: A Letter Report*, 1-37.

⁷⁹ Ibid.

D. OBJECTIVES AND STRATEGY FOR COMMUNITY MITIGATION

1. The Objectives of Community Mitigation/Intervention Practice

A community mitigation strategy will have two important objectives to slowing the spread of a deadly influenza virus:

- The immediate preservation of lives and;
- Acquiring valuable time sufficient for the development and distribution of an effective vaccine that can be produced from a newly identified strain of influenza virus.

2. Specific Mitigation and intervention Means

While these two objectives provide the overarching goals, the strategies or specific responses for community mitigation and intervention are typically referred to as a series or combination of non-pharmaceutical (NPI) and available pharmaceutical interventions such as antiviral medications used for prophylaxis. Such interventions will typically consist of combinations of the following actions:

- School closures
- Limiting or avoiding altogether the gathering or congregating of significant numbers of individuals in single locations or large public venues (sporting events, conventions, trade shows, malls)
- quarantining of households with sick or infected persons
- Travel restrictions (including airplanes, buses, trains and boats)
- Work at home institution by private and government employers
- Limited religious services and funerals
- Tightly controlled borders
- Enforcement of hygiene etiquette including widespread use of masks.

IV. VOLUNTARY COMPLIANCE AND SOCIAL TRUST

I am a firm believer in the people. If given the truth, they can be depended upon to meet any national crises. The great point is to bring them the real facts.

— Abraham Lincoln, 16th president of U.S.
(1809–1865)

A. WORKING TOWARDS COMPLIANCE

Community intervention methods, in order to be successful, are likely to require personal and public sacrifice in terms of restricting the freedom of individual movement. For example, school closures will require children and teenagers to remain at home for extended periods; mass transit and air travel will likely see significant reductions and cancellations; employers may restrict employees from coming to work or require they remain at home. In all probability, the government will lack sufficient resources to forcefully employ mitigation efforts on such a large scale while maintaining basic services. Subsequent surveys in Canada after the 2003 SARS episode indicated that public compliance with interventions was not motivated by any fear of violating the law.⁸⁰ Rather, compliance was largely obtained through education and information put forth by the government, which resulted in cooperation and understanding of a greater good.

B. SOCIAL TRUST

1. Survey on Public Trust

In obtaining cooperation and, ultimately, voluntary compliance with intervention efforts, there must be a base level of trust between those that represent the government and members of a broad and diverse community. With whom and under what conditions

⁸⁰ Cleve DiGiovanni et al., “Factors Influencing Compliance with Quarantine in Toronto during the 2003 SARS Outbreak,” *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science* 2, no. 4 (2004), 3 (accessed December 4, 2006).

is the public likely to develop trust? The Pew Research Foundation ran a survey in November of 2006 attempting to determine what groups within society have sustained levels of trust in others. Researchers asked three questions of respondents in a telephone poll:⁸¹

- **Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?** Some 45 percent of respondents said most people can be trusted.
- **Do you think most people would try to take advantage of you if they got the chance, or would they try to be fair?** Some 59 percent of respondents said most people try to be fair.
- **Would you say that most of the time people try to be helpful, or that they are mostly just looking out for themselves?** Some 57 percent of respondents said most people try to be helpful.

The Pew research reflected in **Figure 6** emphasizes that while there is optimism for compliance in several areas of the community, substantial work in trust building remains. Particularly, rural and upper middle-class white communities have higher indicators for trust than urban, economically depressed areas. While all communities will require substantial preparation for a pandemic, the data clearly establishes that a substantial amount of work awaits us in the urban areas where high concentrations of people live and work. These are obviously key areas of concern for pandemic preparation as they will require significant government support and will likely be areas where transmissibility of infection may be highest.

2. Truthfulness in Building Community Trust

Community faith in the integrity of the message is important in achieving the desired result of compliance. Mark A. Glaser, Lee E. Parker and Stephanie Payton wrote a 2001 research report focusing on the issues related to community and self interest. In this research they contend:

⁸¹ Pew Research Center, *Americans and Social Trust: Who, Where, Why* (Washington, DC: Pew research Center, 2006), <http://pewresearch.org/assets/social/pdf/SocialTrust.pdf> (accessed July 5, 2007).

Public leaders must be prepared to truthfully describe the actions of government and the state of the community and to articulate the sacrifices that will be needed to be made to produce change. This transition toward honesty between government and citizens, as well as citizens with themselves, will include conflict in values that will not be easily molded into respect for the well-being of others.⁸²

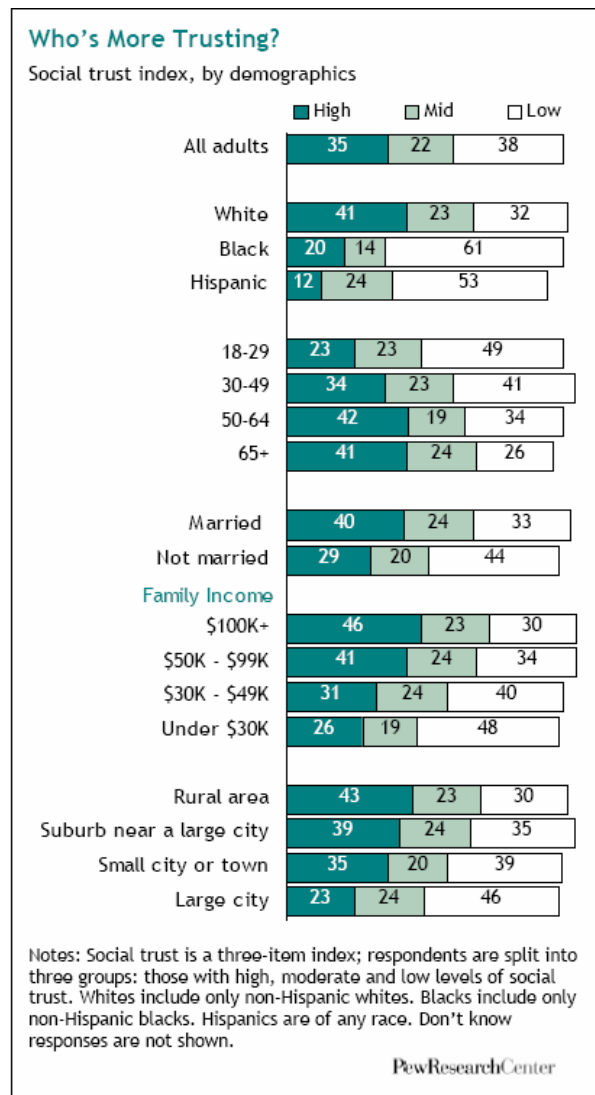


Figure 6. Who is more trusting.⁸³

⁸² Mark A. Glaser, Lee E. Parker and Stephanie Payton, "The Paradox between Community and Self-Interest: Local Government, Neighborhoods, and Media," *Journal of Urban Affairs* 23, no. 1 (2001), 101, <http://web.ebscohost.com/ehost/pdf?vid=2&hid=103&sid=a393941b-0820-4363-9bdd-ffc1d27492e%40sessionmgr102> (accessed July 13, 2007).

⁸³ Pew Research Center, *Americans and Social Trust: Who, Where, Why*, 1-7.

The public (the community) will be required to fully understand the consequences of compliance with government-imposed restrictions as well as the potentially catastrophic consequences of avoidance. Glaser et al., suggest “the restoration of the trust of citizens and the elevation of community in the value systems of citizens will be facilitated through processes that are open to public inspection and consideration.”⁸⁴ What Glaser is referring to is the transparency of planning, another key component of compliance.

C. PUBLIC PANDEMIC EDUCATION

In spite of strategic planning at the federal or state level, the public education component of that planning is generally confined to government web pages or strategic planning documents. Public familiarity with pandemic influenza is alarmingly deficient. A 2006 Harvard School of Public Health Opinion Poll⁸⁵ revealed that 58 percent of the respondents had no knowledge of what the meaning of a pandemic actually is.⁸⁶ Only 41 percent of the respondents knew what the term “pandemic flu” was referring to. In order to comply with many of the extensive intervention measures that will be proposed at the onset of a pandemic, awareness and knowledge levels must be raised considerably.

1. The Harvard Study

In the Harvard survey, when the consequences of a pandemic flu were explained to the respondents, answers reflected higher levels of potential compliance. In terms of limiting attendance at large events and restricting travel, the responses were quite positive, as represented in **Figure 7**. One of the commonly discussed intervention options, and one that will have wide-ranging application for pandemic influenza, is school closures. The Glass Modeling Study⁸⁷ in particular, emphasized the potential value in school closures

⁸⁴ Glaser, Parker and Payton, *The Paradox between Community and Self-Interest: Local Government, Neighborhoods, and Media*, 101.

⁸⁵ Robert J. Blendon, John M. Benson and Kathleen J. Weldon, *Pandemic Influenza and the Public: Survey Findings* (Boston, MA: Harvard School of Public Health, 2006), http://www.hsph.harvard.edu/panflu/panflu_charts.ppt (accessed July 14, 2007).

⁸⁶ Ibid.

⁸⁷ Glass et al., *Targeted Social Distancing Design for Pandemic Influenza*, 1671-1681.

as an effective mitigation strategy. However, school closures will have wide-ranging impacts on a community and on families in particular. When surveyed in the Harvard Study relative to their ability to keep children home from school (**Figure 8**), the results are both encouraging and provide insightful areas that require continued support and assistance to the community. Yes, families are willing to keep children home from school, but some assistance with that may be required. This is an area where community groups and volunteers, prepared well in advance, may be particularly valuable.

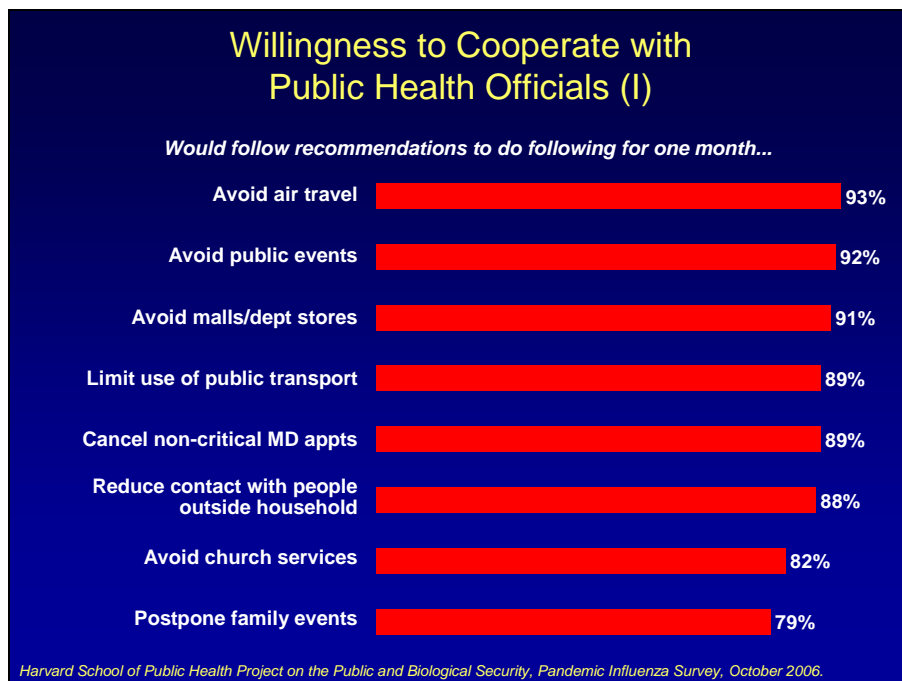


Figure 7. Willingness to Cooperate.⁸⁸

⁸⁸ Glass et al., *Targeted Social Distancing Design for Pandemic Influenza*, 1671-1681.

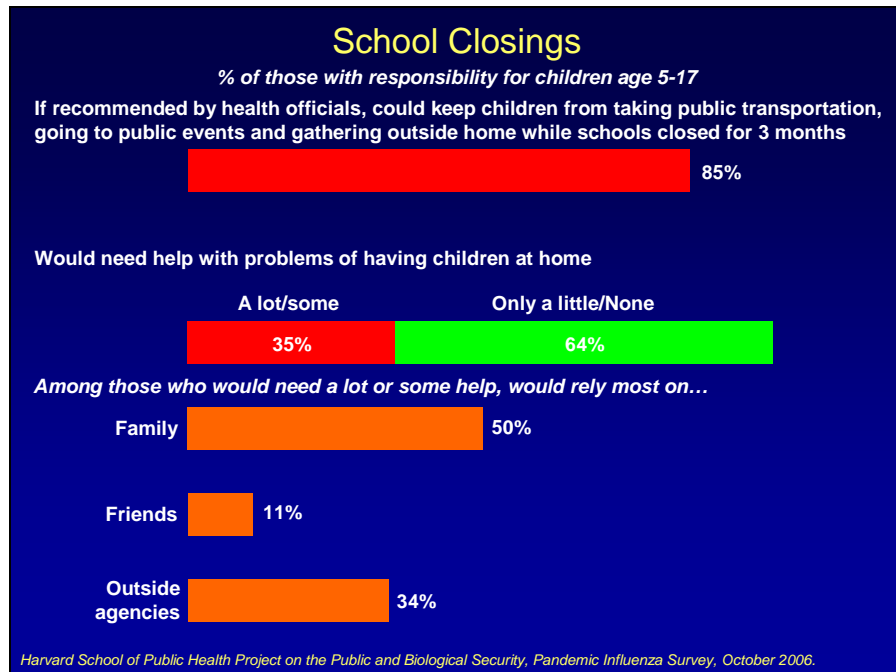


Figure 8. School Closings.⁸⁹

What this study clearly highlights is areas that require the investment of continued research and focus. For example, what can the government or volunteer groups do to be of assistance to those families requiring help with keeping children home?

2. The Keystone Center Study

The Keystone Center is a non-profit organization for science and public policy development. The center assembled a representative group of 50 community stakeholders and 260 citizen representatives from dispersed areas of the country, represented by four cities to discuss potential community mitigation efforts and render favorable or unfavorable dispositions on each.⁹⁰

⁸⁹ Blendon, Benson and Weldon, *Pandemic Influenza and the Public: Survey Findings*, 17.

⁹⁰ Keystone Center, *The Public Engagement Project on Community Control Measures for Pandemic Influenza* (Keystone, CO: The Keystone Center, 2007), http://www.keystone.org/spp/documents/FinalReport1_CommunityControl15_2007.pdf (accessed July 14, 2007).

The Public Engagement Project On Community Control Measures for Pandemic Influenza was carried out in October and November 2006 to engage the public in discussions and deliberations about the economic and social tradeoffs associated with community control measures to slow the spread of the disease.⁹¹

The results of the study represented in **Table 3** reflect generally favorable attitudes toward many of the most prominent community intervention options that have been considered or thought to be effective. Majorities of participants in the study supported the use of individual mitigations or combinations of interventions. The positive attitudes reflected in the study support the contention that if the population is educated and aware of the consequences of pandemic influenza, they are likely to voluntarily comply with mitigations. Like the Harvard School of Public Health Study, The Keystone Center’s study is indicative of a substantial base of community support for mitigation efforts.

Control Measures	Atlanta	Seattle	Lincoln	Syracuse	Average for Citizens	Stakeholders
	N=84	N=66	N=34	N=75	N=259	N=50
1. Encouraging sick persons to stay at home	100%	96%	100%	100%	99%	100%
2. Encouraging non-ill contacts to stay at home	82%	77%	92%	82%	83%	83%
3. Canceling large public gatherings	100%	79%	100%	99%	95%	100%
4. Closing schools and large day care facilities	78%	78%	96%	82%	84%	83%
5. Altering work patterns	95%	93%	96%	96%	96%	96%
All Five	67%	30%	96%	63%	64%	70%
Some	32%	61%	4%	37%	33%	30%
None	1%	9%	0%	0%	3%	0%

Table 3. Stakeholders Supporting Intervention.⁹²

⁹¹ Keystone Center, *The Public Engagement Project*.

⁹² Ibid.

D. INFORMATION FLOW

In an era of preparation for emergency response, the public must know, precisely, what the threat, consequences and alternatives available may be. Restrictions on movement, work or school closures will likely be weeks or possibly months in duration.⁹³ This may be cause for unprecedented social unrest, stress and the accompanying concerns about basic subsistence. Public messages should emphasize adaptive behaviors and immediately refute myths or contradictory declarations that will likely arise.⁹⁴ The government must move to provide relief in those areas that are clear concerns to the community such as assistance with children at home, economic loss or travel restriction. Post 9/11, the American public is well versed on the threat of terrorism. Pandemic influenza, however, is a concept or reality far less familiar to the average person.

In *The Great Influenza*, Barry writes extensively about the Administration of Woodrow Wilson and the extensive efforts to suppress public discussion of the devastating effects of influenza the country was experiencing in 1918.⁹⁵ According to Barry, Wilson feared that disclosing the condition of the country fighting a disease would alert our enemies to a domestic weakness. Unknown to Wilson, Germany and other European countries were enduring the same peril. The inference drawn by Barry (and others) is that a lack of collective public education contributed to excessive loss of life.

Thomas Glass and Monica Schoch-Spana of the Bloomberg School of Public Health at Johns Hopkins University, in an article for the journal *Confronting Biological Weapons*, wrote:

⁹³ Bootsma and Ferguson, *The Effect of Public Health Measures on the 1918 Influenza Pandemic in U.S. Cities*, 7592.

⁹⁴ Dori B. Reissman et al., "Pandemic Influenza Preparedness: Adaptive Responses to an Evolving Challenge," *Journal of Homeland Security and Emergency Management* 3, no. 2 (2007, 2006), 12, <http://www.bepress.com/jhsem/vol3/iss2/13> (accessed April 5, 2007).

⁹⁵ Barry, *The Great Influenza: The Story of the Deadliest Pandemic in History*, 545.

The issue of trust bears significantly on 2 critical aspects of medical and public health response to bioterrorism: (1) the choice of strategies for effective communication with the public, and (2) the processes for debating, as a society, some of the more ethically complex dimensions of disease containment.⁹⁶

While pandemic influenza is not bioterrorism, the protocol in dealing with the public is similar in many respects. The results of the Pew Center survey as well as the Harvard Public Health survey suggests that there is a substantial foundation of trust upon which to build.

1. Communication

Open and frequent communication will become the facilitator of public education and the foundation of building trust leading to compliance with mitigation efforts. Uncertainty and confusion will likely be, at times, unavoidable consequences of a pandemic and ever present in pre-pandemic planning. Nothing compromises integrity and trust more than contradictory information. In order to limit these effects, the government will be required to provide reassurance, constant updates on relief measures being employed, and provide guidance and actions that citizens can take to protect themselves.⁹⁷

During the 2003 SARS episode in Toronto, Ontario, one of the most perplexing situations to control was contradictory and misleading information provided through the media.⁹⁸ This is a problem frequently encountered in emergency response situations. It will never be possible to eliminate or pre-approve media coverage of large events. The key is for leadership to ensure that the government has the most consistent, visible and credible media presence and information for public consumption.

⁹⁶ T. A. Glass and M. Schoch-Spana, "Bioterrorism and the People: How to Vaccinate a City Against Panic," *Clinical Infectious Diseases* 34, no. 2 (12/03/2001, 2002), 221, <http://www.journals.uchicago.edu/CID/journal/issues/v34n2/011333/011333.web.pdf> (accessed June 27, 2007).

⁹⁷ Glass and Schoch-Spana, "Bioterrorism and the People." 220.

⁹⁸ Fantino, *2003 SARS Outbreak: The Response of the Toronto Police Service*, 3.

Stephen Covey in his recent book, *The Speed of Trust*, writes that “transparency will create trust fast.”⁹⁹ Covey’s message, written for individual relationships but with certain application to government or private enterprise, is that openness, regardless of consequence, removes much of the suspicion and consternation the public may have toward government. As the consequences of a pandemic (accelerated mortality and morbidity rates) and intended government response actions are made fully known to the public, cooperation and compliance will likely increase proportionately. In retrospect, President Wilson’s policy of illusion and concealment in 1918 contributed to less security, not more.

2. Community Leaders and Existing Institutions

Within every community there are pre-existing leaders and institutions that interact and provide service on a daily basis. Many of these leaders can be utilized to disseminate and collect information.¹⁰⁰ Faith-based organizations, civic groups, veterans groups and local elected officials provide critical sources of instant credibility with community members. Community policing coordinators recognized this as an effective element of planning and implementation early in the process, and immediately sought the cooperation of targeted leaders.

Schools and private employers are critical organizations that interact with and share mutual interests of families and members of the community. These institutions will have extensive economic, social and moral investment in reducing the spread of a deadly influenza. Employers, particularly, will have unique influence with employees. Employees will require some confidence in knowing that, with interventions, their pay and benefits will continue uninterrupted or their employment is secure. Employers, conversely, will wish to limit economic losses and know that ill workers cannot perform vital production tasks and will spread virus within their facilities. Employers speaking to

⁹⁹ Stephen R. Covey, *The Speed of Trust*, 1st ed., Vol. 1 (New York, NY: Free Press, 2006), 154, (accessed July 3, 2007).

¹⁰⁰ Reissman et al., *Pandemic Influenza Preparedness: Adaptive Responses to an Evolving Challenge*, 13.

employees about the critical need to employ community intervention plans will have a level of instant credibility, built over a period of years.

3. Panic and Fear

The fact remains that in spite of preventative measures and practice, significant numbers of people may acquire influenza during a pandemic and ultimately succumb to its effects. On a significant scale, this will cause unease, possible panic and an inevitable surge on the medical infrastructure.¹⁰¹ Any interruption to basic needs, such as food, medicine and clean water, will be cause for upheaval in communities. With so much at stake, intervention strategies require unprecedented public/private partnerships. The more information and detail that can be provided prior to a pandemic will serve as a psychological inoculation against fear and panic.¹⁰² Informing the public of the consequences of a pandemic will prepare them for trying circumstances that will inevitably follow.

E. SUMMARY

Pandemic modeling efforts continue to support community intervention measures and planning. Perhaps even more encouraging are the recent studies emanating from the Harvard School of Public Health,¹⁰³ the Pew Research Center and the Keystone Center on issues concerning potential compliance and existing levels of public trust. Each of these studies or surveys indicates that a significant portion of the public would likely support government intervention efforts in mitigating a pandemic. The existing research suggest that the public is willing to make the necessary and difficult daily adjustments required to reduce a pandemic peak, save lives and acquire valuable time to produce vaccines.

¹⁰¹ Glass and Schoch-Spana, *Bioterrorism and the People: How to Vaccinate a City Against Panic*, 220.

¹⁰² *Ibid.*, 220.

¹⁰³ Harvard School of Public Health, *In the Case of an Outbreak of Pandemic Flu, Large Majority of Americans Willing to make Major Changes in their Lives*, 1-4.

However, there are areas of concern in these studies as well. The Harvard Study in particular points to a concerning level of public ignorance regarding pandemic influenza.¹⁰⁴ We may be educating government emergency planners very well, but the necessary information is not reaching the public in the current format. Building trust and transparency of planning must become more than mere concepts; they must become practices. In essence, the data is suggesting that the community is willing to be led, but currently lacks leadership and direction in pandemic preparation.

¹⁰⁴ Harvard School of Public Health, *In the Case of an Outbreak of Pandemic Flu*.

V. COMMUNITY POLICING/HOMELAND SECURITY POLICING MODEL

A. PUBLIC HEALTH AND DISEASE MITIGATION

1. A Declining Presence of Public Health

Attributable in large part to its own success in mitigating and eradicating an assortment of historically infectious diseases¹⁰⁵ (polio, smallpox etc), the role of public health agencies has been incrementally marginalized over several decades. The capacity of Public Health to act as a first responder in a post 9/11 world has been hindered by reduced services or stagnated funding.¹⁰⁶ In Massachusetts, for example, the Public Health response to routine infectious disease cases is typically delegated to a local city or town public health department. In the larger cities, these departments may be staffed by full-time professionals, but in many towns, the service, if provided at all, is covered by part-time employees with limited staff, minimal budgets and questionable training. As a consequence, existing community outreach programs or operational capability within Public Health suitable for a broad, community-wide, pandemic awareness and education initiative are typically fragmented if available at all. Achieving voluntary public compliance with community mitigation efforts will require a substantial and comprehensive pre-pandemic outreach and engagement program. Government web sites containing research documents, statistical reports or brochures espousing the perils of a pandemic will fall considerably short of a preparedness objective. While state public health organizations possess the requisite subject matter expertise concerning pandemic and infectious disease, few public institutions possess the operational experience and community engagement capability required to effectively carry out a compliance

¹⁰⁵ National Governor's Association, *State Strategies for Fully Integrating Public Health into Homeland Security*, 2.

¹⁰⁶ Patricia D. Reed, "Integrating Public Health Agencies into the Homeland Security Community" (Master of Security Affairs, Naval Postgraduate School), 10, https://www.hsdl.org/homesec/docs/theses/07Mar_Reed.pdf&code=a089965cbf733e463e876c8dcf65fd39 (accessed July 9, 2007).

campaign. The Community Policing, Problem Orientated Policing and the most recent Homeland Security Policing models provide an established framework for a collaborative law enforcement/public health initiative aimed at public engagement for pandemic mitigation.

2. The Importance of Existing Relationships

Community mitigation efforts, in order to be successful, will require extensive cooperation and communication in areas of the community not necessarily familiar to public health operations. Many communities are traditionally uncooperative with law enforcement. Communication will be required between and among government, private industry, community organizations and individuals. There is currently a significant void in leading and organizing this effort for pandemic preparedness. This is a void that the community policing approach, though not necessarily the police, is well suited to fill. Pre-existing relationships developed to implement community policing initiatives that have been established with schools, businesses, civic and faith-based groups provide an established pathway to the community. Law enforcement agencies, through the community policing initiatives of the 1990's and by way of transformation to Homeland Security responsibilities of today, have established relationships with all of the key constituencies. Creating a similar model using these same established relationships in order to implement a comprehensive community mitigation strategy for pandemic influenza would be a practical solution for implementation.

B. CRITICAL ELEMENTS OF COMMUNITY POLICING

Community policing practice is predicated on two critical components: community partnership and problem solving.¹⁰⁷ Relationship building through

¹⁰⁷ Community Policing Consortium, *Understanding Community Policing: A Framework for Action* (Washington, DC: Bureau of Justice Assistance, 1994), <http://www.ncjrs.gov/pdffiles/commmp.pdf> (accessed July 1, 2007).

collaborative problem solving and providing opportunities for educational¹⁰⁸ initiatives and community awareness have contributed extensively to building community partnerships and trusted partnerships.

1. Trust Based Partnerships

Partnerships between individuals or groups with a common objective or mutual interest require levels of trust built over time. That trust results from positive and consistent interactions. That trust is based on established, open and dependable lines of communication. **Figure 9** illustrates the dynamics of this partnership that is so crucial to community policing.

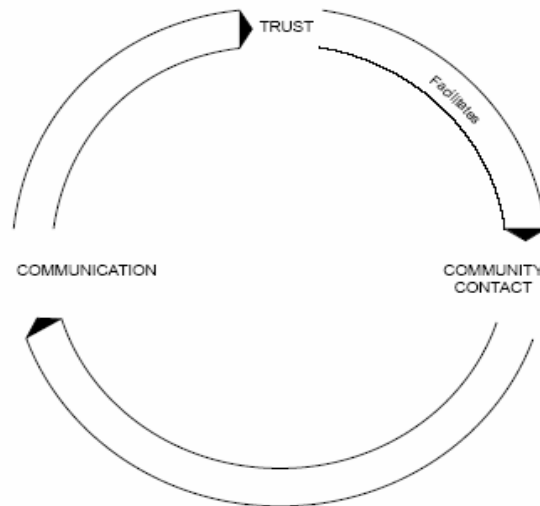


Figure 9. Trust Communication Cycle.¹⁰⁹

While the trust communication cycle illustrates the basic requirements of the partnership process, in reality the challenge of implementing such a model varies from one community to another. The Pew research suggests that social trust is affected by

¹⁰⁸ Edward P. Richards and others, *The Role of Law Enforcement in Public Health Emergencies* (Washington, DC: United States Department of Justice, 2006), http://www.policeforum.org/upload/Pandemic%20FINAL_289750054_182007082257.pdf (accessed January 18, 2007).

¹⁰⁹ Community Policing Consortium, *Understanding Community Policing: A Framework for Action*, 16.

variables in a community such as racial composition, socio-economic conditions and varying levels of education among community members.¹¹⁰ All of this suggests that trust and partnership building must be a hands-on, interactive process. Trust is a personal process and the result of a consistent investment. It is not likely that trust can be developed through the distribution of a television advertisement or a crafty webpage.

2. Problem Solving

The second critical component of a viable community policing model is an effective problem solving¹¹¹ relationship. While many of the problem-solving initiatives in community policing have concerned crime problems, historically this interaction has expanded to include an assortment of neighborhood issues. Community policing has solved issues related to rubbish collection, clean streets, traffic light maintenance or an assortment of concerns community members may have. The critical component of this relationship is the one-on-one interaction, a relationship that has few parallels in any other government/community interaction. After 9/11, this problem solving relationship between police and the community expanded on the basis of a perceived, omnipresent terrorist threat.¹¹² Law enforcement and the community established a mutual and expanding interest in such areas as critical infrastructure protection and intelligence gathering. In some communities, a sense of urgency and fear of terrorism has galvanized the police/community partnership. Logically, this could be extended further to include preparation for natural disasters and pandemic influenza. **Figure 10** illustrates the cycle of problem solving.

¹¹⁰ Pew Research Center, *Americans and Social Trust: Who, Where, Why*.

¹¹¹ Community Policing Consortium, *Understanding Community Policing: A Framework for Action*, 18.

¹¹² Matthew C. Scheider and Robert Chapman, "Community Policing and Terrorism," *Journal of Homeland Security* (2003), <http://www.homelandsecurity.org/newjournal/articles/scheider-chapman.html> (accessed July 4, 2007).

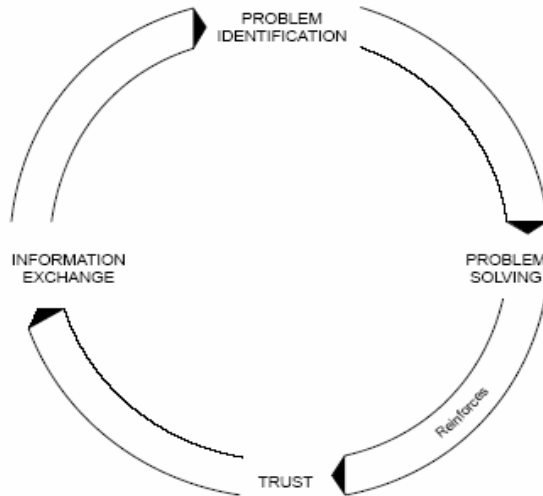


Figure 10. Problem Solving Cycle.¹¹³

This model provides a vehicle to facilitate two-way information flow. The value specific to pandemic influenza preparation is the ability to educate the public while concurrently building partnerships in trust through continual communication. These methods and practices of community policing are an important component of a compliance strategy. A collaborative alliance between elected officials, police, public health, the business community, faith-based organizations, community leaders and members of the community themselves will be a likely path to implementing an effective community mitigation strategy.¹¹⁴

C. THE EVOLUTION OF COMMUNITY POLICING

Writing for the Police Executive Research Forum (PERF) in 1998, Daniel W. Flynn captured the essence of community policing theory.

Within the realm of problem-oriented policing, many police departments have successfully formed community partnerships with various groups within their jurisdiction, and confronted individual problems of specific concern to those groups. These efforts are solid problem-oriented policing tactics, which are also core elements of community policing. Community

¹¹³ Community Policing Consortium, *Understanding Community Policing: A Framework for Action*, 19.

¹¹⁴ DiGiovanni et al., *Factors Influencing Compliance with Quarantine in Toronto during the 2003 SARS Outbreak*.

policing, however, extends beyond the strategy of treating individual problems by addressing the collective problems of a community. Thus, the non-traditional community is more than a special interest group or a group formed around one issue.¹¹⁵

1. The Original Community Policing

Community Policing is a methodology or strategy that changed the approach to law enforcement, placing a greater emphasis on problem solving, collaboration and building partnerships with members of the community.^{116 117} With substantial Department of Justice grant funding and supported by both anecdotal and statistical successes, major metropolitan police agencies engaged with community leaders, organizations and businesses to solve community concerns. Influenced in great measure by George Kelling and James Wilson's 1982 Atlantic Monthly article, *Broken Windows*,¹¹⁸ the resulting relationships between the police and the community were noteworthy testaments to a newly discovered effectiveness of police/community interaction. Problem solving, collaboration and cooperative partnerships were outgrowths and tangible results of a common trust between police (government) and citizens. Willard M. Oliver has written several articles on the evolution of American policing from inception to present methodologies. During the 1990's, Oliver, while trying to define the precise composition of community policing, concluded that:

There was a consensus that it includes police and community partnerships, community and police empowerment, the use of problem solving methods, and tailor made responses to address local crime and order maintenance issues, there can be no mold from which community policing is cut.¹¹⁹

¹¹⁵ Daniel W. Flynn, *Defining the "Community" in Community Policing* (Washington, DC: Police Executive Research Foundation, 1998), http://www.policeforum.org/upload/cp_570119206_12292005152452.pdf (accessed June 14, 2007).

¹¹⁶ Ibid.

¹¹⁷ Community Policing Consortium, *Understanding Community Policing: A Framework for Action*, 13.

¹¹⁸ James Q. Wilson and George Q. Kelling, "Broken Windows," *The Atlantic Monthly*, March 1982, 1982, 1, <http://www.theatlantic.com/doc/198203/broken-windows>, (accessed January 20, 2007).

¹¹⁹ W. M. Oliver, "Community Policing: A Conceptual Framework" Willard M. Oliver, Elaine Bartgis the Authors," *Policing: An International Journal of Police Strategies & Management* 21, no. 3 (1998), 9, <http://www.emeraldinsight.com/Insight/ViewContentServlet?Filename=Published/EmeraldFullTextArticle/Articles/1810210308.html> (accessed July 12, 2007).

Much of community policing practice, however, was about re-establishing contact and interpersonal relationships between the police and members of the community. In some respects, it became more about police attending meetings and public relations events. The actual value of community policing as a crime reduction technique was continuously debated within and without law enforcement. While some aspects of community policing such as interaction with the community held promise, more tangible results were necessary to justify its continuance. As a result, community policing required refinement and further evolution.

2. Problem Orientated Policing

In a sense, Community Problem Orientated Policing (CPOP) was a competing philosophy with community policing early on. The differences between the two, perhaps subtle to those outside law enforcement, were significant to practitioners. Unlike earlier versions of community policing, CPOP valued not simply developing relationships with the community, but collaborative efforts at solving problems.¹²⁰ CPOP was instituted as a problem-solving partnership mechanism with the community and not just police officers interacting closely or just attending meetings for the sake of public relations. Ultimately, tangible problem solving, the philosophy of CPOP, was integrated into overall community policing as pressure mounted to show more for the investment than simply police officers riding bicycles or walking beats. None the less, the core value of CPOP meshes very well with Homeland Security concerns raised after 9/11.

3. Homeland Security Policing

There is little debate that the events of 9/11, the subsequent anthrax attacks and Hurricane Katrina changed the landscape of public safety and first responders. Our national readiness and response vulnerabilities were painfully exposed. After 9/11, federal grant funding for law enforcement was abruptly redirected from community policing initiatives to Homeland Security preparedness and response capability. The

¹²⁰ Darrel Stephens, *The Challenges to the Future of Community Policing* (Washington, DC: Police executive Research Foundation, The Annie E. Casey Foundation, 2004), http://www.policeforum.org/upload/CommunityPolicingReduced_570119206_12292005152352.pdf (accessed July 10, 2007).

anthrax incidents emphasized the need for collaborative, multi-disciplined responses. Hurricane Katrina pointed out the need for broad based *National Incident Management* training across disciplines.

Darrel W. Stephens and Francis X. Hartmann, in a 2002 report of the *Executive Session on Domestic Preparedness* at the Kennedy School of Government at Harvard University, described *The Policing Challenge* and wrote:

Over the decade, the police have become better at connecting with the community and working in a partnership to solve problems; they have learned a great deal about how to engage people in activities that deter criminal acts and decrease fear. These skills should be put to use in helping mobilize the community to undertake projects and initiate programs that will have the dual purpose of preparing for acts of terror while strengthening overall neighborhood safety.¹²¹

Written months after 9/11, Stephens and Hartman were writing about a transition in policing that was well underway. The authors recognized the valuable lessons of 1980's and 90's policing and how those lessons could be transitioned to homeland security.

More recently, Willard Oliver has written *The Fourth Era of Policing: Homeland Security*. In this latest evolution of modern policing, Oliver maintains that since 2001, following cuts in traditional federal law enforcement funding programs, a hybrid, *Homeland Security Policing* design has evolved from the original Community Policing concept.¹²² In describing what the new Homeland Security policing model will look like, Oliver states:

While police and citizen participation may be mixed based upon the threat, police will have to link with other agencies, both governmental and non-governmental in order to implement nearly any type of security measure. This will include other public safety agencies such as fire and code

¹²¹ Darryl Stephens and Francis X. Hartmann, *Beyond the Beltway: Focusing on Hometown Security – the Policing Challenge* (Cambridge, Massachusetts: Harvard University [2002]), http://bcsia.ksg.harvard.edu/BCSIA_content/documents/beyond_the_beltway.pdf (accessed June 14, 2007).

¹²² William M. Oliver, "The Fourth Era of Policing: Homeland Security," *International Review of Law, Computers & Technology* 20, no. 1 & 2 (March - July 2006, 2006).

enforcement, it will include those in the medical and mental health community, and it will draw heavily upon such agencies as public works, water treatment, and transportation.¹²³

Willard Oliver’s assessment of *Homeland Security Policing* is orientated toward terrorism mitigation, intelligence gathering and traditional law enforcement. I propose that this newest evolution of the Homeland Security policing has actually been extended beyond the realm of terrorism to include natural disasters and public health emergencies.

Figure 11 illustrates this evolution of community policing:

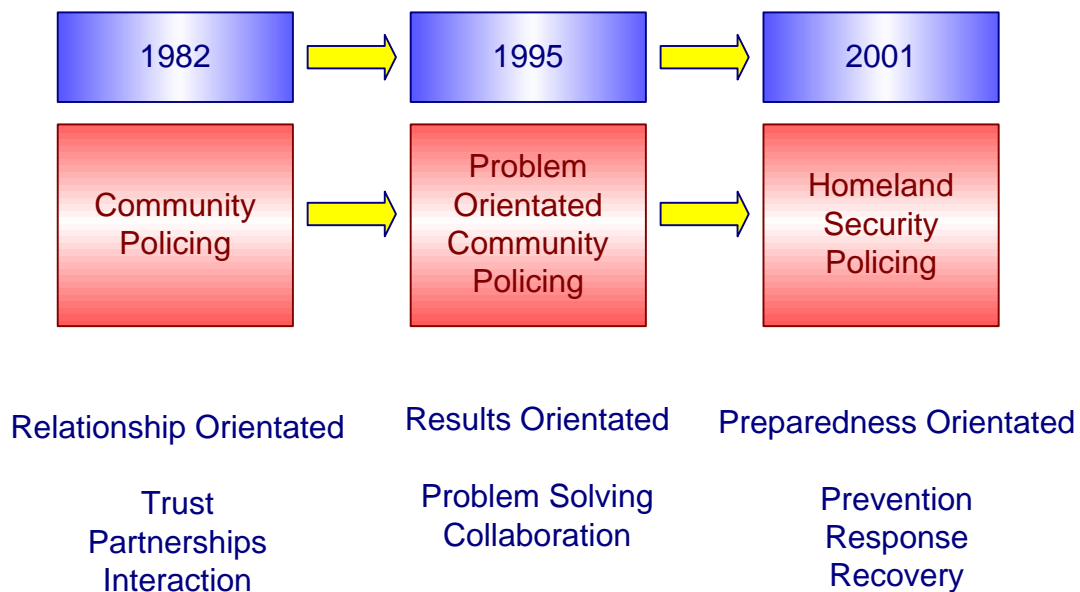


Figure 11. Homeland security Policing.

Homeland Security Orientated Policing places emphasis on the unification of first responder capability. This is reflected in the recent mandate for *National Incident Management System* (NIMS) training for all first responders, regardless of discipline.

¹²³ Oliver, “The Fourth Era of Policing: Homeland Security,” 59.

Homeland Security Policing recognizes that in any prevention, response or recovery the skills and expertise required extend beyond the capability of any one responder agency. This is particularly true and well suited for pandemic preparation and community containment.

D. COUNTERARGUMENTS

It has been argued that pandemic preparation is a public health issue that has little relevance to traditional law enforcement responsibilities.¹²⁴ Public health officials have contended that security agencies (law enforcement and fire services in particular), while receiving the majority of attention (and funding) post 9/11, are not in the business of disease prevention. The argument contends that a pandemic is a public health issue and law enforcement has no practical experience with such an endeavor.¹²⁵ Further, segments of the public health establishment have suggested that police presence will interfere and likely impede public participation and compliance. One of the key arguments is that alliances with law enforcement may be viewed, in certain communities such as high crime communities, as justification for refusing to cooperate with public health.¹²⁶ This is a legitimate point and one that law enforcement has to recognize as valid. There are segments of the community, particularly in minority and economically suppressed communities, where experiences with police have not always been positive or trusting. This argument serves to support the contention that collaborative, multi-agency approaches to homeland security will overcome individual agency shortcomings or deficiencies.

E. THE OVERARCHING OBJECTIVES

Obtaining the voluntary compliance of community members with mitigation and intervention efforts will most likely be the result of a collaborative and unified effort. This proposal will integrate public health, as a lead agency, into the current community

¹²⁴ Tee L. Guidotti, "Public Health and Patriotic Doubts," *HSI Journal of Homeland Security* (2002), <http://www.homelandsecurity.org/newjournal/search/searchResults.asp> (accessed July 4, 2007).

¹²⁵ Ibid.

¹²⁶ Ibid.

policing/Homeland Security policing model. The investments made by law enforcement during the 1990s in the practice of community policing created a unique foundation upon which cooperation and problem solving can be built upon.¹²⁷ Recognizing that in some areas, those relationships have not been all good, government must look toward partnerships with faith-based groups, volunteer organizations such as the Red Cross, employers and community leaders to improve them. The new model of Homeland Security Policing will be characterized by collaborative efforts of multiple agencies; public, private and voluntary, working with a common objective of preventing the loss of life and ensuring security of the Homeland.

¹²⁷ Ellen Scrivner, *The Impact of September 11 on Community Policing* (Washington, DC: Police Executive Research Foundation, 2004), http://www.policeforum.org/upload/CommunityPolicingReduced_570119206_12292005152352.pdf (accessed June 14, 2007).

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VI. STRATEGIC PLAN FOR ACHIEVING VOLUNTARY COMPLIANCE

A. DEFINING THE PROBLEM

In 1918, Massachusetts was one of the many states particularly hard hit by pandemic influenza. According to the U.S. Department of Health and Human Services, within a period of weeks and months, pandemic was raging in Massachusetts.

Scarcely six weeks after it touched the first sailor on Commonwealth Pier, the pandemic was raging all across the state. By October 1st, the Public Health Service estimated that there were at least 75,000 cases in the state, excluding those from the military camps.

At that point, nearly 800 people had already died from influenza here in Boston. Another 200 had perished from pneumonia. By the time the next week ended, nearly 1,300 more Bostonians had died.

By the time the pandemic finally passed, an estimated 45,000 people had perished in Massachusetts. That is about two-thirds of a sellout crowd at a Patriots game, or more than two consecutive sell-outs at Boston Garden.

When it comes to pandemics, there is no rational basis to believe that the early years of the 21st century will be different than the past. If a pandemic strikes, it will come to Massachusetts.¹²⁸

—U.S. Department of Health & Human Services

In 1918, there was no vaccine available for the pandemic. Should a pandemic influenza begin today, despite current plans, this country would be no better off than in September of 1918. An estimated fifty million people worldwide allegedly died as a result of the 1918 pandemic.¹²⁹ Current estimates suggest a modern pandemic, with a vastly expanded global population and jet transportation, may result in over a 100 million

¹²⁸ United States Department of Health and Human Services, “The Great Pandemic of 1918: State by State,” U.S. Department of Health and Human Services, <http://www.pandemicflu.gov/general/greatpandemic2.html#massachusetts> (accessed August 4, 2007).

¹²⁹ United States Center for Disease Control, “Pandemic Flu: The Facts,” United States Center for Disease Control, http://www.pandemicflu.gov/news/PDFs/pandemicfluthefacts_eng.pdf (accessed August 5, 2007).

deaths worldwide. Given the magnitude of the potential problem and the size of the United States population, it would seem that radio and television advertisement alone, while arguably a component of an awareness campaign, are woefully insufficient to adequately prepare a community for an event with such potentially devastating consequences.

1. The Public Challenge

The challenge with respect to pandemic intervention is not in the creation of or existence of plans; pandemic plans and strategies abound. Rather, the challenge will lie in widespread public acceptance, participation, understanding and ultimately, compliance with those plans. Unfortunately, those likely to read and comprehend currently available guidance or pandemic plans will not be the members of the community who's compliance and cooperation will be critical to success. It is not probable that individual states, where the real burden of a pandemic will exist,¹³⁰ or the federal government will have suitable resources to forcefully compel comprehensive, large-scale interventions simultaneously across the country during a pandemic. Despite extensive federal guidance and an array of both federal and state pandemic plans, planning efforts are essentially silent with respect to guidance in accomplishing the necessary levels of cooperation and compliance from the community that will be so vital in this effort to save lives.

2. Government

The Department of Health and Human Services (HHS) released its *Pandemic Influenza Plan* in 2005, a 200-page document. The federal government's plan amounts to more of a reference document than an actionable plan.¹³¹ HHS, the primary federal cabinet responsible for national pandemic preparation, recently released "Pandemic Flu Update IV."¹³² In the report, the government discussion of pandemic flu continues to be

¹³⁰ Staff of the Center for Biosecurity of UPMC, *National Strategy for Pandemic Influenza and the HHS Pandemic Influenza Plan: Thoughts and Comments*, 293.

¹³¹ *Ibid.*, 292.

¹³² Michael Leavitt, *Pandemic Planning Update IV* (Washington, DC: United States Department of Health and Human Services, 2007), <http://www.pandemicflu.gov/plan/panflureport4.pdf> (accessed August 4, 2007).

dominated by discussions concerning vaccine production and capacity. In terms of community mitigation efforts and the government's education campaign, the strategy, in terms of delivering this to the community, is summarized in the following:

In February 2007, HHS launched a series of television and radio public service announcements (PSA) in English and Spanish to raise awareness of pandemic influenza and to educate the public about the steps people can take now to prepare. The PSA, released under the title *Know What to Do about Pandemic Flu*, were distributed to 300 television and 1,000 radio stations across the country.¹³³

B. FRAMING THE INTERVENTION COMPLIANCE STRATEGY

1. Strategy Canvas

A strategy canvas (**Figure 12**) illustrates the shifting emphasis or value of a community mitigation strategy, as opposed to the more prevalent existing emphasis on vaccine-based solutions. The existing pandemic preparation plans in many states, for example, focus on pharmaceutical remedies or existing traditional mitigations such as encouraging cough etiquette or the distribution and use of surgical masks to slow virus transmission. These are typically the established response choices that have worked for other public health threats. Unfortunately, pandemic influenza on a scale of the 1918 variety presents a threat of proportions not routinely encountered by public health organizations. Therefore a shift to the new compliance strategy is necessary.

¹³³ Leavitt, *Pandemic Planning Update IV*.

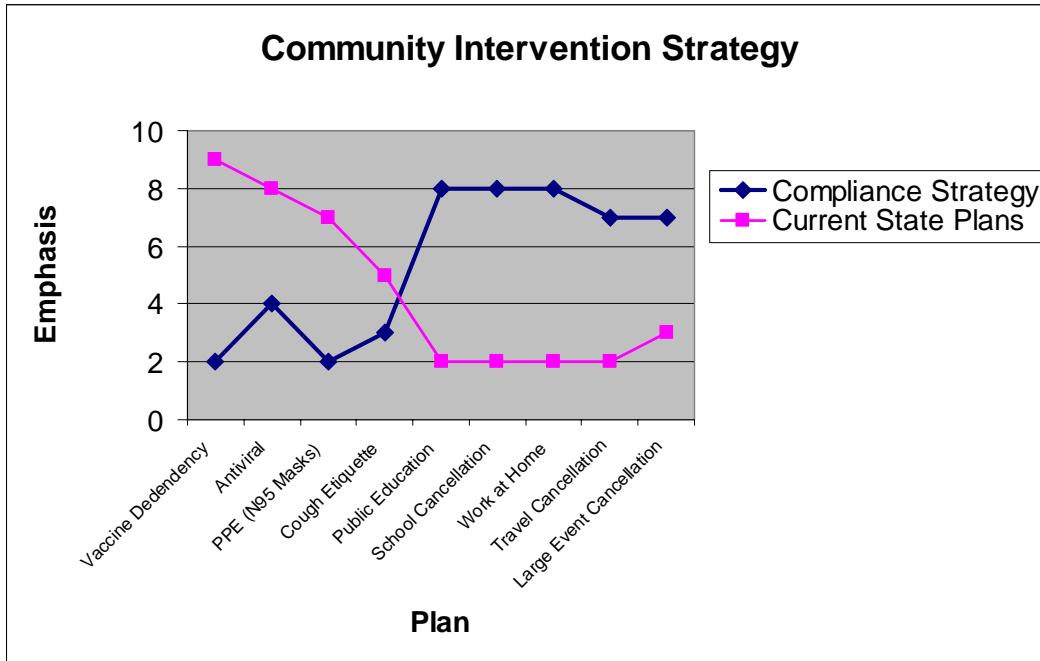


Figure 12. Community Intervention Strategy.¹³⁴

2. The Framework for Compliance

A framework is applied to illustrate and evaluate the contributing factors or elements necessary to achieve community compliance. This community mitigation strategy deemphasizes the traditional rules of forced compliance (fines, arrest and incarceration) and encourages public engagement through education and transparency. Through community based pandemic education, the consequences of non-compliance such as death or spread of a deadly virus become better understood while the dependence on traditional vaccine remedies decline. Communities, through voluntary compliance, become more resilient, self-reliant and less dependent on a government provided vaccine that may be months from production and availability. **Figure 13** provides a graphic illustration of the fundamentals of the framework for this compliance strategy.

¹³⁴ W. Chan Kim and Renee Mauborgne, *Blue Ocean Strategy* (Boston, Massachusetts: Harvard Business School Press, 2005), 240.

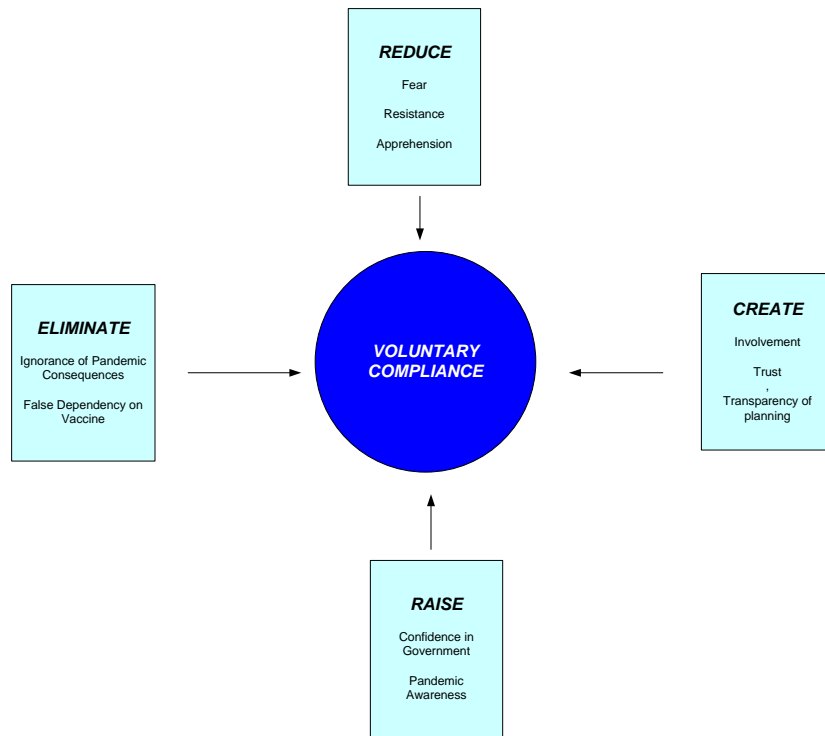


Figure 13. Four Action Framework.¹³⁵

Compliance is dependent on the effectiveness of the four actions framework, each contributing to a lessening of resistance while raising trust and confidence in the process. Each component, along with its value to the mitigation strategy, is described in further detail.

a. *Eliminate*

- Pervasive levels of public ignorance regarding pandemic influenza. The Harvard Study¹³⁶ on compliance factors recorded a 58 percent ignorance level concerning what the term “pandemic” actually referred to. No individual will be willing to comply with restrictive interventions if they don’t understand the consequences first.

¹³⁵ Kim and Renee Mauborgne, *Blue Ocean Strategy*.

¹³⁶ Harvard School of Public Health, *In the Case of an Outbreak of Pandemic Flu, Large Majority of Americans Willing to make Major Changes in their Lives*, 1-4.

- A false sense of security and dependency on vaccines and questionably effective anti-viral medications. If the community buys into this government fueled belief that vaccines will be available, cooperation and compliance will be unlikely.

b. Raise

- The awareness and understanding level of the community as to the threat presented by pandemic and consequences for non-compliance
- The level of confidence and faith that the community has in itself and government with respect to pandemic preparation. Instilling a belief that community action can save lives.

c. Create

- Community involvement in the preparation and planning process. Individuals will have more motivation and faith in a plan that has been brought before them complete with an opportunity to ask questions, gather facts and contribute to a plan that affects them directly.
- Trust in the process. When planning is confined to television commercials, fancy brochures or edicts from Washington D.C., it becomes an impersonal process. A lesson from community policing is that individuals bestow trust and faith in others only when they can make a personal assessment of credibility and candor.
- Transparency of planning is putting the planning process out front where it is viewable to the public long before implementation. With honest risk communication and openness, the community can make informed judgments on compliance. Studies such as the Harvard and Keystone center study indicate that when properly informed of the consequences, community members are likely to comply with directives and restrictive measures.

d. Reduce

- Fear is an ever present emotion in any disaster planning. With advance risk communication, the community is better informed

and, as such, better prepared to do what is requested. Awareness and information become an “inoculation” for fear.

- Resistance to intervention measures through informative action, risk communication, education and transparency of planning.

C. A COMMUNITY POLICING ORIENTATED COMPLIANCE TEAM

At the state and local level, the American Public Health Association contends that public health agencies are typically overburdened with their day-to-day commitments without the added responsibilities of preparing for a pandemic.¹³⁷ Public health, acting alone, lacks the resources and structure to effectively reach wide segments of the population in a manner similar to the community policing initiatives.

Alternatively, law enforcement, while experienced in grassroots community policing initiatives, lacks the specific public health training and expertise in pandemic preparation and education to achieve such a goal. The solution is in the creation of a collaborative statewide team consisting of elected and/or appointed officials, public health, law enforcement, emergency management and education experts. The team would be assembled and operate under the framework of the Incident Management System, a system that is widely recognized and distributed as the standard for Homeland Security response.

D. INCIDENT COMMAND STRUCTURE

The Incident Command System (ICS) would make an appropriate framework to construct and implement a mitigation compliance team framework. While the ICS was designed to manage emergency response and disasters, there is no reason its collaborative framework could not be sustained over a longer course of action for a community mitigation compliance campaign. The ICS framework will provide a practical format that most homeland security providers are familiar with as a result of pre-existing training or practical experience. Positions within the Compliance ICS structure will be populated

¹³⁷ American Public Health Association, *APHA's Prescription for Pandemic Flu* (Washington, DC: American Public Health Association, 2007), <http://www.apha.org/NR/rdonlyres/D5017DB9-F400-4399-A656-939C4C8DF259/0/FLUpolicycomplete.pdf> (accessed August 5, 2007).

with public health, law enforcement, education professionals, emergency management, the private sector, and perhaps other government resources as appropriate.

Creating an ICS structure for a pandemic-related event would serve the dual purpose of creating a structure to attain voluntary compliance and education, as well as creating knowledgeable and familiar working groups prepared for a pandemic or other disaster scenarios. **Figure 14** illustrates the framework and specific areas of the ICS customized for a compliance program strategy.

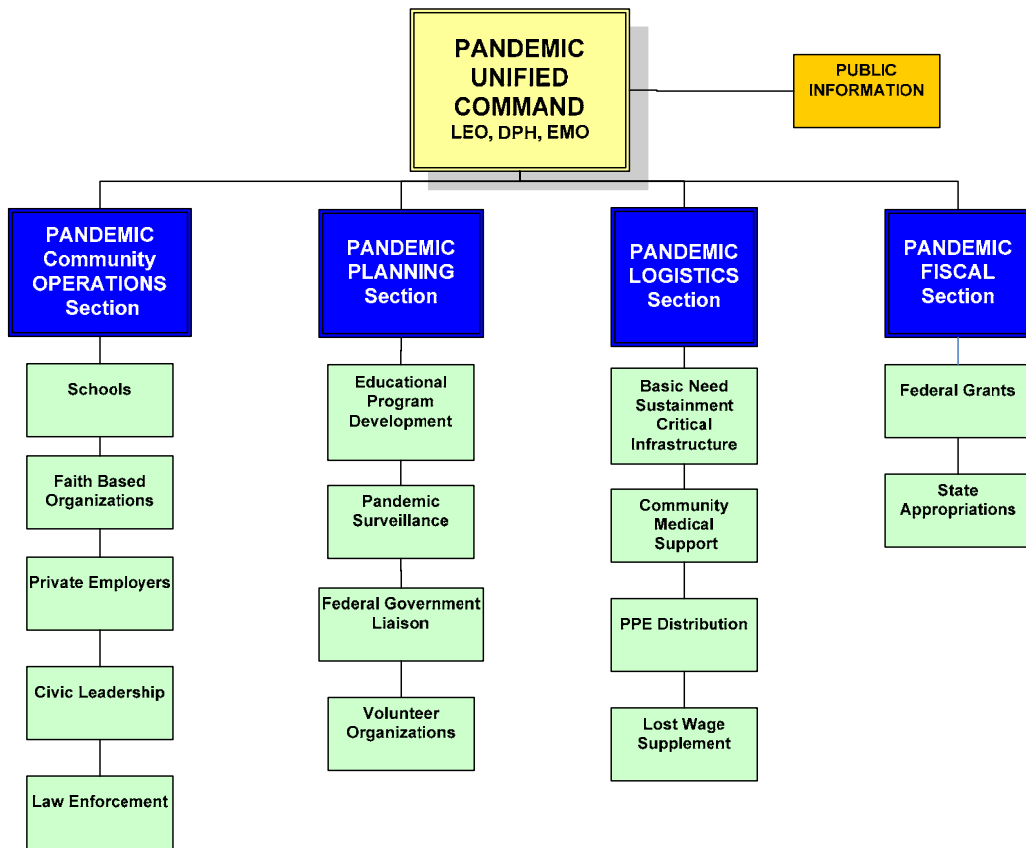


Figure 14. The ICS – Mitigation Compliance Team Diagram.¹³⁸

¹³⁸ United States Department of Agriculture Forest service, *Incident Command System, ICS Organization Forms*, http://www.fs.fed.us/fire/planning/nist/ics_forms/ics201p3.doc (accessed August 31, 2007)

1. Unified Command

The leadership of this team, the Unified Command, will establish the objectives, agenda and operational direction of the compliance outreach process. Consisting of qualified management members of concerned agencies such as public health, law enforcement and emergency management, the Unified Command will constitute the leadership of the compliance effort. Members of the executive team should have substantial preparedness training backgrounds and specific expertise in the area of pandemic or biological threat assessment. The responsibility of the unified pandemic team is to provide direction and leadership in instituting a jurisdictional strategy for pandemic awareness leading to compliance with mitigation efforts.

2. Operations

The most important and consequently the most visible component of the compliance initiative is the operational component. Operations will bring the awareness and engagement initiative directly to the community. The critical entities that must be represented and employed within the operational level will be schools, faith-based organizations, private and government employers and volunteer organizations. At this level, it is the pre-existing community policing relationships and structures that make the planning and logistical support operational.

An example of a community initiative can be found in the recent works of a group of Stanford University undergraduate students in the Social Innovation and Entrepreneurship Program. Working on pandemic preparation, the students have proposed community, social networking solutions to pandemic survivability.¹³⁹ Four of the students in particular have presented a comprehensive educational and awareness program through a proposed California Public Schools curriculum on pandemic education.¹⁴⁰ A program such as this, reaching students and parents, would be widely

¹³⁹ Social Innovation and Entrepreneurship Program, "Saving Lives in the Next Pandemic," Stanford University, <http://sie.stanford.edu/1/index.html> (accessed August 4, 2007).

¹⁴⁰ Francisco Cai et al., *Community Resiliency through Schools* (Palo Alto, California: Stanford University, 2007), http://sie.stanford.edu/1/reports/community_resiliency.pdf (accessed August 5, 2007).

adaptable to any state educational requirement, and would have significant impact and immediate results with pandemic awareness and preparedness.

3. Planning

The planning section would have considerable duties related to curriculum and learning objective development, liaison with federal and state public health organizations, as well as with academic institutions. Populated primarily with public health and educational staff, the planning section would develop and refine the curriculum and awareness training to prepare the public.

4. Logistics

The logistics section will be tasked with acquiring the necessary equipment, facilities and educational material required to conduct community preparedness training. Many emergency management personnel are trained and prepared to serve within this section for natural disasters already. Logistics would produce informative web postings, educational videos, mailings and brochures to further the ends of the awareness campaign. Many public service and educational announcements are already in existence through the CDC or HHS. The logistics section would be tasked with obtaining and targeting their distribution through the various operations units deployed in the community.

5. Finance

Large educational undertakings such as this will require substantial financing and detailed accounting of expenditures. The finance section would be responsible for exploring and acquiring grants and appropriations to underwrite costs. Collaborative, multi-agency, multi-jurisdictional efforts such as this can become quite complicated and costly. Having experienced grant writers as well as accounting staff dedicated to the section, will provide the necessary oversight while ensuring that all appropriate funding is aggressively sought.

E. PANDEMIC MITIGATION COMPLIANCE OPERATIONS MODEL

The role of government is that of a facilitator bringing together the key partners in the process of securing compliance with community interventions. Partnerships between government (law enforcement, public health, emergency management and elected officials), employers, volunteer groups, faith-based groups and schools are established. The partnership becomes the operational component or arm of the compliance strategy delivering educational awareness, trust, transparency of planning and participation directly to the community. **Figure 15** illustrates this partnership in operation, creating a core of community compliance with mitigation efforts.



Figure 15. The Operational Model.

F. SUMMARY

Pandemic preparation and community intervention strategies must be developed now, long before the spread of a virus. In spite of high levels of anxiety concerning a future pandemic influenza, there is mounting evidence that community mitigation efforts

can have a significant, positive affect.¹⁴¹ ¹⁴² Through intervention efforts, overall mortality may be reduced and perhaps more importantly, valuable time may be gained for critical vaccine development. Timely instituted mitigation efforts, in order to be truly effective, will require significant, voluntary compliance from the community.

Community mitigation efforts or interventions such as school closures, work at home programs, cancellation of large public events or closed public transportation venues will likely have cascading consequences¹⁴³ for the public. The community, in order to make informed decisions with potentially life-threatening consequences, needs to fully comprehend the risks and consequences of compliance or non-compliance with mitigation or intervention strategies. While much has been written or posted concerning the ramifications of community interventions or the lack of viable vaccines, that effort is not reaching the public. The community policing model and the ICS structure provide a viable and tested mechanism to bring the appropriate awareness to the public.

¹⁴¹ Germann et al., *Mitigation Strategies for Pandemic Influenza in the United States*, 5935-5940.

¹⁴² Fraser et al., *Factors that make an Infectious Disease Outbreak Controllable*, 6146-6151.

¹⁴³ Center for Disease Control, *Interim Pre-Pandemic Planning Guidance: Community Strategy for Pandemic Influenza Mitigation in the United States*, 10.

APPENDIX

Scott Holmber et al., examine the variances that exist in state pandemic plans.¹⁴⁴ An examination of the table highlights the consistency of vaccine and vaccination plans (left column) as opposed to the inconsistent and sporadic plans for “community containment (far right column).

¹⁴⁴ Scott D. Holmberg et al., *State Plans for Containment of Pandemic Influenza* (Triangle Park, N.C.: RTI International, 2006), <http://www.cdc.gov/ncidod/EID/vol12no09/06-0369.htm> (accessed December 22, 2006).

Appendix Table 2. Overview of 50 state plans for vaccination, surveillance, and containment of pandemic influenza*

State	Vaccination		Surveillance and detection				Community containment activities considered			
	ACIP priority groups	Other groups considered†	Clinics/hospitals/clinicians	Laboratories	Syndromic surveillance‡	International travelers	Voluntary self-isolation	School/institution closings	Institution/household quarantine	Contact vaccination/chemoprophylaxis
Alabama	Yes		Yes	Yes					Possible	
Alaska	Yes		Yes	Yes						
Arizona	Yes		Yes	Yes			Yes			
Arkansas	Yes	Children 2–18 y of age	Yes		Nonprescription medicine use		Yes	Yes	Yes	
California	(Yes)	(Yes)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Colorado	Yes		Yes	Yes						
Connecticut	Yes		Hospitals only	Yes						
Delaware	Yes	Yes	Yes	Yes					Yes	
Florida	Yes	Community service personnel‡ and preschoolers	Yes	Yes				Possible	Yes	
Georgia	Yes		Yes	Yes					Possible	
Hawaii	Yes		Yes	Yes		Yes	Yes	Possible	Possible	
Idaho	Yes		Possible	Yes	Possible		Possible	Possible		
Illinois	(Yes)		Yes		Possible					
Indiana	Yes	Yes	Yes	Yes			Yes	Possible	Yes	
Iowa	(Yes)		Yes	(Yes)		(Yes)				
Kansas			Yes	Yes		(Yes)		"Will follow generic... response plans.."		
Kentucky	Yes	Yes	Yes	Yes					(Yes)	
Louisiana										
Maine	Yes;		Yes	Yes		(Yes)	Yes	Possible	Yes	
Maryland	Yes		Yes	Yes		(Yes)				
Massachusetts	Yes	Yes	Yes	Yes			Yes	Yes	Yes	
Michigan	Yes	(Yes)	Yes	Yes		Possible	Yes	Yes		
Minnesota	Yes		Yes	Yes	Yes, in development					
Mississippi	(Yes)		Yes	(Yes)						
Missouri	Yes	Yes	Yes	Yes						
Montana	Yes		Yes	Yes						
Nebraska	(Yes)		Yes	Yes	Yes, in development				Possible	
Nevada	(Yes)		Yes	Yes			Yes			
New Hampshire	Yes		Yes	Yes				Yes		
New Jersey	Yes		Yes	Yes			Yes	Yes	Yes	
New Mexico	Yes		Yes	Yes			(Yes)	(Yes)		
New York	(Yes)	(Yes)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
North Carolina	Yes	(Yes)	Yes	Yes	Yes		(Yes)	(Yes)	(Yes)	
North Dakota	Yes	(Yes)	Yes	Yes			(Yes)	(Yes)	Possible	

Holmberg SD, Layton CM, Ghneim GS, Wagener DK. State plans for containment of pandemic influenza. Emerg Infect Dis [serial on the Internet]. 2006 Sep [date cited]. Available from http://www.cdc.gov/ncidod/EID/vol12no09/06-0369_appT2.htm

State	Vaccination		Surveillance and detection				Community containment activities considered			
	ACIP priority groups	Other groups considered†	Clinics/hospitals/clinicians	Laboratories	Syndromic surveillance‡	International travelers	Voluntary self-isolation	School/institution closings	Institution/household quarantine	Contact vaccination/chemoprophylaxis
Ohio	Yes		Yes	Yes				Possible	Possible	
Oklahoma	Yes		Yes	Yes				Possible	Possible	
Oregon	Yes		Yes	Yes						
Pennsylvania	(Yes)		Yes		Pittsburgh		Yes		Possible	
Rhode Island	Yes									
South Carolina	Yes	(Yes)	Yes				(Yes)			
South Dakota	Yes	(Yes)	Yes	(Yes)			(Yes)			(Yes)
Tennessee	(Yes)		Yes							
Texas	(Yes)	(Yes)	Yes	Yes	Yes, in development				Yes	
Utah	Yes		(Yes)					Possible		
Vermont	Yes	(Yes)	Yes	Yes						(Yes)
Virginia	(Yes)		Yes	Yes	Yes					
Washington	(Yes)		(Yes)							
West Virginia	Yes	(Yes)								
Wisconsin	Yes		Yes	Yes	Possible					
Wyoming	Yes		Yes	Yes				(Yes)	(Yes)	

*ACIP, Advisory Committee on Immunization Practices; (Yes), a program was explicitly considered but not finalized in the state plan; Possible, a program was alluded to but not extensively considered.

†Other groups include nuclear power plant workers, telecommunications and public utility workers, and key government personnel.

‡Syndromic surveillance refers to the immediate electronic collection and reporting of patients in clinics, emergency departments, and other medical venues who have cough, fever, and other symptoms suggestive of influenza.

Louisiana

No pandemic influenza plan posted before Hurricane Katrina

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BIBLIOGRAPHY

- American Public Health Association. *APHA's Prescription for Pandemic Flu*. Washington, DC: American Public Health Association, 2007, <http://www.apha.org/NR/rdonlyres/D5017DB9-F400-4399-A656-939C4C8DF259/0/FLUpolicycomplete.pdf> (accessed August 5, 2007).
- Barry, John M. *The Great Influenza: The Story of the Deadliest Pandemic in History*. 1st ed. New York, NY: Penguin Group, 2005.
- Barbera, Joseph, Anthony Macintyre, Larry Gostin, Tom Inglesby, Tara O'Toole, Craig DeAtley, Kevin Tonant, and Marci Layton. "Large-Scale Quarantine Following Biological Terrorism in the United States." *JAMA* 286 (2001) <http://jama.ama-assn.org/cgi/reprint/286/21/2711>. (accessed December 10, 2006)
- Blendon, Robert J., John M. Benson, and Kathleen J. Weldon. *Pandemic Influenza and the Public: Survey Findings*. Boston, MA: Harvard School of Public Health, 2006, http://www.hsph.harvard.edu/panflu/panflu_charts.ppt (accessed July 14, 2007).
- Blendon, Robert J., Katherine M. DesRoches, Martin S. Cetron, John M. Benson, Theodore Meinhardt, and William Pollard. "Attitudes Toward the use of Quarantine in A Public Health Emergency in Four Countries." *Health Affairs* 25, no. 2 (2006): <http://content.healthaffairs.org/cgi/content/full/25/2/w15?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&author1=Blendon&andorexactfulltext=and&searchid=1&FIRSTINDEX=0&resourcetype=HWCIT>. (accessed November 2, 2006)
- Bootsma, Martin C. and Neil M. Ferguson. "The Effect of Public Health Measures on the 1918 Influenza Pandemic in U.S. Cities." *Proceedings of the National Academy of Sciences of the United States of America* 104, no. 18 (April 6, 2007): 7588-7593, www.pnas.org/cgi/doi/10.1073/pnas.0611071104 (accessed May 2, 2007).
- Cai, Francisco, Fagan Harris, Emily Gorbaty, and Ellen Truxaw. *Community Resiliency through Schools*. Palo Alto, CA: Stanford University, 2007, http://sie.stanford.edu/1/reports/community_resiliency.pdf (accessed August 5, 2007).
- Committee on Modeling Community Containment for Pandemic Influenza. *Modeling Community Containment for Pandemic Influenza: A Letter Report*. Washington, DC: National Academy of Sciences, 2006, <http://books.nap.edu/catalog/11800.html> (accessed January 25, 2007).
- Community Policing Consortium. *Understanding Community Policing: A Framework for Action*. Washington, DC: Bureau of Justice Assistance, 1994, <http://www.ncjrs.gov/pdffiles/commpp.pdf> (accessed July 1, 2007).

- Covey, Stephen R., ed. *The Speed of Trust*. 1st ed. Vol. 1. New York, NY: Free Press, 2006 (accessed July 3, 2007).
- Department of Homeland Security. *National Response Plan*. Washington, DC: United States Department of Homeland Security, 2004, http://www.dhs.gov/xlibrary/assets/NRP_FullText.pdf (accessed December 29, 2006).
- DiGiovanni, Clete, Jerome Conley, Daniel Chiu, and Jason Zaborski. "Factors Influencing Compliance with Quarantine in Toronto during the 2003 SARS Outbreak." *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science* 2, no. 4 (2004): 1-8 (accessed December 4, 2006).
- Fantino, Julian. 2003 SARS Outbreak: The Response of the Toronto Police Service. *The Police Chief*, April 2005, 1, http://policechiefmagazine.org/magazine/index.cfm?fuseaction=print_display&article_id=565&issue_id=42005 (accessed March 26, 2007).
- Flynn, Daniel W. *Defining the "Community" in Community Policing*. Washington, DC: Police Executive Research Foundation, 1998, http://www.policeforum.org/upload/cp_570119206_12292005152452.pdf (accessed June 14, 2007).
- Fraser, Christopher, Steven Riley, Roy M. Anderson, and Neil M. Ferguson. "Factors that make an Infectious Disease Outbreak Controllable." *Proceedings of the National Academy of Sciences* 101, no. 16 (April 20, 2004): 6146-6151.
- Friel, Brian. "Bird Flu Fears Raise Quarantine Questions." *National Journal*. October 25, 2005: 11/27/2006-2,3, <http://www.govexec.com/dailyfed/1005/102505nj1.htm> (accessed November 27, 2006)
- Garrett, Laurie. "The Next Pandemic?" *Foreign Affairs* July/August 2005, no. July/August 2005 (2005), <http://www.foreignaffairs.org/20050701faessay84401/laurie-garrett/the-next-pandemic.html>. (accessed November 2, 2005)
- Germann, Timothy C., Kai Kadau, Ira M. Longini, and Catherine A. Macken. "Mitigation Strategies for Pandemic Influenza in the United States." *Proceedings of the National Academy of Sciences* 103, no. 15 (April 3, 2006): 5935-5940, www.pnas.org/cgi/doi/10.1073/pnas.0601266103 (accessed May 2, 2007).
- Glaser, Mark A., Lee E. Parker, and Stephanie Payton. "The Paradox between Community and Self-Interest: Local Government, Neighborhoods, and Media." *Journal of Urban Affairs* 23, no. 1 (2001): 87-102, <http://web.ebscohost.com/ehost/pdf?vid=2&hid=103&sid=a393941b-0820-4363-9bdd-ffca1d27492e%40sessionmgr102> (accessed July 13, 2007).

- Glass, T. A., and M. Schoch-Spana. "Bioterrorism and the People: How to Vaccinate a City Against Panic." *Clinical Infectious Diseases* 34, no. 2 (December 3, 2001): 217-223, <http://www.journals.uchicago.edu/CID/journal/issues/v34n2/011333/011333.web.pdf> (accessed June 27, 2007).
- Glass, R. J., L. M. Glass, and W. E. Beyeler. *Local Mitigation Strategies for Pandemic Influenza*. Albuquerque, NM: National Infrastructure Simulation and Analysis Center, 2005.
- Glass, R. J., L. M. Glass, W. E. Beyeler, and H. J. Min. "Targeted Social Distancing Design for Pandemic Influenza." *Emerging Infectious Diseases* 12, no. 11 (November 2006): 1671-1681, http://www.cdc.gov/ncidod/EID/vol12no11/06-0255.htm?s_cid=eid06_0255_e (accessed May 24, 2007).
- Government of Hong Kong. "OCCUPATIONAL SAFETY AND HEALTH ORDINANCE." Government of Hong Kong. http://www.legislation.gov.hk/blis_ind.nsf/CurAllEngDoc?OpenView&Start=509&Count=30&Expand=509.1#509.1 (accessed August 19, 2007).
- Guidotti, Tee L. "Public Health and Patriotic Doubts." *HSI Journal of Homeland Security* (July 2002): 07/04/2007, <http://www.homelandsecurity.org/newjournal/search/searchResults.asp> (accessed July 4, 2007).
- Harvard School of Public Health. *In the Case of an Outbreak of Pandemic Flu, Large Majority of Americans Willing to make Major Changes in their Lives*. Boston, MA: Harvard University, 2006, <http://www.hsph.harvard.edu/press/releases/press10262006.html> (accessed November 27, 2006).
- Hatchett, Richard J., Carter E. Mecher, and Marc Lipsitch. "Public Health Interventions and Epidemic Intensity during the 1918 Influenza Pandemic." *Proceedings of the National Academy of Sciences of the United States* 104, no. 18 (April 6, 2007): 7582-7587, www.pnas.org/cgi/doi/10.1073/pnas.0610941104 (accessed May 2, 2007).
- Holmberg, Scott D., Christine M. Layton, George S. Ghneim, and Diane K. Wagner. *State Plans for Containment of Pandemic Influenza*. Triangle Park, N.C.: RTI International, 2006, <http://www.cdc.gov/ncidod/EID/vol12no09/06-0369.htm> (accessed December 22, 2006).
- Homeland Security Council. *National Strategy for Pandemic Influenza Implementation Plan*. Washington, DC: Homeland Security Council, 2006, <https://www.hsdl.org/homesec/docs/whitehouse/nps11-050406-01.pdf> (accessed December 20, 2006).

- Keystone Center. *The Public Engagement Project on Community Control Measures for Pandemic Influenza*. Keystone, CO: The Keystone Center, 2007, http://www.keystone.org/spp/documents/FinalReport1_CommunityControl5_2007.pdf (accessed July 14, 2007).
- Kim, W. Chan and Renee Mauborgne. *Blue Ocean Strategy*. Boston, Massachusetts: Harvard Business School Press, 2005.
- Leavitt, Michael O. *Pandemic Planning Update III*. Washington, DC: U.S. Department of Health and Human Services, 2006, <http://www.pandemicflu.gov/plan/pdf/panflureport3.pdf> (accessed March 14, 2007).
- Luke, Catherine J. and Kanta Subbarao. "Vaccines for Pandemic Influenza." *Emerging Infectious Diseases* 12, no. 1 (January 2006): 66-72, <http://www.cdc.gov/ncidod/EID/vol12no01/pdfs/05-1147.pdf> (accessed January 27, 2007).
- Massachusetts Department of Public Health. *Influenza Pandemic Preparedness Plan*. Boston, Massachusetts: Commonwealth of Massachusetts, 2006, http://www.mass.gov/dph/cdc/epii/flu/pandemic_plan.htm (accessed May 20, 2006).
- . *Frequently Asked Questions about Isolation and Quarantine*. Boston, Massachusetts: Commonwealth of Massachusetts, 2005, http://www.mass.gov/dph/cdc/surveillance/iq/iq_faq.pdf (accessed December 17, 2006).
- Matthews, Gene. *The Public/Private Response to Sudden Disease Outbreak*. Atlanta, Georgia: Institute of Public Health Law, 2005, <http://www.cdcfoundation.org/sitefiles/TorontoReport.pdf> (accessed November 2, 2006).
- Moore, M. H. "Problem-Solving and Community Policing." *Crime and Justice* 15 (1992): 99-158, <http://www.jstor.org/view/01923234/ap040015/04a00040/0> (accessed January 31, 2007)
- National Governor's Association. *State Strategies for Fully Integrating Public Health into Homeland Security*. Washington, DC: National Governor's Association, 2005, www.public-health.uiowa.edu/icphp/docs/NGA-Report.pdf (accessed December 15, 2006).
- Neergaard, Luran. "State Pandemic Preparations Vary Widely." *Washington Post*, December 16, 2006, Saturday, http://www.washingtonpost.com/wp-dyn/content/article/2006/12/16/AR2006121600404_pf.html (accessed February 22, 2007).

- Oliver, W. M. "Community Policing: A Conceptual Framework Willard M. Oliver, Elaine Bartgis the Authors." *Policing: An International Journal of Police Strategies & Management* 21, no. 3 (1998): 490-509, <http://www.emeraldinsight.com/Insight/ViewContentServlet?Filename=Published/EmeraldFullTextArticle/Articles/1810210308.html> (accessed July 12, 2007).
- . "The Fourth Era of Policing: Homeland Security." *International Review of Law, Computers & Technology* 20, no. 1 & 2 (March–July 2006): 49-62.
- Pew Research Center. *Americans and Social Trust: Who, Where, Why*. Washington, DC: Pew research Center, 2006, <http://pewresearch.org/assets/social/pdf/SocialTrust.pdf> (accessed July 5, 2007).
- Reed, Patricia D. "Integrating Public Health Agencies into the Homeland Security Community." Master of Security Affairs, Naval Postgraduate School, 2007, https://www.hsdl.org/homsec/docs/theses/07Mar_Reed.pdf&code=a089965cbf733e463e876c8dcf65fd39 (accessed July 9, 2007).
- Reissman, Dori B., Patricia J. Watson, Richard W. Klomp, Terri L. Tanielian, and Stephen D. Prior. "Pandemic Influenza Preparedness: Adaptive Responses to an Evolving Challenge." *Journal of Homeland Security and Emergency Management* 3, no. 2 (2007, 2006): 1-26, <http://www.bepress.com/jhsem/vol3/iss2/13> (accessed April 5, 2007).
- Richards, Edward, Richard Goodman, and Stacy Milligan. *Quarantine and Police Powers: The Role of Law Enforcement in a Biomedical Crisis*. Washington, DC: Police Executive Research Forum, 2004.
- Richards, Edward P., Katherine C. Rathburn, Corina Sole Brito, and Andrea Luna. *The Role of Law Enforcement in Public Health Emergencies*. Washington, DC: United States Department of Justice, 2006, http://www.policeforum.org/upload/Pandemic%20FINAL_289750054_182007082257.pdf (accessed January 18, 2007).
- Rothstein, Mark A., J. D. Alcalde, M. Gabriela, M.P.H., Elster, Nanette R., J. D., M.P.H., Majumder, Mary, J.D., Ph.D., Palmer, Larry I., LL.B., and Stone, T. Howard, J.D., LL.M. *Quarantine and Isolation: Lessons Learned from SARS*. Louisville, Kentucky: Institute for Bioethics, Health Policy and Law University of Louisville School of Medicine, 2003, <http://louisville.edu/medschool/ibhpl/images/pdf/SARS%20REPORT.pdf> (accessed December 15, 2006)
- Scheider, Matthew C. and Robert Chapman. "Community Policing and Terrorism." *Journal of Homeland Security* (April 2003): July 4, 2007, <http://www.homelandsecurity.org/newjournal/articles/scheider-chapman.html> (accessed July 4, 2007).

Scrivner, Ellen. *The Impact of September 11 on Community Policing*. Washington, DC: Police Executive Research Foundation, 2004, http://www.policeforum.org/upload/CommunityPolicingReduced_570119206_12292005152352.pdf (accessed June 14, 2007).

Social Innovation and Entrepreneurship Program. "Saving Lives in the Next Pandemic." Stanford University. <http://sie.stanford.edu/1/index.html> (accessed August 4, 2007).

Staff of the Center for Biosecurity of UPMC. *National Strategy for Pandemic Influenza and the HHS Pandemic Influenza Plan: Thoughts and Comments*, Edited by Staff of the Center for Biosecurity of UPMC. December 2005 ed. Vol. 3. Larchmont, NY: Mary Ann Liebert, 2005, <http://www.liebertonline.com/doi/abs/10.1089/bsp.2005.3.292> (accessed July 8, 2007).

Stephens, Darrel. *The Challenges to the Future of Community Policing*. Washington, DC: Police executive Research Foundation, The Annie E. Casey Foundation, 2004, http://www.policeforum.org/upload/CommunityPolicingReduced_570119206_12292005152352.pdf (accessed July 10, 2007).

Stephens, Darryl and Francis X. Hartmann. *Beyond the Beltway: Focusing on Hometown Security - the Policing Challenge*. Cambridge, Massachusetts: Harvard University, 2002, http://bcsia.ksg.harvard.edu/BCSIA_content/documents/beyond_the_beltway.pdf (accessed June 14, 2007).

United States Center for Disease Control. *Interim Pre-Pandemic Planning Guidance: Community Strategy for Pandemic Influenza Mitigation in the United States*. Washington, DC: Department of Health & Human Services, 2007, http://www.pandemicflu.gov/plan/community/community_mitigation.pdf (accessed February 22, 2006).

———. "Pandemic Flu: The Facts." United States Center for Disease Control. http://www.pandemicflu.gov/news/PDFs/pandemicfluthefacts_eng.pdf (accessed August 5, 2007).

United States Department of Agriculture, Forest Service. *Incident Command System*. http://www.fs.fed.us/fire/planning/nist/ics_forms/ics201p3.doc (accessed August 31, 2007).

United States General Accounting Office. *Influenza Pandemic: Plan Needed for Federal and State Response*. Washington, DC: United States General Accounting Office,

2000, <https://www.hsdl.org/homesec/docs/gao/nps11-120203-04.pdf&code=31438a34382c6dd44a17600141d1facd> (accessed November 3, 2006).

Wilson, James Q. and George Q. Kelling. Broken Windows. *The Atlantic Monthly*, March 1982. 1, <http://www.theatlantic.com/doc/198203/broken-windows>. (accessed January 20, 2007).

Wu, J. T., S. Riley, C. Fraser, and G. M. Leung. “Reducing the Impact of the Next Influenza Pandemic using Household-Based Public Health Interventions.” *PLoS Medicine* 3, no. 9 (September 2006): e361, <http://medicine.plosjournals.org/perlserv/request=index-html?request=get-document&doi=10.1371/journal.pmed.0030361> (accessed May 24, 2007).

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