Distribution Agreement

In presenting this thesis or dissertation as a partial fulfillment of the requirements for an advanced degree from Emory University, I hereby grant to Emory University and its agents the non-exclusive license to archive, make accessible, and display my thesis or dissertation in whole or in part in all forms of media, now or hereafter known, including display on the world wide web. I understand that I may select some access restrictions as part of the online submission of this thesis or dissertation. I retain all ownership rights to the copyright of the thesis or dissertation. I also retain the right to use in future works (such as articles or books) all or part of this thesis or dissertation.

Signature:

_____ _____

Alice Lee Date

The Association of Average Daily Population of Jails on 2009 H1N1 Influenza Vaccine Receipt

By

Alice Lee
Master of Public Health

Epidemiology

_____

Anne Spaulding, MD MPH
Committee Chair

_____

Katherine G. Seib, MSPH
Committee Member

_____

Ellen Whitney, MPH
Committee Member

The Association of Average Daily Population of Jails on 2009 H1N1 Influenza Vaccine Receipt

By

Alice Lee

B.S., Wheaton College, 2007

Thesis Committee Chair: Anne Spaulding, MD MPH

An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
in partial fulfillment of the requirements for the degree of
Master of Public Health
in Epidemiology
2011

ABSTRACT

The Association of Average Daily Population of Jails on
2009 H1N1 Influenza Vaccine Receipt

By Alice Lee

Background: Emergency preparedness efforts often overlook U.S. correctional facilities, as demonstrated in the 2009 H1N1 influenza pandemic. There are about 12 million admissions to U.S. jails and prisons each year, and rapid detainee turnover and facility overcrowding may exacerbate transmission of respiratory droplet-spread infectious diseases. The number of detained individuals varies tremendously across correctional facilities, especially among smaller jails. By collaborating with the correctional sector, public health professionals have an opportunity to reach individuals who may otherwise lack access to care.

Objective: To address the facilitating factors, as well as barriers, to vaccine receipt among correctional facilities during the 2009-2010 H1N1 influenza pandemic.

Methods: A nationwide facility-level survey of a randomly selected, representative sample of U.S. correctional facilities was conducted through fax, email, and phone. This survey examined the timing of vaccine receipt, H1N1 influenza cases among facilities, barriers to dispensing vaccine, and pandemic preparedness planning. The effect of correctional facility type on H1N1 influenza vaccine receipt was analyzed using logistic regression modeling techniques.

Results: Overall, the sample respondents incorporated in the analysis totaled 448 facilities, including 28 federal prisons, 135 non-federal prisons, and 285 jails. Fifty-five percent of jails never received vaccine during the pandemic period, whereas only 15% of federal prisons and 11% of non-federal prisons were without vaccine. The size of the facility given by average daily population (ADP) was the most significant predictor of the likelihood of vaccine receipt. Logistic modeling indicates that each 100 inmate increase in ADP resulted in a 32% increased likelihood of receiving 2009 H1N1 influenza vaccine among smaller jails. Influenza preparedness in correctional facilities varied by facility type.

Conclusions: Consideration of correctional facilities, especially jails, during vaccine distribution is essential to future pandemic response, given that 95% of persons who enter U.S. correctional facilities only stay in jails. Involving correctional facilities, especially smaller facilities, in pandemic preparedness planning may help protect correctional facility populations, and the community as a whole, in the event of future pandemics.

The Association of Average Daily Population of Jails on 2009 H1N1 Influenza Vaccine Receipt

By

Alice Lee

B.S., Wheaton College, 2007

Thesis Committee Chair: Anne Spaulding, MD MPH

A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
in partial fulfillment of the requirements for the degree of
Master of Public Health
in Epidemiology
2011

ACKNOWLEDGEMENTS

I would like to thank my thesis advisors, Anne Spaulding, Katy Seib, and Ellen Whitney, as well as members of the Emory PERRC, for their guidance and encouragement throughout the course of my thesis work. I would also like to acknowledge Penny Howards, Pat Kilgo, David Kleinbaum, and Paul Weiss, for offering their analytical expertise. Each of you has helped strengthen my skills and abilities to make a difference in the real world.

I am truly grateful for my family—엄마, 아빠, and 문용—for their unending support from day one of my MPH career. Thank you for always having faith in me, and pushing me to do my best.

I want to express my appreciation to my friends for your thoughts and prayers throughout this process.

Thank you, Chris Kang, for being my emotional and spiritual support, being patient with me each and every day, and encouraging me to press on (Philippians 4:13). I could not have done this without you.

TABLE OF CONTENTS

LIST OF TABLES & FIGURES

Tables

Figures

CHAPTER I

LITERATURE REVIEW

Introduction to the 2009 H1N1 Influenza Pandemic

On April 21, 2009, the Centers for Disease Control and Prevention (CDC) reported that two children aged 9 and 10 years from San Diego, California, had developed febrile respiratory illness caused by a novel strain of swine influenza A (H1N1) virus, which had not previously been documented in the United States (1). An additional five cases, three of whom were adolescents aged 16 years, were identified and confirmed just three days later in California and in Texas (2). None of the cases had recent exposure to pigs. Mild influenza-like-illness (ILI) was characteristic of all seven of the laboratory-confirmed cases in the U.S. The World Health Organization (WHO) reported the first cases of 2009 H1N1 influenza in the United States and Mexico on April 24, 2009 (3). Surprisingly, the majority of cases were young adults, as the target age populations for seasonal influenza vaccination are young children and the elderly. The 2009 H1N1 influenza virus became a concern due to the unexpected age range of susceptible individuals, widespread transmission of disease, and the occurrence of human illness related to zoonotic influenza virus.

On June 11, 2009, WHO elevated the pandemic alert for H1N1 influenza to level 6 due to the rapid global transmission of the virus (4). Current seasonal influenza vaccines were not protective against transmission, as the novel strain of influenza A (H1N1) strain was antigenically distinct from strains in the seasonal vaccines (5-6). Consequently, WHO, Health Ministers, and National Health Agencies began working together to develop and produce a vaccine by the end of June 2009 (7). By the end of

October 2009, only 23.2 million doses of H1N1 influenza monovalent vaccine had been produced, even though the Department of Health and Human Services had projected several months earlier to have as many as 120 million doses available by October (8). As a result, the Advisory Committee on Immunization Practices (ACIP) recommended that during limited vaccine availability vaccine initially be given to targeted population groups based on surveillance data that suggested a higher proportion of infection in children and young adults as opposed to older age groups (6, 9). The initial target groups included care providers for infants less than six months old (10), health care and emergency medical services personnel, persons who are 6 months to 24 years old, pregnant women (10-13), and patients aged 25 to 64 years who have at least one underlying medical condition (14-16). In the event that a sufficient supply of vaccine was unavailable for the general population, ACIP recommended that a subset of the initial target groups be given precedence. The subset included pregnant women, providers for infants, and health care and emergency medical services personnel who have direct contact with patients or infectious material; however, priority was given to children aged 6 months to 4 years, and persons aged 5 to 18 years who have medical conditions associated with higher risk of influenza-related complications (17). During the 2009 H1N1 influenza pandemic, third-party distributers, such as local health departments, hospitals, and clinics served as vaccine providers designated as vaccine-receiving sites (17). Overall, the initial target groups included an estimate of 160 million persons, while the subset of target groups identified for times of limited vaccine availability included 62 million (18).

United States Inmate Population

There are approximately 12 million admissions to jails and prisons each year in the United States (19).With one in 99.1 adult residents behind bars on any given day in 2008 (20), the United States incarcerates the highest number of people per capita worldwide, resulting in a substantial portion of persons confined to close quarters, the defining characteristic of the congregate setting (21). At midyear 2009, about 1.6 million inmates were detained in federal and state prisons (22), along with almost 770,000 held in jails (23).Up until 2009, the overall inmate population had steadily been increasing over the years. A disproportionate number of incarcerated persons share several distinct characteristics; many are impoverished, homeless, undereducated, and of minority groups (24).

In the United States, correctional populations are predominantly male (about 90%). Men are 14 times more likely to be imprisoned than women (25). However, the number of women in prisons has been growing at a higher rate than that for men. Of women who are incarcerated, 6% to 10% are pregnant (26), and as many as 1,400 women gave birth while being incarcerated (27). This is not surprising, since 70% of incarcerated women are aged 18 to 39 years (25), which is within the prime age range for fertility.

Persons confined in correctional facilities (CFs) are prone to infectious agents. Jails are CFs for persons awaiting trial, and are important targets for immunization programs, because inmates are often held within congregate settings, which facilitate the spread of respiratory illness (28). According to a study conducted by the National Commission on Correctional Health Care (NCCHC) in cooperation with the National

Institute of Justice, incarcerated persons in the United States have higher rates of chronic and infectious diseases, mental illness, and substance dependency than the general population (29). The H1N1 influenza virus affected a total of sixteen inmates and correctional officers from an Australian prison in July 2009 (30). Even more recently, the H1N1 influenza virus circulated at a minimum security prison in South Carolina, infecting 140 of 730 inmates in January 2011 (31). Overcrowding in CFs has been associated with transmission of a number of infectious diseases, including tuberculosis, hepatitis B, and methicillin-resistant *Staphylococcus aureus* (19, 32-33). Certain characteristics about jails may need to be taken into account for influenza planning: the number and size of the facility, high turnover rate, the link between jails and their neighboring communities, the ability to handle ill persons, and provisions for physical health, mental health and substance abuse problems (34). Improving the health of jail and prison populations and strengthening their pandemic preparedness efforts may in turn enhance public health in the surrounding community (35).

Health Care Workers in Correctional Facilities

Most of the prisoner population are medically underserved prior to incarceration due to factors such as lack of insurance coverage or inadequate access to primary health care (36). As a result, entry into incarceration may be an individual's first contact with the health care system. In some cases, ethical considerations may be relevant to correctional health care delivery. Correctional staff and health care workers may be under the impression that detainees inevitably surrender their rights as soon as they are

convicted, and as a result are part of a subhuman group (37). Such beliefs of the general population may hinder proper health care for inmates. Therefore, obtaining adequate health care from quality health care workers is a major concern for persons who encounter the correctional system.

For correctional health care providers, the ability and willingness to work may also be strained under emergency situations. Results from a cross-sectional study among a convenience sample of 1,103 health care workers in Nassau County, New York, showed that out of six organizations representing essential infrastructure sectors, the CF officers self-reported the least ability and willingness to report to work in the event of an influenza pandemic (37%) than the other organizations (38). Vaccination of health care providers has been shown to reduce illness and absenteeism caused by influenza. However, CDC assessed that overall, only 37.1% of health care workers had received the influenza A (H1N1) 2009 monovalent vaccine by January 2010 (39), even though ACIP considered this health care workers a priority for getting the vaccine. Unvaccinated health care workers present a risk to patients who may be vulnerable to severe cases of influenza, and may be exacerbated in correctional settings.

2009 H1N1 Influenza Vaccination Coverage in the General Population

The CDC evaluated state-by-state and overall population coverage for the H1N1 influenza vaccination campaign using two telephone surveys (18, 40). The Behavioral Risk Factor Surveillance System determined the vaccination status of about 400,000 persons, while the National 2009 H1N1 Flu Survey (NHFS) sought to uncover the extent

of coverage from the vaccination campaign with the monthly completion goal of 6,000 interviews.

An estimated 85 million doses of H1N1 influenza vaccine were distributed nationwide by mid-December of 2009 (18), and by the following month, approximately 20% of the general population (equivalent to 61 million people), had received the 2009 H1N1 influenza vaccine. Notably, the priority subset recommended by ACIP during limited vaccine availability had the highest rate of coverage (38%) (18). According to the Harvard School of Public Health's poll of the general public's behavioral response to the H1N1 influenza pandemic, the two main rationales for not receiving vaccine were concern about the safety of the vaccine and belief that the vaccine was not necessary (41). They concluded that this may be attributed to the fact that by the time the 2009 H1N1 influenza vaccine was made widely available in January 2010, there was a public realization that the symptoms of H1N1 influenza disease were not as severe as had initially been anticipated. By February, 21% of adults had received the H1N1 influenza vaccine and 16% intended to get it by the end of the month. However, during the period of limited vaccine between July and October 2009, about half of the general population indicated that they would get vaccinated.

Surveys in the Correctional Health Care Setting

National surveys in correctional healthcare at the facility level are rare, but have been conducted by governmental, academic, and independent research organizations, with varying participation rates from target inmate or correctional healthcare worker

populations. CFs vary in fundamental respects that make generalizability a challenge (42). These factors are especially relevant in the jail context, and include the process of incarceration, the physical size of the facility, geographical location, assessment procedures, and architecture/supervision of the facility.

The length of incarceration is largely based on bond hearings, with pretrial release for less serious crimes. Those who remain in jail are more likely to be male, impoverished, charged for more severe crimes, or have a previous record. In addition, the size of the facility is an important element to uphold survey generalizability. Most of the published literature focus on larger facilities that have an average daily population (ADP) of over 1,000 incarcerated persons, even though 50% of all jail systems have an ADP of <250 persons (42). Another factor to consider is the geographical region in which a facility is located. Regions differ in both crime and health patterns, and social factors (race/ethnicity, urban/rural, health disparities). In addition, inmate classification decisions through risk assessment are made on a facility-by-facility basis. These procedures may stem from static risks (race, gender, age) or dynamic factors (sexual behavior, substance abuse). Therefore, taking some of these factors into consideration can aid in the research goal of obtaining a representative jail sample.

Surveys at the government level have been conducted mainly by the Bureau of Justice Statistics (BJS). The U.S. Census Bureau conducted several series of voluntary surveys for BJS, which were completed by detainees. The Survey of Inmates in Federal Correctional Facilities (SIFCF) and the Survey of Inmates in State Correctional Facilities (SISCF) were last conducted in 2004 by BJS and the Federal Bureau of Prisons (FBOP). Both surveys had comparable response rates, with 89.1% for the SIFCF and 84.6% for

the SISCF. These surveys include information on basic inmate characteristics and background, previous drug and alcohol use and treatment, and various programs in place during incarceration. An equivalent survey for jails, called the Survey of Inmates in Local Jails (SILJ), is also performed periodically, and in 2002, the response rate was 84.1%. In terms of prisons, 8% of federal and 16% of state inmates reported multiple health impairments (43). The prevalence of medical conditions, such as arthritis, diabetes, cancer, Human Immunodeficiency Virus (HIV), tuberculosis and hypertension, were reported by inmates within all facility types. Almost 40% of individuals within federal prisons reported a current non-virus related medical problem, for which 75.9% saw a healthcare professional (43). Within state prisons, 44% of inmates attested to a current medical condition. About two-thirds of these inmates received care from a healthcare worker. Over 229,000 jail inmates had a self-reported medical condition (36.9%), with 14% of jail inmates reporting two or more medical impairments, but only 42% had not seen a healthcare worker pertaining to the issue (44). Health care access and delivery in CFs is currently inadequate to meet the needs of inmates.

There are also correctional surveys completed at the academic level. The Illinois Department of Public Health and the Chicago Department of Public Health STD, HIV/AIDS, and hepatitis programs created a survey aimed at persons responsible for medical care within Illinois adult county jails to look at STD and HIV/AIDS testing within these facilities in comparison to public health surveillance data (45). In all, 81 of 91 (89%) of health care workers in Illinois adult county jails completed surveys by fax or telephone. The results of this survey helped public health entities to identify opportunities and barriers to service provision.

Surveys by independent research organizations implemented at the facility level have had lower response rates. From 1985 to 2005, Abt Associates, in conjunction with the National Institute of Justice and the CDC, carried out a series of national surveys of infectious diseases in adult U.S. CFs aimed at the director of health services (46). The random sample from the 2005 survey included the FBOP, all 50 state correctional systems, and the 50 largest city/county jail systems in the country. For the 2005 report on HIV/AIDS and STDs, the survey response was 79% for the three main respondent types (FBOP, state departments of corrections, and large city/county systems), 45% for tribal, regional/rural and small city jails, and 16% for a parallel validation survey. The latter survey was sent to a random sample of individual facilities from all states and the Federal system, and included a subset of the questions regarding policies and practices. About two-thirds of large city and county jail systems responded, while state department of corrections had a 92% (46/50) response rate, and the FBOP had 100% (1/1). The total respondents among both regional/rural jails and small city jails were each less than 50%. The overall survey response rate across the systems came to a total of 56%. As for non-respondents, 35% of facilities gave soft refusals due to factors such as busyness, understaffing and the survey being too lengthy. Even up to the last round of follow-up calls, 21% said they were still “working on it.” The addition of follow-up telephone calls did not yield higher response rates.

Another correctional health study used a convenience sample of providers to look at reproductive health issues in CFs that detain women. They conducted a paper survey that was mailed to a national sample of correctional health providers who are members of the Academy of Correctional Health Professionals (ACHP), and had direct clinical

interactions with women. Respondents were mostly female jail nurses. The resultant response rate reached 43%, of which 30% were eligible for analysis (47). However, as this study used a convenience sample from ACHP, the results may not be demonstrative of every correctional health worker.

Despite high rates of chronic and infectious diseases among inmates, health care delivery issues and public health planning in CFs are often overlooked. Consequently, a national survey of CFs is important for health practices and policies. In this study, we specifically examine survey results from a nationally representative sample of correctional health care workers with regard to vaccine distribution among CF populations in connection with public health partnerships and future pandemics planning.

CHAPTER II

The Association of Average Daily Population of Jails on 2009 H1N1 Influenza Vaccine Receipt

Alice S. Lee

ABSTRACT

Background: Emergency preparedness efforts often overlook U.S. correctional facilities, as demonstrated in the 2009 H1N1 influenza pandemic. There are about 12 million admissions to U.S. jails and prisons each year, and rapid detainee turnover and facility overcrowding may exacerbate transmission of respiratory droplet-spread infectious diseases. The number of detained individuals varies tremendously across correctional facilities, especially among smaller jails. By collaborating with the correctional sector, public health professionals have an opportunity to reach individuals who may otherwise lack access to care.

Objective: To address the facilitating factors, as well as barriers, to vaccine receipt among correctional facilities during the 2009-2010 H1N1 influenza pandemic.

Methods: A nationwide facility-level survey of a randomly selected, representative sample of U.S. correctional facilities was conducted through fax, email, and phone. This survey examined the timing of vaccine receipt, H1N1 influenza cases among facilities, barriers to dispensing vaccine, and pandemic preparedness planning. The effect of correctional facility type on H1N1 influenza vaccine receipt was analyzed using logistic regression modeling techniques.

Results: Overall, the sample respondents incorporated in the analysis totaled 448 facilities, including 28 federal prisons, 135 non-federal prisons, and 285 jails. Fifty-five percent of jails never received vaccine during the pandemic period, whereas only 15% of federal prisons and 11% of non-federal prisons were without vaccine. The size of the facility given by average daily population (ADP) was the most significant predictor of the likelihood of vaccine receipt. Logistic modeling indicates that each 100 inmate increase in ADP resulted in a 32% increased likelihood of receiving 2009 H1N1 influenza vaccine among smaller jails. Influenza preparedness in correctional facilities varied by facility type.

Conclusions: Consideration of correctional facilities, especially jails, during vaccine distribution is essential to future pandemic response, given that 95% of persons who enter U.S. correctional facilities only stay in jails. Involving correctional facilities, especially smaller facilities, in pandemic preparedness planning may help protect correctional facility populations, and the community as a whole, in the event of future pandemics.

INTRODUCTION

There are approximately 12 million admissions to jails and prisons each year in the United States (19). At midyear 2009, about 1.6 million inmates were detained in federal and state prisons (22), in addition to almost 770,000 held in jails (23). The overall inmate population had steadily been increasing over the years until a decrease in numbers for jail inmates was detected in 2009 (23). A disproportionate number of incarcerated persons share several distinct characteristics; many are impoverished, homeless, undereducated, of minority groups, and within the age range of 18-30 (24). This vulnerable inmate population has characteristically been medically underserved prior to incarceration due to factors such as lack of insurance coverage or inadequate access to primary health care (36). According to a study conducted by the National Commission on Correctional Health Care (NCCHC) in cooperation with the National Institute of Justice, incarcerated persons in the United States have higher rates of chronic and infectious diseases, mental illness, and substance dependency than the general population (29). For many inmates, imprisonment may be an individual's first contact with the health care system, which emphasizes the need for proper inmate care to a population that is susceptible to diseases that can thrive in such environments.

Persons confined in correctional facilities (CFs) are prone to infectious agents. The congregate environment of CFs can facilitate spread of infectious diseases to inmates (28). Overcrowding in CFs has been associated with transmission of a number of infectious diseases, including tuberculosis, hepatitis B, and methicillin-resistant *Staphylococcus aureus* (MRSA) (19, 32-33). Several recent outbreaks in CFs have demonstrated the capacity for infectious disease transmission within this setting. The

2009 H1N1 influenza virus affected a total of sixteen inmates and correctional officers from an Australian prison in July of 2009 (30). Even more recently in January 2011, H1N1 influenza circulated at a minimum security prison in South Carolina, infecting 140 of 730 inmates who were held in the largest of three units (31). Improving the health of jail and prison populations and strengthening their pandemic preparedness efforts may in turn enhance public health in the surrounding community (35). Therefore, targeting the interface that lies between corrections and public health is a relevant issue for emergency preparedness efforts.

We conducted a survey directed toward the responsible medical authority of a random sample of U.S. CFs nationwide —including federal prisons, non-federal prisons, and jails—to take on a web-based or paper-based format. The survey was designed to understand facility-level preparedness and response efforts to the 2009-2010 H1N1 influenza pandemic and to seasonal influenza in order to ensure that these facilities obtain timely information and assistance necessary for subsequent influenza seasons. This paper addresses the extent to which individual CFs received H1N1 influenza, vaccine factors associated with receipt, and also acknowledges barriers to vaccine distribution that existed during the 2009 H1N1 influenza mass vaccination campaign. The study was funded by a grant from the Centers for Disease Control and Prevention (CDC) [5-P01-TP000300].

METHODS

Survey Design and Contact List

Following approval by Emory's Institutional Review Board (IRB) in April 2010, a pilot survey was administered to twenty-five CF providers at the "Updates in Correctional Health Care" national conference hosted by NCCHC. These results helped refine the survey instrument. The final survey (Appendix B) consisted of 34 questions pertaining to facility-wide preparedness during the pandemic, H1N1 influenza vaccinations, as well as relationships and communication with health departments and other partners.

The target participants for the revised nationwide survey were United States CF-based healthcare providers or responsible medical authorities who are 18 years of age or older. The survey design was a proportionally allocated stratified sample of CFs. One-third of the 50 largest jails and subsequently smaller jails were randomly sampled from the 2006 Census of Jail Facilities (48) (US Census Bureau and Bureau of Justice Statistics [BJS]) by zip code. For sampling purposes, multiple jails per zip code were considered single facilities. Prison census data collected by the Bureau of the Census and BJS (49) were obtained and prisons were categorized as either federal or non-federal prisons. Collaborators at NCCHC updated contact information for the target respondents to produce a revised list of jails and prisons. Alternate facilities were substituted for facilities whose contact information was unattainable or for facilities that had been shut down following census publication (n=270). Inclusion criteria for the final list for analysis consisted of adults incarcerated in CFs as classified from BJS. This excluded any

juvenile hall, drug or alcohol abuse rehabilitative center, community corrections or halfway houses, and Immigration and Customs Enforcement facilities from further assessment. Contact email addresses for the federal prisons were referenced from the Federal Bureau of Prisons (FBOP) website. The eligible facilities in the sample included 380 non-federal prisons, 814 jails, and 30 federal prisons (Figure 1).

Survey Implementation

The survey was administered from July 2010 through November 2010 (Figure 2). CF health authorities were contacted by sending blast faxes using Ventafax Business version 6.5 (Venta Association, St. Petersburg, Russian Federation) and, if possible, by e-mail through Feedback Server v.2009.1 (Data Illusion, Geneva, Switzerland), as valid electronic addresses were not available for the majority of facilities. Facility name and zip code were the only mandatory fields in the web-based survey. The initial point of contact was a pre-survey request, which introduced the premise of the survey, emphasized de-identification of responses, and gave notification that the survey that would be sent in the coming days. Jails and non-federal prisons received the pre-survey request by fax and/or email, while a representative from the FBOP formally made the same request by email to federal prisons. In three days, each facility received a survey packet, which along with the survey included a cover letter and Emory University IRB approval. Participants were able to complete the survey either electronically using Feedback Server or return a hard copy by fax. Each completed survey was assigned an identification number upon receipt to easily distinguish between emailed and faxed

surveys. Follow-up requests were sent by fax and/or email to non-respondents after one week of releasing the survey. Three successive rounds of calls were made to non-respondent facilities, as well as those with undeliverable emails and faxes. A script to reach the responsible medical authority served to provide information about the survey, resolve any incorrect contact information, answer any relevant questions of concern, and resend the survey to those who wished to complete it. Such CFs obtained surveys within 24 hours by the preferred mode of distribution. Incorrect phone numbers were rectified from web-based sources and directories.

Non-federal prisons sampled from California, Delaware, Kentucky, Maryland, Missouri, Ohio, Texas, and Virginia required IRB approval from each individual state's Department of Corrections (DOC) to participate in the survey. Information pertaining to the approval process was obtained from state DOC websites. After subsequent authorization, the designated research directors of the state DOCs notified the sampled facilities within their jurisdictions of upcoming receipt of the survey.

Three months into the survey period, an abbreviated ten question version of the survey was administered over the phone to remaining facilities who did not respond to the previous version of the survey through internet, fax, or phone means (Appendix C). Informed consent and anonymity of information were communicated in a brief phone script before collecting survey responses.

Data Management and Statistical Analysis

Data analysis was completed using SAS version 9.2 (SAS Institute, Cary, NC). Each CF was considered one unit of analysis; therefore, adjustment for clustering was not necessary. The main predictor variable, average daily population (ADP), was a continuous variable. Descriptive univariate analysis was performed on each variable to check for unusual or implausible values and the degree of missing data. Descriptive statistics are presented by facility type (Table 1). In order to compare vaccine receipt status of smaller jails, the chi-square test was used to assess proportions and the student's t-test was used to assess means (Table 2). All statistical analyses were evaluated at a 0.05 level of significance.

Logistic regression analysis was used to model the relationship between H1N1 influenza vaccine receipt and ADP, adjusted for type of healthcare, and whether or not the CF had a plan before/after 2009. The main exposure, ADP, was increased by a magnitude of 100 to account for 100 inmate intervals in the model. Multicollinearity assessment preceded the regression analysis using a SAS macro (50). Collinearity problems were indicated by the largest condition index (CNI) being largest than the predetermined cutoff value of 30 and at least two variables with a variance decomposition proportion (VDP) greater than the cutoff point of 0.5. Independent variables that had the highest condition index or VDP value were successively removed one at a time until no collinearity problems remained.

For interaction and subsequent confounding assessment, a multiple imputation approach was used to make the dataset more robust, by randomly imputing missing data

for designated variables with a set of plausible values that represent the uncertainty regarding the right value to impute, and then combining the results (51). The result is a complete dataset containing a random sample of missing values that appropriately exhibit the uncertainty due to missing values, which is then used for analysis. Missing data were imputed for all variables except for the outcome, H1N1 influenza vaccine receipt, in order to retain the dichotomous coding of the variable for use in logistic regression. As a result, any observation with a missing value for this outcome variable was not included in the model. In order to address any effect modification within the model, a likelihood ratio test statistic was used to determine the significance of interaction terms.

Modeling continued with assessment of confounding using a subsets approach comparing odds ratios for each subset of variables. The model that retained all first level covariates was considered the gold standard (GS). Using this approach, the model was refit for each combination of remaining first level covariates. Since the GS estimate controls for all potential confounders, this is considered the best estimate; however, if a subset model has an odds ratio that is within ten percent of the GS, and also has a gain in precision, then this is the recommended model (52).

In order to determine the proportion of persons detained within jails that were accounted for by the respondents from the entire sampled jail population, the ADP for each facility listing as found in the 2009-2010 American Correctional Association (ACA) National Jail and Adult Detention Directory was used for smaller jails (53). If there was no ADP record for a facility then the rated capacity, defined as the legal capacity of inmates or the number of beds in the facility, was substituted. ADP's for the sampled top 50 jails were taken from BJS (23).

For facility-level H1N1 influenza vaccine receipt data, large and small jails were grouped together in order to produce a cohesive depiction. In this analysis, these data are only applicable for facilities that had specified an H1N1 influenza vaccine receipt date.

RESULTS

Baseline Characteristics

Originally, the sample population consisted of one-third (n=1,564) of U.S. CFs listed in census data from 2005 and 2006. After removing ineligible facilities, the study sample comprised of 1,224 CFs: 30 federal prisons, 380 non-federal prisons, and 814 jails. Overall, the responsible medical authority at 93% of federal prisons, 38% of non-federal prisons, and 37% of jails responded to either the full or abridged survey. The response rate of 37% for jails represents 50% of the U.S. jail inmate population.

The distribution of each characteristic by CF type is presented (Table 1). Approximately two-thirds of the responding CFs had non-privatized healthcare, reflected by the non-federal prisons and smaller jails, with 62.9% and 62.2%, respectively. However, a higher proportion of federal prisons (89.3%) were non-privatized facilities, while the largest jails were divided equally. ADP varied by facility type. All of the federal facilities and those in the largest jails group had an ADP larger than 800 inmates, with a median of 1,775 (range 800-7,500) and 2,400 (range 1,200-9,000) inmates, respectively. Non-federal prisons had a median of 1,100 inmates, while the smaller jails had a median ADP of 100, and ranged across 1 to 2,300 persons. Each facility type had median ADP's larger than the median ADP for the total (369) except for smaller jails.

During the H1N1 influenza pandemic, 60.9% of all facilities received any H1N1 influenza vaccine, but proportions differed with respect to facility type. While over 85% of federal and non-federal prisons received H1N1 influenza vaccine, only 43.5% of smaller jails had vaccine delivered. All of our sampled largest jails received vaccine

during the pandemic period, and the majority (80%) of these facilities had a pandemic influenza plan in place before April of 2009. Ninety-two percent of federal prisons also had pandemic influenza preparedness plans in place prior to the onset of the H1N1 influenza pandemic. In contrast, pre-pandemic planning was considered by a little over half of non-federal prisons had a pandemic influenza and this number was even less (40.9%) of the smaller jails.

Coordination between corrections and public health occurred mostly across the same institutional level. Of the federal prisons which received H1N1 influenza vaccine, 50.0% of respondents coordinated with federal public health entities, such as the CDC, to receive vaccine. All facility types coordinated to some degree with the state health department, although to a higher degree with non-federal prisons (52.7%). The largest jails and smaller jails also worked with state health departments to obtain H1N1 influenza vaccine (55.6% and 43.8%, respectively), but both large and small jails coordinated mostly with local public health agencies (77.8% and 83.0%, respectively).

Of the CFs that received H1N1 influenza vaccine, all facility types began receiving vaccine before all the vaccine was available by January 2010 (Figure 3). The graph illustrates that federal prisons began receiving H1N1 influenza vaccine before non-federal prisons, which in turn arrived before jails.

Modeling Analysis

The sample respondents incorporated in the modeling analysis only included one facility type—the smaller jails (n=275). The initial logistic regression model included the main predictor, ADP, as a continuous variable, and dichotomous potential confounders, healthcare type (privatized or non-privatized), and whether or not a facility had a pandemic influenza plan in place before April of 2009 (Table 2). This initial model also contained the following interaction terms: ADP*healthcare type and ADP*pandemic influenza plan.

Multicollinearity diagnostics were performed on the initial model. The largest CNI was 8.82168, indicating that there were no collinearity problems. Therefore, no variables needed to be removed before assessment of interaction.

Interaction assessment was completed on both interaction terms, ADP*pandemic influenza plan and ADP*healthcare type, using a chunk test. The full model contained imputed data for these interaction terms along with all other first level covariates (Table 3). This model was compared to a model excluding the interaction terms (Table 4). Both interaction terms were subsequently removed from the model, because the likelihood ratio test statistic ($\chi^2_{2df} = 2.956$) comparing the full and reduced models produced a p-value greater than 0.05 ($p = 0.22809$), suggesting there is no presence of interaction. Backwards elimination of the interaction terms also confirmed a no interaction model. Thus, the reduced model was used as the GS model.

In considering assessment of confounding, a multiple subsets approach was used to compare odds ratios to the GS model (Table 5). There were three subsets of predictors to consider: 1) ADP, healthcare type; 2) ADP, pandemic influenza plan; and 3) ADP only.

Odds ratio and confidence intervals for each of these subsets were then compared to that of the GS. Since the GS estimate controls for all potential confounders, this is considered the best estimate that can be obtained. The model containing ADP and pandemic influenza plan (OR = 1.32 [1.19, 1.45]) was within ten percent of the GS estimate (OR = 1.33 [1.19, 1.49]) and had tighter confidence intervals. Therefore, the final multivariate model contained the subset ADP and pandemic influenza plan before April of 2009 (Table 6).

The final model showed that ADP was a significant factor in smaller jails obtaining 2009 H1N1 influenza vaccine during the pandemic period. The model indicates that each 100 inmate increase in ADP resulted in a 32% increased likelihood of receiving 2009 H1N1 influenza vaccine among smaller jails. There was no significant association between H1N1 influenza vaccine receipt and having a pandemic influenza plan in place before April of 2009 for this smaller jail population.

DISCUSSION

Our 2009 H1N1 influenza survey of CFs showed that 55% of the jail in the United States did not receive any H1N1 influenza vaccine during the 2009 influenza pandemic period and thus were overlooked during the mass vaccination campaign. Failure to supply vaccine to this medically underserved vulnerable population, if repeated during future pandemics, could have major consequences within the public health context for both the correctional and general populations. Furthermore, lack of vaccine highlights issues that need to be resolved before the advent of a future pandemic involving a more virulent pathogen. ACIP guidelines for the influenza A (H1N1) 2009 monovalent vaccine included persons aged 6 months to 24 years, as well as persons aged 25-64 who have comorbid conditions that make them susceptible to influenza-related complications, in their initial list of five target groups where vaccination efforts should focused (17). Given that a high number of inmates in CFs are within the age range of 18-30 years, and that these facilities detain a higher proportion of persons with chronic and infectious diseases, highlighting the importance of reaching out to this confined vulnerable population.

Supply and demand challenges were also a problem due to early delays in vaccine production. By the time the vaccine was widely available in by January of 2010, there was far more vaccine than the public demand (8). We found that many of the CFs received H1N1 influenza vaccine before all vaccine went out to the general population. Both federal prisons and non-federal prisons began acquiring vaccine earlier than jails, indicating the need to include local jails in vaccine distribution plans.

For our survey, we achieved an overall response rate of 39% (473/1,224). A few recent studies have expressed difficulty in achieving high survey respondent rates among CFs (46-47). In this study, the difficulty in reaching the responsible medical authority was particularly noted during the follow-up period in which emails were sent and phone calls were made to non-respondents. A high number of facilities for whom the most current contact names, email addresses, and phone numbers were obtained were invalid. Surveying in the correctional setting has been known to be inconvenient and prone to lower response rates. As a result, many studies are forced to use convenience samples rather than a random sample as we have implemented in our study (37). Much of the literature focuses on facilities with an ADP of over 1,000 inmates, when 50% of all jail systems have less than 250 persons within their facilities at any given time (42). Over half of our respondents (275/448) were the responsible medical authority for this hard-to-reach smaller jail population. With this in mind, the jail response rate for this study is comparable to other surveys conducted in this field, and therefore can be considered a representative account of the responsible medical authorities.

Mathematical modeling indicated that ADP was a potential factor in vaccine receipt for the 2009 H1N1 influenza vaccination campaign. Given that the range of ADP for our smaller jail population was from one inmate to 2,300 inmates, there is cause for concern for jails on this lower spectrum in receiving H1N1 influenza vaccine. The potential importance of facility size in pandemic planning has been suggested in the literature. Certain characteristics, such as the number of inmates and size of the facility, high turnover rate, and the link between jails and their neighboring communities are known factors (34). The results of this study indicated that ADP was significantly

associated with H1N1 influenza vaccine receipt within the smaller jail context, which implies a need to account for this population during future vaccination campaigns.

These findings illustrate the need for public health to serve populations that might otherwise be ignored when it comes to vaccination efforts and pandemic influenza planning. This survey gave correctional healthcare workers a voice to speak out about their experiences during the 2009 H1N1 influenza pandemic. Public health professionals can be preparedness advocates for this often overlooked population.

Strengths and Limitations

External validity of the study results is supported from the facility-based design of the survey. The study population was chosen from a nationally representative population from facility listings in the U.S. Bureau of Justice Statistics. Consequently, the results are generalizable to the rest of the correctional population in the United States. Although there was a loss of precision from variable response rates, precision was gained from doing a stratified analysis.

One limitation to this study stems from the inability to maintain our original random sample due to facility closures and ineligible facilities, resulting in a reduced sample size. Random facilities were substituted to maintain the integrity of the sample. The use of the multiple imputation strategy on missing data also served to preserve the variance while asserting a robust dataset.

Misclassification bias is also a concern; facilities were classified as either a prison or jail by study staff manually. Several states (Alaska, Hawaii, Vermont, Delaware, Rhode Island, and Connecticut) have combined jail-prison systems, making it more difficult to distinguish between facility types for our purposes. Accuracy of facility classification was examined using data from various sources, including the DOC websites for each state and the 2009-2010 ACA directory.

Recall bias is another limitation, as these surveys were based on self-report. Since the survey was conducted between July and November of 2010, well after the peak of the H1N1 influenza pandemic occurred, some of the vaccine receipt dates and other data reflect rough estimates made by survey respondents, introducing the possibility of recall bias. However, concise survey language and training of each survey staff member ensured clear distinction between H1N1 influenza and seasonal influenza as to make this a question easy to comprehend by the respondent.

Another limitation may be selection bias, in relation to the non-respondents in the study sample. It is possible that survey respondents were generally more concerned about the effects of the H1N1 influenza pandemic and preparedness, and thereby be more apt to respond to the survey and push for vaccine receipt within their own facilities. If this were the case, then the results would be an overestimate in the number of facilities that received H1N1 influenza vaccine among the correctional population.

The results from this study during the 2009 H1N1 influenza pandemic demonstrate the importance of including CFs in future pandemic influenza planning, and supplements current literature in providing information pertaining to emergency

preparedness and response measures from smaller jails. Coordination between the corrections and public health sectors may close the immunization gap and protect the health of both correctional populations and the greater community.

REFERENCES

1. Swine influenza A (H1N1) infection in two children--Southern California, March-April 2009. *MMWR Morb Mortal Wkly Rep* 2009;58(15):400-2.
2. Update: swine influenza A (H1N1) infections--California and Texas, April 2009. *MMWR Morb Mortal Wkly Rep* 2009;58(16):435-7.
3. World Health Organization. *Evolution of a pandemic: A(H1N1) 2009, April 2009 - March 2010*. Geneva: World Health Organization; 2010.
4. Sullivan SJ, Jacobson RM, Dowdle WR, et al. 2009 H1N1 influenza. *Mayo Clin Proc* 2010;85(1):64-76.
5. Serum cross-reactive antibody response to a novel influenza A (H1N1) virus after vaccination with seasonal influenza vaccine. *MMWR Morb Mortal Wkly Rep* 2009;58(19):521-4.
6. Dawood FS, Jain S, Finelli L, et al. Emergence of a novel swine-origin influenza A (H1N1) virus in humans. *N Engl J Med* 2009;360(25):2605-15.
7. Girard MP, Tam JS, Assossou OM, et al. The 2009 A (H1N1) influenza virus pandemic: A review. *Vaccine* 2010;28(31):4895-902.
8. Rambhia KJ, Watson M, Sell TK, et al. Mass Vaccination for the 2009 H1n1 Pandemic: Approaches, Challenges, and Recommendations. *Biosecur Bioterror* 2010;8(4):321-30.
9. Kwan-Gett TS, Baer A, Duchin JS. Spring 2009 H1N1 influenza outbreak in King County, Washington. *Disaster Med Public Health Prep* 2009;3 Suppl 2:S109-16.
10. Peiris JS, Poon LL, Guan Y. Emergence of a novel swine-origin influenza A virus (S-OIV) H1N1 virus in humans. *J Clin Virol* 2009;45(3):169-73.

11. Jamieson DJ, Honein MA, Rasmussen SA, et al. H1N1 2009 influenza virus infection during pregnancy in the USA. *Lancet* 2009;374(9688):451-8.

12. Lapinsky SE. Critical illness as a result of influenza A/H1N1 infection in pregnancy. *BMJ* 2010;340:c1235.

13. Louie JK, Acosta M, Jamieson DJ, et al. Severe 2009 H1N1 influenza in pregnant and postpartum women in California. *N Engl J Med* 2010;362(1):27-35.

14. Jain S, Kamimoto L, Bramley AM, et al. Hospitalized patients with 2009 H1N1 influenza in the United States, April-June 2009. *N Engl J Med* 2009;361(20):1935-44.

15. Shieh WJ, Blau DM, Denison AM, et al. 2009 pandemic influenza A (H1N1): pathology and pathogenesis of 100 fatal cases in the United States. *Am J Pathol* 2010;177(1):166-75.

16. Bautista E, Chotpitayasunondh T, Gao Z, et al. Clinical aspects of pandemic 2009 influenza A (H1N1) virus infection. *N Engl J Med* 2010;362(18):1708-19.

17. Use of influenza A (H1N1) 2009 monovalent vaccine: recommendations of the Advisory Committee on Immunization Practices (ACIP), 2009. *MMWR Recomm Rep* 2009;58(RR-10):1-8.

18. Interim results: influenza A (H1N1) 2009 monovalent vaccination coverage --- United States, October-December 2009. *MMWR Morb Mortal Wkly Rep* 2010;59(2):44-8.

19. Gondles EF. A call to immunize the correctional population for hepatitis A and B. *Am J Med* 2005;118 Suppl 10A:84S-9S.

20. Warren J. One in 100: Behind Bars in America 2008. Washington, DC: The Pew Charitable Trusts, 2008.

21. Minton TD. Jail inmates at midyear 2010 - statistical tables. Washington, DC, 2011, (Bureau of Justice Statistics Statistical Tables)(U.S. Department of Justice BoJS publication no. NCJ 233431)

22. West HC. Prison inmates at midyear 2009 -- statistical tables. Washington, DC: U.S. Department of Justice, 2010, (Bureau of Justice Statistics Statistical Tables)(U.S. Department of Justice BoJS publication no. NCJ 230113)

23. Minton TD. Jail inmates at midyear 2009 -- statistical tables. Washington, DC, 2010, (Bureau of Justice Statistics Statistical Tables)(U.S. Department of Justice BoJS publication no. NCJ 230122)

24. Freudenberg N. Jails, prisons, and the health of urban populations: a review of the impact of the correctional system on community health. *J Urban Health* 2001;78(2):214-35.

25. Sabol WJ, Minton TD, Harrison PM. Prison and jail inmates at midyear 2006. Washington, DC, 2007, (Bureau of Justice Statistics Bulletin)(U.S. Department of Justice BoJS

26. Clarke JG, Rosengard C, Rose J, et al. Pregnancy attitudes and contraceptive plans among women entering jail. *Women Health* 2006;43(2):111-30.

27. Office USGA. Report to the Honorable Eleanor Holmes Norton House of Representatives. Women in Prison: Issues and Challenges Confronting U.S. Correctional Systems. 1999.

28. Bick JA. Infection control in jails and prisons. *Clin Infect Dis* 2007;45(8):1047-55.

29. Care NCoCH. *The Health Status of Soon-to-be-Released Inmates*. Washington, DC, 2002.

30. Turner KB, Levy MH. Prison outbreak: pandemic (H1N1) 2009 in an Australian prison. *Public Health* 2010;124(2):119-21.

31. NEWS SCAN: H5N1 in Japan, H1N1 prison outbreak, vaccine-autism poll, cholera levels off, E coli in ground beef, polio in Pakistan. Center for Infectious Disease Research & Policy; 2011. (http://www.cidrap.umn.edu/cidrap/content/influenza/avianflu/news/jan2411newsscan.html). (Accessed February 23, 2011).

32. Bellin EY, Fletcher DD, Safyer SM. Association of tuberculosis infection with increased time in or admission to the New York City jail system. *JAMA* 1993;269(17):2228-31.

33. Baillargeon J, Kelley MF, Leach CT, et al. Methicillin-resistant Staphylococcus aureus infection in the Texas prison system. *Clin Infect Dis* 2004;38(9):e92-5.

34. Maruschak LM, Sabol WJ, Potter RH, et al. Pandemic influenza and jail facilities and populations. *Am J Public Health* 2009;99 Suppl 2:S339-44.

35. Spaulding AC, McCallum VA, Walker D, et al. How public health and prisons can partner for pandemic influenza preparedness: a report from Georgia. *J Correct Health Care* 2009;15(2):118-28; quiz 59.

36. Goldenson J, Hennessey M. Correctional health care must be recognized as an integral part of the public health sector. *Sex Transm Dis* 2009;36(2 Suppl):S3-4.

37. Restum ZG. Public health implications of substandard correctional health care. *Am J Public Health* 2005;95(10):1689-91.

38. Gershon RR, Magda LA, Qureshi KA, et al. Factors associated with the ability and willingness of essential workers to report to duty during a pandemic. *J Occup Environ Med* 2010;52(10):995-1003.

39. Interim results: influenza A (H1N1) 2009 monovalent and seasonal influenza vaccination coverage among health-care personnel - United States, August 2009-January 2010. *MMWR Morb Mortal Wkly Rep* 2010;59(12):357-62.

40. Interim results: state-specific influenza A (H1N1) 2009 monovalent vaccination coverage - United States, October 2009-January 2010. *MMWR Morb Mortal Wkly Rep* 2010;59(12):363-8.

41. SteelFisher GK, Blendon RJ, Bekheit MM, et al. The public's response to the 2009 H1N1 influenza pandemic. *N Engl J Med* 2010;362(22):e65.

42. Potter RH. Jails, public health, and generalizability. *J Correct Health Care* 2010;16(4):263-72.

43. Maruschak LM. Medical problems of prisoners. Washington, DC: US Department of Justice, 2008, (U.S. Department of Justice BoJS publication no. NCJ 221740)

44. Maruschak LM. Medical problems of jail inmates. Washington, DC: U.S. Department of Justice, 2006, (Bureau of Justice Statistics Special Report)(U.S. Department of Justice BoJS publication no. NCJ 21069)

45. McIntyre AF, Studzinski A, Beidinger HA, et al. STD, HIV/AIDS, and hepatitis services in Illinois County Jails. *Sex Transm Dis* 2009;36(2 Suppl):S37-40.

46. Hammett TM, Kennedy S, Kuck S. National survey of infectious diseases in correctional facilities: HIV and sexually transmitted diseases. Abt Associates Inc., 2007.

47. Sufrin CB, Creinin MD, Chang JC. Contraception services for incarcerated women: a national survey of correctional health providers. *Contraception* 2009;80(6):561-5.

48. United States Department of Justice. Office of Justice Programs. Bureau of Justice S. Census of Jail Facilities, 2006. Inter-university Consortium for Political and Social Research (ICPSR) [distributor], 2010.

49. United States Department of Justice. Office of Justice Programs. Bureau of Justice S. Census of State and Federal Adult Correctional Facilities, 2005. Inter-university Consortium for Political and Social Research (ICPSR) [distributor], 2010.

50. Zack M, Singleton J, Satterwhite C. Collinearity macro (SAS). Department of Epidemiology RSPH at Emory University, 2009.

51. SAS OnlineDoc, Version 8. *Chapter 9: The MI Procedure*. Cary, NC: SAS Institute Inc., 2000.

52. Kleinbaum DG, Klein M. Modeling strategy for assessing interaction and confounding. *Logistic Regression: A Self-Learning Text*. New York: Springer, 2010:203-39.

53. *National Jail and Adult Detention Directory*. 2009-2010 ed. Alexandria: American Correctional Association; 2009.

54. Glaser JB, Greifinger RB. Correctional health care: a public health opportunity. *Ann Intern Med* 1993;118(2):139-45.

TABLES

Table 1. Descriptive baseline and preparedness characteristics of sampled U.S. correctional facilities.

	Federal Prisons (n=28)	Non-Federal Prisons (n=134)	50 Largest Jails (n=11)	Smaller Jails (n=275)	Total (n=448)
Type of Healthcare					
Privatized	3 (10.7)	43 (37.1)	4 (50.0)	84 (37.8)	134 (35.8)
Non-Privatized	25 (89.3)	73 (62.9)	4 (50.0)	138 (62.2)	240 (64.2)
Missing	--	18	3	53	74
Average Daily Population (Inmates), median [range]	1,775 [800-7,500]	1,100 [35-45,000]	2,400 [1,200-9,000]	100 [1-2,300]	369 [1-45,000]
Missing	--	6	1	14	21
Pandemic Influenza Plan					
Yes	22 (91.7)	48 (53.3)	8 (80.0)	70 (40.9)	148 (50.2)
No	2 (8.3)	42 (46.7)	2 (20.0)	101 (59.1)	147 (49.8)
Missing	4	44	1	104	153
H1N1 Influenza Vaccine Receipt					
Yes	23 (85.2)	116 (89.2)	9 (100.0)	118 (43.5)	266 (60.9)
No	4 (14.8)	14 (10.8)	--	153 (56.5)	171 (39.1)
Missing	1	4	2	4	11
Coordination with Public Health Entities to Receive H1N1 Influenza Vaccine					
Federal (e.g. CDC)					
Yes	11 (50.0)	9 (12.2)	2 (28.6)	6 (8.2)	28 (15.9)
No	10 (45.5)	46 (62.2)	3 (42.9)	58 (79.5)	117 (66.5)
Not sure	1 (4.6)	19 (25.7)	2 (28.6)	9 (12.3)	31 (17.6)
Missing	6	60	4	202	272
State Health Dept.					
Yes	2 (11.1)	58 (52.7)	5 (55.6)	45 (43.3)	110 (45.6)
No	15 (83.3)	32 (29.1)	3 (33.3)	52 (50.0)	102 (42.3)
Not sure	1 (5.6)	20 (18.2)	1 (11.1)	7 (6.7)	29 (12.0)
Missing	10	24	2	171	207
Local Health Dept.					
Yes	2 (11.1)	38 (36.9)	7 (77.8)	93 (83.0)	140 (57.9)
No	16 (88.9)	46 (44.7)	1 (11.1)	13 (11.6)	76 (31.4)
Not sure	--	19 (18.5)	1 (11.1)	6 (5.4)	26 (10.7)
Missing	10	31	2	163	206

Table 2. Frequency of independent variables stratified by 2009 H1N1 influenza vaccine receipt for smaller jails only (n=275).

Characteristic	Received Vaccine (n=118)	Did not receive Vaccine (n=153)	p-value (α=0.05)
Average Daily Population (Inmates)			<0.0001
Mean	547.84	129.63	
Range	1-2,300	1-1,640	
Missing	3	10	
Healthcare Type			0.7024
Privatized	39 (39.4)	45 (36.9)	
Non-Privatized	60 (60.6)	77 (63.1)	
Missing	34	35	
Pandemic Influenza Plan			<0.0001
Yes	49 (55.7)	20 (25.3)	
No	39 (44.3)	59 (74.7)	
Missing	30	74	

Table 3. Full logistic regression model with interaction terms for the effect of factors on 2009 H1N1 influenza vaccine receipt in smaller jails.

	Beta Estimate	Standard Error	Odds Ratio	95% Confidence Interval
Average Daily Population (Inmates)	0.292890	0.079232	1.34	(1.15, 1.57)
Healthcare Type				
Privatized	*reference*	--	1.00	
Non-Privatized	0.188948	0.441060	1.21	(0.50, 2.89)
Pandemic Influenza Plan				
No	*reference*	--	1.00	
Yes	0.739494	0.456253	2.10	(0.85, 5.17)
Healthcare Type*Average Daily Population (Inmates)	0.012726	0.107216	1.01	(0.82, 1.25)
Pandemic Influenza Plan* Average Daily Population (Inmates)	-0.025694	0.091013	0.97	(0.81, 1.17)

Table 4. Reduced logistic regression model (Gold Standard Model) excluding interaction terms for the effect of factors on 2009 H1N1 influenza vaccine receipt in smaller jails.

	Beta Estimate	Standard Error	Odds Ratio	95% Confidence Interval
Average Daily Population (Inmates)	0.292890	0.079232	1.33	(1.19, 1.49)
Healthcare Type				
Privatized	*reference*	--	1.00	
Non-Privatized	0.188948	0.441060	1.88	(0.91, 3.89)
Pandemic Influenza Plan				
No	*reference*	--	1.00	
Yes	0.739494	0.456253	1.26	(0.60, 2.64)

Table 5. Logistic model subsets tested in comparison to the Gold Standard (GS) model to determine selection of final model.

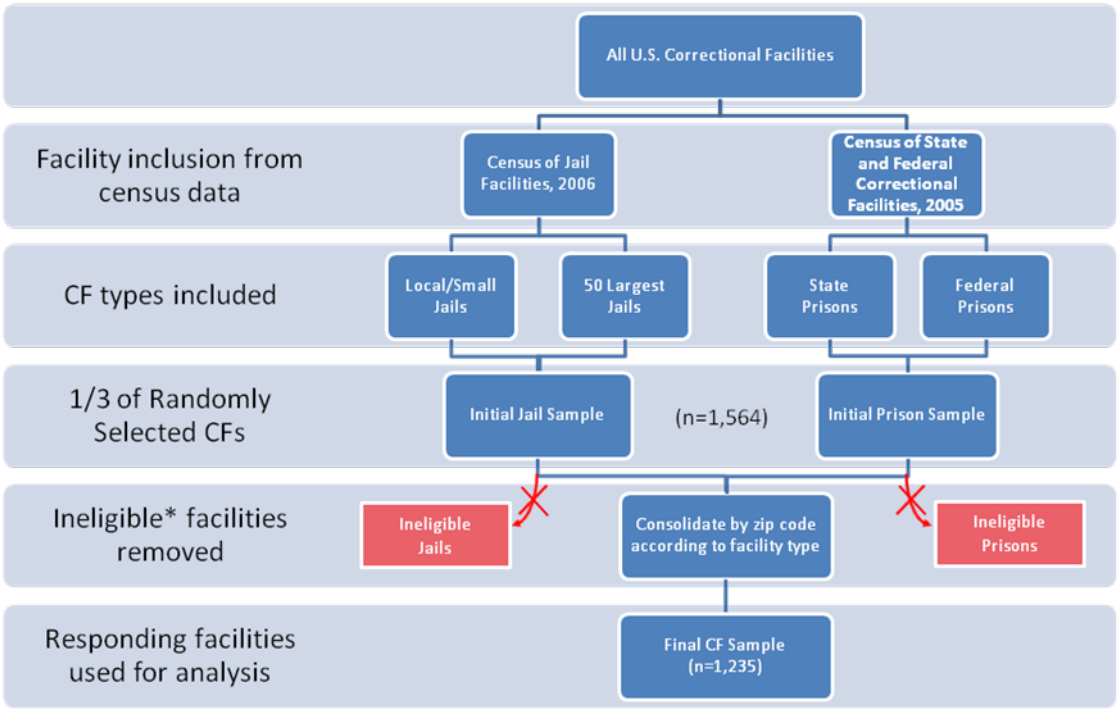
Variables in Model	Odds Ratio	95% Confidence Interval
ADP, Healthcare Type, Pandemic Influenza Plan (GS)	1.33	(1.19, 1.49)
ADP, Healthcare Type	1.34	(1.21, 1.49)
ADP, Pandemic Influenza Plan	1.32	(1.19, 1.45)
ADP	1.34	(1.21, 1.49)

Table 6. Final multivariate model for the effect of factors on 2009 H1N1 influenza vaccine receipt in smaller jails.

Variable	Beta Estimate	Standard Error	Odds Ratio	95% Confidence Intervals
ADP (Inmates)	0.275177	0.049985	1.32	(1.19, 1.45)
Pandemic Influenza Plan				
No	*reference*	--	1.00	
Yes	0.526239	0.343692	1.69	(0.86, 3.35)

FIGURES

Figure 1. Sampling Strategy for H1N1 Influenza Survey of Correctional Facilities, 2010.



*Ineligible facilities included: 1. juvenile facilities, 2. halfway houses/community corrections, 3. immigration and customs enforcement (ICE) facilities, 4. substance abuse centers, 5. facilities shut down since census taken

Figure 2. Timeline of H1N1 Influenza Survey of Correctional Facilities, 2010.

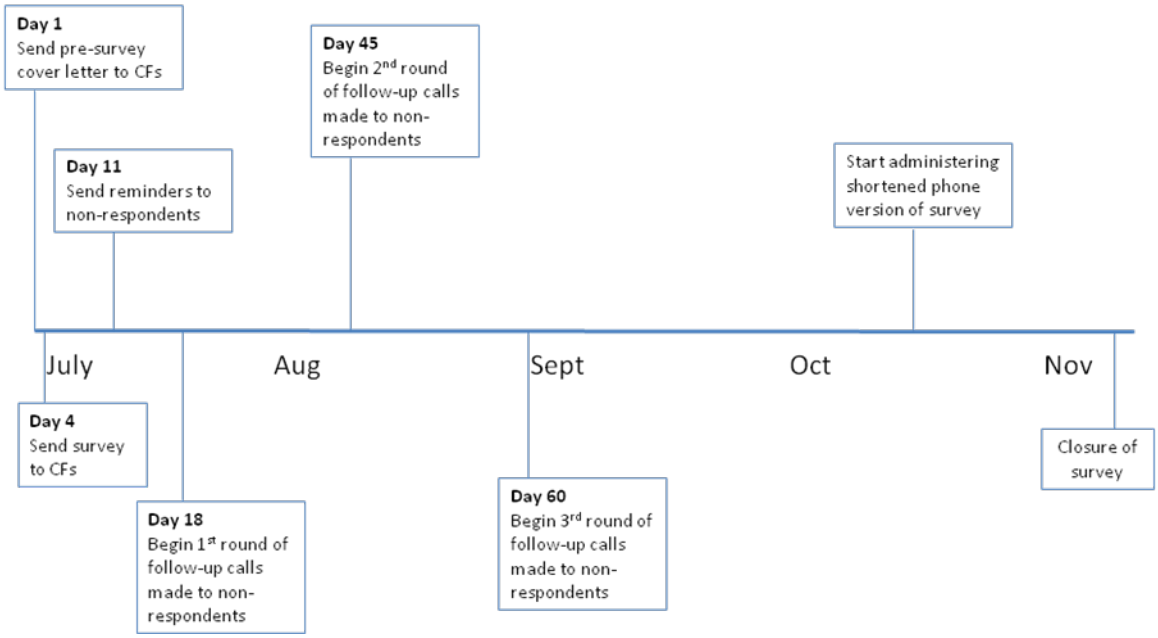
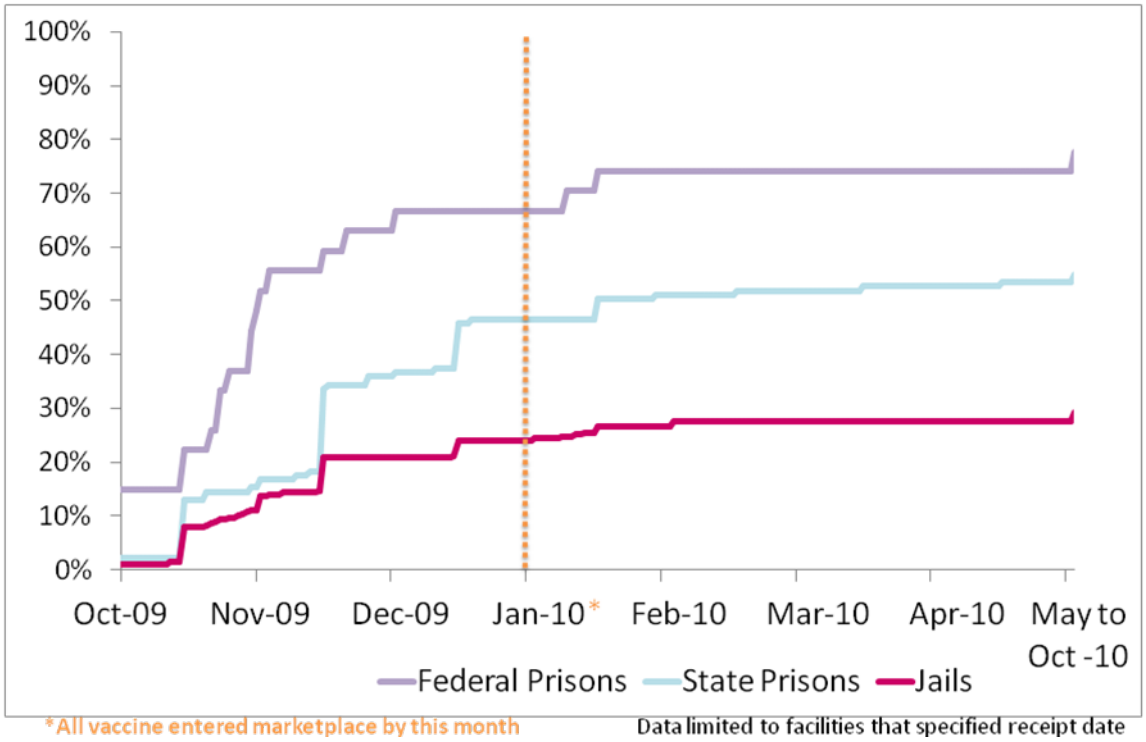


Figure 3. First shipment of H1N1 influenza vaccine among facility types, 2009-2010.



CHAPTER III

PUBLIC HEALTH IMPLICATIONS

The results from our H1N1 influenza survey of CFs revealed that over half of the jail in the United States did not receive any H1N1 influenza vaccine during the 2009 influenza pandemic period. Given that 45% of these jail facilities were overlooked during the mass vaccination campaign, lack of vaccine among this medically underserved vulnerable population may have major consequences the public health context within both the correctional and general populations.

Failing to address the vaccination needs of inmates affects not only the immediate inmate and correctional worker populations, but has the potential to influence the health of nearby communities as well. Jails hold inmates in pretrial detention or persons with minor felonies serving sentences of less than one year, with at least 10 million inmates released annually (54); these high rates of turnover result in intermittent associations with neighboring communities. At midyear 2010, small jails (ADP < 50 inmates) experienced the highest turnover rate at 136.7%, which equates to more people going in and out of jail with respect to ADP (21). CFs may become incubators for disease due to persistent contact with fellow inmates, correctional workers, health care workers, and the public (37). Since a large proportion of the inmate population is apt to be medically underserved prior to incarceration due to factors such as lack of insurance coverage or inadequate access to primary health care (36), entry into incarceration may be an individual's first contact with the health care system. Influenza planning should consider these factors that pertain to the revolving door of the jail population. By improving the health of jail and

prison populations and strengthening their pandemic preparedness efforts, the health of the public may be enhanced in the surrounding community (35).

The partnership between correctional healthcare and public health is essential in pandemic response, as was demonstrated in procurement of the 2009 H1N1 influenza vaccine. All levels of public health were instrumental in providing assistance to each of the CF types in obtaining H1N1 influenza vaccine during the pandemic period. Coordination between correctional facilities and public health from preexisting relationships may expedite immunization efforts in the future (8). Although the 2009 H1N1 influenza strain proved to be generally milder than initially anticipated, had it been more severe, the question of just how prepared the corrections sector would have been warrants further examination.

APPENDICES

APPENDIX A

List of Abbreviations

ACA: American Correctional Association

ACHP: Academy of Correctional Health Professionals

ACIP: Advisory Committee on Immunization Practices

ADP: Average Daily Population (number of inmates that a facility holds on a daily basis)

BJS: Bureau of Justice Statistics

CDC: Centers for Disease Control and Prevention

CFs: Correctional facilities

CNI: Condition Index

DOC: Department of Corrections

FBOP: Federal Bureau of Prisons

ILI: Influenza-Like-Illness

IRB: Institutional Review Board

NCCHC: National Commission on Correctional Health Care

NHFS: National 2009 H1N1 Flu Survey

SIFCF: Survey of Inmates in Federal Correctional Facilities

SILJ: Survey of Inmates in Local Jails

SISCF: Survey of Inmates in State Correctional Facilities

VDP: Variance Decomposition Proportion

WHO: World Health Organization

APPENDIX B

—H1N1 Survey of Healthcare Workers in Correctional Facilities—

1. What is your principal work setting? (Choose setting that best applies)

- ☐ Federal prison—contracted
- ☐ Federal prison—non-contracted
- ☐ Detention center
- ☐ State prison
- ☐ Jail system
- ☐ Other (circle one): (Juvenile system) (Federal ICE facility) (Fill in: _____)

Which of the following would best classify your work setting? (Choose one)

- ☐ Central office (see below)
- ☐ Facility level

If central office, are there facility level health service/infection control administrators at the correctional facility that you oversee in your zip code?

☐ Yes (**please provide contact information below**) ☐ No

Contact Information for Health Service/Infection Control Administrators

Name: _____

Email: _____

Fax: _____

Facility: _____

Zip code: __ __ __ __ __

What type of healthcare does your facility have?

☐ Privatized healthcare ☐ Non-privatized healthcare

2. What is your primary role? (Choose one)

Healthcare

- ☐ Physician (including physician serving as medical director)
- ☐ Physician assistant
- ☐ Nurse practitioner
- ☐ Nurse manager/director
- ☐ Infection control nurse
- ☐ Nurse, other
- ☐ Health Service Administrator, non-clinical
- ☐ Other:_____

Non-healthcare

- ☐ Sheriff
- ☐ Jail administrator
- ☐ Warden
- ☐ Superintendent
- ☐ Other: _____

Which of the following would best classify your role at this setting? (Choose one)

☐ Full-time ☐ Part-time

Part I: General Facility Communication and Preparedness

3. In your clinic, who was responsible for receiving and disseminating updates from public health officials to clinic staff regarding H1N1 influenza vaccine administration? (Check all that apply)

- ☐ A physician
- ☐ A physician assistant or nurse practitioner
- ☐ A nurse manager/director
- ☐ The infection control nurse
- ☐ A nurse
- ☐ The health service administrator, non-clinical
- ☐ The immunization coordinator
- ☐ Other:_____

4. To your knowledge, which of the following external entities did you and your facility rely upon the most to obtain timely, accurate information regarding the H1N1 influenza outbreak and vaccination campaign? (Check all that apply)

- ☐ Central office
- ☐ Corporate office
- ☐ Federal government agencies (e.g. CDC)
- ☐ Local hospital/healthcare system
- ☐ Medical Supply Representative
- ☐ News media (e.g. TV, internet news sites, newspapers)
- ☐ Professional societies (e.g. American Medical Association)
- ☐ State or local public health departments
- ☐ World Health Organization
- ☐ Other sources, please indicate: _____

5. How was H1N1 influenza outbreak and vaccination information primarily disseminated to clinic staff? (Check "None" or all that apply)

- ☐ Face-to-face conversations with physicians and staff
- ☐ Routine staff meetings (e.g. daily or weekly)
- ☐ Email (e.g. mass emails scanning in a hard-copy document and emailing)
- ☐ Hard-copy facsimiles or flyers
- ☐ Posting in common areas (e.g. kitchen, break room)
- ☐ Newsletters in mailbox
- ☐ Other: _____
- ☐ Don't know
- ☐ None (information was not disseminated)

6. In the matrix below, please rate the effectiveness of the following methods for public health departments to communicate information to your facility about outbreaks or general public health emergencies.

COMMUNICATION METHOD	**(1) Very ineffective**	**(2) Ineffective**	**(3) Neutral**	**(4) Effective**	**(5) Very effective**	**No basis for comment or unsure**

Blast faxes	☐	☐	☐	☐	☐	☐
Emails	☐	☐	☐	☐	☐	☐
In-person visits to facility offices	☐	☐	☐	☐	☐	☐
Newsletters	☐	☐	☐	☐	☐	☐
Notifications by postal mail	☐	☐	☐	☐	☐	☐
Phone calls	☐	☐	☐	☐	☐	☐
Press releases	☐	☐	☐	☐	☐	☐
Posting information to your state's immunization Information System (IIS)	☐	☐	☐	☐	☐	☐
Posting information on general health department website	☐	☐	☐	☐	☐	☐
Notifications through the Health Alert Network (HAN)	☐	☐	☐	☐	☐	☐
Organized conference call(s)	☐	☐	☐	☐	☐	☐
Text message alerts	☐	☐	☐	☐	☐	☐
Twitter feeds	☐	☐	☐	☐	☐	☐

7. Is there a designated person in your facility who monitors state/local health departments and CDC websites daily for current information about disease outbreaks?

   ☐ Yes ☐ No ☐ Not sure

8. Regarding preparedness for the H1N1 influenza vaccination campaign, how would you characterize the usefulness of information and guidance your clinic received from your state/local health department?

   - ☐ **Very useful**---the information and guidance we received was timely, accurate, and met our needs
   - ☐ **Useful**---the information and guidance we received was helpful, but could have been more frequent, more accurate, or more relevant to our needs
   - ☐ **Somewhat useful**---the information and guidance we received was somewhat helpful, but we often had questions about the information's accuracy, timeliness, or relevance
   - ☐ **Not useful**---the information and guidance was not helpful, and was often inaccurate or out-of-date
   - ☐ **Irrelevant**---the information and guidance we received was not relevant to our needs
   - ☐ **I cannot recall** receiving information on the H1N1 vaccination campaign from the state/local health department

9. How could this health department better communicate information on influenza vaccination to you and your facility?

_____
_____
_____

10. Did your correctional facility have a pandemic influenza plan in place prior to April 2009?
    ☐ Yes ☐ No ☐ Not sure

    A. **If no** to Question 10, do you have one now?
       ☐ Yes ☐ No ☐ Not sure

    B. **If yes** to Question 10, has the healthcare staff been educated and trained on this pandemic plan?
       ☐ Yes ☐ No ☐ Not sure

    C. **If yes** to Question 10, how helpful did you find the pandemic influenza plan to be in planning for H1N1 influenza in your correctional facility?
       ☐ Very helpful ☐ Helpful ☐ Neutral ☐ Unhelpful ☐ Very unhelpful

    D. **If yes** to Question 10, has your pandemic influenza plan been modified since the outbreak?
       ☐ Yes ☐ No ☐ Not sure

       If yes, how has it been changed?

       _____
       _____

11. Does your correctional facility have contact names and numbers for the following key positions to contact during a pandemic influenza outbreak? Please indicate using the matrix below.

Contact	Yes	No	Not sure
Infection Control at facility	☐	☐	☐
Local Health Department	☐	☐	☐
State Health Department (see below)	☐	☐	☐

If you chose State Health Department above, please choose which of the following best describes the contact:

- ☐ Director of public health preparedness
- ☐ Immunization program manager (IPM)
- ☐ Other: please specify _____
- ☐ Not sure

12. On a given day, what is the approximate average population of your facility (inmates only)? _____

13. In your month of most vaccination last flu season, what percentage of inmates (combined high risk and low risk) in your facility received the **seasonal influenza vaccine**?

☐ None (0%) ☐ 1-20% ☐ 21 – 40% ☐ 41 – 60% ☐ 61 – 80% ☐ 81 – 100%

Part II: H1N1 Preparedness and Response

14. After April 2009, did your facility use antiviral medications (e.g. oseltamivir (Tamiflu), zanamivir (Relenza)) as H1N1 influenza prophylaxis for staff/patients at any point before your facility received H1N1 influenza vaccine (if at all)? (check one)

- ☐ Yes, we provided antiviral medications as prophylaxis to both staff and patients
- ☐ Yes, but only to staff
- ☐ Yes, but only to patients
- ☐ No
- ☐ Not sure

15. Did your facility receive H1N1 influenza vaccine during/after the outbreak?

☐ Yes ☐ No (**skip to question 29**)

If yes, what date did your facility receive its **first** shipment of H1N1 influenza vaccine?
__ __ /__ __ __ __ (MM/YYYY)

16. What barriers did your facility encounter in storing and administering H1N1 influenza vaccine? (Check "None" or all that apply)

- ☐ Lack of adequate refrigerator space
- ☐ Lack of consent forms
- ☐ Lack of staff capacity to administer additional vaccines
- ☐ Limited storage space for ancillary supplies
- ☐ Limited storage space for vaccine
- ☐ Not enough vaccine
- ☐ Vaccine arrived too late
- ☐ Other (please specify): _____
- ☐ None(we did not have storage or staff barriers)

17. Did you coordinate with any of the following entities to receive H1N1 influenza vaccine? (Check all that apply)

	Yes	No	Not sure
Federal (e.g. CDC)	☐	☐	☐
State Health Dept.	☐	☐	☐
Local Health Dept.	☐	☐	☐

A. **If yes** to any above in Question 17, did this coordination go smoothly?

☐ Yes ☐ No ☐ Not sure

Comments on coordination efforts:

_____

_____

18. In your month of most H1N1 influenza vaccination, approximately what percent of each of the following groups did you vaccinate? (please check)

	0% (None)	1-20%	21-40%	41-60%	61-80%	81-100%
Medical staff	☐	☐	☐	☐	☐	☐
Non-medical staff (e.g. correctional officers)	☐	☐	☐	☐	☐	☐
Administrative staff	☐	☐	☐	☐	☐	☐
Inmates (high and low risk)	☐ **If "None,"** skip to question 29	☐	☐	☐	☐	☐

From October, 2009 to January 28th, 2010, the CDC/ACIP generated guidelines regarding the H1N1 influenza vaccine in order to limit it to the following priority groups: pregnant women, individuals under 24 years of age, and persons aged 25-64 with underlying health conditions.

19. Did your clinic follow these priority group recommendations when administering the vaccine after October 2009 but before sufficient vaccine had been acquired to vaccinate all inmates?

☐ Yes ☐ No ☐ Not sure

20. In the following table, please indicate which groups of personnel, if any, were required to receive the H1N1 influenza vaccine:

Group	Yes	No	No, but they were encouraged to receive it
Medical staff	☐	☐	☐
Non-medical staff (e.g. correctional officers)	☐	☐	☐
Administrative staff	☐	☐	☐

21. What was the vaccination policy for inmates: opt-in, opt-out, or mandatory (without right to refuse)?

☐ "**Opt in**" policy vaccinates none of the patients automatically. Those who want to get vaccinated must consciously choose to get vaccinated.

☐ "**Opt out**" policy vaccinates all patients except those who consciously choose not to get vaccinated.

☐ Mandatory (without right to refuse)

If opt out or mandatory, did instituting an opt-out or mandatory policy raise concern among personnel or inmates?

☐ Yes ☐ No

Please comment:

_____

_____

_____

22. Among inmates offered the H1N1 influenza vaccine, approximately what percentage <u>refused</u> the vaccine?

☐ None (0%) ☐ 1-20% ☐ 21 – 40% ☐ 41 – 60% ☐ 61 – 80% ☐ 81 – 100%

23. What were, or what do you believe were their top concerns or reasons of refusal? (Check "None" or all that apply)

- ☐ Distrust of authority or intent behind mass vaccination
- ☐ Fear of getting sick from influenza from the vaccine
- ☐ Fear of needles
- ☐ Not concerned about contracting H1N1 influenza
- ☐ Not concerned about the severity of illness from H1N1 influenza
- ☐ Don't feel vaccine is effective
- ☐ Don't feel vaccine is safe
- ☐ Other: _____
- ☐ None

24. Does your medical facility submit patient H1N1 influenza vaccination data to your state's immunization information system (IIS) or vaccine registry?

☐ Yes ☐ No ☐ Not sure

25. How did you utilize your state's Immunization Information System (IIS)? (Check "None" or all that apply)
    - ☐ To check or verify the vaccination status of inmates arriving at your facility during the H1N1 influenza vaccination campaign
    - ☐ To manage vaccine inventory
    - ☐ To order H1N1 influenza vaccine
    - ☐ To track H1N1 influenza vaccine
    - ☐ Other: _____
    - ☐ None (did not use IIS)

26. Did your medical facility attempt to vaccinate new inmates who arrived at your facility during the H1N1 Influenza vaccination campaign?
    ☐ Yes ☐ No ☐ Only if they were in a priority group

27. What were the <u>greatest concerns</u> among members of your facility staff regarding H1N1 influenza vaccine administration? (Check "None" or all that apply)
    - ☐ Ancillary supplies provided with the vaccine were different than what is typically used for seasonal vaccination campaigns
    - ☐ Extra duties above and beyond those already assigned
    - ☐ Inmate acceptance
    - ☐ Not receiving vaccine for our inmates
    - ☐ Vaccine efficacy
    - ☐ Vaccine safety
    - ☐ Other: please specify _____
    - ☐ None

28. What recommendations would you have for state and local public health officials to help your facility plan and manage any similar mass vaccination campaigns in the future?
    _____
    _____

Part III: H1N1 Case and Containment within your Facility

29. Did your facility have any cases of Influenza-Like-Illness (ILI) since April 2009?
    ☐ Yes ☐ No ☐ Not sure

    If yes:
    How many? ____
    When did the number of cases peak in your facility? (MM/DD/YYYY)
    __ __/__ __/__ __ __ __
    Did your clinic perform rapid influenza testing?
    ☐ Yes ☐ No ☐ Not sure

    Did you submit any specimens for confirmatory testing at the state health laboratory?
    ☐ Yes ☐ No ☐ Not sure

30. Were any of these (or others) confirmed as H1N1 influenza?
    ☐ Yes ☐ No (skip to Question 33) ☐ Not sure

    If yes:

How many? ____
When did the number of H1N1 cases peak in your facility? (MM/DD/YYYY)
__ __/__ __/__ __ __ __
Did you experience multiple waves?
☐ Yes ☐ No ☐ Not sure

31. Did your clinic dispense antiviral medications (e.g. oseltamivir (Tamiflu), zanamivir (Relenza)) to correctional facility patients with ILI or confirmed H1N1 influenza?
☐ Yes ☐ No ☐ Not sure

32. Did your clinic dispense antiviral medications (e.g. oseltamivir (Tamiflu), zanamivir (Relenza)) to correctional staff with ILI or confirmed H1N1 influenza?
☐ Yes ☐ No ☐ Not sure

33. For each of the following methods of general hygiene or containment, please indicate the earliest point when each was instituted in your facility.

METHOD	When instituted?			
	Before 2009	During national outbreak (after April 2009)	After H1N1 influenza found at our facility	Not Instituted
Encouragement of good handwashing practices	☐	☐	☐	☐
Encouragement to cover nose/mouth when sneezing or	☐	☐	☐	☐
Promotion of use of face masks by	☐	☐	☐	☐
Promotion of use of face masks (surgical or N-95) by staff	☐	☐	☐	☐
Cancellation of large group events/social distancing	☐	☐	☐	☐
Isolation signage	☐	☐	☐	☐
Isolation of symptomatic individuals	☐	☐	☐	☐
Quarantine of exposed individuals	☐	☐	☐	☐
Quarantine of all newcomers for a few days	☐	☐	☐	☐
Screening of new inmates for ILI	☐	☐	☐	☐
Post-exposure prophylaxis	☐	☐	☐	☐
Prohibition or limitation of outside visitors	☐	☐	☐	☐
Stop receiving inmates	☐	☐	☐	☐

Screening of visitors for ILI and/or H1N1 influenza	☐	☐	☐	☐
Cancellation of court dates (use of remote video option or	☐	☐	☐	☐

34. Which of the following has your facility stocked in preparation for a public health emergency? (Check "None" or all that apply)

- ☐ Antiviral medications (e.g., oseltamivir (Tamiflu), zanamivir (Relenza))
- ☐ Disinfectants (such as bleach)
- ☐ Gloves
- ☐ Gowns
- ☐ Hand sanitizers
- ☐ N-95 masks
- ☐ Surgical masks
- ☐ None of the above

35. Has the staff been trained on appropriate isolation precautions to be utilized when caring for a patient with H1N1 influenza?

☐ Yes ☐ No ☐ Not sure

36. What lessons did you learn from your experience with the H1N1 influenza outbreak (and in what ways do you feel better prepared for a potential recurrence in 2010, if at all)?

_____
_____
_____

We are requesting that you provide us with the name of your facility so that we can avoid duplication of responses from a single facility. Facility names will be removed prior to analysis and responses will remain anonymous. Zip codes will be utilized to categorize facility as rural vs. urban for analysis purposes. Data will not be reported by zip code.

37. Please provide the following general information:

Facility
Name:_____
Facility official mailing zip code: __ __ __ __ __

Thank you for completing this H1N1 Survey of Correctional Facilities. We greatly appreciate your time, and your responses to this survey will help us better plan and prepare for future pandemic flu outbreaks affecting correctional facilities.

APPENDIX C

—H1N1 Survey of Healthcare Workers in Correctional Facilities—

1. Do you work at a state prison or do you work at a jail facility?

   - ☐ State prison
   - ☐ Jail system
   - ☐ Neither [if this is confirmed, thank participant and stop survey]

2. Does your facility have privatized healthcare or non-privatized healthcare?

   ☐ Privatized healthcare ☐ Non-privatized healthcare

3 What is your position within the facility? [Only start reading examples of choices if respondent fails to spontaneously identify their position.]

Healthcare

- ☐ Physician (including physician serving as medical director)
- ☐ Physician assistant
- ☐ Nurse practitioner
- ☐ Nurse manager/director
- ☐ Infection control nurse
- ☐ Nurse, other
- ☐ Health Service Administrator, non-clinical
- ☐ Other:_____

Non-healthcare

- ☐ Sheriff
- ☐ Jail administrator
- ☐ Warden
- ☐ Superintendent
- ☐ Other: _____

4. Do you work full-time or part-time at the facility?

   ☐ Full-time ☐ Part-time

5. On a given day, what is the approximate average population of your facility (including the inmates only)? [If they ask when, say the 2009-2010 flu season (*last* year's flu season).]

   _____

6. Did your facility receive H1N1 influenza vaccine during or after last year's outbreak?

   ☐ Yes ☐ No [if No, go to **Closure of telephone survey**, below.]

7. [Ask if Yes to #6] What date did your facility receive its **first** shipment of H1N1 influenza vaccine?

   __ __ /__ __ __ __ (MM/YYYY)

8. Did you coordinate with a public health department? [If yes, ask "was it your state health department or your local health department?"]

	Yes	No	Not sure
State Health Dept.	☐	☐	☐
Local Health Dept.	☐	☐	☐

9. [Ask if Yes to #8] Did your coordination with your state or local health department go smoothly?

☐ Yes ☐ No ☐ Not sure

10. During the month in which you administered the most H1N1 vaccinations, approximately what percent of medical staff did you vaccinate? [pause] What percentage of non-medical staff (for example, correctional officers) did you vaccinate in during that month? [pause] What percentage of administrative staff during that month? [pause] What percentage of inmates during that month? [Only probe with the column headers (0%, 1-20%, etc.) if spontaneous responses are ambiguous.]

	0% (None)	1-20%	21-40%	41-60%	61-80%	81-100%
Medical staff	☐	☐	☐	☐	☐	☐
Non-medical staff (e.g. correctional officers)	☐	☐	☐	☐	☐	☐
Administrative staff	☐	☐	☐	☐	☐	☐
Inmates (high and low risk)	☐	☐	☐	☐	☐	☐

Closure of telephone survey:

What is your facility's name?

_____

What is your facility's official mailing zip code? _ _ _ _ _

"Thank you for completing this H1N1 Survey of Correctional Facilities. We greatly appreciate your time, and your responses to this survey will help us better plan and prepare for future pandemic flu outbreaks affecting correctional facilities."