



Implementation of a hepatitis A/B vaccination program using an accelerated schedule among high-risk inmates, Los Angeles County Jail, 2007–2010[☆]

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ABSTRACT

Background: The Centers for Disease Control and Prevention recommend vaccination for men who have sex with men (MSM) and injection drug users against hepatitis A and B. This study is the first report of a hepatitis vaccination program in a United States jail with a combined vaccine using an accelerated schedule. Los Angeles County has the largest jail system in the nation and Men's Central Jail (MCJ) is the largest facility within that system. MCJ includes a unit for self-identified MSM, where approximately 2700 inmates are housed per year.

Methods and findings: Starting in August 2007, a combined hepatitis A and B vaccine was offered to all inmates housed in this special unit. Using an accelerated schedule (0-, 7-, 21–30 days, 12-month booster), a total of 3931 doses were administered to 1633 inmates as of June 2010. Of those, 77% received 2 doses, 58% received 3 doses, and 11% received the booster dose. Inmates who screened positive for a sexually transmitted infection in this unit were 1.3 times more likely to be vaccinated (95% CI 1.2–1.4) compared to others in the same housing unit who screened negative.

Conclusions: Hepatitis vaccination initiatives can be successfully implemented in an urban jail among an extremely high-risk population using the accelerated, combined hepatitis A/B vaccine. Ours may be a useful model for other programs to vaccinate incarcerated populations.

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1. Introduction

In the United States, adults aged 25–45 years have the highest incidence of acute hepatitis B (HBV) and men who have sex with men (MSM) are at even higher risk [1]. Hepatitis A virus (HAV) is usually transmitted person-to-person *via* the fecal–oral route; high-risk groups include: MSM, injection drug users (IDUs), and other illicit drug users [2].

Compared to the 4–6% prevalence estimated in the adult US population, serologic markers for HBV are approximately four times greater among incarcerated populations [3,4]. In one state correctional facility, detection of anti-Hepatitis B core antigen (HBc) was reported in 20–25% of inmates [5], and outbreaks of HBV have been

documented in several state correctional systems [6]. Additionally, the incarcerated population is at increased risk for complications resulting from hepatitis infections. Correctional populations have a high prevalence of other risk factors for liver disease, such as: poly-pharmacy; use of illegal drugs; unsafe tattooing practices; alcoholism; and human immunodeficiency virus (HIV) infection [7].

In the US, approximately 800,000 individuals are in jail at any given time, with jails processing an estimated 13 million incarcerations per year [8]. Jails house a highly transient population, composed of inmates with short sentences and detainees awaiting trial – many of whom cycle repeatedly between jail and the community [9]. The communities to which inmates return are largely comprised of the socioeconomically disadvantaged, and racial and ethnic minorities who are known to have poor access to health care [10].

The Los Angeles County Jail (LACJ) houses primarily male (88%) inmates, who are mostly 18–45 years of age, and either Hispanic (52%) or black (28%). Of the seven Los Angeles County Sheriff's Department (LASD) facilities, Men's Central Jail (MCJ) is the largest; approximately 180,000 inmates are processed each year [10]. Most inmates are released after serving short sentences, typically 10–20 days and 25% are in jail for less than five days [10]. For safety

[☆] *Disclaimer:* The findings and conclusions in this report are those of the author and do not necessarily represent the views of the Los Angeles County Sheriff's Department. Though we refer to them as “inmates” for the sake of clarity in this manuscript, all incarcerated individuals are treated by our medical staff as patients.

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reasons LASD created the MSM dorm: a special unit within MCJ, for self-identified gay, bisexual, and transgender inmates. The unit has approximately 2700 admissions per year and comprises three large dormitories with bunk beds for up to 110 inmates in each. The inmates are at high-risk for many infections, including sexually transmitted infections (STIs), HAV and HBV: all are gay, bisexual or transgender; over 30% are arrested on drug or alcohol related charges and 5% are arrested on sex-related charges (e.g. prostitution); 25% report IDU.

The Centers for Disease Control and Prevention's (CDC) Advisory Committee on Immunization Practices (ACIP) recommends HBV vaccination for MSM, IDUs, those who are HIV positive, and the incarcerated [1,3,11]. HAV vaccination is also recommended for MSM and illicit drug users [2]. Furthermore, CDC guidelines recommend vaccination for all inmates not immune, even if the vaccination series cannot be completed during incarceration [3]. These guidelines are particularly relevant for incarcerated individuals because they do not usually have a stable medical home and have limited vaccination opportunities [10]. Since most inmates in LACJ (75%) are released back to their home communities, their health is intimately connected to that of the local population. Upon release, inmates may infect their household and sexual contacts with HBV [12]. Despite its importance, vaccination against HAV and HBV in correctional facilities remains a largely unrealized public health objective in the US.

We describe the first reported hepatitis A/B immunization program using an accelerated schedule in a US jail. In April 2007, the US Food and Drug Administration (FDA) approved the accelerated schedule (0-, 7-, 21–30 days, and 12-month booster) for the combined hepatitis A/B vaccine [13]. In August 2007, The Los Angeles County Department of Public Health (LACDPH) Sexually Transmitted Disease Program (STDP), in collaboration with the LASD Communicable Disease Unit, began a one year hepatitis vaccination demonstration project in the MSM dorm which was sponsored by the California Department of Health Services Immunization Branch, in collaboration with the Infectious Diseases and Sexually Transmitted Disease Control Branches and the Office of AIDS. We present data from the vaccine program and the lessons learned from our experience.

2. Materials and methods

The study population consisted of county jail inmates housed in the LACJ MSM dorm; inmates are typically awaiting trial or serving sentences of less than one year. On entry to the dorm, as part of the ongoing STD prevention program, all inmates were offered screening for HIV and the following STIs: syphilis (using the rapid plasma reagin or RPR test) and, according to site of sexual exposure, urogenital, rectal and pharyngeal gonorrhea and urogenital and rectal chlamydia. As part of the same program, inmates were offered counseling and education services, and condoms were made available.

Public Health Nurses from the LAC STDP visited the MSM dorm once a week to offer hepatitis vaccine to the inmates. Twinrix[®], a bivalent vaccine containing 720 ELISA units inactivated HAV (strain HM175) and 20 µg recombinant, HBV surface antigen was offered using the accelerated schedule with doses (1 mL each) given at: 0-, 7-, 21–30 days, with a 12-month booster [14]. Single antigen vaccine was also available for those with a history of HAV or HBV disease or vaccination. The vaccine was supplied as a sterile suspension in pre-filled syringes; administration of the vaccine was intramuscular in the deltoid using a 22–25-gauge needle. Cold chain was preserved between 36 and 46 °F and the vaccine was stored in a refrigerator supplied by a power source connected to an emergency power generator. On days when doses were given,

portable coolers were used to transport the vaccine to the MSM dorm.

The MSM dorm population is regularly screened for STIs and other communicable diseases and individuals are tested for viral hepatitis when clinically indicated; consequently, hepatitis status was determined for some inmates. Before receiving the vaccine, inmates were asked about HAV and HBV history, prior immunizations against these diseases, and for contraindications and allergies to any of the vaccine components (e.g. neomycin and yeast). An anaphylaxis kit was available in the vaccine administration location at all times. Fact sheets – a hepatitis information leaflet written for incarcerated MSM, CDC hepatitis A and B vaccine information sheets and a California Immunization Registry (CAIR) disclosure form customized for use in the jail – were distributed.

A vaccine record card documenting patient information – demographics, risk factors, indications and contraindications – was generated for each inmate who received vaccine. A next-dose card was given to each inmate after vaccination. The card included the following fields: a record of hepatitis vaccines administered by nurses in the program, due date for the next dose, sexual health clinics serving gay men, a website and helpline with information on clinics that also offered free hepatitis vaccine, and a message stating that “It is never too late to complete the vaccine series.”

Data in this analysis were collected from the beginning of the program in August 2007 to June 2010. Vaccine record card data were entered into the CAIR internet registry and a Microsoft[®] Access database. Missing or illegible data was extracted from LASD electronic medical records (EMR). STI test results were taken from both the LASD EMR system and an STDP Microsoft[®] Access database. For this study, two groups of MSM dorm inmates screened for STIs were compared: (a) control group of unvaccinated inmates; (b) a group of vaccinated inmates. STI history was defined as ever testing positive for Chlamydia, gonorrhea, syphilis, or HIV while incarcerated. Analyses were performed for each infection separately and as combined STI history.

Since analysis was performed on a pre-existing data, constructed from multiple sources and de-identified, this study was exempted from the LACDPH Institutional Review Board formal review. Unadjusted prevalence ratios (PR) were reported with 95% confidence intervals (CI). Differences between PRs were assessed using confidence intervals. All *p*-values were two-sided and all statistical analyses were performed using SAS (version 9.1, Cary, NC).

2.1. Hepatitis B vaccination among general population inmates

In a separate hepatitis vaccine program initiative, we offered HBV vaccine to general population inmates using the standard hepatitis B immunization schedule: day 0, 1 month and 4–6 months. For this initiative, we selected violent offenders – more likely to experience the longer periods of jail incarceration – in an effort to maximize vaccine series completion rates. Vaccination rates for this group of general population (GP) inmates to that of the accelerated schedule group in the MSM dorm.

3. Results

3.1. Participant characteristics

A total of 4719 inmates who were incarcerated in the MSM dorm with available STI testing data were included in the analysis from August 2007 to June 2010 (Table 1). The unvaccinated group included individuals in the MSM dorm who refused vaccine, were ineligible or not present when vaccine was offered. The vaccinated group included anyone who received at least one dose of vaccine. Most of the MSM dorm population was either black (*n* = 1695, 36%)

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