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A qualitative analysis of the impact of healthcare personnel influenza vaccination requirements in California

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Abstract

Objective—Using qualitative methods, we explored the implementation of California's 2007 influenza immunization requirements of hospital-based health care personnel (HCP).

Methods—We conducted nine case studies of California hospitals with different HCP vaccination rates and policies. Case studies consisted of interviewing 13 hospital representatives and analyzing relevant hospital documents, including influenza policies. We also conducted 13 semi-structured phone interviews with key state and county public health officials, union representatives, and officials of various professional healthcare organizations.

Results—Our qualitative results suggest that California's vaccination requirements likely did not increase influenza vaccination uptake among HCP. The law was not strong enough to compel hospitals with low and medium vaccination rates to improve their vaccination efforts, and hospitals with high vaccination rates were able to comply fully with the law by continuing to do what they were already doing – namely offering vaccinations to HCP, providing education about the risks of influenza and the benefits of vaccination, and obtaining signed declinations from those who refuse vaccination. Nonetheless, we found that by publicly raising the issue of influenza vaccination in the context of public safety and healthcare quality, California's law encouraged hospitals to develop and implement data systems to monitor the effectiveness of vaccination promotion efforts and prompted discussions, and, in some cases, adoption of stricter vaccination requirements at hospital or county levels.

Conclusions—Our findings generally support the literature that suggests that permissive influenza vaccination requirements, though politically feasible, provide little direct incentive for hospitals to focus efforts on increasing HCP vaccination rates.

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Keywords

Health care personnel; Influenza vaccination; Mandatory vaccination; State influenza vaccination requirements of healthcare personnel

1. Introduction

To protect patients and maintain treatment capacity during influenza outbreaks, the CDC's Advisory Committee on Immunization Practices recommends voluntary influenza vaccination of health care personnel (HCP) [1–3]. However, typically less than half of all HCP receive annual vaccinations [4,5]. The perceived ineffectiveness of voluntary programs has led numerous professional societies to call for implementing HCP vaccination requirements coupled with penalties for non-compliance [6–8]. Starting 2013, CMS required that general acute care hospitals (GACHs) participating in its quality reporting program report uptake annually for personnel working in the facility [9]. Case studies and testimonials suggest that the few hospitals requiring influenza vaccination as a condition of employment have generated vaccination coverage above 90% [10,11]. Yet, proven strategies for translating this success beyond a small number of hospitals have yet to emerge.

State requirements are an alternative to hospital-initiated requirements [12,13]. As of fall 2012, ten states have enacted such laws that apply to GACHs [14]. At least eight states require GACHs to provide influenza vaccination to HCP, and, in four states, GACHs must do so free of charge to HCP; seven require hospitals to maintain records about their HCP vaccination status; and five require vaccination data be submitted to appropriate state and local health authorities [14]. Most states, however, have permissive laws that do not impose strict penalties for non-vaccination on workers or the facilities that employ them. Rhode Island is the only state that has stricter requirements because it specifies penalties for non-compliance. Besides requiring unvaccinated HCP with direct patient contact to wear a surgical mask during periods of declared widespread influenza, Rhode Island law subjects HCP who fail to wear a mask and facilities that fail to enforce this rule to a $100 penalty and disciplinary action [14]. While politically feasible, whether and how permissive state requirements influence facility-level policies remain uncertain.

To improve understanding in this area, we conducted an evaluation of California's state HCP influenza vaccination requirement. Enacted in 2007, California law stipulates that all GACHs must annually offer employees free onsite influenza vaccination and educate them regarding risks of influenza and benefits of vaccination; require employees to be vaccinated or sign a written declination; and report vaccination and declination rates to the California Department of Public Health (CDPH). In 2008, CDPH clarified hospitals' obligation to provide vaccination education to non-employees and the method by which hospitals should calculate and report vaccination/declination rates [17]. While California law is consistent with CDC recommendations [1], it is permissive because it does not stipulate enforcement mechanisms or penalties for non-compliance. California is an ideal setting for evaluating the impact of permissive vaccination requirements because it is a large state (>400 GACHs) and its law contains many provisions enacted in other states [14,18].

2. Methods

We used a mixed-methods approach to evaluate the impact of California's 2007 law. We first conducted a quantitative evaluation to measure the law's impact on vaccination rates, hospital-level vaccination efforts, and worker acceptance. We found no difference in influenza vaccination rates and worker vaccination acceptance between hospital-based HCP in California and other states [19]. This paper presents results of a complementary qualitative study that documents and assesses implementation of the law's provisions. The stakeholder experiences and perspectives documented here will serve as a resource for state and local policymakers considering the enactment of statutes as a means of increasing HCP influenza vaccination.

Our qualitative evaluation was based on nine hospital case studies and 13 key stakeholder interviews. Case-study data consisted of 13 semi-structured interviews conducted between December 2011 and February 2012 with hospital managers and administrators, reviews of hospital-specific influenza vaccination policies, and three annual CDPH reports documenting hospital worker vaccination and declination rates [20–22]. Stakeholder interviews with representatives of state and local health departments, unions, and professional associations were conducted during the same period. Data collection and management procedures were approved by RAND's institutional review board.

2.1. Hospital case studies

We used a "maximum variation" method [23] to develop a sample reflecting the diversity of hospitals' experiences in vaccinating their staff and operational characteristics. First, we categorized all GACHs into four comparably sized groups based on their reporting of employee HCP vaccination rates for the 2009–2010 influenza season (i.e., non-reporting, low (<50% vaccination rate), medium (50–69% vaccination rare), high (≥70% vaccination rate)). Next, we sub-divided GACHs with high vaccination rates into two groups based on the existence of a facility-wide policy that required unvaccinated HCP to wear a surgical mask during a flu season, which resulted in total of five groups of hospitals. Finally, we selected hospitals from each group based on their geographic location, rural/urban status, bed size, and presence on the *Immunization Action Coalition Honor Roll for Patient Safety* [24]. In doing so, we selected no more than two hospitals with identical vaccination performance, vaccination policies, and physical and operational characteristics. Relevant characteristics of case-study hospitals are shown in Tables 1 and 2.

Out of 17 identified hospitals, we established contact with 12, and 9 of them agreed to participate. Within each hospital, we interviewed up to three people who were most familiar with, or responsible for, compliance with the law. We first interviewed the person responsible for reporting vaccination rates to CDPH; we also asked interviewees if there were other people whom we should interview. Respondents included six individuals from hospital employee health departments, six from infection prevention departments, and one education coordinator. Two qualitative researchers used conversational interviewing techniques [25] to explore the perception of California law's impact on vaccination by asking open-ended questions about perceptions of its effectiveness, compliance barriers and facilitators, hospital vaccination policies, approaches to HCP vaccination, and strategies

used to increase vaccination rates. Additional topics were discussed if raised by interviewees. To supplement interview data, we reviewed relevant written hospital policies and three annual reports published by CDPH documenting hospital-reported influenza vaccination rates [12,13,26]. These documents were used to confirm hospital policies and select case study sites.

2.2. Key stakeholder interviews

We used a similar approach to conduct semi-structured interviews with 13 stakeholders representing various organizations (other than case-study hospitals) interested in, or affected by, implementation of the law's provisions. Participants, identified through consultation with CDPH and snowball sampling [27], included state and county public health officials, union representatives, officials of various healthcare professional organizations, and representatives from Hospital Corporation of America hospitals that were the subject of litigation for their masking policies. Interview questions focused on the law's implementation, its impact on stakeholder organizations and hospital workers, and its effectiveness in increasing HCP vaccination rates.

2.3. Analysis

All data were coded thematically using MAXQDA 10 qualitative data analysis software [28]. A hierarchically organized codebook [29] was developed to summarize themes and identify patterns. Two qualitative researchers first coded all the data independently and then reviewed coded text to ensure coding consistency; disagreements were discussed until consensus was reached [29]. They incorporated themes identified during the literature and document reviews and included in the interview guide (e.g., perceived impact of the law), and added new unanticipated themes that emerged during the interviews (e.g., county vaccination ordinances). All data sources were used to triangulate [27] findings, that is to confirm identified themes using interviews with hospital representatives and stakeholders and/or document reviews, to increase the reliability of our conclusions. Cross-case analyses were conducted for the hospital case studies to identify within-group similarities and intergroup differences based on vaccination rates and hospital policies.

3. Results

3.1. Acceptance of and compliance with California law

We found wide support for the intent of California law even among traditional opponents of vaccination requirements—One union representative commented: "We believe that anything that encourages people to get vaccinated is a great idea…[This law] is identical to what we supported and helped write in 1980s for HCP Hepatitis B vaccines." Likewise, case-study participants uniformly agreed that influenza vaccination of hospital-based HCP was the right thing to do to ensure patient safety. As one hospital representative put it, "It's very appropriate for healthcare facilities whose primary focus is to heal or prevent illness in people to ask employees to be vaccinated." Similarly, another hospital representative stated that HCP influenza vaccination is "necessary because the vaccine protects us, our families, and our patients."

Study participants attributed the broad acceptance of, and lack of opposition to, California law to the fact that it is a permissive requirement. One hospital representative commented that the law "mandates offering the vaccine and signing a declination. It mandates that hospitals provide education, track the data, and report back to the state…It doesn't mandate that you take the vaccine." Another hospital representative explained, "The purpose of the legislation was that everyone has to be *offered* the vaccination, and it doesn't say they *have to* get vaccinated. Hospitals with 100% outreach, but 30% vaccination are in fact complying with the law."

Compliance efforts varied depending on the hospitals' vaccination rates at the time of enactment—Case-study participants clearly understood that compliance with the law did not require them to take specific action to increase vaccination. Hospitals with low vaccination rates often focused their compliance efforts on establishing systematic collection of vaccine declination forms and on initiation or expansion of education efforts. Participants from several hospitals with low vaccination rates praised the law for encouraging them to improve influenza education by creating an "influenza myth-busters" campaign, for example, and by making influenza vaccination a mandatory component of annual employee education. By contrast, several participants representing hospitals with medium and high vaccination rates often reported focusing their compliance efforts on improving their ability to track employee vaccination rates and reasons for declination. This, in turn, allowed them to identify employees who repeatedly declined vaccination offers and to make them the targets of tailored communication efforts, including one-on-one conversations with an employee health or infection control director.

Hospitals indicated that initial reporting requirements were burdensome and confusing—California law requires hospitals to report vaccination and declination rates to CDPH. Several participants indicated that reporting requirements were confusing and required significant investments of time and effort: "CDPH has been asking for peculiar subsets of information…I guess they are trying to distinguish between the clinical employees and non-clinical. [Those] data are just not available for us and don't make sense for us." Moreover, case-study participants reported confusion regarding whether and how physicians, volunteers, and others not employed directly by the hospitals were covered by the reporting requirements. According to two stakeholders, this confusion led a significant fraction of hospitals (approximately 15%) not to report to CDPH following the 2008–2009 season. In response, CDPH clarified their guidance defining the categories of workers subject to the reporting requirement and explaining the method for calculating vaccination and declination rates [17], which likely helped increase hospital compliance rates to 98 percent by the 2010–2011 season.

3.2. Impact of California law

Many participants did not believe that vaccination requirements were strict enough to have an impact on vaccination rates—To use the words of one hospital representative, the law had "no impact on vaccination rates. If it got more stringent, it might make an impact." Another representative argued that "[the State hasn't] put enough teeth in the law for hospitals to mandate the flu vaccine, as we would have liked" because it did not

specify any consequences for low vaccination uptake. Indeed, several participants referred to California law as a "mandatory participation requirement" and a "mandatory written declination requirement" (a term also used by CDPH) because it does not specify consequences for non-compliance. Requiring unvaccinated HCP to sign a declination form, the only consequence for unvaccinated HCP, was not perceived to be effective in increasing vaccination rates. According to one hospital representative, "declination doesn't help me get everyone protected…I was foolishly thinking that declination was going to make people think about how important [influenza vaccination] is, but it didn't."

The law required hospitals to do what many had already been doing for several years—Prior to the law, many hospitals offered influenza vaccination to HCP free of charge and some required declinations. While the law's permissive provisions helped generate broad-based acceptance, they contributed to its limited impact on vaccination uptake because the law did not require hospitals that had taken active steps to promote vaccination prior to enactment to strengthen their promotion efforts. Typical of this finding is the following statement by one hospital administrator: "This is something that we've done for quite a while, so it's not anything new to us." Likewise, another hospital representative indicated that "[the law] really didn't help us get any *more* people immunized."

Participants, however, believed that the law helped their hospitals raise influenza vaccination awareness and change their organizational culture by including HCP influenza vaccination in the patient safety strategy. Study participants generally agreed that the law has been very effective in raising awareness of the importance of employee vaccination, promoting better policies in GACHs, and encouraging education and outreach. Some hospital representatives stated that the law also helped them reassess the content of educational messages about influenza and change the rationale for HCP influenza vaccination: "When others have gone to mandatory vaccinations, we've tried to change our culture by emphasizing that flu vaccination is a part of [our] patient safety strategy and respiratory etiquette." Indeed, several participants suggested that the law facilitated a "culture shift" toward treating influenza vaccination as a patient safety strategy and supported a "culture of accountability" around HCP influenza vaccination.

After initial confusion, the law's reporting requirements prompted hospitals to improve their data systems in ways that support process monitoring and improvement. California law requires that hospitals collect and report their HCP vaccination and declination rates to CDPH and requires the State to make those rates publically available. Several hospitals reported investing in building or upgrading their IT systems to facilitate vaccination tracking and reporting. Moreover, as one medical director of occupational health noted, the law improved the quality of the data his hospital reported to the state: "It used to be that HR collected and reported it; now I am doing it, and I have more confidence in the reported numbers now." Furthermore, as mentioned by a stakeholder, the public reporting requirement helped create "an infrastructure that will be valuable in the future as a way of monitoring [vaccination] programs" at the federal level. Indeed, the effect of California law actually went beyond the state's borders. As described by one stakeholder, "The newly endorsed National Quality Forum measure and CMS requirement for [reporting] the

vaccination of health-care workers build upon the reporting infrastructure created by California law."

Public reporting requirements stimulated discussion and, in some cases, voluntary adoption of stricter vaccination and masking requirements. One stakeholder explained, "If you produce a public report showing you have mediocre vaccination coverage, there is a reasonable expectation that you are supposed to make a policy statement in regards to what should happen next, which will then draw you into the controversy over mandatory influenza vaccination." Indeed, several participants stated that the law helped both hospitals and counties implement masking requirements for unvaccinated HCP. One case-study participant indicated that the law gave her hospital's mandatory vaccination policy "more clout" and helped push the influenza vaccination agenda forward by letting people know that "there is a new law, and we really need you to get your vaccine," even though the law itself did not require vaccination. Evidence of changed attitudes is reflected in the voluntary adoption of policies requiring HCP to be vaccinated or wear masks after the implementation of California law by at least eleven counties [30–40] and at least 15 California hospitals [24] not located in these counties. Moreover, three counties [41–43] strongly recommend that hospitals mandate HCP influenza vaccination and masking, and one of them plans to require vaccination or masking in the 2013–14 season [43].

4. Discussion and conclusion

Our quantitative evaluation results show that California's requirements likely did not *directly* increase influenza vaccination uptake among hospital workers, suggesting that California law may be too permissive to offer a strong incentive for hospitals to increase vaccination rates. We identified two potential reasons: (1) the law was not strong enough to compel hospitals with low and medium vaccination rates to improve their vaccination efforts; and (2) hospitals with high rates could comply fully with the law by continuing to do what they were already doing, namely offering vaccinations to staff, providing education about the risks of influenza and the benefits of vaccination, and obtaining signed declinations from those who refuse vaccination. In these ways, the law helped reinforce the status quo.

However, the law appeared to have some unexpected benefits. By publicly raising the issue of influenza vaccination in the context of public safety and healthcare quality, it may have prompted hospitals and county governments to discuss, and in some cases adopt, stricter requirements than those contained in the actual statute. The law's reporting requirements, similar to those introduced by CMS in 2013 [9], also prompted hospitals to develop and implement data systems allowing managers to monitor the effectiveness of vaccination promotion efforts. Increased data quality and feedback of vaccination rates to hospital staff may consequently lead to increased vaccination rates [44] associated with targeting groups with the lowest vaccination uptake. By making hospitals and even counties more willing and able to undertake vaccination improvement initiatives, the law may have set the stage for future improvement in vaccination in the absence of stronger but more controversial enforcement measures.

Our findings illustrate the diverse experiences and perspectives of hospitals and other stakeholders in implementing California's hospital-based HCP vaccination requirement [19] and suggest that permissive requirements, though politically feasible, provide little direct incentive for hospitals to focus efforts on increasing HCP vaccination. Notwithstanding the small size and limited representativeness of our hospital sample, which affect the generalizability of our findings, the rich qualitative data we collected from multiple sources demonstrate the role that mandatory reporting may play in stimulating the development of a performance improvement culture and therefore may help inform future evaluations of the national reporting requirements. Our findings can help move the policy debate beyond simple consideration of the merits of strict and permissive hospital-level vaccination requirements [12,13] to a broader focus on the role government can play in creating an environment that promotes HCP influenza vaccination through hospital vaccination tracking and public reporting.

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References

1. Pearson M, Bridges C, Harper S. Influenza vaccination of health-care personnel: recommendations of the Healthcare Infection Control Practices Advisory Committee (HICPAC) and the Advisory Committee on Immunization Practices (ACIP). MMWR Morb Mortal Wkly Rep. 2006; 55(RR-2): 1–16. [PubMed: 16410759]
2. Shefer A, Atkinson W, Friedman C, Kuhar DT, Mootrey G, Bialek SR, et al. Immunization of Health-Care Personnel. MMWR Recomm Rep. 2011; 60(7):1–46.
3. Centers for Disease Control and Prevention. Recommendation of the Public Health Service Immunization Practices Advisory Committee: Influenza Vaccine 1980–1981. Ann Intern Med. 1980; 93:466–8. [PubMed: 6254417]
4. Centers for Disease Control and Prevention. Self-reported influenza vaccination coverage trends 1989–2008 among adults by age group, risk group, race/ethnicity, health-care worker status, and pregnancy status, United States, National Health Interview Survey (NHIS). [cited April 10, 2012]; Available from: http://www.cdc.gov/flu/pdf/professionals/nhis89_08fluvaxtrendtab.pdf
5. Harris KM, Uscher-Pines L, Black C, Euler G, Singleton J, Lindley M, et al. Influenza vaccination coverage Among Health-Care Personnel –United States, 2010–11 influenza season. MMWR Morb Mortal Wkly Rep. 2011; 60(32):1073–7. [PubMed: 21849963]
6. Infectious Disease Society of America and Society for Healthcare Epidemiology of America. Nation's leading infectious diseases experts call for mandatory flu vaccine for all healthcare personnel. 2010. [cited October 30, 2011]; Available from: http://www.idsociety.org/Content.aspx?id=16980
7. American College of Physicians. American college of physicians recommends flu vaccination for health care workers. 2007. [cited October 15, 2011]; Available from: http://www.acponline.org/pressroom/hcw.htm

8. Talbot TR, Babcock H, Caplan AL, Cotton D, Maragakis LL, Poland GA, et al. Revised SHEA position paper: influenza vaccination of healthcare personnel. Infect Control Hosp Epidemiol. 2010; 31(10):987–95. [PubMed: 20807037]
9. U.S. Department of Health and Human Services. Medicare program; hospital inpatient prospective payment systems for acute care hospitals and the long-term care hospital prospective payment system and FY2012 rates; hospitals' FTE resident caps for graduate medical education payment; final rules. Federal Register. 2011 Sect. 51631–3.
10. Babcock HM, Gemeinhart N, Jones M, Dunagan WC, Woeltje KF. Mandatory Influenza Vaccination of Health Care Workers: Translating Policy to Practice. Clin Infect Dis. 2010 Feb 15; 50(4):459–64. [PubMed: 20064039]
11. Rakita RM, Hagar BA, Crome P, Lammert JK. Mandatory influenza vaccination of healthcare workers: a 5-year study. Infect Control Hosp Epidemiol. 2010; 31(9):881–8. [PubMed: 20653445]
12. Miller BL, Ahmed F, Lindley MC, Wortley PM. Increases in vaccination coverage of healthcare personnel following institutional requirements for influenza vaccination: a national survey of US hospitals. Vaccine. 2011; 29(50):9398–403. [PubMed: 21945495]
13. Miller BL, Ahmed F, Lindley MC, Wortley PM. Institutional requirements for influenza vaccination of healthcare personnel: results from a nationally representative survey of acute care hospitals—United States, 2011. Clin Infect Dis. 2011; 53(11):1051–9. [PubMed: 22045954]
14. Stewart AM, Cox MA. State law and influenza vaccination of health care personnel. Vaccine. 2013; 31(5):827–32. [PubMed: 23219775]
17. Billingsley, K. All Facility Letter 08–17: New Regulatory Requirements for Compliance with Senate Bill 739 – Reporting of Influenza Vaccination/Declination of Employees and Healthcare Personnel. California Department of Public Health; 2008.
18. Stewart, AM., Cox, MA. The Influenza Vaccination of the Health Care Workforce: Developing a Model State Law. 2011. [cited 2012 December 21]; Available from: http://www.gwumc.edu/sphhs/departments/healthpolicy/influenza/MODEL%20LAW%20REPORT.pdf
19. Harris K, Uscher-Pines L, Han B, Lindley MC, Lorick SA. The Impact of Influenza Vaccination Requirements for Hospital Workers in California: Knowledge, Attitudes, and Uptake. Submitted.
20. Healthcare-Associated Infections Program Center for Health Care Quality California Department of Public Health. Influenza Vaccination Among Employees in California General Acute Care Hospitals for the 2008–2009 Respiratory Season. 2010. [cited 2011 April 10]; Available from: http://www.cdph.ca.gov/programs/hai/Documents/InfluenzaVaccination_Employees_CaliforniaGeneralAcuteCareHospitals_2008_2009RespiratorySeasonHAI_ProgramReport.pdf
21. Healthcare-Associated Infections Program Center for Health Care Quality California Department of Public Health. Influenza Vaccination Among Employees in California General Acute Care Hospitals for the 2009–2010 Respiratory Season. [cited 2011 December 20]; Available from: http://www.cdph.ca.gov/programs/hai/Documents/California_Hospital_Employee_Influenza_Vaccination_2009-2010.pdf
22. Healthcare-Associated Infections Program Center for Health Care Quality California Department of Public Health. Influenza Vaccination Among Health Care Personnel in Calfornia General Acute Care Hospitals for the 2010–2011 Respiratory Season. 2011. [cited 2011 December 20]; Available from: http://www.cdph.ca.gov/programs/hai/Documents/CDPH2010-11HCPInfluenza_VaccinationReport.pdf
23. Coyne IT. Sampling in qualitative research Purposeful and theoretical sampling; merging or clear boundaries? J Adv Nurs. 1997; 26(3):623–30. [PubMed: 9378886]
24. Immunization Action Coalition. Honor Roll for Patient Safety. [cited October 10, 2011]; Available from: http://www.immunize.org/honor-roll/
25. Lee, TW. Using qualitative methods in organizational research. Thousand Oaks, CA: Sage Publications, Inc; 1999.
26. Stewart AM, Rosenbaum S. Vaccinating the health-care workforce: state law vs. institutional requirements. Public Health Rep. 2010; 125(4):615–8. [PubMed: 20597463]
27. Patton, MQ. Qualitative research and evaluation methods. 2. Thousand Oaks, CA: Sage Publications, Inc; 2002.

28. Godau R. Qualitative data analysis software: MAXqda and MAXdictio. Qual Res J. 2004; 4(1):66–72.
29. MacQueen KM, McLellan E, Kay K, Milstein B. Codebook development for team-based qualitative analysis. Cult Anthropol Method. 1998; 10(2):31–6.
30. Aragon, T. Mandatory Influenza and Pertussis Vaccination of Health Care Workers (HCWs). 2011. [cited 2012 September 28]; Available from: http://www.sfcdcp.org/document.html?id=676
31. Trochet, G. Mandatory Influenza Vaccination of All Healthcare Workers in Sacramento County. 2011. [cited 2012 September 28]; Available from: http://www.cdph.ca.gov/programs/cclho/Documents/MandatoryFluVaccineofAllHCW.pdf
32. Caldwell, C. Mandatory Influenza Vaccination of All Healthcare Workers in Yolo County. 2012. [cited 2012 September 28]; Available from: http://www.yolocounty.org/Modules/ShowDocument.aspx?documentid=20653
33. Chalfin, L. Requirement for Influenza Vaccination of Certain Health Care Workers in Sonoma County. 2012. [cited 2013 February 12,]; Available from: http://www.sonoma-county.org/health/announcements/pdf/20121019order.pdf
34. Fenstersheib, M. Mandatory Influenza Vaccination or Masking of Health Care Workers During Influenza Season. 2012. [cited 2012 September 28]; Available from: http://www.cdph.ca.gov/programs/cclho/Documents/Mandatory%20Influenza%20Vaccination%20Santa%20Clara%20July%2024%202012.pdf
35. Furst, K. Mandatory Influenza Vaccination or Masking of Health Care Workers During Influenza Season. 2012. [cited 2013 February 12]; Available from: http://www.cdph.ca.gov/programs/cclho/Documents/MandatoryFluVaccorMaskofHCWSanJoaquin20120827.pdf
36. Hartmann, R. Mandatory Influenza Vaccination of All Healthcare Workers in Amador County. 2012. [cited 2013 February 12]; Available from: http://www.cdph.ca.gov/programs/cclho/Documents/AmadorCountyMandatoryFluMandateSeptember212012.pdf
37. Hartmann, R. Influenza Vaccine or Masking of Health Care Workers during Influenza Season. 2012. [cited 2013 February 12]; Available from: http://www.cdph.ca.gov/programs/cclho/Documents/ElDoradoCountyInfluenzaMaskingOrderSeptember132012.pdf
38. Lubell, I. Influenza Vaccination or Masking of Health Care Workers During Influenza Season. 2012. [cited 2013 February 12,]; Available from: http://www.santacruzhealth.org/alerts/pdf/2012%200831%20Influenza%20Precautions%20for%20Providers.pdf
39. Walker, W. Mandatory Influenza Vaccination or Masking of Health Care Workers During Influenza Season. 2012. [cited 2012 September 28]; Available from: http://cchealth.org/flu/pdf/2012-0827-hcw-memo.pdf
40. Wickenheiser, R. Health Officer Order No. 12-01: Mandatory Influenza Vaccination or Masking of Health Care Workers During the 2012/13 Influenza Season. 2012. [cited 2012 September 28]; Available from: http://www.tehamacohealthservices.net/Documents%202012/TCHSA_Influenza_Vaccination_HCW_9-10-12.pdf
41. Borenstein, P. Mandatory Influenza Vaccination of All Healthcare Workers in San Luis Obispo County. 2011. [cited 2013 February 12,]; Available from: http://www.cdph.ca.gov/programs/cclho/Documents/SLOMandatoryInfluenzaLetter.pdf
42. Davis, M. Mandatory Influenza and Pertussis Vaccination of Health Care Workers. 2012. [cited June 7, 2012]; Available from: http://www.acphd.org/media/212709/acphd-mandatory-flu-pertussis-vaccination.pdf
43. Deckert, A. Influenza Vaccination of Healthcare Personnel (HCP) in Shasta County – mandate for vaccination or mask/non-patient care beginning fall 2013. 2012. [cited 2013 February 12,]; Available from: http://www.cdph.ca.gov/programs/cclho/Documents/ShastaADMaskOrFluShotForHCP.pdf
44. Helms C, Polgreen P, Polgreen L, Evans T, Roberts LL, Clabaugh G, et al. Voluntary reporting of employee influenza vaccination rates by acute care hospitals in Iowa: the impact of a four year provider-based statewide performance improvement project. Vaccine. 2011; 29:3483–8. [PubMed: 21439317]

Table 1

Characteristics of California case-study hospitals ($n = 9$).

	2009–2010 employee seasonal flu vaccination rates %[a]	Masking policy[b]	Location in California	Area type	Bed size[c]	Honor roll[d]
Hospital 1	Not reported	Yes	Northern	Urban	Large	No
Hospital 2	Low	No	Northern	Suburban	Medium	No
Hospital 3	Low	No	Northern	Rural	Small	No
Hospital 4	Medium	Yes	Northern	Urban	Medium	No
Hospital 5	High	No	Southern	Urban	Large	No
Hospital 6	High	No	Southern	Urban	Large	No
Hospital 7	High	No	Central	Rural	Small	No
Hospital 8	High	Yes	Southern	Urban	Large	Yes
Hospital 9	High	Yes	Southern	Urban	Large	Yes

[a] Low, <50%; medium, 50–69%; high, ≥70%

[b] Hospital has a masking policy for unvaccinated HCP (Yes/No)

[c] Small, 4–80; medium, 81–204; large, 205+beds

[d] Hospital on immunization action coalition's honor roll for patient safety for mandatory influenza vaccination policies for healthcare workers: http://www.immunize.org/honor-roll/.

Table 2

California case-study hospital personnel seasonal influenza vaccination status data.

Hospital	Influenza season	Percentage vaccinated	Percentage declined	Percentage vaccination status unknown
All CA hospital average	2008–2009	55.3	27.9	16.8
	2009–2010	62.6	23.9	13.5
	2010–2011	64.3	28.3	7.8
Hospital 1	2008–2009	70.3	13.3	16.4
	2009–2010	Not reported	Not reported	Not reported
	2010–2011	82.8	13.7	3.5
Hospital 2	2008–2009	37.3	28.5	34.2
	2009–2010	38.3	6.0	55.7
	2010–2011	44	16.5	39.5
Hospital 3	2008–2009	37.0	23.2	39.8
	2009–2010	31.0	69.0	0
	2010–2011	57.5	42.5	0
Hospital 4	2008–2009	59.0	10.5	30.5
	2009–2010	64.4	34.3	1.3
	2010–2011	60.2	39.2	0.6
Hospital 5	2008–2009	Not reported	Not reported	Not reported
	2009–2010	93.0	7.0	0
	2010–2011	62.4	37.6	0
Hospital 6	2008–2009	50.6	43.3	6.1
	2009–2010	96.0	4.0	0
	2010–2011	63.2	36.8	0
Hospital 7	2008–2009	83.1	16.9	0.0
	2009–2010	91.1	11.7	-
	2010–2011	85.6	14.1	0.3
Hospital 8	2008–2009	75.7	19.4	4.9
	2009–2010	98.3	1.7	0.0
	2010–2011	97.6	2.4	0.0
Hospital 9	2008–2009	64.9	33.4	1.7
	2009–2010	93.8	5.3	0.9
	2010–2011	90.8	4.4	18.3