

the study of Darouiche et al,⁵ one of the most recent and powerful studies published in 2010 in the *New England Journal of Medicine*. It should be pointed out that in the studies included in these 2 meta-analyses, most patients had their skin disinfected with an alcoholic formulation of chlorhexidine or an aqueous formulation of povidone iodine.

I agree with the authors that some studies have several limitations, including the use of different concentrations of chlorhexidine, the comparison of alcoholic and nonalcoholic formulations, the use of different definitions for SSIs, and the lack of search for SSIs blindly to the antiseptic used. However, the superiority of chlorhexidine on povidone iodine was constant at a concentration ranging from 0.5% to 4%. Moreover, a subanalysis performed by Lee et al⁶ in response to a letter to the editor published in *Infection Control and Hospital Epidemiology* confirmed the superiority of chlorhexidine on povidone iodine when aqueous or alcoholic formulations of both compounds were directly compared.

The superiority of alcoholic formulations on aqueous formulations of antiseptics still remains an unresolved issue. Alcohol is a potent skin antiseptic on its own, and its in vitro antimicrobial activity is enhanced when combined with povidone iodine or chlorhexidine.⁷ The addition of alcohol to povidone iodine in the preparation of skin and nails before foot and ankle surgery increases the difference in total bacterial load before and after skin preparation.⁸ Similar findings were reported with chlorhexidine. Skin disinfection with 2% chlorhexidine in 70% isopropyl alcohol prior to peripheral venous catheter insertion leads to a significant reduction in the number of catheter tips that have microorganisms present on their surface, compared with skin disinfection with 70% isopropyl alcohol alone.⁹

In conclusion, aqueous povidone iodine should never be used to disinfect the intact skin before surgery. Chlorhexidine-based formulations are more effective, at least at a chlorhexidine concentration of 0.5% or higher. The combination with alcohol should be recommended because of a synergistic effect on bacterial reduction. Although the available data comparing alcoholic formulations of chlorhexidine and povidone iodine are in favor of the use of chlorhexidine products, further well-conducted studies are warranted to definitively determine which antiseptic formulation is most effective in decreasing the incidence of SSIs, as pointed out by Kamel et al.¹

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REFERENCES

1. Kamel C, McGahan L, Polisen J, Mierzewski-Urban M, Embil JM. Preoperative skin antiseptic preparations for preventing surgical site infections: a systematic review. *Infect Control Hosp Epidemiol* 2012;33:608-617.
2. Swenson BR, Hedrick TL, Metzger R, Bonatti H, Pruett TL, Sawyer RG. Effects of preoperative skin preparation on postoperative wound infection rates: a prospective study of 3 skin preparation protocols. *Infect Control Hosp Epidemiol* 2009;30:964-971.
3. Noorani A, Rabey N, Walsh SR, Davies RJ. Systematic review and meta-analysis of preoperative antisepsis with chlorhexidine versus povidone-iodine in clean-contaminated surgery. *Br J Surg* 2010; 97:1614-1620.
4. Lee I, Agarwall RK, Lee BY, Fishman NO, Umschied CA. Systematic review and cost analysis comparing use of chlorhexidine with use of iodine for preoperative skin antisepsis to prevent surgical site infection. *Infect Control Hosp Epidemiol* 2010;31: 1219-1229.
5. Darouiche RO, Wall MJ Jr, Itani KM, et al. Chlorhexidine alcohol versus povidone-iodine for surgical-site antisepsis. *N Engl J Med* 2010;362:18-26.
6. Lee I, Fishman NO, Agarwal RK, Lee BY, Umscheid CA. Reply to Maiwald et al and Riccio et al. *Infect Control Hosp Epidemiol* 2011;32:406-408.
7. Swenson BR, Sawyer RG. Importance of alcohol in skin preparation protocols. *Infect Control Hosp Epidemiol* 2010;31:977
8. Becerro de Bengoa Vallejo R, Losa Iglesias ME, Alou Cervera L, Sevillano Fernández D, Prieto Prieto J. Preoperative skin and nail preparation of the foot: comparison of the efficacy of 4 different methods in reducing bacterial load. *J Am Acad Dermatol* 2009; 61:986-992.
9. Small H, Adams D, Casey AL, Crosby CT, Lambert PA, Elliott T. Efficacy of adding 2% (w/v) chlorhexidine gluconate to 70% (v/v) isopropyl alcohol for skin disinfection prior to peripheral venous cannulation. *Infect Control Hosp Epidemiol* 2008;29: 963-965.

Seasonal Influenza Vaccine Compliance and Use of Declination Forms

To the Editor—The article by Rebmann et al¹ in the March issue of the journal established that mandatory vaccination was the strongest predictor of compliance for both hospital-based and non-hospital-based workers. Although the authors acknowledge the use of declination and/or mandatory vaccination policies by healthcare organizations to increase vaccination compliance, previously published literature supports the notion that mandatory vaccination policies are different in effectiveness, implementation, and perceived acceptability

from vaccination policies that include use of a declination statement.^{2,3}

Distinguishing between the 2 policies would have strengthened the article and made it more useful for organizations considering employee vaccination policies. We were struck by the fact that the use of declination forms was not separately included among the factors evaluated for their relative influence on influenza vaccine compliance within and between the 2 healthcare worker (HCW) groups. We would be interested to know whether the term “mandatory vaccination policies,” as used by authors, included the declination process and, if so, precisely how it was accounted for in the design and execution of their study.

The use of declination forms has been reported in the literature to improve HCW influenza vaccine uptake.^{4–6} These sources suggest that, to be effective, a declination policy needs to be combined with other vaccination strategies and include consequences for HCWs who decline vaccination and do not sign a declination form.

We believe that there would have been an added benefit to the study if the authors had (a) clearly defined the terms “declination” and “mandatory vaccination” at the outset and then treated them as separate, distinct factors when presenting the study methods, results, and conclusions and (b) investigated the effectiveness of a declination policy compared with a more extreme policy, such as making influenza vaccination a condition of continued employment for all HCWs except those with exemptions (eg, medical and religious).

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REFERENCES

1. Rebmann T, Wright KS, Anthony J, Knaup RC, Peters EB. Seasonal influenza vaccine compliance among hospital-based and nonhospital-based healthcare workers. *Infect Control Hosp Epidemiol* 2012;33(3):243–249.
2. Ribner BS, Hall C, Steinberg JP, et al. Use of a mandatory declination form in a program for influenza vaccination of healthcare workers. *Infect Control Hosp Epidemiol* 2008;29(4):302–308.
3. Cormier SB, Septimus E, Moody JA, Hickok JD, Perlin JB. Implementation of a successful seasonal influenza vaccine strategy

in a large healthcare system. Paper presented at: 5th Decennial International Conference on Healthcare-Associated Infections; March 18–22, 2010; Atlanta. Abstract 365.

4. Quan K, Tehrani DM, Dickey L, et al. Voluntary to mandatory: evolution of strategies and attitudes toward influenza vaccination of healthcare personnel. *Infect Control Hosp Epidemiol* 2012;33(1):63–70.
5. Polgreen PM, Septimus E, Talbot TR, Beekmann SE, Helms C. Results of a national survey of infectious diseases specialists regarding influenza vaccination programs for healthcare workers. *Infect Control Hosp Epidemiol* 2010;31(10):1063–1065.
6. Weinstein RA, Talbot TR. Do declination statements increase health care worker influenza vaccination rates? *Clin Infect Dis* 2009;49(5):773–779.

Reply to Soyemi et al

To the Editor—We appreciate the interest of Soyemi et al¹ in our article and study. Our instrument did differentiate between a mandatory vaccination policy and the use of declination statements. In addition to being asked about having a mandatory vaccination policy or use of declination forms, subjects were asked (a) if nonvaccinated staff had to wear a mask during patient care activities, (b) if nonvaccinated staff were fired for noncompliance, (c) if nonvaccinated staff had their paycheck held until they complied with the policy, and (d) if nonvaccinated staff had to attend a mandatory counseling/educational influenza transmission session. In this way, we were able to assess the extent to which the mandatory vaccination policy was enforced and/or documented; these results were included in our article.

In our regression, we assessed vaccination using the following categories: mandated, highly encouraged, informed, and nothing. Declination forms could have been a separate category (mandatory policy that excuses only medically contraindicated individuals or those with religious opposition versus mandatory policy consisting of written declination forms that also allow for opting out for personal reasons). However, statistically we could not separate these groups because of a corresponding cell count of 0 that caused a very high standard error in the regression model. We collapsed those categories, which solved the statistical problem. This approach also reinforced our pilot study findings that subjects had difficulty differentiating between mandatory vaccination and the use of declination forms. Pilot study participants indicated that they interpreted declination statements as a form of mandatory vaccination, albeit one in which healthcare personnel could still opt out of vaccination as long as they signed a statement indicating their religious or philosophical reason for not wanting the vaccine. Perhaps this is reflective of the current mandatory vaccination policies that exist in the Saint Louis region, where both the pilot testing and the full study were conducted. Differentiating between a declination policy and mandatory vaccination may be ben-