UCLA Health Clinical Epidemiology & Infection Prevention

Subject: Recommendation for isolation precaution policy change

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A. Executive Summary

In an effort to create value for patients, staff and visitors, UCLA Health Clinical Epidemiology & Infection Prevention (CEIP) thoroughly examined the potential harms and benefits associated with Contact Precautions for methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant enterococcus (VRE). The results of our careful review are summarized in the following risk-based, patient-centered recommendation:

This recommendation applies to all units at Ronald Reagan UCLA, Santa Monica UCLA Medical Center and Orthopaedic Hospital, and Resnick Neuropsychiatric Hospital that utilize Contact Precautions.

- Contact Precautions will no longer be required for MRSA.
- Contact Precautions will no longer be required for VRE.
- Visitors will no longer be required to adhere to Contact Precautions. Visitors will be expected, however, to practice diligent hand hygiene and utilize standard precautions.
- Emphasis will be placed on syndromic isolation (e.g. patient with draining wound to be placed on Contact Precautions).
- Bath treatment with chlorhexidine gluconate (CHG) will be done for *ALL* inpatients (excluding inpatient behavioral health and post-partum) every 24 hours unless contraindicated.
- CEIP may decide to institute Contact Precautions if the risk of transmission of MRSA and/or VRE increases such as in an outbreak setting.

B. Introduction

One of the primary goals of infection prevention programs is to interrupt the transmission of potentially pathogenic bacteria within the healthcare setting. At UCLA this has taken the form of standard precautions and additional Contact Precautions (CP) for patients known to be colonized or infected with specific pathogens including MRSA and VRE. This approach, while generally supported by the CDC[2] and affiliated infection prevention professional societies (APIC

and SHEA[1]), has become increasingly controversial. There is a lack of well-designed research supporting the efficacy of CP for MRSA and VRE, and several studies have shown adverse effects associated with CP. Additionally, new research has shown that there are other effective interventions aimed at curbing the transmission of resistant bacteria that do not have the harms associated with CP. Our review of the literature is presented here in four sections:

- Potential Benefits of CP
- Potential Harms of CP
- Other Methods to Interrupt Transmission
- Framework for Considering Local Factors

C. Potential Benefits of Contact Precautions

Studies that support the use of CP have important limitations. Studies show that gowns and gloves are not better than gloves alone in preventing transmission of MRSA and/or VRE.

Studies have shown that isolation gloves and gowns become contaminated with MRSA and VRE after patient contact.[4] One study demonstrated that the gloves of healthcare workers (HCW) were much more likely to be contaminated than gowns for both MRSA (17.7% versus 6.2%) and VRE (7.7% versus 4.3%), respectively. Additionally, specific nursing activities were associated with higher risk of contamination: presence of a jejunostomy, manipulation of a tracheostomy, and contact with the head and neck. Despite the evidence that gloves and gowns become contaminated with MRSA and VRE after patient contact, with certain activities being higher risk, prospective evidence demonstrating an actual decrease in transmission to patients is lacking.

Multiple studies that have demonstrated significant clinical and financial benefit of CP in the setting of increased endemicity of multi-drug resistant organisms (MRDOs) and outbreaks are subject to important limitations[3,5]:

1. Study sample sizes are too small to assess the effect size of healthcare associated infections.
2. Many studies were performed in an outbreak setting where multiple interventions were implemented simultaneously. Given this, it is difficult distinguish the relative effect of any single intervention.
3. Most studies had a quasi-experimental design and thus, did not contain comparison groups nor adequately assess for the secular trends of infection outbreaks and regression to the mean.
4. CP compliance monitoring was not performed in many studies.
5. Confounders are important yet difficult to account for in CP studies. Additional factors, such as the decrease in patient-healthcare worker interaction may result in decreased infection rates rather than CP isolation.

A review of published studies on CP for MRSA and VRE in 2006 found only 7 quality studies: one was a randomized controlled trial, 5 were interrupted time series analyses, and one was a retrospective review[6]. Three of the 7 studies, including the randomized controlled trial, showed no decrease in infection rates or transmission rates with CP and active surveillance screening compared to gloves and standard precautions. Additional retrospective studies have shown benefit of CP in decreasing the risk of MRSA and VRE transmission or infection, but are significantly limited by the study limitations listed above[7]. Other exhaustive reviews on the topic did not identify additional studies through 2009[8-9].

The single randomized controlled trial of CP[10] in a long term care setting did not demonstrate decreased infection rates with active MRSA surveillance and CP compared to gloves and standard precautions alone.

Since 2009, three prospective randomized controlled trials have been performed dealing with CP.[11-13] All 3 trials had different comparison groups. One trial showed no benefit of universal gowning and glove use for all patient interactions compared to usual care, which included standard precautions for everyone and CP for MRSA and VRE patients.[13] The trial by Huang, et al.[12] compared 3 groups: MRSA screening and isolation; screening, isolation and universal decolonization for MRSA; universal decolonization. Patients with positive MRSA cultures were in CP in all 3 groups. This study demonstrated that universal MRSA decolonization for all hospitalized patients was more effective in decreasing MRSA infections than either alternate approach: screening and isolation of MRSA or screening and isolation plus targeted MRSA decolonization. In the trial by Huskins, et al. there were 2 ICU comparison groups: in group 1, patients with positive MRSA or VRE cultures in the intervention ICUs were screened and placed into CP, while all others were cared for with universal gloving; in group 2, patients were not screened but were placed on CP if they had a history of MRSA or VRE. This trial showed no difference in infectious outcome between groups, though compliance with hand hygiene and CP was generally poor.

Two additional prospective trials using an interrupted time series design were done with mixed results. A small study in one hospital by Marshall, et al.[15] demonstrated benefit of screening and CP for MRSA in one time period versus CP only for draining wounds in the other time period. The trial by Derde, et al.[14] involved 13 ICUs and compared 2 groups: hand hygiene and daily CHG bathing during the initial intervention phase versus active screening and CP for MRSA, VRE and multi-drug resistant (MDR) enterobacteriacieae carriers during the second intervention period. The study found no difference in infection outcomes between either intervention group, though there was a decrease in MRSA acquisition when comparing both intervention periods to the baseline period.

Overall, the available scientific literature fails to provide clear benefit of CP over standard precautions in decreasing patients' infection risk due to MRSA and VRE.

D. <u>Potential Harms of Contact Precautions</u>

A growing body of literature suggests that CP can have direct and indirect harmful effects for patients. [16-17] Although much of the literature has focused on CP for MRSA, these studies may also be relevant to patients who are on CP for VRE.

Patients on CP have higher rates depression and anxiety.

Although the literature is mixed, multiple prior studies in different patient populations have demonstrated the adverse psychological effects of CP for inpatients. Early studies using predominantly descriptive measures first documented the potential adverse effects of CP on psychological parameters.[18] One particular study assessed the depression, anxiety, and anger scores of elderly rehabilitation inpatients on CP versus matched controls not on CP. They reported statistically significantly higher depression prevalence (77% versus 33%) and anxiety scores (15 versus 8.6) for those patients on CP compared to the controls.[19] Another study assessed the depression and anxiety scores of inpatients on CP compared to those not on CP at admission, 1 week, and then 2 weeks after admission. Although the anxiety and depression scores were similar at admission, the patients on CP had statistically significantly higher depression and anxiety scores by 1 week after admission which were sustained at the 2 week follow-up compared to those not on CP.[20]

Patients on CP have fewer HCW interactions and worse adverse events.

Although no differences in HCW behavior have been reported, multiple studies have shown that patients in CP have fewer healthcare worker (HCW) encounters, less time with HCWs, less physical contact with HCWs in ICU, general medicine, surgical ICU, and general surgery patients than non-CP patients.[16] Specifically in a medical ICU when comparing CP to non-CP patients, the hourly room entry was 49% for CP patients, physical contact with a HCW was 50%, and the overall duration in a CP room was 62%.[21] One additional study found that CP patients were less likely to be examined by an attending physician compared to the non-CP patients.[22] A study conducted at UCLA by Dr. Uslan, presently submitted for publication, found that Internal Medicine interns spent less time per day and had fewer patient visits with patients in contact precautions.

Studies suggest that patients on CP have higher rates of adverse events compared to those not on CP.[24] In this historical case-control study performed at two hospitals among general medicine and congestive heart failure patients, a statistically significant difference in preventable adverse events such as pressure ulcers and falls, was reported in the CP compared to non-CP patients (20 vs. 3/1,000 days, respectively, $p<0.001$). They also reported a statistically significant higher inappropriate documentation of vital signs and days without a nursing or physician note. The study had some methodological limitations including that the CP group was isolated for positive clinical cultures (not active surveillance cultures) and were thus potentially more likely to have had a hospital acquired infection which is associated with increased morbidity.

The impact of CP on patient satisfaction scores is unclear.

Studies comparing satisfaction scores in patients on CP compared to those not on CP have showed mixed results. Some studies have shown no difference in patient satisfaction scores between patients who are on CP and those who are not on CP, including a study of general medicine and surgical patients in a tertiary care center.[25–26] Conversely, other studies have shown a decreased satisfaction score for physician education and staff responsiveness in patients who are on CP compared to those who are not.[27]

E. <u>Other Methods of Interrupting Transmission</u>

a. Daily Chlorhexidine gluconate (CHG) treatment

CHG has activity against Gram positive organisms such as MRSA and VRE. Daily application of CHG may reduce the bacterial burden on a patient's skin, thereby preventing secondary environmental contamination. In 2006, Vernon et al found that daily bathing with CHG decreased the burden of VRE on healthcare worker hands by 40%.[28] In 2013, Climo et al published the findings of a multicenter, randomized crossover trial conducted from 2007-2009; acquisition rates of both MDROs and hospital-acquired bloodstream infections significantly decreased during a 6-month period of daily bathing with 2% CHG. The overall rate of MRSA and VRE acquisition, as identified by surveillance cultures, was 25% lower during the intervention period (p=0.03) and the rate of hospital-acquired bloodstream infections was 28% lower (p=007).[29]

Presently, it is a UCLA policy to bathe all ICU patients and non-ICU patients with central lines or who are undergoing surgery with CHG every 24h.

b. Environmental surface decontamination

Evidence suggests that vegetative bacteria such as MRSA and VRE persist in the hospital environment.[30] Environmental surfaces are a reservoir for these pathogens and a variety of disinfection methods are routinely utilized at our facility.

i. Environmental Services (EVS) uses either a quaternary ammonium compound or sodium hypochlorite (bleach) for both daily and discharge room cleaning in all UCLA hospitals. In mid-2013, three adult ICUs at Ronald Reagan implemented surface decontamination with sodium hypochlorite wipes by RNs/CCPs every shift in addition to daily cleaning by EVS.

ii. The literature supporting new disinfection technologies such as UV-C light is growing; a number of studies have shown a decrease in the bioburden of pathogens of significance on hard surfaces. Anderson, et al. conducted a prospective cohort study in 2012 at two tertiary referral centers. The study targeted VRE, among other pathogens, and assessed whether or not UV-C light decreased the bioburden on 5 hospital environmental sites including bedside rails, bedside tables, chair arms, overbed tables and sink counters (i.e., "high-touch" surfaces). They study showed a statistically significant 1.68 log reduction in bacterial colonization.[31]

UV-C disinfection has been utilized for discharge cleaning at both UCLA hospitals since late 2012.

F. Framework for a Less Dogmatic Approach

In 2009, Kathryn Kirkland presented a valuable framework for assessing the benefit of CP using several institutional factors.[32] We utilized this framework to thoroughly assess the benefit of CP and to formulate the recommendations outlined in section A.

Local factor	Lower likelihood of benefit of CP		Higher likelihood of benefit of CP	
Hand hygiene compliance by health care workers	High	☒	Low	☐
Epidemiology of health care-associated infections	Low endemic rates	☐	Epidemic or uncontrolled rates	☒
Organisms of concern	All or easily treatable	☒	Selected or difficult to treat	☐
Prevalence of organisms	Common	☒	Rare	☐
Clinical features of source patient	Asymptomatic	☒	Open wound, diarrhea, or uncontained secretions	☒
Clinical features of patients at risk of infection	Healthy	☐	Vulnerable to infection because of age, immune status, or other risks	☒
Physical environment	Clean, spacious, single rooms	☒	Crowded, dirty wards	☐
Available resources	Limited	☐	Plentiful	☒

G. Summary

Clinical Epidemiology and Infection Prevention recognizes the unique challenge of using evidence-based practice to optimize the care of the individual patient while safe-guarding and advocating for the patient population through policy recommendations.

CP are a strategy to consider for the control of MRSA and VRE.[2] However, given the increasing literature base describing harms associated with CP, additional interventions to interrupt transmission (e.g. CHG bathing), a culture shift to support patient safety, and the emerging threat of additional pathogens such as MDR gram negative and *C. difficile*, we recommend discontinuation of CP for MRSA and VRE.

H. References

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