



Prevention of Infection  
Clinical Practice Guidelines Table

(Literature search completed through May 2008)

Review Author	Study Information	Conclusions and Implications
<b>PEP Weight of Evidence Category: Recommended for Practice</b>		
<p>Aapro, 2006</p>	<p><b>Search strategy:</b> MEDLINE, PreMEDLINE, EMBASE, and The Cochrane Library. Articles selected were published in English language between December 31, 1994, and September 16, 2005. Studies involving children &lt; 18 years of age or patients with leukemia were excluded, as were cost analyses, as these lack international applicability. Relevant articles “in press” and additional papers identified by members of the working party were included in limited instances. Reference lists of the identified meta-analyses were interrogated manually, and any primary papers considered relevant were included. Abstract books from key international congresses were searched manually to identify relevant evidence presented at meetings from 2003 through 2005.</p> <p><b>Sample:</b> adult patients receiving chemotherapy for cancer</p> <p><b>Treatment evaluated:</b> the use of granulocyte–colony-stimulating factor (G-CSF) in adult patients receiving chemotherapy for cancer</p> <p><b>Outcomes measured:</b> <b>Questions applied by the European Organisation for Research and Treatment of Cancer (EORTC) G-CSF Guidelines Working Party</b> In adult patients with cancer receiving chemotherapy: 1. Is there evidence that patient-related factors increase the risk of febrile neutropenia (FN)? 2. Is there evidence that certain chemotherapy regimens increase the risk of FN? 3. Is there evidence that some patients are more at risk of severe morbidity as a result of an FN episode? 4. Is there evidence to support the use of G-CSF when there is a 20% risk level for FN?</p>	<p><b>Recommendation 1: Patient-related risk factors for increased incidence of FN</b> Patient-related risk factors should be evaluated in the overall assessment of FN risk prior to each cycle of chemotherapy. Particular consideration should be given to the elevated risk of FN for patients 65 or older. Other adverse risk factors that may influence FN risk based on Level I and II evidence included: advanced stage of disease, experience of previous episode(s) of FN, and lack of G-CSF use and lack of antibiotic prophylaxis. However, please note that the indiscriminate use of antibiotic prophylaxis is not recommended by either the working party or the EORTC Infectious Disease Group. Risk factors that may influence FN risk based on Level III and IV evidence included: poor performance and/or nutritional status, female gender, hemoglobin &lt; 12g/dl, and liver, renal, or cardiovascular disease. Recommendation grade B</p> <p><b>Recommendation 2: Chemotherapy regimens associated with increased risk of FN</b> Consideration should be given to the elevated risk of FN with certain chemotherapy regimens. The risk of FN for certain chemotherapy regimens is summarized in Table 4 of the original paper. Recommendation grade A/B (depending on the evidence for each chemotherapy regimen)</p> <p><b>Recommendation 3: G-CSF to support chemotherapy</b> In situations where dose-dense or dose-intense chemotherapy strategies have survival benefits, prophylactic G-CSF should be used as a supportive treatment. If reductions in chemotherapy dose intensity or density are known to be associated with a poor prognosis, primary G-CSF prophylaxis should be used to maintain chemotherapy. Examples of this could be when the patient is receiving adjuvant or potentially curative treatment, or when the treatment intent is to prolong survival. Where this is not crucial, use of less myelosuppressive chemotherapy or dose and schedule modifications should be considered. Recommendation grade A</p> <p><b>Recommendation 4: Impact of the overall FN risk on G-CSF use</b> The risk of complications related to FN should be assessed individually for each</p>



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	<p>5. Is there evidence to support the use of G-CSF to: (a) maintain the correct dose of chemotherapy and relative dose intensity and density? (b) improve overall and progression-free survival?</p> <p>6. Is there evidence to support the use of G-CSF to enable the delivery of dose-dense and -intense chemotherapy: (a) by increasing the dose? (b) by withdrawing one drug and increasing the dose of the remaining drugs? (c) by increasing the dose frequency?</p> <p>7. Is there evidence to support the use of G-CSF to reduce the risk of infection-related mortality?</p> <p>8. Is there evidence to support the use of G-CSF to reduce the incidence of FN?</p> <p>9. Is there evidence to support the use of G-CSF for the treatment of ongoing FN?</p> <p>10. Is there evidence to support the use of different G-CSFs?</p> <p>The article describes guidelines prepared by the G-CSF Guidelines Working Party of the EORTC to systematically review available published data and derive evidence-based recommendations on the appropriate use of G-CSF in adult patients receiving chemotherapy for cancer.</p> <p><b>Levels of evidence applied by the EORTC G-CSF Guidelines Working Party:</b></p> <p><b>Level I</b> Evidence obtained from meta-analysis of multiple, well-designed, controlled studies or from high-power randomized, controlled clinical trial</p> <p><b>Level II</b> Evidence obtained from at least one well-designed experimental study or low-power randomized, controlled clinical trial</p>	<p>patient. When assessing FN risk, the clinician should take into account patient-related risk factors, the chemotherapy regimen and associated complications, and treatment intent. If the patient is at &gt; 20% overall risk of FN, prophylactic G-CSF is recommended. With chemotherapy regimens associated with an FN risk of 10%–20%, particular attention should be given to the assessment of patient characteristics that may increase the overall risk of FN. Recommendation grade A</p> <p><b>Recommendation 5: G-CSF in patients with existing FN</b> Treatment with G-CSF for patients with solid tumors and ongoing FN is indicated only in special situations. These are limited to those patients who are not responding to appropriate antibiotic management and who are developing life-threatening infections (such as severe sepsis or septic shock). Recommendation grade B</p> <p><b>Recommendation 6: Choice of formulation</b> Filgrastim, lenograstim, and pegfilgrastim have clinical efficacy, and the authors recommend the use of any of these agents to prevent FN and FN-related complications, where indicated. Recommendation grade A</p>



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	<p><b>Level III</b> Evidence obtained from well-designed, quasi-experimental studies such as nonrandomized, controlled single-group, pre-post, cohort, time or matched case-control series</p> <p><b>Level IV</b> Evidence obtained from well-designed, non-experimental studies such as comparative and correlational descriptive and case studies</p> <p><b>Level V</b> Evidence obtained from case reports and clinical examples</p> <p><b>Grade of recommendations applied by the EORTC G-CSF Guidelines Working Party</b></p> <p><b>Grade A</b> There is evidence of type I or consistent findings from multiple studies of types II, III, or IV.</p> <p><b>Grade B</b> There is evidence of types II, III, or IV, and findings are generally consistent.</p> <p><b>Grade C</b> There is evidence of types II, III, or IV, but findings are Inconsistent.</p> <p><b>Grade D</b> There is little or no systematic empirical evidence.</p>	
Hughes et al., 2002	<p><b>Search strategy:</b> not described in the article</p> <p>The article described guidelines prepared by a panel of experts in oncology and infectious diseases, known as the IDSA Fever and Neutropenia Guidelines Panel. The guidelines were peer reviewed by an external group of practitioners, reviewed and approved by the IDSA Practice Guidelines Committee, and approved by the IDSA. Each recommendation was ranked according to the strength of the recommendation (A–E) and the</p>	<ul style="list-style-type: none"> <li>▪ Trimethoprim-sulfamethoxazole therapy is recommended for all patients at risk for <i>P. carinii</i> pneumonia, regardless of whether they have neutropenia (A-I).</li> <li>▪ No consensus exists to recommend trimethoprim-sulfamethoxazole or quinolones for routine antimicrobial prophylaxis for all afebrile neutropenic patients with cancer.             <ul style="list-style-type: none"> <li>○ The lack of consensus is based on the concern for antibiotic-resistant infections and inconsistent results with regard to mortality rates. However, the scientific data supporting the efficacy of antimicrobial prophylaxis are strong and warrant an A-I rating.</li> </ul> </li> </ul>



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	<p>quality of the scientific evidence (I–III).</p> <p><b>IDSA–U.S. Public Health Service Grading System for ranking recommendations in clinical guidelines</b> <i>Strength of recommendation:</i></p> <ul style="list-style-type: none"> <li>• A: good evidence to support a recommendation for use</li> <li>• B: moderate evidence to support a recommendation for use</li> <li>• C: poor evidence to support a recommendation for use</li> <li>• D: moderate evidence to support a recommendation against use</li> <li>• E: good evidence to support a recommendation against use</li> </ul> <p><i>Quality of evidence</i></p> <ul style="list-style-type: none"> <li>• I: evidence from ≥ 1 properly randomized, controlled trial</li> <li>• II: evidence from ≥ 1 well-designed clinical trial, without randomization; from cohort or case-controlled analytic studies (preferably from &gt; 1 center); from multiple time series; or from dramatic results from uncontrolled experiments</li> <li>• III: evidence from opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees</li> </ul> <p><b>Sample:</b> The target population for the guidelines is neutropenic patients with cancer.</p> <p><b>Outcomes measured:</b> infection</p>	<ul style="list-style-type: none"> <li>▪ Routine use of fluconazole or itraconazole for all neutropenic patients with cancer is not recommended (D-II). <ul style="list-style-type: none"> <li>○ This is based on the concern for antibiotic-resistant infections and inconsistent results with regard to mortality rates. However, the scientific data supporting the efficacy of antimicrobial prophylaxis are strong and warrant an A-I rating.</li> </ul> </li> </ul>
<p>National Comprehensive Cancer Network (NCCN), 2008</p>	<p>Practice guidelines developed by an expert committee that are reviewed and updated annually</p> <p><b>Search strategy:</b> not described</p> <p><b>Outcomes measured:</b> not described</p> <p><b>Category 1:</b> Uniform NCCN consensus exists, based</p>	<p><b>Antibacterial prophylaxis:</b> Antibacterial prophylaxis (fluoroquinolones) should be reserved for patients at high risk for infection. Antibacterial prophylaxis is not recommended for short-term neutropenia. (2A) Patients at intermediate to high risk for infection include</p> <ul style="list-style-type: none"> <li>• Autologous or allogeneic Hematopoietic Cell Transplant (HCT)</li> <li>• Lymphoma</li> </ul>

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	<p>on high-level evidence, that the recommendation is appropriate.</p> <p><b>Category 2A:</b> Uniform NCCN consensus exists, based on lower-level evidence including clinical experience, that the recommendation is appropriate.</p> <p><b>Category 2B:</b> Nonuniform NCCN consensus exists (without major disagreement), based on lower-level evidence including clinical experience, that the recommendation is appropriate.</p> <p><b>Category 3:</b> Major NCCN disagreement exists that the recommendation is appropriate.</p> <p>All recommendations are category 2A unless otherwise noted.</p>	<ul style="list-style-type: none"> <li>• Chronic Lymphocytic Leukemia (CLL) Multiple myeloma</li> <li>• Purine analog therapy</li> <li>• Anticipated neutropenia longer than seven days</li> <li>• Acute leukemia</li> <li>• Myelodysplastic Syndrome (MDS)</li> </ul> <p>Patients with graft-versus-host disease: penicillin and trimethoprim and sulfamethoxazole (TMP/SMX)</p> <p>Patients on alemtuzumab: TMP/SMX for a minimum of two months after treatment and until CD4 count <math>\geq</math> 200 cells/mcl.</p> <p><b>Viral prophylaxis:</b></p> <p>Herpes viral prophylaxis (acyclovir, famciclovir, or valacyclovir) is recommended for seropositive patients.</p> <ul style="list-style-type: none"> <li>• During cytotoxic therapy-induced neutropenia in all patients with cancer who have had prior reactivations requiring treatment (2A)</li> <li>• During cytotoxic therapy-induced neutropenia in patients with lymphoma, multiple myeloma, or CLL (2A)</li> <li>• Receiving T-cell-depleting agents (e.g., fludarabine, 2-CdA) (2A)</li> <li>• During autologous or allogeneic HCT until day 30 post-transplant (2A)</li> <li>• During induction or consolidation therapy for acute leukemia through the neutropenic period (1)</li> <li>• During treatment with alemtuzumab for a minimum of two months after treatment and until CD4 count <math>\geq</math> 200 cells/mcl (2A).</li> </ul> <p>Cytomegalovirus prophylaxis (e.g., ganciclovir, valganciclovir, foscarnet) is recommended for patients at high risk for disease.</p> <ul style="list-style-type: none"> <li>• Allogeneic HCT</li> <li>• Patients treated with alemtuzumab</li> </ul> <p>Hepatitis B reactivation Reactivation of latent hepatitis B may occur in immunocompromised patients, particularly patients undergoing HCT, patients with lymphoma treated with anthracyclines, and patients treated with rituximab. Evaluation of hepatitis serologies should be considered at baseline, and antiviral therapy with lamivudine may be considered for patients with active hepatitis B infection.</p>



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		<p><b>Vaccinations:</b>  Annual vaccination against influenza with the inactivated influenza virus currently is recommended for all individuals at increased risk for immunosuppressive disease, as well as individuals who can transmit influenza to high-risk patients such as healthcare workers and household contacts. Currently, the rate of influenza vaccination among patients with cancer is low, presumably because of concerns regarding efficacy in this population. Several studies have demonstrated similar immune responses in patients with cancer and healthy controls, but others have failed to confirm the findings. Despite conflicting evidence, the low incidence of adverse effects coupled with the potential benefit led the NCCN panel to recommend that all patients with cancer and their household contacts receive annual influenza immunization.</p> <p>FluMist (intranasal attenuated influenza vaccine) should be avoided in patients who are receiving immunosuppressive chemotherapy and others who have close contact with immunosuppressive patients such as healthcare workers and household contacts. (2A)</p> <p>Polysaccharide pneumococcal vaccine is recommended prior to splenectomy with revaccination at five years. Patients undergoing allogeneic HCT should be vaccinated one year after cessation of immunosuppression with revaccination in five years.</p> <p>Patients with cancer receiving chemotherapy or radiation therapy should not receive live attenuated vaccines for at least three months after discontinuation of therapy. (2A)</p> <p><b>Pneumococcal prophylaxis:</b>  Prophylaxis against pneumococcal infection is recommended in patients who have undergone splenectomy, those who are functionally asplenic, and allogeneic HCT patients. Penicillin prophylaxis should be continued for at least five years after splenectomy and for at least one year after allogeneic HCT. Patients with chronic graft-versus-host disease should continue prophylaxis until immunosuppressive therapy is discontinued. Daily TMP/SMX also may be used for prophylaxis.</p> <p><b>Timing of vaccinations:</b></p>



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		<p>The timing of the vaccination in relation to chemotherapy treatments has not been established, but the panel recommends vaccination at least two weeks prior to cytotoxic or immunosuppressive therapy. If this is not possible, patients should be revaccinated at least three months after therapy is discontinued. (2A)</p> <p><b>Pneumocystis jirovecii prophylaxis:</b> Pneumocystis jirovecii (formerly known as Pneumocystiscarinii) prophylaxis with trimethoprim-sulfamethoxazole is recommended for</p> <ul style="list-style-type: none"> <li>• Allogeneic HCT recipients (1)</li> <li>• Patients with acute lymphocytic leukemia (1)</li> <li>• Patients receiving alemtuzumab (2A)</li> <li>• Patients receiving fludarabine therapy or other T-cell–depleting agents (2B)</li> <li>• Patients with neoplastic diseases receiving prolonged corticosteroid treatment (≥ 20 mg prednisone daily for four or more weeks) (2B)</li> <li>• Patients receiving temozolomide and radiation therapy (2B)</li> <li>• Autologous peripheral blood stem cell transplant recipients (2B).</li> </ul> <p>Consider trimethoprim-sulfamethoxazole desensitization or atovaquone, dapsone, or aerosolized pentamidine when pneumocystis jirovecii pneumonia prophylaxis is required and patients are trimethoprim-sulfamethoxazole intolerant (2A).</p> <p><b>Antifungal prophylaxis:</b> Antifungal prophylaxis is indicated for patients at high risk for fungal infections.</p> <ul style="list-style-type: none"> <li>• Acute Lymphocytic Leukemia (ALL) <ul style="list-style-type: none"> <li>○ Fluconazole</li> <li>○ Amphotericin B products</li> </ul> </li> <li>• Neutropenic patients with MDS or Acute Myelogenous Leukemia (AML) (until resolution of neutropenia) <ul style="list-style-type: none"> <li>○ Posaconazole (1)</li> <li>○ Voriconazole (2B)</li> <li>○ Amphotericin B products (2B)</li> </ul> </li> <li>• Autologous HCT with mucositis <ul style="list-style-type: none"> <li>○ Fluconazole (1)</li> <li>○ Micafungin (1)</li> </ul> </li> <li>• Allogeneic HCT (until 75 days after transplant)</li> </ul>



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		<ul style="list-style-type: none"> <li>○ Fluconazole (1)</li> <li>○ Itraconazole (1)</li> <li>○ Micafungin (1)</li> <li>○ Voriconazole (2B)</li> <li>○ Posaconazole (2B)</li> <li>○ Amphotericin B products (2B)</li> <li>● Significant graft-versus-host disease (until resolution of significant cases)               <ul style="list-style-type: none"> <li>○ Posaconazole (1)</li> <li>○ Voriconazole (2B)</li> <li>○ Echinocandin (2B)</li> <li>○ Amphotericin B products (2B)</li> </ul> </li> </ul> <p>Antifungal prophylaxis is not routinely used for autologous transplant recipients without mucositis (2B) or for those receiving standard solid-tumor chemotherapies. (2A)</p> <p>Use of high-efficiency particulate air filters is reasonable for HCT patients and for non-transplant recipients with prolonged neutropenia. The principal benefit is likely the prevention of mold infections. The value of laminar airflow in preventing infections is unclear, and it is not recommended. (2A)</p>
<p>NCCN, 2008</p>	<p>Practice guidelines developed by an expert committee that are reviewed and updated annually</p> <p><b>Search strategy:</b> not described</p> <p><b>Outcomes measured:</b> not described</p> <p><b>Category 1:</b> Uniform NCCN consensus exists, based on high-level evidence, that the recommendation is appropriate.</p> <p><b>Category 2A:</b> Uniform NCCN consensus exists, based on lower-level evidence including clinical experience, that the recommendation is appropriate.</p> <p><b>Category 2B:</b> Nonuniform NCCN consensus exists (without major disagreement), based on lower-level evidence including clinical experience, that the recommendation is appropriate.</p> <p><b>Category 3:</b> Major NCCN disagreement exists that the</p>	<p>Colony-stimulating factor (CSF) prophylaxis should be used in patients with cancer undergoing chemotherapy with a <math>\geq 20\%</math> risk of febrile neutropenia. (1)</p> <p>CSF prophylaxis may be considered in patients with cancer undergoing chemotherapy with a 10%–20% risk of febrile neutropenia if the patient has other risk factors such as age, comorbidities, previous history of febrile neutropenia, disease factors or treatment variables that increase the risk of FN, or complications from neutropenia.</p> <p>Administration of CSFs results in a 50% risk reduction of developing febrile neutropenia.</p>



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	<p>recommendation is appropriate.</p> <p>All recommendations are category 2A unless otherwise noted.</p>	
<p>Tablan et al., 2004</p>	<p>This is a guideline developed by a Centers for Disease Control and Prevention advisory committee aimed at reducing pneumonia and other severe respiratory tract infections in acute care hospitals and other healthcare facilities. The report contains consensus recommendations for preventing bacterial pneumonia, Legionnaires disease, pertussis, invasive pulmonary aspergillosis, lower respiratory tract infections caused by respiratory syncytial virus, parainfluenza, adenoviruses, and influenza. Performance indicators are outlined for personnel who evaluate their institution's implementation of the guidelines.</p> <p><b>Search strategy:</b> Not described</p> <p><b>Outcomes measured:</b> Not described</p> <p><b>Centers for Disease Control and Prevention/Healthcare Infection Control Practices Advisory Committee system for categorizing recommendations:</b></p> <p><b>Category IA:</b> Strongly recommended for implementation and strongly supported by well-designed experimental, clinical, or epidemiologic studies</p> <p><b>Category IB:</b> Strongly recommended for implementation and supported by certain experimental, clinical, or epidemiologic studies and a strong theoretical rationale</p> <p><b>Category IC:</b> Required by state or federal regulation or representing an established association standard</p> <p><b>Category II:</b> Suggested for implementation and supported by suggestive clinical or epidemiologic</p>	<p><i>Prevention of Healthcare-Associated Bacterial Pneumonia</i> (These statements are not necessarily based on data from patients with cancer.)</p> <p>Oxygen humidifiers</p> <ul style="list-style-type: none"> <li>Change the humidifier tubing, including nasal prongs or masks, when in use for one patient after it malfunctions or becomes visibly contaminated (II).</li> </ul> <p>Small-volume medication nebulizers</p> <ul style="list-style-type: none"> <li>Between uses on the same patient, clean, disinfect, rinse with sterile water, and dry (IB).</li> <li>Use only sterile fluid for nebulization and dispense fluid aseptically (IA).</li> <li>Single-dose dispensing is preferred (IB).</li> </ul> <p>Mist tent</p> <ul style="list-style-type: none"> <li>Between uses on different patients, replace mist tents and their nebulizers, reservoirs, and tubing with those that have been subjected to sterilization or high-level disinfection (II).</li> <li>No recommendations made regarding the frequency of routinely changing mist tent nebulizers, reservoirs, and tubing while in use on one patient (unresolved issue).</li> <li>Mist tent nebulizers, reservoirs, and tubing that are used on the same patient should be subject to daily low-level disinfection or pasteurization followed by air-drying.</li> </ul> <p>Prevention of person-to-person transmission of bacteria</p> <ul style="list-style-type: none"> <li>Use standard hand hygiene and appropriate glove changing (IA).</li> <li>Gloves should be used for handling respiratory secretions or objects contaminated with respiratory secretions (IB).</li> <li>Wear a gown if soiling with respiratory secretions is anticipated; change it after soiling occurs and before providing care to another patient (IB).</li> </ul> <p>Modifying host's risk for infection</p> <ul style="list-style-type: none"> <li>23-valent pneumococcal polysaccharide vaccine should be administered to all individuals aged 65 and greater.</li> <li>For patients aged 5–64, administer 23-valent pneumococcal polysaccharide vaccine to those who have received immunosuppressive therapy or who have generalized malignancy, multiple myeloma, leukemia,</li> </ul>

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	<p>studies or a theoretical rationale</p> <p><b>Unresolved issue:</b> No recommendation is offered. No consensus or insufficient evidence exists regarding efficacy.</p>	<p>lymphoma, and other chronic and acute conditions, as well as individuals in long term-care facilities (as indicated in the original document). (IA)</p> <ul style="list-style-type: none"> <li>• 7-valent pneumococcal polysaccharide protein-conjugate vaccine should be administered to all children younger than 2 years and children aged 24–59 months who are increased risk for pneumococcal disease, including those with malignancies.</li> <li>• No recommendation can be made regarding the routine use of G-CSF or IV gamma globulin for prophylaxis against healthcare-associated pneumonia (unresolved issue). (This statement is based on data from studies including patients with cancer as well as trauma and surgical patients.)</li> </ul> <p><i>Prevention of Healthcare-Associated Legionnaires Disease</i></p> <p>Maintain a high index of suspicion for the diagnosis of healthcare-associated Legionnaires disease on suspected cases, especially high-risk patients, such as those who are immunosuppressed or receiving systemic steroids, as well as transplant recipients and those with chronic underlying disease (IA).</p> <p><i>Prevention of Healthcare-Associated Pulmonary Aspergillosis</i></p> <p>No recommendation can be made for the routine administration of antifungal agents such as itraconazole solution (5 mg/kg per day) or capsules (500 mg twice a day, low-dose parenteral amphotericin B [0.1 mg/kg per day]), lipid-based formulations of amphotericin B (1 mg/kg per day), or nebulized amphotericin B administered by inhalation as prophylaxis for pulmonary aspergillosis in patients at high risk for this infection (unresolved issue).</p> <p><i>Prevention of Healthcare-Associated Respiratory Syncytial Virus, Parainfluenza Virus, and Adenovirus Infections</i></p> <p>Do not allow individuals with symptoms of respiratory infection to visit pediatric, immunosuppressed, or cardiac patients (IB).</p> <p>No recommendation can be made regarding the use of respiratory syncytial virus immune globulin or monoclonal antibody to control outbreaks of the infection in the healthcare setting (unresolved issue).</p> <p>In acute care settings, offer the vaccine to patients at high risk for complications from influenza beginning in September and throughout the influenza season (IA).</p> <p><i>Excluded Data</i></p>

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		<ul style="list-style-type: none"> <li>• Studies based on ventilated patients, intensive care units, postsurgical, trauma, HCT</li> <li>• Maintenance and sterilization of equipment (ventilator equipment, sterilized fluids, pulmonary function testing equipment, faucet aerators)</li> <li>• Tracheostomy care and suctioning</li> <li>• Aspiration prevention</li> <li>• Environmental surveillance</li> <li>• Notification requirements (Centers for Disease Control and Prevention, institutional)</li> <li>• Pertussis vaccination guidelines</li> <li>• Pertussis antibiotic prophylaxis postexposure</li> <li>• Viral person-to-person transmission prevention</li> <li>• Management of flu outbreaks, culturing and prophylaxis</li> </ul>
<p>Boyce et al., 2002</p>	<p>The Centers for Disease Control and Prevention (CDC) guideline for hand hygiene in healthcare settings was based on recommendations from its Healthcare Infection Control Practices Advisory Committee and the Healthcare Infection Control Practices Advisory Committee, Society for Healthcare Epidemiology of America, Association for Professionals in Infection Control, and IDSA Hand Hygiene Task Force.</p> <p><b>Search strategy:</b> Not specifically described; the report states that studies published since the 1985 Centers for Disease Control and Prevention guidelines are reviewed.</p> <p><b>Sample:</b> Not described</p> <p><b>Treatment evaluated:</b> hand hygiene in healthcare settings</p> <p><b>Outcomes measured:</b> not described</p> <p><b>Centers for Disease Control and Prevention/Healthcare Infection Control Practices Advisory Committee system for categorizing recommendations:</b></p>	<p>Hand hygiene reduces the incidence of healthcare-associated infections.</p> <p><b>Hand hygiene</b></p> <ul style="list-style-type: none"> <li>• When hands are visibly dirty or contaminated with proteinaceous material or are visibly soiled with blood or other body fluids, wash them with a non-antimicrobial soap and water or an antimicrobial soap and water (IA).</li> <li>• If hands are not visibly soiled, use an alcohol-based hand rub for routinely decontaminating hands or wash them with an antimicrobial soap and water (IB).</li> </ul> <p><b>Hand hygiene technique</b></p> <ul style="list-style-type: none"> <li>• When decontaminating hands with an alcohol-based hand rub, apply the product to the palm of one hand and rub hands together, covering all surfaces of the hands and fingers, until hands are dry (IB).</li> <li>• When washing hands with soap and water, wet hands first with water, apply an amount of product recommended by the manufacturer to hands, and rub hands together vigorously for at least 15 seconds, covering all surfaces of the hands and fingers. Rinse hands with water and dry thoroughly with a disposable towel. Use the towel to turn off the faucet (IB).</li> <li>• Avoid using hot water because repeated exposure to hot water may increase the risk of dermatitis (IB).</li> <li>• Liquid, bar, leaflet, or powdered forms of plain soap are acceptable when washing hands with a non-antimicrobial soap and water. When bar soap is used, soap racks that facilitate drainage and small bars of soap should be used (II).</li> </ul>

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	<p><b>Category IA:</b> Strongly recommended for implementation and strongly supported by well-designed experimental, clinical, or epidemiologic studies</p> <p><b>Category IB:</b> Strongly recommended for implementation and supported by certain experimental, clinical, or epidemiologic studies and a strong theoretical rationale</p> <p><b>Category IC:</b> Required by state or federal regulation or representing an established association standard</p> <p><b>Category II:</b> Suggested for implementation and supported by suggestive clinical or epidemiologic studies or a theoretical rationale</p> <p><b>Unresolved issue:</b> No recommendation is offered. No consensus or insufficient evidence exists regarding efficacy.</p>	<ul style="list-style-type: none"> <li>• Multiple-use cloth towels of the hanging or roll type are not recommended for use in healthcare settings (II).</li> </ul> <p><b>Decontaminate hands</b></p> <ul style="list-style-type: none"> <li>• Before direct contact with patients (IB)</li> <li>• After contact with intact skin (e.g., taking a pulse or blood pressure) (IB)</li> <li>• After contact with body fluids or excretions, mucous membranes, nonintact skin, and wound dressings if hands are not visibly soiled (IA)</li> <li>• After removing glove (IB)</li> <li>• Before donning sterile gloves when inserting a central intravascular catheter (IB)</li> <li>• Before inserting indwelling urinary catheters, peripheral vascular catheters, or other invasive devices that do not require a surgical procedure (IB)</li> <li>• If moving from a contaminated body site to a clean body site during patient care (II)</li> <li>• After contact with inanimate objects (including medical equipment) in the immediate vicinity of the patient (II)</li> <li>• Before eating and after using a restroom (IB)</li> </ul> <p><b>Antimicrobial wipes</b></p> <ul style="list-style-type: none"> <li>• Antimicrobial-impregnated wipes (i.e., towelettes) may be considered as an alternative to washing hands with non-antimicrobial soap and water. Because they are not as effective as alcohol-based hand rubs or washing hands with an antimicrobial soap and water for reducing bacterial counts on the hands of healthcare workers, antimicrobial-impregnated wipes are not a substitute for using an alcohol-based hand rub or antimicrobial soap (IB)</li> </ul> <p><b>Bacillus anthracis exposure</b></p> <ul style="list-style-type: none"> <li>• Wash hands with nonantimicrobial soap and water or with antimicrobial soap and water if exposure to Bacillus anthracis is suspected or proven. The physical action of washing and rinsing hands under such circumstances is recommended because alcohols, chlorhexidine, iodophors, and other antiseptic agents have poor activity against spores (II).</li> </ul> <p><b>Other aspects of hand hygiene</b></p> <ul style="list-style-type: none"> <li>• Do not wear artificial fingernails or extenders when having direct contact with patients at high risk (e.g., those in intensive care units or operating rooms) (IA).</li> <li>• Keep natural nails tips less than 1/4-inch long (II).</li> </ul>

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Review Author	Study Information	Conclusions and Implications
		<ul style="list-style-type: none"> <li>Wear gloves when contact with blood or other potentially infectious materials, mucous membranes, and nonintact skin could occur (IC).</li> <li>Remove gloves after caring for a patient. Do not wear the same pair of gloves for the care of more than one patient, and do not wash gloves between uses with different patients (IB).</li> <li>Change gloves during patient care if moving from a contaminated body site to a clean body site (II).</li> <li>No recommendation can be made regarding wearing rings in healthcare settings. This issue is unresolved.</li> </ul> <p>Do not add soap to a partially empty soap dispenser. This practice of "topping off" dispensers can lead to bacterial contamination of soap (IA).</p> <p><b>Spore-Forming Bacteria</b></p> <ul style="list-style-type: none"> <li>None of the agents (including alcohols, chlorhexidine, hexachlorophene, iodophors, PCMX, and triclosan) used in antiseptic handwash or antiseptic hand-rub preparations are reliably sporicidal against <i>Clostridium</i> spp. or <i>Bacillus</i> spp. Washing hands with non-antimicrobial or antimicrobial soap and water may help to physically remove spores from the surface of contaminated hands. When caring for patients with <i>C. difficile</i>-associated diarrhea or <i>B. anthracis</i>, gloves should be worn. After gloves are removed, hands should be washed with a non-antimicrobial or an antimicrobial soap and water.</li> </ul>
Sehulster & Chinn, 2003	<p>Synopsizes findings of the Healthcare Infection Control Practices Advisory Committee</p> <p><b>Search strategy:</b> Predominantly English articles available in MEDLINE, bibliographies from published articles, and infection-control textbooks</p> <p><b>Sample:</b> None described</p> <p><b>Criteria:</b> "outbreaks of infection due to environmental opportunistic organisms and epidemiological or laboratory experimental studies"; guidelines and standards from relevant environmental and healthcare agencies were reviewed. When topics lacked rigorous literature, expert opinion and experiences were used.</p> <p><b>Treatment evaluated:</b> Interventions to prevent infection in healthcare facilities</p> <p><b>Outcomes measured:</b> None described</p>	<p><b>Selected recommendations</b></p> <p><b>Environment</b></p> <ul style="list-style-type: none"> <li>Open windows in healthcare facilities may increase the risk of airborne infection (IB, IC).</li> <li>Immunocompromised patients placed in protective environments should have mask protection when traveling outside of their protected area (II).</li> <li>Laminar airflow units are discouraged as a part of the protective environment (II).</li> <li>Patients with airborne respiratory viruses (e.g., varicella zoster virus, tuberculosis) should be placed in rooms equipped with an anteroom to maintain proper air balance. High-efficiency particulate air filters should be used for air recirculation (IC).</li> <li>Negative-pressure rooms should be used for patients with documented or suspected airborne infections (IB) or those who have viral hemorrhagic fever (II).</li> <li>Portable high-efficiency particulate air filters should be used when anterooms are not available (II).</li> </ul>

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	<p><b>Centers for Disease Control and Prevention/Healthcare Infection Control Practices Advisory Committee system for categorizing recommendations:</b></p> <p><b>Category IA:</b> Strongly recommended for implementation and strongly supported by well-designed experimental, clinical, or epidemiologic studies</p> <p><b>Category IB:</b> Strongly recommended for implementation and supported by certain experimental, clinical, or epidemiologic studies and a strong theoretical rationale</p> <p><b>Category IC:</b> Required by state or federal regulation or representing an established association standard</p> <p><b>Category II:</b> Suggested for implementation and supported by suggestive clinical or epidemiologic studies or a theoretical rationale</p> <p><b>Unresolved issue:</b> No recommendation is offered. No consensus or insufficient evidence exists regarding efficacy.</p>	<p><b>Construction</b></p> <ul style="list-style-type: none"> <li>• Preplanning (with infection control team member participation) for construction and renovation activities should be undertaken when immunocompromised patients are treated in a facility. Planning includes a risk assessment, documentation and monitoring of construction barrier, and education to the clinical staff about the implications of the construction and appropriate precautionary measures for patient care areas (IB, IC).</li> <li>• High-risk patients should wear high-efficiency masks when not in a functioning protective environment room during construction or renovation activities (included in the literature review, but not specifically rated).</li> <li>• Hallways or areas of access should be designated for the construction crew; patients should not be transported in any areas where construction material and debris have been placed (included in literature review, but not specifically rated).</li> </ul> <p><b>Hand hygiene</b></p> <ul style="list-style-type: none"> <li>• Hand hygiene prevents the acquisition of hand-transferred waterborne pathogens (IA).</li> <li>• Wash hands with soap and water, especially if hands are visibly soiled or contaminated with proteinaceous material (II).</li> <li>• Use soap and water or alcohol-based hand rubs when hands are not visibly soiled or contaminated (II).</li> </ul> <p><b>Ice handling</b></p> <ul style="list-style-type: none"> <li>• Do not handle ice by hand, and wash hands prior to obtaining ice (II).</li> <li>• Automated ice-dispensing systems are preferred to ice bins that require ice to be removed with a scoop (II).</li> </ul> <p><b>Flower and plant guidelines</b></p> <ul style="list-style-type: none"> <li>• Flowers and potted plants are permissible for immunocompetent patients (II).</li> <li>• Limit plant care to staff not directly caring for patients (II).</li> <li>• If plant care by patient care staff is unavoidable, staff should wear gloves while handling plants or flowers and perform hand hygiene after glove removal (II).</li> <li>• Changing vase water every two days, discharging water outside the patient's room (included in the literature review; but not rated in the</li> </ul>

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		<p>evidence table).</p> <ul style="list-style-type: none"> <li>• Clean and disinfect vases after use (included in the literature review; not rated in the evidence table).</li> <li>• Patients with cancer and other compromised patients should avoid fresh or dried flowers and plants because of a risk of Aspergillus infection (II).</li> </ul> <p><b>Animal encounters</b></p> <ul style="list-style-type: none"> <li>• Advise patients to avoid contact with animal feces, saliva, urine, or solid litter-box material (II).</li> <li>• Promptly clean and treat scratches, bites, or other wounds that break the skin (II).</li> <li>• Advise patients to avoid direct or indirect contact with reptiles (IB).</li> <li>• Practice hand hygiene after any animal contact (II).</li> </ul> <p><b>Other recommendations</b></p> <ul style="list-style-type: none"> <li>• Employers should launder protective garments (i.e., lab coats) or uniforms contaminated with blood or other potentially infectious substances (IC).</li> <li>• Replace mattresses or pillows that are torn or otherwise have lost integrity (II).</li> <li>• Do not stick needles or syringes through mattresses (II).</li> <li>• Detailed guidelines exist for cleaning and maintaining hemodialysis systems but were excluded here for the sake of brevity.</li> </ul>
Siegel et al., 2007	<p>The Centers for Disease Control and Prevention (CDC) guideline for isolation precautions for the prevention of transmitting infectious agents in healthcare settings was based on recommendations from its Healthcare Infection Control Practices Advisory Committee; it updates and expands the 1996 Guideline for Isolation precautions in hospitals.</p> <p><b>Search strategy:</b> MEDLINE and PubMed were used to search for relevant studies published in English, focusing on those published since 1996. Much of the evidence cited for preventing transmission of infectious agents in healthcare settings is derived from studies that used “quasi-experimental designs,” also referred to as</p>	<p><b>Selected recommendations</b></p> <p><b>Hand hygiene:</b></p> <ul style="list-style-type: none"> <li>• During the delivery of health care, avoid unnecessary touching of surfaces in close proximity to the patient to prevent both contamination of clean hands from environmental surfaces and transmission of pathogens from contaminated hands to surfaces. (IB/IC)</li> <li>• When hands are visibly dirty, contaminated with proteinaceous material, or visibly soiled with blood or body fluids, wash hands with either a non-antimicrobial soap and water or an antimicrobial soap and water. (IA)</li> <li>• If hands are not visibly soiled, or after removing visible material with non-antimicrobial soap and water, the preferred method of hand decontamination is with an alcohol-based hand rub. Alternatively, hands may be washed with an antimicrobial soap and water. Frequent use of alcohol-based hand rub immediately following handwashing with non-</li> </ul>



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	<p>nonrandomized preintervention and postintervention study designs. The quality of studies, consistency of results, and correlation with results from randomized, controlled trials, when available, were considered during the literature review and assignment of evidence-based categories to the recommendations in the guidelines.</p> <p><b>Sample:</b> not described</p> <p><b>Treatment evaluated:</b> administrative responsibilities; education and training; surveillance; standard precautions, including hand hygiene, gloves, gowns, mouth/nose/eye protection, and respiratory hygiene and cough etiquette; patient placement; care of the environment; safe injection practices, transmission-based precautions, including contact precautions; use of personal protective equipment; patient transport; environmental measures; and protective environment</p> <p><b>Outcomes measured:</b> not described</p> <p><b>Centers for Disease Control and Prevention/Healthcare Infection Control Practices Advisory Committee system for categorizing recommendations:</b></p> <p><b>Category IA:</b> strongly recommended for implementation and strongly supported by well-designed experimental, clinical, or epidemiologic studies</p> <p><b>Category IB:</b> strongly recommended for implementation and supported by certain experimental, clinical, or epidemiologic studies and a strong theoretical rationale</p> <p><b>Category IC:</b> required by state or federal regulation or representing an established association standard</p> <p><b>Category II:</b> suggested for implementation and supported by suggestive clinical or epidemiologic studies or a theoretical rationale</p>	<p>antimicrobial soap may increase the frequency of dermatitis. (IB)</p> <ul style="list-style-type: none"> <li>• Wash hands with non-antimicrobial soap and water or with antimicrobial soap and water if contact with spores (e.g., <i>C. difficile</i> or <i>Bacillus anthracis</i>) is likely to have occurred. The physical action of washing and rinsing hands under such circumstances is recommended because alcohols, chlorhexidine, iodophors, and other antiseptic agents have poor activity against spores. (II)</li> <li>• Do not wear artificial fingernails or extenders if duties include direct contact with patients at high risk for infection and associated adverse outcomes (e.g., those in intensive care units or operating rooms). (IA)</li> </ul> <p><b>Perform hand hygiene:</b></p> <ul style="list-style-type: none"> <li>• Before having direct contact with patients. (IB)</li> <li>• After contact with blood, body fluids or excretions, mucous membranes, nonintact skin, or wound dressings. (IA)</li> <li>• After contact with a patient's intact skin (e.g., when taking a pulse or blood pressure or lifting a patient). (IB)</li> <li>• If hands will be moving from a contaminated body site to a clean body site during patient care. (II)</li> <li>• After contact with inanimate objects (including medical equipment) in the immediate vicinity of the patient. (II)</li> <li>• After removing gloves. (IB)</li> </ul> <p><b>Gloves:</b></p> <ul style="list-style-type: none"> <li>• Wear gloves when it can be reasonably anticipated that contact with blood or other potentially infectious materials, mucous membranes, nonintact skin, or potentially contaminated intact skin (e.g., of a patient incontinent of stool or urine) could occur. (IB/IC)</li> <li>• Wear gloves with fit and durability appropriate to the task. (IB) <ul style="list-style-type: none"> <li>○ Wear disposable medical examination gloves for providing direct patient care</li> <li>○ Wear disposable medical examination gloves or reusable utility gloves for cleaning the environment or medical equipment</li> </ul> </li> <li>• Remove gloves after contact with a patient and/or the surrounding environment (including medical equipment) using proper technique to prevent hand contamination. Do not wear the same pair of gloves for the care to more than one patient. Do not wash gloves for the purpose of reuse because this practice has been associated with transmission of pathogens. (IB)</li> </ul>



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	<p><b>No recommendation:</b> unresolved issue; practices for which no consensus or insufficient evidence exists regarding efficacy</p>	<ul style="list-style-type: none"> <li>• Change gloves during patient care if the hands will move from a contaminated body site (e.g., perineal area) to a clean body site (e.g., face). (II)</li> </ul> <p><b>Gowns:</b></p> <ul style="list-style-type: none"> <li>• Wear a gown that is appropriate to the task to protect skin and prevent soiling or contamination of clothing during procedures and patient-care activities when contact with blood, body fluids, secretions, or excretions is anticipated. (IB/IC)</li> <li>• Wear a gown for direct patient contact if the patient has uncontained secretions or excretions. (IB/IC)</li> <li>• Remove gown and perform hand hygiene before leaving the patient’s environment. (IB/IC)</li> <li>• Do not reuse gowns, even for repeated contacts with the same patient. (II)</li> <li>• Routine donning of gowns upon entrance into a high-risk unit is not indicated. (IB)</li> </ul> <p><b>Private rooms:</b></p> <ul style="list-style-type: none"> <li>• Place patients who pose a risk for transmission to others (e.g., uncontained secretions, excretions or wound drainage, infants with suspected viral respiratory or gastrointestinal infections) in single-patient rooms when available. (IB)</li> </ul> <p><b>Transmission-based precautions (e.g., droplet, contact, airborne)</b></p> <ul style="list-style-type: none"> <li>• In addition to standard precautions, use transmission-based precautions for patients with documented or suspected infection or colonization with highly transmissible or epidemiologically important pathogens for which additional precautions are needed to prevent transmission. (IA)</li> <li>• Extend duration of transmission-based precautions for immunosuppressed patients with viral infections because of prolonged shedding of viral agents that may be transmitted to others. (IA)</li> </ul> <p><b>Protective environment:</b></p> <ul style="list-style-type: none"> <li>• Place allogeneic hematopoietic stem cell transplant patients in a protective environment to reduce exposure to environmental fungi (e.g., Aspergillus species). (IB)</li> <li>• No recommendation was made for placing patients with other medical conditions that are associated with increased risk for environmental fungal infections (e.g., aspergillosis) in a protective environment. (unresolved issue)</li> <li>• For patients who require a protective environment, implement the</li> </ul>



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Review Author	Study Information	Conclusions and Implications
		<p>following.</p> <ul style="list-style-type: none"> <li>○ Environmental controls</li> <li>○ Filtered incoming air using central or point-of-use high-efficiency particulate (HEPA) filters capable of removing 99.97% of particles &gt;0.3 µm in diameter (IB)</li> <li>○ Directed room airflow with the air supply on one side of the room that moves air across the patient bed and out through an exhaust on the opposite side of the room (IB)</li> <li>○ Positive air pressure in room relative to the corridor (pressure differential of &gt;12.5 Pa [0.01-in water gauge]) (IB)</li> <li>○ Monitor air pressure daily with visual indicators (e.g., smoke tubes, flutter strips). (IA)</li> <li>○ Well-sealed rooms that prevent infiltration of outside air (IB)</li> <li>○ At least 12 air changes per hour 13 (IB)</li> <li>○ Lower dust levels from smooth, nonporous surfaces and finishes that can be scrubbed, rather than textured material (e.g., upholstery). Wet dust horizontal surfaces whenever dust is detected and routinely clean crevices and sprinkler heads where dust may accumulate. (II)</li> <li>○ Avoid carpeting in hallways and patient rooms. (IB)</li> <li>○ Prohibit dried and fresh flowers and potted plants. (II)</li> </ul> <ul style="list-style-type: none"> <li>● Minimize the length of time that patients who require a protective environment are outside their rooms for diagnostic procedures and other activities. (IB)</li> <li>● During periods of construction, to prevent inhalation of respirable particles that could contain infectious spores, provide respiratory protection (e.g., N95 respirator) to patients who are medically fit to tolerate a respirator when they are required to leave the protective environment. (II) <ul style="list-style-type: none"> <li>○ No recommendation for fit-testing of patients who are using respirators (unresolved issue)</li> <li>○ No recommendation for use of particulate respirators when leaving the protective environment in the absence of construction (unresolved issue)</li> </ul> </li> </ul> <p><b>Visitors:</b></p> <ul style="list-style-type: none"> <li>● Limit patient visitation by people with signs or symptoms of a communicable infection. Screen visitors to high-risk patient-care areas (e.g., oncology units, hematopoietic stem cell transplant units, intensive care units, other severely immunocompromised patients) for possible</li> </ul>



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		infection. (IB)
Siegel et al., 2006	<p>The Centers for Disease Control and Prevention (CDC) guideline for management of multidrug-resistant organisms (MDROs) in healthcare settings was based on recommendations from its Healthcare Infection Control Practices Advisory Committee.</p> <p><b>Search strategy:</b> not specified. However, includes discussion that despite the volume of literature, an appropriate set of evidence-based control measures that can be universally applied has not been definitively established. Furthermore, the discussion continues regarding differences in study methodology and outcomes measures, including the absence of randomized, controlled trials comparing one MDRO strategy with another. Additionally, the data are largely descriptive and quasiexperimental.</p> <p><b>Sample:</b> not described</p> <p><b>Treatment evaluated:</b> Seven categories of interventions were studied: administrative support, use of antimicrobials, surveillance (routine and enhanced), standard and contact precautions, environmental measures, education, and decolonization. The specific interventions reviewed include education, handwashing, contact precautions, private rooms, segregation of cases, cohorting of patients, cohorting of staff, change in antimicrobial use, surveillance cultures of patients, surveillance cultures of staff, environmental cultures, extra cleaning and disinfection, dedicated equipment, decolonization, ward closure to new admissions or all patients, and other miscellaneous measures.</p> <p><b>Outcomes measured:</b> not described</p>	<p><b>Contact precautions:</b> Implement contact precautions for all patients known to be colonized or infected with target MDROs. (IB)</p> <p>No recommendations can be made regarding when to discontinue contact precautions. (unresolved)</p> <p>Masks are not recommended for routine use to prevent transmission of MDROs from patients to healthcare workers.</p> <p>When single patient rooms are available, assign priority to patients with known or suspected MDRO colonization or infection.</p> <p><b>Intensified MDRO control efforts:</b> when 1) incidence or prevalence of MDROs is not decreasing despite the use of routine control measures or 2) the first case or outbreak of an MDRO is identified within an facility or unit (IB)</p> <p><b>Contact precautions:</b> Implement contact precautions routinely for all patients colonized or infected with a target MDRO. (IA)</p> <p>Don gloves and gowns before or upon entry to the patient room. (IB)</p> <p><b>Environmental measures:</b> Implement patient-dedicated use of noncritical equipment. (IB)</p>



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<p>Chaudhury et al., 2003</p>	<p>The guidelines are updated on a four-year cycle by the multidisciplinary Health Guidelines Revision Committee (HGRC). Individuals knowledgeable about healthcare practices and healthcare facility design (doctors, nurses, facility managers, architects, and engineers) and those who apply the document in the field (state and federal authorities having jurisdiction, or AHJs) serve on the committee. (AHJs reviewing and approving plans and construction for health facilities are often architects or engineers.)</p> <p>The guidelines revision process involves two opportunities for public comment. During a proposal period, anyone can submit a proposal to change language in the guidelines. The HGRC considers these</p>	<p><b>Single-patient rooms as the minimum standard for medical-surgical and postpartum units in a general hospital to reduce the occurrence or transmission of infection</b></p>



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	<p>proposals and develops a draft manuscript. This draft is then posted for public comment, and anyone can comment on the proposed changes. From its review of these comments, the HGRC develops the manuscript for the next edition of the guidelines.</p> <p><b>Search methods:</b> An extensive review of literature in the area of healthcare design, construction and operating cost, hospital management, staff efficiency, infection control, and patient outcomes was conducted to identify advantages and disadvantages of single- versus double-occupancy patient rooms. The research questions that guided this review were as follows.</p> <ol style="list-style-type: none"> <li>1) What are the differences in first cost, operating cost, energy costs, and efficiency of management and care delivery in single- and double-occupancy patient rooms in acute-care settings?</li> <li>2) What are the advantages and disadvantages in disease control and falls prevention in single- versus double-occupancy rooms in acute-care settings?</li> <li>3) What are the therapeutic impacts (sociobehavioral issues of patient privacy, social interaction, and daily functioning) of single- versus double-occupancy hospital rooms?</li> </ol> <p>To address the study research questions and facilitate the review and analysis process, the articles and chapters reviewed were divided into four categories. Additionally, the articles in each category were subdivided into empirical and nonempirical articles. Articles that presented primary data and findings from a research project were grouped under the “empirical” subcategory. Articles and chapters that were either reviews of other studies or prescriptive in nature, or that covered general descriptive information, were grouped</p>	



# ONS PUTTING EVIDENCE INTO PRACTICE



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Review Author	Study Information	Conclusions and Implications
	under the “nonempirical” subcategory. The four subcategories were: first and operating costs, healthcare facility management and design, disease control and fall prevention, and therapeutic impacts.	