**ATTACHMENT J-16: Tables of Evidence-Based Interventions**

**Evidence-Based Interventions for Multidimensional Programs to Improve Care Transitions**

<table>
<thead>
<tr>
<th>Program / Toolkit</th>
<th>Supporting Evidence</th>
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</thead>
</table>
| Care Transitions Intervention (CTI)                  | **Description**: Care transitions coaches support patients by providing specific tools and teaching self-management skills to ensure their needs are met during the transition from the acute care setting to home.  
**Aim**: Support patients and families; increase skills among healthcare providers; enhance the ability of health information technology to promote health information exchange across care settings; implement system level interventions to improve quality and safety; develop performance measures and public reporting mechanisms; influence health policy at the national level.  
**Resource**: [http://www.caretransitions.org](http://www.caretransitions.org)  
**RCT**  
*Coleman et al. (2006)*: Lower 30-day readmission; lower readmission at 90 days and 180 days.  
**Other support**  
*Coleman et al. (2004)*: Lower readmission for same diagnosis at 90 days and 180 days. |
| Bridging Nursing Support / Transitional Care Model   | **Description**: Multidisciplinary, comprehensive in-hospital planning and home follow-up. Transitional Care Nurses follow patients from the hospital into the home to provide services designed to streamline plans of care, interrupt patterns of frequent acute hospital and emergency department use and prevent health status decline.  
**Aim**: Improve coordination and continuity of care; engage and activate patients, family members and caregivers.  
**RCTs**  
*Naylor et al. (1999)*: 45% reduction in readmission rate.  
*Naylor et al. (2004)*: Increased time to readmission/death; reduced readmission rate. |
<table>
<thead>
<tr>
<th>Program / Toolkit</th>
<th>Supporting Evidence</th>
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<tbody>
<tr>
<td>Better Outcomes for Older Adults through Safe Transitions (BOOST)</td>
<td><strong>Description:</strong> Toolkit for improving hospital discharge, including screening/assessment tools, discharge checklist, transition record, teach-back process, risk-specific Interventions and written discharge Instructions. <strong>Aim:</strong> Reduce 30-day readmissions; improve patient satisfaction; improve information flow between hospital and outpatient physicians; ensure that high-risk patients are identified and specific interventions are offered to mitigate their risk; improve patient and family education practices to encourage use of the teach-back process around risk specific issues. <strong>Resource:</strong> <a href="http://www.hospitalmedicine.org/ResourceRoomRedesign/RR_CareTransitions/CT_Home.cfm">http://www.hospitalmedicine.org/ResourceRoomRedesign/RR_CareTransitions/CT_Home.cfm</a></td>
</tr>
<tr>
<td><strong>RCT</strong></td>
<td><em>Preen et al. (2005):</em> Improved QOL, involvement and satisfaction with discharge care. <strong>Systematic review</strong> <em>Kripalani, Jackson et al. (2007):</em> Approaches to promoting effective transitions of care include “…improvements in communication between inpatient and outpatient physicians, effective reconciliation of prescribed medication regimens, adequate education of patients about medication use, closer medical follow-up, engagement with social support systems, and greater clarity in physician–patient communication.” <em>Kripalani, LeFevre et al. (2007):</em> Deficient communication between hospital-based physicians and PCPs; need for improvements to discharge summaries and health information technology. <strong>Other support</strong> <em>Simon et al. (1998):</em> PCP involvement in hospitalization associated with reduced problems with diagnostic tests, post-discharge activity and health habits. <em>van Walraven et al. (2004):</em> Follow-up care with hospitalization physician associated with lower readmission rate, versus community physician or specialist.</td>
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<tr>
<td>Best Practices Intervention Package (BPIP): Transitional Care Coordination</td>
<td><strong>Description:</strong> Comprehensive manual for home health agency leadership and staff to identify tools and processes to improve patient transitions; focus on the four pillars, or conceptual domains, of patient transition; includes tools and resources for patients and staff, guidelines and podcasts <strong>Aim:</strong> Reduce avoidable acute care hospitalizations. <strong>Resource:</strong> <a href="http://www.homehealthquality.org/hh/ed_resources/interventionpackages/default.aspx">http://www.homehealthquality.org/hh/ed_resources/interventionpackages/default.aspx</a></td>
</tr>
<tr>
<td><strong>Health Quality Improvement National Campaign</strong></td>
<td><em>Esslinger (2008):</em> Preliminary data demonstrate modest improvements in hospitalization rates among participating HHAs and worsening among non-participating HHAs. <strong>Schade et al. (2009):</strong> Agencies w/ improvement more likely to report activities consistent with campaign and use of campaign interventions, regardless of participation status.</td>
</tr>
</tbody>
</table>
| Interventions to Reduce Acute Care Transfers (INTERACT)                        | **Description:** Toolkit for SNF personnel to reduce avoidable hospital admission. Three types of tools: 1) communication; 2) clinical care paths; and 3) advance care planning. **Resource:** [http://www.cms.gov/medicare/medicare-program发展战略/medicare-and-you/about-you facile-decisions/information-for-distributors/interact](http://www.cms.gov/medicare/medicare-program发展战略/medicare-and-you/about-you facile-decisions/information-for-distributors/interact) | **CMS Nursing Home Special Study** *Ouslander (2008):* Higher hospitalization rates associated with larger facilities, more Medicaid and Medicare skilled care.
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<tr>
<td><strong>CROSS-SETTING CARE STANDARDIZATION</strong></td>
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</table>
| Enhanced information transfer at discharge | **Systematic review**  
Kripalani, LeFevre et al. (2007): Deficient communication between hospital-based physicians and PCPs; need for improvements to discharge summaries and health information technology.  
Cohort study  
Forster et al. (2003): 19% with adverse event following hospital discharge (of which 6% preventable, 6% ameliorable); primarily medication-related (66%) and procedure-related |
| **Description:** Improvements in timely transfer of medical information from the acute care setting to post-discharge healthcare providers.  
**Aim:** Ensure that current, accurate health information is accessible to receiving providers.  
**Targeted drivers of readmission:** Unreliable handover processes; poor information transfer. |  |
| **Resource:** http://www.bu.edu/fammed/projectred/index.html |  |

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**Table 1 B: Intervention Strategies to Improve Care Transitions**

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<thead>
<tr>
<th>Intervention Strategy</th>
<th>Supporting Evidence</th>
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<tbody>
<tr>
<td><strong>RE-ENGINEERED DISCHARGE</strong></td>
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</table>
| **Description:** Standardized discharge intervention; includes patient education, comprehensive discharge planning, post-discharge telephone reinforcement.  
**Aim:** Minimize post-discharge hospital utilization. | **RCT**  
Jack et al. (2009): Nurse discharge advocate support (follow-up appointments, medication reconciliation, patient education, individualized instruction booklet sent to PCP); telephone follow-up by clinical pharmacist (reinforce the discharge plan, review medications) associated with lower rate of post-discharge utilization overall; non-significant reduction in readmission rate. |
| **Resource:** http://www.bu.edu/fammed/projectred/index.html |  |

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**Transforming Care at the Bedside (TCAB)**

**Description:** Hospital interventions built around four themes: 1) safety and reliability, 2) care team vitality, 3) patient-centeredness and 4) increased value. Four core elements of the intervention: 1) enhanced admission assessment for post-discharge needs; 2) enhanced teaching and learning; 3) patient and family-centered handoff communication; and 4) early post-acute care follow-up.  
**Aim:** Transform the care experience of patients in hospital medical/surgical units, as well as the experience of health care professionals who care for them. | **Program evaluation**  
Lorenz et al. (2008): Reductions in patient wait times; increase in patient and staff satisfaction by 30 percentiles; shortened turnaround for laboratory results; improvement of visitors' first impressions through new signage and a concierge program. |
| **Resource:** http://www.ihi.org/IHI/Programs/StrategicInitiatives/TransformingCareAtTheBedside.htm |  |

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**Utilization specified for selected members of the care team.**  
**Aim:** Reduce transfers to acute care setting.  
**Resource:** http://interact.geriu.org/  
Residents, lower percentage of Caucasian residents and higher percentage of residents with impaired decision making; 68% of hospitalizations were avoidable, per expert panel record review.
<table>
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<tr>
<th>Intervention Strategy</th>
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<tbody>
<tr>
<td><strong>Basis for recommendation:</strong> An element of formal multidimensional programs with strong evidence base; evidence linking deficient information transfer processes and adverse events.</td>
<td>(17%); attributed to ineffective communication and inadequate information transfer; suggestions for improved discharge planning, drug therapy education, follow-up visit with hospitalist within a week of discharge and telephone follow-up with 5 days of discharge. Other support Payne et al. (2002): Liaison between hospital and community personnel (“key worker”) improved communication and satisfaction; little evidence to support reduced readmission rates per se. van Walraven et al. (2002): Non-significant association between discharge summary received by follow-up physician and lower readmission rate.</td>
</tr>
</tbody>
</table>
| Follow-up care established at discharge | RCTs  
*Naylor et al. (1999):* 45% reduction in readmission rate.  
*Naylor et al. (2004):* Increased time to readmission/death; reduced readmission rate. |
| **Description:** Arrangements – made prior to leaving the acute care setting – for the patient to receive appropriate follow-up care.  
**Aim:** Ensure that patients receive proper post-acute follow-up care.  
Targeted drivers of readmission: Unreliable handover process.  
**Basis for recommendation:** An element of formal multidimensional programs with strong evidence base. |  |
| Medication management | RCTs  
*Crotty et al. (2004):* More appropriateness of prescribing, better pain and lower hospital utilization.  
*Schnipper et al. (2006):* Reduction in preventable adverse drug events.  
*Koehler et al. (2009):* Reduced readmission/ED visit rates.  
Systematic review  
*Pellegrino et al. (2009):* Potential benefit, but numerous challenges; need for randomized controlled trials.  
Cohort Study  
*Boockvar et al (2004):* 86% with at least one drug alteration during hospitalization, primarily drug discontinuations; 20% incidence of alteration-attributed adverse drug events; 4.4% overall risk of adverse drug event per alteration; most adverse drug events occurred following return to SNF.  
**Description:** Activities to improve effectiveness of pharmacotherapy, including support of patient understanding of appropriate medication use and adverse events; adherence to medication regimens and detection of adverse events and over-/under-use.  
**Aim:** Reduce medication errors leading to adverse events and readmission.  
**Targeted drivers of readmission:** Insufficient support for patient and family self-management; unreliable handover process; poor information transfer.  
**Basis for recommendation:** Evidence linking adverse drug events and higher healthcare utilization; an element of formal multidimensional programs with strong evidence base. |
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<tr>
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<tr>
<td><strong>Plan of care</strong></td>
<td><strong>Other support</strong></td>
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<td><strong>Description</strong>: Collaborative development of a complete, accurate strategy for post-discharge care including history, situation, likely progression, patient/family preferences for end-of-life issues.</td>
<td>Forster et al. (2003) above (Enhanced information transfer at discharge). Lappe et al. (2004): Lower readmission rate after program implementation targeting discharge medications. Coleman et al. (2005): 14% prevalence of ≥1 discrepancy; associated with multiple medications and CHF.</td>
</tr>
<tr>
<td><strong>Aim</strong>: Consistent vision of medical and health support needs among caregivers, including the patient as self-caregivers. <strong>Targeted drivers of readmission</strong>: Insufficient support for patient and family self-management; poor information transfer. <strong>Basis for recommendation</strong>: An element of many formal multidimensional programs strong evidence base. AHRQ endorsement.</td>
<td>Government report AHRQ (2007): Plan of care is essential to care coordination. Your support</td>
</tr>
<tr>
<td><strong>Telemedicine</strong></td>
<td><strong>Systematic reviews</strong></td>
</tr>
<tr>
<td><strong>Description</strong>: Remote monitoring and care delivery via telemonitoring (electronic or telephonic transfer of physiological data from home to healthcare provider) or regular telephone-based medical management. <strong>Aim</strong>: Continued medical management following discharge. <strong>Targeted drivers of readmission</strong>: Poor information transfer due to insufficient availability of health information; discontinuous care after discharge. <strong>Basis for recommendation</strong>: Substantive positive evidence amid mixed results; promising strategy for patients living in remote locations.</td>
<td>Chaudhry et al. (2007): Evidence base still developing; telephone-based interventions appear equally effective to more complex, and costly, interventions. Clark et al. (2007): Reduced hospital admissions for CHF; reduced all-cause mortality; improved QOL. Your support</td>
</tr>
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<td></td>
<td>Other support</td>
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<td></td>
<td>Jerant et al. (2001): Intervention of home telecare or nursing telephone calls resulted in non-significant reduction in hospital readmission charges. Hersh et al. (2006): Significant gaps in the evidence base; need for well-designed and targeted research.</td>
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<tr>
<td>Intervention Strategy</td>
<td>Supporting Evidence</td>
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<tr>
<td><strong>Telephone follow-up</strong></td>
<td>Systematic review</td>
</tr>
<tr>
<td><strong>Description:</strong> Telephone calls made to the patient shortly after discharge from acute care setting to provide information, health education, symptom management, early monitoring of complications, reassurance and quality post-discharge care.</td>
<td>Mistiaen &amp; Poot (2006): Some effects favoring telephone follow-up; insufficient evidence to support/refute effectiveness.</td>
</tr>
<tr>
<td><strong>Aim:</strong> Address problems arising in the first few weeks following hospital discharge; address patients’ post-discharge questions and care needs.</td>
<td>RCTs</td>
</tr>
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</table>
| **Targeted drivers of readmission:** Discontinuous care after discharge; insufficient support for patient and family self-management. | Jerant et al. (2001) above (Telemedicine).  
Schnipper et al. (2006) above (Medication management).  
Jack et al. (2009): Nurse discharge advocate support (follow-up appointments, medication reconciliation, patient education, individualized instruction booklet sent to PCP); telephone follow-up by clinical pharmacist (reinforce the discharge plan, review medications) associated with lower rate of post-discharge utilization overall; non-significant reduction in readmission rate. |
| **Basis for recommendation:** Ease of implementation; an element of many formal multidimensional programs with strong evidence base. |  |
| **Electronic health record / electronic medical record**  | Congressional report                                                                  |
| **Description:** Databases and data access/reporting systems to standardize patient information available to providers across care settings. | MedPAC (2007): Efficiency and quality benefits of health information technology, especially electronic medical record (e.g., informed care decisions, real-time measures of quality). |
| **Aim:** Prevent medical errors by minimizing incomplete, inaccurate and conflicting information across care settings. | Systematic reviews                                                                      |
| **Targeted drivers of readmission:** Poor information transfer. | Chaudhry et al. (2006): Increased adherence to guidelines and protocols; decreased utilization.  
Jha et al. (2006): Electronic health record used by 24% of physicians in ambulatory setting; computerized provider order entry used by 5% of hospitals. |
<p>| <strong>Basis for recommendation:</strong> Evidence linking inadequate information transfer and complications that lead to unnecessary care; robust information exchange continues to be rare. |  |
| <strong>SYSTEMIC ENHANCEMENTS (WITHIN SETTING)</strong>                | Systematic review                                                                    |
| <strong>Multidisciplinary team, multifaceted interventions</strong>    | McAlister et al. (2004): 27% reduction in CHF hospitalization rates; reduced all-cause mortality; enhanced self-care, follow-up monitoring (including telephone), access to CHF clinics were most efficacious; key elements of specially trained CHF nurses, patient education on CHF and ready access to CHF-trained clinicians. |
| <strong>Description:</strong> Collaboration among a multidisciplinary team, facilitating community treatment, collaborative care and shared primary specialty care | RCTs                                                                                   |
| <strong>Aim:</strong> Improve care coordination to reduce readmissions; integration of patients’ medical, pharmaceutical, psychosocial and spiritual needs at the time of discharge. | Rich et al. (1995): 56% reduction in readmissions for CHF; non-significant reduction in all- |</p>
<table>
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<tr>
<td>Patient and family self-management; lack of standard, known processes. <strong>Basis for recommendation:</strong> Strong evidence base; an element of formal multidimensional programs with strong evidence base. <strong>See Table 1a:</strong> BOOST, INTERACT, RED, TCAB</td>
<td>Cause readmissions. <em>Kasper et al. (2002):</em> Fewer CHF hospitalizations and deaths among treatment group. <strong>Meta-analysis</strong> <em>Holland et al. (2005):</em> Reduced all-cause and CHF hospitalization, notably for home and telehealth; reduced all-cause mortality.</td>
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<tr>
<td>Clinical protocols, best practices and regional guidelines <strong>Description:</strong> Establishment of congruence in practice standards within and across settings. <strong>Aim:</strong> Ensure that in-setting care will be consistent with care in other settings. <strong>Targeted drivers of readmission:</strong> Lack of standard, known processes. <strong>Basis for recommendation:</strong> Strong evidence base (esp. medication management). Consistent with AHRQ patient safety goals; MedPAC recommendations. <strong>See Table 1a:</strong> BPIP, TCAB</td>
<td>Congressional report <em>MedPAC (2007):</em> Several recommendations in favor or empirically based guidelines in clinical practice. <strong>Other support</strong> Lappe et al. (2004) above (<em>medication management</em>). <em>Orrick et al. (2004):</em> Antibacterial therapy per Infectious Diseases Society of America guidelines associated with shorter hospital stay, lower cost of hospitalization. <em>Huffman (2005):</em> Recommendations for implementation of best practices and linkage to patient outcome. <em>Dean et al. (2006):</em> Hospitals implementing PNE guidelines had lower readmission rate.</td>
</tr>
<tr>
<td>Enhanced palliative care consultation/support <strong>Description:</strong> Improved assessment of palliative care needs and end-of-life preferences, including appropriate palliative and hospice care referrals. Support for advanced care planning. <strong>Aim:</strong> Ensure common understanding of preferred medical treatments to reduce reliance on acute care services; consistent vision of medical and health support needs among caregivers, including the patient as self-caregivers. <strong>Targeted drivers of readmission:</strong> Insufficient support for patient and family self-management; lack of standard, known processes; poor information transfer. Basis for recommendation: Strong evidence base. <strong>See Table 1a:</strong> INTERACT</td>
<td>RCT <em>Gade et al. (2008):</em> Fewer ICU admissions on hospital readmission; longer hospice stays. <strong>Observational study</strong> <em>Levy et al. (2008):</em> Lower likelihood of in-hospital death after implementation; 100% prevalence of advanced directive among those who died after implementation; increased likelihood of palliative care referral. <strong>Other support</strong> <em>Johnson et al. (2004):</em> 68% use of guidelines, protocols or care pathways for symptom management (larger organizations reported greater use); lack of availability was top reason for non-use; medication management was most common resource. <em>Penrod et al. (2006):</em> Palliative care associated with smaller likelihood of ICU admission and lower direct, ancillary inpatient costs. <em>Meier &amp; Beresford (2008):</em> Recognition of large overlap between palliative care and care transitions.</td>
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**PATIENT, FAMILY & CAREGIVER SUPPORT**

<p>| Education | RCTs |</p>
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<td><strong>Intervention Strategy</strong></td>
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<tr>
<td><strong>Description:</strong> Teaching and materials targeted toward patients, family members and other informal caregivers on topics of disease self-management, treatment options, expectations and available resources. <strong>Aim:</strong> Enable patients to avoid unnecessary utilization of health services though accurate understanding of health medical needs; improve quality of self-care and management. <strong>Targeted drivers of readmission:</strong> Insufficient support for patient and family self-management. <strong>Basis for recommendation:</strong> Strong evidence base; an element of formal multidimensional programs with strong evidence base.</td>
<td>Rich et al. (1995) above (multidisciplinary team / multifaceted interventions)]. Krumholz et al. (2002): Lower readmission rate; lower risk of readmission, controlling for demographics. Riegel et al. (2002): Lower CHF readmission rate at 3 and 6 months; fewer multiple readmissions. Kimmelstiel et al. (2004): Fewer hospitalizations for CHF; fewer cardiovascular hospitalizations. Koelling et al. (2005): Lower risk of readmission; lower cost of care. Coleman et al. (2006): Lower 30-day readmission; lower readmission at 90 days and 180 days. Meta-analyses Phillips et al. (2004): Lower readmission rate. Mistiaen et al. (2007): Some evidence that educational interventions at discharge lower the risk of readmission. Other support Coleman et al. (2004): Lower readmission for same diagnosis at 90 days and 180 days.</td>
</tr>
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Coaching
**Description:** Non-medical support for home-based self-management capability. **Aim:** Improve competence in achieving personal health goals. Avoid inappropriate and unwanted medical interventions. **Targeted drivers of readmission:** Insufficient support for patient and family self-management. **Basis for recommendation:** Strong evidence base; an element of formal multidimensional programs with strong evidence base. See Table 1a: CTI | RCT Coleman et al. (2006) above (Education). Other support Coleman et al. (2004): above (Education) |

Personal health record (PHR)
**Description:** Organizational tool for patients to track health care goals/concerns, medications, sign and symptom red flags, provider contact information and any other information relevant to healthcare self-management. | RCT Coleman et al. (2006) above (Education). Other support Coleman et al. (2004) above (Education). |
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| **Aim:** Provide reliable resource for patients to document key medical information and track health support needs.  
**Targeted drivers of readmission:** Insufficient support for patient and family self-management; poor information transfer.  
**Basis for recommendation:** An element of formal multidimensional programs with strong evidence base; widespread acceptance as a promising and inexpensive intervention.  
See Table 1a: CTI, BPIP | **Kaelber et al. (2008):** Need for additional PHR research to increase likelihood of PHR deployment and demonstrate beneficial effects on healthcare costs, quality and efficiency. |

| Community supports  
**Description:** Connecting patients and family members to non-medical community health support agencies and other entities (individuals, community groups, businesses); patient use of resources provided by community members.  
**Aim:** Eliminate everyday barriers to self-management (e.g., lack of transportation).  
**Targeted drivers of readmission:** Insufficient support for patient and family self-management.  
**Basis for recommendation:** Strong evidence base; AHRQ recommendation. | Systematic review  
**Naylor & Keating (2008):** Recommendations made for family support, esp. needs assessment.  
Other support  
**AHRQ (2007):** Review of evidence and recommendations on care coordination improvement - “Providers should also consider establishing communication links with community services and maintaining an inventory of these services.” (p.133) |
*Some of Evidence-Based Interventions for HAI prevention and reduction: Central line-associated bloodstream infections (CLABSI), Catheter-Associated Urinary Tract Infections (CAUTI), *Clostridium difficile* infections (CDI) and Surgical site infections

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<tr>
<td><strong>Hand Hygiene</strong></td>
<td>Perform hand hygiene procedures, either by washing hands with conventional soap and water or with alcohol-based hand rubs (ABHR). Hand hygiene should be performed before and after palpating catheter insertion sites as well as before and after inserting, replacing, accessing, repairing, or dressing an intravascular catheter. Palpation of the insertion site should not be performed after the application of antiseptic, unless aseptic technique is maintained.</td>
<td>Guidelines for the Prevention of Intravascular Catheter-Related Infections<a href="http://www.cdc.gov/hicpac/pdf/guidelines/bsi-guidelines-2011.pdf">^2^</a></td>
<td>Category IB</td>
</tr>
<tr>
<td><strong>Healthcare Worker Education and Training</strong></td>
<td>Educate health-care workers regarding the indications for intravascular catheter use, proper procedures for the insertion and maintenance of intravascular catheters, and appropriate infection-control measures to prevent intravascular catheter-related infections. Periodically assess knowledge of and adherence to guidelines for proper insertion and maintenance of intravascular catheters.</td>
<td>Guidelines for the Prevention of Intravascular Catheter-Related Infections<a href="http://www.cdc.gov/hicpac/pdf/guidelines/bsi-guidelines-2011.pdf">^2^</a></td>
<td>Category IA</td>
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B. Category 1IB  
C. Category 1C | All relevant clinical staff at hospitals and surgical care settings. Executive staff is included to support and champion interventions. |
Category 1B | All relevant clinical staff at hospitals and surgical care settings. Executive staff is included to support and champion interventions. |

**Surveillance**

- A. Conduct surveillance in ICUs and other patient populations to determine CRBSI rates, monitor trends in those rates, and assist in identifying lapses in infection-control practices.
- B. Express ICU data as the number of catheter-associated BSIs per 1,000 catheter-days for both adults and children and stratify by birth weight categories for neonatal ICUs to facilitate comparisons with national data in comparable patient populations and health-care settings.
- C. Investigate events leading to unexpected life-threatening or fatal outcomes. This includes any process variation for which a recurrence would likely present an adverse outcome (13).

**Catheter Site Selection**

- Avoid using the femoral vein for central venous access in adult patients.
- Use a subclavian site, rather than a jugular or a femoral site, in adult patients to minimize infection risk for nontunneled CVC placement.
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<tbody>
<tr>
<td>Maintain Aseptic Technique (Category 1B)</td>
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<tr>
<td>Sterile gloves should be worn for the insertion of arterial, central, and midline catheters (Category 1A)</td>
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<tr>
<td>Intervention Strategies</td>
<td>Supporting Evidence</td>
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<tr>
<td>Appropriate Urinary Catheter Use</td>
<td>GUIDELINE FOR PREVENTION OF CATHETER-ASSOCIATED URINARY TRACT INFECTIONS 2009</td>
<td>Category 1B</td>
<td>All relevant clinical staff at hospitals and surgical care settings. Executive staff is included to support and champion interventions</td>
</tr>
</tbody>
</table>
|                                                                  | Carolyn V. Gould, MD, MSCR \(^1\); Craig A. Umscheid, MD, MSCE \(^2\); Rajender K. Agarwal, MD, MPH \(^2\), et al.  
\(^1\) Division of Healthcare Quality Promotion Centers for Disease Control and Prevention Atlanta, GA  
\(^2\) Center for Evidence-based Practice | Category 1B |                                                                                     |
<p>|                                                                  | Implement quality improvement (QI) programs or strategies to enhance appropriate use of indwelling catheters and to reduce the risk of CAUTI based on a facility risk assessment. | Category 1B     | All relevant clinical staff at hospitals and surgical care settings. Executive staff is included to support and champion interventions |
|                                                                  | A system of alerts or reminders to identify all patients with urinary catheters and assess the need for continued catheterization | Category 1B     | All relevant clinical staff at hospitals and surgical care settings. Executive staff is included to support and champion interventions |</p>
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<th>Supporting Evidence</th>
<th>Evidence Rating</th>
<th>Intervention Target</th>
</tr>
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<tbody>
<tr>
<td>Guidelines and protocols for nurse-directed removal of unnecessary urinary catheters</td>
<td>University of Pennsylvania Health System Philadelphia, PA 3 Division of Infectious Diseases David Geffen School of Medicine at UCLA Los Angeles, CA 1</td>
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</tr>
<tr>
<td>Education and performance feedback regarding appropriate use, hand hygiene, and catheter care</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgical Care Improvement Project</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prophylactic antibiotic received one hour prior to surgical incision</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Prophylactic antibiotic selection for surgical patients</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Prophylactic antibiotics discontinued within 24 hours after surgery end time (48h for cardiac surgery patients)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiac surgery patients with controlled 6am postoperative serum glucose</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgery patients with appropriate hair removal (clippers as opposed to use of razor)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention Strategies</td>
<td>Supporting Evidence</td>
<td>Evidence Rating</td>
<td>Intervention Target</td>
</tr>
<tr>
<td>--------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>-----------------</td>
<td>-------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>CDI prevention</td>
<td>Strategies to prevent Clostridium difficile infections in acute care hospitals.</td>
<td>(IIA for hand hygiene, 1A for gloves, IIIB for gowns, and IIIB for single-patient room) (National Clostridium difficile Standards Group, 2004; Fekety, 1997; Gerding et al., 1995; Simor et al., 2002).</td>
<td>All relevant clinical staff at hospitals and surgical care settings. Executive staff is included to support and champion interventions.</td>
</tr>
<tr>
<td>Use of Contact Precautions</td>
<td>Bibliographic Source(s)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleaning and Disinfection of Equipment and Environment</td>
<td>Dubberke ER, Gerding DP, Coffin SE, Fraser V, LA, Nicolle L, Pegues DA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surveillance</td>
<td>Strategies to prevent Clostridium difficile infections in acute care hospitals.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Healthcare Personnel, Patient and Family Education</td>
<td>Bibliographic Source(s)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention Strategies</td>
<td>Supporting Evidence</td>
<td>Evidence Rating</td>
<td>Intervention Target</td>
</tr>
<tr>
<td>-------------------------</td>
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</tr>
<tr>
<td>Centers for Disease Control and Prevention Healthcare-associated infection tool-kit Includes education material (Slide sets) outlining core and supplemental prevention techniques for HAIs</td>
<td>Centers for Disease Control <a href="http://www.cdc.gov/resources/HAI/recoveryact/stateResources/toolkits.html">www.cdc.gov/resources/HAI/recoveryact/stateResources/toolkits.html</a></td>
<td>A Good evidence to support a recommendation for use</td>
<td>All hospital facilities including ICU and non-ICU wards</td>
</tr>
</tbody>
</table>

**Strength of recommendation**
A Good evidence to support a recommendation for use  
B Moderate evidence to support a recommendation for use  
C Poor evidence to support a recommendation

**Quality of evidence**
I Evidence from x1 properly randomized, controlled trial  
II Evidence from x1 well-designed clinical trial, without randomization; from cohort or case-control analytic studies (preferably from 11 center); from multiple time series; or from dramatic results of uncontrolled experiments  
III Evidence from opinions of respected authorities, based on clinical experience, descriptive studies, or
### Evidence-Based Interventions For Improving Preventive Services Utilization with EHRs

#### Table 3: Surgical Infections: Timely Urinary Catheter Removal

<table>
<thead>
<tr>
<th>Intervention Strategy</th>
<th>Supporting Evidence</th>
<th>Study Design</th>
<th>Evidence Rating</th>
</tr>
</thead>
</table>
| ▪ Daily reminders to physicians from nursing staff  
▪ Formalized stop orders | Loeb et al., 2008 | Multicenter, randomized controlled trial in which participants were randomized to either have prewritten stop orders for urinary catheter removal placed in their charts or to usual care. In the stop-order group, nurses were to ensure catheter removal when appropriate. The intervention group had significantly fewer days of inappropriate and total urinary catheter use (1.23 vs 1.34, p<0.001), but no significant difference in urinary tract infections compared to the usual care group. | High |
| ▪ Huang et al., 2004 | Time-sequence, nonrandomized intervention study in which physicians received daily reminders from the nursing staff to remove unnecessary urinary catheters 5 days after insertion. The intervention resulted in a significant reduction in duration of urinary catheterization (from 7 plus/minus 1.1 days to 4.6 plus/minus 0.7 days, p<0.001), catheter-associated urinary tract infection per 1,000 catheter days (CAUTI)(p<0.009), and in the excess monthly cost of antibiotics for | Moderate |
CAUTI (from $4021 plus minus $1800 to $1220 plus/minus $941, p<0.004).

### Evidence-Based Interventions for Nursing Home Pressure Ulcer Reduction

<table>
<thead>
<tr>
<th>Intervention Strategy</th>
<th>Supporting Evidence</th>
<th>Study Design</th>
<th>Evidence Rating</th>
<th>Intervention Strategy</th>
</tr>
</thead>
</table>
| Best Practice-Management | Joanna Briggs Institute (JBI)
Moderate to Excellent – Best practice summary, evidence grading | Summary & grading of evidence from:
1. JBI information sheet, 1997
2. Clinical Practice Guidelines from the Royal College of Nursing & National Institute for Health & Clinical Excellence, 2005
| Best practice sheet: PUs – management of pressure related tissue damage:
PU Management Technical report:
- Optimal mgmt requires comprehensive & accurate assessment of wound history, etiology recurrence & characteristics
- Grade 1-2 PUs should be placed on high specification mattress or cushion w/ pressure reducing capabilities w/ close observation of skin changes & documented repositioning regime
- If deterioration from 1-2 or if grade 3-4: alternating pressure or CLP system should be implemented
- Dressings (such as hydrocolloids) create an environment most optimal for wound healing
- Patients w/ PUs should actively mobilize, change position independently or be repositioned as clinically indicated

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- PUs are in many cases preventable  
- A targeted prevention approach less costly than one focused on treating already established ulcers |

**Best Practice - Protocol Implementation (Hospital)**

<table>
<thead>
<tr>
<th>Griffin, et al. 2007&lt;sup&gt;8&lt;/sup&gt;</th>
<th>n=1 medical center w/ PU incidence rate of 9.4% at baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Limited – Hospital case study</strong></td>
<td><strong>Aim:</strong> Implement a PU prevention protocol to ↓ PU incidence by 50%</td>
</tr>
<tr>
<td>Skin breakdown prevention protocol</td>
<td>• Total skin assessment every 24 hrs</td>
</tr>
<tr>
<td></td>
<td>• Moisture mgmt for incontinence w/ dry flow pads, moisture barriers, skin sealants &amp; fecal incontinence pouches</td>
</tr>
<tr>
<td></td>
<td>• Braden Scale on admission &amp; every 24 hrs</td>
</tr>
<tr>
<td></td>
<td>• Pressure redistribution mattresses for all patients</td>
</tr>
<tr>
<td></td>
<td>• Low-air loss bed if Stage III or IV</td>
</tr>
<tr>
<td></td>
<td>• Scheduled audible reminders to turn patients</td>
</tr>
<tr>
<td></td>
<td>• Save Our Skins (SOS) prompts</td>
</tr>
<tr>
<td></td>
<td>• SOS champion for each unit</td>
</tr>
<tr>
<td></td>
<td>• PUs reported as “never events”</td>
</tr>
<tr>
<td></td>
<td>• “Lift team” rounds hospital every 2 hrs to help mobilize patients</td>
</tr>
<tr>
<td></td>
<td>• Monthly meeting of interdisciplinary team led by WOCN nursing</td>
</tr>
<tr>
<td></td>
<td>• Pt &amp; family education</td>
</tr>
<tr>
<td></td>
<td>• Performance audits</td>
</tr>
<tr>
<td><strong>Outcomes:</strong></td>
<td>• Hospital-acquired PUs ↓ from 9.4 to 1.5% in 5 yrs</td>
</tr>
<tr>
<td></td>
<td>• Implementation of comprehensive PU prevention program has demonstrated sustained improvements</td>
</tr>
<tr>
<td></td>
<td>• Evidence based care benefits noted:</td>
</tr>
<tr>
<td></td>
<td>➢ ↑ pt safety through ↑ care quality</td>
</tr>
<tr>
<td></td>
<td>➢ ↓ healthcare costs from pt complications</td>
</tr>
<tr>
<td></td>
<td>➢ Enhanced staff satisfaction from streamlined work processes &amp; knowing they’re providing optimal pt care</td>
</tr>
<tr>
<td><strong>Ongoing program targets:</strong></td>
<td>• ↓ # PU cases</td>
</tr>
<tr>
<td></td>
<td>• Improving pt safety</td>
</tr>
<tr>
<td></td>
<td>• ↑ service quality</td>
</tr>
<tr>
<td></td>
<td>• Limiting complications due to hospital acquired PUs</td>
</tr>
<tr>
<td></td>
<td>• Reducing costs by &gt;$3 million annually</td>
</tr>
</tbody>
</table>

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- Disposable bodyworns will guard against skin deterioration
- No-rinse cleansers preferable to soap & water to ↓ PU & skin dryness, no evidence exists for use to prevent skin tears
- Sudocrem may ↓ skin redness over zinc cream alone
- No recommendation on safety of any intervention as safety was not evaluated in any included study |

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9 JBI Topical Skin Care in Aged Care Facilities Best Practice 11(3) 2007. Issn: 1329-1874.
### Best Practice - Wound Cleaning

| Joanna Briggs Institute (JBI) | Summary & grading of evidence from systematic review of:  
1. JBI, 2003  
2. Fernandez et al. 2004 |
|-----------------------------|------------------------------------------------------------------|
| Moderate to Excellent - Best practice recommendations and evidence grading | **Best practice sheet** – Wound cleaning:  
**Wound Cleaning Technical Report**  

- Potable tap water may be appropriate cleansing solution if saline not available
- Boiled & cooled tap water effective for cleansing in absence of saline
- Irrigation with 1% povidone-iodine is effective in ↓ infection rate in contaminated wounds.
- Pressures of 13 psi effective in ↓ infection & inflammation w/ lacerations & traumatic wounds.
- Showering patients does not impact infection & healing rates of postoperative wounds; may benefit patients w/feeling of well-being, health, cleanliness.
- Showering for cleaning ulcers & other chronic wounds should be undertaken with caution.
- Whirlpool therapy may ↓ pain & inflammation in surgical wounds & ↑ PU healing rate
- Soaking in 1% povidone-iodine not effective in ↓ bacterial count

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11 JBI Solutions, techniques and pressure in wound cleaning Best Practice 10(2) 2006. Issn: 1329-1874.
12 JBI Solutions, techniques and pressure in wound cleaning Best Practice 7(1) 2003. Issn: 1329-1874
| Nutrition | AHRQ/Horn, 2009<sup>14</sup> | Summary of 6 studies related to nutritional interventions (78 studies reviewed):  
- Citation  
- Setting  
- Sample  
- Design  
- Results & conclusions  
**Aim:** Review of literature to summarize existing evidence about treatments to ↑ PU healing. | Intervention topics assessed include:  
- Nutrition  
- Support surfaces  
- Wound debridement  
- Skin cleansers  
- Hydrocolloids/wound dressings  
- Other adjunctive therapies  
- Topical agents, growth factors & skin equivalents  
- Bacterial control  
- Vacuum assisted closure  
- Negative Pressure Wound Therapy (NPWT)  
**Nutritional Intervention Results & Conclusions:**  
**Bergstrom & Braden, 1990:**  
- Monitoring nutritional status & ensuring adequate intake may help prevent & heal PUs faster  
- Patients w/out PUs & w/PUs that healed had higher caloric intake than those w/non-healing PUs  
- Patients w/non-healing PUs had lower intake of zinc  
**Breslow, et al 1993:** dietary protein 61g protein/L  
- ↓ in PU area was significantly correlated w/dietary protein intake & caloric intake  
- ↑ protein intake ↑ wound healing  
**Van Rijswijk & Polansky, 1994:** good nutritional status at baseline ↓ healing time significantly  
**Welch, et al. 1991:** Indirectly demonstrates efficacy of nutrient supplements in the few PU patients included to promote ↑ in albumin & PU healing |

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[http://www.ahrq.gov/research/pressureulcerhealing/pruhlit.htm](http://www.ahrq.gov/research/pressureulcerhealing/pruhlit.htm)
| Lee, et al. 2006<sup>15</sup> | 23 NHs w/ 89 residents w/ 132 stage II, III or IV PUs (71 residents w/108 PUs at completion) randomized to:  
- Intervention (n = 56 res; 44 residents at completion w/ 75 PUs)  
- Control (n = 33 res; 27 residents at completion w/33 PUs)  
**Exclusions**: (a) terminal diagnosis; (b) hospice care; (c) a protein-restricted diet due to renal insufficiency; (d) active metabolic or gastrointestinal diseases that might interfere with nutrient absorption, distribution, metabolism, or excretion (e) food allergies; or (f) use of corticosteroids or antibiotics for wound infection.  
**Aim**: evaluate efficacy of a concentrated, fortified, collagen protein hydrolysate supplement  
**Intervention** = standard care plus a concentrated, fortified, collagen protein hydrolysate supplement  
**Control** = standard care plus placebo  
Administered (intervention or placebo)  
- 1.5 fl oz doses orally or via feeding tube  
- 3 times daily for 8 weeks  
Wound healing assessed biweekly using the PUSH Tool.  
**Outcome measure** – change in PUSH scores at 8 wks | • After 8 weeks of treatment, intervention group had statistically significant mean ↓ in PUSH tool scores compared w/ placebo (60% reduction vs. 48% reduction)  
• PUSH tool scores showed approximately twice the rate of PU healing in treatment group compared w/ control group  
• A concentrated, fortified, collagen protein hydrolysate supplement may benefit LTC residents w/ PUs |

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<table>
<thead>
<tr>
<th>Schols, et al. 200916</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nutrition</strong> (continued)</td>
</tr>
<tr>
<td><strong>Moderate to Excellent – Literature review</strong></td>
</tr>
<tr>
<td>6 RCTs or clinical trials (CTs) w/ Oral Nutritional Supplement (ONS) enriched w/ arginine, vitamin C, &amp; zinc</td>
</tr>
<tr>
<td>Aim: Examine effect of nutritional intervention in PU care</td>
</tr>
<tr>
<td>Review of electronic &amp; conference databases from 1997- Oct 2008:</td>
</tr>
<tr>
<td>• 4 studies (2RCTs, 2CTs) examined effects of ONS in patients w/ PUs</td>
</tr>
<tr>
<td>• 2 studies (1RCT, 1CT) examined effects of ONS in patients at high risk of developing</td>
</tr>
<tr>
<td>• The ONS specifically developed for patients w/ PUs show positive effects on PU healing</td>
</tr>
<tr>
<td>• The ONS might potentially ↓ the risk of developing PUs.</td>
</tr>
</tbody>
</table>

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| Prevention & Treatment of PUs | Cullum & Petherick, 2008<sup>17</sup> | Moderate to Excellent - Systematic review | n=60 systematic reviews, RCTs or observational studies from systematic review of databases through Feb, 2007. | Summary & grading of evidence | **Aim:** Answer the following questions: 1. What are the effects of prevention interventions in people at risk of developing a PU? 2. What are the effects of treatments in people w/ PUs? | **Preventative Interventions:** 1. Pressure Relieving surfaces (bed & chair) 2. Nutritional supplements 3. Repositioning 4. Topical lotions & dressings | **Treatment Interventions:** 1. Pressure Relieving surfaces (bed & chair) 2. Debridement 3. Wound dressings 4. Electrotherapy 5. Low level laser treatment 6. Nutritional supplements 7. Surgery 8. Therapeutic Ultrasound 9. Topical negative pressure 10. Topical phenytoin | **Key Points:** • Alternative foam mattresses (ie. viscoelastic foam) ↓ incidence of PUs compared to standard hospital foam mattresses, although not sure of best alternative • Low-air-loss beds: may ↓ risk of PUs compared w/ standard intensive-care beds • Medical sheepskin overlays may ↓ risk of PUs compared w/ standard care • Hydrocellular heel supports may ↓ risk of PUs compared w/ orthopaedic wool padding • Air-filled vinyl boots w/ foot cradles & low air-loss hydrotherapy beds may ↑ risk of PUs compared w/ other pressure-relieving surfaces **Prevention/Unknown effectiveness:** • Alternating pressure surfaces • Seat cushions • Electric profiling beds • Low-tech constant low pressure supports • Repositioning • Topical lotions & dressings • Nutritional supplements **Compared to standard care in people w/PUs:** • Air-fluidised supports may ↑ healing • Hydrocolloid dressings may ↑ healing **Treatment/Unknown effectiveness:** • Alternating pressure surfaces • Debriding agents • Low-tech constant low pressure supports • Low air-loss beds • Seat cushions • Dressings other than hydrocolloid • Topical phenytoin |

| Prevention of Heel Ulcers | Walsh & Plonczynski, 200718 | n=242 hospital patients randomized to:  
• Intervention (n=46)  
• Control (n=196)  
Aim: Determine whether identification of comorbidities (plus daily Braden scale assessment and early aggressive pressure reduction interventions) would impact development of facility-acquired PUs (FAPUs) of the heel.  
Study: 4 phases:  
1. Retrospective chart audit to identify factors predictive of skin breakdown  
2. Two 10-day intervention periods  
3. Prevalence day assessments of interventions vs control  
4. Staff survey for effectiveness & satisfaction w/ products  
All groups:  
• Facility wide education  
• Revised protocol based on Braden score  
• Braden complete in first hrs of day shift  
• 2 hr turning schedule clocks in rooms  
• Waffle Heel Elevator  
Intervention group:  
• More frequent risk assessment w/ use of comorbidities & Braden scale  
• Assessment & documentation of heel skin integrity every 8 hours  
• Application of lotion daily  
• Notification of the wound care nurse if any PU developed.  
• Prevalon Pressure Relieving Heel Protector  
• Use of the Braden scale for predicting PU risk in conjunction w/ assessment of individual comorbidities is effective in ↓ risk of developing heel FAPUs  
• Early & aggressive implementation of pressure-relief & pressure-reducing products as part of the individual care plan is effective in prevention of heel FAPUs  
• Phase 2: No heel FAPUs were associated w/ the intervention.  
• Phase 3: 3 FAPUs occurred: 2 control group & 1 in intervention (pt not following intervention protocol).  
• Phase 4: significant preference to Prevalon Pressure Relieving Heel Protector effectiveness & pt/staff satisfaction w/ product |

| **PU Prevention & Disparities** | Rosen, et al. 2006 | All staff & residents from 136 bed non-profit NH | **Intervention:**  
(1) **Staff ability enhancement:**  
- Computer-based interactive video educ program on PU prevention & early detection  
- Mandated use of penlights to promote early detection  
(2) **Financial incentives:** $75/staff member if desired ↓ in PU incidence was achieved  
(3) **Real-time mgmt feedback:** information re adherence to the mandated training  
**Baseline:**  
- Black residents - higher rate of Stage II-IV PU emergence.  
- Black residents with any PU more likely to have multiple Stage II PUs compared w/ white res  
- 31.8% of PUs detected in white residents were Stage I, no Stage I PUs detected in black res  
**Intervention period:**  
- Rate of emergence of all PUs ↓ for both groups in similar trends.  
- Educintervention effectively ↓ rate of PUs for all residents & eliminated racial disparity noted at baseline. |

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| PU Prevention & Disparities | Rosen, et al. 2008 \[20\]  
Moderate – Further longitudinal analysis of Rosen, et al. 2006 \[9\] | All staff & residents from 136 bed non-profit NH  
Aim: Determine sustainability of previously incorporated interventions to reduce PU rate | 48 wk longitudinal study comparing incidence of PU in NH residents at baseline and post-intervention.  
Interventions of original study \[9\]:  
(1) Staff ability enhancement:  
(2) Financial incentives: $75/staff member if desired $↓$ in PU incidence was achieved  
(3) Real-time mgmt feedback: information re adherence to the mandated training |  
- Adherence to protocol and training compliance was 100%  
- Other intervention components not actively maintained  
- Significant reduction (P < .05) in the incidence of stage 2 or worse PUs during intervention period, but was lost during post-intervention period.  
Conclusion: $↓$ in PU unsustainable when 3 components of intervention not actively maintained  
| **PU Prevention Programs** | Hiser, et al. 2006 | 580-bed regional medical facility | 1. Lit review for evidence-based & best practices for PU prevention & treatment  
2. Interdisciplinary woundcare team  
3. Formal nsg survey revealing many attitudes towards & misconceptions about PUs.  
4. PU strategic plan developed to include:  
• Prevalence studies  
• Risk assessment based treatment plan – replaced Norton w/ Braden RAS  
• New PU Prevention Protocol (PUPP)  
• Clarify role of Certified Wound Ostomy Continence Nurse (CWOCN)  
• Education, training & development of infrastructure  
• New pressure relieving surfaces | • Strategic planning & continuous performance improvement program significantly ↓ acquired PUs (from avg of 9.2% to avg of 6.6%)  
• Overall quality of pt care & use of financial resources improved substantially.  
• Staff members’ attitudes reflect their belief that PUs are not inevitable.  
• CWOCN now seen as a resource & clinical expert.  
• Program ended early (2004) due to FL hurricanes |

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| Quality Improvement & Collaboration | Abel, et al. 2005 22 | n=20 NH in TX w/ full data (from convenience sample of 34 NHs) | Aim14: Improve use of PU prevention procedures at NHs in TX through implementation of process of care system changes in collaboration w/QIO. | Process of care system changes w/tools & educ to prevent pressure PUs Measure QIs & PU incidence rates Nov 2000-Aug 2002. | • PU incidence rates ↓ (not quite significantly) • NHs w/ greatest ↑ in QI scores had significantly lower PU incidence rates than NHs w/ least improvement in QI scores, suggesting that interventions positively affected process of care & led to ↓ in PU incidences |

| Quality Improvement & Collaboration (continued) | NHs working with Quality Improvement Organizations (QIOs) during 2002 Nursing Home Quality Initiative (NHQI) | NH#1 received:  
• Advice & encouragement about ↓ PUs.  
• Hands on educ & training by QIO  
• Data sharing  
• Onsite consultation  
• Publications  
NH #2: Interdisciplinary team for prevention  
• Dietary – health supplements  
• Rehab – positioning & mobility  
• Activities - stimulate interest  
• Housekeeping – clean environment  
• All staff educ to identify Stage 1 PUs.  
• Taking action on Stage 1 PUs  
NH #3: Prevention is primary goal  
• Full body assessment on admission  
• Preventative measures identified  
• Pressure relieving mattresses on all beds  
• Developed processes to identify problems & formulate solutions | NH#1:  
• ↓ in # of PUs from 10.4 to 7.8% in 18 mos in targeted NHs  
• Review of PU protocol:  
  ➢ Changed to pressure relieving mattresses  
  ➢ Staff training on equipment use  
  ➢ Instituted hydration processes  
  ➢ Weekly skin meetings  
  ➢ Diet considerations/adding supplements  
NH #2:  
• PUs ↓ from 10 to 5% in 18 mos.  
• One res. reports ↑ quality of life.  
• Now only Stage II PUs, no stage III or IV PUs.  
NH #3: ↓ % of PUs from 12.2 to 5.8 in 2 yrs |

<table>
<thead>
<tr>
<th>Quality Improvement &amp; Collaboration (continued)</th>
<th>Lynn, et al. 200724</th>
<th>Moderate - CMS-led collaborative of quality improvement efforts to ↓ PU (National NH Improvement Collaborative or NNHIC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NNHIC: n=52 NH from 6 multi-state LTC corporations in 39 states &amp; 29 quality improvement organizations (QIOs) led by Qualis Health in WA To participate, NHs must have:  • publicly reported PU QM data for 3rd quarter of 2003  • at least 75 certified beds</td>
<td></td>
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</tr>
<tr>
<td>Collaborative QI project.  • Quality improvement team from each NH attended 3 learning sessions &amp; summary conference. Learning sessions included:  • Faculty-led training &amp; peer-to-peer sharing  • Focus on QI methods  • Measurement  • PU prevention &amp; treatment Communication via:  • Learning sessions  • Monthly conference calls  • Email discussions  • Final conference</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NNHIC Aims:  1. Develop &amp; test QI methods to ↓ PU incidence &amp; prevalence  2. Test a national collaborative QI framework in NHs  3. ↓ PU incidence &amp; prevalence among participating NHs 50%  4. Identify effective strategies, tools, &amp; interventions  5. Encourage &amp; estimate the diffusion of improvement methods &amp; best practices in NHs. NHs monitored monthly PU prevalence &amp; incidence, healing &amp; adoption of key processes via computerized registry.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Successful Intervention themes:  • To ↑ community ties  • To ↑ organizational commitment  • To improve assessment &amp; monitoring of PU  • To improve PU prevention &amp; treatment</td>
<td></td>
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</tr>
<tr>
<td>Also reviewed: Taller, 200725</td>
<td>Limited – Editorial on NNHIC</td>
<td></td>
</tr>
<tr>
<td>At 35 regularly reporting NHs, total # of new nosocomial Stage III to IV PUs ↓ 69%.  • Facility median incidence of Stage III to IV lesions ↓ from 0.3 per 100 occupied beds/month to 0.0  • Incidence of Stage II to IV lesions ↓ from 3.2 to 2.3 per 100 occupied beds/mo  • Prevalence of Stage III to IV lesions trended down (from 1.3 to 1.1 res/100 occupied beds)  • Improvement teams reported: Stage II lesions usually healed quickly &amp; new PUs corresponded w/hospital transfer, admission, scars, obesity, and immobility &amp; w/noncompliant, younger, or newly declining res  • Results suggest that facilities can reduce incidence of Stage III to IV lesions &amp; incidence of Stage II lesions may not correlate with the incidence of Stage III to IV lesions</td>
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| Risk Assessment Scales (RAS) | Anthony, et al. 2008 | n=253 research or review papers | Inclusion criteria: Papers using quantitative methods to evaluate RAS that included sensitivity, specificity, receiver operating characteristics, inter- and intra-rater reliability. | Review of literature from 1960-2006 | Primary RAS reviewed: | • Norton Scale  
• Braden Scale  
• Waterloo Scale  
• RAS may be helpful to identify patients who need higher levels of support.  
• Clinical judgment also useful in absence of RAS scores.  
• Implementation of RAS shown to ↓ PU incidence, but it is not clear if this is due RAS or the education and training to improve clinical judgment.  
• Contradictory evidence re RAS validity |

| Two citations: Pancorbo-Hidalgo, et al. 200627 Mod to Excellent - Systematic review. 14 databases, cited by 2 Moore & Cowman, 200828 | Aim: Determine 1. Effectiveness of use of Risk Assessment Scales (RAS) for PU prevention in clinical practice 2. Degree of validation 3. Effectiveness as indicators of risk of developing a PU. Moore & Cowman, 2008 - Aim: Determine if structured, systematic PU risk assessment tools ↓ risk of PU in any setting via RCT. | • Confirmation of the lack of evidence establishing that the use of RASs ↓ PU incidence. • The Braden Scale has best validity & reliability indicators, & has been used in a large # of studies in a variety of settings. • The Braden Scale offers best risk estimate. • The Braden & Norton Scales predict PU development risk better than nurses’ clinical judgment alone • The Waterlow Scale has good sensitivity but low specificity. • No RCT evidence available to identify whether applying a policy of conducting risk assessment makes any difference to PU incidence.2 |

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| Skincare | AHRQ/Horn, 2009 | Moderate to Excellent – Literature review, link w/citation below | Summary of 3 studies re skin cleansers (from total of 78 studies reviewed) including:  
- Citation  
- Setting  
- Sample  
- Design  
- Results & conclusions  
Aim: Review of literature to summarize existing evidence about treatments to ↑ PU healing. | Intervention topics assessed include:  
- Nutrition  
- Support surfaces  
- Wound debridement  
- Skin cleansers  
- Hydrocolloids/wound dressings  
- Other adjunctive therapies  
- Topical agents, growth factors & skin equivalents  
- Bacterial control  
- Vacuum assisted closure  
- Negative Pressure Wound Therapy |

**Skin Cleanser Significant Results & Conclusions:**  
**Thompson, et al. 2005:**  
- Implementation of skin care protocols that included use of a body wash & skin protectant ↓ incidence of stage I & II PUs & ↓ healing time  
**Weller, 1991:** Dey-wash  
- In > 80% of patients, Dey-Wash cleansed the wound of exudates & debris in less than half the time of the control group w/ bulb syringe method  
- Use of Dey-Wash cleanser is both efficient and effective

### Evidence-Based Interventions for Reducing Physical Restraints Use

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### Data Feedback and Target Setting

**Baier, et al., 2008**

**Moderate – Baseline & re-measure**

n=7,091 volunteer NH using Setting Targets-Achieving Results (STAR) site to set targets for at least 1 of 2 QMs

**Aim:** Evaluate improvement among NH that set targets using NH STAR Site for 2 QMs

NHs using STAR site to set targets re:
1. Proportion of long-stay residents w/ daily PR use &
2. Proportion of high-risk long-stay residents who have pressure ulcers

NH used STAR site to evaluate clinical performance, identify targets & track achievement of targets

- Greater relative improvement in NH w/ STAR targets.
- If STAR targeting was routinely utilized & level of improvement realized by all NH nationwide, an estimated 45,000 residents would have better PR & PU outcomes at end of 1 year.

### Educational Impact on Caregiver Knowledge

**Castle, 2003**

**Excellent – RCT; however, cause-and-effect may be disputed**

**Intervention**

n=120 NH

**Control:** n=1,171 NH

NH selection: NH stratified by state w/ random sample of 10% of NH from eligible NH; excluded hosp-based and NH < 100 beds.

**Aim:** Examined whether providing outcomes info facilitated improvements in quality over a 12-mo period

30 pg report from OSCAR data (1998-1999) mailed to administrators of intervention NH in 2nd qtr of 1998 w/ rates of:
- PR use
- Urethral catheterization
- Contracture
- Pressure ulcers (PU)
- Psychotropic medication use
- Quality of care deficiencies

**Intervention NHs:**
- PR & psychotropic medication use significantly lower after 12 months
- May provide evidence that outcomes initiatives in LTC will positively affect quality of care

Unclear as to which specific interventions used by NHs upon receipt of OSCAR report, may have had the most impact on rate improvement.

### Educational Impact on Caregiver Knowledge

**Kuske, et al, 2009**

**Excellent - RCT**

96 caregivers & 210 residents

Randomized to 3 groups:
1. Education group (EG)
2. Relaxation group (RG)
3. Control group (CG)

**Aim:** Determine impact of intervention on interaction of staff & residents w/ dementia

Interventions:
- EG - 3 month training on dementia care.
- RG – relaxation training

Data collected at baseline, immediate post intervention, & 6 mo follow up.

- EG: Significant ↓ in PR use at 6 months
- EG: Significant positive effects on caregivers’ knowledge post intervention & at 6 months
- EG & RG: Caregivers’ overall competence ↑ significantly
- RG: more successful in ↓

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| Educational-Practice Nurse (APN) or Clinical Nurse Specialist | Evans, et al, 199734 | Excellent - Prospective 12 mo RCT | RE & REC: 6-month education program:  
- Ten 30-45 min. educ sessions by GNS re: PR hazards, assessing & managing resident behaviors likely to lead to PR use  
- REC: additional 12 hours/week GNS unit based consultation.  
NH PR rates observed at baseline, 6 mo, 9 mo & 12 mos. SR use excluded from PR measure. | Only REC had significant ↓ in PR prevalence at 6 months, 9 months & 12 months  
- Average ↓ in PR use at 12 months: 23% RE, 11% Ct, 54% REC  
- REC residents 25-40% more likely to have ↓ PR use (without ↑ staff, psycho-active drugs, or serious fall-related injuries) |
|---|---|---|---|---|
| | 3 NH in PA randomly assigned to 3 groups (n=463 residents at study close):  
1. n=152: 6 mo PR educ (RE)  
2. n=127: 6 mo PR educ + Geriatric Nurse Specialist (GNS) consult (REC)  
3. n=184 control (Ct) | Aim: Examine effect of 2 interventions on PR use at NH level | |
| Summary review | JBI, 200235 | Systematic review of evidence based literature addressing:  
- Do PR minimization programs safely reduce use of PR?  
- What are components of PR minimization programs in literature?  
- What interventions have been used as alternatives to PR or to ↓ need for PR?  
**Aim:** Summary of systematic review of PR focusing on:  
- PR minimization programs  
- Components of PR minimization programs | Multiple interventions addressed including:  
- Restraint free care  
- PR minimization programs  
- PR education  
- PR alternatives (table 1)  
- Management of specific populations (table 2)  
- Multiple support activities  
1. Organizational approach  
2. Minimization vs. abolition  
3. Changes in PR order  
4. Gradual process  
5. Develop a plan  
6. PR experts  
7. Resident assessment  
8. Family Participation | Restraint education with clinical consultation or restraint education alone can safely ↓ PR use in the residential care setting.  
**PR reduction programs:**  
- Incorporated educ to change org culture  
- Provide strategies for success  
- Multiple activities used to minimize PR use  
**PR education summary:**  
- Format – inservices, educ packages, mandatory & voluntary education, workshops, seminars, videos & computer assisted  
- Content: |

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| specific populations table | • PR alternatives | 9. Stereotype Patient Protocols 10. Learning from others  
|----------------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                            |                  | ➢ Impact of PR  
➢ Resident rights & autonomy  
➢ Myths & misconceptions  
➢ Ethical aspects of retraining people  
➢ Legal & legislative aspects  
➢ Dangers & adverse outcomes  
➢ Specific behavior problems  
➢ PR alternatives |