120BEvidence Tables for Chapter 9. Reducing Unnecessary Urinary Catheter Use and Other Strategies To Prevent Catheter-Associated Urinary Tract Infection: Brief Update Review

Table 1, Chapter 9. Characteristics of studies with interventions to avoid unnecessary urinary catheter use

| **Study**  **(Country)** | **Study Design** | **Population,**  **Total N** | **Interventions to avoid unnecessary catheter PLACEMENT** | **Interventions to prompt REMOVAL of unnecessary catheters** | **Other**  **Interventions** |
| --- | --- | --- | --- | --- | --- |
| Apisarnthanarak et al, 2007[1](#_ENREF_1)  (Thailand) | Pre-Post | All Inpatients,  N=2412 patients | None | **Reminder:** Nurse-generated daily bedside verbal reminders to encourage physicians to remove unnecessary UC. | None |
| Bruminhent et al, 2010[2](#_ENREF_2) (USA) | Pre-Post | Med-Surg: Ward + ICU, N=400 patients | None | **Reminder:** Sticker applied to medical record to remind physicians to discontinue unnecessary UCs. | None |
| Cornia et al, 2003[3](#_ENREF_3) (USA) | Non-randomized crossover trial | Medical (non-ICU),  N=70 patients | Computerized UC order required selection of an appropriate UC indication | **Stop order:** Computer-generated stop order for physicians to discontinue/renew UC order 72 hours after placement. | UC care  education |
| Crouzet et al, 2007[4](#_ENREF_4) (France) | Pre-Post | All Inpatients,  N=234 patients | None | **Reminder:** Daily reminders from nurses to physicians to remove unnecessary UC >=4 days after insertion. | None |
| Dumigan et al, 1998[5](#_ENREF_5) (USA) | Pre-Post | ICU: Med-Surg,  N=27103 patient-days | Guideline for appropriate UC indications | **Stop order, nurse-empowered:** Daily use of UC indication protocol by nurse empowered to remove UC no longer meeting criteria without requesting physician order. | UC care  education |
| Elpern et al, 2009[6](#_ENREF_6) (USA) | Pre-Post | ICU: Medical,  N=337 patients | Appropriate indications for UC insertion were emphasized, and list of inappropriate reasons to insert was provided. | **Reminder:** Daily review by nurses for UC indication to make recommendations for removal; removal required physician order. | None |
| Fakih et al, 2008[7](#_ENREF_7) (USA) | Pre-Post with concurrent controls | Med-Surg (non-ICU)  N=3736 intervention patient-days, and 4041 control patient-days | None | **Reminder:** Nurse generated reminder to physician to remove UC when no appropriate indication. | None |
| Fakih et al, 2010[8](#_ENREF_8) (USA) | Pre-Post | ED,  N=322 patients had UCs placed, of 2517 ED patients in sample | Institutional guidelines for appropriate UC placement, ED physician education regarding UC utilization | None | None |
| Fakih et al, 2012[9](#_ENREF_9) (USA) | Pre-Post | Statewide, N=163 inpatient units in 71 hospitals | Education intervention to promote adherence to appropriate UC indications | None | None |
| Fuchs et al, 2011[10](#_ENREF_10) (USA) | Pre-Post | ICU: Med-Surg,  N=not provided | Urinary retention protocol, including use of bladder scanner  Procedure-specific protocols for appropriate indications for UC placement | **Stop order:** Daily checklist for evaluating UCs; when not indicated, physician order was requested for removal.  **Stop order:** Procedure-specific protocols for UC removal. | None |
| Gokula et al, 2007[11](#_ENREF_11) (USA) | Pre-Post | ED,  N=200 patients with UCs placed in ED | UC indication checklist attached to UC kits | None | None |
| Gotelli et al, 2008[12](#_ENREF_12) (USA) | Pre-Post | Medical (not ICU),  N=not provided | None | **Stop order, nurse-empowered:** Nurses were empowered to assess UC need by protocol and remove if not indicated. | None |
| Huang et al, 2004[13](#_ENREF_13) (Taiwan) | Pre-Post | ICU: Med-Surg,  N=6297 patients | None | **Reminder:** Nurse generated daily reminder to physician to remove unnecessary UC 5 days after insertion. | None |
| Jain et al, 2006[14](#_ENREF_14) (USA) | Pre-Post | ICU: Med-Surg, N=13471  catheter-days | None | **Reminder:** Daily use of checklist in multidisciplinary rounds to determine if UC still indicated, then nurse contacted physician for order to removal UC if no longer indicated. | Bladder Bundle:  UC care steps,  selected use of  silver-alloy UC. |
| Knoll et al, 2011[15](#_ENREF_15) (USA) | Pre-Post | All Inpatients,  N=112,140  patient-days | Education interventions about an approved hospital list of UC indications  Computer UC order template with indication | **Stop order:** Computerized order for UC with indications and 72 h default stop date.    **Reminder:** ICU daily checklist for  UC necessity. | Bundle: UC care  education,  dedicated UC  nurse. |
| Loeb et al, 2008[16](#_ENREF_16) (Canada) | RCT | Medical (non-ICU),  N=692 patients | None | **Stop order, nurse-empowered:** Pre-written in chart for nurses empowered to discontinue UC based on criteria without an additional physician order. | None |
| Murphy et al, 2007[17](#_ENREF_17) (USA) | Pre-Post | Not explained,  N=Not provided | None | **Reminder:** Foley bag sticker with time/date of insertion to remind to nurse to notify physician when Foley in place >48h in order to request removal. | UC care  education |
| Patrizzi et al, 2009[18](#_ENREF_18) (USA) | Pre-Post | ED,  N=Not provided | Computerized ED UC order with indications, UC alternatives promoted, urinary retention protocol with bladder scanner use | None | None |
| Reilly et al, 2008[19](#_ENREF_19) (USA) | Pre-Post | ICU: Med-Surg,  N=207 patients | Developed criteria for appropriate UC placement in ICU, implemented with educational interventions regarding UC indications, and urinary retention protocol | **Reminder:** Daily use of checklist of appropriate UC indications by nurse, reminding nurse to contact physician to recommend UC removal. | UC care  education |
| Robinson et al, 2007[20](#_ENREF_20) (USA) | Pre-Post | Med-Surg (non-ICU), N=69 patients |  | **Stop order:** Nurse identified patients without appropriate indications, then requested removal order from physicians | None |
| Rothfield et al, 2010[21](#_ENREF_21) (USA) | Pre-Post | Medical ICU step-down unit,  N=99 patients | Developed list of appropriate indications for which UCs could be requested by nurses | **Stop order:** Nurses asked physicians for order to remove UCs when not indicated. | None |
| Saint et al, 2005[22](#_ENREF_22) (USA) | Pre-Post with concurrent nonequivalent controls | Intervention Group: Medical,  Control Group: Surgery.  N=3027 patients | None | **Reminder:** Study nurse generated sticker placed in chart reminding physician to generate stop order after 48 hours of UC use if no longer needed | None |
| Schultz et al, 2011[23](#_ENREF_23) (USA) | Pre-Post | ICU: unclear type,  N=Not provided | Urinary retention protocol, including use of bladder scanner | **Stop order, nurse-empowered:** Nurses were empowered to insert and remove UCs by protocol. | None |
| Seguin et al, 2010[24](#_ENREF_24) (France) | Pre-Post | ICU: Surgical,  N=1271 patients | None | **Stop order:** Daily assessment required by physicians to assess if UC is needed or not; when categorized as not indicated, then removed by nurses. | None |
| Stephan et al, 2006[25](#_ENREF_25) (Switzerland) | Pre-Post with concurrent nonequivalent controls | Surgery: Ward+ICU  Intervention: Orthopedic, N=539  Control:  Abdominal, N=489 | UC placement restrictions, urinary retention protocol | **Stop order:** Pre-operative written order to remove UC on post-operative day 1 or 2, depending on surgery. | UC care  education |
| Topal et al, 2005[26](#_ENREF_26) (USA) | Pre-Post | Medical (non-ICU),  N = 245 patients | Urinary retention protocol including bladder scanner | **Stop order:** Computerized order entry system order to prompt physicians to remove/re-order UC if placed in ED or in place >48 hours.  **Stop order, nurse-empowered:** Nurses were also empowered to remove UCs no longer needed by protocol criteria. | UC care  education |
| van den Broek et al, 2011[27](#_ENREF_27)  (The Netherlands) | Pre-Post | All Inpatients, in 5 hospitals.  N=2943 patients | Bladder scanner protocol in 2 hospitals | Intervention varied by hospital:  **Reminders:** Used by 4 hospitals, placed in patient’s record.  **Stop order:** Fixed order for removal, employed by 1 hospital. | Specially trained  UC nurse |
| Voss, 2009[28](#_ENREF_28) (USA) | Pre-Post | Medical (non-ICU),  N=187 patients age 65 or older | None | **Stop order, nurse-empowered**: Daily assessment by nurse for UC indications, with authority for nurse to remove if not indicated. | None |
| Weitzel, 2008[29](#_ENREF_29) (USA) | Pre-Post | Medical (unclear if ICU), N=50 patients | None | **Reminder:** Daily use of protocol by nurse to review if UC still indicated, unclear if protocol allowed for UC removal without physician order. | None |
| Wenger, 2010[30](#_ENREF_30) (USA) | Pre-Post | All Inpatients,  N=Not provided | None | **Stop order, nurse-empowered**: Daily assessment by nurse of UC necessity, with authority to remove if not indicated. | UC care  education,  silver-alloy UC |

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