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 scannerProcedure-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 indicationsComputer 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+ICUIntervention: 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 |

References

1. Apisarnthanarak A, Thongphubeth K, Sirinvaravong S, et al. Effectiveness of multifaceted hospitalwide quality improvement programs featuring an intervention to remove unnecessary urinary catheters at a tertiary care center in Thailand. Infect Control Hosp Epidemiol. 2007;28(7):791-8. PMID 17564980.

2. Bruminhent J, Keegan M, Lakhani A, et al. Effectiveness of a simple intervention for prevention of catheter-associated urinary tract infections in a community teaching hospital. Am J Infect Control. 2010;38(9):689-93. PMID 21034979.

3. Cornia PB, Amory JK, Fraser S, et al. Computer-based order entry decreases duration of indwelling urinary catheterization in hospitalized patients. Am J Med. 2003;114(5):404-7. PMID 12714131.

4. Crouzet J, Bertrand X, Venier AG, et al. Control of the duration of urinary catheterization: impact on catheter-associated urinary tract infection. J Hosp Infect. 2007;67(3):253-7. PMID 17949851.

5. Dumigan DG, Kohan CA, Reed CR, et al. Utilizing national nosocomial infection surveillance system data to improve urinary tract infection rates in three intensive-care units. Clin Perform Qual Health Care. 1998;6(4):172-8. PMID 10351284.

6. Elpern EH, Killeen K, Ketchem A, et al. Reducing use of indwelling urinary catheters and associated urinary tract infections. Am J Crit Care. 2009;18(6):535-41; quiz 42. PMID 19880955.

7. Fakih MG, Dueweke C, Meisner S, et al. Effect of nurse-led multidisciplinary rounds on reducing the unnecessary use of urinary catheterization in hospitalized patients. Infect Control Hosp Epidemiol. 2008;29(9):815-9. PMID 18700831.

8. Fakih MG, Pena ME, Shemes S, et al. Effect of establishing guidelines on appropriate urinary catheter placement. Acad Emerg Med. 2010;17(3):337-40. PMID 20370769.

9. Fakih MG, Watson SR, Greene MT, et al. Reducing inappropriate urinary catheter use: a statewide effort. Arch Intern Med. 2012;172(3):255-60. PMID 22231611.

10. Fuchs MA, Sexton DJ, Thornlow DK, et al. Evaluation of an evidence-based, nurse-driven checklist to prevent hospital-acquired catheter-associated urinary tract infections in intensive care units. J Nurs Care Qual. 2011;26(2):101-9. PMID 21037484.

11. Gokula RM, Smith MA, Hickner J. Emergency room staff education and use of a urinary catheter indication sheet improves appropriate use of foley catheters. Am J Infect Control. 2007;35(9):589-93. PMID 17980237.

12. Gotelli JM, Merryman P, Carr C, et al. A quality improvement project to reduce the complications associated with indwelling urinary catheters. Urol Nurs. 2008;28(6):465-7, 73. PMID 19241786.

13. Huang WC, Wann SR, Lin SL, et al. Catheter-associated urinary tract infections in intensive care units can be reduced by prompting physicians to remove unnecessary catheters. Infect Control Hosp Epidemiol. 2004;25(11):974-8. PMID 15566033.

14. Jain M, Miller L, Belt D, et al. Decline in ICU adverse events, nosocomial infections and cost through a quality improvement initiative focusing on teamwork and culture change. Qual Saf Health Care. 2006;15(4):235-9. PMID 16885246.

15. Knoll BM, Wright D, Ellingson L, et al. Reduction of inappropriate urinary catheter use at a Veterans Affairs hospital through a multifaceted quality improvement project. Clin Infect Dis. 2011;52(11):1283-90. PMID 21596671.

16. Loeb M, Hunt D, O’Halloran K, et al. Stop orders to reduce inappropriate urinary catheterization in hospitalized patients: a randomized controlled trial. J Gen Intern Med. 2008;23(6):816-20. PMID 18421507.

17. Murphy D, Francis K, Litzenberger M, et al. Reducing urinary tract infection: a nurse-initiated program. Pa Nurse. 2007;62(4):20. PMID 18286841.

18. Patrizzi K, Fasnacht A, Manno M. A collaborative, nurse-driven initiative to reduce hospital-acquired urinary tract infections. J Emerg Nurs. 2009;35(6):536-9. PMID 19914479.

19. Reilly L, Sullivan P, Ninni S, et al. Reducing foley catheter device days in an intensive care unit: using the evidence to change practice. AACN Adv Crit Care. 2006;17(3):272-83. PMID 16931923.

20. Robinson S, Allen L, Barnes MR, et al. Development of an evidence-based protocol for reduction of indwelling urinary catheter usage. Medsurg Nurs. 2007;16(3):157-61. PMID 17849921.

21. Rothfeld AF, Stickley A. A program to limit urinary catheter use at an acute care hospital. Am J Infect Control. 2010;38(7):568-71. PMID 20381918.

22. Saint S, Kaufman SR, Thompson M, et al. A reminder reduces urinary catheterization in hospitalized patients. Jt Comm J Qual Patient Saf. 2005;31(8):455-62. PMID 16156193.

23. Schultz P, Aljawawdeh A, Hopp T. EB105: Reducing use of indwelling urinary catheters with a nurse-driven protocol. Crit Care Nurse. 2011;31(2):e42.

24. Seguin P, Laviolle B, Isslame S, et al. Effectiveness of simple daily sensitization of physicians to the duration of central venous and urinary tract catheterization. Intensive Care Med. 2010;36(7):1202-6. PMID 20237761.

25. Stephan F, Sax H, Wachsmuth M, et al. Reduction of urinary tract infection and antibiotic use after surgery: a controlled, prospective, before-after intervention study. Clin Infect Dis. 2006;42(11):1544-51. PMID 16652311.

26. Topal J, Conklin S, Camp K, et al. Prevention of nosocomial catheter-associated urinary tract infections through computerized feedback to physicians and a nurse-directed protocol. Am J Med Qual. 2005;20(3):121-6. PMID 15951517.

27. van den Broek PJ, Wille JC, van Benthem BHB, et al. Urethral catheters: can we reduce use? BMC Urol. 2011;11:10. PMID 21605403.

28. Voss AB. Incidence and duration of urinary catheters in hospitalized older adults: before and after implementing a geriatric protocol. J Gerontol Nurs. 2009;35(6):35-41. PMID 19537293.

29. Weitzel T. To cath or not to cath? Nurs. 2008;38(2):20-1. PMID 18223406.

30. Wenger JE. Cultivating quality: reducing rates of catheter-associated urinary tract infection. Am J Nurs. 2010;110(8):40-5. PMID 20671495.