3M curos™
Disinfecting Port Protectors

Clinical evidence summary

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“Using a peripheral intravascular (PIV) maintenance bundle including disinfecting caps and tips can effectively lower the rate of primary bloodstream infection (BSI) attributable to PIV lines.”

Duncan M, Warden P, Bernatchez S, Morse D. A bundled approach to decrease the rate of primary bloodstream infections related to peripheral intravenous catheters. *J Assoc Vasc Access.* 2018; 23(1): 15–22.

Design

Before and after intervention study comparing hospital wide peripheral line-associated BSIs and intervention compliance.

Methods

Pre-intervention
Central line-associated bloodstream infection (CLABSI) bundle alone. This included full barrier central line insertion kit, a sterile dressing change kit, CHG dressings on all central lines (excluding burns patients and implanted ports), adhesive catheter stabilisation device and disinfecting caps for needeleless connectors on all central lines. Primary bloodstream infection (BSI) and IV catheter data collected.

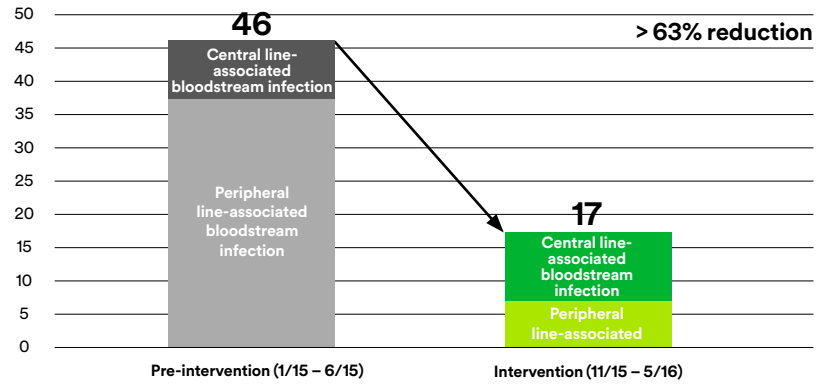
Intervention
PIV bundle implemented. 3M™ Curos Tips™ Disinfecting Cap for Male Luers added to existing CLABSI bundle for all disconnected IV tubing. Compliance monitored for PIV and CLABSI bundles.

PIV bundle elements

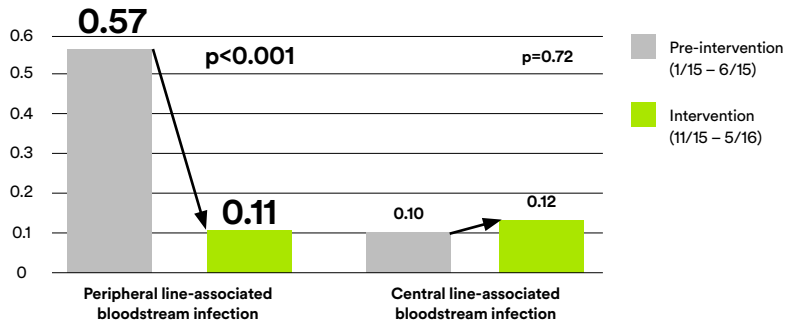
- Prohibit disconnecting IV tubing for convenience
- 3M™ Curos™ Disinfecting Cap for Needleless Connectors on all ports for all patients
- 3M™ Curos Tips™ Disinfecting Cap for Male Luers on all disconnected tubing
- Assessment of IV site, removing IV catheters with indication of phlebitis
- Assessment of dressing, changing if non-occlusive or blood is present

Results

Number of primary bloodstream infections (BSI)



Average BSI rate for peripheral and central lines (per 1000 patient days)



*Because central line-associated bloodstream infection bundle was implemented prior to study, no significant change to central line-associated bloodstream infection rate was anticipated or observed during study time period.

Compliance with protecting all needleless connectors was close to

90%

Compliance with protecting male ends of disconnected IV tubing was close to

90%

Peer reviewed

“...use of the antiseptic barrier cap can lower the occurrence of central line-associated bloodstream infection (CLABSI) and is cost saving.”

Voor in ‘t holt AF, Helder OK, Vos MC, *et al*. Antiseptic barrier cap effective in reducing central line-associated bloodstream infections: a systematic review and meta-analysis. *Int J Nurs Stud.* 2017; 69: 34–40.
Voor In ‘t Holt AF, Helder OK, Vos MC, *et al*. Corrigendum to ‘Antiseptic barrier cap effective in reducing central line-associated bloodstream infections: A systematic review and meta-analysis’ [Int J Nurs Stud. 69. (2017) 34-40]. *Int J Nurs Stud.* 2018 Aug; 84:79–80.

Design

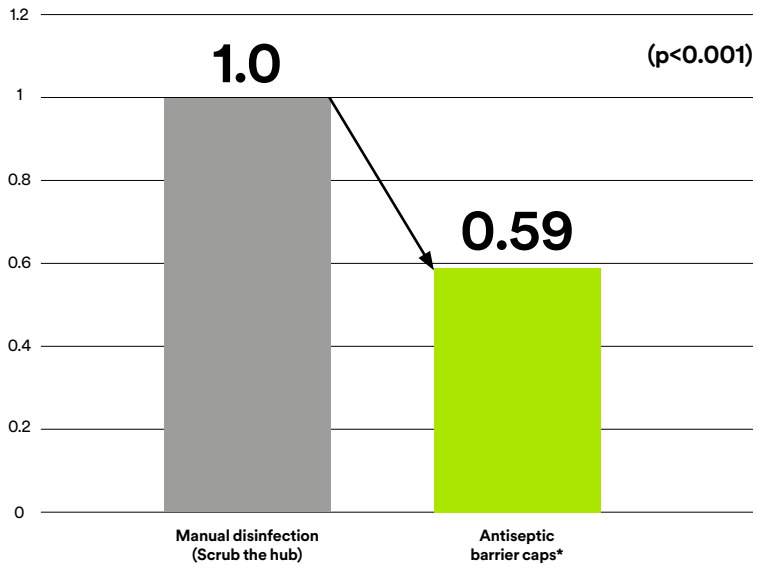
Systematic review and meta-analysis.

Methods

Studies conducted in the hospital setting that compared 3M™ Curos™ Disinfecting Cap for Needleless Connectors and SwabCap® Disinfecting Caps to manual disinfection on the incidence of CLABSI per 1000 catheter days were included.

Results

Relative pooled CLABSI (per 1000 catheter days)



Nine studies were included in the systematic review and seven within the meta-analysis.

There were
41% fewer
CLABSIs associated with use of the antiseptic barrier cap.

(IRR = 0.59, 95% CI = 0.45-0.77 p<0.001)

Overall median rate of compliance with barrier cap =
82.5%

Net cost savings ranged from
$39,050 to $3,268,990

*Curos Disinfecting Cap for Needleless Connectors and SwabCap Disinfecting Caps.

Peer reviewed

“Following implementation of the caps, the rates of central line-associated bloodstream infection (CLABSI) within the burn ICU were significantly reduced…”

Martino A, Thompson L, Mitchell C, *et al*. Efforts of a unit practice council to implement practice change utilizing alcohol impregnated port protectors in a burn ICU. *Burns.* 2017; 43: 956–964.

Background

Despite >90% compliance to the CVC bundle, the CLABSI rate in the burn ICU was higher than benchmark.

Design

Prospective before and after intervention study comparing CLABSI rates in burn patients with CVCs.

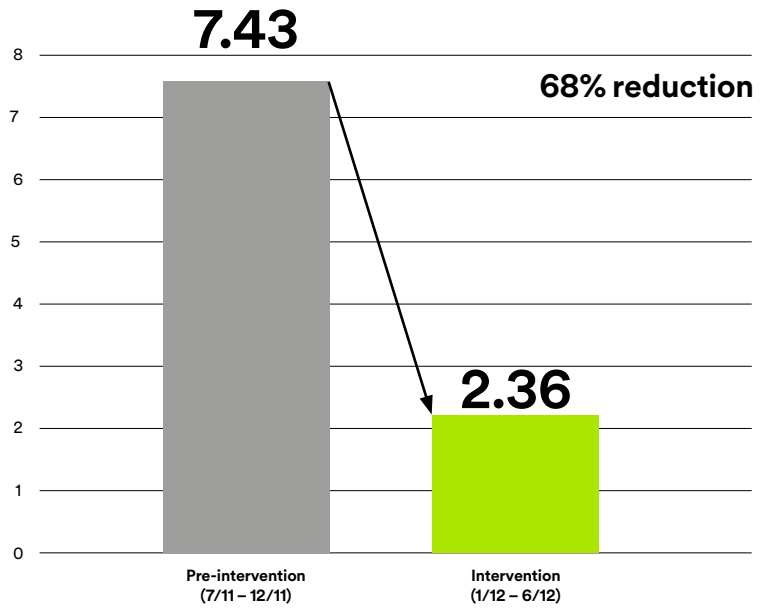
Methods

Pre-intervention
CDC recommended CVC bundle and scrub the hub protocol.

Intervention
3M™ Curos™ Disinfecting Cap for Needleless Connectors added to CVC bundle as a standard of care Jan 2012.

Results

CLABSI rate (per 1000 central line days)



The number of central line days was 673 before and 1272 after bundle implementation.

The overall trend of Central Line-Associated Bloodstream Infection rates decreased from 2009 to 2014 (p=0.0045).

”… ease of use with the caps simplified daily tasks, leading to higher compliance.”

Peer reviewed

The number of vascular access device (VAD) related bacteraemias was reduced by 69% when compliance with 3M™ Curos™ cap placement was 80% or more.

Cameron-Watson C. Port protectors in clinical practice: an audit. *Br J Nurs.* 2016; 25(8): S25–S31.

Design

Before and after intervention study comparing VAD related bacteraemia for CVCs, PIVs and arterial lines from four wards at two hospital sites.

Methods

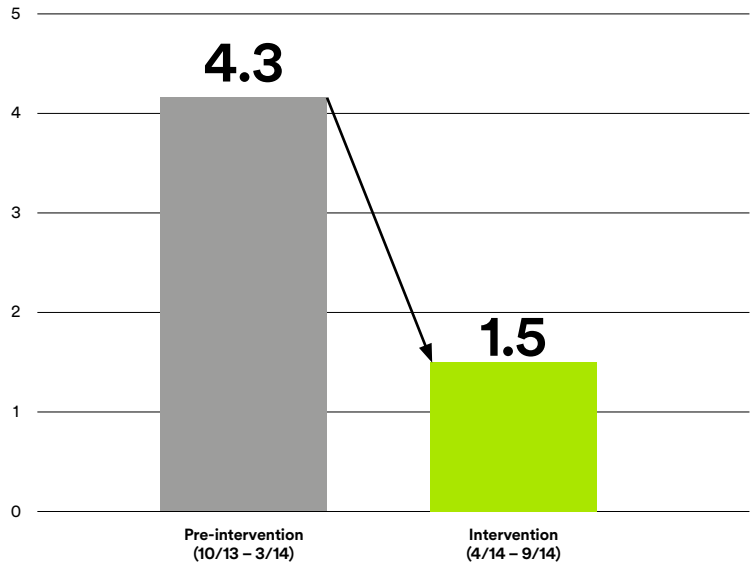
Pre-intervention
Scrub the hub using CHG/IPA wipes prior to IV access.

Intervention
3M™ Curos™ Disinfecting Cap for Needleless Connectors placed on all needleless devices.

Post intervention
Scrub the hub protocol resumed.

Results

VAD related bacteraemia rate



Infection rates began to increase when scrub the hub was resumed in the post intervention period (10/14 – 3/15).

Compliance to protocol increased from **27% to 80%** during the intervention period.

100% of staff surveyed preferred disinfecting caps.

92% of patients provided positive feedback.

Estimated potential time savings from passive disinfection compared to scrub the hub equated to **82.4** working days/year.

Estimated cost savings during the 6-month study period with passive disinfection = **£381,168.33**

Peer reviewed

“Application of the bundle resulted in a significant and sustained reduction in central line-associated bloodstream infection (CLABSI) in long-term acute care hospitals (LTACHs) for 14 months.”

Grigonis AM, Dawson AM, Burkett M, *et al*. Use of a central catheter maintenance bundle in long-term acute care hospitals. *Am J Crit Care.* 2016; 25(2): 165–172.

Design

Before and after intervention study comparing CLABSI in patients with CVCs from 30 LTACHs.

Methods

Pre-intervention
No formal standardized CVC maintenance protocol in place.

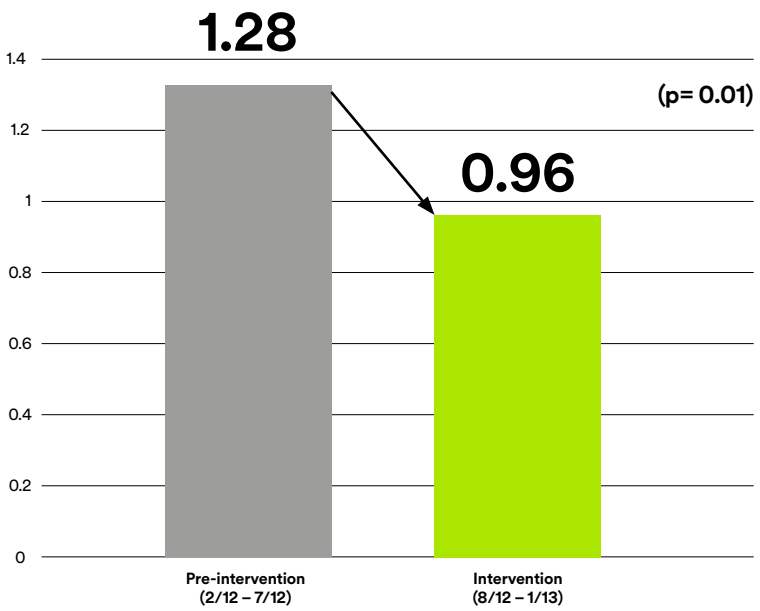
Intervention
Implementation of CVC maintenance bundle and care team trained on CVC care.

CVC bundle

- CDC guideline recommendations
- Mandatory use of 3M™ Curos™ Disinfecting Cap for Needleless Connectors on all IV needleless connectors
- Chlorhexidine gluconate dressings

Results

CLABSI standarized infection ratio (SIR)



The number of central line days was 120,137 before and 119,412 after bundle implementation.

The study concluded that a mean reduction of 4.5 CLABSIs per LTACH occurred for the LTACHs studied for 14 months after the bundle was implemented. The infection reduction could have potentially saved

20 patients’ lives.*

*assuming a 15% mortality rate

Estimated potential savings of approximately

$3.7 million

for the LTACHs studied.

Peer reviewed

“Disinfectant cap use was associated with an estimated savings of almost $300,000 per year in the hospital studied.”

Merrill KC, Sumner S, Linford L, Taylor C, Macintosh C. Impact of universal disinfectant cap implementation on central line-associated bloodstream infections. *Am J Infect Control.* 2014; 42: 1274–1277.

Design

Before and after intervention study comparing central line-associated bloodstream infection (CLABSI) rates and estimated costs in patients (newborn to adult) with CVCs and PIVs from 13 units at a Level 1 Trauma Center.

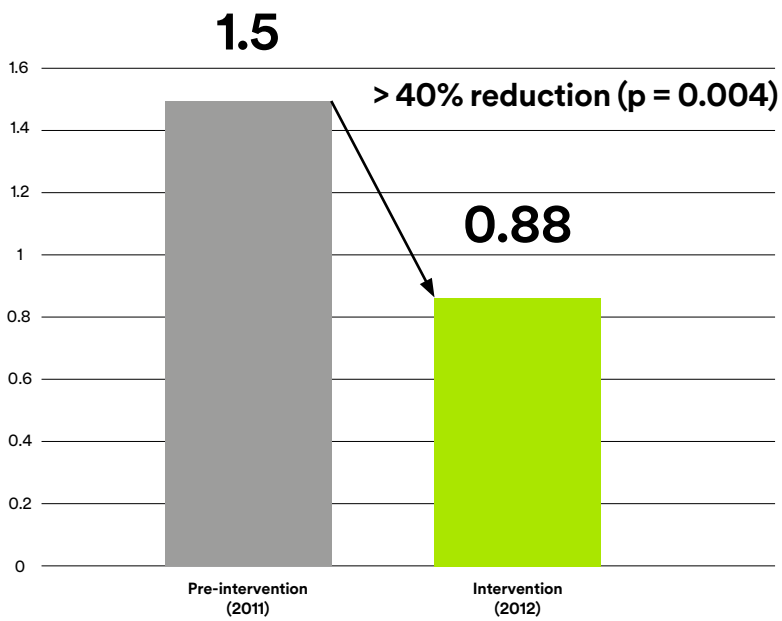
Methods

Pre-intervention
Standard central line bundle of care.

Intervention
3M™ Curos™ Disinfecting Cap for Needleless Connectors placed on CVC, PIV catheter and IV tubing needleless connectors.

Results

Mean CLABSI rate (per 1000 catheter days)



20%
increase in compliance was associated with
7%
drop in infection rates.

Estimated decrease of
68 patient
hospital days after cap implementation.

Estimated annual savings =
$282,840

Download full clinical study

Peer reviewed

“The implementation of the port protector cap system resulted in lower infection rates compared with an alcohol swab technique.”

Ramirez C, Lee AM, Welch K. Central venous catheter protective connector caps reduce intraluminal catheter-related infection. *J Assoc Vasc Access.* 2012; 17(4): 210–213.

Design

Before and after intervention study comparing central line-associated bloodstream infection (CLABSI) rates in patients with CVCs from 2 ICUs.

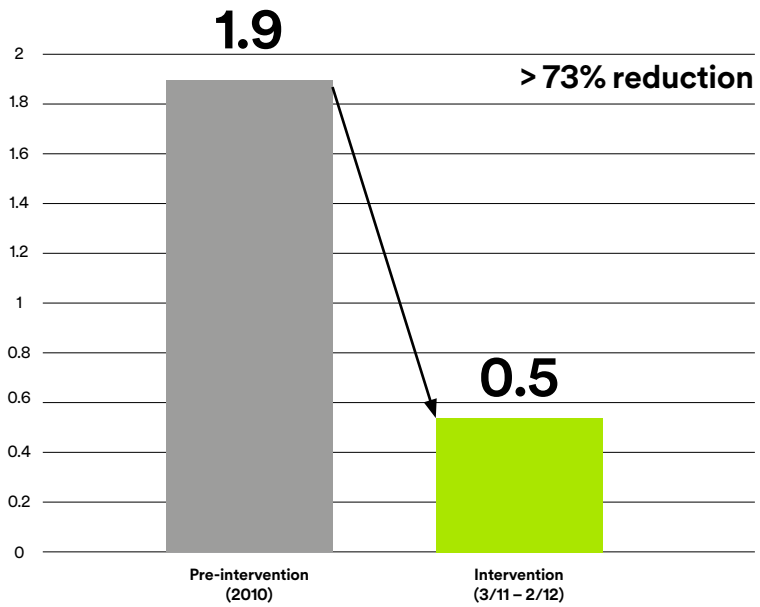
Methods

Pre-intervention
Scrub the hub protocol.

Intervention
3M™ Curos™ Disinfecting Cap for Needleless Connectors placed on all CVC and IV tubing needleless connectors.

Results

CLABSI rate (per 1000 catheter days)



Compliance increased from **63%** to **80%** after moving from single caps to multiple cap strips to hang on IV pole for bedside access.

The trial resulted in a calculated net savings of **$39,050**

Download full clinical study

Peer reviewed

Implementation of port protectors and needleless neutral pressure connectors was associated with a significant reduction in the rate of central line-associated bloodstream infections (CLABSIs) and contaminated blood cultures (CBCs).

Sweet MA, Cumpston A, Briggs F, Craig M, Hamadani M. Impact of alcohol-impregnated port protectors and needleless connectors on central line-associated bloodstream infections and contamination of blood cultures in an inpatient oncology unit. *Am J Infect Control.* 2012; 40(10): 931–934.

Design

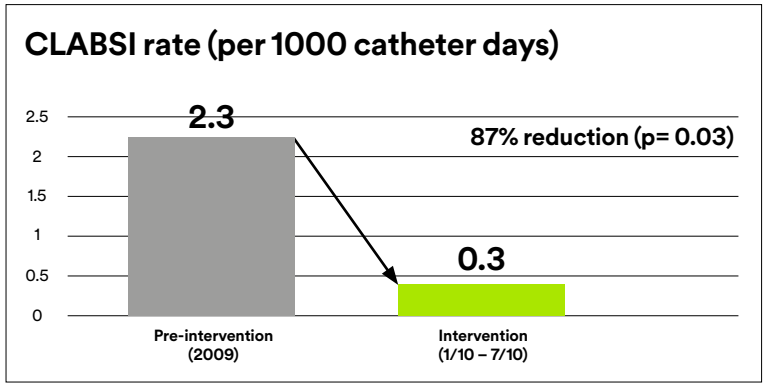
Before and after intervention study comparing CLABSI and CBC rates in adult haematology and oncology patients with CVCs.

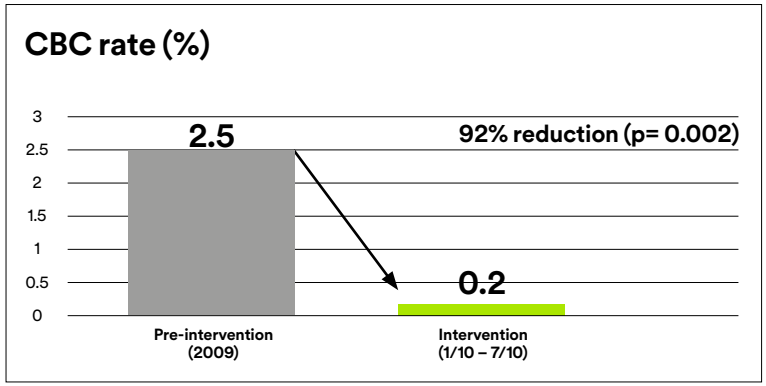
Methods

Pre-intervention
Scrub the hub protocol.

Intervention
Needleless neutral pressure connectors and 3M™ Curos™ Disinfecting Cap for Needleless Connectors placed on CVC hubs.

Results





The number of central line days was 6,851 in the pre-intervention and 3,005 in the intervention period.

Compliance to the intervention =

85.2%

Post-intervention central line-associated bloodstream infection (CLABSI) rate improved from 5.2 to 0.4 per 1000 line days in 2014 (p<0.05).

Karam-Howlin R, Fede A, Gibbs K, Bravo N, Wallach F, Patel G. Successful decrease of central line-associated bloodstream infections in an urban neonatal intensive care unit using a pediatric-specific interdisciplinary approach. *Am J Infect Control.* 2015; 43(6): S58.

Design

Before and after intervention study comparing CLABSI in NICU patients.

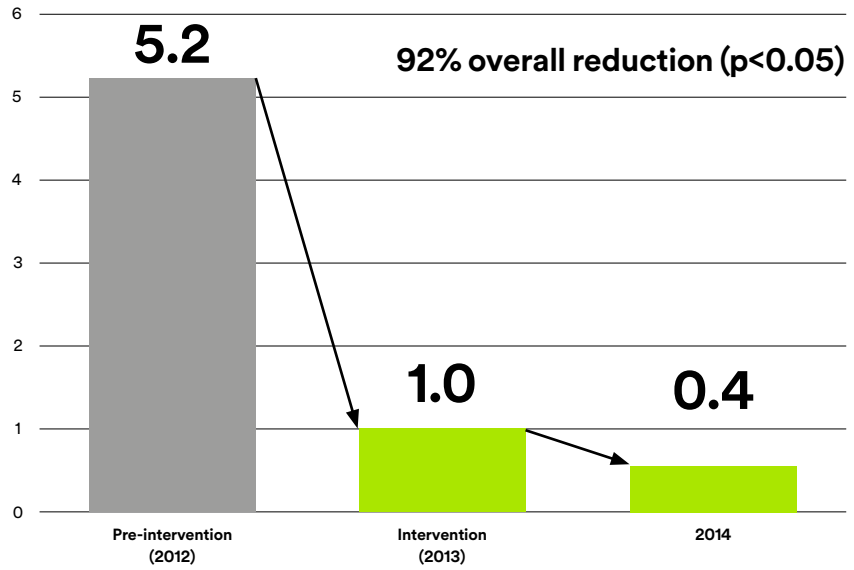
Intervention

Implementation of an interdisciplinary pediatric CLABSI committee and multiple interventions including:

- Insertion checklist, placement of non-emergent lines in dedicated procedure room
- Daily assessment of line necessity
- Daily assessment of dressing, exit site and presence of 3M™ Curos™ Disinfecting Cap for Needleless Connectors

Results

CLABSI rate (per 1000 line days)



View abstract

By utilising disinfecting caps compliance is more accurate and a significant reduction can be seen in the burden of central line-associated bloodstream infections (CLABSIs).

Jimenez A, Barrera A, Madhivanan P. Systematic review on impact of use of disinfectant caps protectors for intravenous access ports on central line-associated bloodstream infections (CLABSIs). *Open Forum Infectious Diseases.* 2015; 2(1): 281.

Design

Systematic review.

Methods

A systematic review was conducted according to the MOOSE guidelines using MEDLINE, EMBASE, CINAHL, Scopus and the Cochrane Database without any limits. Searches were conducted to identify articles needing inclusion criteria and were independently screened by the authors.

Results

CLABSI reduction ranged from

30% to 87%

in the 9 studies included in the systematic review.

9 quasi-experimental studies examining the effect of 3M™ Curos™ Disinfecting Cap for Needleless Connectors and Swabcap® Disinfecting Caps on CLABSI were included.

View abstract

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Implementation of disinfecting caps was associated with a reduced rate of hospital wide central line-associated bloodstream infection (CLABSI).

Danielson B, Williamson S, Kaur G, Johnson N. A significant decline in central line-associated blood stream infections using alcohol-impregnated port protectors at a large non-profit acute care hospital. *Am J Infect Control.* 2014; 42(6): S16.

Design

Before and after intervention study comparing hospital wide CLABSI standardized infection ratios (SIR).

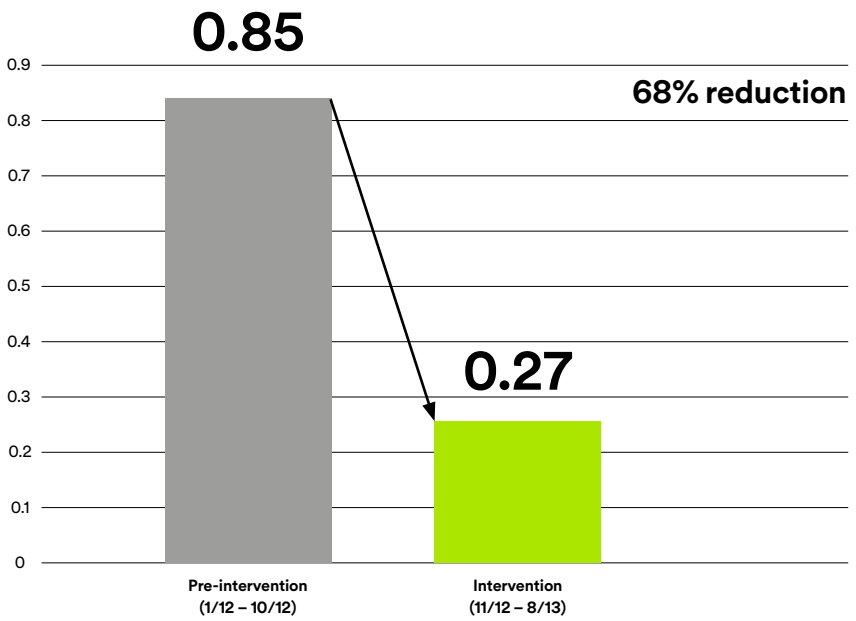
Methods

Pre-intervention
15 second scrub the hub protocol.

Intervention
Implemented 3M™ Curos™ Disinfecting Cap for Needleless Connectors hospital wide.

Results

Adult CLABSI SIR



View abstract

“When disinfectant caps were used on all IV ports, the rate of both central line-associated bloodstream infection (CLABSI) and nosocomial bloodstream infection (BSI) fell significantly.”

Shelly M, Greene L, Brown L, Romig S, Pettis AM. Alcohol-impregnated disinfectant caps reduce the rate of central-line associated bloodstream infections and nosocomial bacteremia. Presented at: IDWeek annual meeting; October 10, 2014; Philadelphia, PA.

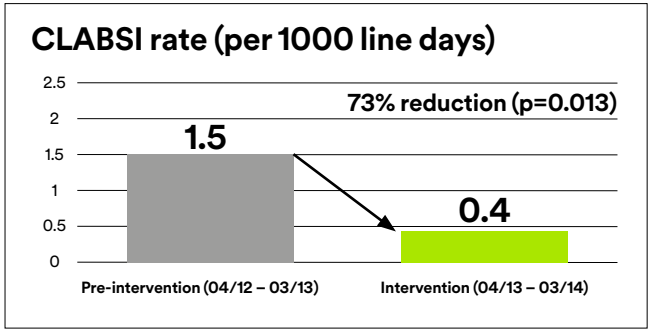
Design

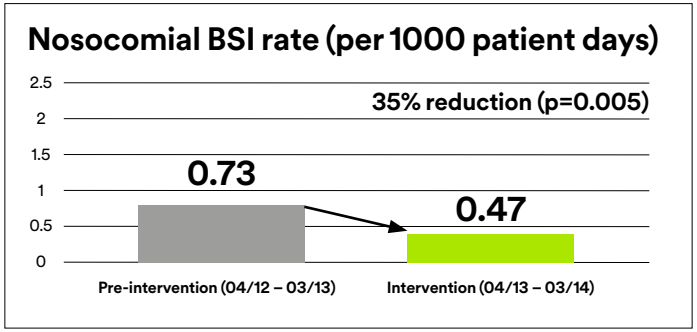
Before and after intervention study comparing CLABSI and nosocomial BSI in 4 hospital units (ICU, step down, 2 med/surg units).

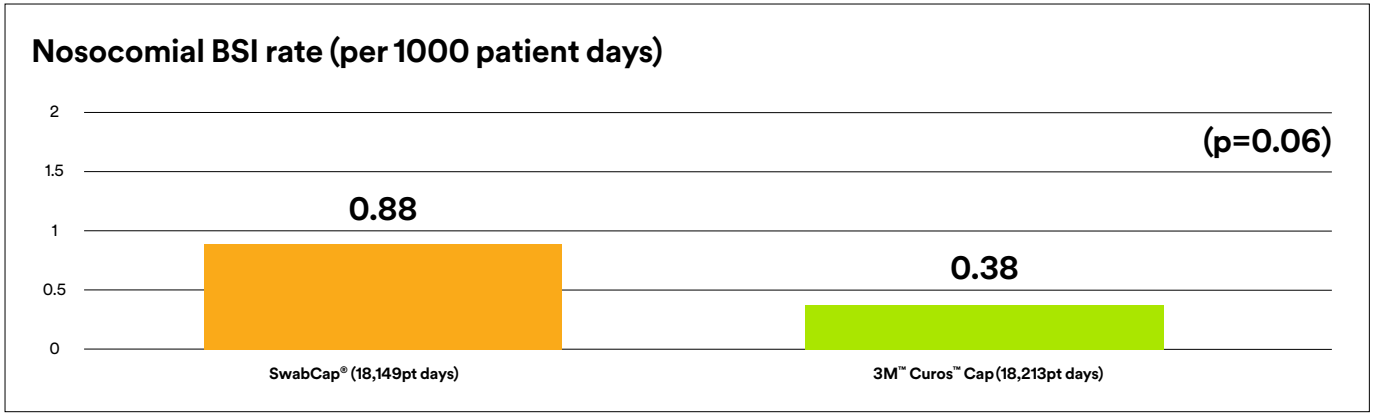
Intervention

3M™ Curos™ Disinfecting Cap for Needleless Connectors or Swabcap® Disinfecting Caps placed on all needleless IV access hubs of peripheral and central lines.

Results







The number of line days was 10,441 in the baseline and 9,536 in the intervention period.

In units that did not implement disinfectant caps, there was no significant difference in CLABSI or nosocomial BSI rates.

99.3% of patients were compliant with the intervention and 99.6% were extremely happy with in-home use of disinfecting caps.

Small M. The impact of 70% isopropyl alcohol port protection caps on catheter related bloodstream infection in patients on home parenteral nutrition. Presented at: World Congress Vascular Access; June 20, 2014; Berlin, Germany.

Design

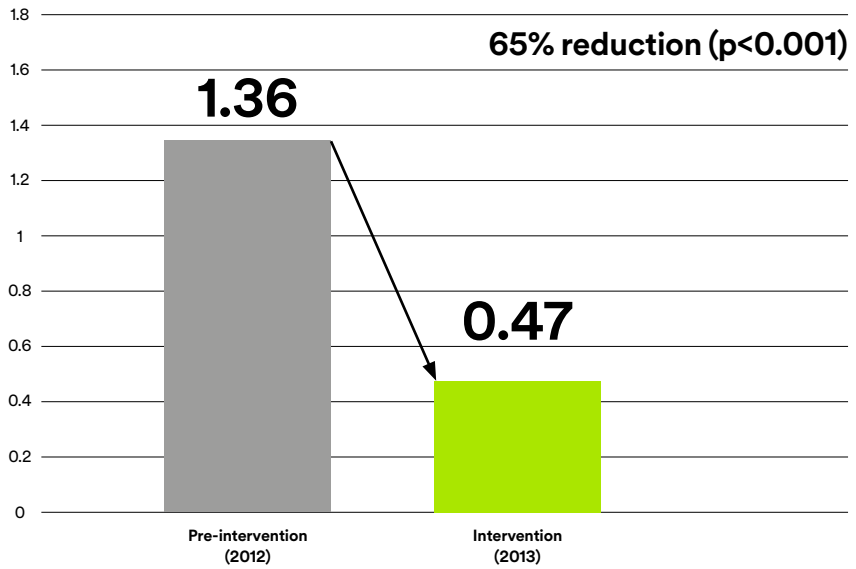
Before and after intervention study comparing catheter-related bloodstream infections (CRBSI) in-home care patients on parenteral nutrition.

Intervention

3M™ Curos™ Disinfecting Cap for Needleless Connectors placed on needleless connectors and patients instructed to continue to actively disinfect the hub after cap removal, immediately before access.

Results

Mean CRBSI rate (per 1000 catheter days)



99.3%
of patients were compliant.

99.6%
of patients were extremely happy with the product.

View abstract

A significant decline in the incidence of central line-associated bloodstream infections (CLABSIs) was observed after the addition of 3M™ Curos™ disinfecting caps to an existing central line bundle.

Danielson B, Williamson S, Kaur G, Brooks C, Scholl P, Baker A. Decreasing the incidence of central line-associated blood stream infections using alcohol-impregnated port protectors (AIPPS) in a neonatal intensive care unit. *Am J Infect Control.* 2013; 41(6): S97–S98.

Design

Before and after intervention study comparing CLABSI standardized infection ratios (SIR) in level 3 NICU patients.

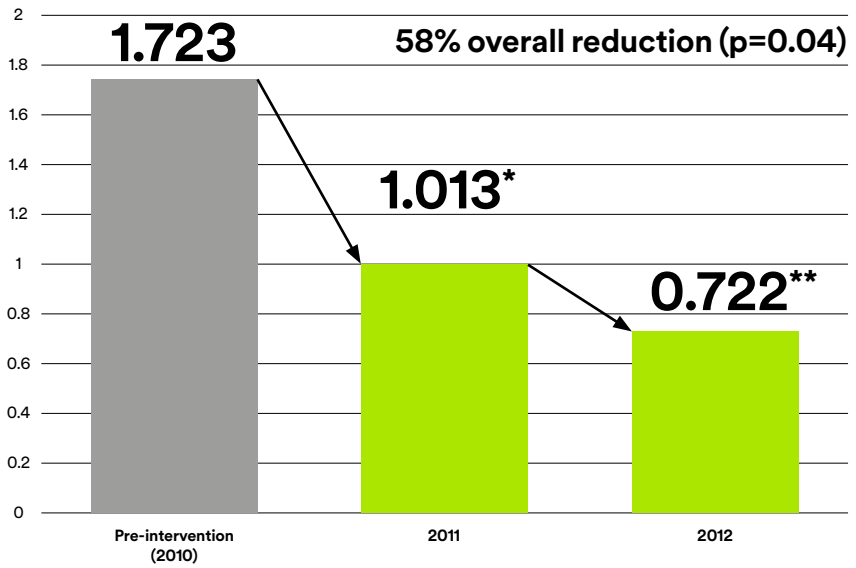
Methods

Pre-intervention
Evidence-based central line bundle including 15 second scrub the hub protocol.

Intervention
Implemented 3M™ Curos™ Disinfecting Cap for Needleless Connectors on IV access ports.

Results

CLABSI SIR



*Intervention began Q1 2011; Results included Q4 2011 when Curos disinfecting caps not in use.

**Use of Curos disinfecting caps resumed January 2012.

View abstract

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“The use of a disinfectant cap is effective in reducing the rate of central line-associated bloodstream infection (CLABSI) and contaminated blood cultures and provides a substantial cost savings.”

Sumner S, Merrill KC, Linford L, Taylor C. Decreasing CLABSI rates and cost following implementation of a disinfectant cap in a tertiary care hospital. *Am J Infect Control.* 2013; 41(6): S37.

Design

Before and after intervention study comparing CLABSI and nursing compliance in a Level I Trauma Center.

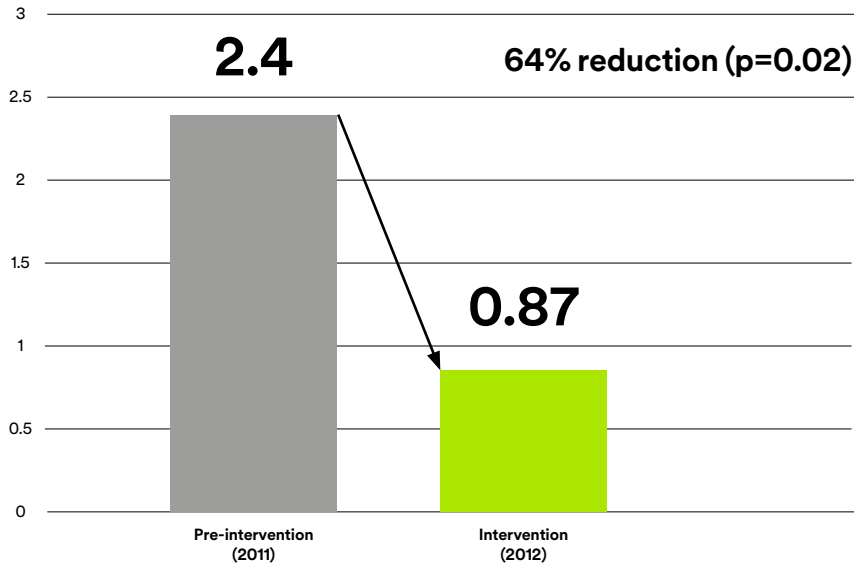
Methods

Pre-intervention
Baseline data found that 55% of nurses scrub the needleless connector for <5 seconds.

Intervention
3M™ Curos™ Disinfecting Cap for Needleless Connectors implemented on all central and peripheral IV catheter needleless connectors in all inpatient departments (excluding womens’ services).

Results

CLABSI rate (per 1000 line days)



There was a non-significant decrease in contaminated blood cultures from **2.5%** before to **1.4%** after intervention.

Nursing compliance to the disinfecting cap increased significantly from **73%** to **88%** during the study (p=0.01).

Total estimated cost savings per month **$95,000**

View abstract

Following discontinuation of disinfecting caps, the catheter-associated bloodstream infection (CABSI) rate returned to the pre-intervention rate.

Alasmari F, Kittur ND, Russo AJ, *et al*. Impact of alcohol-impregnated protectors on incidence of catheter-associated blood stream infections. Presented at: IDWeek annual meeting; October 18, 2012; San Diego, CA.

Design

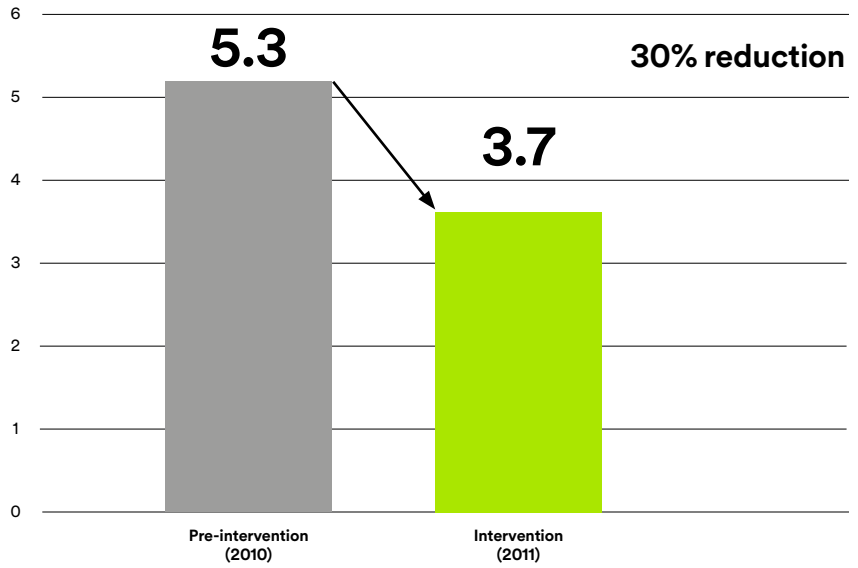
Before and after intervention study comparing CABSI between a control and intervention unit caring for acute leukaemia and stem cell transplant patients.

Intervention

Implementation of 3M™ Curos™ Disinfecting Cap for Needleless Connectors on CVC needleless connectors.

Results

Median CABSI rate (per 1000 central line days)



The number of central line days was 20,126 in the pre intervention and 20,206 in the intervention period.

Analysis of CABSI rate in a control unit during the same time periods were 5.6 (2010) and 5.4 (2011) per 1000 central line days.

View abstract

The central line-associated bloodstream infection (CLABSI) rate decreased 68% during the first year after implementation of 3M™ Curos™ disinfecting cap, used in conjunction with other CLABSI prevention measures.

Pong A, Salgado C, Speziale M, Grimm P, Abe C. Reduction in central line associated bloodstream infection (CLABSI) in a neonatal intensive care unit with use of access site disinfection caps. Presented at: Infectious Disease Society of America annual meeting; October 21, 2011; Boston, MA.

Design

Before and after intervention study comparing CLABSI and blood culture contamination in level 4 NICU patients.

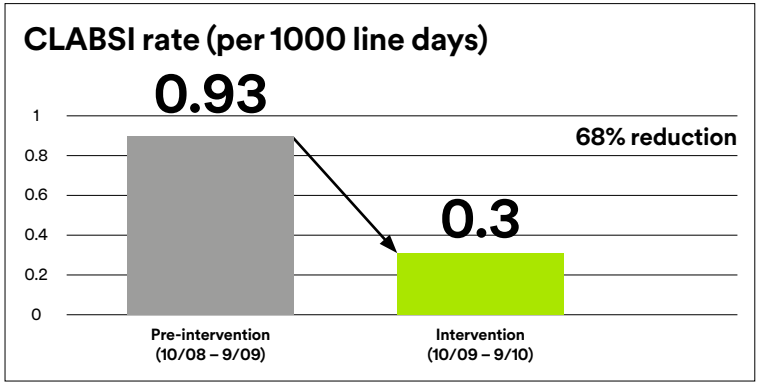
Methods

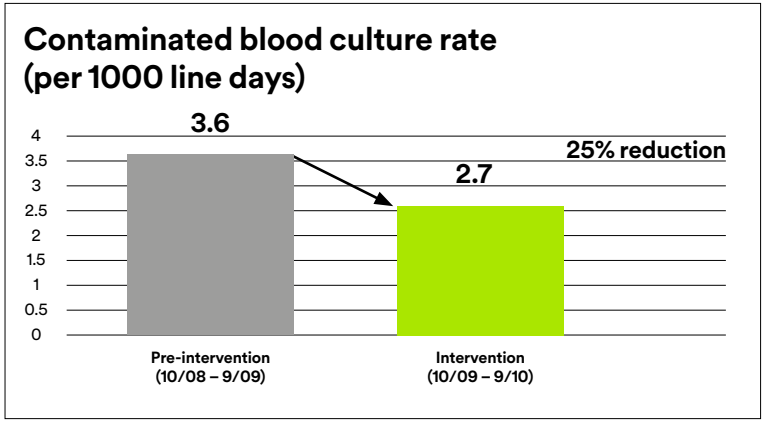
Pre-intervention
CLABSI prevention measures in place:

- Sterile insertion technique
- Hand hygiene
- Hub cleansing with access
- Standards for dressing and tubing changes
- Prompt catheter removal

Intervention
3M™ Curos™ Disinfecting Cap for Needleless Connectors added to all CVC needleless connectors.

Results





The number of central line days was 7,533 in the pre-intervention and 6,782 in the intervention period.

Additional resources

Abstracts

Hignell P. Improving customer quality experience and outcomes with use of alcohol-impregnated disinfection caps. Presented at: Fraser Health Canada Patient Experience Conference; November 2017; Surrey, British Columbia.

Levy ZD, Ledoux DE, Lesser ML, White T, Rosenthal JM. Rates of iatrogenic ventriculitis before and after the use of an alcohol-impregnated external ventricular drain port cap. *Am J Infect Control.* 2017; 45: 92-93.

Kaur G. An interdisciplinary approach to reduce intensive care unit (ICU) central line-associated bloodstream infections (CLABSI) using LEAN Six Sigma. *Am J Infect Control.* 2015; 43(6): S64.

Shiber J, Jolicoeur G, Crouchet T. Reducing central line-associated bloodstream infections through the addition of disinfecting port protectors. Presented at: Ochsner Research Day; May 20, 2014; New Orleans, LA.

Miskill M, Bellard E. Implementing alcohol impregnated port protectors as a means to decrease central line-associated bloodstream infections. Carolinas HealthCare System, Charlotte, NC, 2014.

Kelleher J, Almeida R, Cooper H, Stauffer S. Achieving Zero CoN CLBSI in the NICU. Providence Sacred Heart Medical Center and Children's Hospital, Spokane, WA, 2013.

Cole M, Kennedy K. Decreasing central line-associated blood stream infections (CLABSIs) in adult ICUs through teamwork and ownership. Grady Health System, Atlanta, GA, 2013.

Moore MJ, Gripp K, Cooper H, Almeida R. Impact of port protectors on incidence of central line infections. Providence Sacred Heart Medical Center, Spokane, WA, 2013.

Davis M. Forcing the function: implementation and evaluation of an IV port protector to decrease Central Line-Associated Bloodstream Infection. Legacy Health, Portland, OR, 2013.

Beauman S, Chance K, Dalsey M, *et al*. California Children's Services (CCS) neonatal infection prevention project phase 3: 2009 (Oct) – 2011 (June) in association with California Perinatal Quality Care Collaborative (CPQCC).

Articles

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