Can the implementation of a Peripheral Intravenous Catheter (PIVC) bundle reduce bloodstream infection (BSI)?

A systematic review

2018 ACIPC conference, Brisbane

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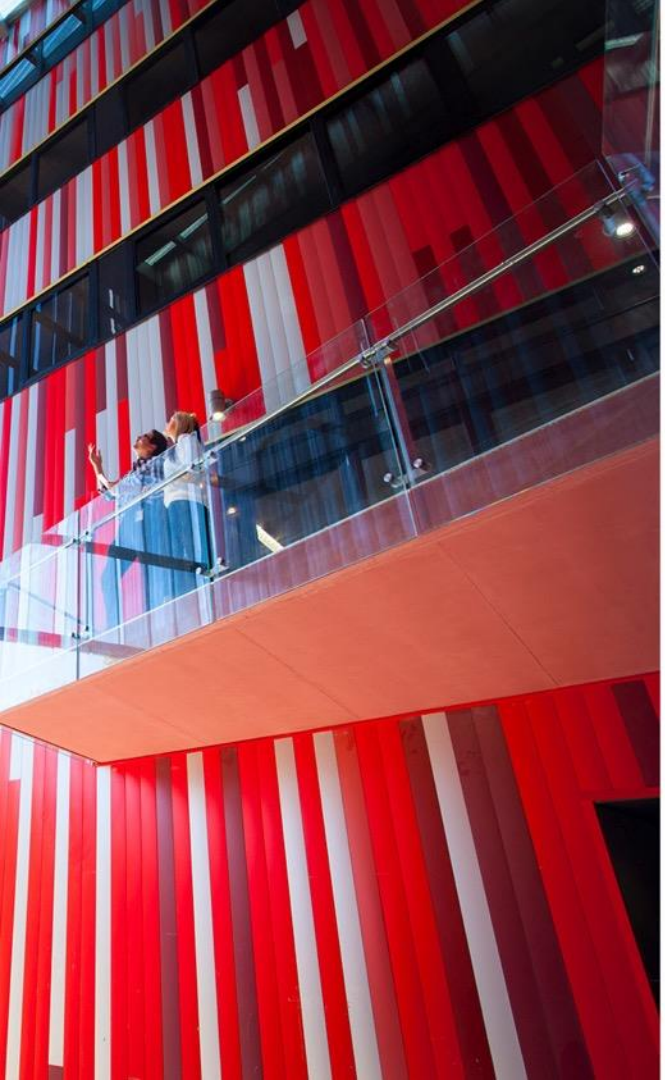

Research team

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The NEW ENGLAND JOURNAL of MEDICINE

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An Intervention to Decrease Catheter-Related Bloodstream Infections in the ICU

Peter Pronovost, M.D., Ph.D., Dale Needham, M.D., Ph.D., Sean Berenholtz, M.D., David Sinopoli, M.P.H., M.B.A., Haitao Chu, M.D., Ph.D., Sara Cosgrove, M.D., Bryan Sexton, Ph.D., Robert Hyzy, M.D., Robert Welsh, M.D.,

The **CVAD bundle** can reduce **Central Line-Associated Blood Stream Infection** (CLABSI) to zero in adult intensive care units.

are common, costly, and potentially lethal.

METHODS

We conducted a collaborative cohort study predominantly in ICUs in Michigan. An evidence-based intervention was used to reduce the incidence of catheter-related

Studies in Business and Education (D.S.), and the Bloomberg School of Public Health (H.C.), Johns Hopkins University, Baltimore; and the University of Michigan, Ann Arbor (R.H.); William Beaumont Hos-

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What is in the CVAD bundle?

1) **Hand washing**
2) Using **full-barrier precautions** during the insertion of central venous catheters
3) Cleaning the skin with **chlorhexidine**
4) **Avoiding the femoral site** if possible
5) **Removing unnecessary** catheters

Pronovost P, Needham D, Berenholtz S, et al. An intervention to decrease catheter-related bloodstream infections in the ICU. N Engl J Med 2006; 355: 2725-2732.

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Research Question

What is the impact of **PIVC insertion or maintenance bundles** on prevalence of **PIVC-related BSI** in hospital patients?

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Method

Systematic review

Cochrane Effective Practice and Organisation of Care (EPOC) guidelines

Database search

6 databases:
- Pubmed
- CINAHL
- EMBASE
- Medline
- Cochrane CENTRAL
- ISI Web of Science

Grey literature

Trial registries

Inclusion criteria

- PIVC insertion or maintenance care bundle (> 2 components)
- English
- 2000- 2018

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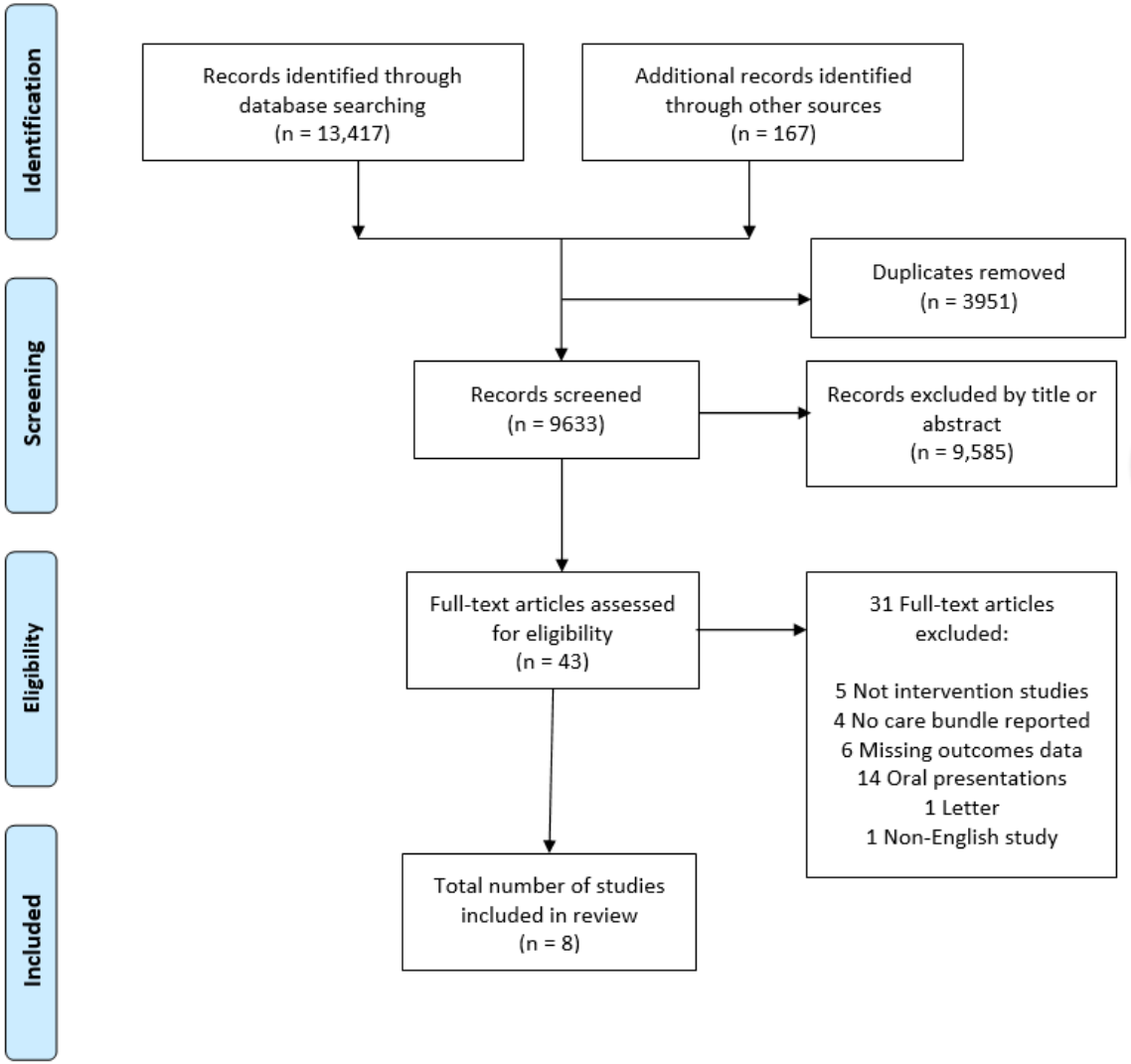
PRISMA



8 studies included:

- 4 interrupted time-series

- 4 controlled before-after

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Quality assessment:
Downs and Black checklist

Excellent (26-28)

Good (20-25)

Fair (15-19)

Poor (≤ 14)

1) Reporting
2) External validity
3) Internal validity: bias
4) Internal validity: confounding (selection bias)
5) Power

Quality: **POOR** (3 studies) - **FAIR** (5 studies)

Downs, S. H., & Black, N. The feasibility *of* creating *a* checklist *for the* assessment *of the* methodological quality both *of* randomised *and* non-randomised studies *of* health care interventions. *J Epidemiol Community Health.* 1998*;52(6):377-84.*

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Results

Insertion Bundle Components

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Results

Maintenance Bundle Components

Phlebitis Scale

0	No clinical symptoms
1	Erythema, with or without pain
2	Erythema and pain, with or without edema
3	Erythema, pain, and/or edema and palpable cord
4	Erythema, pain And/or edema Palpable venous cord > 1 inch Streak formation Purulent drainage

Dressing integrity

IV patency

Routine resite

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How can we compare?

Inconsistency between bundles

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Implementation strategies

Education & training

8 studies

Audits & compliance monitoring

5 studies

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Reported outcomes in BSI reduction

- 6/8 studies reported reduction (19%-81%) in PIVC induced BSIs/bacteremia/MRSA bacteremia
- 1/8 had no effect
- 1/8 had no BSI detected

Disparity among bundles means we can't compare these results!

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Conclusion

- Current PIVC insertion and maintenance bundles include **diverse** interventions.
- The methodological quality is varied from **poor to fair**.
- **Which components** are effective in reducing BSI remains **uncertain**.

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Recommendation:

Consistency of PIVC bundle components and more **high quality** studies are required!!

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THANK YOU

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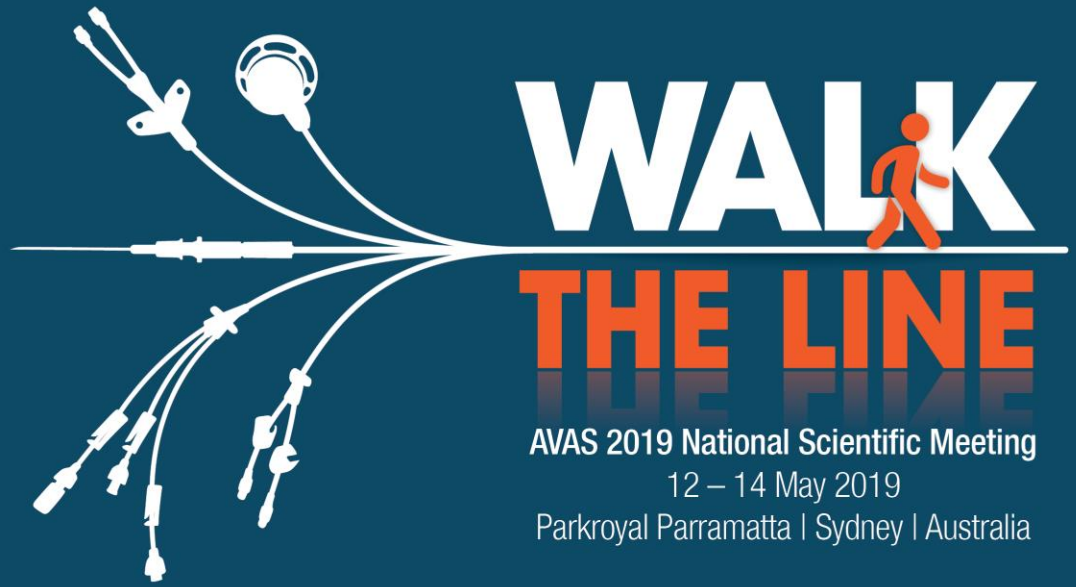

WALK THE LINE

AVAS 2019 National Scientific Meeting

12 – 14 May 2019

Parkroyal Parramatta | Sydney | Australia

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