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Bundles for Vascular Access in a Neonatal Population

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What are Care Bundles?

- A set of three to five evidence-informed practices performed collectively and reliably to improve the quality of care.
- Care bundles are used widely across healthcare settings with the aim of preventing and managing different health conditions.


They say there's
"no magic bullet".

Effect of Care Bundles on Patient Outcome

Lavallée *et al. Implementation Science* (2017) 12:142
DOI 10.1186/s13012-017-0670-0

Implementation Science

SYSTEMATIC REVIEW Open Access

The effects of care bundles on patient outcomes: a systematic review and meta-analysis

Jacqueline F. Lavallée[1,2,3*], Trish A. Gray[1,2], Jo Dumville[1,2], Wanda Russell[4] and Nicky Cullum[1,2,5]

Conclusions: Very low quality evidence from controlled before-after studies suggests that care bundles may reduce the risk of negative outcomes when compared with usual care. By contrast, the better quality evidence from six randomised trials is more uncertain.

Trial registration: PROSPERO, CRD42016033175

Keywords: Care bundle, Effectiveness, Implementation fidelity, Behaviour change

Challenges Identified

- Health condition (the more serious the health condition the better compliance)
- Healthcare setting (more effective in trauma and ICUs)
- The number of Care bundle elements (effect of care bundles appeared to reduce as the number of elements increased)
- Behaviour-change techniques (There is an impact of the number of behaviour change techniques on the effectiveness of care bundles)
- Fidelity with the care bundle (Adequate at 95% or above)

Conclusion

Very low quality evidence from controlled before-after studies (downgraded due to the risk of bias, inconsistencies and potential indirectness of outcomes) suggests that the implementation of care bundles may be an effective strategy to improve patient outcomes when compared with usual care. By contrast, the low-quality evidence from five randomised trials (downgraded due to the risk of bias, inconsistencies and potential indirectness of outcomes) is highly uncertain. Future research should focus on the explicit and transparent reporting of the implementation of the care bundle including issues relating to implementation fidelity such as the frequency with which the behaviour change techniques were used. The higher quality reporting of the research findings will enable stronger conclusions to be drawn about the effectiveness of care bundles.

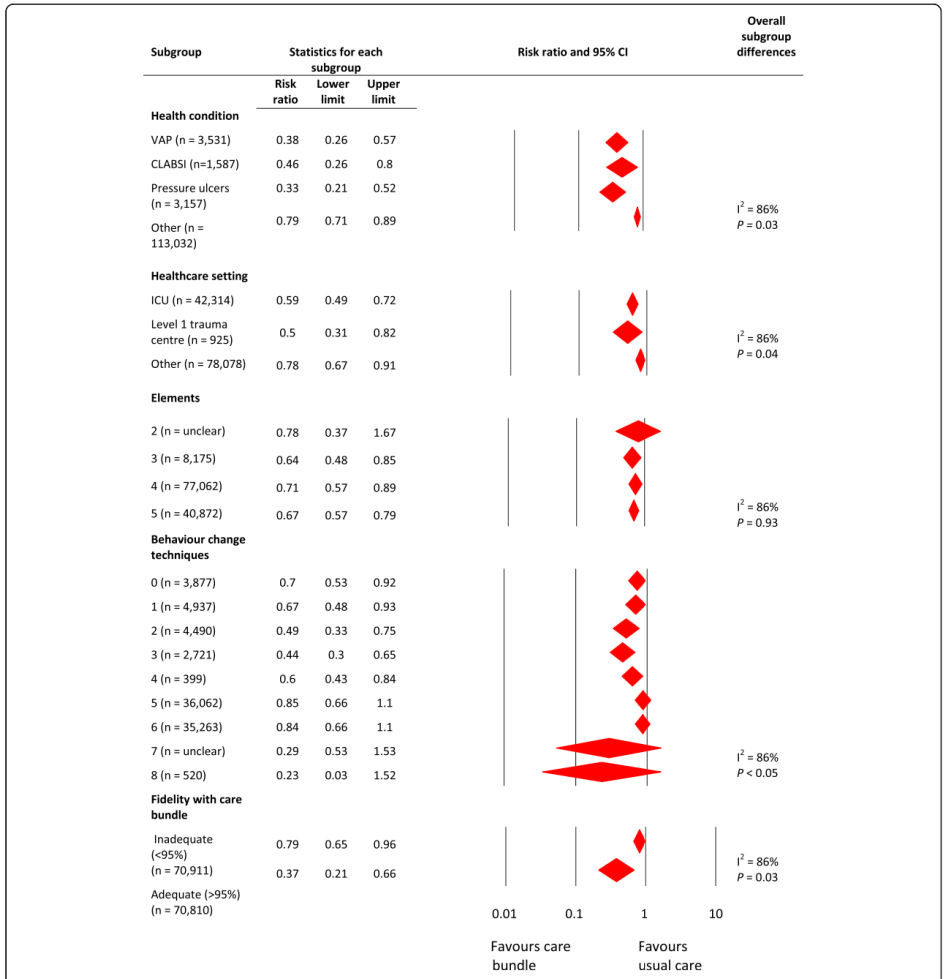


Fig. 3 Subgroup analysis of included studies. An analysis of five subgroups including risk ratios and heterogeneity

Implementation Strategies

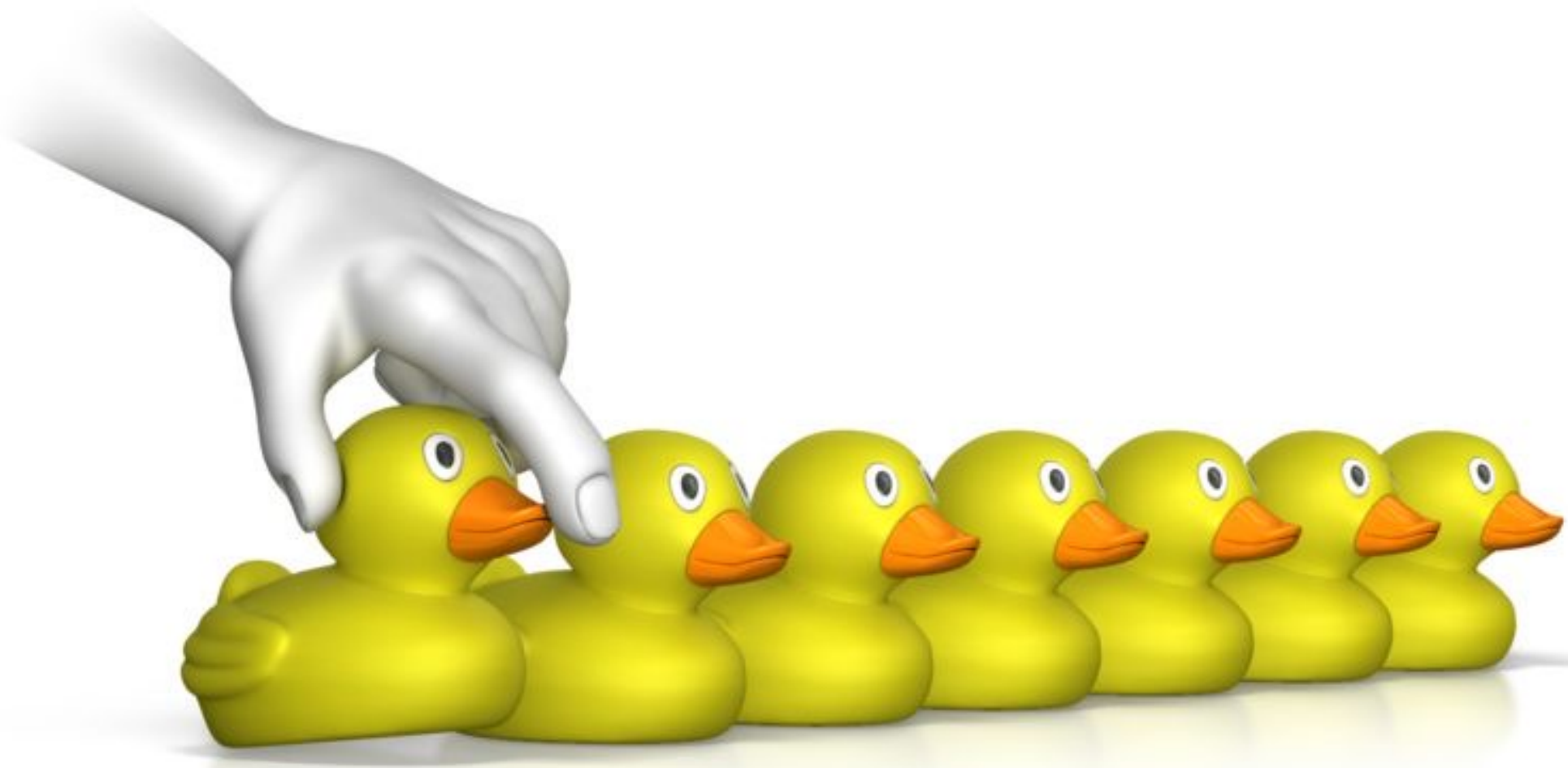
Borgert *et al. Implementation Science* (2015) 10:119
DOI 10.1186/s13012-015-0306-1

IMPLEMENTATION SCIENCE

Implementation strategies

The three most frequently used strategies to implement care bundles were as follows: educational activities in 88 % (43/49) followed by reminders in 71 % (35/49) and audit and feedback (A&F) in 63 % (31/49).

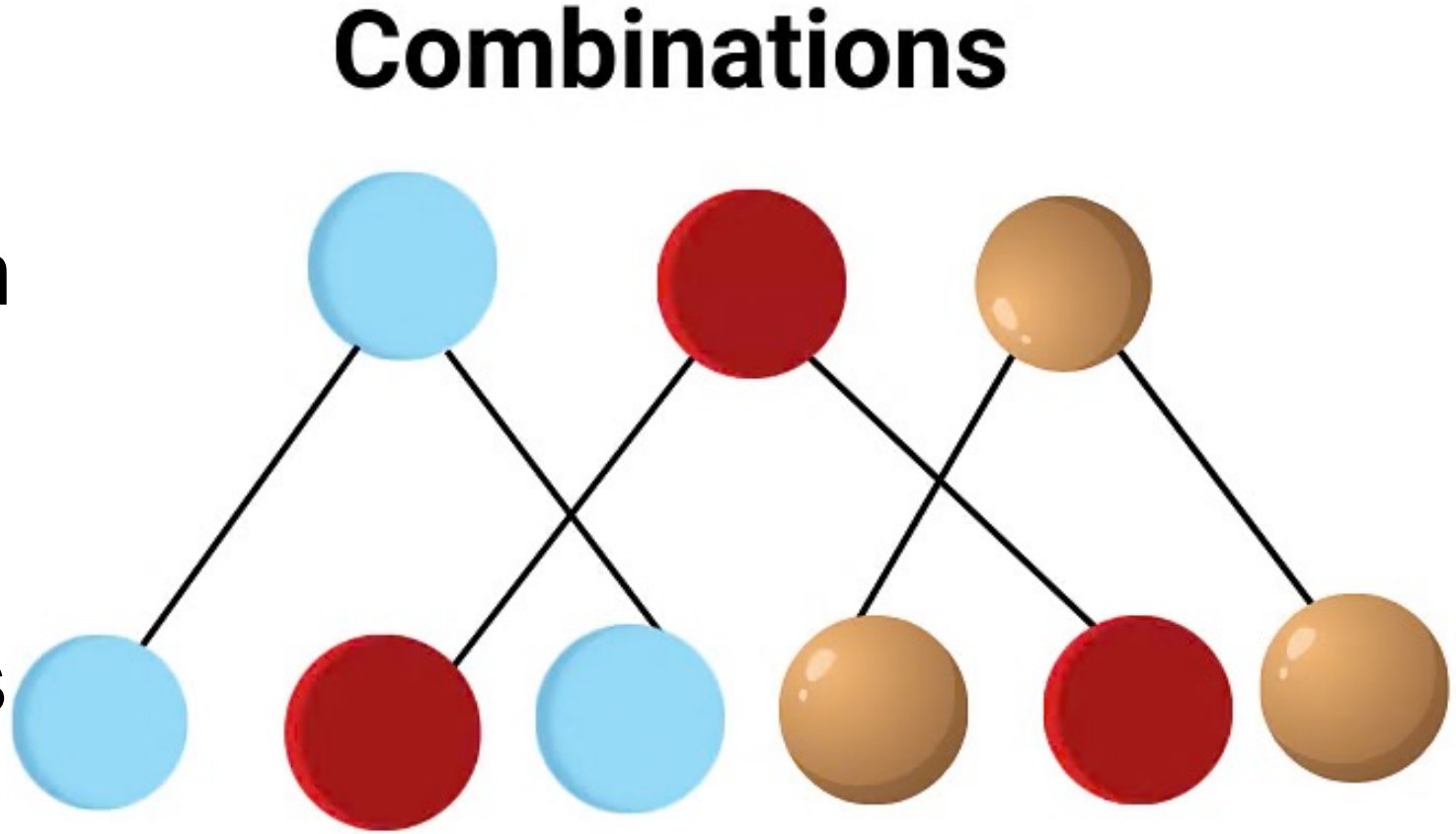
All Ducks in a Row



Bundels in Neonatal Vascular Access

Topics:

- CLABSI prevention
- POCUS insertion
- Tip location
- CVC complications



CLABSI prevention

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

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

This article has been corrected. VIEW THE CORRECTION

Authors: 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., +5, and Christine Goeschel, R.N., M.P.A. Author Info & Affiliations

Published December 28, 2006 | N Engl J Med 2006;355:2725-2732 | DOI: 10.1056/NEJMoa061115

VOL. 355 NO. 26

Table 4. Incidence-Rate Ratios for Catheter-Related Bloodstream Infections.*

Variable	Incidence-Rate Ratio (95% CI)	P Value
Study period		
Baseline	1.00	
During implementation	0.76 (0.57–1.01)	0.063
After implementation		
0–3 mo	0.62 (0.47–0.81)	0.001
4–6 mo	0.56 (0.38–0.84)	0.005
7–9 mo	0.47 (0.34–0.65)	<0.001
10–12 mo	0.42 (0.28–0.63)	<0.001
13–15 mo	0.37 (0.20–0.68)	0.001
16–18 mo	0.34 (0.23–0.50)	<0.001
Teaching hospital	1.34 (0.73–2.46)	0.35
Bed size (per 100 beds)	1.03 (0.97–1.09)	0.33

>60% CLABSI reduction

CLABSI Prevention Bundles

GMS Hygiene and Infection Control

Deutsche Gesellschaft für Krankenhaushygiene (DGKH)

ISSN 2196-5226

Research Article

Preventive bundles to reduce catheter-associated bloodstream infections in neonatal intensive care

Präventivbündel zur Reduzierung katheterassoziierter Blutbahninfektionen in der neonatalen Intensivmedizin

Sarah Schmid - University Hospital of the Saarland, Children?s Hospital, Pediatric Oncology and Hematology, Homburg, Germany

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Arne Simon - University Hospital of the Saarland, Children?s Hospital, Pediatric Oncology and Hematology, Homburg, Germany

GMS Hyg Infect Control 2018;13:Doc10

doi: 10.3205/dgkh000316, urn:nbn:de:0183-dgkh0003169

Published: November 16, 2018

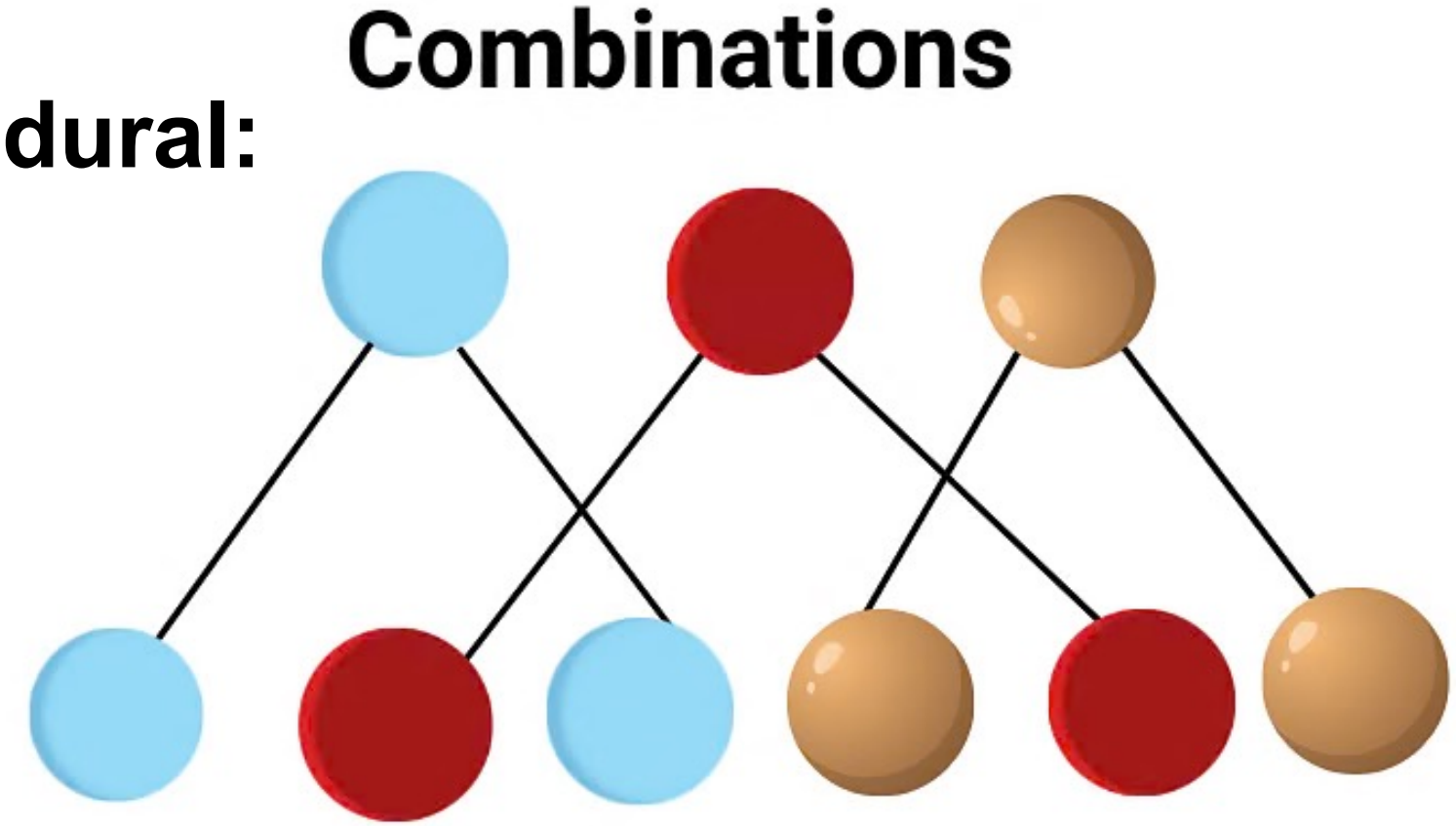
CLABSI Prevention Bundles

1. Feedback of surveillance findings and compliance rates to treatment team
2. Hand hygiene
3. Critical indication and limitation of indwelling
4. Skin antisepsis
5. Maximum barrier precautions when inserting central lines
6. Empowerment of staff
7. Reviewing compliance, checklists, daily goals
8. Dressing changes
9. Change of infusion system
10. Pre-assembled flushing syringes
11. Disinfection of catheter hub and other injection-/connecting points
12. Provision of necessary medical devices and products on a trolley
13. Specialized teams

Bundels in Neonatal Vascular Access

Chronologic/Procedural:

- Pre-insertion
- Insertion
- Maintenance
- Removal



Insertion Bundle

The Journal of Vascular Access

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Impact Factor: **1.9**
5-Year Impact Factor: **1.9**

JOURNAL HOMEPAGE

SUBMIT PAPER

Restricted access | Research article | First published online May 9, 2022

A GAVeCeLT bundle for central venous catheterization in neonates and children: A prospective clinical study on 729 cases

Mauro Pittiruti, Davide Celentano, [...], and Giorgio Conti +3 View all authors and affiliations

Volume 24, Issue 6 | https://doi.org/10.1177/11297298221074472

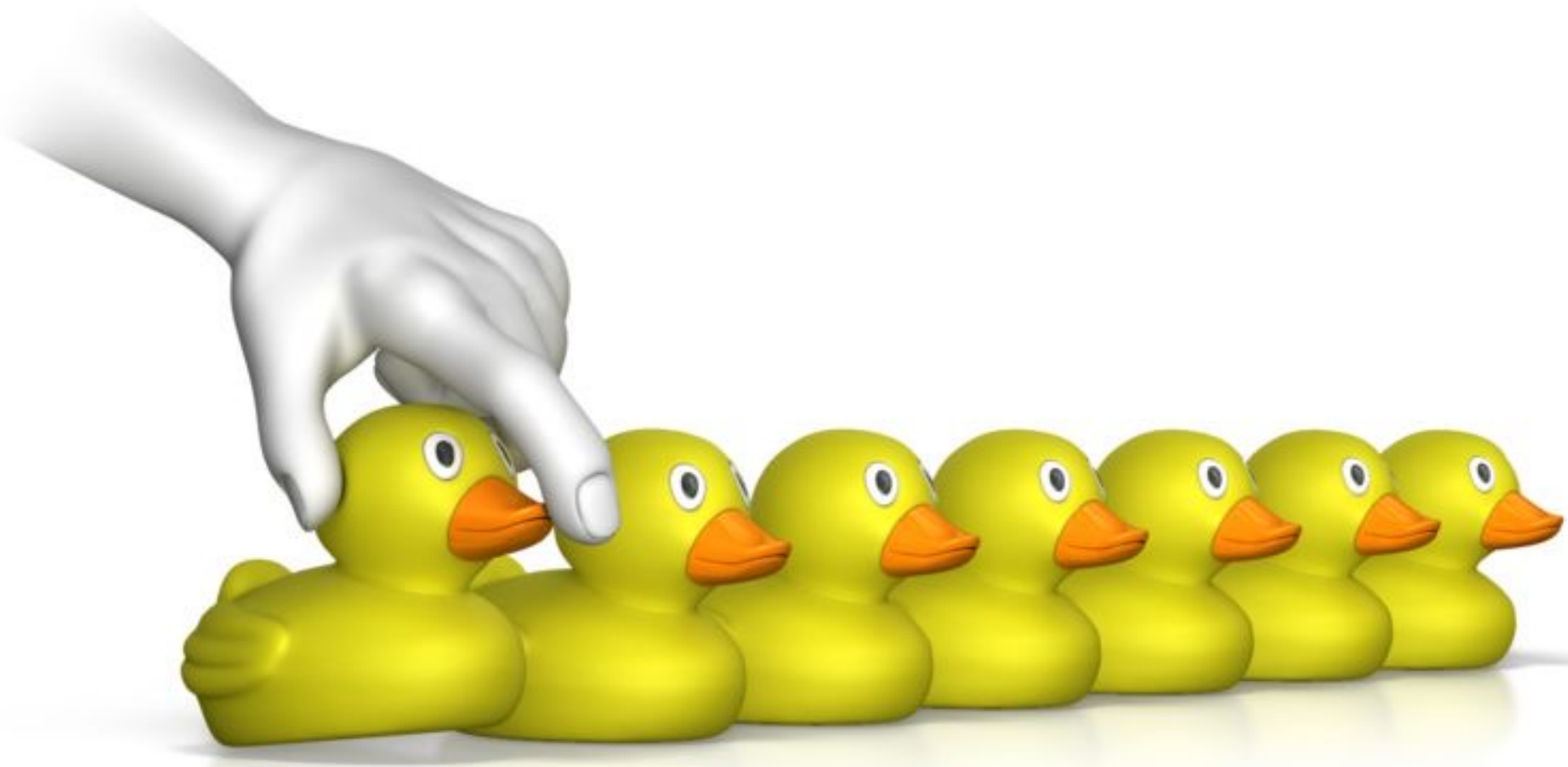
Bundels in Neonatal VascularAccess

1. **Pre-procedural evaluation** (including US evaluation).
2. Adoption of **pre-assembled insertion kits**.
3. Appropriate aseptic technique (hand hygiene, maximal barrier precautions, skin antisepsis with chlorhexidine/isopropyl alcohol).
4. Vein cannulation using the smallest catheter that meets infusion requirements and least number of lumen.
5. Real-time **tip navigation and tip location** by US
6. Securement of the catheter and protection of the exit site (combining **sutureless devices**, **cyanoacrylate glue**, semipermeable transparent membranes).
7. Post-procedural serial assessment of tip location by US.

Conclusion:

The results of this prospective study strongly validate the hypothesis that an insertion bundle is highly effective in optimizing the safety of the maneuver, reducing immediate, early, and late complications.

Beyond the bundle





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NEVAT: https://neonat.org/

WoCoVA 8th World Congress on Vascular Access

The 7 Rights of Neonatal Vascular Access

Pediatric RESEARCH

Enhancing neonatal vascular access, proposing a patier centered (rights) based framework: part 1

Journal:	*Pediatric Research*
Manuscript ID	PR-2024-0212
Manuscript Type:	Review article

Pediatric RESEARCH

Enhancing neonatal vascular access, operationalizing a patient-centered '7-rights Framework': part 2

Journal:	*Pediatric Research*
Manuscript ID	PR-2024-0505
Manuscript Type:	Review article

The 7 Rights Framework

- The word ‘right’ has several meanings in the English language.
- It can mean the accurate, appropriate, true, or correct way of doing something.
- It also can refer to having a moral and/or legal entitlement to something.
- In this framework we use the word “Rights” to mean both entitlement and correct evidence-based VA practice.

The 7 Rights Framework





7 RIGHTS OF VASCULAR ACCESS

- THE RIGHT CARE TEAM
- THE RIGHT COMFORT MEASURES
- THE RIGHT VAD FOR INTENDED THERAPY
- THE RIGHT PATIENT
- THE RIGHT BLOOD VESSEL FOR DEVICE AND THERAPY
- THE RIGHT CARE OF THE INFUSION AND DEVICE
- THE RIGHT DURATION OF THERAPY AND DEVICE REMOVAL

Let's elevate neonatal care! Integrate best practices for vascular access devices and prioritize continuous learning for our NICU staff.

Right patient

- Prioritize Patient Safety: use patient identification bands and two patient identifiers before procedures.
- Utilize Recommendations and Standards from Recognized Organizations: INS, AVA, GloVANet, WoCoVA, EFCNI.
- Accommodate an individualized Vascular Access Management Plan (VAMP): take into account gestational age, birth weight, underlying medical conditions, impact of prematurity, infant size variations, skin integrity, skin maturation and vascular development.

Right care team

- Multiprofessional competent care team.
- Recognize parents as integral members of the care team.
- Establish robust educational and training programs.

Right comfort measures

- Considering both physical and emotional well-being to avoid the long-term detrimental effects of repeated exposure to painful procedures.
- Anticipation in guidelines to Pain and Stress, Signaling, and Management.
- Parent Participation in comforting measures during procedures to enhance emotional bonding and reassurance.

Right device for intended therapy

- Emphasis on Optimal Device Selection*:* Prioritize the least invasive VAD option with the smallest outer diameter and fewest lumen for the required therapy.
- Implement decisional trees endorsed by professional organizations to guide VAD selection, ensuring a standardized approach.

Right blood vessel for VAD and therapy

- Use imaging (NIRS or POCUS) to assess vessel size and patency before cannulation.
- Develop an individualized VAMP that sets out strategies to preserve blood vessel health to improve overall VA management by ensuring stable VA, preserving blood vessels, reducing the number of needlesticks and attendant pain.

Right care of the infusion and device

- Prioritize infection control through rigorous adherence to aseptic techniques and infection prevention protocols.
- Consider of using a dedicated VA team, use preventative care bundles, closed infusion systems, tissue adhesive (securement+site sealing), only changing insertion site dressings when they are soiled or loosened.
- Use syringe pumps, infusion devices and infusion accessories validated as suitable for neonatal patients and in which staff are trained.

Right duration of therapy and device removal

- Remove the VAD when it is no longer required.
- Conduct regular audits of VA by registering the life course of the VAD as a systematic approach to quality assurance.
- Take personal responsibility to contribute to a culture of continuous quality improvement in neonatal VA care through participation in training, education, clinical audit cycles, quality improvement initiatives.

Bundles, Guidelines, 7 Rights Framework

By rallying together to employ the 7 Rights, bundles and guidelines, quality improvement, overall outcomes, and patient satisfaction will come together like pieces of a puzzle, necessitating the contribution of everyone involved.



Thank you
&
Questions

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