



0% lijninfecties , Hoe ?
Een reis van evidence naar
practice

0% lijninfecties , Hoe ?

Definitie (CDC- NHSN) :

CRBSI : catheter-related bloodstream infection

more precise and rigorous definition that requires either

- (a) isolation of the same organism from the catheter and the peripheral blood,
- (b) simultaneous quantitative blood cultures with a ratio of 5:1 or higher of those from the indwelling CVC compared with peripheral blood, or
- (c) a differential time to positivity of CVC-derived versus (vs.) peripheral blood culture positivity of more than 2 hours

CLABSI: central-line associated bloodstream infection

- for surveillance purposes, defining the term as a laboratory confirmed BSI in any patient with a CVC present either at the time of, or within a 48-hour period before the detection of infection

LCBI: laboratory confirmed bloodstream infection

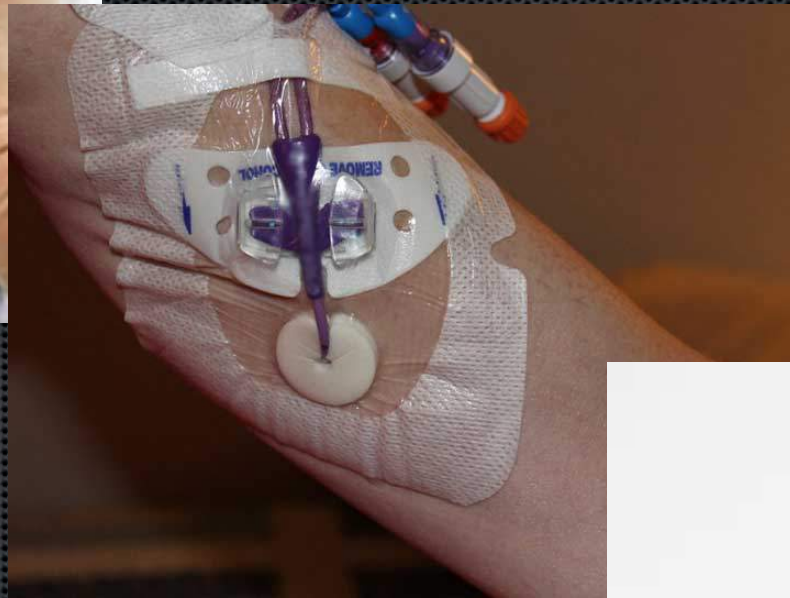
0% lijninfecties , Hoe ?



0% lijninfecties, Hoe ?



0% lijninfecties , Hoe ?



0% lijninfecties , Hoe ?

Alle artsen en zorgverleners hebben een **zorgplicht** op basis van de Wet Geneeskundige Behandelings Overeenkomst (WGBO)

0% lijninfecties , Hoe ?

Bewijs

Ook de Wet op de Beroepen op de Individuele Gezondheidszorg
(Wet BIG)

kent enkele strafbaarstellingen waarbij
artikel 96 lid 2 Wet BIG het enige misdrijf is.

De genoemde artikelen uit het Wetboek van Strafrecht kennen alle ofwel het bestanddeel 'opzet' ofwel het bestanddeel 'schuld'. Daarom kan het
OM alleen dan een strafvervolgning op basis van deze artikelen instellen als bewijs vergaard is voor het 'opzet' of de 'schuld' van de verdachte

0% lijninfecties , Hoe ?

85% van de opgenomen patiënten in de VS krijgen een infuus

Wereldwijd rond 60 %

de meeste lijnen daar zijn PICC en perifere infuusnaalden

330 miljoen infuusnaalden werden 2012 in de VS verkocht

7 miljoen CVL in de VS en 10 miljoen wereldwijd

Registratie van complicaties is te laag omdat in het algemeen een infuusnaald als nagenoeg risicovrij wordt gezien

0% lijninfecties , Hoe ?

Kosten van een kathetergeralteerde bloedbaaninfectie :

€ 18.000 (24.000\$ in 2012)

- incidence of major catheter-related infections from 1.4‰ to 0.6‰ catheter days
- disability model and assuming a cost of \$2,118/intensive care unit day

Economic evaluation of chlorhexidine-impregnated sponges for preventing catheter-related infections in critically ill adults in the Dressing Study*

Schwebel, Carole MD, PhD; et al; Timsit, Jean-François MD, PhD

Critical Care Medicine: January 2012 - Volume 40 - Issue 1 - p 11–17

doi: 10.1097/CCM.0b013e31822f0604

0% lijninfecties , Hoe ?

Biol Blood Marrow Transplant 19 (2013) 720–724

Clinical Research

Defining Incidence, Risk Factors, and Impact on Survival of Central Line-Associated Blood Stream Infections Following Hematopoietic Cell Transplantation in Acute Myeloid Leukemia and Myelodysplastic Syndrome



Joshua Lukenbill^{1,*}, Lisa Rybicki², Mikkael A. Sekeres¹,
Muhammad Omer Zaman¹, Alexander Copelan³, Housam Haddad¹,
Thomas Fraser^{4,5}, Megan J. DiGiorgio⁵, Rabi Hanna⁶, Hien Duong¹,
Brian Hill¹, Matt Kalaycio¹, Ronald Sobecks¹, Brian Bolwell¹,
Edward Copelan¹

73 patiënten na stamceltransplantatie
(26 maanden) bij of AML of MDS

23 (31%) met O_{original}CLABSI en
8 (11%) met M_{ucosal}CLABSI

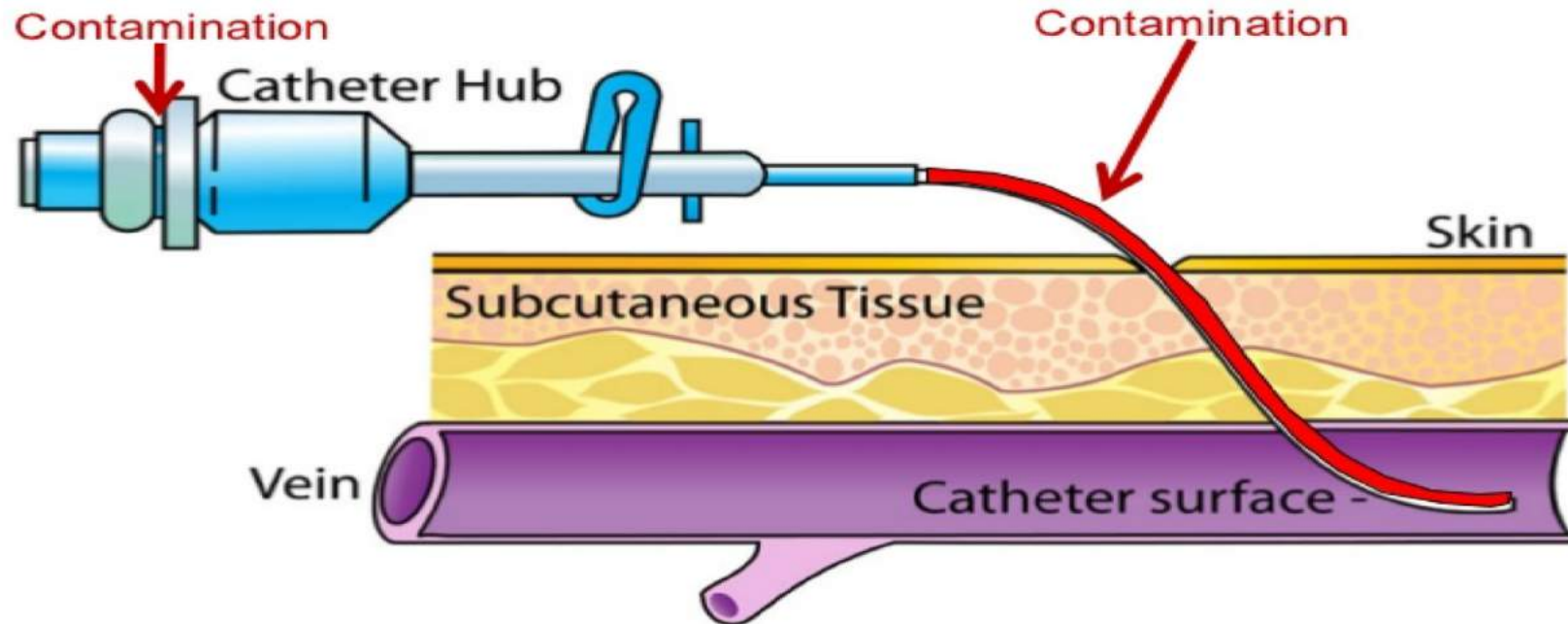
69,9 % met OCLABSI overleden ,
87,5% bij MCLABSI

Groter risico bij
comorbiditeit en
bij navelstrengbloed

Een onderzoek naar het vermijden van lijnsepsis

3M Skin & Wound Care

Sources of CRBSI: Intraluminal



Non-aseptic manipulations to hub and tubing

Contaminated Infusate

 it for yourself.

© 3M 2008. All Rights Reserved.

0% lijninfecties , Hoe ?



geen onafhankelijke factor voor mortaliteit

substantieel meer kosten

meer verpleegdagen

doel : **geen** katheter gerelateerde bloedbaaninfecties meer

Een onderzoek naar het voorkomen van lijnsepsis



2009

VMS veiligheidsthema :

Lijnsepsis:

Het optreden van lijnsepsis verminderen tot < 3 gevallen van lijnsepsis per 1000 katheterdagen

Een onderzoek naar het vermijden van lijnsepsis

Voting on recommendations

- A Accept completely
- B Accept with some reservation
- C Accept with major reservation
- D Reject with reservation
- E Reject completely

Quality of the evidence

- I At least one appropriately designed, randomly assigned, controlled trial
- II-1 At least one appropriately designed controlled trial without random assignment
- II-2 Cohort or case-controlled studies, preferably from one or more research groups
- II-3 Substantial or marked results from uncontrolled studies
- III Opinions of experts based on clinical experience or descriptive studies

Classification of the recommendations

- A Good supportive evidence
- B Fair supportive evidence
- C Poor supportive evidence but recommendations reasonable on other grounds
- D Fair contrary evidence
- E Good contrary evidence

Adapted with permission from references 1,8

Hoe goed is een onderzoek en
wat mag ik hieruit concluderen

0% lijninfecties , Hoe ?

Interventiebundel



1. **Handhygiëne**, iedereen die actief betrokken is bij het plaatsen van de CVK dient direct voor het inbrengen zijn of haar handen te desinfecteren **IA**

2. Maximale **voorzorgsmaatregelen** bij insertie, het lichaam van de patiënt dient voor **80%** afgedekt te zijn met een **steriele doek**, waarbij het van belang is dat het hoofd en de haren geheel afgedekt zijn bij insertie in de vena subclavia of in de vena jugularis. Voor degene die de CVK plaatst en voor de personen die daarbij direct assisteren, geldt dat zij een **muts**, een **mondneusmasker**, een **steriele jas** en **steriele handschoenen** dragen **IB- IC**

0% lijninfecties , Hoe ?



Interventiebundel

3. **Desinfectie** van de huid, voor het inbrengen van een CVK dient de insteekplaats gedesinfecteerd te zijn met 0,5% chloorhexidine in 70% alcohol **IA/B**
4. Selectie van de **katheterplaats**, om het infectierisico zo veel mogelijk te beperken, dient de optimale katheterplaats geselecteerd te zijn (**1 - v. subclavia, 2 - v. jugularis, 3 - v. femoralis**). **IA – IB**
5. Controleren op juistheid **indicatie**, dagelijks dient gecontroleerd te worden of de indicatie voor de CVK nog aanwezig is. Indien de indicatie is vervallen, moet de CVK binnen 24 uur worden verwijderd **IA**
6. Controleren van de **insteekopening**, dagelijks dient de insteekopening gecontroleerd te worden op ontstekingsverschijnselen, dit maakt vroegtijdige herkenning van een lokale infectie van de insteekopening mogelijk **IB**

0% lijninfecties , Hoe ?

2002 – 2016

During the period 2011 to 2016, a total of 37,308 central venous catheters (CVK) with 255.681 line days were registered in 24,062 (2015) patients from 57(2015) hospitals

165.251 IC linedays, 90.430 linedays (2016)

The average incidence of linesepsis is 1.9 cases / 1000 line days

The average incidence of linesepsis in the ICU is decreasing from 1.7 to 1000 line days to 1,2 cases / 1000 line days from 2011 to 2015. The incidence fluctuates on the non-IC patients / lines: 4,1 -> 3,2

0% lijninfecties , Hoe ?

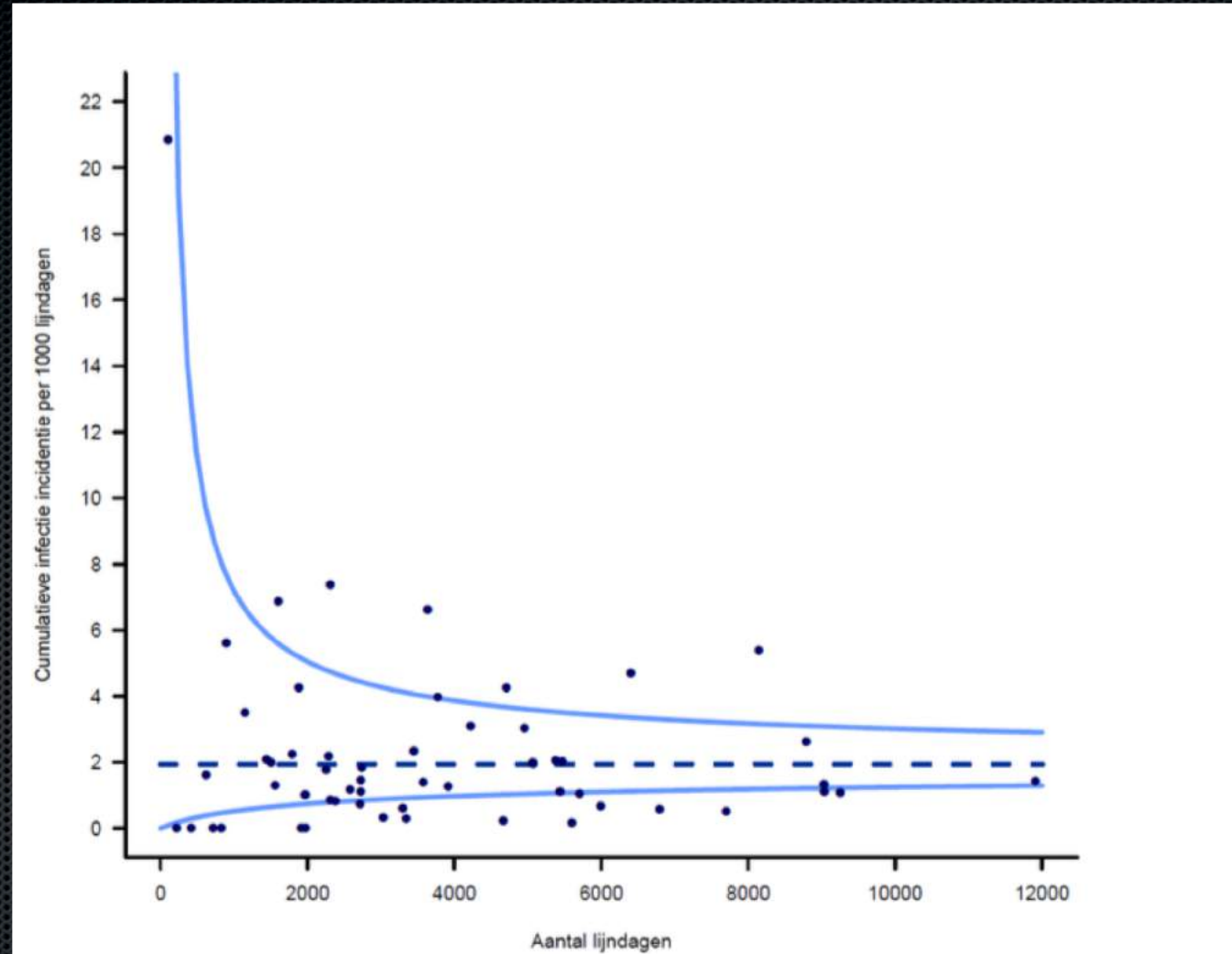
2002 – 2015

The incidence is significantly higher when administering parenteral nutrition than when administering antibiotics

Coagulase negative staphylococci (CNS) is the most common causative agent of a linesepsis (the other 4 make 10% less per causative agent)

0% lijninfecties , Hoe ?

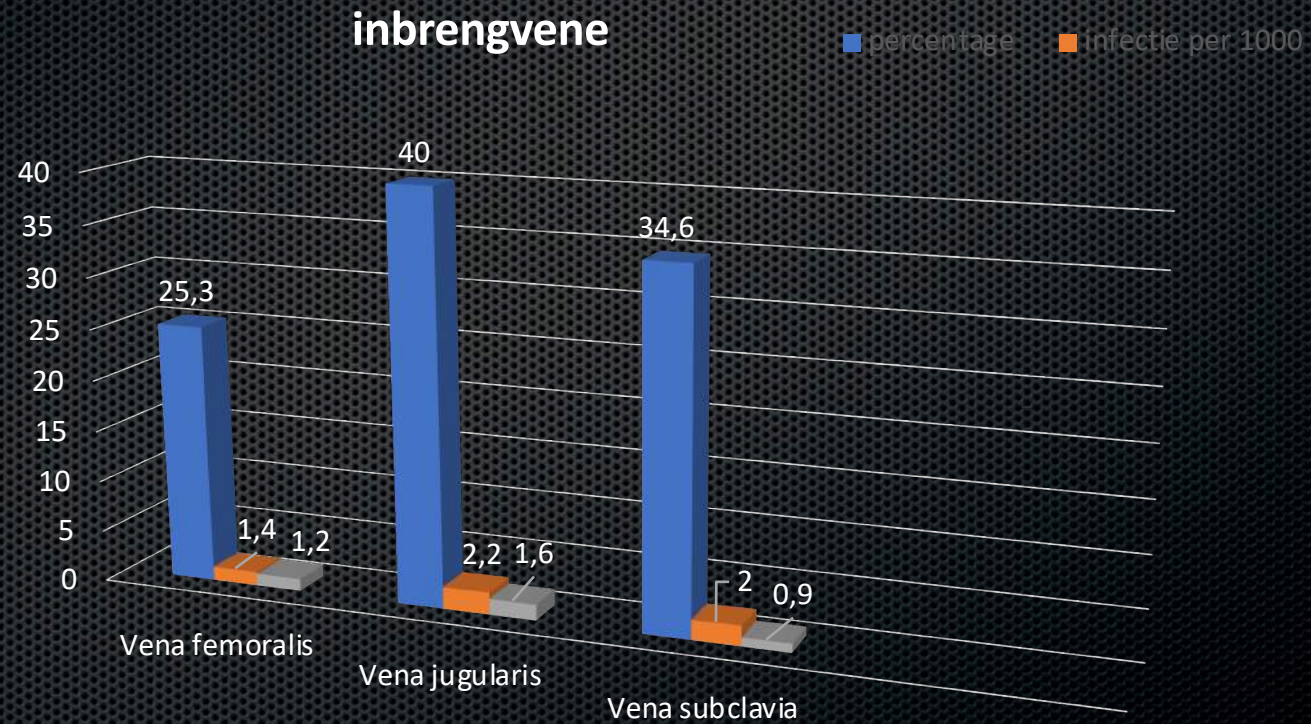
2002 – 2015



Gemiddelde lijnsepsisincidentie in 2014 : 1,9 / 1000 lijndagen
(0,0 tot 20,8 gevallen van lijnsepsis per 1000 lijndagen)

0% lijninfecties , Hoe ?

2002 – 2015

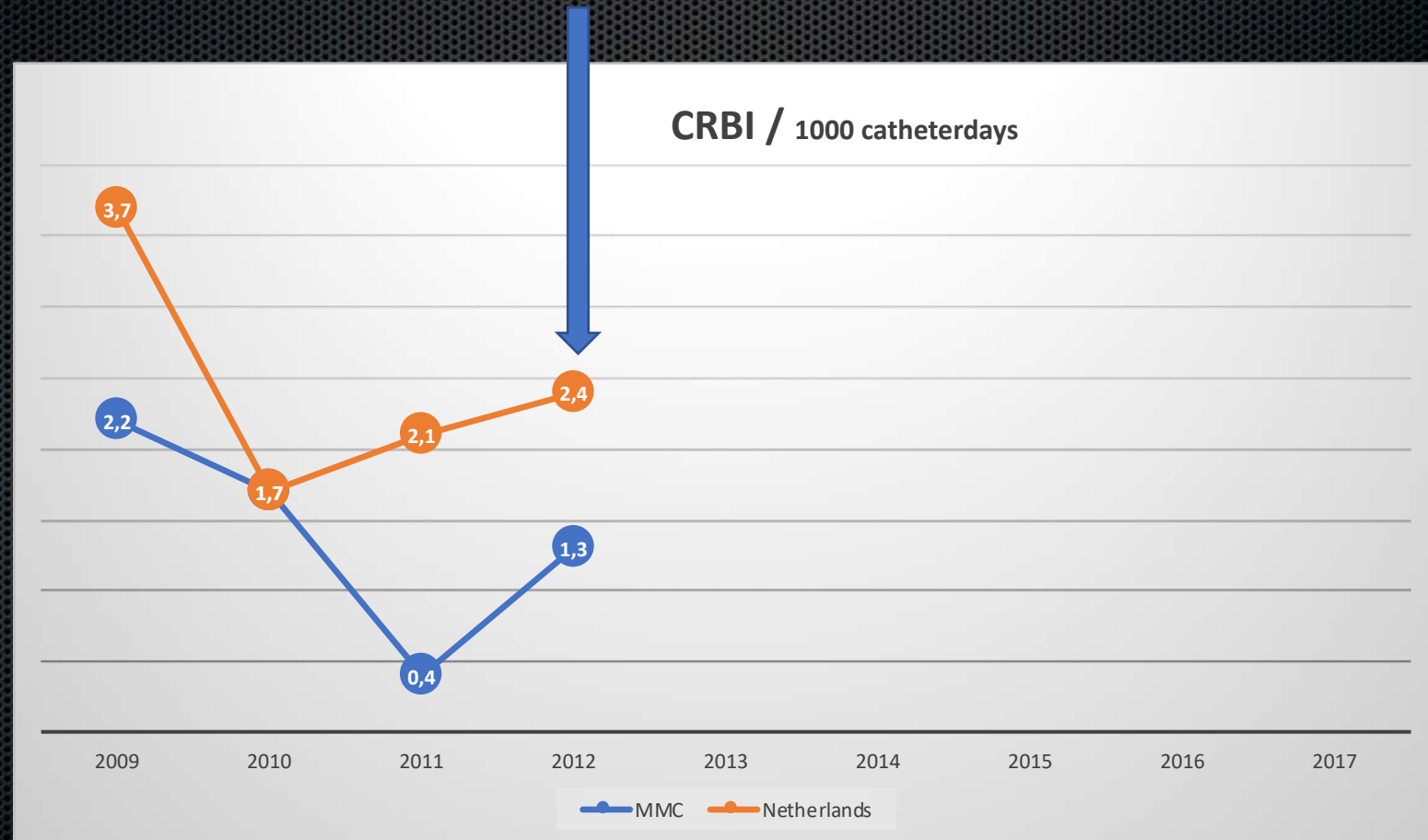


data: PREZIES

O% lijninfecties , Hoe ?



Introducing the zero tolerance strategie



0% lijninfecties , Hoe ?



Introductie van de MMC-bundels geassocieerd aan de richtlijnen 2011 door WIP (Nederlands) en CDC:

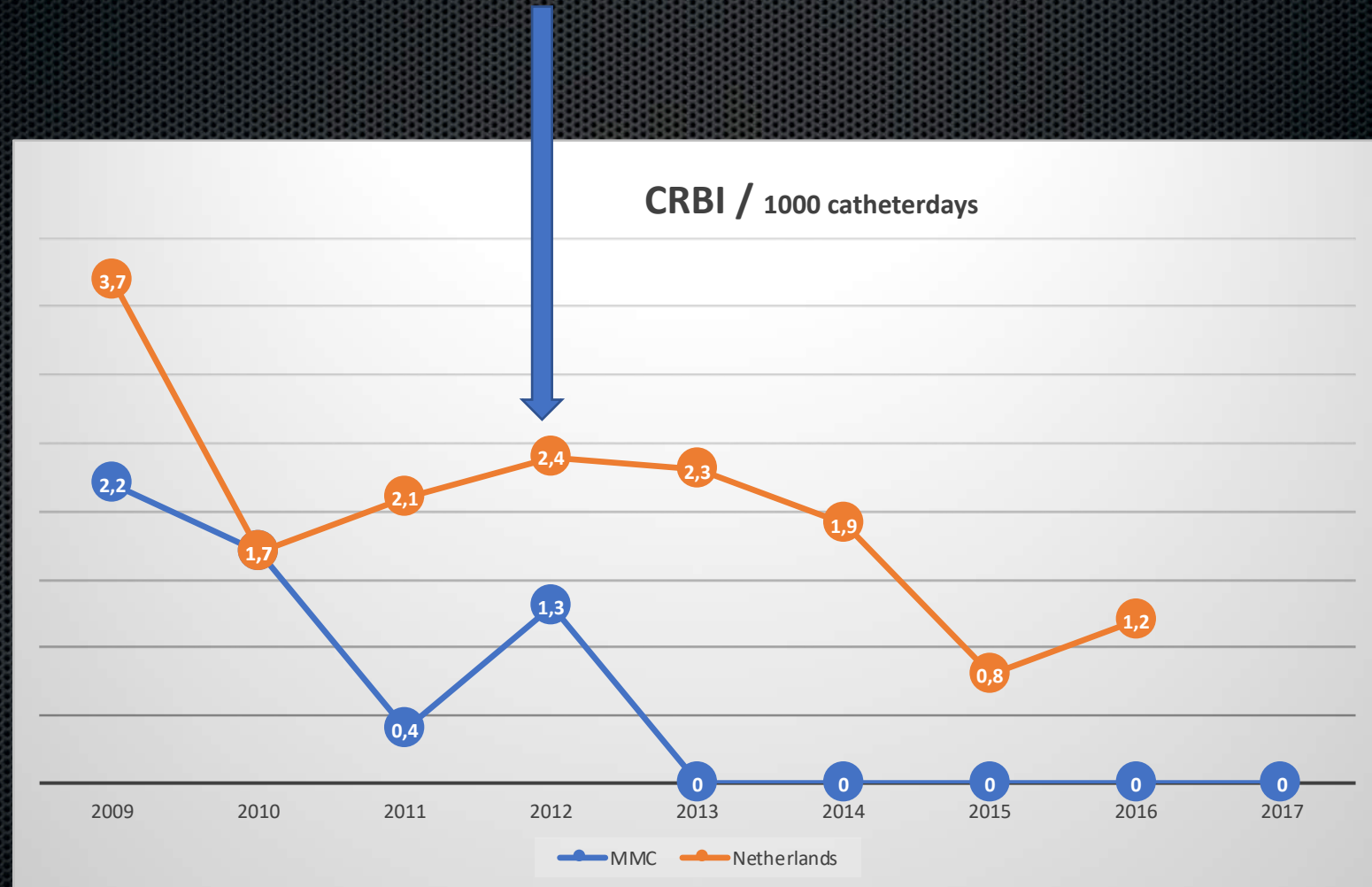
- Inclusief 100% dekking, maximale barrière: hoed, masker, steriel jasje, steriele handschoen
- CHG- pleister (2e lijnsaanbeveling)
- 2 priknaalden
- Het opleiden en trainen van medisch personeel dat katheters invoert en onderhoudt
- Gebruik van maximale steriele barrière voorzorgsmaatregelen tijdens het inbrengen van centraal veneuze katheters
- Gebruik van een > 0,5% chloorhexidine huidpreparaat met alcohol voor antisepsis
- Vermijden van routine-vervanging van centrale veneuze katheters als een strategie om infectie te voorkomen
- Gebruik van een kant en klaar inbrengset (*figuur 16*) voor centraal veneuze lijnen

O% lijninfecties , Hoe ?

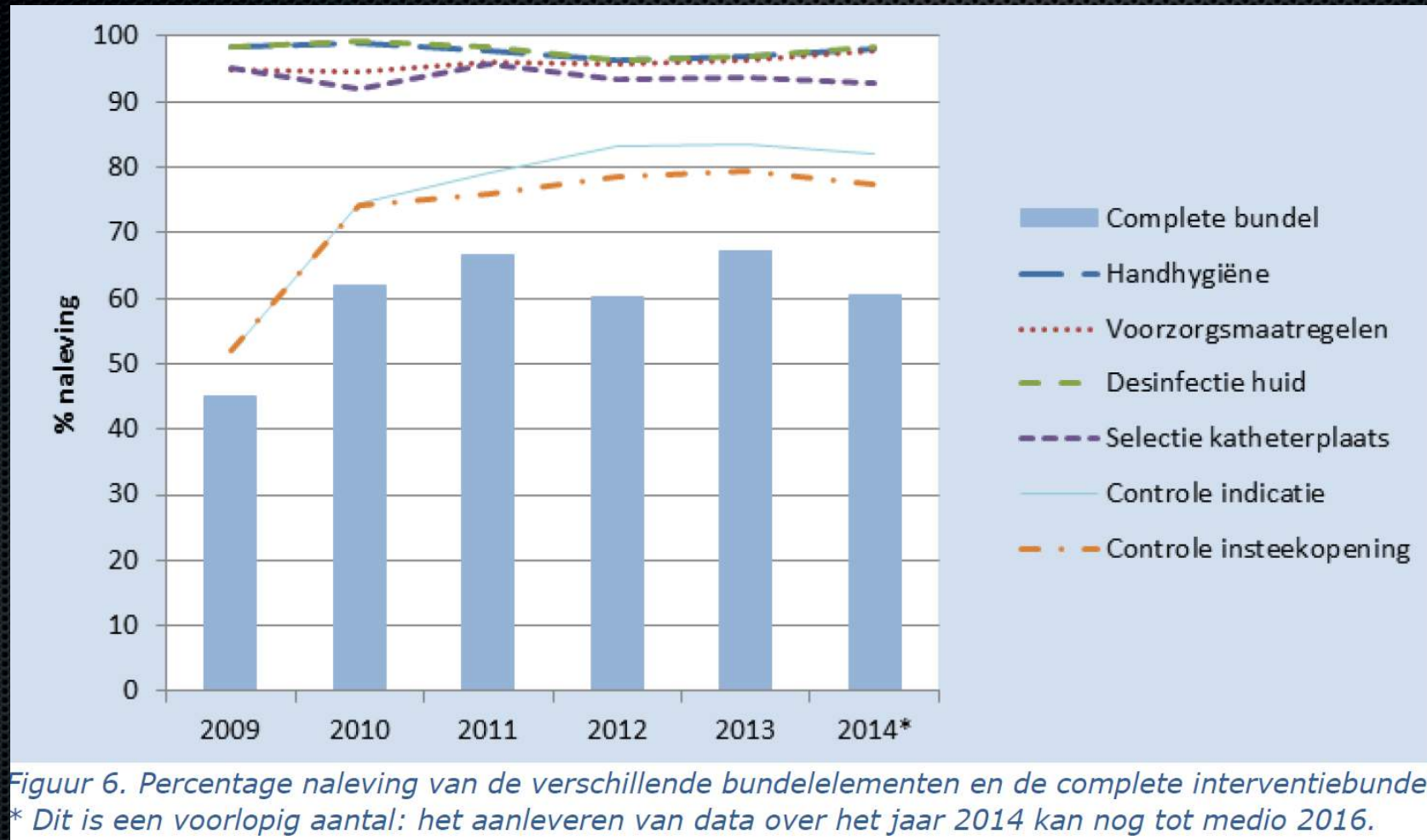
Introducing the zero tolerance strategie



14-10-2012
to
19-10-2018



O% lijninfecties , Hoe ?



0% lijninfecties , Hoe ?

Crit Care Med. 2014 Mar 26

Chlorhexidine-Impregnated Dressing for Prevention of Catheter-Related Bloodstream Infection: A Meta-Analysis.

Safdar N1, O'Horo JC, Ghufran A, Bearden A, Didier ME, Chateau D, Maki DG.

- reduced prevalence of catheter-related bloodstream infection (random effects relative risk, 0.60; 95% CI, 0.41-0.88, $p = 0.009$)
- catheter colonization was also markedly reduced in the chlorhexidine-impregnated dressing group (random effects relative risk, 0.52; 95% CI, 0.43-0.64; $p < 0.001$)
- 9 RCTs o.a. Timsit JF; Am J Respir Crit Care Med. 2012 Dec 15;186(12):1272-8. doi: 10.1164/rccm.201206-1038OC.

0% lijninfecties , Hoe ?



- The 3M Tegaderm CHG IV securement dressing for central venous and arterial catheter insertion sites
- Medical technology guidance Published: 22 July 2015
- [nice.org.uk/guidance/mtg25](https://www.nice.org.uk/guidance/mtg25)
- The National Institute for Health and Care Excellence (NICE) is an executive non-departmental public body of the Department of Health in the United Kingdom

0% lijninfecties , Hoe ?



The **3M Tegaderm CHG IV** securement dressing should be considered for use in critically ill adults who need a central venous or arterial catheter in intensive care or high dependency units.

The estimated cost saving from using a 3M Tegaderm CHG IV securement dressing (Tegaderm CHG) instead of a standard transparent semipermeable dressing is **£73** per patient.

This estimate is based on a baseline catheter-related bloodstream infection rate of **1.48** per 1000 catheter days.

Tegaderm CHG is estimated to be cost neutral when the baseline catheter-related bloodstream infection rate is **0.24** per 1000 catheter days, and cost incurring when the baseline rate falls below that gure

0% lijninfecties , Hoe ?

Culture eats strategy for breakfast

0% lijninfecties , Hoe ?

Marang-van de Mheen PJ, van Bodegom-Vos L

Meta-analysis of the central line bundle for preventing catheter-related infections: a case study in appraising the evidence in quality improvement

BMJ Qual Saf 2016;**25**:118-129.

two highest quality studies reached different conclusions : effectief / niet effectief ?

Vs.

Prevention of Central Line-Associated Bloodstream Infections Through Quality Improvement Interventions: A Systematic Review and Meta – analysis

Blot,K et al

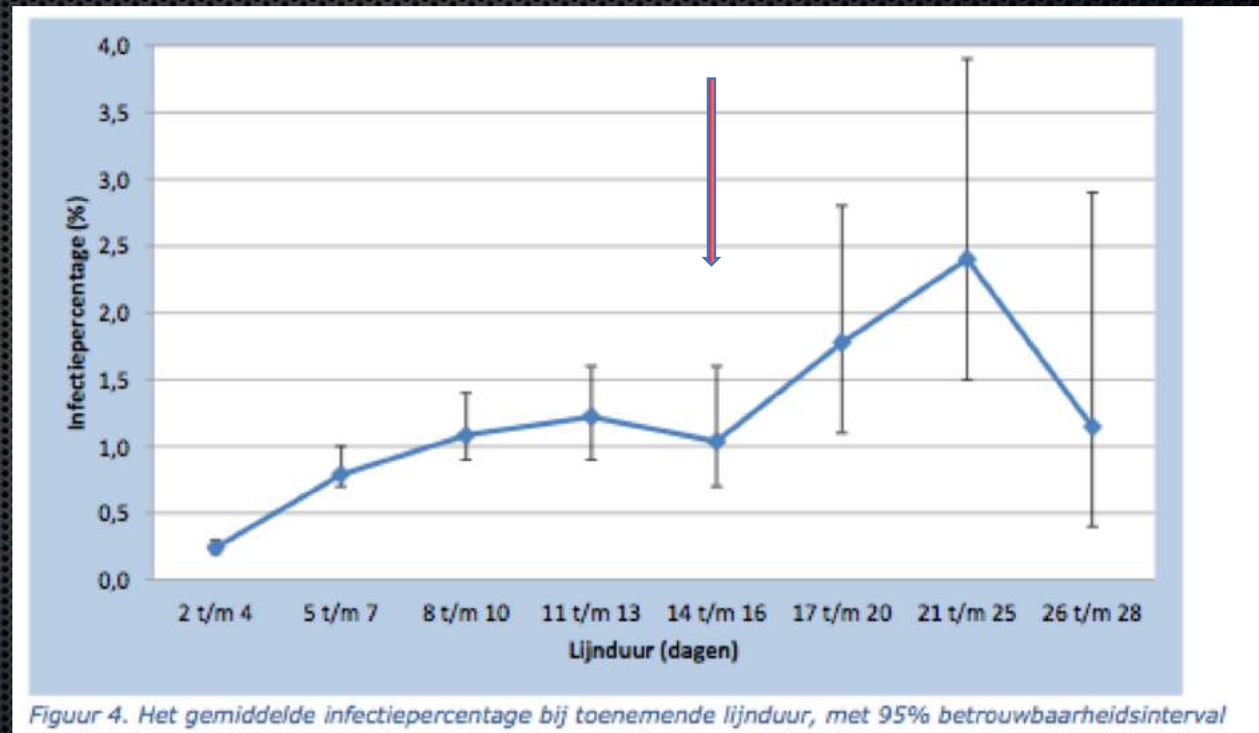
Clinical Infectious Diseases · April 2014 DOI: 10.1093/cid/ciu239

These results suggest that quality improvement interventions contribute to the prevention of central line-associated bloodstream infections. Implementation of care bundles and checklists appears to yield **stronger risk reductions**

0% lijninfecties , Hoe ?



2002 – 2014



0% lijninfecties , Hoe ?

5 jaar zonder lijninfectie

Pitfalls :

Wat gebeurde buiten de bundels nog :

2009 : start SDD met 4 dagen Ceftriaxon -> minder waarschijnlijk

2012 : wassen zonder water – voorheen vaker Gram⁻ verwekker - > mogelijk

2013 : VRE maatregelen : naleving pas eind 2014 op orde

2015 / 2016 SDD levert soms therapeutische spiegels van Tobramycine in het
bloed

chloorhexidine rondom de insteekopening waardoor de te kweken lijn 'gedesinfecteerd' wordt

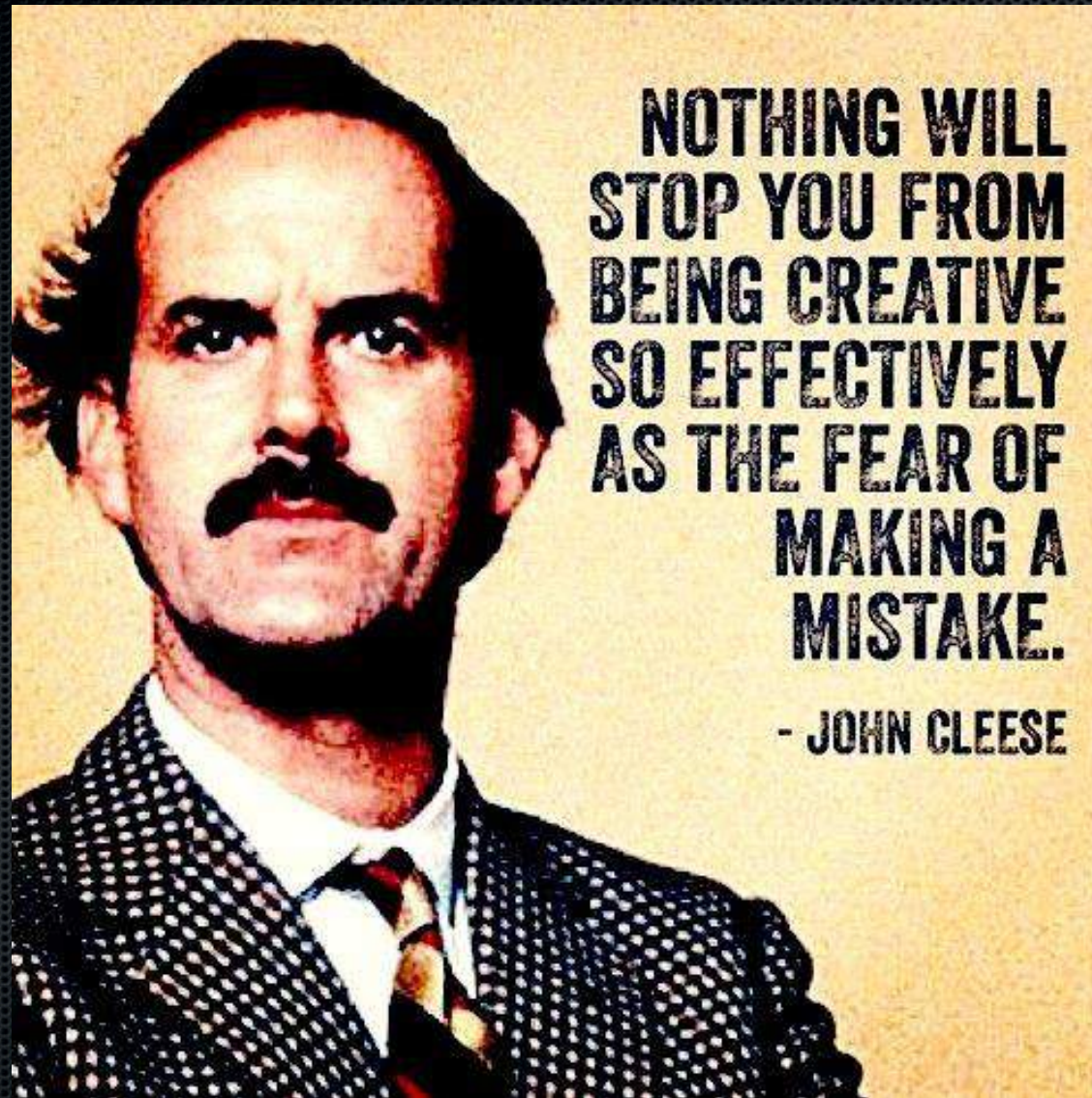
klopt de kweekmethode (rolplaatmethode) nog ?

alternatief : kwantitatieve sonificatietechniek (lage sensitiviteit en hoge specificiteit in beide gevallen)

0% lijninfecties , Hoe ?

- Uit de data van het MMC, is dus te concluderen dat de CHG-pleisters invloed hebben op het aantal lijninfecties
- Uit de landelijke data is te concluderen dat de bundels positieve invloed op het vermijden van lijnsepsis hebben
- Het onderdeel insteekplaats voor de katheter zo als van het VMS in het bundel voor gegeven is niet meer waar
- Aseptische werkwijze /- plaats bij het inbrengen van een CVL is zinvol maar er blijft de vraag hoeveel invloed die heeft : Intensivisten vs. Anesthesisten in het MMC
- Scholing van het verplegend personeel met cultuurverandering is belangrijker dan scholing met alleen maar strategieverandering **IA** (S. Blot: Central line-associated bloodstream infections: a critical look at the role and research of quality improvement interventions and strategies, Annual update in intensive care and emergency medicine 2015, https://doi.org/10.1007/978-3-319-13761-2_2) |

0% lijninfecties , Hoe ?



**NOTHING WILL
STOP YOU FROM
BEING CREATIVE
SO EFFECTIVELY
AS THE FEAR OF
MAKING A
MISTAKE.**

- JOHN CLEESE

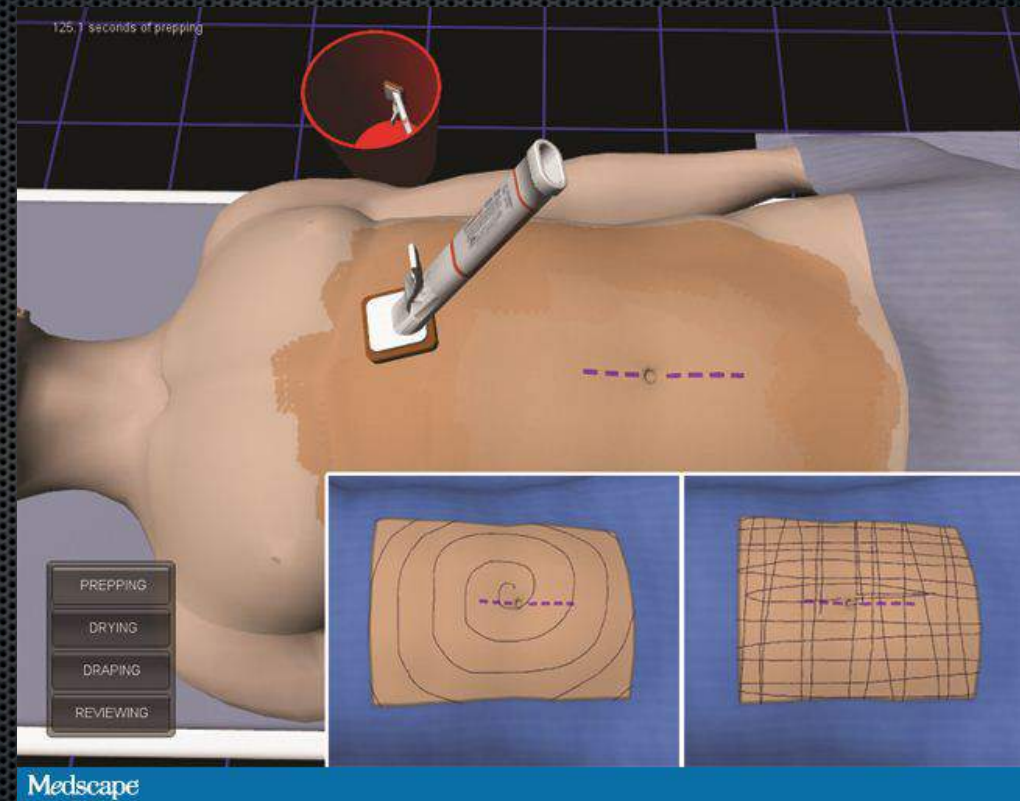
0% lijninfecties , Hoe ?



0% lijninfecties , Hoe ?



0% lijninfecties , Hoe ?





EVERYTHING
WILL BE ALL
RIGHT IN THE
END. SO IF
IT IS NOT ALL
RIGHT, IT IS NOT
YET THE END.

Sonny

THE BEST EXOTIC MARIGOLD HOTEL

0% lijninfecties, Hoe?

INTRODUCTION

The evidence-based Vessel Health & Preservation (VHP) concept of vascular access management was introduced in the US. The essence of VHP is timely, intentional, proactive patient intervention for vascular access device selection during the first 24 hours of entry into the healthcare process (and re-evaluated thereafter), followed by placement of a clinically appropriate device within 48 hours. Once placed, the focus shifts to daily maintenance and care of the device using the central line bundle and daily assessment to determine the health of patient's blood vessels as well as continued necessity of the device (Moreau, et al., 2012).

This practical framework has been developed to support practitioners to undertake vessel assessment and make decisions regarding suitable devices for vascular access and administration of medication or fluids. This is based on individual patient need and risk assessment. The framework is divided into relevant sections recognising the different stages of vascular assessment and therapy and is intended to be used either in its entirety or individual sections.

Preservation of vessels is required to minimise damage (thrombosis, stenosis and infection) and maintain the patency of the peripheral and central veins for as long as possible. This maintains good venous access for future treatments and minimises patient suffering. Further such actions have the potential to save significant staff and equipment costs to organisations providing vascular access and administration of medication or fluids.

This guidance relates to adult vascular access in acute or planned settings. It is not planned for use in emergency situations where other issues take priority and other routes of access may be appropriate e.g. introsseous infusions.

The content of the poster will be reviewed every two years and revisions taken in the light of new evidence.

Please forward feedback to VHP@bps.uk.net

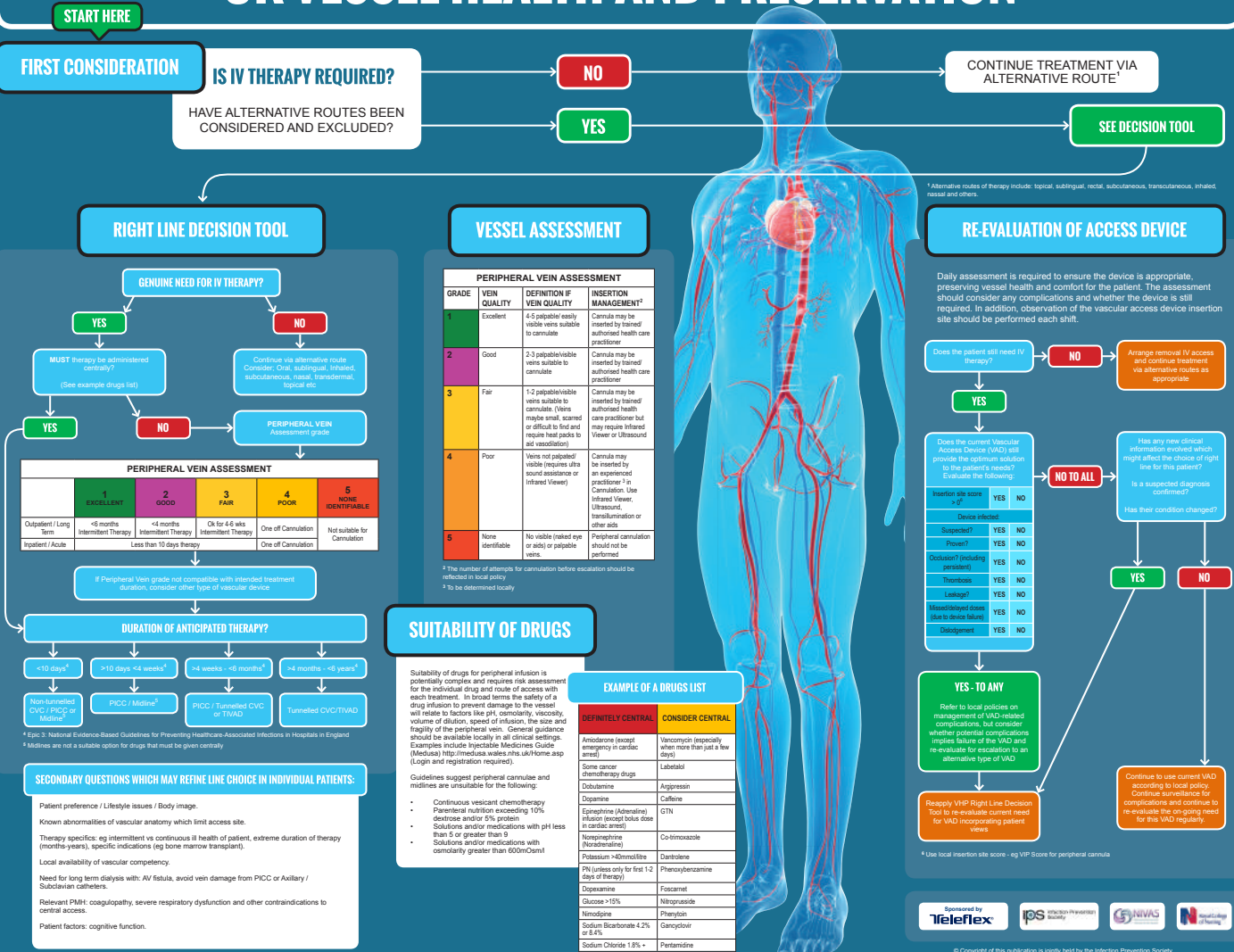
GLOSSARY OF TERMS

- CVC - Central venous catheter
- IV - Intravenous route of access
- Midline - Long venous catheter inserted into arm veins which does not extend centrally
- PICC - Peripherally inserted central venous catheter
- PN - Parenteral nutrition
- TIVAD - Total implanted vascular access device (port)
- Tunnelled CVC - central venous catheter which is tunnelled away from exit site and has anchoring cuff (e.g. Hickman type catheter)
- VAD - Vascular access device
- VHP - Vessel health and preservation
- VIP - Visual Infusion Phebitis Score (Jackson, 1997)

REFERENCES

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UK VESSEL HEALTH AND PRESERVATION



FIRST CONSIDERATION IS IV THERAPY REQUIRED? HAVE ALTERNATIVE ROUTES BEEN CONSIDERED AND EXCLUDED?

NO

YES

CONTINUE TREATMENT VIA ALTERNATIVE ROUTE*

SEE DECISION TOOL

* Alternative routes of therapy include: topical, sublingual, rectal, subcutaneous, transcutaneous, inhaled, nasal and others.

RIGHT LINE DECISION TOOL

GENUINE NEED FOR IV THERAPY?

YES

NO

MUST therapy be administered centrally? (See example drugs list)

Consider via alternative route. Consider: Oral, sublingual, inhaled, subcutaneous, nasal, transdermal, topical etc.

YES

NO

PERIPHERAL VEIN ASSESSMENT GRADE

	1 EXCELLENT	2 GOOD	3 FAIR	4 POOR	5 NONE IDENTIFIABLE
Outpatient / Long Term	<6 months Intermittent Therapy	<4 months Intermittent Therapy	0x to 4-6 wks Intermittent Therapy	One of Cancellation	Not suitable for Cancellation
Inpatient / Acute	Less than 10 days therapy	Less than 10 days therapy	One of Cancellation	One of Cancellation	Not suitable for Cancellation

If Peripheral Vein grade not compatible with intended treatment duration, consider other type of vascular device

DURATION OF ANTICIPATED THERAPY?



SECONDARY QUESTIONS WHICH MAY REFINE LINE CHOICE IN INDIVIDUAL PATIENTS:

- Patient preference / Lifestyle issues / Body image.
- Known abnormalities of vascular anatomy which limit access site.
- Therapy specifics: eg intermittent vs continuous ill health of patient, extreme duration of therapy (months-years), specific indications (eg bone marrow transplant).
- Local availability of vascular competency.
- Need for long term dialysis with: AV fistula, avoid vein damage from PICC or Axillary / Subclavian catheters.
- Relevant PMH: coagulopathy, severe respiratory dysfunction and other contraindications to central access.
- Patient factors: cognitive function.

VESSEL ASSESSMENT

GRADE	VEIN QUALITY	DEFINITION IF VEIN QUALITY	INSERTION MANAGEMENT*
1	Excellent	4-5 palpable/visible veins suitable to cannulate	Cannula may be inserted by trained/authorized health care practitioner
2	Good	2-3 palpable/visible veins suitable to cannulate	Cannula may be inserted by trained/authorized health care practitioner
3	Fair	1-2 palpable/visible veins suitable to cannulate. (Veins may be small, scarred or difficult to find and require heat packs to all resistances)	Cannula may be inserted by trained/authorized health care practitioner but may require Infrared Viewer or Ultrasound
4	Poor	Veins not palpable/visible (requires ultra sound assistance or Infrared Viewer)	Cannula may be inserted by an experienced practitioner in Cannulation. Use Infrared Viewer, Ultrasound, transillumination or other aids.
5	None identifiable	No visible (retired eye or aids) or palpable veins.	Peripheral cannulation should not be performed.

* The number of attempts for cannulation before escalation should be reflected in local policy

SUITABILITY OF DRUGS

Suitability of drugs for peripheral infusion is potentially complex and requires risk assessment for the individual drug and route of access with each treatment. In broad terms the safety of a drug infusion to prevent damage to the vessel will relate to factors like pH, osmolality, viscosity, volume of dilution, speed of infusion, the size and fragility of the peripheral vein. General guidelines should be available locally in all clinical settings. Examples include *Injectable Medicines Guide (Medusa)* <http://medusa.wales.nhs.uk/home.asp> (Login and registration required).

Guidelines suggest peripheral cannulae and midlines are unsuitable for the following:

- Continuous vesicant chemotherapy
- Parenteral nutrition exceeding 10% dextrose and/or 5% protein
- Solutions and/or medications with pH less than 5 or greater than 9
- Solutions and/or medications with osmolality greater than 600mOsm/l

EXAMPLE OF DRUGS LIST

DEFINITELY CENTRAL	CONSIDER CENTRAL
Anesthetics (except emergency in cardiac arrest)	Vancomycin (especially when more than just a few days)
Some cancer chemotherapy drugs	Labetalol
Daburine	Aggrenox
Dopamine	Caffeine
Ephedrine (Adrenaline)	GTN
Flutamide	Dantrolene
Hydrocortisone	Phenoxymethamine
PN (unless only for first 1-2 days of therapy)	Fosfarnet
Doxepamine	Foscarnet
Quinine >15%	Heparin
Nemefine	Phenol
Sodium Bicarbonate 4.2% or 8.4%	Galoplyol
Sodium Chloride 18%	Pertamidine

RE-EVALUATION OF ACCESS DEVICE

Daily assessment is required to ensure the device is appropriate, preserving vessel health and comfort for the patient. The assessment should consider any complications and whether the device is still required. In addition, observation of the vascular access device insertion site should be performed each shift.

Does the patient still need IV therapy?

NO

Arrange removal IV access and continue treatment via alternative routes as appropriate.

YES

Does the current Vascular Access Device (VAD) still provide the optimum solution to the patient's needs? Evaluate the following:

Insertion site score >7	YES	NO
Device choice		
Susceptible?	YES	NO
Power?	YES	NO
Obstruction (including persistent)	YES	NO
Thrombosis	YES	NO
Leakage?	YES	NO
Misadvised doses (due to device failure)	YES	NO
Dislodgement	YES	NO

YES TO ANY

Refer to local policies on management of VAD-related complications, but consider whether potential complications implies failure of the VAD and re-evaluate for escalation to an alternative type of VAD.

Reapply VHP Right Line Decision Tool to re-evaluate current need for VAD incorporating patient views.

* Use local insertion site score - eg VIP Score for peripheral cannula

Has any new clinical information evolved which might affect the choice of right line for this patient?

Is a suspected diagnosis confirmed? Has their condition changed?

YES

NO

Continue to use current VAD according to local policy. Continue surveillance for complications and continue to re-evaluate the ongoing need for this VAD regularly.