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5-12

"Man, we are making a MINT off that thing!"

PREVENTION OF INTRAVASCULAR CATHETER-RELATED INFECTIONS

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Catheter-Related Bloodstream Infections in US ICUs, 1993-98

- **80,000 central line-associated bloodstream infections in US ICUs/yr**

  (based on 15 million central line days/year, 5.3 central line-associated bloodstream infections/1,000 cath days)

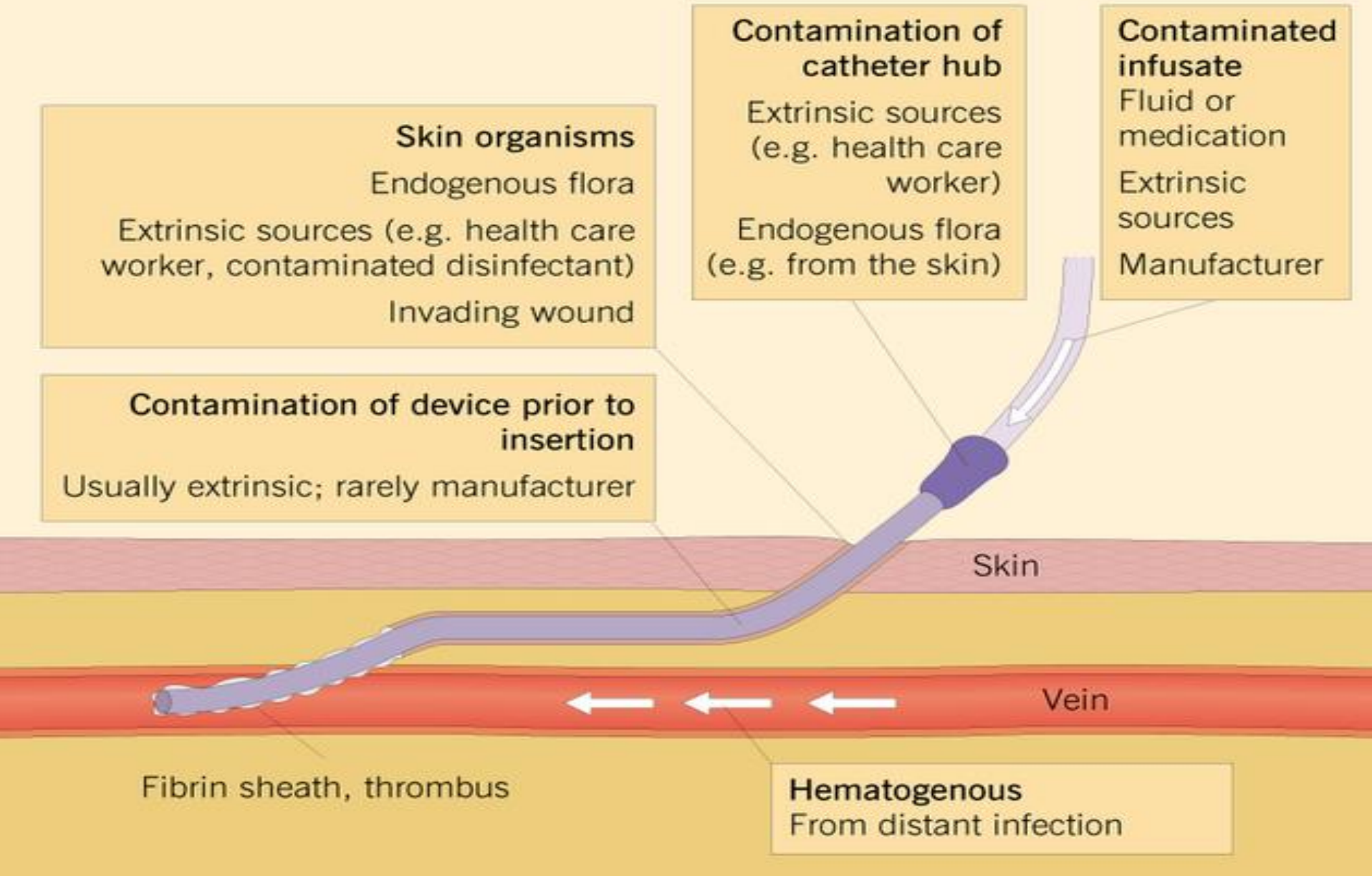
Data from NNIS & computer modeling by Dr N. Halpern
Mermel, Ann Intern Med, 2000

CVC-Related Bloodstream Infections in US ICUs, 1993-98

- **Associated mortality is ~ 2,400-20,000 pts/yr (based on 12%-25% mortality from prospective studies & 3% mortality in a meta-analysis)**
- **Attributable cost of treating CRBSI is ~ $300,000,000-$2,320,000,000/yr (based on published cost of $3700-$29,000 per episode)**

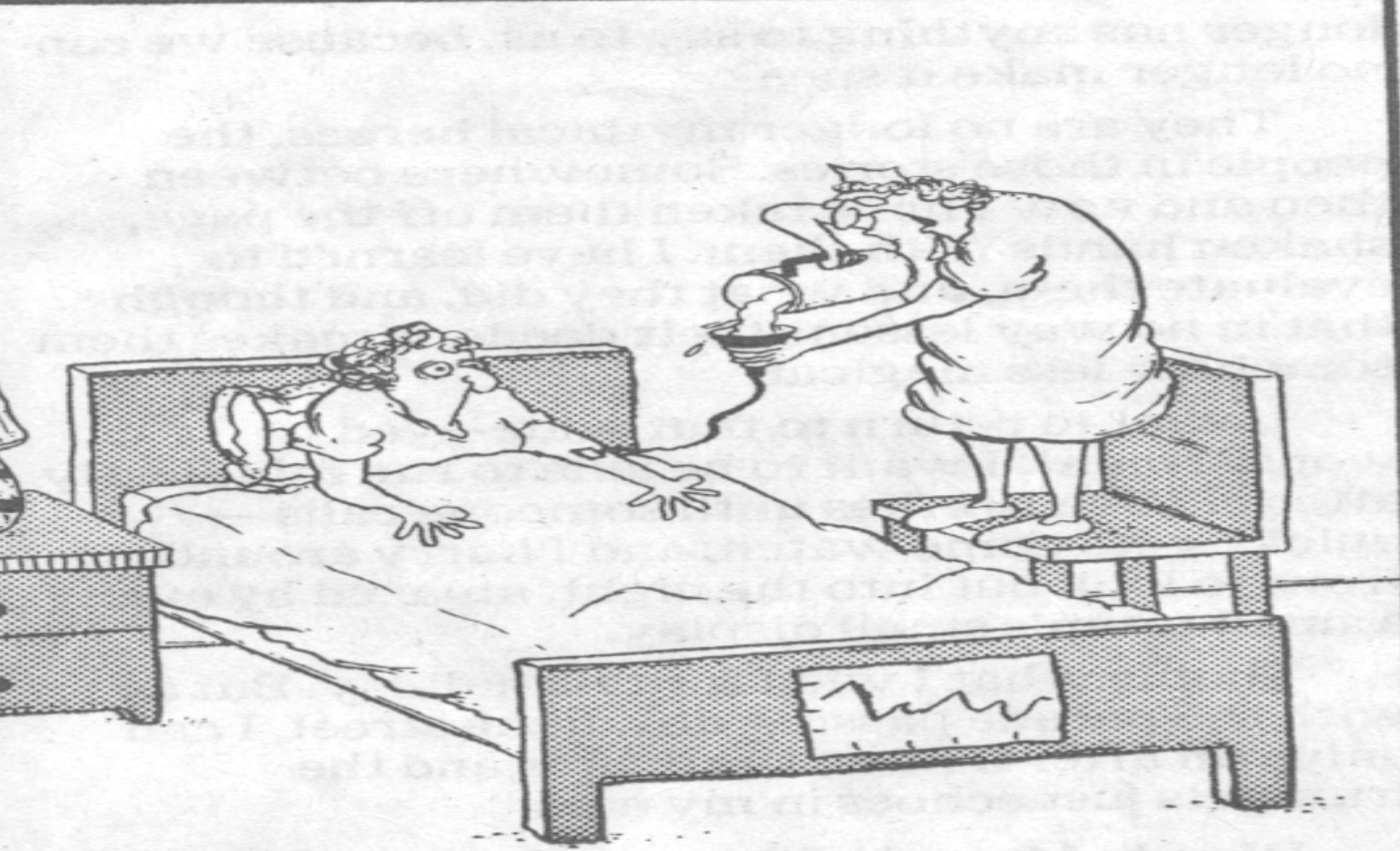
Mermel, Annals Internal Med, 2000

POTENTIAL ROUTES OF INFECTION



Simple Preventive Strategies Without Associated Risk of Antimicrobial Resistance

Reduced ICU Nurse:Patient Ratio and using Non-ICU-Trained Nurses in ICUs Independently Increases Risk of BSI



"We ran out of IV bags."

Non-ICU-Trained (Pooled) Nurses in ICUs Independently Increases Risk of Primary BSI

Non-ICU-trained nurse : patient ratio	Primary BSI odds ratio*
2.2 hrs/pt	1
4.4 hrs/pt	3.8

*controlled for confounding variables

Roberts et al, ICHE 2000

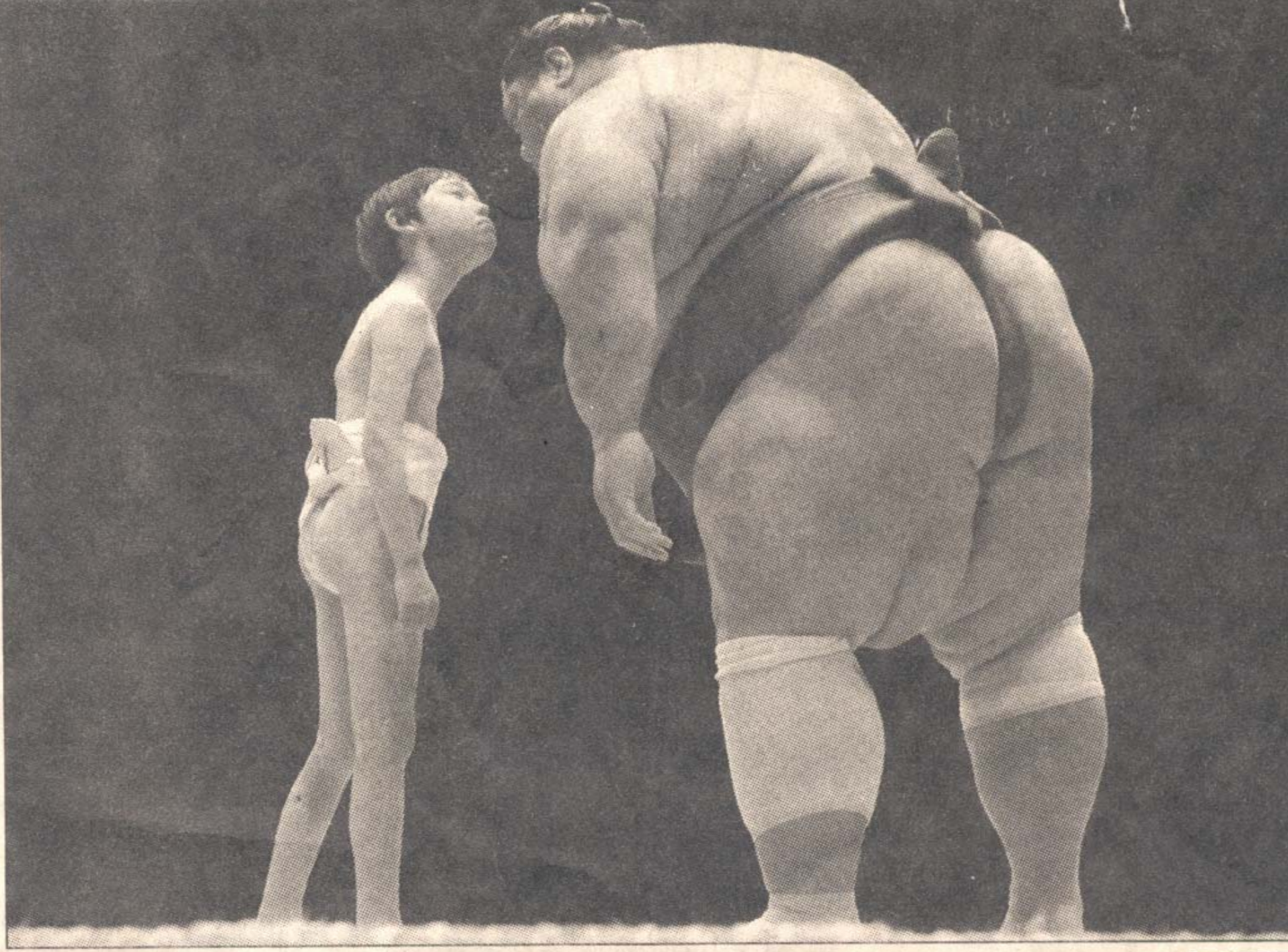
Increased Patient-Nurse Ratio is an Independent Risk Factor for CVC-RBSI

Nurse hrs worked per patient d	Pt - Nurse ratio	CVC - RBSI odds ratio*
24	1 : 1	1
20	1.2 : 1	4
16	1.5 : 1	16
12	2 : 1	62

*controlled for confounding variables

Fridkin et al, ICHE 1996

Education & CQI Programs Reduce Risk of CRBSI



Impact of Physician / Nurse Education & CQI on CRBSI*

CRBSI/1000 cath d		
Before Intervention	After Intervention	
2.4	0.8	(RR 0.31, CI .09-.53)[1]
19	7	(RR 0.36, CI .17-.75)[2]

*Program focus - infection control, revised hospital guidelines re: proper catheter insertion / maintenance

[1] Eggimann et al, Lancet 2000 [2] Maas et al, JHI 1998

Impact of Physician Education re: Infection Control & Proper Cath Insertion Technique on CRI

Catheter-related infections/1000 pt d

Before intervention	After intervention
4.5	3.2 (p=0.01)

Sherertz et al, Ann Intern Med 2000

Catheter Placement

Prospective, Randomized, Multicenter Study of Femoral vs Subclavian CVC Insertion

	Femoral cath	Subclavian cath
Cath coloniz.	14.2 %	2.2 %*
CRS	4.4%	1.5%
CR thrombosis	6%	0%*†

*($p \leq 0.01$) † femoral insertion independently assoc. w/ thrombosis (OR 14.4) Merrer et al JAMA 2001

Efficacy of Barrier Precautions During CVC Insertion

	Barrier precautions	
	Minimal	Maximal
Cath colonization	7.2%	2.3%*
Cath sepsis	3.6%	0.6%*

*$p \leq 0.05$

Raad et al, ICHE 1994

Preventive Strategies Involving Antiseptics, Antimicrobials, Novel Devices

Cutaneous Antisepsis

Catheter-Related Infection Prevention w/ Chlorhexidine Cutaneous Antisepsis

Cath colonization		CRBSI	
CHX	Control	CHX	Control
2.3%	7% *†	0.5%	2.6% (Maki `91)
2%	7%*	0.6%	0.6% (Sheehan`93)
4.7%	9.3%*	0	0.5% (Garland `95)
$12/10^3$	$31/10^3$*	$0.1/10^3$	$0.9/10^3$ (Minoz `96)
34%	27%*	$3.5/10^3$	$4.1/ 10^3$ (Humar `97)

underlined values = $p<0.05$

* = povidone iodine † = alcohol

Chlorhexidine-Impregnated Sponge

Chlorhexidine-Impregnated Sponge (Biopatch) at Cath Insertion Site for CRBSI Prevention

	C-I sponge	Control
# CVCs + ALs	665	736
Cath coloniz.	16%	29%*
CRBSI	1.2%	3.3%*†

*RR 0.62 (0.49-0.78) †RR 0.38 (0.16-0.89)
(proportional hazards regression analysis)

Maki, Mermel, et al ICAAC 2000

Chlorhexidine-Silver Sulfadiazine-Impregnated Catheters

Chlorhexidine-Silver Sulfadiazine-Impregnated Catheters

Summary measure of the impact of newly-inserted 1st gen. CHSS catheters on CRBSI from prospective, randomized studies of catheterization ≤ 11 days

RR 0.4 (CI 0.2-0.8)

Mantel-Haenszel weighted RR & Greenland/Robins CI

Maki et al `97, van Heerden et al `96, Hannan et al `96, Bach et al `96, Collin `99, George et al`97, Pemberton et al, `96, Ramsay et al `94

Chlorhexidine-Silver Sulfadiazine-Impregnated 2nd Generation Catheters* - Potential Prospects

	CHSS	Control
# CVCs	368	374
Cath duration	7 d	7d
Cath coloniz.	6.4% (9/10^3 CD)	12.8% (19/10^3 CD)†

*2nd gen. cath - extraluminal CHSS impregnation w/ increased chlorhexidine concen. & chlorhex. w/i cath lumens, hubs, extension sets

†p=0.006 Rupp et al, ICAAC 2001

Chlorhexidine-Silver Sulfadiazine-Impregnated Catheters - Potential Pitfalls

- March 1998 FDA public health notice of potential hypersensitivity reactions. 13 anaphylactoid reactions in Japan, 1 death. One reaction in US reported to FDA as of December 2001.

Minocycline-Rifampin-Impregnated Catheters

Minocycline-Rifampin-Impregnated vs 1st Generation Chlorhexidine-Silver Sulfadiazine- Impregnated CVCs*

	M-R	CHSS
Duration catheterization	6 d	7 d
CRBSI	0.3%	3. 4% (RR 0.1, CI 0-0.6)

*M-R impregnation intraluminal & extraluminal, CHSS impregnation only extraluminal

Darouiche et al, NEMJ 1999

Minocycline-Rifampin-Impregnated Catheters-Potential Pitfalls

Susceptibility of S. epi after 20 passages in media containing subinhibitory concentrations of M-R or CHSS*.

Antimicrobial Catheter	MBC (mg/L) before passage	after passage
M-R	0.05	>100
CHSS	1.25	2.5

***ratio of each compound based on levels in M-R caths and 2nd gen CHSS caths**

Tambe et al, JAC 2001

Prevention of CRBSI & Thrombosis w/ Heparin-Bonded CVCs

	Heparin-Bonded	Control	
CRBSI	0%	26%	(OR 0, CI 0-1.5)*
CRBSI	1%	18%	(OR 0, CI 0-1.5)†
CR thrombosis	0%	8%	(OR 0, CI 0-0.5)†

heparin-bonded cath independently assoc. w/ reduced cath-related thrombosis (HR 0.14)

*Appelgren et al, CCM 1996

†Pierce et al, Intensive Care Med 2001

Prevention of Infection with Silver-Iontophoretic (Oligon) CVCs

	Silver- Iontophoretic	Control
CRBSI	3.1%	8%*
CRBSI	1%	3.9%†

Combined OR 0.23 (0.07-0.66)

*Bong et al, ICAAC 2001

†Ibanez-Nolla et al, ICAAC 2001

Recommendations

- **Implement preventive strategies *not* associated with a risk of developing antimicrobial resistance**
  - **Education re: cath insertion / maintenance**
  - **Adequate nurse staffing based on N:P ratio & level of expertise**
  - **Maximal barrier precautions for CVC insertion**
  - **IV nursing teams**
  - **Non-femoral line placement**
  - **Remove caths ASAP after intended use**

Recommendations

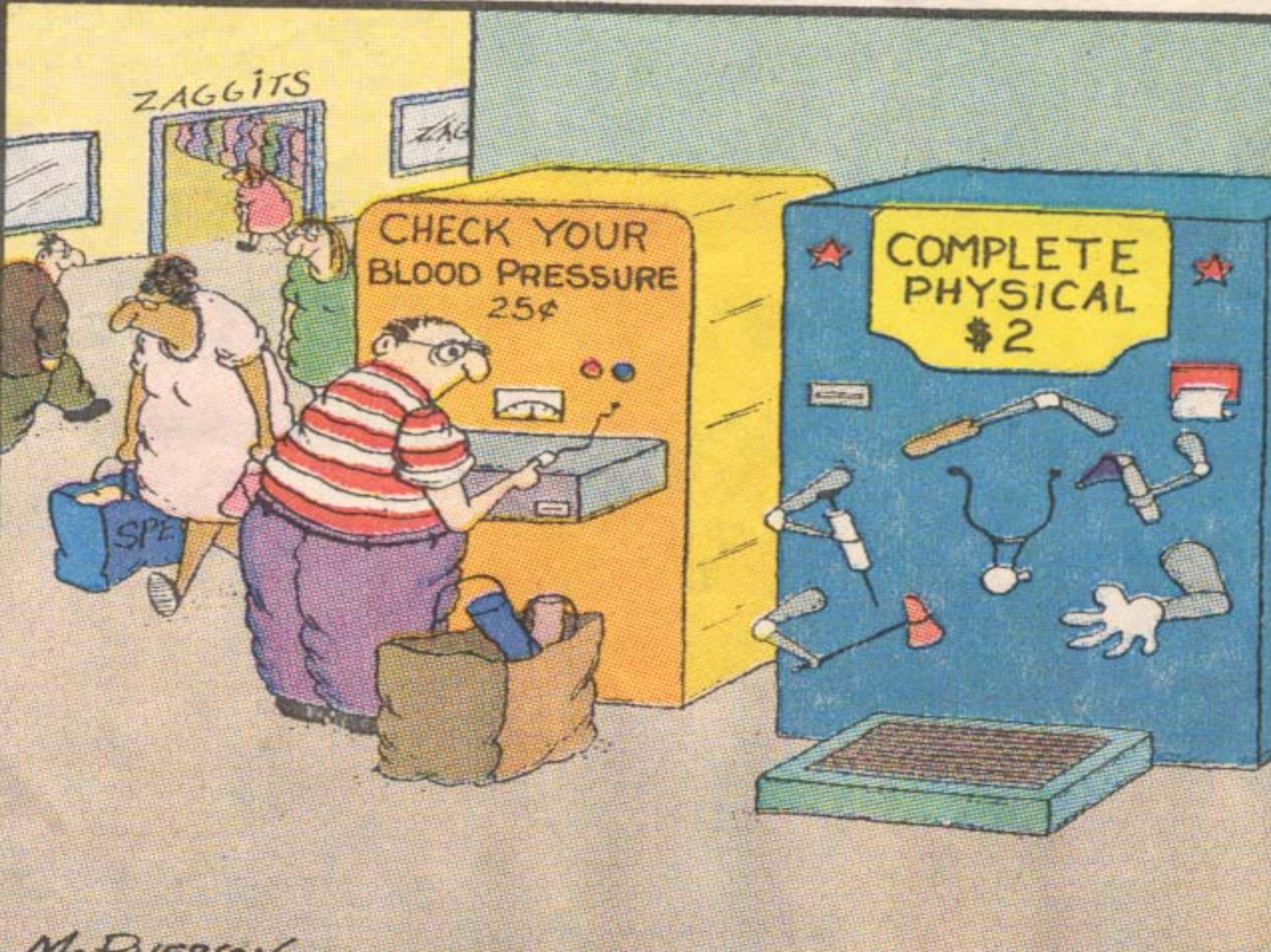
- **If CRBSI incidence still higher than institutional goals, then implement preventive strategies *unlikely* to be associated with a risk of developing antimicrobial resistance**
  - **Chlorhexidine-containing cutaneous antiseptics**
  - **Chlorhexidine-impregnated sponge**
  - **Heparin-bonded catheter**

Recommendations

- **If CRBSI incidence still higher than institutional goals (e.g. CRBSI is > 3/1000 cath d or > 1%), then use one of the following:**
  - **Chlorhexidine-silver sulfadiazine catheter**
  - **Silver-iontophoretic catheter**
  - **Minocycline-rifampin impregnated catheter**

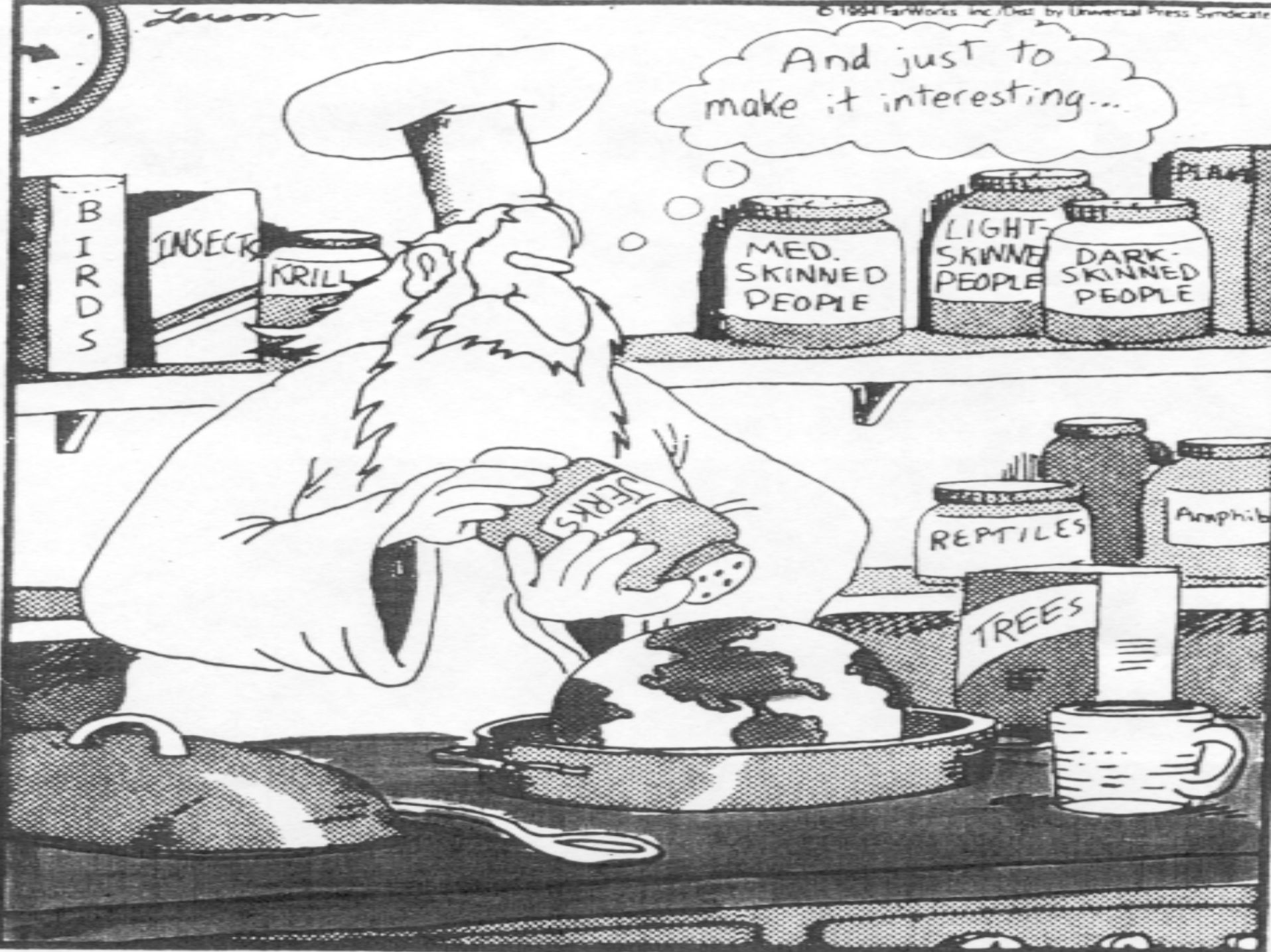
LIFE IS SHORT, ART IS LONG, OPPORTUNITY FUGITIVE, EXPERIMENTING DANGEROUS, REASONING DIFFICULT.

Hippocrates


ZAGGITS
ZAG
CHECK YOUR
BLOOD PRESSURE
25¢
COMPLETE
PHYSICAL
$2
SPE

I have but one lamp by which my feet are guided and that is the lamp of experience.
I know no way of judging the future but by the past.

Patrick Henry, Speech in the Virginia convention, March 1775


Larson
And just to make it interesting...
BIRDS
INSECTS
KRILL
MED. SKINNED PEOPLE
LIGHT-SKINNED PEOPLE
DARK-SKINNED PEOPLE
JERKS
REPTILES
TREES

Needleless IV Systems in Home Health Care

- **Possible increased risk of CRI w/ Safesite compared to Clave (p=.07) or Interlink (p<.01)**
- **Risk of CRI may be greater if change cap every 7 d compared to every 3 d (p=.06)**
- **Increased risk of CRBSI if shower w/ device**

Do et al, ICAAC 1996

RECOMMENDED INTERVENTIONS TO REDUCE THE RISK OF IV CATHETER-RELATED INFECTIONS

General

1-Maximal barrier precautions at catheter insertion

2-Cutaneous antisepsis w/ a chlorhexidine-based preparation or tincture of iodine

3-IV catheter team or strictly enforced adherence to protocol for aseptic manipulation of hubs & ports

4-Insert CVC in subclavian vein (esp if

RECOMMENDED INTERVENTIONS TO REDUCE THE RISK OF IV CATHETER-RELATED INFECTIONS

Catheter-related infection rate unacceptably high

1-Povidone-iodine ointment at insertion site

3-Chlorhexidine-Silver Sulfadiazine impregnated catheter (Arrowgard)

4-Hub containing antiseptic chamber (Segur Lock)

5-Chlorhexidine-impregnated sponge (Biopatch) at insertion site

Prevention of CVC-Related Bloodstream Infection: Effect of an Antiseptic-Containing Hub (Segur Lock)

	Standard hub	Hub w/ iodinated alcohol chamber
# Patients	73	78
Catheterization (mean) d	15 d	16
CRBSI (hub-related)	11%	

Cutaneous Antisepsis

	Log CFU (mean)			
	C	70% IPA	CHG in 70% IPA	
			0.5%CHG	2%CHG
Immediate	1.5	0.5	0.6	0.5
24 hrs*	4.3	4.1	1.7**	1.1**

*under occlusive dressing **p<.05

McGrath et al, ICHE 1997

Tunneled vs Non-tunneled IJ CVCs A Prospective, Randomized Trial*

	Non-tunneled	Tunneled
Cath coloniz	25%	17%
	3.1/100 cath d	2/100 cath d
CRBSI	3.4%	0.1%**
	1.3/100 cath d	0.4/100 cath d*

*caths not used for blood drawing **p<0.05

Timsit et al, JAMA 1996

Needleless Systems - Noncompliance with Manufacturer's Guidelines Leads to CRBSIs

Needleless System Use & Increased Bloodstream Infections

	CVC-RBSI / 1000 cath d	
	Conventional system	Needleless system
SICU	5	9.4 (p=.05)
MICU	7.3	9.5 (p>.05)
SOTU	2.2	13.6 (p=.002)

30-40% of nurses exchanged end caps at >72^0 intervals (manufacturer = 72^0)

Cookson et al ICHE 1998

Needleless System Change Increased Bloodstream Infections

- Change from interlink to IVAC system in ICUs
- IVAC needleless system changed every 6 d (manufacturer = daily)
- CVC-RBSI increased in one ICU (OR 88) , but not in another ICU
- In ICU w/ increased BSIs, pts more likely (OR 49) to have intermittent rather than continuous IV therapy (i.e. more cath manipulation)
- When IVAC changed daily, CVC-RBSI rate returned to baseline

McDonald et al ICAAC 1997

CRBSI - Complications From Catheters Remaining *in situ*

Coagulase-negative Staph

- **3 fold higher risk of recurrent CRBSI if catheter left in situ (Raad et al, Infect Contr Hosp Epi 1992)**

Staph aureus

- **4 fold higher risk of death w/ CRBSI if catheter left in situ >48 hrs (Malanoski et al, Arch Int Med 1995)**
- **6.5 fold higher independent risk of relapse or death w/ CRBSI if catheter left in situ (Fowler et al, CID 1998)**

CRBSI - Complications From Catheters Remaining *in situ*

Candida

- **2 - 10 fold higher independent risk of death w/ CRBSI if catheter left in situ after first positive blood cx (Nguyen et al, Arch Int Med `95; Nucci et al ICHE `98)**
- **Other studies in children & adults w/ same findings by univariate analysis (Eppes et al, PIDJ `89; Dato et al, PIDJ `90; Lecciones et al, CID `92)**

Needleless IV Systems

- At least 7 reports of increased infections associated with needleless IV systems
- Problems
  - Contamination & inability to disinfect internal components
  - End caps or covers not changed as frequently as recommended by manufacturer
  - Devices become FDA-approved without prospective trials to assess the risk of catheter infection

Prevention of Hemodialysis Catheter-Related Infections with Povidone-Iodine Ointment

	PI ointment	No ointment
Colonization	17%	37%*
CRBSI	5%	18%*

Prevention of CRBSI using an Antiseptic-Containing Hub (Segur Lock)

	Standard hub	Hub w/ iodinated alcohol chamber
# CVCs	114	116
Catheterization (mean)	11 d	11 d
Cath hub-related BSI (p=.05)	7%	1.7%

Prevention of Tunneled CRBSI in a Home Care Setting

- Tunneled CRBSI increased 0.88 to 2.1/10^3 CDs during summer months
- 2/3 of cases = hydrophilic GNRs
- Independent risk factors: self- rather than caregiver-administered IV meds; infrequently changed needleless devices; frequent baths
- Action: Parafilm to cover needleless device when bathing; change needleless device 2x/wk
- Outcome: tunneled CRBSI decreased to 0.35/10^3 CDs

Nichols et al, ICAAC 2000

Preventing CRI using a Silver Iontophoretic Catheter*

Catheter type	Caths w/ significant growth
Control	100%
Chlorhexidine/silver sulfadiazine (1^0 gen)	67%
Silver iontophoretic	20%

* insertion site of lab animals inoculated w/ S. aureus, caths quantitatively cultured at 7 d

Raad et al, JID 1996

RECOMMENDED INTERVENTIONS TO REDUCE THE RISK OF IV CATHETER-RELATED INFECTIONS

General

1-IV catheter nurse team or strictly enforced adherence to protocol for aseptic manipulation of hubs & ports through education / CQI programs

2-Maximal barrier precautions at CVC insertion

3-Cutaneous antisepsis w/ a chlorhexidine-based preparation or tincture of iodine

3-Dressing type as preferred by nurses caring for catheters

4-Remove catheters ASAP after intended use

RECOMMENDED INTERVENTIONS TO REDUCE THE RISK OF IV CATHETER-RELATED INFECTIONS

Catheter-related infection rate unacceptably high despite practical interventions

1-Povidone-iodine ointment at insertion site of pt grps w/ heavy S. aureus carriage

3-Chlorhexidine-Silver Sulfadiazine-impregnated catheter (Arrowgard) or possibly minocycline-rifampin impregnated catheter (BioGuard Spectrum)

4-Chlorhexidine-impregnated sponge (Biopatch**)** at insertion site

5-Hub w/ antiseptic chamber (Segur Lock)

Dressings

Designated IV Nursing Teams

Barrier Precautions

Risk Factors

New Ports/Hubs

Ointments

Treatment

Prophylactic Antibiotics

Antiseptic Catheter Lock Solutions

Needleless System Change Increased Bloodstream Infections

- **Change from interlink to IVAC system in ICUs**
- **IVAC needleless system changed every 6 d (manufacturer = daily)**
- **CVC-RBSI increased in one ICU (OR 88) , but not in another ICU**
- **When IVAC changed daily, CVC-RBSI rate returned to baseline**

McDonald et al ICAAC 1997

Needleless System Disinfection*

	Positive fluid path recovery	
	Conventional system	Needleless system**
Alcohol		
No	72%	80%
Yes	4%	6%

*septum inoculated w/ $2x10^3$ enterococci; **interlink

Luebke et al AJIC 1998

Pathogenesis

Diagnosis

The Future

Current Practice

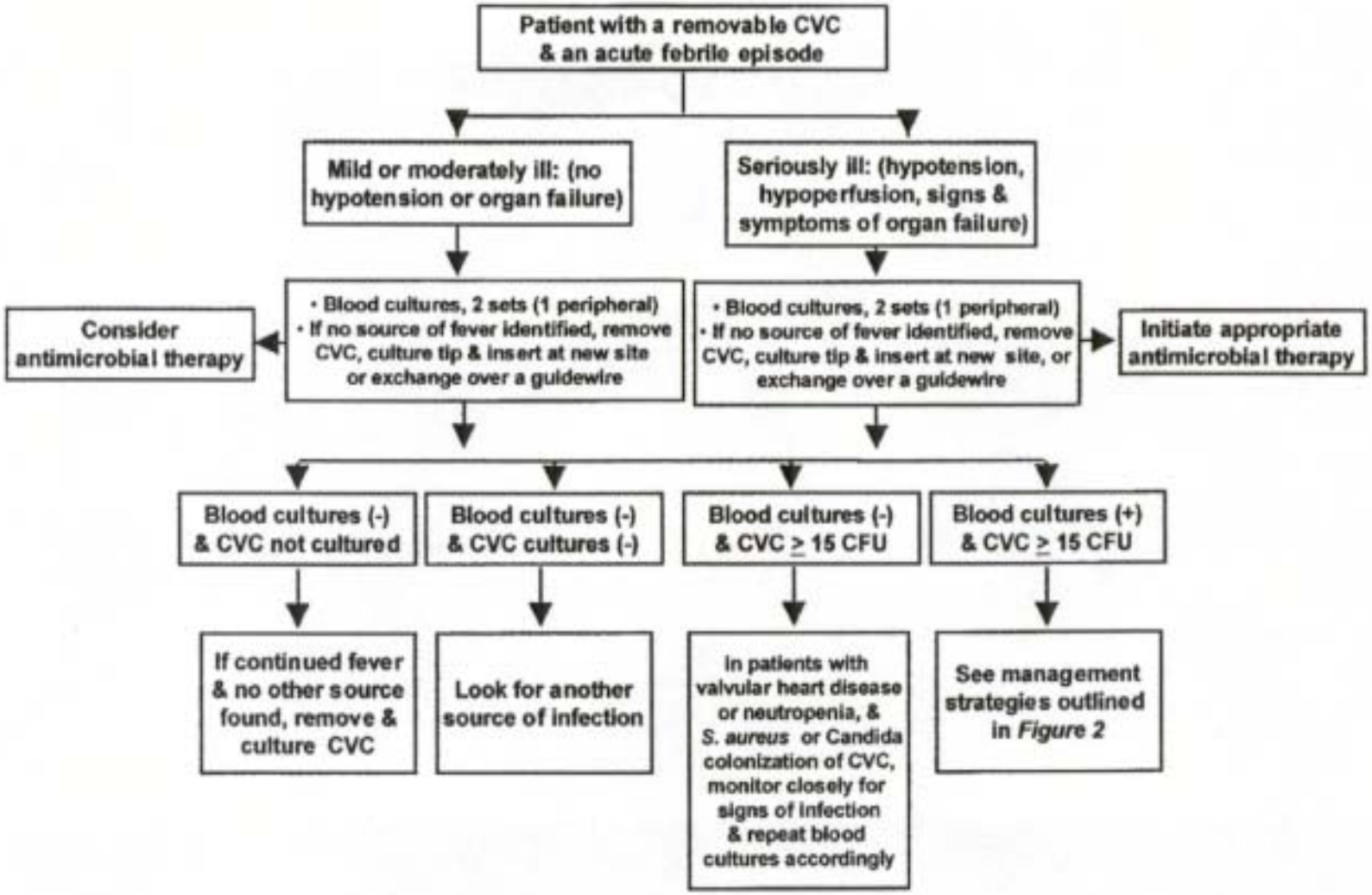


Figure 1. Methods for the diagnosis of acute fever in a patient suspected of having nontunneled central venous catheter (CVC) infection. The patient should be assessed for severity of illness, and 2 blood samples should be obtained (at least 1 peripherally and 1 via a catheter) for culture. If a catheter is the suspected source of infection in a patient who has mild to moderate illness, antimicrobial therapy should be considered, and the catheter either should be removed and cultured, or exchanged over a guidewire and cultured. Patients with severe disease due to catheter-related infection should be given appropriate antimicrobial therapy, and the CVC should be removed, cultured, and inserted into a different site. Results of catheter and blood cultures help to establish the presence of infection and the infecting organism, which may allow for adjustment in antibiotic coverage and catheter management. +, positive; −, negative.

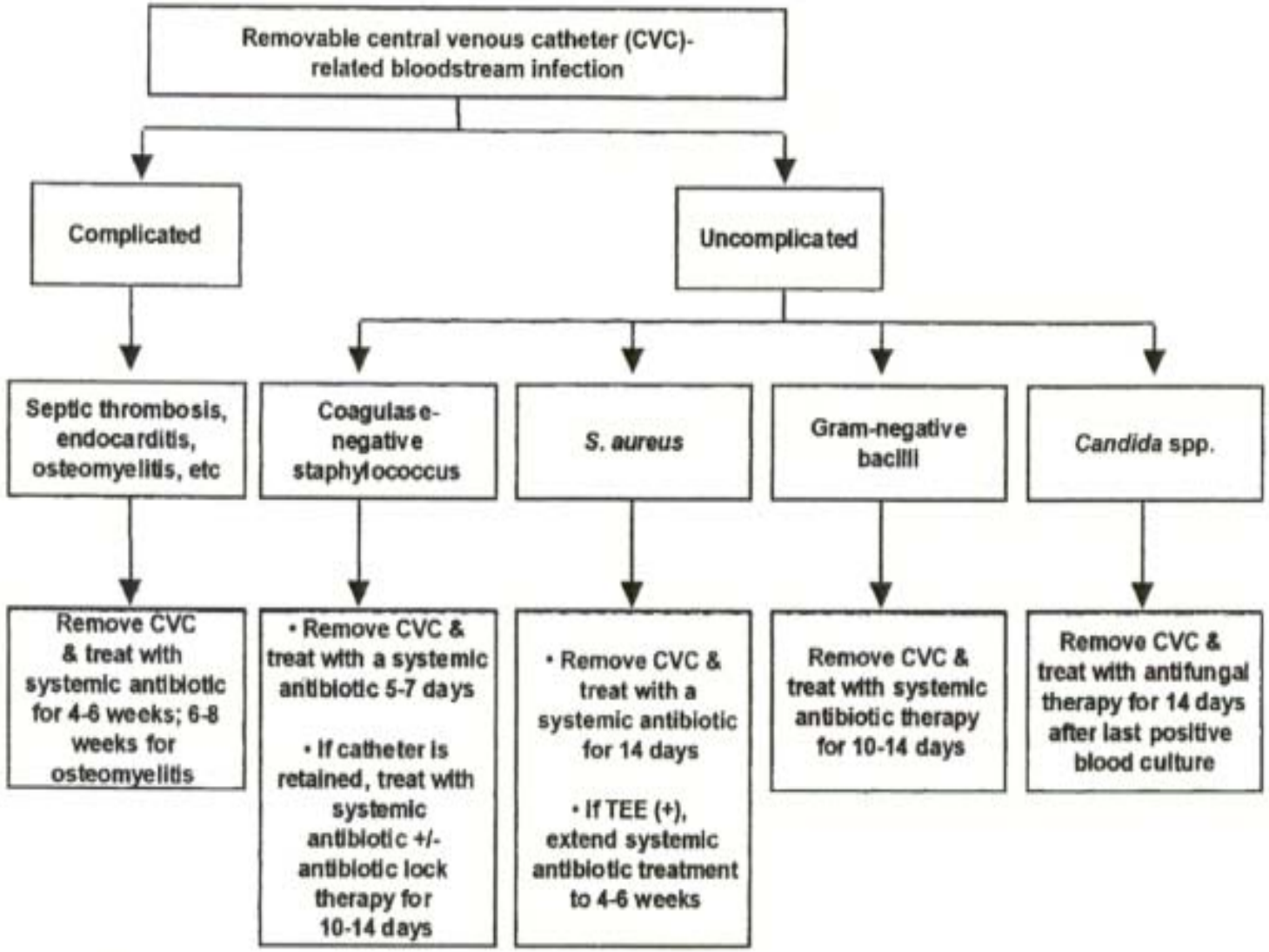


Figure 2. Approach to the management of patients with nontunneled central venous catheter (CVC)–related bloodstream infection. Duration of treatment will depend on whether the infection is complicated or uncomplicated. The catheter should be removed and systemic antimicrobial therapy should be initiated, except in some cases of uncomplicated catheter-related infection due to coagulase-negative staphylococci. For infections due to *Staphylococcus aureus*, transesophageal echocardiography (TEE) may reveal the presence of endocarditis and help to determine the duration of treatment. +, positive; −, negative.

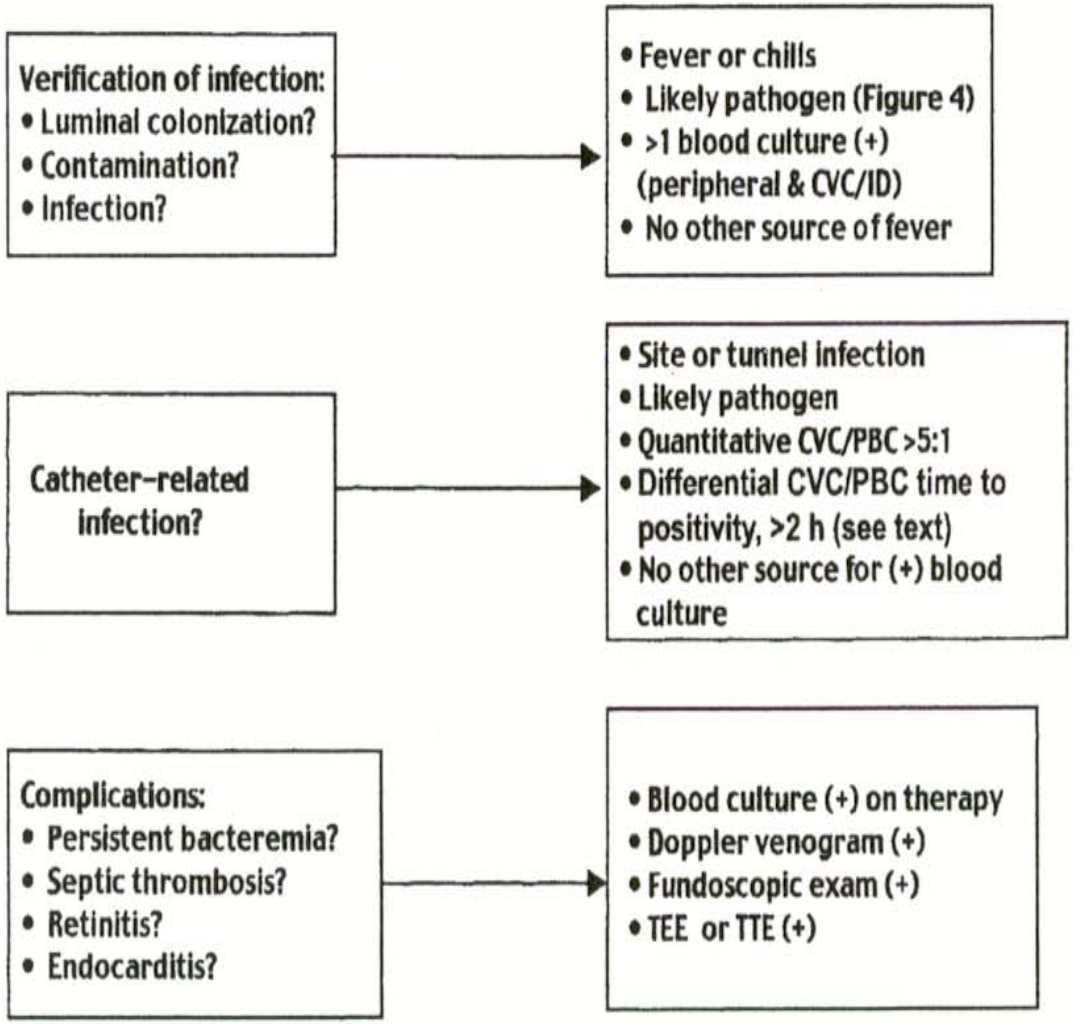


Figure 3. Management points for a patient with bloodstream infection and a tunneled central venous catheter (CVC) or an implantable device (ID). It is important (1) to verify that the CVC or the ID is infected and that it is the source of bloodstream infection, and (2) to carefully assess the patient for possible complications, such as septic thrombosis, metastatic seeding, endocarditis, or osteomyelitis. PBC, peripheral blood culture; TEE, transesophageal echocardiogram; TTE, transthoracic echocardiogram; +, positive.

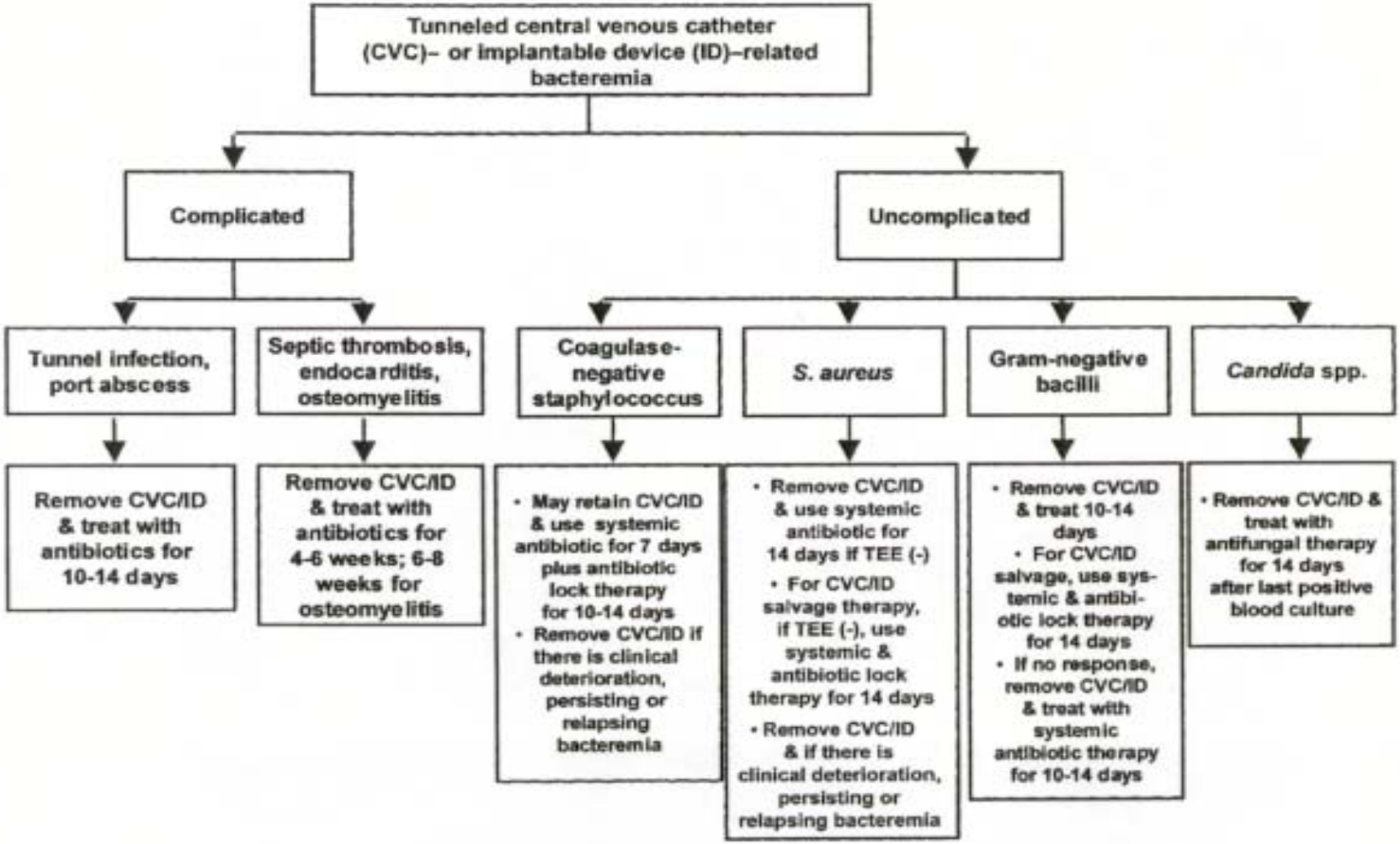


Figure 4. Approach to the management of a patient with a tunneled central venous catheter (CVC)– or a surgically implanted device (ID)–related bloodstream infection. It is important to assess the patient for complications and to identify the specific pathogen. Complicated infections invariably require antimicrobial therapy for 4–8 weeks and removal of the CVC or the ID, depending on the site of metastatic infection. All patients with infection due to *Candida* species should have the device removed and should receive antifungal therapy for 14 days after fungemia has cleared. If tunneled CVC- or ID-related bacteremia is uncomplicated and the CVC or port is not be removed, infections due to coagulase-negative staphylococci, *Staphylococcus aureus*, or gram-negative bacilli should be treated with systemic and antimicrobial lock therapy for 14 days. If a patient has *S. aureus* bacteremia and transesophageal echocardiography (TEE) has demonstrated vegetations, systemic treatment should be extended to 4–6 weeks. –, negative.

TREATMENT OF INTRAVASCULAR CATHETER-RELATED INFECTIONS - 2001 GUIDELINES BASED ON ANECDOTES, WISDOM OR FACTS?

Dr. Leonard Mermel, Associate Professor of Medicine, Brown University School of Medicine, Medical Director, Department of Infection Control, Rhode Island Hospital

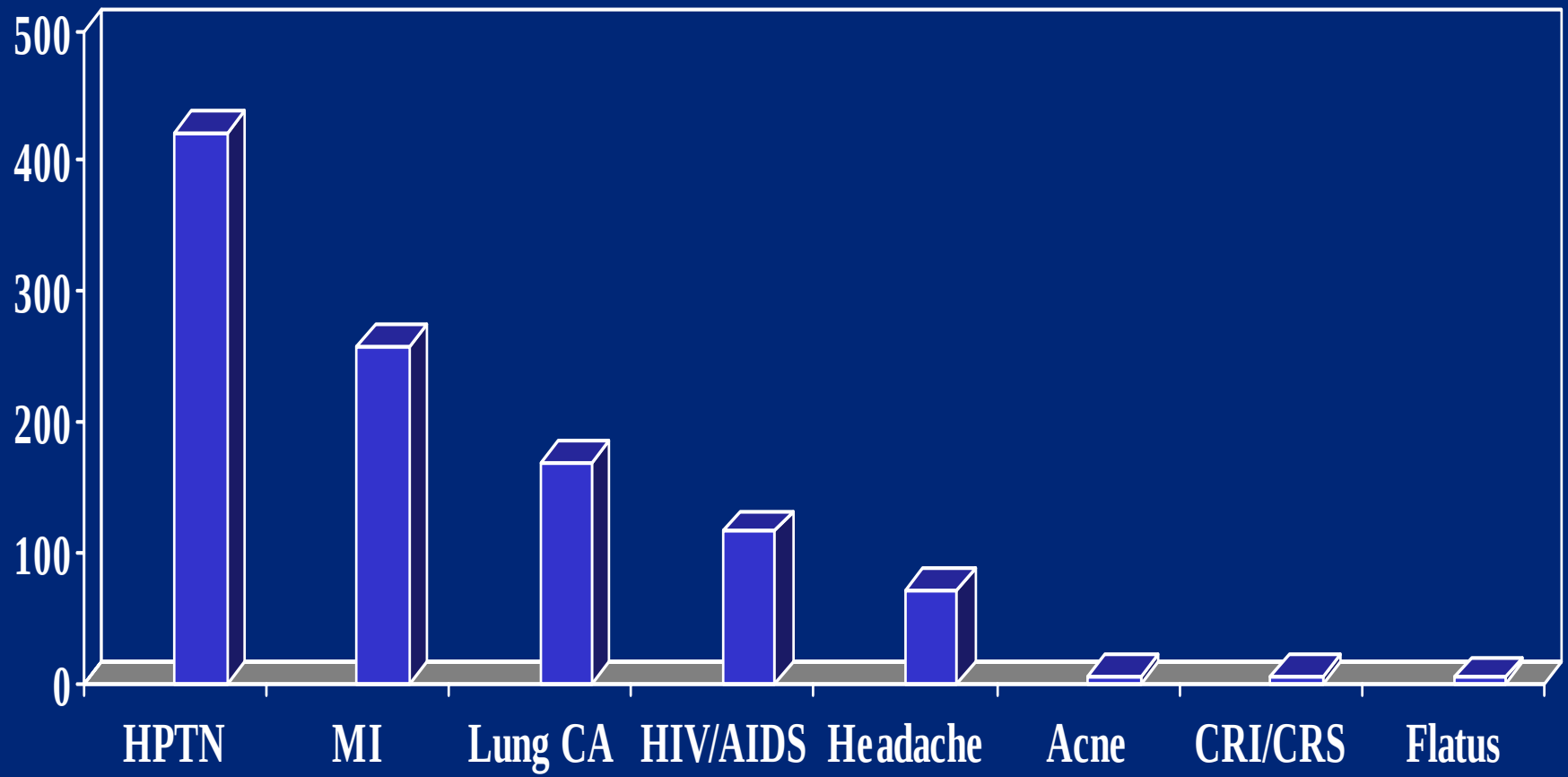
IDSA / SCCM / SHEA MANAGEMENT GUIDELINES FOR INTRAVASCULAR CATHETER-RELATED INFECTIONS

Dr. Leonard Mermel, Associate Professor of Medicine, Brown University School of Medicine, Medical Director, Department of Infection Control, Rhode Island Hospital

TO ACQUIRE KNOWLEDGE,
ONE MUST STUDY.
TO ACQUIRE WISDOM,
ONE MUST OBSERVE.

Haydee DeLeon

Medline (1/66-8/01) Search Terms - Prospective and Randomized Combined with Treatment



Recommendation - Managing Catheter Colonization for Specific Patients & Pathogens

- **Patients w/ catheter tip culture growing S. aureus or Candida who have valvular heart disease or neutropenia, monitor closely for signs of infection & repeat blood cultures accordingly.**

S. aureus Endocarditis Animal Model

Catheter status	Culture positive	Sterile
Marantic endocarditis w/i RA	S. aureus endocarditis w/i cath lumen*	
No	Yes	0%
0%		
Yes	No	0%
100%		
Yes	Yes	88%
12%		

Recommendation - Retaining Non-Tunneled CVCs Associated w/ CRBSIs

- A non-tunneled CVC may be retained in some patients w/ CRBSI if no evidence of persistent or relapsing bloodstream infection, no localized or metastatic infection, especially when due to coag-negative staph

S. aureus BSI Treatment & TEE

- **25% of adult pts w/ S. aureus BSI had endocarditis; 2/3 catheter-related**
- **TTE & TEE sensitivity = 32% & 100% respectively; of 103 pts w/ S. aureus BSI, diagnostic TTE & TEE for endocarditis = 7 % & 25 % respectively**
- **TEE-determined tx duration for *clinically* uncomplicated S. aureus CRBSI is cost-effective**
- **Problem - 12% relapse rate from metastatic infection in pts w/o endocarditis by TEE; presumably pts received short-course tx which was insufficient**

Fowler et al, JACC 1997 Rosen et al, Ann Int Med 1999

Antibiotic Lock Therapy: *in vitro* Abx Stability in Heparin*

	% Abx activity remaining at 37°C x 10 d
Vanco	99%
Cefazolin	91%
Ticar-Clav	96%
Ceftaz	60%
Cipro	100

*equal volume heparin (100 U/ml) & abx final concentration = 500 μg/ml, except cipro 125 μg/ml

Anthony & Rubin, AAC 1999

Rationale for Antibiotic Lock Therapy

Greater abx concentration needed to eradicate bacteria & fungi w/i biofilms possibly due to: slow abx penetration or abx inactivation or antagonism; abx-resistant phenotype

Stewart & Costerton, Lancet 2001

Antimicrobial Activity Against S. aureus

Abx	MBC (μg/ml)		Fold increase
	Planktonic bacteria	Adherent bacteria	
Vanco	3.4	263	77
Cipro	0.75	125	167
Fleroxacin	5.0	333	67
Rifampin	0.44	3.4	8

Zimmerli et al, JAC 1994

Antibiotic Lock Therapy: *in situ* Abx Stability in Heparin*

- **Over 28 d max (median 17 d), vanco conc = 136 -1280 μg/ml (median 488 μg/ml) > 100 x MIC_{90} for at least 21 d**
- **Over a median 17 d (34 d max), ceftaz conc <8 -1116 μg/ml (median 197 μg/ml) 29 x MIC_{90} for 15 d**

*** equal volume heparin (100 U/ml) and abx final concentration = 2,000 μg/ml placed in implanted ports**

Haimi-Cohen et al, AAC 2001

Antibiotic Lock Therapy - Formulations

- Most abx lock solutions are used in concentrations of 1000-5000 μg/ml in heparin (50-100 U) or saline, enough volume to fill catheter lumen and port if present
- Note: some abx precipitate at high concentrations (eg 4000 μg/ml vanco in 2500 U heparin); some abx are incompatible w/ heparin (eg gentamicin)

Antibiotic Lock Therapy - *in vitro* Efficacy

TPN inoculated w/ slime-producing coag-neg staph infused x 3 d thru caths →abx then infused thru caths x 3 d* →lumenal flush culture →lumen filled w/ broth & reincubated for additional cultures →microscopic exam of gram-stained cath surface

***sterile TPN infused during 3 d when abx administered by standard fashion, TPN *not* given during 3 d when catheters treated w/ abx lock**

Gaillard et al, JPEN 1990

Antibiotic Lock Therapy - *in vitro* Efficacy

Treatment cultures & gram stain	Culture results (mean CFU/ml)	Negative
No antibiotic	$1x10^6$	0/5
Vanco*	$1x10^3$	0/5
Vanco*+ Rifampin*	$1x10^1$	2/5
Vanco* + Netilmicin*	$1x10^1$	3/5
Vanco lock‡	0	5/5

*standard pediatric doses ‡2.5 mg vanco BID

Gaillard et al, JPEN 1990

Abx Lock Tx: One Hospital's Experience w/ Tunneled, Long-Term CVCs in Compromised Patients

- **Attempted cath salvage - 12 pts w/ CRBSI (5 CNS; 6 NF-GNR; 1 Enterococcus)**
- **Paired qual & quant bld cxs before, during, after tx**
- **Tx = 4 d standard abx (thru peripheral v.) and 12 d (12 hr/d) of abx lock tx (thru infected CVC) w/ vanco or teicho (5 mg) + amikacin (5 mg)**
- **Successful cath salvage in 11 of 12 (92%) pts w/ long-term f/u**

Douard et al, ICAAC `93

Abx Lock Tx: One Hospital's Experience w/ Implanted Ports in Compromised Patients

- Attempted cath salvage -16 pts w/ CRBSI (7 CNS; 2 S. aureus; 8 NF-GNR)
- Paired qual& quant bld cxs before, during, after tx; semiquant & quant tip cx; port reservoir cx
- Tx in successful cases = 4 - 15 d systemic abx (thru peripheral v.) + 4-15 d abx lock QD or BID (thru port) w/ vanco or teicho (5 mg) w/ or w/o amikacin (5 mg)
- Successful port salvage in 7 of 16 pts (44%) w/ long-term f/u (no f/u BSI w/ same microbe)
- In 8 of 9 failures, infecting microbe found in

Abx Lock Tx: One Hospital's Experience w/ Implanted Ports

Success

(symptoms resolved <48 hr, negative bld cx < 5 d and remained negative after tx)

S. epi (2), P. aggglomerans, E. cloacae, S. maltophilia

Relapse

S. epi (2)

Failure

Coag-neg staph (3), S. aureus (2), Acineto lwoffii (2),

E. aerogenes, S. maltophilia, GNB CDC IV

Molecular Fingerprinting to Define CRBSI Source Based on Duration of Catheterization

Presumed source of CRBSI	Median cath duration
Skin	14 d
Skin & hub/infusate	24 d
Hub/Infusate	64 d

Douard et al, Nutrition 1994

Now that I know I'm no wiser than anyone else,
does this new wisdom make me wiser?

Hugh Prather, Notes to Myself