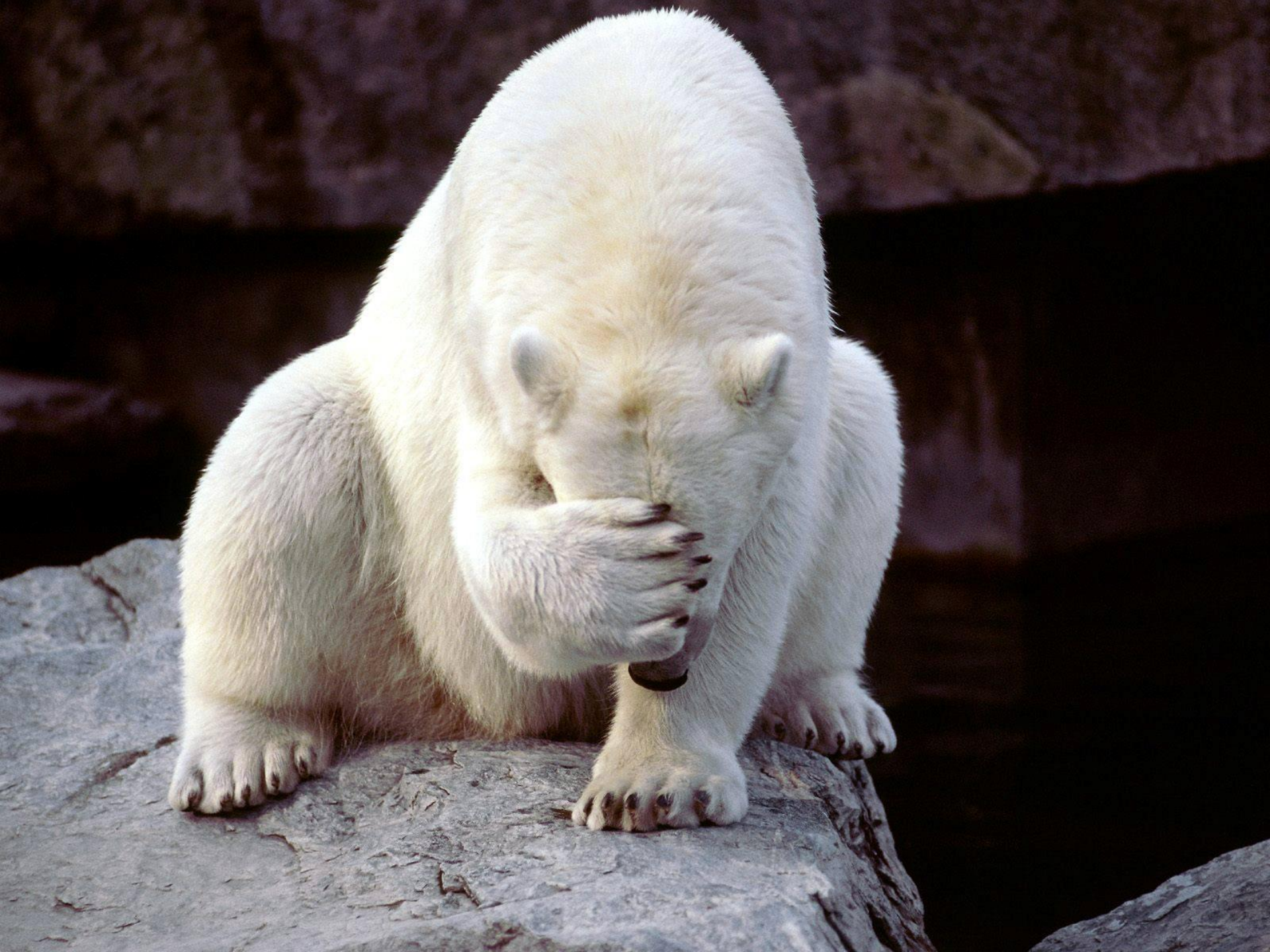



# Prevention of Cesarean Wound Complications

Brett Einerson, MD MPH

2/26/2016 - Project ECHO





- 
- A person with a backpack is walking away from the viewer down a long, straight path that stretches to a bright horizon. The path is flanked by tall grass. The sky is filled with clouds, and there are streaks of light in the upper corners, suggesting a sunset or sunrise. The overall mood is one of journey and exploration.
1. Brief Background
  2. What works?
  3. What doesn't work?
  4. What's new?
  5. What's next?

No disclosures.

# Defining “Wound Complication”

Our focus today:

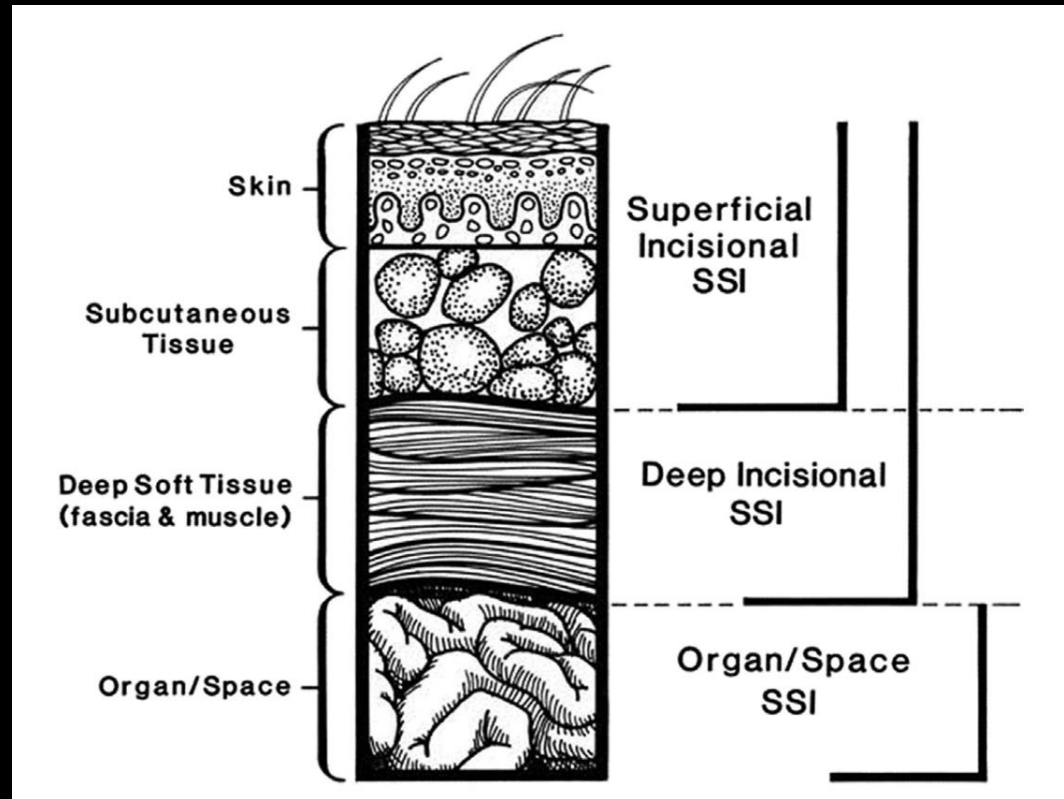
Wound infection

Wound disruption

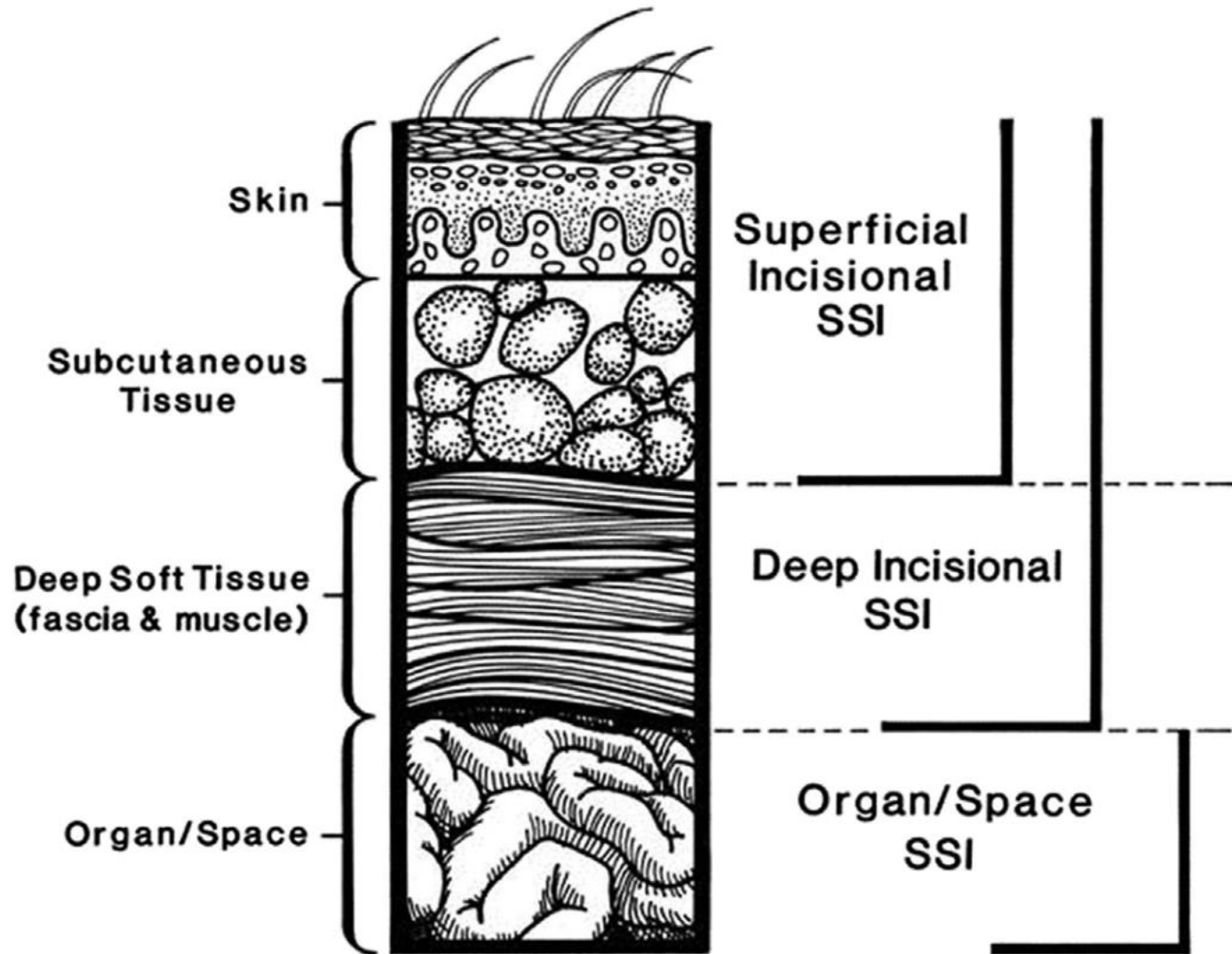
Not in focus today:

Uterine incisions

OB lacerations



SSI = Surgical Site Infection



Horan. CDC definitions of nosocomial surgical site infections. Infect Control Hosp Epidemiol 1992; 13(10):606-8.

# The cost.

**\$3,400 to \$4,000**  
per surgical site infection

**\$500 million**  
per year in the U.S.

So...

How can we prevent  
**wound complications**  
in patients  
undergoing cesarean?



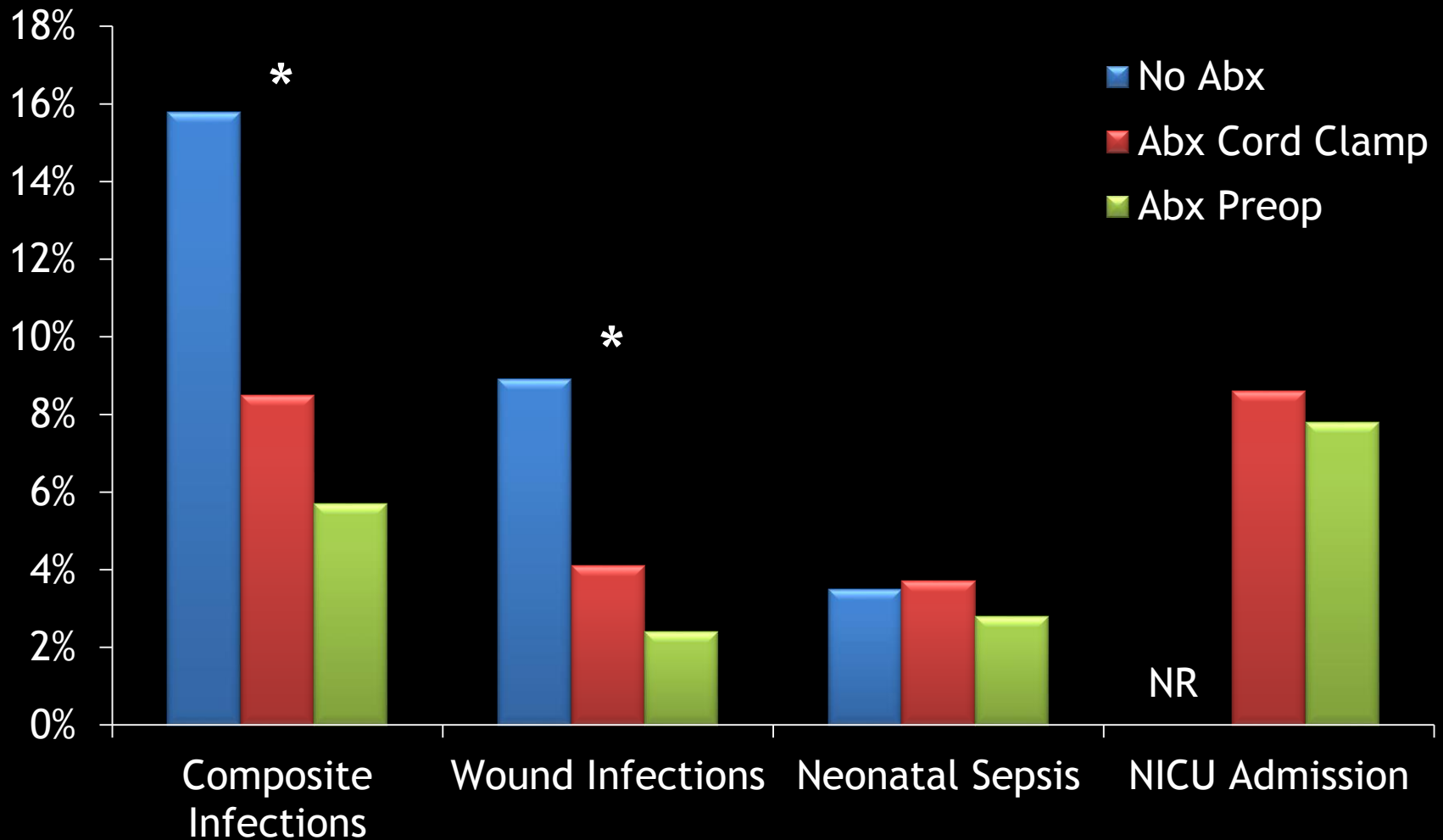
# What we do that works.



# What we do that works.

- Pre-incision antibiotics

# Prophylactic Antibiotic Use and Infectious Morbidity



Smail et al. Cochrane Database 2014.  
Mackeen et al. Cochrane Database 2014.

\* $P < 0.05$

# Reminder: Guidelines for Cesarean

“A single dose of cefazolin before incision.”

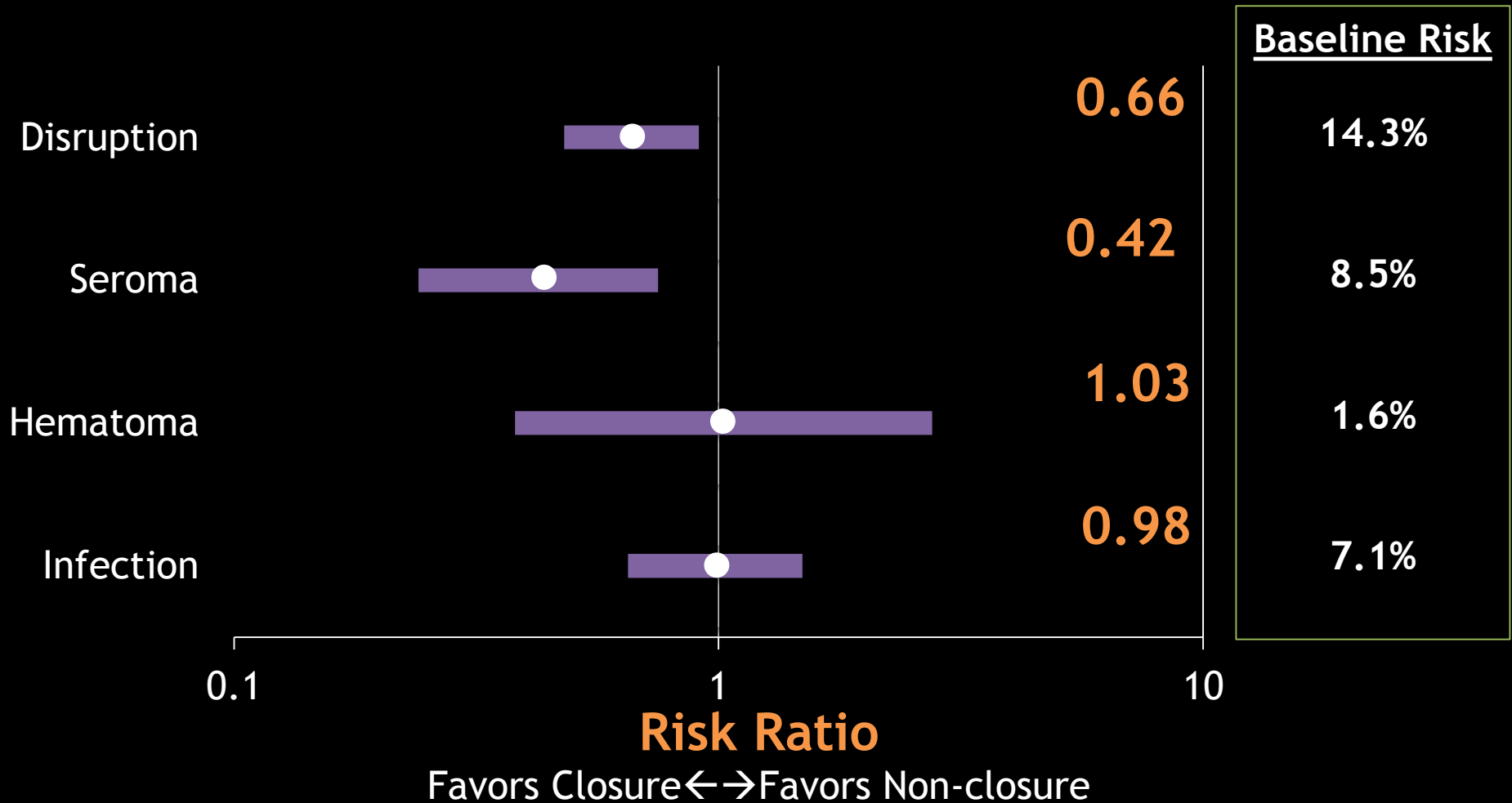
- Timing                      15-60 min before incision
- Dose                         2g (3g if  $\geq 120\text{kg}$ )
- Redose                     4 hrs
- Allergy?                  Clinda 900mg + Gent 5mg/kg
- Multi-dose?              No

# What we do that works.

- Pre-incision antibiotics
- Closure of subcutaneous layer >2cm
  - Meta-analysis of 6 RCTs (n=875)
    - No effect when <2cm
    - But if >2cm...



# Wound complications when subcutaneous tissue $\geq 2$ cm deep



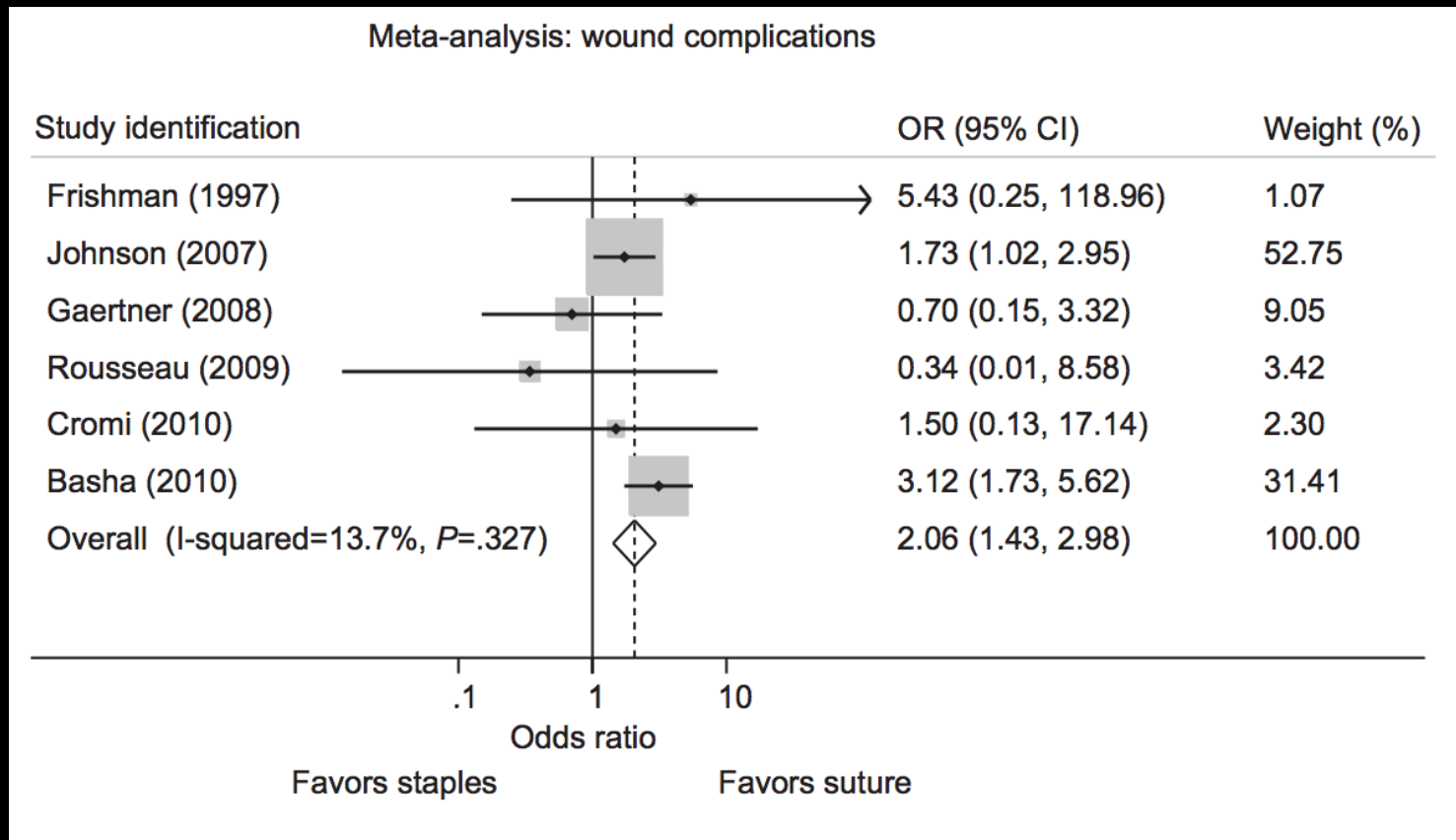


# What we do that works.

- Pre-incision antibiotics
- Closure of subcutaneous layer >2cm
- Suture the skin (or staple?)

# Skin: Suture vs Staple

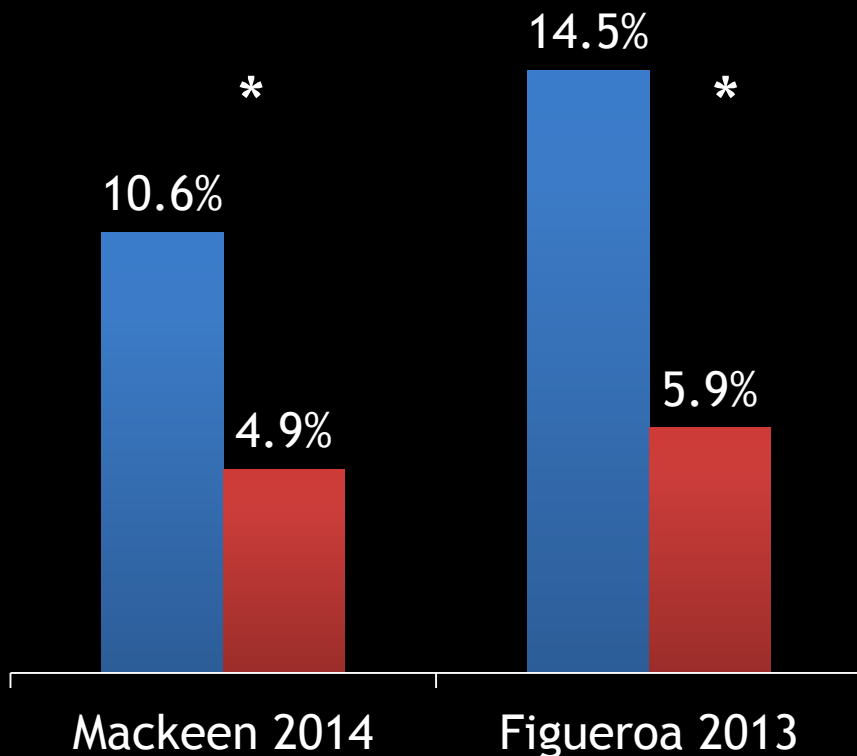
- Meta-analysis (2011)
  - 5 RCTs + 1 prospective cohort, n=1,487



# Skin: Suture vs Staple

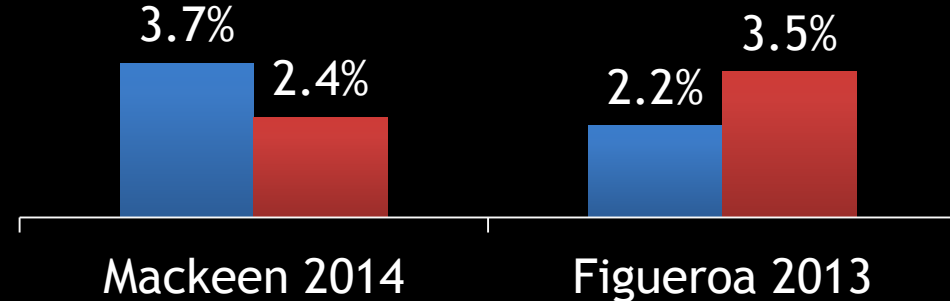
- Two newer large RCTs (n=1,114)
  - >65% obese

All Wound Complications



Wound Infection

■ Staples ■ Sutures



\*P<0.05

# What we do that works.

- Pre-incision antibiotics
- Closure of subcutaneous layer >2cm
- Suture the skin (or staple?)

What we tried  
that **doesn't**  
work.

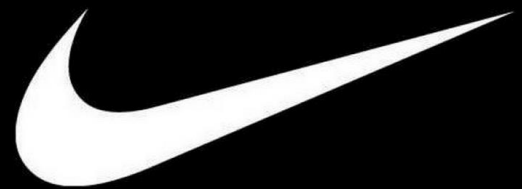


# What we tried that **doesn't** work

- Multiple doses of prophylactic antibiotics
  - Cochrane Meta-analysis of 51 Trials:

Multi- vs Single-dose  
to prevent wound infection

OR 0.92 (95% CI 0.70-1.23)





# What we tried that **doesn't** work

- Multiple doses of prophylactic antibiotics
- Perioperative supplemental oxygen

## Three RCTs (total n= 1,559)

1. Gardella:	80% vs 30% O <sub>2</sub>	→	No Benefit ? Harm
2. Scifres:	10L vs 2L	→	
3. Duggal:	80% vs 30% O <sub>2</sub>	→	

Gardella. Obstet Gynecol. 2008

Scifres. Am J Obstet Gynecol. 2010

Duggal. Obstet Gynecol. 2013

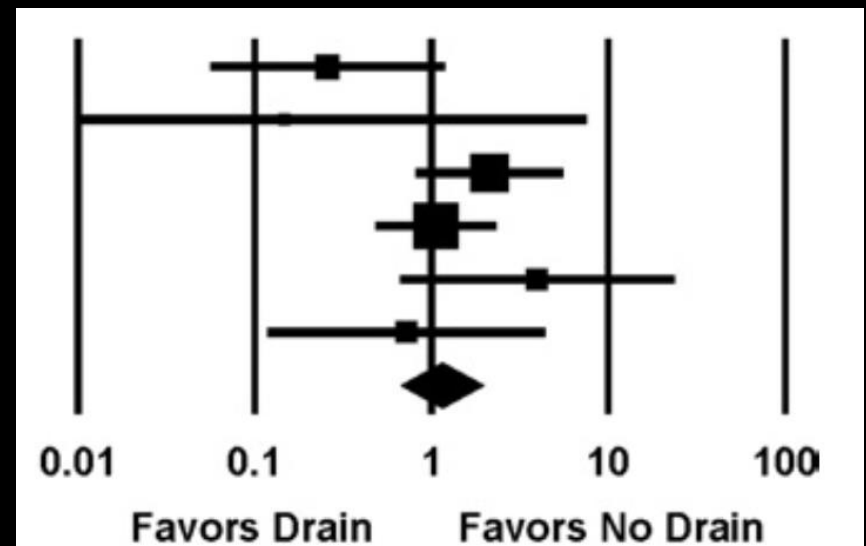
# What we tried that **doesn't** work

- Multiple doses of prophylactic antibiotics
- Perioperative supplemental oxygen
- Routine subcutaneous drain

Three Meta-analyses of RCTs agree...

- No benefit in cesarean
- No benefit in obese
- No benefit in general

Hellums. Am J Obstet Gynecol. 2007  
Gates. Cochrane Database. 2013  
Kosins. Plast Reconstr Surg. 2013



# What we tried that **doesn't** work

- Multiple doses of prophylactic antibiotics
- Perioperative supplemental oxygen
- Routine subcutaneous drain

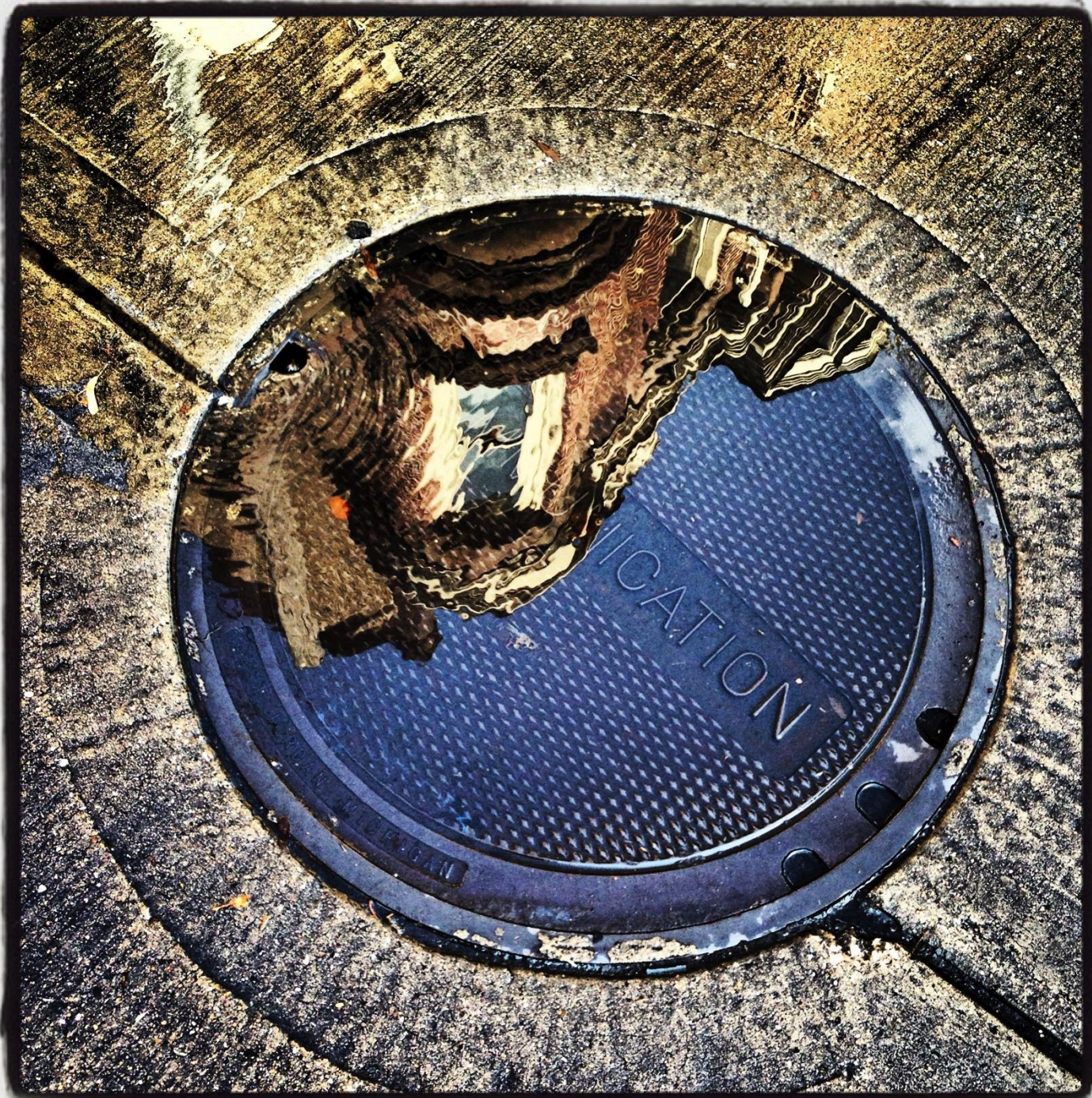
*What about in obese cesarean patients?*

Multicenter RCT

n=280, mean BMI 48, subcut >4cm

	Suture	Suture+Drain	Adj OR (95%CI)
Seroma (%)	9.0	10.6	1.01 (0.44-2.32)
Composite (%)	17.4	22.7	1.21 (0.65-2.26)








# What we tried that **doesn't** work

- Multiple doses of prophylactic antibiotics
- Perioperative supplemental oxygen
- Routine subcutaneous drain



# What's new?



Society for  
Maternal • Fetal  
Medicine

SMFM 36th Annual Meeting —  
The Pregnancy Meeting™

February 1–6, 2016

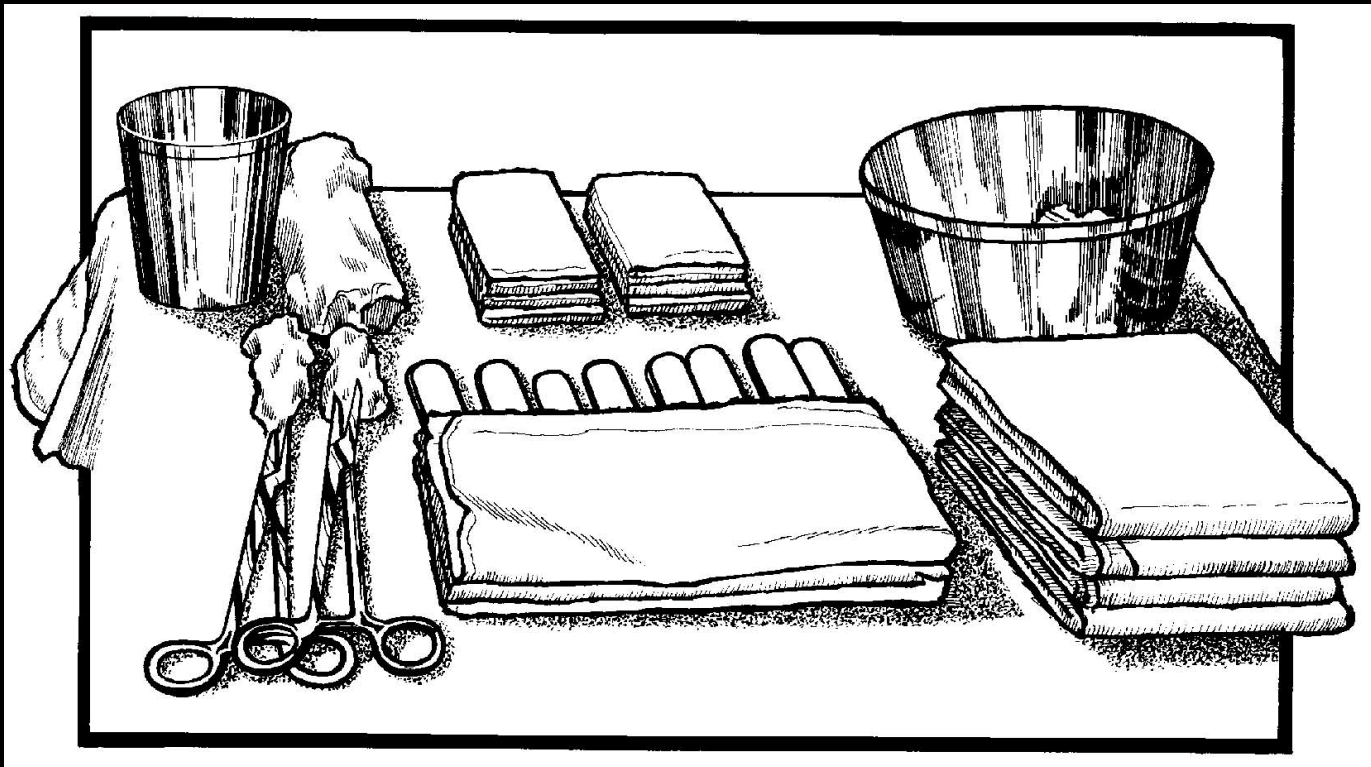
Hilton Atlanta

Atlanta, GA



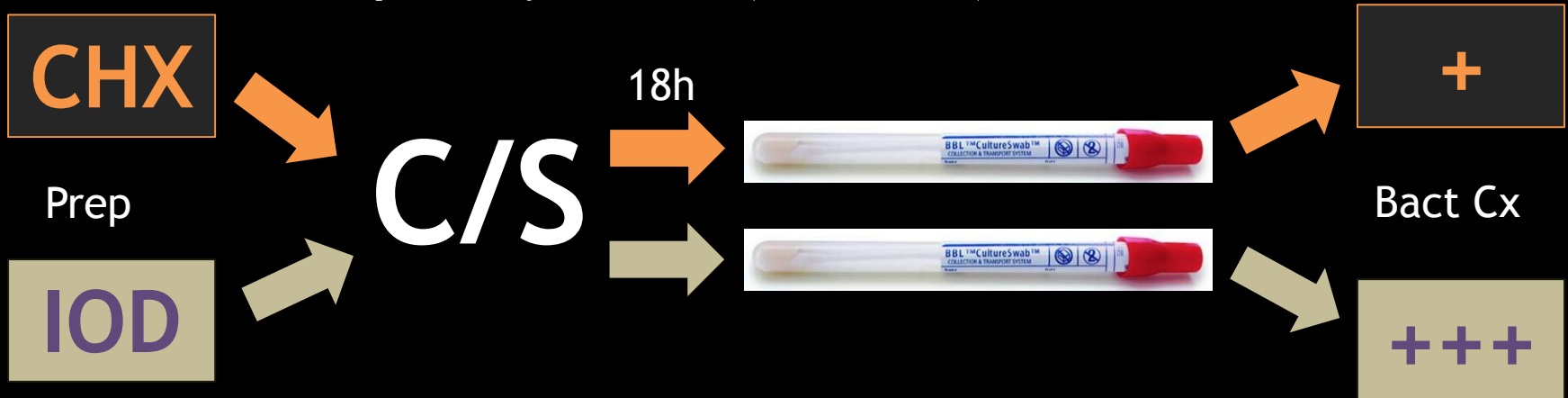
# What's new?

- Skin antisepsis: the debate ends?



# Skin Antisepsis (in 2015)

- CHX vs Iodophor base +/- alcohol
- Meta-analysis:
  - 6 low quality RCTs (n=1522)



– No difference in SSI or endometritis

# Skin Antisepsis (*in 2016*)

The NEW ENGLAND JOURNAL of MEDICINE

## ORIGINAL ARTICLE

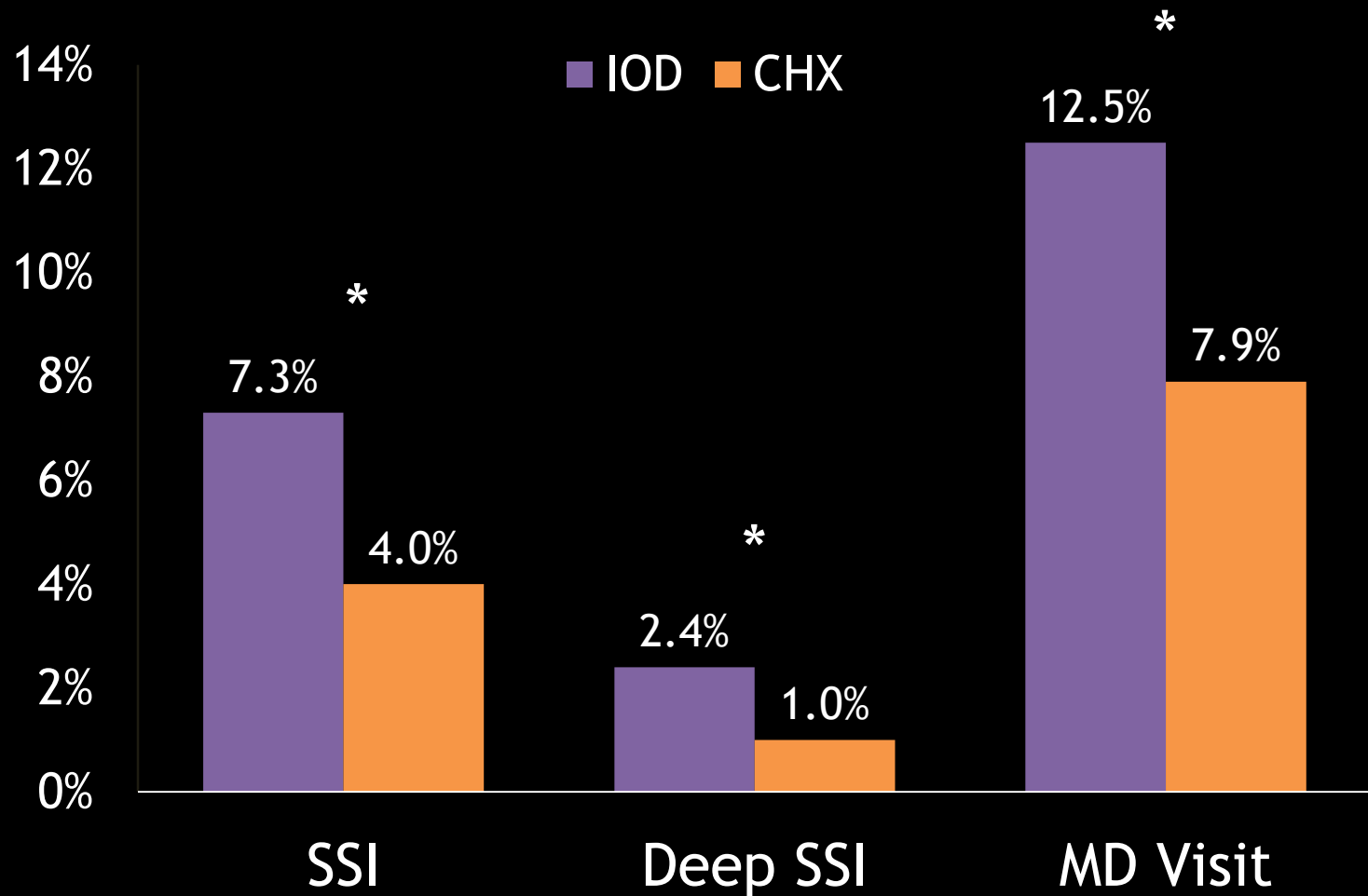
### A Randomized Trial Comparing Skin Antiseptic Agents at Cesarean Delivery

Methodius G. Tuuli, M.D., M.P.H., Jingxia Liu, Ph.D.,  
Molly J. Stout, M.D., M.S.C.I., Shannon Martin, R.N.,  
Alison G. Cahill, M.D., M.S.C.I., Anthony O. Odibo, M.D., M.S.C.E.,  
Graham A. Colditz, M.D., Dr.P.H., and George A. Macones, M.D., M.S.C.E.

## ABSTRACT

# Skin Antisepsis (*in 2016*)

- Tuuli RCT  
n=1147 cesareans



WHAT'S NEXT?



# What's next?

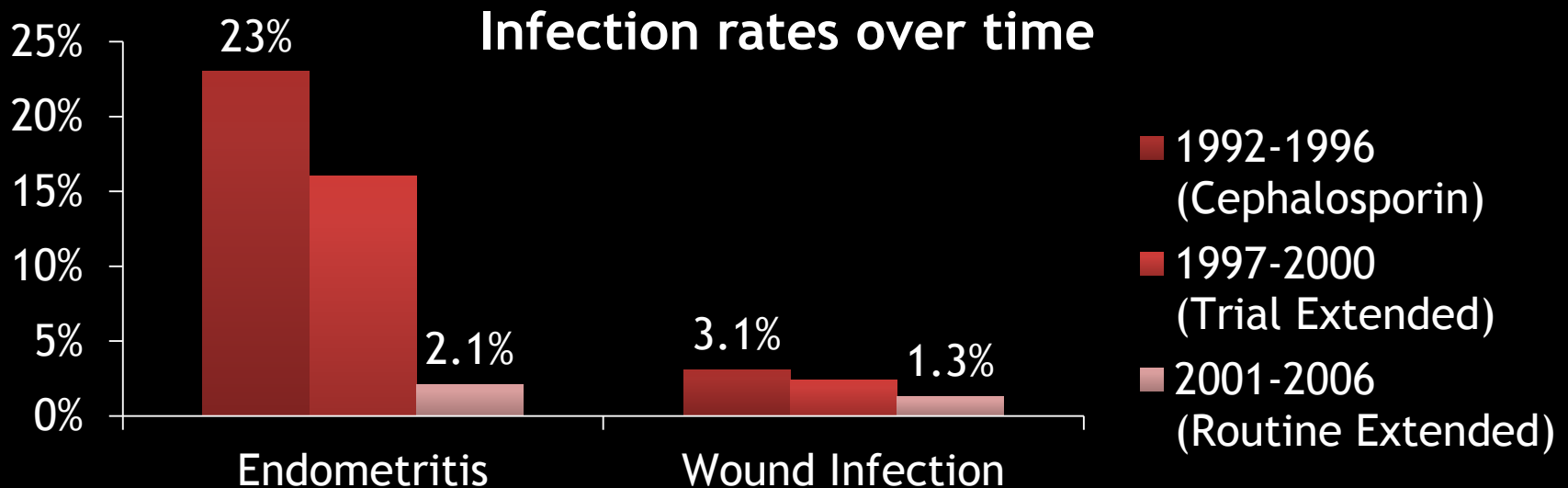
- Broad spectrum prophylactic antibiotics





# Broad spectrum: Better?

Complication	Cefotetan + doxy + azithro (n=301)	Cefotetan + placebo (n=296)	<i>P</i>
Endometritis (%)	16.9	24.7	.020
Wound infection (%)	0.8	3.6	.030
Postoperative stay (hr)	95	104	.016



Andrews. RCT. Obstet Gynecol 2003.

Tita. Systematic Review. Obstet Gynecol 2009

# C/SOAP

- Multicenter RCT  
MFMU  
n=2103

- Preop Abx: Cefazolin vs Azithro + Cefazolin

