

Chlorhexidine versus Povidone-Iodine in Skin Antisepsis: A Systematic Review and Cost Analysis to Inform Initiatives to Reduce Hospital Acquired Infections.

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1. BACKGROUND:

- Hospital-acquired infections (HAIs), like surgical site and line infections, are a source of severe morbidity costing an estimated 3.5 billion dollars in Pennsylvania alone. (PHC4 2006)

	Number of Cases	Mortality		Average Length of Stay (in Days)	Average Charge
		Number	Percent		
Cases with a hospital-acquired infection	19,154	2,478	12.9	20.6	\$185,260
Cases without a hospital-acquired infection	1,550,010	36,238	2.3	4.5	\$31,389

2. OBJECTIVE:

- To inform medical center purchasing decisions relevant to the reduction of HAIs, we compared the efficacy and cost of chlorhexidine versus povidone-iodine in skin antisepsis.

3. METHODS:

SYSTEMATIC REVIEW

Study Designs: Prospective, randomized controlled clinical trials

Inclusion and Exclusion Criteria—P.I.C.O.:

- PARTICIPANTS:** Adults receiving topical antisepsis prior to surgery, blood cultures, and vascular or epidural catheter insertion
- INTERVENTIONS:** Chlorhexidine gluconate (with or without alcohol)
- COMPARISONS:** Povidone-iodine (with or without alcohol)
- OUTCOMES:** Positive surface cultures after skin preparation, surgical site infections (SSI), catheter site / tip colonization, catheter-related sepsis and blood culture contamination
- OTHER:** English Language, Studies evaluating impregnated catheters and dressings were excluded

Data Collection:

- DATABASES:** PubMed— 901 studies initially identified, 9 studies ultimately used for the review.
- STUDY QUALITY AND DATA EXTRACTION:** Two investigators independently identified relevant articles, assessed study quality using a modified Jadad for RCTs (9 point scale), performed data extraction and resolved any discrepancies by consensus.

META-ANALYSES

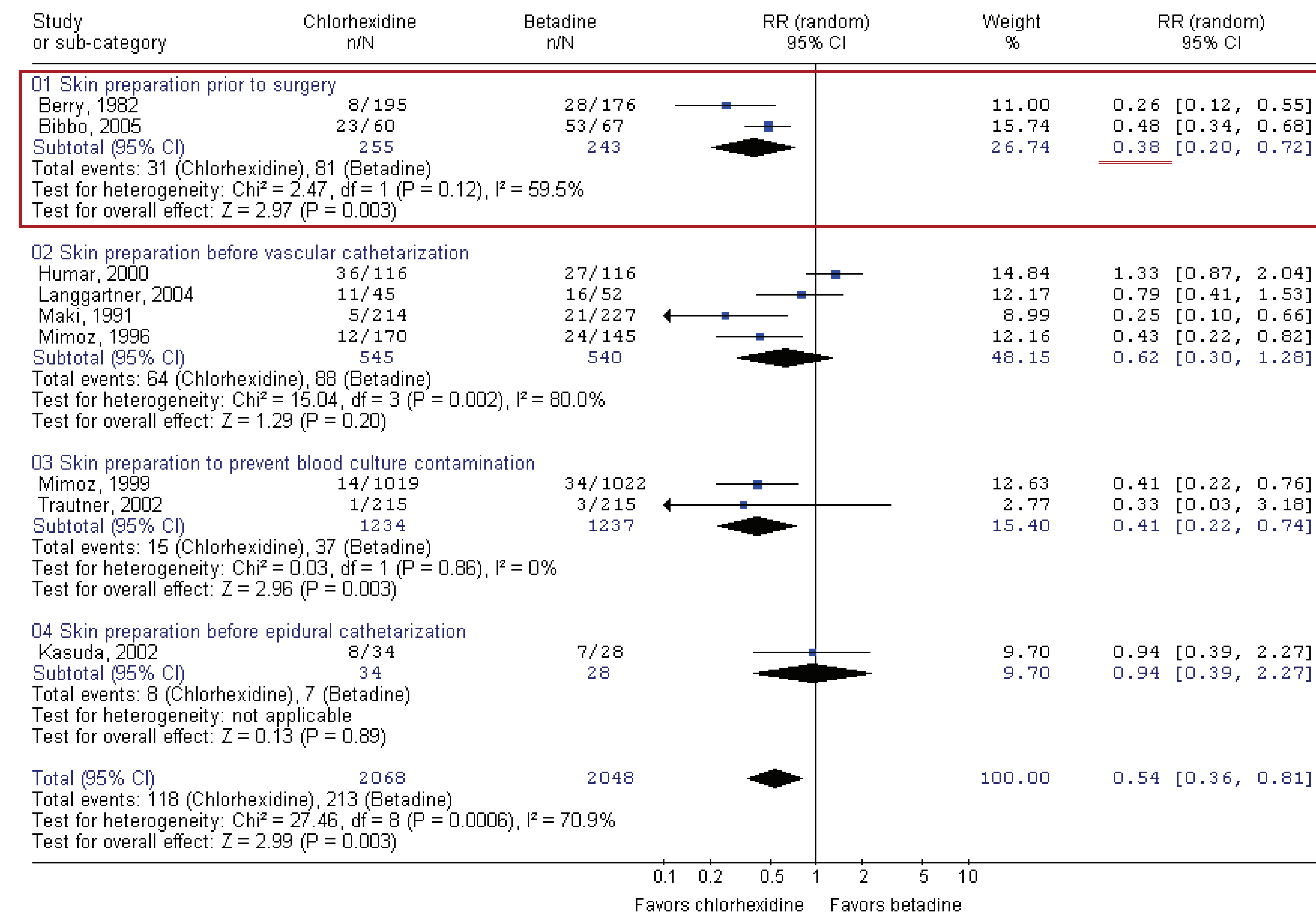
- Random effects meta-analyses were performed and heterogeneity was assessed using the Q and I² statistic. We also stratified meta-analyses by clinical context.
- All statistical analyses were performed using Review Manager (RevMan) [Computer program]. Version 4.2 for Windows. Copenhagen: The Nordic Cochrane Centre, The Cochrane Collaboration, 2003.

COST-EFFECTIVENESS MODEL

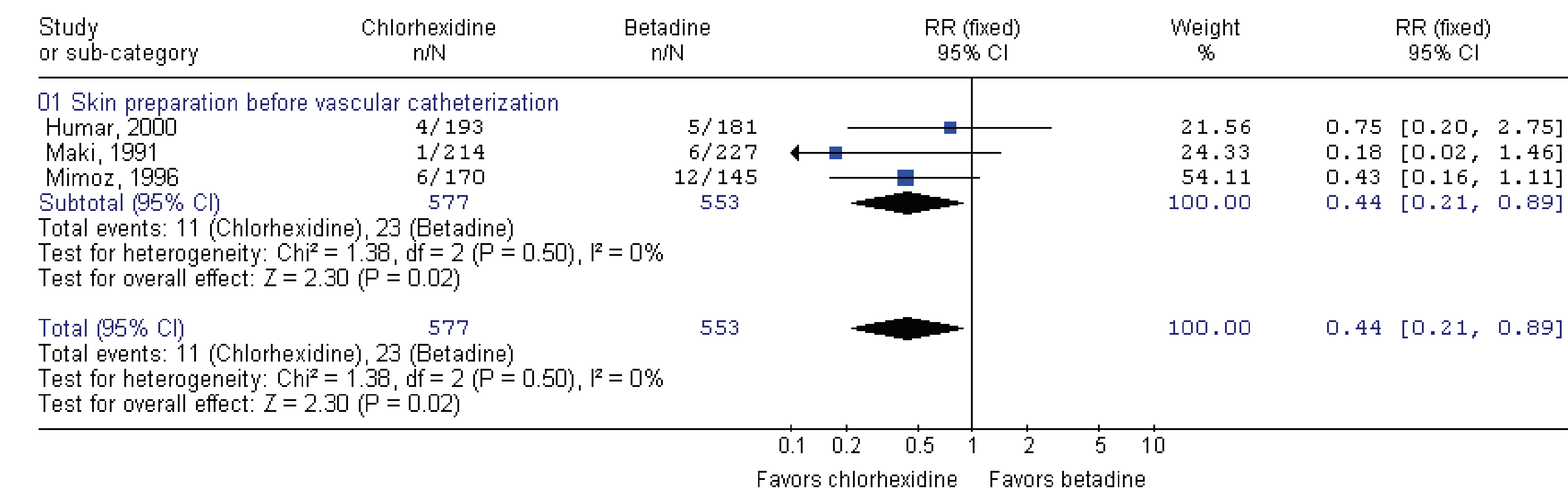
- We used the relevant results of our review to inform a cost-effectiveness analysis comparing the two antiseptic agents in the context of surgical site antisepsis.
- Efficacy was measured as reduction in SSIs
- Local administrative data from fiscal year 2006 was used for baseline event rates and average direct hospital costs for those with and without SSIs
- Perspective = hospitals; Time horizon = hospital stay

4. RESULTS:

META-ANALYSES — Efficacy of Chlorhexidine vs. Betadine in Lowering Infection or Contamination Rate



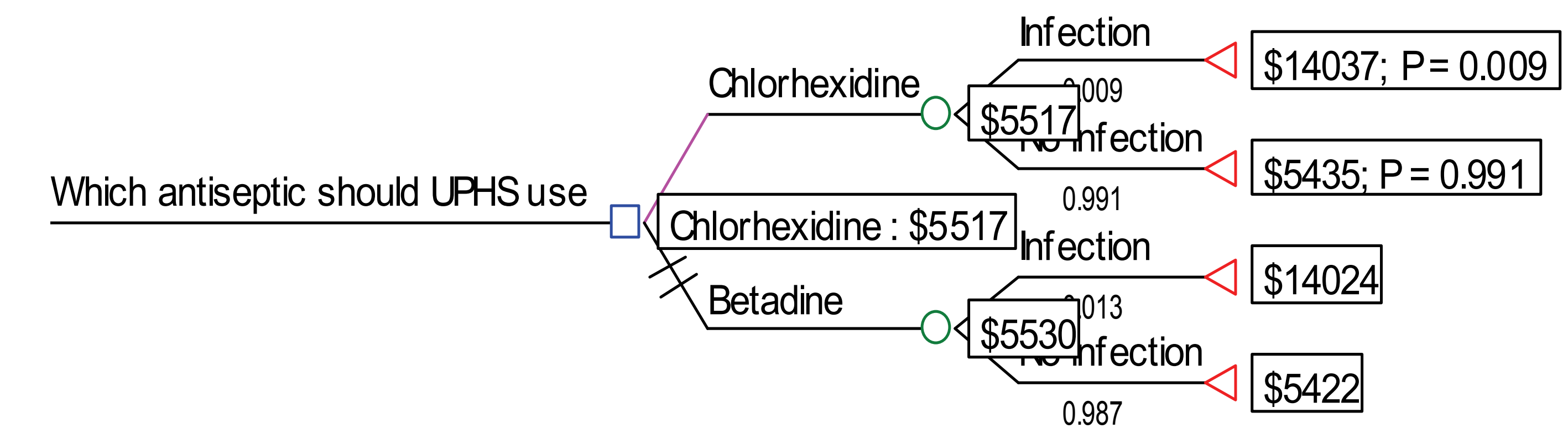
META-ANALYSES — Efficacy of Chlorhexidine vs. Betadine in Preventing Catheter-related Sepsis



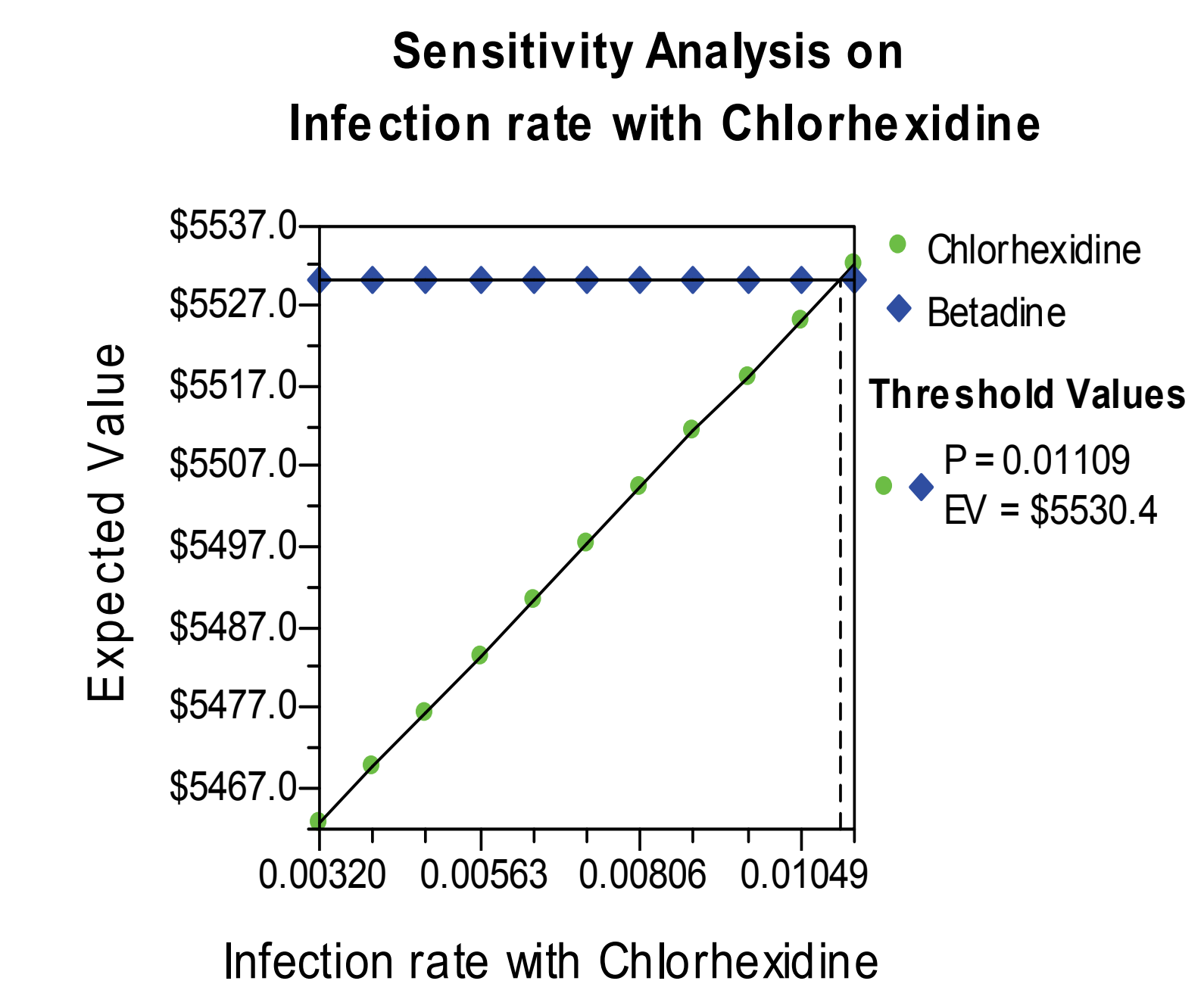
COST-EFFECTIVENESS MODELS —

- Models assume a baseline overall SSI rate of 1.26% based on 2006 UPHS incidence data and a 25% reduction in the risk of SSI with Chlorhexidine and an additional cost of \$6.29 per applicator (2 applicators needed).

	#	\$ per case
Infected	277	\$14024
Uninfected	21669	\$5422



- Cost-effectiveness analyses examining the use of chlorhexidine for all surgical site antisepsis suggests savings of \$13 per case, or annual hospital savings of **\$285,298**. Furthermore, 68 SSIs would be prevented annually.
- Cost savings and number of prevented infections may be greater based on the overall risk reduction of 62% suggested by our meta-analyses.



Chlorhexidine is the more cost-effective option for reductions in risk of 12% and higher.

- Though, not presented here, our analyses also suggest that the cost-effectiveness of chlorhexidine-based antisepsis may be more pronounced for certain subsets of surgical procedures like cardiac surgery, only requiring a 3% relative risk reduction to be cost-effective.

5. CONCLUSIONS:

- Our analyses suggest that the use of chlorhexidine for skin antisepsis, instead of povidone-iodine, would result in significant reductions in hospital-acquired infections and hospital costs.
- These results led our medical center to purchase chlorhexidine for use in surgical site antisepsis.

6. ACKNOWLEDGEMENTS:

- We would like to thank Jeff Rohrbach, Clinical Effectiveness and Quality Improvement (CEQI), University of Pennsylvania Health System, for his assistance in obtaining the administrative data used in our cost-effectiveness models.