

Appendix A

LMBP Blood Culture Contamination Expert Panel Members

Roberta Carey, PhD (Centers for Disease Control and Prevention)

Dennis Ernst, MT(ASCP) (Center for Phlebotomy Education)

Dana Grzybicki, MD, PhD (University of Colorado Denver)

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APPENDIX C

LMBP Blood Culture Contamination Systematic Review Eligible Studies

Venipuncture vs. Intravenous Catheter Collection

Included studies

Published

Beutz M, Sherman G, Mayfield J, Fraser VJ, Kollef MH. Clinical utility of blood cultures drawn from central vein catheters and peripheral venipuncture in critically ill medical patients. *Chest*. 2003;123:854-61.

DesJardin JA, Falagas ME, Ruthazer R, Griffith J, Wawrose D, Schenkein D, et al. Clinical utility of blood cultures drawn from indwelling central venous catheters in hospitalized patients with cancer. *Annals of internal medicine*. 1999;131:641-7.

Everts RJ, Vinson EN, Adholla PO, Reller LB. Contamination of catheter-drawn blood cultures. *Journal of clinical microbiology*. 2001;39:3393-4.

Martinez JA, DesJardin JA, Aronoff M, Supran S, Nasraway SA, Snyderman DR. Clinical utility of blood cultures drawn from central venous or arterial catheters in critically ill surgical patients. *Critical care medicine*. 2002;30:7-13.

McBryde ES, Tilse M, McCormack J. Comparison of contamination rates of catheter-drawn and peripheral blood cultures. *The Journal of hospital infection*. 2005;60:118-21.

Norberg A, Christopher NC, Ramundo ML, Bower JR, Berman SA. Contamination rates of blood cultures obtained by dedicated phlebotomy vs intravenous catheter. *JAMA : the journal of the American Medical Association*. 2003;289:726-9.

Qamruddin A, Khanna N, Orr D. Peripheral blood culture contamination in adults and venipuncture technique: Prospective cohort study. *Journal of clinical pathology*. 2008;61:509-13.

Ramsook C, Childers K, Cron SG, Nirken M. Comparison of blood-culture contamination rates in a pediatric emergency room: Newly inserted intravenous catheters versus venipuncture. *Infection control and hospital epidemiology : the official journal of the Society of Hospital Epidemiologists of America*. 2000;21:649-51.

Weddle G, Jackson MA, Selvarangan R. Reducing blood culture contamination in a pediatric emergency department. *Pediatric emergency care*. 2011;27:179-81.

Excluded studies

Published

Gonsalves WI, Cornish N, Moore M, Chen A, Varman M. Effects of volume and site of blood draw on blood culture results. *Journal of clinical microbiology*. 2009;47:3482-5.

Phlebotomy Teams

Included studies

Published

Gander RM, Byrd L, DeCrescenzo M, Hirany S, Bowen M, Baughman J. Impact of blood cultures drawn by phlebotomy on contamination rates and health care costs in a hospital emergency department. *Journal of clinical microbiology*. 2009;47:1021-4.

Sheppard C, Franks N, Nolte F, Fantz C. Improving quality of patient care in an emergency department: A laboratory perspective. *American journal of clinical pathology*. 2008;130:573-7.

Surdulescu S, Utamsingh D, Shekar R. Phlebotomy teams reduce blood-culture contamination rate and save money. *Clinical performance and quality health care*. 1998;6:60-2.

Weinbaum FI, Lavie S, Danek M, Sixsmith D, Heinrich GF, Mills SS. Doing it right the first time: Quality improvement and the contaminant blood culture. *Journal of clinical microbiology*. 1997;35:563-5.

Unpublished

Geisinger Wyoming Valley Hospital; 2009

Excluded

Unpublished

Providence Regional Medical Center-Everett, WA; 2009

Prepackaged Prep Kit

Included studies

Published

McLellan E, Townsend R, Parsons HK. Evaluation of chloraprep (2% chlorhexidine gluconate in 70% isopropyl alcohol) for skin antisepsis in preparation for blood culture collection. *The Journal of infection*. 2008;57:459-63.

Trautner BW, Clarridge JE, Darouiche RO. Skin antisepsis kits containing alcohol and chlorhexidine gluconate or tincture of iodine are associated with low rates of blood culture

contamination. Infection control and hospital epidemiology : the official journal of the Society of Hospital Epidemiologists of America. 2002;23:397-401.

Weinbaum FI, Lavie S, Danek M, Sixsmith D, Heinrich GF, Mills SS. Doing it right the first time: Quality improvement and the contaminant blood culture. Journal of clinical microbiology. 1997;35:563-5.

Wilson ML, Weinstein MP, Mirrett S, Reimer LG, Fernando C, Meredith FT, et al. Comparison of iodophor and alcohol pledgets with the medi-flex blood culture prep kit ii for preventing contamination of blood cultures. Journal of clinical microbiology. 2000;38:4665-7.

Excluded studies

Published

Madeo M, Davies D, Owen L, Wadsworth P, Johnson G, Martin CR. Reduction in the contamination rate of blood cultures collected by medical staff in the accident and emergency department. Clinical Effectiveness in Nursing. 2003;7:30-2.

APPENDIX B
Laboratory Medicine Best Practices
Body of Evidence Table 2012

TOPIC AREA: Blood Culture Contamination
Practice: Venipuncture (vs. Catheter)

Practice: Venipuncture (vs. Catheter)	Study Quality Rating						Effect Size Rating	Overall Consistency	Overall Strength of Body of Evidence
	Study	Practice	Measures	Results	Total	Rating			
<u>Published</u>									
Beutz 2003	2	2	2	2	8	Good	Moderate	Yes 5 Studies = Good/Substantial 1 Study = Fair/Substantial 2 Studies = Good/Moderate 1 Study = Fair/Moderate 1 Study = Poor - Excluded High	
DesJardin 1999	2	2	2	3	9	Good	Moderate		
Everts 2001	3	2	2	3	10	Good	Substantial		
Gonsalves 2009	2	2	1	0	5	Poor	N/A		
Martinez 2002	2	2	2	3	9	Good	Substantial		
McBryde 2005	2	2	1	3	8	Good	Substantial		
Norberg 2003	1	2	2	3	8	Good	Substantial		
Qamruddin 2007	1	2	2	2	7	Fair	Moderate		
Ramsook 2000	1	2	2	1	6	Fair	Substantial		
Weddle 2011	1	2	2	3	8	Good	Substantial		

<u>Bibliographic Information</u> - Author (s) - Yr Published/Submitted - Publication - Author Affiliations - Funding	<u>Study</u> - Design - Facility/Setting - Time Period - Population/Sample - Comparator - Study bias	<u>Practice</u> - Description - Duration - Training - Staff/Other Resources - Cost	<u>Outcome Measures</u> - Description (s) - Recording method	<u>Results/Findings</u> - Type of Findings - Findings/Effect Size - Stat. Significance/Test(s) - Results/Conclusion Bias
Beutz M [1], Sherman G [2], Mayfield J [3], Fraser V [4], Kollef MH [1] - Year: 2003 - Publication: <i>Chest</i> - Affiliations: [1] Pulmonary and Critical Care Division, Washington University School of Medicine. [2] Department of Nursing, Barnes-Jewish Hospital, St. Louis, MO. [3] Department of Infection Control, Barnes-Jewish Hospital, St. Louis, MO. [4] Division of Infectious Diseases, Washington University School of Medicine - Funding: Self-funded	- Design: Prospective cohort - Facility/Setting: Barnes-Jewish Hospital, St. Louis, MO: university-affiliated teaching hospital; 1,000-bed primary and tertiary care facility; average 1,600 medical ICU patients annually. - Time period: 02/2001-10/2001 - Population/Sample: All patients admitted to medical ICU surveyed for blood culture specimen; 300 paired blood cultures met criteria from 119 patients - Comparator: Catheter-drawn blood culture with a matched pair venipuncture blood culture drawn within 4 hours; needleless caps disinfected with 70% isopropyl alcohol, allowed to dry, and wiped with Betadine pad for 30 seconds; excess Betadine wiped off with sterile gauze prior to taking sample; 3 mL of blood aspirated and discarded; new syringe used to aspirate 20 mL of blood - Study bias: None noted	- Description: Venipuncture blood culture; skin disinfected with 70% isopropyl alcohol followed by 2% iodine tincture; antecubital fossa preferred sampling site using sterile needle and syringe - Duration: 9 months (02/2001-10/2001) - Training: Not reported - Staff: Critical care nurses; two study physicians - Other resources: Not reported - Cost: Not reported	- Description: Blood Culture Contamination Rate (BCCR) - Recording Method: Blood draw recorded by the ICU nurse in the bedside computer (two study physicians blinded to blood culture source classified cultures	- Type of Findings: Paired comparison - Findings/Effect Size: BCCR: Venipuncture: 3.7% (11/300) Catheter draw: 6.7% (20/300) ➤ OR = 1.88 (CI: 0.88 – 3.99) - Statistical Significance/Test(s): Student <i>t</i> test; χ^2 , multiple logistic regression; all p values were 2 tailed and p <= 0.05 - Results/conclusion biases: None noted
Quality Rating: <u>8 (Good)</u> (10 point maximum) Effect Size Magnitude Rating: <u>Moderate</u> Relevance: <u>Direct</u>	Study (3 pts maximum): <u>2</u> Facility description (ICU only) study location sufficiently distinctive that results may not be generalizable to other settings.	Practice (2 pts maximum): <u>2</u>	Outcome measures (2 pts. maximum): <u>2</u>	Results/findings (3 pts maximum): <u>2</u> Sample sufficiency: sample may be insufficient to allow robust estimate of impact of practice (2.52 culture pairs per patient from 119 patients).

<u>Bibliographic Information</u> - Author (s) - Yr Published/Submitted - Publication - Author Affiliations - Funding	<u>Study</u> - Design - Facility/Setting - Time Period - Population/Sample - Comparator - Study bias	<u>Practice</u> - Description - Duration - Training - Staff/Other Resources - Cost	<u>Outcome Measures</u> - Description (s) - Recording method	<u>Results/Findings</u> - Type of Findings - Findings/Effect Size - Stat. Significance/Test(s) - Results/Conclusion Bias
DesJardin JA [1], Falagas ME [2], Ruthazer R [3], Griffith J [3], Wawrose D [4], Schenkein D [3], Miller K [3], Snyderman DR [3] - Year: 1999 - Publication: <i>Annals of Internal Medicine</i> - Affiliations: [1] Western Infectious Disease Consultants, Wheat Ridge, CO. [2] Vas. Sofias Avenue, Athens, Greece. [3] New England Medical Center, Boston, MA. [4] Nashville, TN - Funding: In part from National Research Service Award, the National Institutes of Health	- Design: Retrospective cohort - Facility/Setting: Oncology ward at New England Medical Center; Boston, MA; 300-bed tertiary care university-affiliated hospital - Time period: 08/1994 – 06/1996 - Population/Sample: Screened all blood cultures from patients on oncology ward; 551 paired blood cultures met criteria from 185 patients - Comparator: Catheter-drawn blood culture with a matched pair venipuncture blood culture drawn within 4 hours of each other; port disinfected with either 70% isopropyl alcohol or a povidone-iodine swab - Study bias: None noted	- Description: Venipuncture blood culture; skin disinfected with povidone-iodine - Duration: 22 months (08/1994 – 06/1996) - Training: Not reported - Staff: Nurses and two infectious disease physicians - Other resources: Not reported - Cost: Not reported	- Description: Blood Culture Contamination Rate (BCCR) - Recording Method: Blood culture results obtained by medical record review; two study physicians blinded to blood culture source classified paired cultures	- Type of Findings: Paired comparison - Findings/Effect Size: BCCR: Venipuncture: 2.4% (13/551) Catheter: 4.4% (24/551) ➤ OR = 1.88 (CI: 0.95 – 3.74) - Statistical Significance/Test(s): Bootstrapped analysis - Results/conclusion biases: Multiple culture pairs per patient
Quality Rating: 9 (Good) (10 point maximum) Effect Size Magnitude Rating: <u>Moderate</u> Relevance: <u>Direct</u>	Study (3 pts maximum): <u>2</u> Facility description Oncology ward only study location sufficiently distinctive that results may not be generalizable to other settings.	Practice (2 pts maximum): <u>2</u>	Outcome measures (2 pts. maximum): <u>2</u>	Results/findings (3 pts maximum): <u>3</u>

<u>Bibliographic Information</u> - Author (s) - Yr Published/Submitted - Publication - Author Affiliations - Funding	<u>Study</u> - Design - Facility/Setting - Time Period - Population/Sample - Comparator - Study bias	<u>Practice</u> - Description - Duration - Training - Staff/Other Resources - Cost	<u>Outcome Measures</u> - Description (s) - Recording method	<u>Results/Findings</u> - Type of Findings - Findings/Effect Size - Stat. Significance/Test(s) - Results/Conclusion Bias
Everts RJ, Vinson EN, Adholla PO, Reller LB. - Year: 2001 - Publication: <i>Journal of Clinical Microbiology</i> - Affiliations: Duke University School of Medicine, Durham, NC - Funding: Self-funded	- Design: Retrospective cohort - Facility/Setting: Tertiary-care medical setting; Duke University School of Medicine, Durham, NC - Time period: 01/1997 – 12/1998 - Population/Sample: All samples submitted for blood culture (BC) from adult or pediatric patients; 71,109 blood cultures submitted; 1408 pairs of concurrent catheter-drawn and venipuncture samples - Comparator: Catheter-drawn blood culture with a matched pair venipuncture blood culture drawn within 20 minutes of each other. - Study bias: None noted	- Description: Venipuncture blood culture - Duration: 24 months (01/1997 – 12/1998) - Training: Not reported - Staff: Various nursing and medical staff. - Other resources: Not reported - Cost: Not reported	- Description: Blood Culture Contamination Rate (BCCR) - Recording Method: Identified BCs using a computerized database	- Type of Findings: Paired comparison - Findings/Effect Size: BCCR: Venipuncture: 1.8% (26/1408) Catheter: 3.8% (54 /1408) ➤ OR = 2.12 (CI: 1.32 – 3.41) - Statistical Significance/Test(s): χ^2 , p =0.001 - Results/conclusion biases: None noted.
Quality Rating: <u>10(Good)</u> (10 point maximum) Effect Size Magnitude Rating: <u>Substantial</u> Relevance: <u>Direct</u>	Study (3 pts maximum): <u>3</u>	Practice (2 pts maximum): <u>2</u>	Outcome measures (2 pts. maximum): <u>2</u>	Results/findings (3 pts maximum): <u>3</u>

<u>Bibliographic Information</u> - Author (s) - Yr Published/Submitted - Publication - Author Affiliations - Funding	<u>Study</u> - Design - Facility/Setting - Time Period - Population/Sample - Comparator - Study bias	<u>Practice</u> - Description - Duration - Training - Staff/Other Resources - Cost	<u>Outcome Measures</u> - Description (s) - Recording method	<u>Results/Findings</u> - Type of Findings - Findings/Effect Size - Stat. Significance/Test(s) - Results/Conclusion Bias
Gonsalves WI (1), Cornish N (2), Moore M (3), Chen A (4), Varman M (5) - Year: 2009 - Publication: <i>Journal of Clinical Microbiology</i> - Affiliations: [1] Creighton University School of Medicine Dept. of Pathology. [2] Children's Hospital and [3] Dept. of Pediatrics, [4] Dept. of Epidemiology and Preventive Medicine, and [5] Dept. of Pediatric Infectious Diseases, Creighton University School of Medicine, Omaha, Nebraska. - Funding: Self-funded	- Design: Retrospective - Facility/Setting: Children's Hospital of Omaha. Pediatrics. - Time period: 1/2006-12/2006 - Population/Sample: Total of 843 blood cultures drawn. Arteria(A)/Central Line (CV) Catheter: 412 (41+371) Venipuncture: 431 - Comparator: Catheter and arterial blood culture draws - Study bias: Pediatric unit.	- Description: Venipuncture blood culture draws in pediatric unit. - Duration: 12 months (1/2006-12/2006) - Training: Not reported - Staff: Not reported - Other resources: Not reported - Cost: Not reported	- Description: Blood Culture Contamination Rate (BCCR) - Recording Method: Medical charts were reviewed for retrospective study.	- Type of Findings: Comparison - Findings/Effect Size: Cannot calculate effect size due to missing data – report false positive/contaminated cultures for “adequate volume” only: - Venipuncture: Missing contaminated cultures for 71 of 431 (16.9%) - A/CV Catheter: Missing contaminated cultures for 77 of 412 (18.6%) - Statistical Significance/Test(s): Not reported - Results/conclusion biases: None reported.
Quality Rating: <u>5 (Poor*)</u> (10 point maximum) Effect Size Magnitude Rating: <u>N/A</u> Relevance: <u>Direct</u> *0 for Results/findings	Study (3 pts maximum): <u>2</u> Facility description (Pediatric setting only) study location sufficiently distinctive that results may not be generalizable to other settings.	Practice (2 pts maximum): <u>2</u>	Outcome measures (2 pts maximum): <u>1</u> Face validity: does not capture well the outcome being estimated.	Results/findings (3 pts maximum): <u>0</u> Appropriateness of statistical analysis: insufficient data to allow calculation of an effect size (-2). Sample sufficiency: number of subjects not reported (sample information is missing for false positives with inadequate volume) (-2)

<u>Bibliographic Information</u> - Author (s) - Yr Published/Submitted - Publication - Author Affiliations - Funding	<u>Study</u> - Design - Facility/Setting - Time Period - Population/Sample - Comparator - Study bias	<u>Practice</u> - Description - Duration - Training - Staff/Other Resources - Cost	<u>Outcome Measures</u> - Description (s) - Recording method	<u>Results/Findings</u> - Type of Findings - Findings/Effect Size - Stat. Significance/Test(s) - Results/Conclusion Bias
Martinez JA, DesJardin JA, Aronoff M, Supran S, Nasraway SA, Snyderman DR - Year: 2002 - Publication: <i>Critical Care Medicine</i> - Affiliations: Departments of Medicine and Surgery, New England Medical Center and Tufts University School of Medicine, Boston, MA - Funding: In part from National Research Service Award, the National Institutes of Health	- Design: Retrospective cohort - Facility/Setting: New England Medical Center; 300-bed tertiary care university-affiliated hospital - Time period: 11/1994 – 08/1997 - Population/Sample: Screened all blood cultures from patients in the surgical and cardiothoracic ICUs; 490 paired blood cultures from 271 patients (total sample = 499 because of counting convention when true bacteremia missed by corresponding paired culture) - Comparator: Catheter-drawn blood culture with a matched pair venipuncture blood culture drawn within 4 hours of each other; ports or stopcocks disinfected with either a povidone-iodine or 75% isopropyl alcohol. - Study bias: None noted	-Description: Venipuncture blood culture; skin disinfected with povidone-iodine - Duration: 34 months (11/1994 – 08/1997) - Training: Not reported - Staff: Critical care nurses; two physicians - Other resources: Not reported - Cost: Not reported	- Description: Blood Culture Contamination Rate (BCCR) - Recording Method: Blood culture results obtained by medical record review; two study physicians blinded to blood culture source classified paired cultures	- Type of Findings: Paired comparison - Findings/Effect Size: BCCR: Venipuncture: 1.6% (8/499) Catheter: 4.0% (20/499) ➤ OR = 2.57 (CI: 1.13 – 5.89) - Statistical Significance/Test(s): Bootstrapped analysis - Results/conclusion biases: None noted.
Quality Rating: <u>9 (Good)</u> (10 point maximum) Effect Size Magnitude Rating: <u>Substantial</u> Relevance: <u>Direct</u>	Study (3 pts maximum): <u>2</u> Facility description (Surgery and cardiothoracic ICUs only) study location sufficiently distinctive that results may not be generalizable to other settings.	Practice (2 pts maximum): <u>2</u>	Outcome measures (2 pts. maximum): <u>2</u>	Results/findings (3 pts maximum): <u>3</u>

<u>Bibliographic Information</u> - Author (s) - Yr Published/Submitted - Publication - Author Affiliations - Funding	<u>Study</u> - Design - Facility/Setting - Time Period - Population/Sample - Comparator - Study bias	<u>Practice</u> - Description - Duration - Training - Staff/Other Resources - Cost	<u>Outcome Measures</u> - Description (s) - Recording method	<u>Results/Findings</u> - Type of Findings - Findings/Effect Size - Stat. Significance/Test(s) - Results/Conclusion Bias
<p>McBryde ES (1,2), Tilse M (2), McCormack J (2). - Year: 2005 - Publication: <i>Journal Hospital Infection</i> - Affiliations: (1) Queensland University of Technology, Brisbane, Queensland Australia (2) Department of Medicine and Departments of Infectious Diseases and Microbiology, University of Queensland, Mater Misericordiae Hospital, Brisbane, Queensland, Australia. - Funding: self-funded</p>	<p>- Design: Retrospective cohort study - Facility/Setting: Mater Misericordiae Hospital, 280 beds; Teaching hospital; Hematology/oncology ward, ICU, and General wards Brisbane, Queensland Australia - Time period: 01/1998- 08/2002 - Population/Sample: 962 paired venipuncture and catheter-drawn cultures from same patient within 120 min of each other (of 8444 identified from pathology database search). Limited to 1 pair/day. 10 mL blood split evenly between anaerobic and aerobic culture bottles at the bedside. - Comparator: Catheter specimen drawn by hematology/oncology ward nursing staff, by resident doctors in the ICU and by trained phlebotomists in general wards. Interlink catheter system cleaned with 70% isopropyl alcohol swabs - Study bias: None noted.</p>	<p>-Description: Venipuncture BC drawn from patients within 120 min. of catheter draw - Duration: 44 months (01/1998-08/2002) - Training: Not reported - Staff: Nursing staff on the hematology/oncology ward, resident doctors in ICU, and trained phlebotomists in the general wards. - Other resources: Not reported - Cost: Not reported</p>	<p>- Description: Blood Culture Contamination Rate (BCCR). - Recording Method: Retrospective chart review and microbiology data.</p>	<p>- Type of Findings: Paired comparison - Findings/Effect Size: BCCR Venipuncture: 2.6% (25/962) Catheter: 13% (125/962) ➤ OR = 5.60 (CI: 3.61 – 8.69) - Statistical Significance/Test(s): False-positive rate (for discordant pairs) catheter vs venipuncture (p<0.00001) - Results/conclusion biases: None noted.</p>
<p>Quality Rating: <u>8 (Good)</u> (10 point maximum) Effect Size Magnitude Rating: <u>Substantial</u> Relevance: <u>Direct</u></p>	<p>Study (3 pts maximum): <u>2</u> Potential study bias: sample selection methods may introduce bias (i.e. patients with catheter and Venipuncture samples within 120 min may differ from other patients).</p>	<p>Practice (2 pts maximum): <u>2</u></p>	<p>Outcome measures (2 pts maximum): <u>1</u> Recording method: may not accurately capture all instances of outcome (only false positives for discordant pairs)</p>	<p>Results/findings (3 pts maximum): <u>3</u></p>

<u>Bibliographic Information</u> - Author (s) - Yr Published/Submitted - Publication - Author Affiliations - Funding	<u>Study</u> - Design - Facility/Setting - Time Period - Population/Sample - Comparator - Study bias	<u>Practice</u> - Description - Duration - Training - Staff/Other Resources - Cost	<u>Outcome Measures</u> - Description (s) - Recording method	<u>Results/Findings</u> - Type of Findings - Findings/Effect Size - Stat. Significance/Test(s) - Results/Conclusion Bias
<p>Norberg A (1,3), Christopher NC (1,3), Ramundo ML (1,3), Bower JR (2, 3), Berman SA (1).</p> <p>- Year: 2003</p> <p>- Publication: <i>Journal of American Medical Association</i></p> <p>- Affiliations: (1) Divisions of Emergency Medicine and (2) Infectious Diseases, Dept of Pediatrics Children's Hospital Medical Center of Akron, Akron, Ohio (3) Departments of Emergency Medicine and Pediatrics, Northeastern Ohio Universities College of Medicine, Rootstown, Ohio</p> <p>- Funding: Self-funded</p>	<p>- Design: Observational before-after</p> <p>- Facility/Setting: Emergency Department, Children's Hospital Medical Center of Akron, Akron, OH</p> <p>- Time period: 0/1998-12/1999 Pre (baseline): 1/1/1998-11/19/1998 (10.5 months); Post: 1/1/1999-12/31/1999 (12 months)</p> <p>- Population/Sample: 4,108 Blood culture specimens from ED patients <18 yrs age. Baseline (catheter): 2108 Postintervention (venipuncture): 2000</p> <p>- Comparator: Catheter blood culture specimens obtained by ED registered nurses through newly inserted peripheral intravenous catheters (1/1/1998-11/19/1998); indwelling, vascular catheters were excluded.</p> <p>- Study bias: Pediatric ED setting. Young age associated with increased contamination rate in both baseline and post-intervention periods.</p>	<p>- Description: Venipuncture performed by ED registered nurses.</p> <p>- Duration: 12 months (01/1999-12/1999)</p> <p>- Training: Not reported</p> <p>- Staff: ED registered nurses, infectious disease expert for consultations</p> <p>- Other resources: Not reported</p> <p>- Cost: Not reported</p>	<p>- Description: Blood Culture Contamination Rate (BCCR)</p> <p>- Recording Method: Medical records were reviewed for positive BC reports.</p>	<p>- Type of Findings: Pretest-Posttest</p> <p>- Findings/Effect Size: BCCR: Venipuncture: 2.8% (56/2000) Catheter: 9.1% (191/2108)</p> <p>➤ OR = 3.46 (CI: 2.55 – 4.69)</p> <p>- Statistical Significance/Test(s): Pearson X^2, $P < 0.05$ Pre vs Post BCCR: $P < 0.001$</p> <p>- Results/conclusion biases: none noted</p>
<p>Quality Rating: <u>8 (Good)</u> (10 point maximum) Effect Size Magnitude Rating: <u>Substantial</u> Relevance: <u>Direct</u></p>	<p>Study (3 pts maximum): <u>1</u> Facility description (Pediatric ED setting only) study location sufficiently distinctive that results may not be generalizable to other settings due to higher BCCRs in ED (-1). Potential study bias: comparator uses newly inserted IV catheter (which have lower contamination rates) which may introduce study bias (-1).</p>	<p>Practice (2 pts maximum): <u>2</u></p>	<p>Outcome measures (2 pts. maximum): <u>2</u></p>	<p>Results/findings (3 pts maximum): <u>3</u></p>

<u>Bibliographic Information</u> - Author (s) - Yr Published/Submitted - Publication - Author Affiliations - Funding	<u>Study</u> - Design - Facility/Setting - Time Period - Population/Sample - Comparator - Study bias	<u>Practice</u> - Description - Duration - Training - Staff/Other Resources - Cost	<u>Outcome Measures</u> - Description (s) - Recording method	<u>Results/Findings</u> - Type of Findings - Findings/Effect Size - Stat. Significance/Test(s) - Results/Conclusion Bias
<p>Qamruddin A, Khanna N, Orr D - Year: 2007 - Publication: <i>Journal of Clinical Pathology</i> - Affiliations: Department of Medical Microbiology, Manchester Royal Infirmary, Manchester, UK - Funding: Self-funded</p>	<p>- Design: Prospective cohort - Facility/Setting: Manchester Royal Infirmary, Manchester, UK. Accident & emergency, Critical care areas and high dependency, medicine, hematology, obstetrics & gynecology, surgery, general outpatients, psychiatry wards. - Time period: 02/2006-04/2006 - Population/Sample: 1138 total blood samples (979 peripheral vein collections and 159 collections in all other sites catheter collections). - Comparator: All other sites comparative with catheter collections - Study bias: Didn't clinically confirm contaminant was pathogen. Very low compliance to questionnaire responses.</p>	<p>- Description: Blood cultures collected by venipuncture via healthworker questionnaire. - Duration: 2 months (02/2006-04/2006) - Training: Not reported - Staff: Hospital healthcare workers (doctors, nurses, other staff) from: accident & emergency, Critical care areas and high dependency, medicine, hematology, obstetrics & gynecology, surgery, general outpatients, psychiatry wards. - Other resources: Not reported - Cost: Not reported</p>	<p>- Description: Blood Culture Contamination Rate (BCCR) - Recording Method: Questionnaire data obtained from healthcare workers who participated in study; and laboratory BC results (from lab computer).</p>	<p>- Type of Findings: Comparison - Findings/Effect Size: BCCR: Peripheral vein: 7.3% (71/979) Catheter (All other sites): 10.7% (17/159) ➤ OR = 1.53 (CI: 0.88 – 2.68) - Statistical Significance/Test(s): Not reported for this comparison. - Results/conclusion biases: None noted.</p>
<p>Quality Rating: <u>7 (Fair)</u> (10 point maximum) Effect Size Magnitude Rating: <u>Moderate</u> Relevance: <u>Direct</u></p>	<p>Study (3 pts maximum): <u>1</u> Potential study bias: sample selection methods may introduce a bias (-1). Self-selection of participants may have influenced technique (-1).</p>	<p>Practice (2 pts maximum): <u>2</u></p>	<p>Outcome measures (2 pts. maximum): <u>2</u></p>	<p>Results/findings (3 pts maximum): <u>2</u> Sample sufficiency: sample may be insufficient to allow robust estimate of impact of practice (-1).</p>

<u>Bibliographic Information</u> - Author (s) - Yr Published/Submitted - Publication - Author Affiliations - Funding	<u>Study</u> - Design - Facility/Setting - Time Period - Population/Sample - Comparator - Study bias	<u>Practice</u> - Description - Duration - Training - Staff/Other Resources - Cost	<u>Outcome Measures</u> - Description (s) - Recording method	<u>Results/Findings</u> - Type of Findings - Findings/Effect Size - Stat. Significance/Test(s) - Results/Conclusion Bias
<p>Ramsook C (1,2), Childers K (2), Cron SG (3), Nirken M (2)</p> <p>- Year: 2000</p> <p>- Publication: <i>Infect Control Hosp Epidemiology</i></p> <p>- Affiliations: [1] Eric Williams Medical Sciences Complex [2] Emergency Medicine, Texas Children's Hospital, Baylor College of Medicine, Houston, TX [3] Academic General Pediatrics, Baylor College of Medicine</p> <p>- Funding: Self-funded</p>	<p>- Design: Observational</p> <p>- Facility/Setting: Texas Children's Hospital; Houston University-affiliated pediatric emergency room Houston, Texas</p> <p>Time period: 02/1999 - 07/1999</p> <p>- Population/Sample: Blood cultures from drawn by nurses using venipuncture and three sequential Betadine swabs followed by three sequential alcohol swabs for skin antisepsis; Venipuncture: 427; IV catheter: 1295.</p> <p>- Comparator: Blood cultures drawn by nurses using newly inserted IV catheter</p> <p>- Study bias: -Pediatric ED setting -Nurses aware of the study</p>	<p>- Description: Blood cultures drawn by nurses using venipuncture and three sequential Betadine swabs followed by three sequential alcohol swabs for skin antisepsis.</p> <p>- Duration: 6 months (02/1999-07/1999)</p> <p>- Training: Not reported.</p> <p>- Staff: Nurses</p> <p>- Other resources: Not reported</p> <p>- Cost: Not reported</p>	<p>- Description: Blood Culture Contamination Rate (BCCR)</p> <p>- Recording Method: Blood culture data reviewed for 6 month period.</p>	<p>- Type of Findings: Non-randomized comparison</p> <p>- Findings/Effect Size: BCCR- Venipuncture: 1.2% (5/427) Catheter: 3.4% (44/1295)</p> <p>➤ OR = 2.97 (CI: 1.17 – 7.54)</p> <p>- Statistical Significance/Test(s): Chi-square and Fisher's Exact Test.</p> <p>- Results/conclusion biases: Nurses used three sequential Betadine swabs followed by three sequential alcohol swabs for skin antisepsis.</p>
<p>Quality Rating: <u>6 (Fair)</u> (10 point maximum)</p> <p>Effect Size Magnitude Rating: <u>Substantial</u></p> <p>Relevance: <u>Direct</u></p>	<p>Study (3 pts maximum): <u>1</u></p> <p>Facility description (Pediatric ED setting only): study location sufficiently distinctive that results may not be generalizable to other settings due to higher BCCRs (-1). Potential study bias: comparator uses newly inserted IV catheter – have lower contamination rates (-1).</p>	<p>Practice (2 pts maximum): <u>2</u></p>	<p>Outcome measures (2 pts. maximum): <u>2</u></p>	<p>Results/findings (3 pts maximum): <u>1</u> Uncontrolled deviations: results/effect size reported not clearly attributable to practice being evaluated due to nurses using three sequential Betadine swabs followed by three sequential alcohol swabs for skin antisepsis.</p>

<u>Bibliographic Information</u> - Author (s) - Yr Published/Submitted - Publication - Author Affiliations - Funding	<u>Study</u> - Design - Facility/Setting - Time Period - Population/Sample - Comparator - Study bias	<u>Practice</u> - Description - Duration - Training - Staff/Other Resources - Cost	<u>Outcome Measures</u> - Description (s) - Recording method	<u>Results/Findings</u> - Type of Findings - Findings/Effect Size - Stat. Significance/Test(s) - Results/Conclusion Bias
Weddle G, Jackson MA, Selvarangan R - Year: 2011 - Publication: <i>Pediatric Emergency Care</i> - Affiliations: Children's Mercy Hospitals and Clinics, Kansas City, MO. - Funding: Self-funded	- Design: Descriptive study with pre-post intervention (pre rates retrospectively studied) - Facility/Setting: Children's Mercy Hospitals and Clinics, Kansas City, MO. 263-bed tertiary children's hospital. ED. - Time period: 3/2008-8/2009 Pre: 3/2008-9/2008 Intervention: 9/2008-2/2008 Post: 2/2008-8/2009 - Population/Sample: 3026 BCs obtained (1796 pre-intervention and 1229 post-intervention) - Comparator: BCs obtained through catheter draws - Study bias: Pediatric ED sample only; bias with potential higher BC contam. rates; reflect policy intervention with education.	- Description: BCs obtained through venipuncture draws. - Duration: 12 months (9/2008-8/2009) - Training: Not reported - Staff: Not reported - Other resources: Not reported - Cost: Not reported	- Description: Blood Culture Contamination Rate (BCCR) - Recording Method: Pre: retrospective rates reviewed. Post: Not described, but BC were cultured and data was recorded.	- Type of Findings: Comparison - Findings/Effect Size: BCCR: Pre: 6.7% ± 2.3% (120/1796) Post: 2.3% ± 0.8% (29/1229) ➤ OR = 2.96 (CI 1.96-4.47) - Statistical Significance/Test(s): 4% reduction of contaminated BCs in post-intervention group was statistically significant (P=0.001) - Results/conclusion biases: None noted.
Quality Rating: <u>8 (Good)</u> (10 point maximum) Effect Size Magnitude Rating: <u>Substantial</u> Relevance: <u>Direct</u>	Study (3 pts maximum): <u>1</u> Facility description (Pediatric ED setting only) study location sufficiently distinctive that results may not be generalizable to other settings due to higher BCCRs (-1). Potential study bias: study period only 6 months after policy intervention with education may have decreased rates that may not have been sustainable over time (-1).	Practice (2 pts maximum): <u>2</u>	Outcome measures (2 pts. maximum): <u>2</u>	Results/findings (3 pts maximum): <u>3</u>

Laboratory Medicine Best Practices

Body of Evidence Table 2012

TOPIC AREA: Blood Culture Contamination

Practice: Phlebotomy Teams

Practice: Phlebotomy Teams	Study Quality Rating						Effect Size Rating	Overall Consistency	Overall Strength of Body of Evidence
	Study	Practice	Measures	Results	Total	Rating			
<u>Published</u>									
Gander 2009	2	2	2	3	9	Good	Substantial	4 Studies = Good/Substantial	
Sheppard 2008	1	2	2	3	8	Good	Substantial		
Surdulescu 1998	2	2	2	1	7	Fair	Substantial		
Weinbaum 1997	1	2	2	3	8	Good	Substantial		
<u>Unpublished</u>									
Geisinger 2009	2	2	2	2	8	Good	Substantial	1 Study = Fair/Substantial	
Providence 2009	3	2	2	0	7	Poor	N/A	1 Study = Poor - Excluded	
								Yes	High

<u>Bibliographic Information</u> - Author (s) - Yr Published/Submitted - Publication - Author Affiliations - Funding	<u>Study</u> - Design - Facility/Setting - Time Period - Population/Sample - Comparator - Study bias	<u>Practice</u> - Description - Duration - Training - Staff/Other Resources - Cost	<u>Outcome Measures</u> - Description (s) - Recording method	<u>Results/Findings</u> - Type of Findings - Findings/Effect Size - Stat. Significance/Test(s) - Results/Conclusion Bias
<p>Gander RM (1,2), Byrd L (2), DeCrescenzo M (3), Hirany S (2), Bowen M (2), Baughman J (2) - Year: 2009 - Publication: <i>Journal of Clinical Microbiology</i> - Affiliations: [1] Dept of Pathology, University of Texas Southwestern Medical Center, Dallas Texas. [2] Dept of Pathology, Parkland Health and Hospital System. [3] Dept of Performance Improvement, Parkland Health and Hospital System - Funding: Self-funded</p>	<p>- Design: Cohort Study (Groups defined by predictor) - Facility/Setting: Parkland Memorial Hospital - 968 bed tertiary care teaching hospital, Dallas, TX. ED (West). - Time period: 12/2006-12/2007 (data collected for 5 separate months over a 13-month period) - Population/Sample: 3662 from ED West: 2012 blood cultures by phlebotomists and 1650 blood cultures by non-phlebotomy Method- all blood cultures within collection period. - Comparator: Venipuncture by non-phlebotomy staff - Study bias: - ED setting/ samples only. Students and other limited experience/skill staff used for comparator.</p>	<p>-Description: Dedicated phlebotomy team assigned to manage all blood collection and specimen activities. - Duration: 13 months (12/2006- 12/2007; ongoing afterward) - Training: Not reported. - Staff: Phlebotomist, nursing staff, residents, emergency medical technicians/students, nursing/medical students. Other resources: Not reported - Cost: Not reported for phlebotomy team. Difference in median patient charges between negative and false-positive episodes (\$18,752 versus \$27,472) reported is \$8,720 (47% higher) for each contamination event. There was no charge overlap within the 95% CI.</p>	<p>- Description: Blood Culture Contamination Rate (BCCR). -Recording method: Blood culture data reviewed for 5 separate months (at 3 month intervals) over a 13 month period.</p>	<p>- Type of Findings: - Comparison (cross-sectional) - Findings/Effect Size: BCCR: Dedicated phlebotomy practice:: Overall: 3.1% (62/2012); monthly range: 2.4 to 3.6% Non-phlebotomy: Overall: 7.4% (122/1650); monthly range 6.2 to 10.2% ➤ OR = 2.51 (CI: 1.84 – 3.43) - Statistical Significance/Test(s): Phlebotomy vs. non phlebotomy: chi-square= 34.41 df=1, p<0.001 - Results/conclusion biases: None noted.</p>
<p>Quality Rating: 9 (Good) (10 point maximum) Effect Size Magnitude Rating: <u>Substantial</u> Relevance: <u>Direct</u></p>	<p>Study (3 pts maximum): <u>2</u> Facility description (ED setting only) study location sufficiently distinctive that results may not be generalizable to other settings due to higher BCCRs in ED.</p>	<p>Practice (2 pts maximum): <u>2</u></p>	<p>Outcome measures (2 pts. maximum): <u>2</u></p>	<p>Results/findings (3 pts maximum): <u>3</u></p>

<u>Bibliographic Information</u> - Author (s) - Yr Published/Submitted - Publication - Author Affiliations - Funding	<u>Study</u> - Design - Facility/Setting - Time Period - Population/Sample - Comparator - Study bias	<u>Practice</u> - Description - Duration - Training - Staff/Other Resources - Cost	<u>Outcome Measures</u> - Description (s) - Recording method	<u>Results/Findings</u> - Type of Findings - Findings/Effect Size - Stat. Significance/Test(s) - Results/Conclusion Bias
Sheppard C (1), Franks N (2), Nolte F(1), Fantz C (1). - Year: 2008 - Publication: <i>Am J Clinical Pathology</i> - Affiliations: [1] Department of Pathology and Laboratory Medicine, Emory University, Atlanta, GA. [2] Department of Emergency Medicine, Emory University, Atlanta, GA. - Funding: Self-funded	- Design: Observational Study, baseline and 2-arm intervention (before-after) - Facility/Setting: Emory Crawford Long Hospital, ED; Academic Medical Center Atlanta, GA, Time Period: No dates reported; 9 mos. (6 mos. comparator; 3 mos. practice). - Population/Sample: Total 2,854 blood cultures collected in the ED; non-phlebotomist comparator 6-month sample= 2,576; phlebotomy practice 3-month sample 278 (Note: 1/4 - 1/3 of all blood cultures in hospital from the ED). - Comparator: Non-phlebotomy staff collected 6 mos. before intervention. - Study bias: Non-phlebotomist samples not 100% venipuncture; Potential patient selection bias – higher acuity for phlebotomists.	- Description: Phlebotomist dedicated to the ED randomly collected specimens on the weekday evening shift (2:00 pm-10:00 pm). - Duration: 3 months – no dates reported - Training: Not reported. - Staff: 1 dedicated ED lab phlebotomist - Other Resources: Not reported - Cost: ED 100% coverage annual labor costs of \$561,506 for 8.4 phlebotomist FTEs at \$13.46/hour (salary and benefits)	- Description: Blood Culture Contamination Rate (BCCR) - Recording method: BCC data collected quarterly and reported by department and collection personnel identifiers.	- Type of Findings: - Pretest-Posttest - Findings/Effect Size: Phlebotomist: 1.1% (3/278 cultures) Non-phlebotomist: 5.0% (129/2576 cultures) Note: 1.1% for phlebotomist collection was not significantly different from the average phlebotomy rate for the hospital of 1.3%. ➤ OR = 4.83 (CI: 1.53 – 15.28) - Statistical Significance/Test(s): Fisher exact test. P =0.001 - Results/conclusion biases: None noted
Quality Rating: 8 (Good) (10 point maximum) Effect Size Magnitude Rating: Substantial Relevance: Direct	Study (3 pts maximum): 1 Facility description: ED setting - study location sufficiently distinctive that results may not be generalizable to other settings - higher BCCRs in ED (-1). Potential study bias: Non-phlebotomist catheter draws and phlebotomist high acuity patients (-1).	Practice (2 pts maximum): 2	Outcome measures (2 pts. maximum): 2	Results/findings (3 pts maximum): 3

<u>Bibliographic Information</u> - Author (s) - Yr Published/Submitted - Publication - Author Affiliations - Funding	<u>Study</u> - Design - Facility/Setting - Time Period - Population/Sample - Comparator - Study bias	<u>Practice</u> - Description - Duration - Training - Staff/Other Resources - Cost	<u>Outcome Measures</u> - Description (s) - Recording method	<u>Results/Findings</u> - Type of Findings - Findings/Effect Size - Stat. Significance/Test(s) - Results/Conclusion Bias
<p>Surdulescu S, Utansingh D, Shekar R - Year: 1998 - Publication: <i>Clinical Performance and Quality Healthcare</i> - Affiliations: Dept. of Internal Medicine, The Division of Infectious Diseases, St. Luke's Medical Center, Case Western Reserve University, Cleveland, Ohio - Funding: Self-funded</p>	<p>- Design: Retrospective case-control study (Groups defined by outcome; chart review). - Facility/Setting: St. Luke's Medical Center, teaching hospital, Case Western Reserve University, Cleveland, Ohio. Internal med, surgery, OB/GYN, pediatrics. - Time period: 01/1993-10/1993 - Population/Sample: Based on total hospital blood cultures; 6,900 reported for 1995; no actual sample size reported; from 1/93–10/93 about 1/2 drawn by phlebotomy team; rest drawn by nurses, nurses' aides and physicians - Comparator: Non-phlebotomy staff blood draws with prep kit - Study bias: Use of commercial prep kit potentially limits generalizability. Selection bias – conservative definition of contaminated blood culture.</p>	<p>-Description: Dedicated phlebotomy team assigned to manage half of the blood collection and specimen activities. Blood draws with prep kit. - Duration: 10 months 01/1993-10/1993 - Training: Not reported. - Staff: Phlebotomy team, nurses, nurses' aid, physicians -Other resources: Prep-kit - Cost: "Estimated cost of a phlebotomy team per year was \$300,000 (salary plus benefits)"</p>	<p>- Description: Blood Culture Contamination Rate (BCCR) - Recording Method: Charts reviews by physicians</p>	<p>- Type of Findings: Comparison (Case control) - Findings/Effect Size: Dedicated Phlebotomy practice: 2.6% (from 01/93 – 10/93) Non-phlebotomy: 5.6% (from 01/93 – 10/93) (p= 0.003) ➤ OR = 2.09 (CI:1.68 – 2.61) Phlebotomy team eliminated from 11/93 – 12/95. Overall BCCR: 4.5% to 5.8% in 1994 and 5.3% (366/6900) in 1995; p= 0.001) - Statistical Significance/Test(s): Chi-square used for proportions. P=0.003 (phlebotomy vs. non-phlebotomy) p=0.001 (phlebotomy team removed) - Results/conclusion biases: None noted</p>
<p>Quality Rating: <u>7 (Fair)</u> (10 point maximum) Effect Size Magnitude Rating: <u>Substantial</u> Relevance: <u>Direct</u></p>	<p>Study (3 pts maximum): <u>2</u> Study design: sample may not be representative of the results of the practice due to use of prep-kit.</p>	<p>Practice (2 pts maximum): <u>2</u></p>	<p>Outcome measures (2 pts. maximum): <u>2</u></p>	<p>Results/findings (3 pts max.): <u>1</u> Appropriateness of statistical analysis: Denominators for proportions not reported; does not provide data sufficient to calculate effect size (1); Sample sufficiency: sample may be insufficient to allow robust estimate of impact of practice (-1).</p>

<u>Bibliographic Information</u> - Author (s) - Yr Published/Submitted - Publication - Author Affiliations - Funding	<u>Study</u> - Design - Facility/Setting - Time Period - Population/Sample - Comparator - Study bias	<u>Practice</u> - Description - Duration - Training - Staff/Other Resources - Cost	<u>Outcome Measures</u> - Description (s) - Recording method	<u>Results/Findings</u> - Type of Findings - Findings/Effect Size - Stat. Significance/Test(s) - Results/Conclusion Bias
Weinbaum FI (1, 2), Lavie S (3), Danek M (2), Sixsmith D (4), Heinrich GF (5), Mills SS (5). - Year: 1997 - Publication: <i>Journal of Clinical Microbiology</i> - Affiliations: The New York Hospital Medical Center of Queens, Flushing, New York [1] Dept of Surgery [2] Dept of Quality Management [3] Dept of Pathology [4] Dept Emergency Medicine [5] Administration - Funding: Self-funded	- Design: Nonrandomized prospective intervention trial; Before-After - Facility/Setting: New York Medical Center Hospital of Queens; 487-beds. Community Hospital Center, Flushing, NY. Adult general medical and surgical care units. (Unit A only) Time period: No dates reported. Baseline: 3 months Intervention: 6 months. - Population/Sample: 956 Blood cultures drawn by Blood Culture Collection Team (BCT) with prep kits. 208 house staff conducting draws with prep kits. - Comparator: Blood draws collected by house staff. - Study bias: None noted	- Description: Blood Culture Team (BCT) made up of three full-time phlebotomists with prep kits. - Duration: 6 months. - Training: House staff educated in proper technique by conventional methods. House staff educated about commercial prep kit use (not available to house staff initially) - Staff: Three full-time phlebotomists - Other resources: Prep-kit - Cost: “Three full-time equivalent salaries and benefits for 6 months was \$45,000”	- Description: Blood Culture Contamination Rate (BCCR) - Recording Method: Physician review of medical record.	- Type of Findings: - Comparison between two independent groups - Findings/Effect Size: House staff with prep kit 4.8%, (10/208) Phlebotomists/BCT with prep kit 1.2% (11/956) ➤ OR = 4.34 (CI: 1.82 – 10.36) - Statistical Significance/Test(s): Mantel-Haenszel chi-square, df=1, p<0.001; For house staff with prep kit vs. house staff without prep kit, P=0.173. - Results/conclusion biases: None noted
Quality Rating: <u>8 (Good)</u> (10 point maximum) Effect Size Magnitude Rating: <u>Substantial</u> Relevance: <u>Direct</u>	Study (3 pts maximum): <u>1</u> Study design: sample may not be representative of the results of the practice due to use of prep-kit (-1). Potential study bias: dates not reported (-1).	Practice (2 pts maximum): <u>2</u>	Outcome measures (2 pts. maximum): <u>2</u>	Results/findings (3 pts maximum): <u>3</u>

LMBP EVIDENCE REVIEW

BLOOD CULTURE CONTAMINATION PHLEBOTOMY TEAM PRACTICE

UNPUBLISHED STUDIES

<u>Bibliographic Information</u> - Author (s) - Yr Published/Submitted - Publication - Author Affiliations - Funding	<u>Study</u> - Design - Facility/Setting - Time Period - Population/Sample - Comparator - Study bias	<u>Practice</u> - Description - Duration - Training - Staff/Other Resources - Cost	<u>Outcome Measures</u> - Description (s) - Recording method	<u>Results/Findings</u> - Type of Findings - Findings/Effect Size - Stat. Significance/Test(s) - Results/Conclusion Bias
LMBP Unpublished Submission - Geisinger Wyoming Valley Hospital - Year: 2009 - Funding: Self-funded	- Design: non-randomized comparison - Facility/Setting: Geisinger Wyoming Valley Hospital; Time period: 01/2009-09/2009 - Population/Sample: All inpatients, Emergency Department, Urgent Care and Outpatients. Approximately 98% of the blood cultures collected are inpatient and Emergency Department. On average, 780 blood cultures collected at site monthly in 2009. 73% by phlebotomists; total estimated sample size approximately 7020. - Comparator: Venipuncture and line collections (A-line, Pic line, dialysis, etc) by non-phlebotomy staff - Study bias: Inclusion of line draws in comparator may bias estimated difference in rates.	- Description: Blood cultures collected by laboratory phlebotomists. All lab draws are peripheral collections. - Duration: 9 months (01/2009-09/2009); ongoing. - Training: Not reported - Staff: lab phlebotomists and non-phlebotomists (ED tech, paramedic, nurse, physician, other) - Other resources: Not reported - Cost: Not reported	- Description: Blood culture contamination rate (BCCR) - Recording Method: Not described	- Type of Findings: Comparison - Findings/Effect Size: Lab phlebotomist: 1.5% Non-phlebotomist: 4.3% ➤ OR = 2.93 (CI: 2.13 – 4.02) - Statistical Significance/Test(s): Monthly averages reported - Results/conclusion biases: None noted
Quality Rating: <u>8 (Good)</u> (10 point maximum) Effect Size Magnitude Rating: <u>Substantial</u> Relevance: <u>Direct</u>	Study (3 pts maximum): <u>2</u> Potential study bias: Non-phlebotomist includes non-venipuncture collections	Practice (2 pts maximum): <u>2</u>	Outcome measures (2 pts. maximum): <u>2</u>	Results/findings (3 pts maximum): <u>2</u> Appropriateness of statistical analysis: sample size data not provided.

<u>Bibliographic Information</u> - Author (s) - Yr Published/Submitted - Publication - Author Affiliations - Funding	<u>Study</u> - Design - Facility/Setting - Time Period - Population/Sample - Comparator - Study bias	<u>Practice</u> - Description - Duration - Training - Staff/Other Resources - Cost	<u>Outcome Measures</u> - Description (s) - Recording method	<u>Results/Findings</u> - Type of Findings - Findings/Effect Size - Stat. Significance/Test(s) - Results/Conclusion Bias
LMBP Unpublished Submission - Providence Regional Medical Center – Everett, WA - Year: 2009 - Funding: In house - as part of ongoing Patient Safety/Quality Indicators from 2005 and 2009.	- Design: Before-after - Facility/Setting: Providence Regional Medical Center – Everett; Non-teaching hospital; >300 beds Everett, Washington. Clinical lab. Test volume >1,000,000. ED, Critical care unit (CCU), neonatal, intensive care, oncology, rehab, family maternity center, med/surgery. - Time period: 1/2005 and 7/2009 - Population/Sample: Process ~1100 blood cultures per month in 2005 and ~1900 blood cultures per month in 2009. - Comparator: Nurses collecting BC - Study bias: Implemented 2 practices at same time (education and monitoring/feedback)	- Description: Blood cultures collected by lab phlebotomists - Duration: 2 one-month periods (1/2005 and 7/2009) - Training: Training coupled with individualized feedback to personnel performing blood draws. Data sharing with Nursing and medical staff; education on collection technique - Staff: nurses, lab phlebotomists, ED, ED tech - Other resources: Not reported - Cost: Not reported	- Description: Blood culture contamination rate (BCCR) - Recording Method: Internal quality control instrument linked to laboratory information system	- Type of Findings: Comparison - Findings/Effect Size: Jan 2005 -Lab Phlebotomy Team 3.0% -Non Lab personnel 6.0% Overall: 4.7% Jul 2009 -Lab Phlebotomy Team 0.9% - Non Lab personnel 3.6% Overall: 2.3% - Statistical Significance/Test(s): Not reported - Results/conclusion biases: No numerator, just proportions given. Approximate denominator.
Quality Rating: <u>7</u> (Poor*) (10 point maximum) Effect Size Magnitude Rating: <u>N/A</u> (Relevance: <u>Direct</u>) *0 for Results/Findings	Study (3 pts maximum): <u>3</u>	Practice (2 pts maximum): <u>2</u>	Outcome measures (2 pts. maximum): <u>2</u>	Results/findings (3 pts maximum): <u>0</u> Sample Sufficiency: Number tests not reported (-2); Appropriateness of statistical analysis: Insufficient data to verify effect size (-1). Uncontrolled deviations: Rresults reported not clearly attributable to practice evaluated (-1)

<u>Bibliographic Information</u> - Author (s) - Yr Published/Submitted - Publication - Author Affiliations - Funding	<u>Study</u> - Design - Facility/Setting - Time Period - Population/Sample - Comparator - Study bias	<u>Practice</u> - Description - Duration - Training - Staff/Other Resources - Cost	<u>Outcome Measures</u> - Description (s) - Recording method	<u>Results/Findings</u> - Type of Findings - Findings/Effect Size - Stat. Significance/Test(s) - Results/Conclusion Bias
<p>Bamber AI, Cunniffe JG, Nayar D, Ganguly R, and Falconer E - Year: 2009 - Publication: <i>British Journal of Biomedical Science</i> - Affiliations: Wirral University Teaching Hospitals NHS Foundation Trust - Funding: Not reported</p>	<p>- Design: Before-After - Facility/Setting: Wirral University Teaching Hospital, UK. Setting includes accident & emergency, clinical decisions unit, medical assessment unit, surgical ward and others. - Time period: 10/2007-3/2008 Pre: 1 month (10/2007) Post: 3 months (1/2008-3/2008) - Population/Sample: Consecutive positive blood cultures Pre: 100 Post: 167 - Comparator: Positive blood cultures collected without use of commercially prepared pre-packaged prep kit - Study bias: None noted.</p>	<p>- Description: Prep Kit (two blood culture bottles, one safety blood collection set with Leur adapter, two blood collection adapter caps, two 2% chlorhexidine wipes, and one informational leaflet) - Duration: 4 months - Training: Over 1 week in December 2007 - Staff: infection control staff and hospital's clinical skills laboratory provided training. - Other Resources: Not reported - Cost: 9402 kits used per year; £0.63 per kit from manufacturer; £5923.26 total (£5934.60 reported)</p>	<p>- Description: Blood culture contamination rate - Recording Method: Adapted trust audit forms used to collect audit data. All positive blood cultures were evaluated as 'obvious pathogen,' 'possible contaminant,' or 'probable contaminant' by laboratory medical staff.</p>	<p>- Pretest-Posttest - Findings/Effect Size: Blood culture contamination rate Pre: 32% (32 / 100) Post: 19% (32 / 167) Absolute decrease: 13% Relative decrease: 41% ➤ OR = - Statistical Significance/Test(s): None conducted - Results/conclusion biases: None noted.</p>
<p>Quality Rating: <u>5 (Poor*)</u> (10 point maximum) Effect Size Magnitude Rating: <u>N/A</u> Relevance: <u>Direct</u> *0 for Results/Findings</p>	<p>Study (3 pts maximum): <u>2</u> Study design: sample may not be representative.</p>	<p>Practice (2 pts maximum): <u>2</u></p>	<p>Outcome measures (2 pts. maximum): <u>1</u> Face validity: does not capture well the outcome being estimated.</p>	<p>Results/findings (3 pts maximum): <u>0</u> Sample sufficiency: sample likely too small for robust estimate of impact of practice (-2). Uncontrolled deviation results reported not clearly attributable to practice being evaluated (-2).</p>

<u>Bibliographic Information</u> - Author (s) - Yr Published/Submitted - Publication - Author Affiliations - Funding	<u>Study</u> - Design - Facility/Setting - Time Period - Population/Sample - Comparator - Study bias	<u>Practice</u> - Description - Duration - Training - Staff/Other Resources - Cost	<u>Outcome Measures</u> - Description (s) - Recording method	<u>Results/Findings</u> - Type of Findings - Findings/Effect Size - Stat. Significance/Test(s) - Results/Conclusion Bias
<p>Madeo M (1), Davies D (1), Owen L (1), Wadsworth P (1), Johnson G (1), Martin C (2) - Year: 2003 - Publication: <i>Clinical Effectiveness in Nursing</i> - Affiliations: [1] Department of Infection Control, Hull and East Yorkshire Hospitals, NHS Trust, UK. [2] Psychology Department of Health Sciences, Alcuin College, University of York, York, UK. - Funding: Self-funded</p>	<p>- Design: Case-control - Facility/Setting: Department of Infection Control, Hull and East Yorkshire Hospitals, NHS Trust, UK. Accident and emergency (A&E) department. - Time period: Not reported - Population/Sample: 100 blood samples taken by medical staff (50 with standard protocol and 50 with prep-kit) - Comparator: 50 standard protocol (control) - Study bias: not identified. ED and accident department. Only junior staff collecting sample.</p>	<p>- Description: Use of blood culture kit as intervention practice by medical staff. - Duration: Not reported - Training: Infection control nurses (who received specialist training in clinical infection control techniques) instructed junior medical staff on to use BC kits; no formal training given on venipuncture. - Staff: junior medical staff and infection control nurses. - Other resources: Not reported - Cost: Not reported</p>	<p>- Description: Blood culture contamination rate (BCCR) - Recording Method: Request forms were marked to facilitate identification in lab for sample collected with prep-kits.</p>	<p>- Type of Findings: Comparison - Findings/Effect Size: Control (standard): 24% (12/50) Intervention (prep-kit): 8% (4/50) - Statistical Significance/Test(s): Chi-square test (df=1) = 2.31, P=0.13 between control and intervention (not statistically significant). Statistically significant reduction in contaminants after intervention: chi-square test (df=2) = 7.06, P=0.03 - Results/conclusion biases: None noted.</p>
<p>Quality Rating: <u>5 (Poor*)</u> (10 point maximum) Effect Size Magnitude Rating: <u>N/A</u> Relevance: <u>Direct</u> *0 for Study</p>	<p>Study (3 pts maximum): <u>0</u> Facility description (ED and accident units) study location sufficiently distinctive that results may not be generalizable to other settings (-1). Study design: sample may not be representative (-1). Potential study bias: study design/participants only junior staff collecting samples may not be representative (-1).</p>	<p>Practice (2 pts maximum): <u>2</u></p>	<p>Outcome measures (2 pts. maximum): <u>2</u></p>	<p>Results/findings (3 pts maximum): <u>1</u> Sample sufficiency: measurement period not reported and sample is likely too small for robust estimate of the impact of practice (-2).</p>

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<p>McLellan, E; Townsend R, and Parsons HK. - Year: 2008 - Publication: <i>Journal of Infection</i> - Affiliations: Dept of Microbiology, Northern General Hospital, Sheffield Teaching Hospitals NHS Foundation Trust, Sheffield, UK. - Funding: Enturia Limited provided ChloroPreps used in study; Self-funded</p>	<p>- Design: Prospective observational intervention study - Facility/Setting: Northern General Hospital , Sheffield Teaching Hospitals NHS Foundation Trust, Sheffield, South Yorkshire, UK Academic Medical Center. Medical Assessment Unit (MAUs) – admissions from accident and emergency and general practice. (MAU1and MAU2) - Time period: 5/2007 – 10/2007 Pre: 5/2007-7/2007 Post: 8/2007-10/2007 - Population/Sample: 1115 blood cultures collected. MAU1 pre: 346, post: 304 MAU2 pre: 217, post: 248 - Comparator: 70% isopropyl alcohol wipes for skin antisepsis - Study bias: BC taken by DSW or junior doctors in a short time period with no record of who received education/training. No record if prekit used before each venesection.</p>	<p>- Description: Use of ChloroPrep (2% chlorhexidine gluconate) BC collected via venipuncture primarily by doctor support workers (DSW). Junior doctors (house staff) obtain blood specimens when DSWs are not available or unable to obtain a specimen. - Duration: 3 months (8/2007-10/2007) - Training: Enturia Limited representative provided several education sessions to DSWs and junior doctors on use of product. Infection Control Team delivered teaching sessions to first year junior doctors on taking BC with appropriate antisepsis. - Staff: Trained Doctor Support Workers (DSWs), junior doctors, on call doctors - Other resources: Not reported - Cost: Unit cost for prep kit: £0.50; unit cost for 70% isopropyl alcohol wipes: £0.02.</p>	<p>- Description: Blood culture contamination rate (BCCR) - Recording Method: Not described</p>	<p>- Type of Findings: Pretest-Posttest - Findings/Effect Size: MAU1 Pre: 8.7% (30/346) Post : 6.6% (20/304) MAU2 Pre : 9.2% (20/217) Post : 8.5% (21/248) Overall: Pre: 8.88% (50/563) Post: 7.43 % (41/552) ➤ OR = 1.22 (CI: 0.79 – 187) - Statistical Significance/Test(s): Chi-square test f and Fisher’s Exact Test. - Results/conclusion biases: None noted</p>
<p>Quality Rating: <u>6 (Fair)</u> (10 point maximum) Effect Size Magnitude Rating: <u>Minimal/None</u> Relevance: <u>Direct</u></p>	<p>Study (3 pts maximum): <u>2</u> Study design: study time period and sample may not be representative of the results of the practice.</p>	<p>Practice (2 pts maximum): <u>2</u></p>	<p>Outcome measures (2 pts. maximum): <u>1</u> Recording method: not described</p>	<p>Results/findings (3 pts maximum): <u>1</u> Uncontrolled deviations: Results not clearly attributable to practice being evaluated;additional education occurred during implementation.</p>

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<p>Trautner BW (1), Clarridge JE (3), Darouiche RO (1,2) - Year: 2002 - Publication: <i>Infection Control and Hospital Epidemiology</i></p> <p>- Affiliations: [1] Dept of Medicine, Infectious Diseases Section, Baylor College of Medicine, Houston, Texas [2] Dept of Physical Medicine and Rehabilitation, Center for Prostheses and Infection, Baylor College of Medicine, Houston, Texas [3] Dept of Pathology, Veterans Affairs Medical Center and Baylor College of Medicine, Houston, Texas.,</p> <p>- Funding: Houston Dept of Veterans Affairs and Medi-Flex Hospital Products</p>	<p>- Design: Prospective blinded trial - Facility/Setting: VA Medical Center, Houston, TX; Tertiary-care teaching hospital, inpatient medical service wards (telemetry, oncology, geriatric), medical ICU, cardiac ICU. - Time period: 11/2000- 5/2001 - Population/Sample: 813 total blood cultures Baseline: 383 BCs Post: Prep kits - Paired blood culture sets collected from 2 sites (215 patients in each). 430 blood cultures collected (215 with chlorhexidine and 215 with tincture of iodine). - Comparator: Blood cultures drawn by venipuncture without antiseptic prep kits collected during 1st 6 weeks from patients on the same wards as study patients. - Study bias: Differential selection of eligible patients by persons who obtaining specimens; excluding "sicker" patients who may have more difficult venous access. Participation by self selection of individuals obtaining specimens. Staff aware contamination rates being monitored; may have been more careful to follow venipuncture protocol.</p>	<p>- Description: Commercial prep antiseptic kits. Comparison of skin antiseptics kits containing 2% chlorhexidine in 70% isopropyl alcohol (1 swab; (Chloraprep One-Step)) vs. 2% tincture of iodine in 47% ethanol plus 70% isopropyl alcohol (2 swab).</p> <p>- Duration: 6.5 months (11/2000- 05/2001)</p> <p>- Training: no instruction provided other than those printed on the package of each antiseptic agent.</p> <p>- Staff: Phlebotomists, house staff (medical students/residents) and healthcare technicians</p> <p>- Other resources: Not reported</p> <p>- Cost: Not reported</p>	<p>- Description: Blood Culture Contamination Rate (BCCR) – number and proportion of blood cultures growing contaminant organisms</p> <p>- Recording Method: Monitoring of BCs by researcher blinded to collection method.</p>	<p>- Type of Findings: Comparison with external comparator for both interventions. Pretest-posttest.</p> <p>- Findings/Effect Size: BCC Rates Venipuncture specimens collected w/o prep kits 6.5% (25/383) Prep Kits (overall): 0.9% (4/430) ➤ OR = 3.68 (CI: 1.27 – 10.73)</p> <p>Prep Kits -chlorhexidine: 0.5% (1/215); tincture of iodine:1.4% (3/215)] Difference in BCCR for the 2 prep kits not stat signif:</p> <p>- Statistical Significance/Test(s): -Fisher exact test, p = 0.001 (baseline rate 6.5% vs. overall rate with antiseptic kit 0.9%) -McNemar test for dependent proportions, p = 0.62 (chlorhexidine vs. tincture of iodine) - Results/conclusion biases: None noted.</p>
Quality Rating: <u>7(Fair)</u> (10 point maximum) Effect Size Magnitude Rating: <u>Substantial</u> Relevance: <u>Direct</u>	Study (3 pts maximum): <u>1</u> Potential study bias: patient selection bias (-1); participant self-selection bias (-1).	Practice (2 pts maximum): <u>2</u>	Outcome measures (2 pts. maximum): <u>2</u>	Results/findings (3 pts maximum): <u>2</u> Sample sufficiency: Small number of contaminated cultures - sample may be insufficient to allow robust estimate of impact of practice.

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Weinbaum FI (1, 2), Lavie S (3), Danek M (2), Sixsmith D (4), Heinrich GF (5), Mills SS (5). - Year: 1997 - Publication: <i>Journal of Clinical Microbiology</i> - Affiliations: The New York Hospital Medical Center of Queens, Flushing, New York [1] Dept of Surgery [2] Dept of Quality Management [3] Dept of Pathology [4] Dept Emergency Medicine [5] Administration - Funding: Self-funded	- Design: Nonrandomized prospective intervention trial; Before-After - Facility/Setting: New York Medical Center Hospital of Queens; 487-bed. Community Hospital Center, Flushing, NY. Adult general medical and surgical care units (Unit A only). Time period: No dates reported; ~1995. Baseline: 3 months Intervention: 3 months. - Population/Sample: A total of 495 blood culture specimens collected by house staff (interns & residents) at a general medical unit of hospital. 208 BC by house staff with prep kits. - Comparator: 287 BC by house staff without prep kits. - Study bias: None noted	- Description: Use of a commercial blood culture prep kit with isopropanol and tincture of iodine – conducted by house staff. - Duration: 3 months - Training: House staff educated in proper technique by conventional methods. House staff educated about commercial prep kit use (not available to house staff initially) - Staff: house staff (interns and residents) - Other resources: Not reported - Cost: Not reported	- Description: Blood Culture Contamination Rate (BCCR) - Recording Method: Physician review of medical record.	- Type of Findings: Comparison between two independent groups - Findings/Effect Size: House staff without prep kit 8.4% (24/287) House staff with prep kit 4.8%, (10/208) ➤ OR = 1.81 (CI: 0.85 – 3.87) - Statistical Significance/Test(s): Mantel-Haenszel chi-square, df=1; For house staff with prep kit vs. house staff without prep kit, P=0.173. - Results/conclusion biases: None noted
Quality Rating: 9(Good) (10 point maximum) Effect Size Magnitude Rating: Moderate Relevance: Direct	Study (3 pts maximum): 2 Potential study bias: dates not reported.	Practice (2 pts maximum): 2	Outcome measures (2 pts. maximum): 2	Results/findings (3 pts maximum): 3

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Wilson ML (1,2), Weinstein MP (3,4,5), Mirret S (6), Reimer LG (7,8), Fernando C (5), Meredith FT (6), Reller LB (6,9,10) - Year: 2000a - Publication: <i>J Clin Microbiol</i> - Affiliations: [1] Denver Health Medical Center, Denver, CO. [2] Univ of Colorado School of Medicine, Denver, CO. [3] Clinical Microbiology Lab, Robert Wood Johnson Univ Hospital [4] Dept Pathology, Robert Wood Johnson Medical School, New Brunswick, NJ. [5] Dept of Medicine, Robert Wood Johnson Medical School, New Brunswick, NJ. [6] Clinical Microbiology Lab, Duke University Medical Center, Durham, NC. [7] Clinical Microbiology Lab, Salt Lake City VA Medical Center, Salt Lake City, UT. [8] Univ of Utah School of Medicine, Salt Lake City, UT. [9] Dept Pathology, Duke Univ School of Medicine, Durham, NC. [10] Dept of Medicine, Duke Univ School of Medicine, Durham, NC. - Funding: Supported in part by Medi Flex (Overland Park, KS)	- Design: Non-randomized multi-center comparison study. - Facility/Setting: Academic medical center Duke University Medical Center (Site a-DUMC). - Time period: Not reported - Population/Sample: 12,367 blood samples. 6,362 samples collected after disinfection with conventional alcohol pledgets and 6005 collected following disinfection with prep kits. Specimens collected via venous catheter excluded from analysis. - Comparator: Blood culture specimens collected after antisepsis with conventional povidone-iodine and isopropyl alcohol pledgets. - Study bias: Variation in practice implementation among 4 sites.	-Description: Prep Kit (70% isopropyl alcohol & 2% iodine tincture on separate sterile applicators; "Medi-Flex Prep Kit II"). In each institution, use of prep kits and conventional practice alternated by month. - Duration: Not reported. Use of prep kit alternated by month with use of conventional pledgets. Order of use not described. - Training: Site provided only written instructions in the kits. - Staff: House staff physicians/ medical students -Other resources: Not reported - Cost: Not reported	- Description: Blood culture contamination rate (BCCR) - Recording Method: Not described	- Type of Findings: Comparison - Findings/Effect Size: BCCR for Site a: 4.4% (157/3536); 4.3% (126/2924) ➤ OR = 1.03 (CI: 0.81 – 1.31) - Statistical Significance/Test(s): Chi-square test, no significant differences among study sites, no difference in contamination rates between prep kit and conventional pledget skin disinfection - Results/conclusion biases: None noted
Quality Rating: <u>7 (Fair)</u> (10 point maximum) Effect Size Magnitude Rating: <u>Minimal/None</u> Relevance: <u>Direct</u>	Study (3 pts maximum): <u>2</u> Potential study bias: study design/implementation may introduce bias that would affect results.	Practice (2 pts maximum): <u>2</u>	Outcome measures (2 pts. maximum): <u>1</u> Recording method: not described	Results/findings (3 pts maximum): <u>2</u> Sample sufficiency: measurement period not reported but large enough denominator to estimate impact of practice (-1).

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Wilson ML (1,2), Weinstein MP (3,4,5), Mirret S (6), Reimer LG (7,8), Fernando C (5), Meredith FT (6), Reller LB (6,9,10) - Year: 2000b - Publication: <i>J Clin Microbiol</i> - Affiliations: [1] Denver Health Medical Center, Denver, CO. [2] Univ of Colorado School of Medicine, Denver, CO. [3] Clinical Microbiology Lab, Robert Wood Johnson Univ Hospital [4] Dept Pathology, Robert Wood Johnson Medical School, New Brunswick, NJ. [5] Dept of Medicine, Robert Wood Johnson Medical School, New Brunswick, NJ. [6] Clinical Microbiology Lab, Duke University Medical Center, Durham, NC. [7] Clinical Microbiology Lab, Salt Lake City VA Medical Center, Salt Lake City, UT. [8] Univ of Utah School of Medicine, Salt Lake City, UT. [9] Dept Pathology, Duke Univ School of Medicine, Durham, NC. [10] Dept of Medicine, Duke Univ School of Medicine, Durham, NC. - Funding: Supported in part by Medi Flex (Overland Park, KS)	- Design: Non-randomized multi-center comparison study. - Facility/Setting: Robert Wood Johnson University Hospital (Site b-RWJUH) - Time period: Not reported - Population/Sample: 12,367 blood samples. 6,362 samples collected after disinfection with conventional alcohol pledgets and 6005 collected following disinfection with prep kits. Specimens collected via venous catheter excluded from analysis. - Comparator: Blood culture specimens collected after antisepsis with conventional povidone-iodine and isopropyl alcohol pledgets. - Study bias: Variation in practice implementation among 4 sites.	-Description: Prep Kit (70% isopropyl alcohol & 2% iodine tincture on separate sterile applicators; "Medi-Flex Prep Kit II"). In each institution, use of prep kits and conventional practice alternated by month. - Duration: Not reported. Use of prep kit alternated by month with use of conventional pledgets. Order of use not described. - Training: Site provided written instructions and verbally (via in-service training). - Staff: House staff physicians/ medical students -Other resources: Not reported - Cost: Not reported	- Description: Blood culture contamination rate (BCCR) - Recording Method: Not described	- Type of Findings: Comparison - Findings/Effect Size: BCCR for Site b: 8.1% (132/1632); 7.5% (135/1801) ➤ OR = 1.09 (CI: 0.85 – 1.39) - Statistical Significance/Test(s): Chi-square test, no significant differences among study sites, no difference in contamination rates between prep kit and conventional pledget skin disinfection - Results/conclusion biases: None noted
Quality Rating: <u>7 (Fair)</u> (10 point maximum) Effect Size Magnitude Rating: <u>Minimal/None</u> Relevance: <u>Direct</u>	Study (3 pts maximum): <u>2</u> Potential study bias: study design/implementation may introduce bias that would affect results.	Practice (2 pts maximum): <u>2</u>	Outcome measures (2 pts. maximum): <u>1</u> Recording method: not described	Results/findings (3 pts maximum): <u>2</u> Sample sufficiency: measurement period not reported but large enough denominator to estimate impact of practice (-1).

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Wilson ML (1,2), Weinstein MP (3,4,5), Mirret S (6), Reimer LG (7,8), Fernando C (5), Meredith FT (6), Reller LB (6,9,10) - Year: 2000c - Publication: <i>J Clin Microbiol</i> - Affiliations: [1] Denver Health Medical Center, Denver, CO. [2] Univ of Colorado School of Medicine, Denver, CO. [3] Clinical Microbiology Lab, Robert Wood Johnson Univ Hospital [4] Dept Pathology, Robert Wood Johnson Medical School, New Brunswick, NJ. [5] Dept of Medicine, Robert Wood Johnson Medical School, New Brunswick, NJ. [6] Clinical Microbiology Lab, Duke University Medical Center, Durham, NC. [7] Clinical Microbiology Lab, Salt Lake City VA Medical Center, Salt Lake City, UT. [8] Univ of Utah School of Medicine, Salt Lake City, UT. [9] Dept Pathology, Duke Univ School of Medicine, Durham, NC. [10] Dept of Medicine, Duke Univ School of Medicine, Durham, NC. - Funding: Supported in part by Medi Flex (Overland Park, KS)	- Design: Non-randomized multi-center comparison study. - Facility/Setting: Denver Health Medical Center (Site c- DHMC). - Time period: Not reported - Population/Sample: 12,367 blood samples. 6,362 samples collected after disinfection with conventional alcohol pledgets and 6005 collected following disinfection with prep kits. Specimens collected via venous catheter excluded from analysis. - Comparator: Blood culture specimens collected after antisepsis with conventional povidone-iodine and isopropyl alcohol pledgets. - Study bias: Variation in practice implementation among 4 sites.	-Description: Prep Kit (70% isopropyl alcohol & 2% iodine tincture on separate sterile applicators; "Medi-Flex Prep Kit II"). In each institution, use of prep kits and conventional practice alternated by month. - Duration: Not reported. Use of prep kit alternated by month with use of conventional pledgets. Order of use not described. - Training: Kit was used as the routine skin disinfectant prior to the study, the phlebotomy teams were given verbal instructions via in-service training. - Staff: At DHMC phlebotomy teams performed venipuncture. -Other resources: Not reported - Cost: Not reported	- Description: Blood culture contamination rate (BCCR) - Recording Method: Not described	- Type of Findings: Comparison - Findings/Effect Size: BCCR for Site c: 5.5% (55/1007); 6.0% (54/906) ➤ OR = 0.91 (CI: 0.62 – 1.34) - Statistical Significance/Test(s): Chi-square test, no significant differences among study sites, no difference in contamination rates between prep kit and conventional pledget skin disinfection - Results/conclusion biases: None noted
Quality Rating: <u>7 (Fair)</u> (10 point maximum) Effect Size Magnitude Rating: <u>Minimal/None</u> Relevance: <u>Direct</u>	Study (3 pts maximum): <u>2</u> Potential study bias: study design/implementation may introduce bias that would affect results.	Practice (2 pts maximum): <u>2</u>	Outcome measures (2 pts. maximum): <u>1</u> Recording method: not described	Results/findings (3 pts maximum): <u>2</u> Sample sufficiency: measurement period not reported but large enough denominator to estimate impact of practice (-1).

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Wilson ML (1,2), Weinstein MP (3,4,5), Mirret S (6), Reimer LG (7,8), Fernando C (5), Meredith FT (6), Reller LB (6,9,10) - Year: 2000d - Publication: <i>J Clin Microbiol</i> - Affiliations: [1] Denver Health Medical Center, Denver, CO. [2] Univ of Colorado School of Medicine, Denver, CO. [3] Clinical Microbiology Lab, Robert Wood Johnson Univ Hospital [4] Dept Pathology, Robert Wood Johnson Medical School, New Brunswick, NJ. [5] Dept of Medicine, Robert Wood Johnson Medical School, New Brunswick, NJ. [6] Clinical Microbiology Lab, Duke University Medical Center, Durham, NC. [7] Clinical Microbiology Lab, Salt Lake City VA Medical Center, Salt Lake City, UT. [8] Univ of Utah School of Medicine, Salt Lake City, UT. [9] Dept Pathology, Duke Univ School of Medicine, Durham, NC. [10] Dept of Medicine, Duke Univ School of Medicine, Durham, NC. - Funding: Supported in part by Medi Flex (Overland Park, KS)	- Design: Non-randomized multi-center comparison study. - Facility/Setting: VA/Military/Federal hospital Salt Lake Veterans Affairs Medical Center (Site d-SLVAMC) - Time period: Not reported - Population/Sample: 12,367 blood samples. 6,362 samples collected after disinfection with conventional alcohol pledgets and 6005 collected following disinfection with prep kits. Specimens collected via venous catheter excluded from analysis. - Comparator: Blood culture specimens collected after antisepsis with conventional povidone-iodine and isopropyl alcohol pledgets. - Study bias: Variation in practice implementation among 4 sites.	-Description: Prep Kit (70% isopropyl alcohol & 2% iodine tincture on separate sterile applicators; "Medi-Flex Prep Kit II"). In each institution, use of prep kits and conventional practice alternated by month. - Duration: Not reported. Use of prep kit alternated by month with use of conventional pledgets. Order of use not described. - Training: Site provided only written instructions in the kits. - Staff: House staff physicians/ medical students -Other resources: Not reported - Cost: Not reported	- Description: Blood culture contamination rate (BCCR) - Recording Method: Not described	- Type of Findings: Comparison - Findings/Effect Size: BCCR for Site d: 3.7% (7/187); 3.5% (13/374) ➤ OR = 1.08 (CI: 0.42 – 2.75) - Statistical Significance/Test(s): Chi-square test, no significant differences among study sites, no difference in contamination rates between prep kit and conventional pledget skin disinfection - Results/conclusion biases: None noted
Quality Rating: <u>7 (Fair)</u> (10 point maximum) Effect Size Magnitude Rating: <u>Minimal/None</u> Relevance: <u>Direct</u>	Study (3 pts maximum): <u>2</u> Potential study bias: study design/implementation may introduce bias that would affect results.	Practice (2 pts maximum): <u>2</u>	Outcome measures (2 pts. maximum): <u>1</u> Recording method: not described	Results/findings (3 pts maximum): <u>2</u> Sample sufficiency: measurement period not reported but large enough denominator to estimate impact of practice (-1).