**APPENDIX D: Summary Evidence Tables for**

**LMBPTM Review: Patient Mis-Identification Due to Labeling Errors**

NOTE: Scoring Information see: Christenson et al. 2011

1. **Formation of Multidisciplinary Teams: Collaborative measures between lab and health professionals**

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| **Bibliographic Information** **- Author (s)** **- Yr Published/Submitted** **- Publication** **- Author Affiliations** **- Funding**  | **Study** **- Design** **- Facility/Setting** **- Time Period** **- Population/Sample** **- Comparator** **- Study bias**  | **Practice** **- Description** **- Duration** **- Training** **- Staff/Other Resources** **- Cost**  | **Outcome Measures** **- Description (s)** **- Recording method**  | **Results/Findings** **- Number of Participants/ CVD events****- Findings/Effect Size** **- Stat. Significance/Test(s)** **- Results/Conclusion Bias**  |
| **1. Author(s):** Zervakis, et.al. -**Publication:****- Year:** 2015**- Publication:** AORN Journal **- Affiliations:** Urban academic medical center – Dept. of Biobehavioral Health Science at the University of Illinois at Chicago College of Nursing- **Funding:** Information not available | - **Design:** Before and After**-Facility/Setting**: Urban Academic medical center in Chicago/ OR**-Population/Sample Type:** Surgical specimen- **Comparator:** Not described**- Study bias:** None  | **-Description:** Failure mode and effect analysis (FMEA) formed a multidisciplinary OR specimen labeling committee (PRSLC) as a subcommittee of the Patient Safety Committee / Used communication strategies to balance safe patient care, practice solutions, policies, Intervention: implementation of new process which included checking two patient identifiers with another healthcare provider, changing labels on one sheet.- **Duration:** One month - **Staff involved to form multidisciplinary team:** OR leadership team, surgeons, nurses, pathology technologist- **Associated** **Cost:** Not provided  | **- Type of labeling error:** Incorrectly labeled specimen: Mismatch between the specimen requisition and specimen container label in terms of the name, location, or laterality of the specimen **Recording Method:** Audit- collecting data on monthly basis **Data abstraction period:**Pre: Feb 1, 2012- July 31, 2012Post: Feb 1, 2013- July 31, 2013**Follow-up period:** I year | **- Number of Specimen/ labeling errors:** Pre: N: 4,271Post: N= 7,709- **Findings/Effect Size:** Pre: n (%)Labeling errors: 36 (0.84)Post: Labeling errors: 20 (0.26)**ES:**Relative percent change in labeling errors: (post-pre/pre)X100=(0.01-0.11/0.11)X100%=

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|  | -69.04% (-82.16, -46.90) |

- **Statistical Significance/Test(s):** Statistically significant**- Results/conclusion biases:** None |
| **Quality Rating (10 point maximum): 9 (Good)** **Effect Size Magnitude Rating: Moderate** | **Study (3 pts maximum): \_2\_\_** -No information about the usual practice for labeling errors | **Practice (2 pts maximum): 2**  | **Outcome measures (2 pts. maximum): \_1\_**  | **Results/findings (3 pts maximum): \_3\_** |

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| **Bibliographic Information** **- Author (s)** **- Yr Published/Submitted** **- Publication** **- Author Affiliations** **- Funding**  | **Study** **- Design** **- Facility/Setting** **- Time Period** **- Population/Sample** **- Comparator** **- Study bias**  | **Practice** **- Description** **- Duration** **- Training** **- Staff/Other Resources** **- Cost**  | **Outcome Measures** **- Description (s)** **- Recording method**  | **Results/Findings** **- Number of Participants/ CVD events****- Findings/Effect Size** **- Stat. Significance/Test(s)** **- Results/Conclusion Bias**  |
| **2. Author(s):** Seferian, et.al. **- Year:** 2014**- Title:** A multidisciplinary, multifaceted improvement initiative to eliminate mislabeled laboratory specimens at a large tertiary care hospital**- Publication:** BMJ Qual Saf**- Affiliations:** Cedars-Sinai Medical Center, Los Angeles, CA- **Funding:** Information not available | - **Design:** Before and after study design**-Facility/Setting**: Cedars-Sinai Medical Center/ an academic care tertiary care hospital/ LA**-Population/Sample Type:** Both adults and pediatric / inpatient blood and body fluid specimens- **Comparator:** Un- exposed to the intervention**- Study bias:** None  | **-Description:** a multidisciplinary (MD) performance improvement team was formed. Education +policy (required two-patient identifiers on the hospital ID band and printed specimen labels during the specimen labelling process). Specimen mislabels were identified and validated monthly by a MD team Performance improvement initiatives were implemented over a 2-year period with control charts used to assess improvement over time.- **Duration:** Over the period of two years**- Staff involved to form MD team:** personnel from nursing, clinical laboratory, blood bank, information technology, performance improvement and patient safety departments. Nurse champions were identified from each inpatient unit, the operating room (OR) and the emergency department (ED).- **Associated** **Cost:** Not reported | **- Description:** **Wrong identification:** A specimen was considered (1) specimen/requisition mismatch; (2) incorrect patient identifiers and (3) unlabeled specimen.**-Measure used:** The aggregated monthly reported specimen errors were reviewed by the project team leadership.**- Recording Method:** All unlabeled specimens were tracked and reported via laboratory electronic information log system in addition to the institution’s patient safety event reporting system.  -**Data abstraction period:**Pre: Data from 6 months period prior to the intervention implementation February- July 2011Intervention: August, 2011Post: April 2013-**Follow-up period:** 2 years | **- Number of Specimen/ labeling errors:** N: 1.8 millions in 2 years (1800000) or 75,000/mnth- **Findings/Effect Size:** Pre (July 2011): Labeling errors: 5.85/10 000 specimens = 0.058%Post: (April 2013)Labeling errors: 1.4/10 000 specimens = 0.014 %**-ES:**Relative percent change in labeling errors: (post-pre/pre)X100=(0.01-0.11/0.11)X100%= -75.86 (-87.69, -52.64)Risk Ratio (RR): 0.0014/0.0058= 0.241(0.12, 0.47)Relative risk (% decrease) = (1 - RR) x 100 = (1-0.24) X 100%= 75.86%

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- **Statistical Significance/Test(s):** Statistically significant**- Results/conclusion biases:** None |
| **Quality Rating (10 point maximum):** 8 (Good)**Effect Size Magnitude Rating:** Significant | **Study (3 pts maximum): \_3\_\_**  | **Practice (2 pts maximum): 1** * Unlimited information on the variables related to practice implementation.
 | **Outcome measures (2 pts. maximum): \_1\_**  | **Results/findings (3 pts maximum): \_3\_** |
| **Bibliographic Information** **- Author (s)** **- Yr Published/Submitted** **- Publication** **- Author Affiliations** **- Funding**  | **Study** **- Design** **- Facility/Setting** **- Time Period** **- Population/Sample** **- Comparator** **- Study bias**  | **Practice** **- Description** **- Duration** **- Training** **- Staff/Other Resources** **- Cost**  | **Outcome Measures** **- Description (s)** **- Recording method**  | **Results/Findings** **- Number of Participants/ CVD events****- Findings/Effect Size** **- Stat. Significance/Test(s)** **- Results/Conclusion Bias**  |
| **3. Author(s):** Kim, et.al. **- Year:** 2013**- Title:** Standardized patient identification and specimen labeling: a retrospective analysis on improving patient safety**- Publication:** Journal of American Academy of Dermatology**- Affiliations:** Duke University Medical Center, Durham; and US Army MedicalCommand, San Antonio**- Funding:** None | - **Design:** Before and After **-Facility/Setting**: Duke University Medical Center Department of Dermatology/ Department of Dermatology**-Population/Sample:** General population/skin specimens- **Comparator:** Unexposed to the intervention**- Study bias:** None  | **-Description:** a safety committee was formed. Implementation of standardized specimen labeling protocol. 5-step clinical protocol was developed to standardize the specimen handling policy+ placing label printers in every examination room.- **Duration**: Not reported- **Staff involved to form multidisciplinary team:** Attending physicians, resident physicians, registered nurses, and certified medical assistants - **Associated** **Cost:** Not reported | **- Description:** **Specimen labeling error (Incorrectly labeled specimen):** any discrepancy between the paper requisition form and the label on the specimen container; absence of an appropriate label; absence of tissue; absence of a paper requisition; or incorrectly labeled anatomic site.**-Measure used:** calculated the monthly aggregated rates of specimen labeling events occurring with skin specimens processed through the department of pathology. The numerator of the error rate calculation included. Average monthly rate of specimen labeling events per 1000 specimens.-**Recording Method:** Electronic summary log**-Data abstraction period:**Pre: December 2008 through March 2010Intervention: April 2010.Post: June 2010 through September 2011**Follow-up period:** 1yr | **- Number of Specimen/ labeling errors:** Pre: N: 8,288Post: N= 9,072- **Findings/Effect Size:** Pre: Labeling errors: 5.79 events per 1000# of events: 48/8288 (0.579%)Post: Labeling errors: 3.53 events per 1000( 0.353%)**ES:**Relative percent change in labeling errors: (post-pre/pre)X100=-39.09 (-61.02, -4.83)RR: 0.609 (0.390, 0.952)Relative risk (% decrease) = (1 - .61) x 100 = (1-0.61) X 100%= 39%P = .002- **Statistical Significance/Test(s):** Statistically significant**- Results/conclusion biases:** None |
| **Quality Rating (10 point maximum):** 8 (Good) **Effect Size Magnitude Rating:** Minimal | **Study (3 pts maximum): \_3\_\_**  | **Practice (2 pts maximum): 1** The duration of intervention implementation was not repoted | **Outcome measures (2 pts. maximum): \_1\_**  | **Results/findings (3 pts maximum): \_3\_** |
| **Bibliographic Information** **- Author (s)** **- Yr Published/Submitted** **- Publication** **- Author Affiliations** **- Funding**  | **Study** **- Design** **- Facility/Setting** **- Time Period** **- Population/Sample** **- Comparator** **- Study bias**  | **Practice** **- Description** **- Duration** **- Training** **- Staff/Other Resources** **- Cost**  | **Outcome Measures** **- Description (s)** **- Recording method**  | **Results/Findings** **- Number of Participants/ CVD events****- Findings/Effect Size** **- Stat. Significance/Test(s)** **- Results/Conclusion Bias**  |
| **4. Author(s):** Rees, et.al. **- Year:** 2012**- Title:** Reducing SpecimenIdentification Errors**- Publication:** J Nurs Care Qual**- Affiliations:** University of Wisconsin Hospital and Clinics, Madison, Wisconsin- **Funding:** No Information provided | - **Design:** Before and After**-Facility/Setting**: University of Wisconsin Hospital and Clinics/ inpatient, ambulatory, and surgical services areas **-Population/Sample Type:** General patients from inpatient, ambulatory, and surgical services areas.- **Comparator:** Patients unexposed to the intervention**- Study bias:** None  | **-Description:** A collaborative performance improvement approach between nursing and the laboratory. A team was formed. The team agreed to meet every 2 weeks and to use a rapid cycle change process. The team created workflow chart to review 5 month data on specimen ID error and to determine that the intervention can vary in each area. The goal was to determine strategies that were effective in reducing specimen ID errors and that were acceptable and sustainable to staff.- **Duration:** two months **- Staff involved to form multidisciplinary team:** laboratory and quality departments and nurses from the 5 areas with the largest number of specimen identification errors- ED, 2 ICUs, an intermediate care unit, and a general care unit.- **Associated** **Cost:** Nor Reported | **- Description:** **Wrong identification:** Specimen labeling error **(**Specimen identification events) : **(**types included no label on the specimen, no patient identification on the request form, no request form, specimen labeled with 1 identifier only (patient name),and specimen and request form not matching (specimen labeled with wrong patient or request form labeled with wrong patient).**-Measure used**: # of Specimen identification events.**-Recording Method:** Organization’s error reporting system by staff from the laboratory.**-Data abstraction period:**Pre: May, 2007Intervention: Feb/March 2008Post: June 30, 2011-**Follow-up period:** 3 yrs | **- Number of Specimen/ labeling errors:** N: NR- **Findings/Effect Size:** Pre (2007) : Labeling errors: 197Post (2011)Labeling errors: 30**ES:**Relative percent change in labeling errors: (197-30/197) X 100%=  -84.77% (NK)Intervention led to 85% reduction in risk of labeling errors compared to the group without intervention. (also reported in the paper)

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- **Statistical Significance/Test(s):** Statistically significant**- Results/conclusion biases:** None |
| **Quality Rating (10 point maximum): 6 (Fair)** **Effect Size Magnitude Rating: Substantial** | **Study (3 pts maximum): \_2\_\_**  | **Practice (2 pts maximum): 1** | **Outcome measures (2 pts. maximum): \_1\_**  | **Results/findings (3 pts maximum): \_1\_**- Total number of specimen not reported-could not calculate statistical significance |

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| **Bibliographic Information** **- Author (s)** **- Yr Published/Submitted** **- Publication** **- Author Affiliations** **- Funding**  | **Study** **- Design** **- Facility/Setting** **- Time Period** **- Population/Sample** **- Comparator** **- Study bias**  | **Practice** **- Description** **- Duration** **- Training** **- Staff/Other Resources** **- Cost**  | **Outcome Measures** **- Description (s)** **- Recording method**  | **Results/Findings** **- Number of Participants/ CVD events****- Findings/Effect Size** **- Stat. Significance/Test(s)** **- Results/Conclusion Bias**  |
| **5. Author(s):** Shetterly et.al./ Pa Pateint\* **- Year:** 2011**- Title:** Pennsylvania Patient Safety Authority Blood Specimen Labeling Collaborative/ Reducing Errors in Blood Specimen Labeling: A Multihospital Initiative**- Publication:** American Society For Healthcare Risk Management**- Affiliations:** Pennsylvania Patient Safety Authority, Harrisburg, PA.- **Funding:** Information not provided\*Shetterly and Pa patient studies evaluated the same intervention on same population | - **Design:** Prospective cohort study (before and after)**-Facility/Setting**: Authority’s Pennsylvania Patient Safety ReportingSystem (PA-PSRS) : Eight acute care hospitals and one rehabilitation hospital/ entire facility while others chose smaller units such as an ED, progressive ICU, and medical ICU.**-Population/Sample Type:** All routine blood specimens from general patients- **Comparator:** Not reported**- Study bias:** None  | **-Description:** A multidisciplinary team was formed for each hospital. Training was provided about the event investigation. Education (coaching calls and workshops) was provided from. This training session included clinical scenarios and role-playing that allowed collaborative participants to gain familiarity with techniques related to respectful investigation of errors, gaining trust of staff, refraining from the use of individual blame, and using active listening skills.- **Duration:** August 2009 through May 2010**- Staff involved to form multidisciplinary team:** laboratory directors, phlebotomy supervisors, patient safety officers, and risk management, quality and performance improvement, and regulatory compliance personnel.- **Associated** **Cost:** Not provided  | **- Description:** **Type of labeling error:** Types of mislabeling included wrong, missing, incomplete, or illegible labels -**Measure:** : # of blood specimen labeling errors per 1,000 opportunities for errors**-Recording Method:** Each event report had to be classified and entered into PA-PSRS according to the appropriate/respective taxonomy listing **-Data abstraction period:**Pre: August-Oct, 2009Intervention: June 2009Post: August-October 2010-**Follow-up period:** 18 months | **- Number of Specimen/ labeling errors:** N; Not reported- **Findings/Effect Size:** Pre: Rate of Labeling errors: 0.50/1000 = 0.050%Post: Rate of Labeling errors: 0.21/1000 = 0.021%**-Effect Size:**Relative percent change in labeling errors: (post-pre/pre)X100=(0.01-0.11/0.11)X100%= - 58.0% (NK)Risk Ratio (RR): 0.021/0.050= 0.42 (0.003, 68.61)Relative risk (% decrease) = (1 - RR) x 100 = (1-0.42) X 100%= 58%(Overall, there was a 58% decrease in blood specimen labeling errors in the collaborative over the 18-month period (95% CI; p < 0.04).)-**Statistical Significance/Test(s):** Statistically significant**- Results/conclusion biases:** None |
| **Quality Rating (10 point maximum): 7 (Fair)** **Effect Size Magnitude Rating: Moderate**  | **Study (3 pts maximum): \_2\_\_** -Limited information about the comparator group | **Practice (2 pts maximum): 2**  | **Outcome measures (2 pts. maximum): \_2\_**  | **Results/findings (3 pts maximum): \_1\_****-**Total number of specimen not reported-could not calculate statistical significance |

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| **Bibliographic Information** **- Author (s)** **- Yr Published/Submitted** **- Publication** **- Author Affiliations** **- Funding**  | **Study** **- Design** **- Facility/Setting** **- Time Period** **- Population/Sample** **- Comparator** **- Study bias**  | **Practice** **- Description** **- Duration** **- Training** **- Staff/Other Resources** **- Cost**  | **Outcome Measures** **- Description (s)** **- Recording method**  | **Results/Findings** **- Number of Participants/ CVD events****- Findings/Effect Size** **- Stat. Significance/Test(s)** **- Results/Conclusion Bias**  |
| **6. Author(s):** O’Neil, et.al. **- Year:** 2009**- Title:** Adherence to a Blood Bank Specimen Labeling Policy by All Clinical Laboratories Significantly Reduces the Incidence of “Wrong Blood in Tube”**- Publication:** American Society for Clinical Pathology**- Affiliations:** Department of Pathology, Beth Israel Deaconess Medical Center, Boston, MA.- **Funding:** Information not reported | - **Design:** Before and After study design **-Facility/Setting**: Beth Israel Deaconess Medical Center, Boston, MA/ all clinical laboratories and blood bank**-Population/Sample Type:** All routine blood specimens- **Comparator:** Before exposure to the intervention**- Study bias:** None  | **-Description:** A multi-disciplinary team was formed which developed a policy that required the collection date, 2 unique patient identifiers, and the ability to identify the phlebotomist. - **Duration: over** 4 months period- **Staff involved to form multi-disciplinary team:** clinical managers from the pathology department.- **Associated** **Cost:** Total cost for phlebotomists’ educational initiative S 4,139, but no overall cost | **- Description:** **Wrong identification:** Specimen labeling error **(**mislabeled specimens received by the clinical laboratories):specimens that do not meet hospital specimen-labeling requirements**Measure used:** Rate of mislabeled specimens received by the clinical laboratories during post policy period)**Recording Method:** To estimate the rate of during post policy period, the total number of mislabeled specimens for calendar year 2006 was extracted from these incident reports and compared with the total number of test requisitions received during the same period.**Data abstraction period:**Pre: October 2001-september 2004Intervention: July-September (educational)October 1, 2004 (policy)Post: October 2004-september 2007-**Follow-up period:** 3 yrs | **- Number of Specimen/ labeling errors:** Pre: N: 106,174Post: N= 104,860- **Findings/Effect Size:** Pre: Labeling errors: n (%)28 (0.026%)Post: Labeling errors: n (%)4(0.004%)**ES:**Relative percent change in labeling errors: (post-pre/pre)X100=(4-28/28)X100%= -85.71(-94.9, -58.8) Risk Ratio (RR): 0.145 (0.051, 0.412)Relative risk (% decrease) = (1 - RR) x 100 = (1-0.145) X 100%= 85.5%Intervention led to 85.5 % reduction in risk of labeling errors compared to the group without intervention.- **Statistical Significance/Test(s):** Statistically significant**- Results/conclusion biases:** None |
| **Quality Rating (10 point maximum): 7 (Fair)** **Effect Size Magnitude Rating: Substantial**  | **Study (3 pts maximum): \_2\_\_** - | **Practice (2 pts maximum): 1** -No overall associate costs described  | **Outcome measures (2 pts. maximum): \_2\_**  | **Results/findings (3 pts maximum): \_2\_****-**it was difficult to tease out the results from all clinical labs from the blood bank settings |
| **Bibliographic Information** **- Author (s)** **- Yr Published/Submitted** **- Publication** **- Author Affiliations** **- Funding**  | **Study** **- Design** **- Facility/Setting** **- Time Period** **- Population/Sample** **- Comparator** **- Study bias**  | **Practice** **- Description** **- Duration** **- Training** **- Staff/Other Resources** **- Cost**  | **Outcome Measures** **- Description (s)** **- Recording method**  | **Results/Findings** **- Number of Participants/ CVD events****- Findings/Effect Size** **- Stat. Significance/Test(s)** **- Results/Conclusion Bias**  |
| **7. Author(s):** Forsberg, et.al. **- Year:** 1996**- Title:** Infant Metabolic Screening: A Total Quality Management Approach**- Publication**: JOGNN PRINCIPLES & PRACTICE**- Affiliations:** Memorial Regional Hospital in Hollywood, FL**.**- **Funding: Information not reported** | - **Design:** **-Facility/Setting**: Hollywood, Florida/ Memorial Regional Hospital in Hollywood, Florida**-Population/Sample Type:** Pediatric (infant screening for PKU)- **Comparator:** Before exposure to the intervention**- Study bias:** Generalizability limitations as the included population is restricted to infants only. | **-Description:** The laboratory team identified and developed a list of all of the problems with the infant screening process. Education + policy: Staff members with multiple poor quality specimens were targeted initially and retrained, using videos and demonstrations by peers who had made no errors in collection. The laboratory team member worked with peers to establish a process to check specimen slips for missing collection dates.- **Duration:** NR - **- Staff involved to form multidisciplinary team:** The team consistedof representatives from a number of departments, including postpartum, level I nursery, the neonatal ICU, the pediatric primary care clinic, medical records, laboratory, nursing quality improvement coordinator, the director of obstetric nursing, and mail room. - **Associated** **Cost**: Not reported | **- Description:** **Wrong identification:** Specimen labeling error **:** Specimens missing information on specimen label (specimen collection date)**-Measure used:** % specimen labeling error rate**-Recording Method:** Not clear**-Data abstraction period:**Pre: Before the interventionIntervention: 1992 (assume)Post: 1995-**Follow-up period:** 3 yrs | **- Number of Specimen/ labeling errors:** N:4,000- **Findings/Effect Size:** Pre (1992): Labeling errors: 2.6% Post(1995): Labeling errors: 0.5%.**ES:**Relative percent change in labeling errors: (post-pre/pre)X100=(0.01-0.11/0.11)X100%= -90.89 (-97.86, -61.14)

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- **Statistical Significance/Test(s):** Statistically significant**- Results/conclusion biases:** None |
| **Quality Rating (10 point maximum): 6 (Fair)** **Effect Size Magnitude Rating: Substantial** | **Study (3 pts maximum): \_2\_\_**  | **Practice (2 pts maximum): 2** | **Outcome measures (2 pts. maximum): \_1\_** -data collection methods are not clearly described | **Results/findings (3 pts maximum): \_1\_**N provided only for baseline data-Only percentage data provided-statistical significance calculated assuming same no of births at both periods of times |

1. Education and Training

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| **Bibliographic Information** **- Author (s)** **- Yr Published/Submitted** **- Publication** **- Author Affiliations** **- Funding**  | **Study** **- Design** **- Facility/Setting** **- Time Period** **- Population/Sample** **- Comparator** **- Study bias**  | **Practice** **- Description** **- Duration** **- Training** **- Staff/Other Resources** **- Cost**  | **Outcome Measures** **- Description (s)** **- Recording method**  | **Results/Findings** **- Number of Participants/ CVD events****- Findings/Effect Size** **- Stat. Significance/Test(s)** **- Results/Conclusion Bias**  |
| **1. Author(s):** Agarwal, et.al. **- Year:** 2012 **-Title**: Role of Intervention on Laboratory Performance: Evaluation of Quality Indicators in a Tertiary Care Hospital**- Publication:** Ind J Clin Biochem **- Affiliations:** Department of Neurochemistry, Institute of Human Behaviour & Allied Sciences; Department of Pathology, Institute of Human Behaviour & Allied Sciences; Department of Microbiology, Institute of Human Behaviour & Allied Sciences; Department of Biostatistics, Institute of Human Behaviour & Allied Sciences- **Funding:** Information not available | - **Design:** Prospective cohort study (before and after)**-Facility/Setting**: Diagnostic laboratories inInstitute of Human Behavior and Allied Sciences (IHBAS),Delhi, India/ Clinical chemistry, hematology and serology laboratories**-Population/Sample Type:** All routine blood specimens- **Comparator:** Upon receiving the samples in the labs, QI were documented in the lab after careful screening of the sample and test requisition form (TRF) by the laboratory technician to monitor pre-analytical phase**- Study bias:** None  | **-Description:** As part of continuous medical education, the above staff of the clinical departments were oriented and sensitized to the quality assurance program and all the activities of laboratory services including patient preparation, filling of TRF, sample collection and reporting of results by group discussions and practical demonstrations in the laboratories.- **Duration:** two months - **Staff Trained:** medical, nursing and laboratory staff- **Associated** **Cost:** Not provided  | **- Type of labeling error:** **Wrong identification: (**sample identification (ID/registration no. verification between sample and TRF): No. of patients wrongly identified-**Measure used:** Number of Specimen/ labeling errors**-Recording Method:** The trend was observed for all the QI before and after sensitization of the staff over the period of 12 months and attempt had been made to find out the parameters. -**Data abstraction period:**Pre: January–June, 2010Intervention:Post: July–December, 2010-**Follow-up period:** 6 months | **- Number of Specimen/ labeling errors:** Pre: N: 20,810Post: N= 21,752- **Findings/Effect Size:** Pre: Labeling errors: 21 (0.11)Post: Labeling errors: 2 (0.01)**ES:**Relative percent change in labeling errors: (post-pre/pre)X100=(0.01-0.11/0.11)X100%= -90.89 (-97.86, -61.14)

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- **Statistical Significance/Test(s):** Statistically significant**- Results/conclusion biases:** None |
| **Quality Rating (10 point maximum): 9 (Good)** **Effect Size Magnitude Rating:**  | **Study (3 pts maximum): \_3\_\_**  | **Practice (2 pts maximum): 2**  | **Outcome measures (2 pts. maximum): \_1\_**  | **Results/findings (3 pts maximum): \_3\_** |
| **Bibliographic Information** **- Author (s)** **- Yr Published/Submitted** **- Publication** **- Author Affiliations** **- Funding**  | **Study** **- Design** **- Facility/Setting** **- Time Period** **- Population/Sample** **- Comparator** **- Study bias**  | **Practice** **- Description** **- Duration** **- Training** **- Staff/Other Resources** **- Cost**  | **Outcome Measures** **- Description (s)** **- Recording method**  | **Results/Findings** **- Number of Participants/ CVD events****- Findings/Effect Size** **- Stat. Significance/Test(s)** **- Results/Conclusion Bias**  |
| **2. Author(s):** Wagar, et.al. **- Year:** 2012 **-Title:** Patient Safety in the Clinical Laboratory A Longitudinal Analysis of Specimen Identification Errors**- Publication:** Patient Safety and Specimen Identification**- Affiliations:** University of California, Los Angeles, Clinical Laboratories, Department of Pathology and Laboratory Medicine; Sutter Medical Center of Sacramento, Clinical Lab, Sacramento, Calif; University of California, Los Angeles, Pathology and Laboratory Medicine - -**Funding:** Developmental Center Grant HS11512–03 from the Agency for Healthcare Research and Quality | - **Design:****-Facility/Setting**: University of California, Los Angeles (UCLA)/ Clinical Laboratories**-Population/Sample Type:** blood specimens- **Comparator:** Practices prior to the implementation of interventions (online electronic event reporting system, automated processing system)**- Study bias:** None  | **-Description:** Phlebotomy services available for 24 hrs. +education of nursing in service: nursing in-service education was performed for ICU nursing phlebotomy. - **Duration:** two months - **Staff Trained:** nursing in service- **Associated** **Cost:** Not reported | **- Type of labeling errors:** Mislabeled specimen: A specimen that is not labeled with appropriate patient identifiersUnlabeled: A specimen received in the clinical laboratory with no label or without 2 identifiers on a label**-Measure used:** No. of labeling errors per month**-Recording Method:** To assess patient identification and specimen labeling improvement, the faculty, nurses, and staff at UCLA established guidelines and definitions to create 15 specimen error categories, data for specimen errors were collected and tabulated alongside the total specimen error data.**-Data abstraction period:**Pre: July 03Intervention: July-Aug 2003Post: January 04**Follow-up period:** 6 months | **- Number of Specimen/ labeling errors:** N: 4.29 million specimens in 2 years/ 2.14 million per year/ 178,750 per month- **Findings/Effect Size:** Pre: Labeling errors:60 (Mislabeled:24 + unlabeled:36) Post: Labeling errors: 50 (Mislabeled:17 +Unlabeled:33)**ES:**Relative percent change in labeling errors: (post-pre/pre)X100=-16.66 (-42.74, -21.28)Risk Ratio (RR): 0.83 (0.57, 1.21)Relative risk (% decrease) = (1 - RR) x 100 = (1-0.833) X 100%= 16.7%Intervention led to 16.7 % reduction in risk of labeling errors compared to the group without intervention.- **Statistical Significance/Test(s):** Statistically significant**- Results/conclusion biases:** None |
| **Quality Rating (10 point maximum): 7 (Fair)**  | **Study (3 pts maximum): \_3\_\_**  | **Practice (2 pts maximum): -1 -**Associated costs not reported | **Outcome measures (2 pts. maximum): \_1\_**  | **Results/findings (3 pts maximum): \_2\_**Total no of specimen for pre and post intervention are not provided seperately |

1. **Audit and Feedback of Labeling Errors: Real time event reporting**

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| **Bibliographic Information** **- Author (s)** **- Yr Published/Submitted** **- Publication** **- Author Affiliations** **- Funding**  | **Study** **- Design** **- Facility/Setting** **- Time Period** **- Population/Sample** **- Comparator** **- Study bias**  | **Practice** **- Description** **- Duration** **- Training** **- Staff/Other Resources** **- Cost**  | **Outcome Measures** **- Description (s)** **- Recording method**  | **Results/Findings** **- Number of Participants/ CVD events****- Findings/Effect Size** **- Stat. Significance/Test(s)** **- Results/Conclusion Bias**  |
| **1. Author(s):** Gonzalez-Porras JR, et.al. **- Year:** 2009**-Title:** Tubes for pre- transfusion testing should be collected by blood bank staff and hand labeled until implementation of new technology for improved sample labeling: results of a prospective study**- Publication:** Vox Sanguinis**- Affiliations:** Department of Hematology, University Hospital of Salamanca, Paseo deSan Vicente- **Funding: Information not provided** | - **Design:** Before and After**-Facility/Setting**: Spain/Transfusion Service, Depart of Hematology, University Hospital of Salamanca, Salamanca/ Hospital Clinico Universitario (hospital A with 705 wards) and Hospital Virgen de la Vega (hospital B with 345 wards**-Population/Sample Type**: Patients require blood transfusion- **Comparator:** Prior to sample collection, a positive identification was performed by asking the patient (or their relatives) to state their full name and date of birth. The labeling was performed at the time of sampling and the information on the tube had to match that of the accompanying TRF. On arrival at the blood bank, the staff checked the results of previous testing (for ABO and Rhesus groups).The information required on the tube was: (i) the name and surname of the patient; (ii) the medical record number; (iii) DOB (iv) the name of the phlebotomist and signature; (v) the date of the sample collection; and (vi) the time of the sample collection.**- Study bias:** None | **-Description:** Errors were identified related to mislabeled samples and WBIT and reported back to the staff.- **Duration:** One month- **Staff Trained:** Not applicable- **Associated** **Cost:** Information not provided | **- Type of labeling error:** Inappropriately labelled blood bank samples- Missing date or signature missing, Name, medical record number or date of birth. Unlabeled samples, Misspelled name, Mismatched information between sample and requisition, illegibleMiscollected: (WBIT) When the tubes contained blood from an individual other that on the label- **Measure used:** Frequency of inappropriately labelled samples**-Recording Method:** Not provided**-Data abstraction period:**Pre: January-AprilIntervention: MayPost: May-July -**Follow-up period:** 6 months | **- Number of Specimen/ labeling errors:** N= 6446- **Findings/Effect Size:** Pre: Labeling errors: 471 (7·3%)Post: Labeling errors: 374 (5.8%)**ES:**Relative percent change in labeling errors: (post-pre/pre)X100=(7.3-5.8/7.3)X100%= -20.55 (-30.33, -9.39)Risk Ratio (RR): 0.795 (0.697, 0.906)Relative risk (% decrease) = (1 – 0.795) x 100 = 0.205 X 100%= 20.5%Intervention led to 20.5 % reduction in Specimen labeling errors.

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- **Statistical Significance/Test(s):** Statistically significant**- Results/conclusion biases:** None |
| **Quality Rating (10 point maximum): 9****Good quality**  | **Study (3 pts maximum): \_\_ 3** | **Practice (2 pts maximum): 1** | **Outcome measures (2 pts. maximum): \_\_ 2** | **Results/findings (3 pts maximum): \_\_3** |

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| **Bibliographic Information** **- Author (s)** **- Yr Published/Submitted** **- Publication** **- Author Affiliations** **- Funding**  | **Study** **- Design** **- Facility/Setting** **- Time Period** **- Population/Sample** **- Comparator** **- Study bias**  | **Practice** **- Description** **- Duration** **- Training** **- Staff/Other Resources** **- Cost**  | **Outcome Measures** **- Description (s)** **- Recording method**  | **Results/Findings** **- Number of Participants/ CVD events****- Findings/Effect Size** **- Stat. Significance/Test(s)** **- Results/Conclusion Bias**  |
| **2. Author(s):** Quillen and Murphy, et.al. **- Year:** 2006**-Title:** Quality improvement to decrease specimen mislabeling in transfusion medicine**- Publication:** Archives of Pathology & Laboratory Medicine**- Affiliations:** Department of Laboratory Medicine, Boston University Medical Center, Boston, MA- **Funding:** Information not available | - **Design: B**efore and after)**-Facility/Setting**: : Department of Laboratory Medicine, Boston University Medical center/ Clinical Laboratory/Blood Bank**-Population/Sample Type:** General population/All routine blood specimens- **Comparator:** Upon receiving the samples in the labs, QI were documented in the lab after careful screening of the sample and test requisition form (TRF) by the laboratory technician to monitor pre-analytical phase**- Study bias:** None  | **-Description:** Weekly incident feedback program. Feedback was provided to the managers of the ED quaterly- **Duration:** Started in first quarter and still going - **Staff Trained:** Not applicable- **Associated** **Cost:** Not provided  | **- Description:** **Wrong identification:** Unlabeled: not labeledMismatched: Between the patient information and the req formWBIT: wrong blood in tube (specimen appears properly labeled but contains blood from an individual other than the one named on the label)**Recording Method:** Weekly collected weekly on the origin of specimen mislabeling and shared with the manager of the ED on quarterly basis **Data abstraction period:**Pre: 4 quarters in 2004Post: 3 quarters in 2005**Follow-up period:** 6 months | **- Number of Specimen/ labeling errors:** Pre (N): Total specimens: 27,667 (four quarters)Post (N): Total specimens:22,288 (three quarters)- **Findings/Effect Size:** Pre: Labeling (no of errors) = 35 in last quarter of pre intervention period or 12/month (0.0050%)Post: Labeling errors (no. of errors) = 12 last quarter of post intervention period or 4 /month (0.0020)**ES:**Relative percent change in labeling errors: (post-pre/pre)X100=(4-12/12)X100%= -66.65 (-89.22, 3.2)

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- **Statistical Significance/Test(s):** Statistically not significant**- Results/conclusion biases:** None |
| **Quality Rating (10 point maximum): 7 (Fair)**  | **Study (3 pts maximum): \_3\_\_**  | **Practice (2 pts maximum): 1**  | **Outcome measures (2 pts. maximum): \_1\_**  | **Results/findings (3 pts maximum): \_2\_** |

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| **Bibliographic Information** **- Author (s)** **- Yr Published/Submitted** **- Publication** **- Author Affiliations** **- Funding**  | **Study** **- Design** **- Facility/Setting** **- Time Period** **- Population/Sample** **- Comparator** **- Study bias**  | **Practice** **- Description** **- Duration** **- Training** **- Staff/Other Resources** **- Cost**  | **Outcome Measures** **- Description (s)** **- Recording method**  | **Results/Findings** **- Number of Participants/ CVD events****- Findings/Effect Size** **- Stat. Significance/Test(s)** **- Results/Conclusion Bias**  |
| **3. Author(s):** Wagar, et.al. **- Year:** 2012 **- Title:** Patient Safety and Specimen Identification**- Publication:** Arch Pathol Lab Med**- Affiliations:** University of California, Los Angeles, Clinical Laboratories, Department of Pathology and Laboratory Medicine; Sutter Medical Center of Sacramento, Clinical Lab, Sacramento, Calif; University of California, Los Angeles, Pathology and Laboratory Medicine.-**Funding:** Developmental Center Grant HS11512–03 from the Agency for Healthcare Research and Quality | - **Design:****-Facility/Setting**: University of California, Los Angeles (UCLA)/ Clinical Laboratories**-Population/Sample Type:** blood specimens- **Comparator:** Practices prior to the implementation of interventions (online electronic event reporting system, automated processing system)**- Study bias:** None | **-Description:** Feedback (electronic error reporting events) – implement an online electronic event reporting system at all 5 medical center campuses, including UCLA. This electronic event reporting system now allows nurses, physicians, and other health care professionals to easily report adverse events and near misses from any computer within their organization. Errors are entered into the Event Reporting System for unlabeled, mislabeled, and specimen/requisition mismatch.- **Duration:** two months - **Staff Trained:** nursing in service- **Associated** **Cost:** Not reported | **- Type of labeling errors:** Mislabeled specimen: A specimen that is not labeled with appropriate patient identifiersUnlabeled: A specimen received in the clinical laboratory with no label or without 2 identifiers on a label**-Measure used:** No. of labeling errors per month**-Recording Method:** To assess patient identification and specimen labeling improvement, the faculty, nurses, and staff at UCLA established guidelines and definitions to create 15 specimen error categories, data for specimen errors were collected and tabulated alongside the total specimen error data.**-Data abstraction period:**Pre: January 2004Intervention: Jan-February 2004Post: May 2004**Follow-up period:** 4 months | **- Number of Specimen/ labeling errors:** N: 4.29 million specimens in 2 years/ 2.14 million per year/ 178,750 per month- **Findings/Effect Size:** Pre: Labeling errors:50 (Mislabeled:17 + unlabeled:33) Post: Labeling errors: 21 (Mislabeled:17 +Unlabeled:33)**ES:**Relative percent change in labeling errors: (post-pre/pre)X100=-58.0 (--74.7, -30.08)Risk Ratio (RR): 0.42 (0.25, 0.67)Relative risk (% decrease) = (1 - RR) x 100 = (1-0.42) X 100%= 58%Intervention led to 58 % reduction in risk of labeling errors compared to the group without intervention.- **Statistical Significance/Test(s):** Statistically significant**- Results/conclusion biases:** None |
| **Quality Rating (10 point maximum): 9 (Good)**  **Effect Size Magnitude Rating:**  | **Study (3 pts maximum): \_3\_\_**  | **Practice (2 pts maximum): 2**  | **Outcome measures (2 pts. maximum): \_1\_**  | **Results/findings (3 pts maximum): \_3\_** |

1. **Formation of Multidisciplinary Teams: Collaborative measures between lab and health professionals**

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| **Bibliographic Information** **- Author (s)** **- Yr Published/Submitted** **- Publication** **- Author Affiliations** **- Funding**  | **Study** **- Design** **- Facility/Setting** **- Time Period** **- Population/Sample** **- Comparator** **- Study bias**  | **Practice** **- Description** **- Duration** **- Training** **- Staff/Other Resources** **- Cost**  | **Outcome Measures** **- Description (s)** **- Recording method**  | **Results/Findings** **- Number of Participants/ CVD events****- Findings/Effect Size** **- Stat. Significance/Test(s)** **- Results/Conclusion Bias**  |
| **1. Author(s):** Zervakis, et.al. -**Publication:****- Year:** 2015**- Publication:** AORN Journal **- Affiliations:** Urban academic medical center – Dept. of Biobehavioral Health Science at the University of Illinois at Chicago College of Nursing- **Funding:** Information not available | - **Design:** Before and After**-Facility/Setting**: Urban Academic medical center in Chicago/ OR**-Population/Sample Type:** Surgical specimen- **Comparator:** Not described**- Study bias:** None  | **-Description:** Failure mode and effect analysis (FMEA) formed a multidisciplinary OR specimen labeling committee (PRSLC) as a subcommittee of the Patient Safety Committee / Used communication strategies to balance safe patient care, practice solutions, policies, Intervention: implementation of new process which included checking two patient identifiers with another healthcare provider, changing labels on one sheet.- **Duration:** One month - **Staff involved to form multidisciplinary team:** OR leadership team, surgeons, nurses, pathology technologist- **Associated** **Cost:** Not provided  | **- Type of labeling error:** Incorrectly labeled specimen: Mismatch between the specimen requisition and specimen container label in terms of the name, location, or laterality of the specimen **Recording Method:** Audit- collecting data on monthly basis **Data abstraction period:**Pre: Feb 1, 2012- July 31, 2012Post: Feb 1, 2013- July 31, 2013**Follow-up period:** I year | **- Number of Specimen/ labeling errors:** Pre: N: 4,271Post: N= 7,709- **Findings/Effect Size:** Pre: n (%)Labeling errors: 36 (0.84)Post: Labeling errors: 20 (0.26)**ES:**Relative percent change in labeling errors: (post-pre/pre)X100=(0.01-0.11/0.11)X100%=

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|  | -69.04% (-82.16, -46.90) |

- **Statistical Significance/Test(s):** Statistically significant**- Results/conclusion biases:** None |
| **Quality Rating (10 point maximum): 9 (Good)** **Effect Size Magnitude Rating: Moderate** | **Study (3 pts maximum): \_2\_\_** -No information about the usual practice for labeling errors | **Practice (2 pts maximum): 2**  | **Outcome measures (2 pts. maximum): \_1\_**  | **Results/findings (3 pts maximum): \_3\_** |

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| **Bibliographic Information** **- Author (s)** **- Yr Published/Submitted** **- Publication** **- Author Affiliations** **- Funding**  | **Study** **- Design** **- Facility/Setting** **- Time Period** **- Population/Sample** **- Comparator** **- Study bias**  | **Practice** **- Description** **- Duration** **- Training** **- Staff/Other Resources** **- Cost**  | **Outcome Measures** **- Description (s)** **- Recording method**  | **Results/Findings** **- Number of Participants/ CVD events****- Findings/Effect Size** **- Stat. Significance/Test(s)** **- Results/Conclusion Bias**  |
| **2. Author(s):** Seferian, et.al. **- Year:** 2014**- Title:** A multidisciplinary, multifaceted improvement initiative to eliminate mislabeled laboratory specimens at a large tertiary care hospital**- Publication:** BMJ Qual Saf**- Affiliations:** Cedars-Sinai Medical Center, Los Angeles, CA- **Funding:** Information not available | - **Design:** Before and after study design**-Facility/Setting**: Cedars-Sinai Medical Center/ an academic care tertiary care hospital/ LA**-Population/Sample Type:** Both adults and pediatric / inpatient blood and body fluid specimens- **Comparator:** Un- exposed to the intervention**- Study bias:** None  | **-Description:** a multidisciplinary (MD) performance improvement team was formed. Education +policy -Remind staff to confirm the required two-patient identifiers on the hospital identification band and printed specimen labels during the specimen labelling process. - A specimen mislabeling dashboard was displayed on each unit’s quality corner.Specimen mislabels were identified and validated monthly by a MD team Performance improvement initiatives were implemented over a 2-year period with control charts used to assess improvement over time.- **Duration:** Over the period of two years**- Staff involved to form MD team:** personnel from nursing, clinical laboratory, blood bank, information technology, performance improvement and patient safety departments. Nurse champions were identified from each inpatient unit, the operating room (OR) and the emergency department (ED).- **Associated** **Cost:** Not reported | **- Description:** **Wrong identification:** of Mislabeled specimens were inpatient blood and body fluid specimens. A specimen was considered mislabeled under the following circumstances: (1) specimen/requisition mismatch; (2) incorrect patient identifiers and (3) unlabeled specimen.**-Measure used:** The aggregated monthly reported specimen errors were reviewed by the project team leadership.**- Recording Method:** All unlabeled specimens were tracked and reported via laboratory electronic information log system in addition to the institution’s patient safety event reporting system.  -**Data abstraction period:**Pre: Data from 6 months period prior to the intervention implementation February- July 2011Intervention: August, 2011Post: April 2013-**Follow-up period:** 2 years | **- Number of Specimen/ labeling errors:** N: 1.8 millions in 2 years (1800000) or 75,000/mnth- **Findings/Effect Size:** Pre (July 2011): Labeling errors: 5.85/10 000 specimens = 0.058%Post: (April 2013)Labeling errors: 1.4/10 000 specimens = 0.014 %**ES:**Relative percent change in labeling errors: (post-pre/pre)X100=(0.01-0.11/0.11)X100%= -75.86 (-87.69, -52.64)Risk Ratio (RR): 0.0014/0.0058= 0.241(0.12, 0.47)Relative risk (% decrease) = (1 - RR) x 100 = (1-0.24) X 100%= 75.86%

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- **Statistical Significance/Test(s):** Statistically significant**- Results/conclusion biases:** None |
| **Quality Rating (10 point maximum):** 8 (Good)**Effect Size Magnitude Rating:** Significant | **Study (3 pts maximum): \_3\_\_**  | **Practice (2 pts maximum): 1** * Unlimited information on the variables related to practice implementation.
 | **Outcome measures (2 pts. maximum): \_1\_**  | **Results/findings (3 pts maximum): \_3\_** |
| **Bibliographic Information** **- Author (s)** **- Yr Published/Submitted** **- Publication** **- Author Affiliations** **- Funding**  | **Study** **- Design** **- Facility/Setting** **- Time Period** **- Population/Sample** **- Comparator** **- Study bias**  | **Practice** **- Description** **- Duration** **- Training** **- Staff/Other Resources** **- Cost**  | **Outcome Measures** **- Description (s)** **- Recording method**  | **Results/Findings** **- Number of Participants/ CVD events****- Findings/Effect Size** **- Stat. Significance/Test(s)** **- Results/Conclusion Bias**  |
| **3. Author(s):** Kim, et.al. **- Year:** 2013**- Title:** Standardized patient identification and specimen labeling: a retrospective analysis on improving patient safety**- Publication:** Journal of American Academy of Dermatology**- Affiliations:** Duke University Medical Center, Durham; and US Army MedicalCommand, San Antonio**- Funding:** None | - **Design:** Before and After **-Facility/Setting**: Duke University Medical Center Department of Dermatology/ Department of Dermatology**-Population/Sample:** General population/skin specimens- **Comparator:** Unexposed to the intervention**- Study bias:** None  | **-Description:** a safety committee was formed. Implementation of standardized specimen labeling protocol. 5-step clinical protocol was developed to standardize the specimen handling policy+ placing label printers in every examination room.- **Duration**: Not reported- **Staff involved to form multidisciplinary team:** Attending physicians, resident physicians, registered nurses, and certified medical assistants - **Associated** **Cost:** Not reported | **- Description:** **Specimen labeling error (Incorrectly labeled specimen):** any discrepancy between the paper requisition form and the label on the specimen container; absence of an appropriate label; absence of tissue; absence of a paper requisition; or incorrectly labeled anatomic site.**-Measure used:** calculated the monthly aggregated rates of specimen labeling events occurring with skin specimens processed through the department of pathology. The numerator of the error rate calculation included. Average monthly rate of specimen labeling events per 1000 specimens.-**Recording Method:** Electronic summary log**-Data abstraction period:**Pre: December 2008 through March 2010Intervention: April 2010.Post: June 2010 through September 2011**Follow-up period:** 1yr | **- Number of Specimen/ labeling errors:** Pre: N: 8,288Post: N= 9,072- **Findings/Effect Size:** Pre: Labeling errors: 5.79 events per 1000# of events: 48/8288 (0.579%)Post: Labeling errors: 3.53 events per 1000( 0.353%)**ES:**Relative percent change in labeling errors: (post-pre/pre)X100=-39.09 (-61.02, -4.83)RR: 0.609 (0.390, 0.952)Relative risk (% decrease) = (1 - .61) x 100 = (1-0.61) X 100%= 39%P = .002- **Statistical Significance/Test(s):** Statistically significant**- Results/conclusion biases:** None |
| **Quality Rating (10 point maximum):** 8 (Good) **Effect Size Magnitude Rating:** Minimal | **Study (3 pts maximum): \_3\_\_**  | **Practice (2 pts maximum): 1** The duration of intervention implementation was not repoted | **Outcome measures (2 pts. maximum): \_1\_**  | **Results/findings (3 pts maximum): \_3\_** |
| **Bibliographic Information** **- Author (s)** **- Yr Published/Submitted** **- Publication** **- Author Affiliations** **- Funding**  | **Study** **- Design** **- Facility/Setting** **- Time Period** **- Population/Sample** **- Comparator** **- Study bias**  | **Practice** **- Description** **- Duration** **- Training** **- Staff/Other Resources** **- Cost**  | **Outcome Measures** **- Description (s)** **- Recording method**  | **Results/Findings** **- Number of Participants/ CVD events****- Findings/Effect Size** **- Stat. Significance/Test(s)** **- Results/Conclusion Bias**  |
| **4. Author(s):** Rees, et.al. **- Year:** 2012**- Title:** Reducing SpecimenIdentification Errors**- Publication:** J Nurs Care Qual**- Affiliations:** University of Wisconsin Hospital and Clinics, Madison, Wisconsin- **Funding:** No Information provided | - **Design:** Before and After**-Facility/Setting**: University of Wisconsin Hospital and Clinics/ inpatient, ambulatory, and surgical services areas **-Population/Sample Type:** General patients from inpatient, ambulatory, and surgical services areas.- **Comparator:** Patients unexposed to the intervention**- Study bias:** None  | **-Description:** A collaborative performance improvement approach between nursing and the laboratory. A team was formed. The team agreed to meet every 2 weeks and to use a rapid cycle change process. The team created workflow chart to review 5 month data on specimen ID error and to determine that the intervention can vary in each area. The goal was to determine strategies that were effective in reducing specimen ID errors and that were acceptable and sustainable to staff.- **Duration:** two months **- Staff involved to form multidisciplinary team:** laboratory and quality departments and nurses from the 5 areas with the largest number of specimen identification errors- ED, 2 ICUs, an intermediate care unit, and a general care unit.- **Associated** **Cost:** Nor Reported | **- Description:** **Wrong identification:** Specimen labeling error **(**Specimen identification events) : **(**types included no label on the specimen, no patient identification on the request form, no request form, specimen labeled with 1 identifier only (patient name),and specimen and request form not matching (specimen labeled with wrong patient or request form labeled with wrong patient).**-Measure used**: # of Specimen identification events.**-Recording Method:** Organization’s error reporting system by staff from the laboratory.**-Data abstraction period:**Pre: May, 2007Intervention: Feb/March 2008Post: June 30, 2011-**Follow-up period:** 3 yrs | **- Number of Specimen/ labeling errors:** N: NR- **Findings/Effect Size:** Pre (2007) : Labeling errors: 197Post (2011)Labeling errors: 30**ES:**Relative percent change in labeling errors: (197-30/197) X 100%=  -84.77% (NK)Intervention led to 85% reduction in risk of labeling errors compared to the group without intervention. (also reported in the paper)

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- **Statistical Significance/Test(s):** Statistically significant**- Results/conclusion biases:** None |
| **Quality Rating (10 point maximum): 6 (Fair)** **Effect Size Magnitude Rating: Substantial** | **Study (3 pts maximum): \_2\_\_**  | **Practice (2 pts maximum): 1** | **Outcome measures (2 pts. maximum): \_1\_**  | **Results/findings (3 pts maximum): \_1\_**- Total number of specimen not reported-could not calculate statistical significance |

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| **Bibliographic Information** **- Author (s)** **- Yr Published/Submitted** **- Publication** **- Author Affiliations** **- Funding**  | **Study** **- Design** **- Facility/Setting** **- Time Period** **- Population/Sample** **- Comparator** **- Study bias**  | **Practice** **- Description** **- Duration** **- Training** **- Staff/Other Resources** **- Cost**  | **Outcome Measures** **- Description (s)** **- Recording method**  | **Results/Findings** **- Number of Participants/ CVD events****- Findings/Effect Size** **- Stat. Significance/Test(s)** **- Results/Conclusion Bias**  |
| **5. Author(s):** Shetterly et.al./ Pa Pateint\* **- Year:** 2011**- Title:** Pennsylvania Patient Safety Authority Blood Specimen Labeling Collaborative/ Reducing Errors in Blood Specimen Labeling: A Multihospital Initiative**- Publication:** American Society For Healthcare Risk Management**- Affiliations:** Pennsylvania Patient Safety Authority, Harrisburg, PA.- **Funding:** Information not provided\*Shetterly and Pa patient studies evaluated the same intervention on same population | - **Design:** Prospective cohort study (before and after)**-Facility/Setting**: Authority’s Pennsylvania Patient Safety ReportingSystem (PA-PSRS) : Eight acute care hospitals and one rehabilitation hospital/ entire facility while others chose smaller units such as an ED, progressive ICU, and medical ICU.**-Population/Sample Type:** All routine blood specimens from general patients- **Comparator:** Not reported**- Study bias:** None  | **-Description:** A multidisciplinary team was formed for each hospital. Training was provided about the event investigation. Education (coaching calls and workshops) was provided from. This training session included clinical scenarios and role-playing that allowed collaborative participants to gain familiarity with techniques related to respectful investigation of errors, gaining trust of staff, refraining from the use of individual blame, and using active listening skills.- **Duration:** August 2009 through May 2010**- Staff involved to form multidisciplinary team:** laboratory directors, phlebotomy supervisors, patient safety officers, and risk management, quality and performance improvement, and regulatory compliance personnel.- **Associated** **Cost:** Not provided  | **- Description:** **Type of labeling error:** Types of mislabeling included wrong, missing, incomplete, or illegible labels -**Measure:** : # of blood specimen labeling errors per 1,000 opportunities for errors**-Recording Method:** Each event report had to be classified and entered into PA-PSRS according to the appropriate/respective taxonomy listing **-Data abstraction period:**Pre: August-Oct, 2009Intervention: June 2009Post: August-October 2010-**Follow-up period:** 18 months | **- Number of Specimen/ labeling errors:** N; Not reported- **Findings/Effect Size:** Pre: Rate of Labeling errors: 0.50/1000 = 0.050%Post: Rate of Labeling errors: 0.21/1000 = 0.021%**-Effect Size:**Relative percent change in labeling errors: (post-pre/pre)X100=(0.01-0.11/0.11)X100%= - 58.0% (NK)Risk Ratio (RR): 0.021/0.050= 0.42 (0.003, 68.61)Relative risk (% decrease) = (1 - RR) x 100 = (1-0.42) X 100%= 58%(Overall, there was a 58% decrease in blood specimen labeling errors in the collaborative over the 18-month period (95% CI; p < 0.04).)-**Statistical Significance/Test(s):** Statistically significant**- Results/conclusion biases:** None |
| **Quality Rating (10 point maximum): 7 (Fair)** **Effect Size Magnitude Rating: Moderate**  | **Study (3 pts maximum): \_2\_\_** -Limited information about the comparator group | **Practice (2 pts maximum): 2**  | **Outcome measures (2 pts. maximum): \_2\_**  | **Results/findings (3 pts maximum): \_1\_****-**Total number of specimen not reported-could not calculate statistical significance |

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| **Bibliographic Information** **- Author (s)** **- Yr Published/Submitted** **- Publication** **- Author Affiliations** **- Funding**  | **Study** **- Design** **- Facility/Setting** **- Time Period** **- Population/Sample** **- Comparator** **- Study bias**  | **Practice** **- Description** **- Duration** **- Training** **- Staff/Other Resources** **- Cost**  | **Outcome Measures** **- Description (s)** **- Recording method**  | **Results/Findings** **- Number of Participants/ CVD events****- Findings/Effect Size** **- Stat. Significance/Test(s)** **- Results/Conclusion Bias**  |
| **6. Author(s):** O’Neil, et.al. **- Year:** 2009**- Title:** Adherence to a Blood Bank Specimen Labeling Policy by All Clinical Laboratories Significantly Reduces the Incidence of “Wrong Blood in Tube”**- Publication:** American Society for Clinical Pathology**- Affiliations:** Department of Pathology, Beth Israel Deaconess Medical Center, Boston, MA.- **Funding:** Information not reported | - **Design:** Before and After study design **-Facility/Setting**: Beth Israel Deaconess Medical Center, Boston, MA/ all clinical laboratories and blood bank**-Population/Sample Type:** All routine blood specimens- **Comparator:** Before exposure to the intervention**- Study bias:** None  | **-Description:** A multi-disciplinary team was formed which developed a policy that required the collection date, 2 unique patient identifiers, and the ability to identify the phlebotomist. - **Duration: over** 4 months period- **Staff involved to form multi-disciplinary team:** clinical managers from the pathology department.- **Associated** **Cost:** Total cost for phlebotomists’ educational initiative S 4,139, but no overall cost | **- Description:** **Wrong identification:** Specimen labeling error **(**mislabeled specimens received by the clinical laboratories):specimens that do not meet hospital specimen-labeling requirements**Measure used:** Rate of mislabeled specimens received by the clinical laboratories during post policy period)**Recording Method:** To estimate the rate of during post policy period, the total number of mislabeled specimens for calendar year 2006 was extracted from these incident reports and compared with the total number of test requisitions received during the same period.**Data abstraction period:**Pre: October 2001-september 2004Intervention: July-September (educational)October 1, 2004 (policy)Post: October 2004-september 2007-**Follow-up period:** 3 yrs | **- Number of Specimen/ labeling errors:** Pre: N: 106,174Post: N= 104,860- **Findings/Effect Size:** Pre: Labeling errors: n (%)28 (0.026%)Post: Labeling errors: n (%)4(0.004%)**ES:**Relative percent change in labeling errors: (post-pre/pre)X100=(4-28/28)X100%= -85.71(-94.9, -58.8) Risk Ratio (RR): 0.145 (0.051, 0.412)Relative risk (% decrease) = (1 - RR) x 100 = (1-0.145) X 100%= 85.5%Intervention led to 85.5 % reduction in risk of labeling errors compared to the group without intervention.- **Statistical Significance/Test(s):** Statistically significant**- Results/conclusion biases:** None |
| **Quality Rating (10 point maximum): 7 (Fair)** **Effect Size Magnitude Rating: Substantial**  | **Study (3 pts maximum): \_2\_\_** - | **Practice (2 pts maximum): 1** -No overall associate costs described  | **Outcome measures (2 pts. maximum): \_2\_**  | **Results/findings (3 pts maximum): \_2\_****-**it was difficult to tease out the results from all clinical labs from the blood bank settings |
| **Bibliographic Information** **- Author (s)** **- Yr Published/Submitted** **- Publication** **- Author Affiliations** **- Funding**  | **Study** **- Design** **- Facility/Setting** **- Time Period** **- Population/Sample** **- Comparator** **- Study bias**  | **Practice** **- Description** **- Duration** **- Training** **- Staff/Other Resources** **- Cost**  | **Outcome Measures** **- Description (s)** **- Recording method**  | **Results/Findings** **- Number of Participants/ CVD events****- Findings/Effect Size** **- Stat. Significance/Test(s)** **- Results/Conclusion Bias**  |
| **7. Author(s):** Forsberg, et.al. **- Year:** 1996**- Title:** Infant Metabolic Screening: A Total Quality Management Approach**- Publication**: JOGNN PRINCIPLES & PRACTICE**- Affiliations:** Memorial Regional Hospital in Hollywood, FL**.**- **Funding: Information not reported** | - **Design:** **-Facility/Setting**: Hollywood, Florida/ Memorial Regional Hospital in Hollywood, Florida**-Population/Sample Type:** Pediatric (infant screening for PKU)- **Comparator:** Before exposure to the intervention**- Study bias:** Generalizability limitations as the included population is restricted to infants only. | **-Description:** The laboratory team identified and developed a list of all of the problems with the infant screening process. Education + policy: Staff members with multiple poor quality specimens were targeted initially and retrained, using videos and demonstrations by peers who had made no errors in collection. The laboratory team member worked with peers to establish a process to check specimen slips for missing collection dates.- **Duration:** NR - **- Staff involved to form multidisciplinary team:** The team consistedof representatives from a number of departments, including postpartum, level I nursery, the neonatal ICU, the pediatric primary care clinic, medical records, laboratory, nursing quality improvement coordinator, the director of obstetric nursing, and mail room. - **Associated** **Cost**: Not reported | **- Description:** **Wrong identification:** Specimen labeling error **:** Specimens missing information on specimen label (specimen collection date)**-Measure used:** % specimen labeling error rate**-Recording Method:** Not clear**-Data abstraction period:**Pre: Before the interventionIntervention: 1992 (assume)Post: 1995-**Follow-up period:** 3 yrs | **- Number of Specimen/ labeling errors:** N:4,000- **Findings/Effect Size:** Pre (1992): Labeling errors: 2.6% Post(1995): Labeling errors: 0.5%.**ES:**Relative percent change in labeling errors: (post-pre/pre)X100=(0.01-0.11/0.11)X100%= -90.89 (-97.86, -61.14)

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- **Statistical Significance/Test(s):** Statistically significant**- Results/conclusion biases:** None |
| **Quality Rating (10 point maximum): 6 (Fair)** **Effect Size Magnitude Rating: Substantial** | **Study (3 pts maximum): \_2\_\_**  | **Practice (2 pts maximum): 2** | **Outcome measures (2 pts. maximum): \_1\_** -data collection methods are not clearly described | **Results/findings (3 pts maximum): \_1\_**N provided only for baseline data-Only percentage data provided-statistical significance calculated assuming same no of births at both periods of times |