Lehigh Valley Health Network

LVHN Scholarly Works

Evaluating Blood Culture Contamination Rates Associated with a Newly Inserted Peripheral Intravenous (IV) Catheter

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Introduction

- Blood culture contamination (BCC) is an urgent issue facing patient care
  - Financial costs – $12,824/patient increase in patients with BCC[5]
  - Length of stay – 2.35 days longer[3]
  - Increased antibiotic exposure – Unnecessary negative effects (allergic reactions, drug-drug interactions, antibiotic resistance etc.)[2]
- Studies show divided opinions on the impact of a newly inserted peripheral IV (±1 hour) on BCC[1]
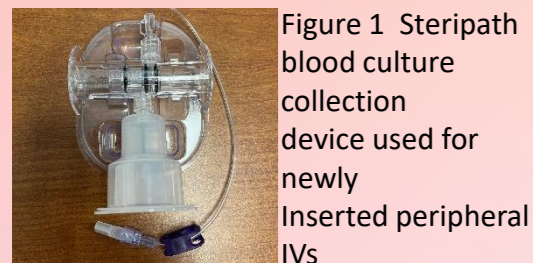

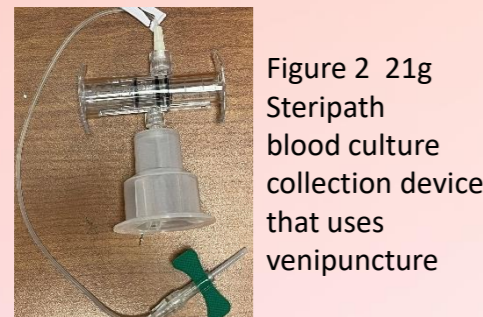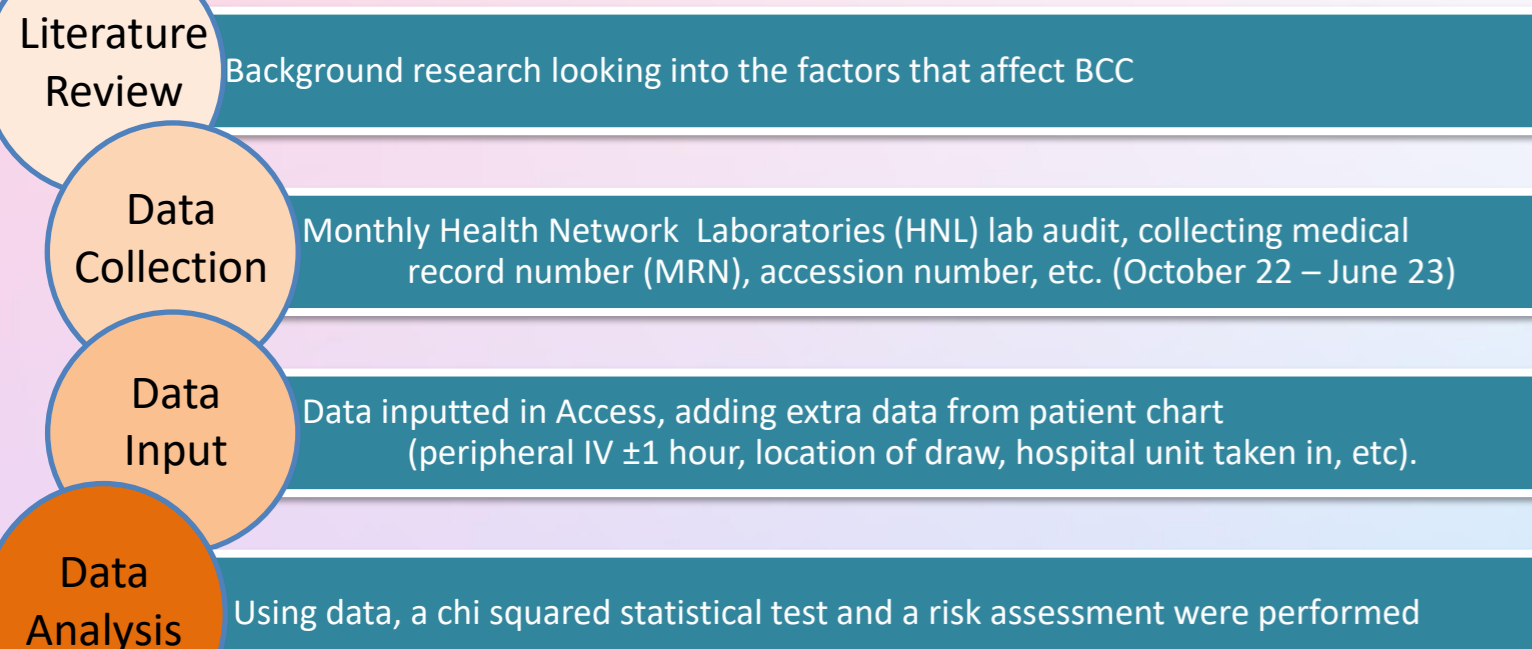Figure 1 Steripath blood culture collection device used for newly Inserted peripheral IVs

Figure 2 21g Steripath blood culture collection device that uses venipuncture

Figure 3 23g Steripath blood culture collection device that uses venipuncture

Objective - The purpose of this study is to evaluate the rate of BCC associated with the drawing blood cultures from a newly inserted peripheral IV, compared to other methods, specifically in the emergency department

Methods

- **Literature Review** — Background research looking into the factors that affect BCC
- **Data Collection** — Monthly Health Network Laboratories (HNL) lab audit, collecting medical record number (MRN), accession number, etc. (October 22 – June 23)
- **Data Input** — Data inputted in Access, adding extra data from patient chart (peripheral IV ±1 hour, location of draw, hospital unit taken in, etc).
- **Data Analysis** — Using data, a chi squared statistical test and a risk assessment were performed

Results

- 43,821 total blood cultures (October 22 – June 23)
  - 4,147 positive blood cultures (9.2%)
    - 963 contaminated blood cultures (2.2%)
- 759 positive blood cultures collected from HNL audits
  - 605 collected in the ED (79.7%)
    - 164 peripheral IV (21.6%)
- Contamination based on single presence of any organism on the National Healthcare Safety Network (NHSN) list of common commensals (2023)
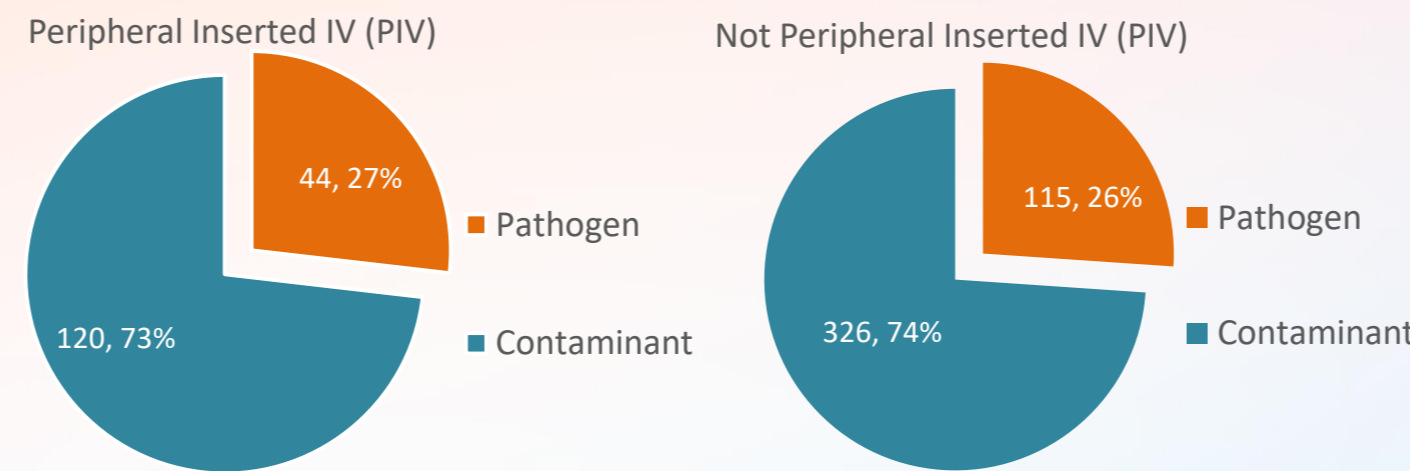

Peripheral Inserted IV (PIV)
44, 27% Pathogen
120, 73% Contaminant
Figure 4 BCC rate for PIV blood cultures

Not Peripheral Inserted IV (PIV)
115, 26% Pathogen
326, 74% Contaminant
Figure 5 BCC rate for non-PIV blood cultures

BCC Rates by Location
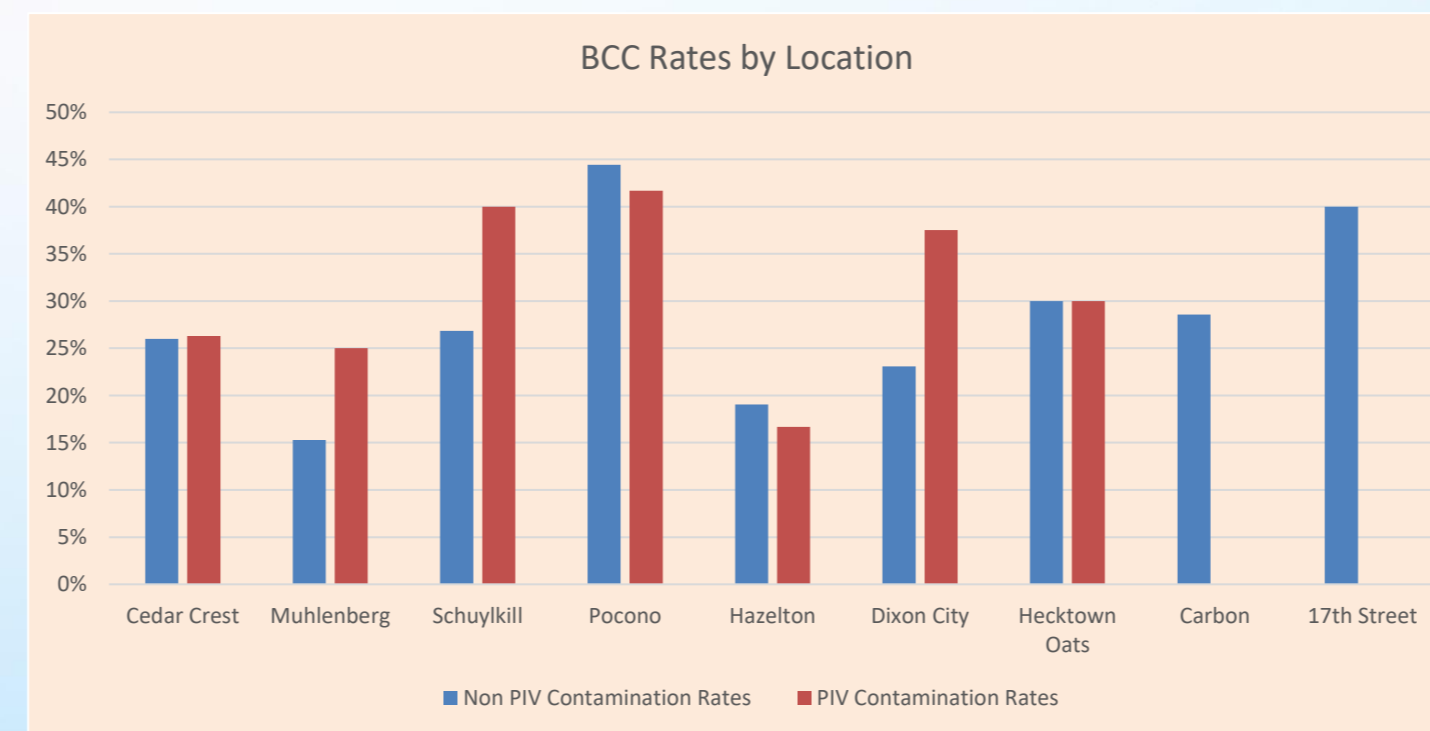Non PIV Contamination Rates · PIV Contamination Rates
Figure 6 BCC rates for both PIV blood cultures and non-PIV blood cultures by location

Conclusion

- **No association** found between the taking of a blood culture from a PIV versus other methods in the overall data
  - X^2 statistic test performed on this data (X^2 =0.035, P=.8517)
  - Risk assessment showed that patients who have PIV blood cultures were only 1.02 times more likely than those whose blood was drawn with other methods of taking blood cultures.
- X^2 statistical test was also performed on each individual location with none proving statistically significant (p>.05)
- Further research could look into other factors that affect BCC to help keep LVHN under the suggested 3% contamination rate, as per the Clinical and Laboratory Standards Institute[4].

Limitations

- Unable to get rid of all duplicate accession numbers, lack of documentation to indicate PIV utilized for blood draw, other contributing factors could have led to BCC independent to PIV use
- Assume steripath device was used, no certainty. No documentation required
- EPIC glitch resulted in lack of site identification for 2 months (April-May)
- Only sample of 100 from each month, not full population

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