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## Introduction

- In October 2011, a Health Maintenance Organization (HMO A) noted a cluster of 11 outpatients since July with vascular access-related bloodstream infections (VABSI) associated with one hemodialysis provider (HDP X) operating clinics in adjacent California counties
- HMO A reported case-patient descriptions of questionable practices involving arteriovenous fistula (AVF) buttonhole (BH) cannulations
  - BH are created over repeated cannulations until formation of scar tissue in the track; when healed, blunt needles are used to access the AVF at the same site each time to reduce pain; scab removal prior to each cannulation is important to prevent infections
- Local and state public health agencies were notified

## Investigation Objectives

- Review laboratory data to determine rates of VABSI in adjacent California counties utilizing HDP X centers for outpatient hemodialysis (HD)
- Observe and identify breaches in infection control practices
- Provide recommendations to identify and prevent future cases

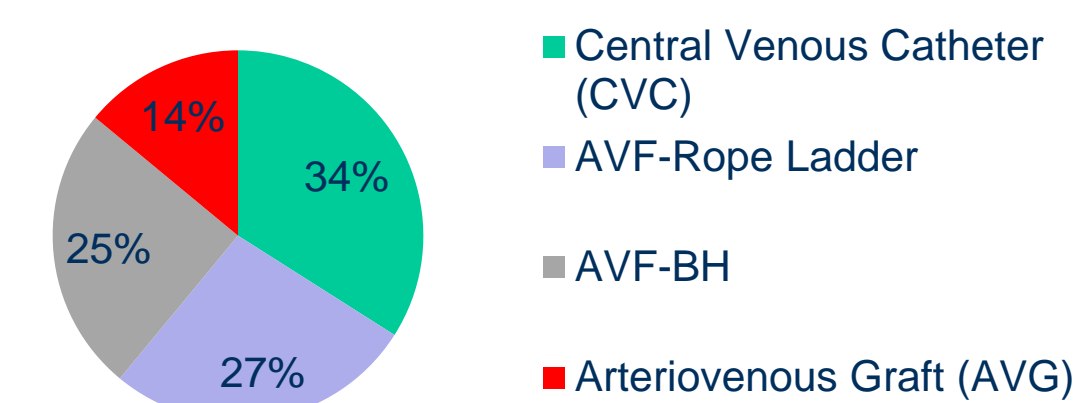
## Methods

- Patient census by vascular access type and blood culture data obtained from HMO A and non-HMO A outpatients utilizing HDP X centers in two adjacent California counties from January 1 – October 31, 2011
- VABSI rates calculated and compared with Centers for Disease Control and Prevention (CDC) unpublished national rates
- Rate ratios and 95% Confidence Intervals (CI) calculated and compared using OpenEpi.com® for the time periods:
  - Baseline: January – June 2011
  - Investigative period: July – October 2011
- Unannounced site visits to HDP X centers from November 2011 – February 2012 conducted to observe infection control practices utilizing CDC HD audit tools
- Recommendations provided

## Results

- Eight HDP X centers servicing HMO A were included:
  - Overall outpatient census by month was 686.5

**Figure. Percentage HD Outpatients by Access Type**



- 35% HMO A outpatients
- Reconciliation of blood culture data from HMO A, HDP X's laboratory and two independent laboratories took four months
- VABSI rates ranged from 0-0.19/100 patient-months

**Table. VABSI Rates by Access Type for HDP X Outpatients from January–October 2011 compared to 2007–2011 National Rates**

Vascular Access Type	AVF Cannulation Practices	HDP X Centers of VABSIs/100 patient-months	Range by HDP X Center/100 patient-months	National Rate of VABSIs/100 patient-months
CVC (n=2378)		0.12	0.04-0.29	2.52
AVF				0.23
	Rope Ladder (n=1849)	0.05	0.02-0.85	
	BH (n=1758)	0.09	0.02-0.23	
AVG (n=960)		0.01	N/A	0.51

- A significantly higher VABSI rate was observed in the investigative period compared to the baseline period (0.26 vs. 0.11; Rate Ratio 2.39; 95% CI 1.40-4.07)
- In the investigative period, for HMO A outpatients only, those with CVCs had a 13 times higher rate of infection than those without CVCs ( $P < 0.001$ ; Rate Ratio 13.63; 95% CI 5.29 – 36.08).
- Infection control audits were conducted at three HDP X centers.
  - The following procedures and breaches were observed:
    - 32 AVF/AVG cannulation procedures – 6 breaches
    - 15 AVF/AVG disconnect procedures – No breaches
    - 4 CVC access and disengage – No breaches
    - 2 CVC exit site care – No breaches
  - AVF/AVG cannulation breaches included lack of 'clean-to-dirty' awareness, hand hygiene compliance and incomplete cleaning of patient care stations.
- Environmental sanitation and disinfection observations did not reveal breaches.

## Limitations

- Site visit observations by public health were constrained due to three simultaneous audits in the same HDP X centers which caused disruption of regular patient care practices:
  - HMO A regional renal case managers audit and assessment of HMO A outpatients access sites
  - CMS surveyors
  - HDP X internal auditing by regional clinical specialists
- CVC exit care was not a focus of site visit observations
  - Epidemiologic data was still being collected that later showed an association between CVCs and VABSI

## Conclusion

- Although there is a concerted national effort to increase the use of AVF/AVGs and decrease CVCs, CVCs were the most common form of access in these outpatient HD centers.
- Although VABSI rates for these HDP X centers were low overall compared to national rates, there was an increase in VABSI rates during the investigative period associated with patients with CVCs; however, no CVC breaches were observed.
- Recommendations included improved infection surveillance by HDP X according to vascular access type with ongoing notification and review of blood culture results from all laboratories for timely detection and response to VABSIs in HDP X outpatients.

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