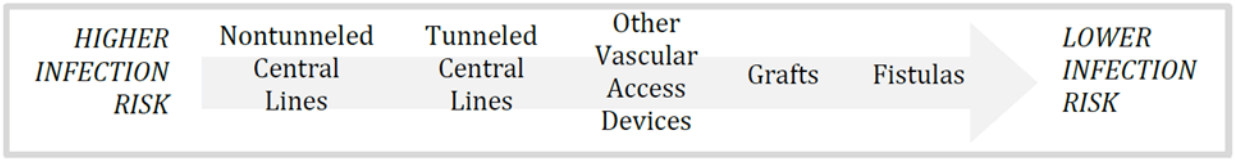
Attach a conceptual model that illustrates the pathway between the social and/or functional status-related risk factors, patient clinical factors, quality of care, and the measured outcome. Please explain the rationale for the model. *

Consider age, gender, race/ethnicity, urbanicity/rurality, Medicare/Medicaid dual eligibility status, indices of social vulnerability (e.g., Centers for Disease Control and Prevention Social Vulnerability Index), and markers of functional risk in the conceptual model. If social and/or functional risk factors are not available but are included in the conceptual model, consider potential bias in the risk model, and describe its direction and magnitude. Address the validity of the measure in light of this bias.

Attachments (word, pdf)

The only risk factor we included in the SIR is access type. The below conceptual model shows how infection risk increases based on access type. The next table shows the beta weights which you can use to calculate the predicted number of events and then we provide a description of how to calculate the SIR.



Parameter	*	Estimate	Standard Error	Wald 95% Confidence Limits[CL((1]	Wald 95% Confidence Limits	Wald Chi-Square	Pr > ChiSq
Intercept	*	-5.9332	0.0156	-5.9638	-5.9025	143934	<.0001
Access type	Other	0.5642	0.1249	0.3194	0.809	20.41	<.0001
*	Graft	0.4179	0.0263	0.3665	0.4694	253.47	<.0001
*	CVC	2.1379	0.0201	2.0984	2.1773	11273.6	<.0001
*	Fistula	0	0	0	0	.	.

*This cell is intentionally left blank

The following formula was used to derive the predicted BSI events:
Logit(BSI)={-5.9332 + (.5642*(AccessType="Other")) + (.4279*(AccessType="Graft"))+ (2.1379*(AccessType="CVC"))}

Predicted(BSI)=Exp(Logit(BSI)) * Number of Patient Months

The model was developed using SAS 9.4 with fistula access as the referent group and ln of patient month used as the models offset.

Reference: Nguyen DB, Shugart A, Lines C, Shah AB, Edwards J, Pollock D, Sievert D, Patel PR. National Healthcare Safety Network (NHSN) Dialysis Event Surveillance Report for 2014. Clin J Am Soc Nephrol. 2017 Jul 7;12(7):1139-1146. doi: 10.2215/CJN.11411116. Epub 2017 Jun 29. PMID: 28663227; PMCID: PMC5498356

For calculation of the SIR, the only risk adjustment performed is stratification of rates by vascular access type. This stratification accounts for direct contributions to risk impacted by the access type and may also account for other factors correlated with vascular access type. Within each stratified category of patient-vascular access type, risks of bloodstream infection are more consistent and more dependent upon practices related to vascular access.

The SIR is calculated as the number of observed infections divided by the number of predicted infections.

$$SIR = \frac{Observed\ (O)\ BSIs}{Predicted\ (P)\ BSIs}$$

The number of predicted infections may alternately be calculated using a negative binomial regression model generated from the nationally aggregated 2014 data that produced the stratified rates mentioned above. The model below represents another statistical method for calculating each facility's predicted number of infections.

Note: The access device reported may not be the one currently used for dialysis. The risk levels for each access type are shown below. Data is reported using the vascular access type that is in place with the highest risk of infection. This access type with the highest risk of infection is used for analysis.