Date ___/___/2011 Reviewer's Name: _____

Form 6
Data Validation Findings

Validation results can be displayed using 2x2 tables and the accuracy and completeness of HAI surveillance and reporting can be calculated. Quantitative findings of data validation include sensitivity, specificity, and positive predictive value (defined below).

		Validation Review ("Gold Standard" or truth)	
		HAI	Not an HAI
Routine Hospital Surveillance	HAI	True positives	**False positives**
	Not an HAI	**False negatives**	True negatives

Positive Predictive Value (PPV) =

$$\frac{\text{True positives}}{\text{True positives + False positives}} \times 100$$

Sensitivity =

$$\frac{\text{True positives}}{\text{True positives + False negatives}} \times 100$$

Specificity =

$$\frac{\text{True negatives}}{\text{True negatives + False positives}} \times 100$$

Positive Predictive Value (PPV)

- Also called the precision rate.
- For HAI surveillance, PPV is the proportion of HAI reported that met the case definition.
- If PPV is high, it means the identified and reported HAIs really *are* HAIs.
- Measures **accuracy** in applying surveillance definitions and/or protocols.

Sensitivity

- Answers question "How likely are all true infections found?
- For HAI surveillance, sensitivity is defined as the proportion of HAIs identified and reported from the total of all patients who had an HAI.
- If sensitivity is low, it means HAIs were missed. The hospital's HAI rate could be higher than what is being reported.
- Measures **completeness** and implies effective surveillance methods.

Specificity

- Answers question "How likely are patients without an infection accurately identified as not having an infection?"
- For HAI surveillance, specificity is defined as the proportion of HAIs not reported from the total of all patients who did not have an HAI.
- If specificity is low it means not all the HAIs reported were actually HAIs. The hospital's HAI rate may actually be lower than what is being reported.

Example

Positive urine cultures reviewed for CAUTI validation = **100**		Validation Review ("Gold Standard" or truth)	
		CAUTI	No CAUTI
Routine Hospital Surveillance	CAUTI **10**	8	**2** Reported in error
	No CAUTI **90**	**3** Missed	87

Positive Predictive Value (PPV) =

$$\frac{8 \text{ True positives}}{8 \text{ True pos.} + 2 \text{ False pos.}} \times 100$$

80%

Sensitivity =

$$\frac{8 \text{ True positives}}{8 \text{ True pos.} + 3 \text{ False neg.}} \times 100$$

73%

Specificity =

$$\frac{87 \text{ True negatives}}{7 \text{ True neg.} + 2 \text{ False pos.}} \times 100$$

98%

Interpretation:

For the 100 urine cultures reviewed for CAUTI, the validation reviewers found **5** disparities.

The hospital had identified and reported 10 CAUTI. The validation reviewers determined only 8 should have been reported; **2** did not meet the surveillance criteria.

The calculated **positive predictive value (PPV)** reveals that what routine hospital surveillance identifies as CAUTI meets the CAUTI surveillance criteria only 80% of the time.

For the other 90 positive urine cultures reviewed in which routine hospital surveillance identified no CAUTI, the validation reviewers identified **3** additional CAUTI.

The calculated **sensitivity** reveals routine hospital surveillance is identifying only 73% of the CAUTI occurring.

The calculated **specificity** reveals hospital routine surveillance accurately "rules out" CAUTI 98% of the time.

Data Validation for *C. difficile* Infections

Surveillance ime period: _____

From CDI Events Table, Form 2		Validation Review	
Number of positive specimens in review = _____		**CDI**	**No CDI**
Routine Hospital Surveillance	**CDI ____** *Form 2, total Q1=Yes*	**A**	**B** *Reported in Error*
	No CDI ____ *Form 2 , total Q1 = No*	**C** *Missed*	**D**

Sensitivity = $\frac{A}{A + C}$ X 100 = _____

Specificity = $\frac{D}{D + B}$ X 100 = _____

Positive Predictive Value = $\frac{A}{A + B}$ X 100 = _____

Data Validation for MRSA Bloodstream Infections

Surveillance time period: _____

From MRSA Events Table, Form 3

Number of MRSA+ blood cultures in review = _____

		Validation Review	
		MRSA BSI	**No MRSA BSI**
Routine Hospital Surveillance	**MRSA BSI** ____ ***Form 3, M total Q1 = Yes***	**A**	**B** ***Reported in Error***
	No MRSA BSI ____ ***Form 3, M total Q1 = No***	**C** ***Missed***	**D**

Sensitivity = $\frac{A}{A + C}$ X 100 = _____

Specificity = $\frac{D}{D + B}$ X 100 = _____

Positive Predictive Value = $\frac{A}{A + B}$ X 100 = _____

Data Validation for VRE Bloodstream Infections

Surveillance time period: _____

From VRE Events Table, Form 3

Number of VRE+ blood cultures in review = _____

		Validation Review	
		VRE BSI	**No VRE BSI**
Routine Hospital Surveillance	**VRE BSI ____** *Form 3, V total Q1 = Yes*	**A**	**B** *Reported in Error*
	No VRE BSI ____ *Form 3, V total Q1 = No*	**C** *Missed*	**D**

Sensitivity = $\frac{A}{A + C}$ X 100 = _____

Specificity = $\frac{D}{D + B}$ X 100 = _____

Positive Predictive Value = $\frac{A}{A + B}$ X 100 = _____

Data Validation for CLABSI

Surveillance time period: _____

From BSI Events Table, Form 4

Number of positive blood culture "clusters" = _____

		Validation Review	
		CLABSI	**Not CLABSI**
Routine Hospital Surveillance	**CLABSI ____** *Form 4, total Q1 = Yes*	**A**	**B** *Reported in Error*
	Not CLABSI ____ *Form 4 total Q1 = No*	**C** *Missed*	**D**

Sensitivity = $\frac{A}{A + C}$ X 100 = _____

Specificity = $\frac{D}{D + B}$ X 100 = _____

Positive Predictive Value = $\frac{A}{A + B}$ X 100 = _____