

# Appropriate Vancomycin Level Collection in CVICU

CS&E Project

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*November 10, 2016*

## Result Summary

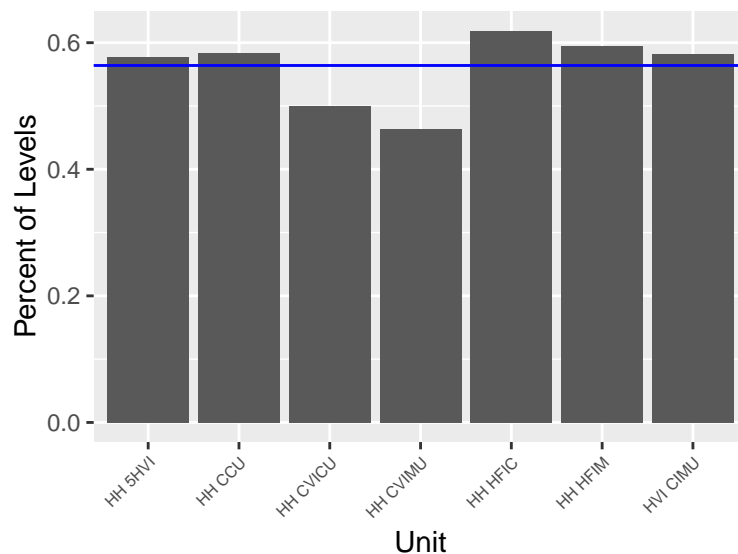


Figure 1: Appropriately Collected Vancomycin Levels

- Blue line represents HVI average

`## Warning: Removed 301 rows containing non-finite values (stat_boxplot).`

## Raw Data

Table 1: Raw Data for HVI and CVICU

	HVI	CVICU
n	1886	448
not_collected = TRUE (%)	295 (15.6)	113 (25.2)
timely90 = TRUE (%)	1189 (63.0)	258 (57.6)
timely60 = TRUE (%)	1044 (55.4)	224 (50.0)
timely30 = TRUE (%)	775 (41.1)	166 (37.1)
collect_detail_diff (mean (sd))	105.78 (387.53)	64.13 (233.15)
priority (%)		
- Add-on	12 ( 0.8)	1 ( 0.3)
- Add-on ST	18 ( 1.1)	2 ( 0.6)
- Routine	429 (26.9)	127 (37.8)
- Stat	445 (27.9)	70 (20.8)
- Timed Study	693 (43.4)	136 (40.5)

	HVI	CVICU
shift = night (%)	838 (44.6)	200 (44.7)

## Orders Placed by Vancomycin Request

Table 2: Orders by Vancomycin Request

	HVI	CVICU
n	181	40
shift = night (%)	48 (26.5)	9 (22.5)

## Exploration of CVICU Levels

### By Shift

Table 3: Vancomycin Levels in CVICU by Nursing Shift

	day	night	p
n	247	200	
appropriate = TRUE (%)	104 (42.1)	120 (60.0)	<0.001
not_collected = TRUE (%)	98 (39.7)	15 (7.5)	<0.001

### By Month

Table 4: Vancomycin Levels in CVICU by Month

	2016-04-01	2016-05-01	2016-06-01	2016-07-01	2016-08-01	2016-09-01	p
n	96	68	71	77	45	77	
appropriate = TRUE (%)	39 (40.6)	28 (41.2)	36 (50.7)	45 (58.4)	25 (55.6)	44 (57.1)	0.159
not_collected = TRUE (%)	31 (32.3)	24 (35.3)	18 (25.4)	15 (19.5)	8 (17.8)	16 (20.8)	0.069
shift = night (%)	48 (50.0)	33 (48.5)	27 (38.0)	36 (46.8)	16 (35.6)	34 (44.2)	0.647

### By Day of Week

Table 5: Vancomycin Levels in CVICU by Day of Week

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	p
n	77	59	64	55	56	67	69	
appropriate = TRUE (%)	37 (48.1)	27 (45.8)	33 (51.6)	27 (49.1)	29 (51.8)	35 (52.2)	36 (52.2)	0.987
not_collected = TRUE (%)	23 (29.9)	16 (27.1)	12 (18.8)	18 (32.7)	13 (23.2)	17 (25.4)	14 (20.3)	0.536
shift = night (%)	30 (39.0)	32 (54.2)	33 (51.6)	24 (43.6)	24 (42.9)	26 (38.8)	31 (44.9)	0.486

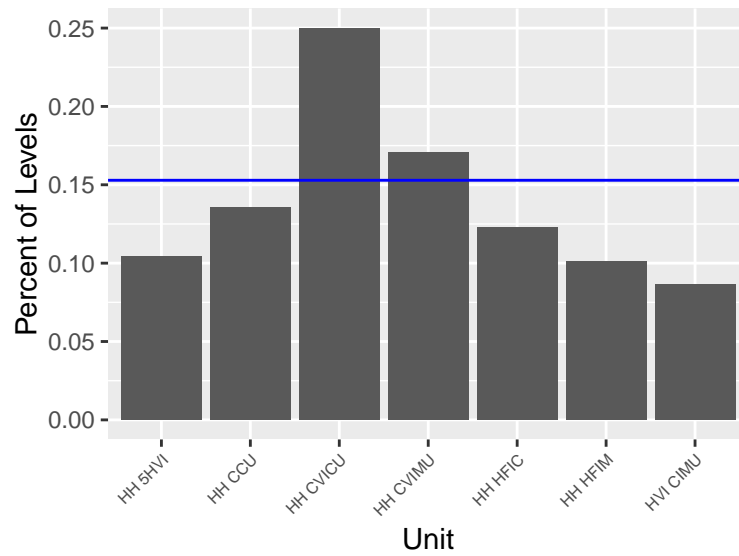


Figure 2: Vancomycin Levels Ordered But Not Collected

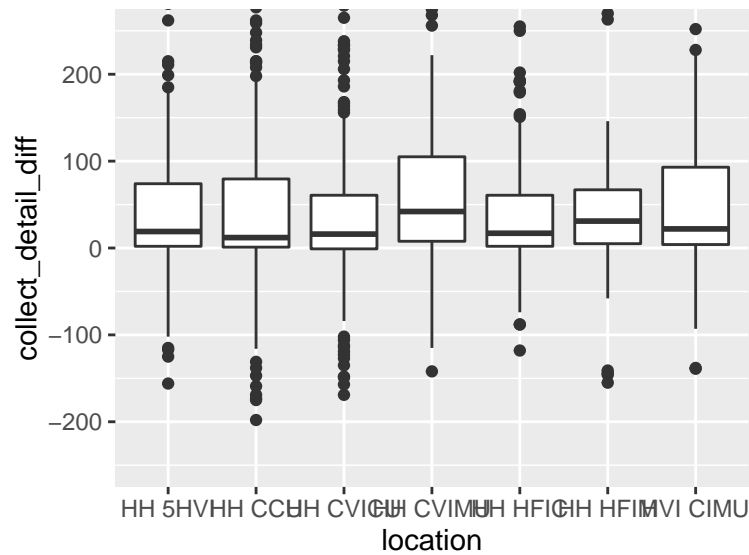


Figure 3: Time Difference Between Scheduled and Actual Level Collection

## By Hour of Day

`## Warning: Removed 1 rows containing non-finite values (stat_count).`

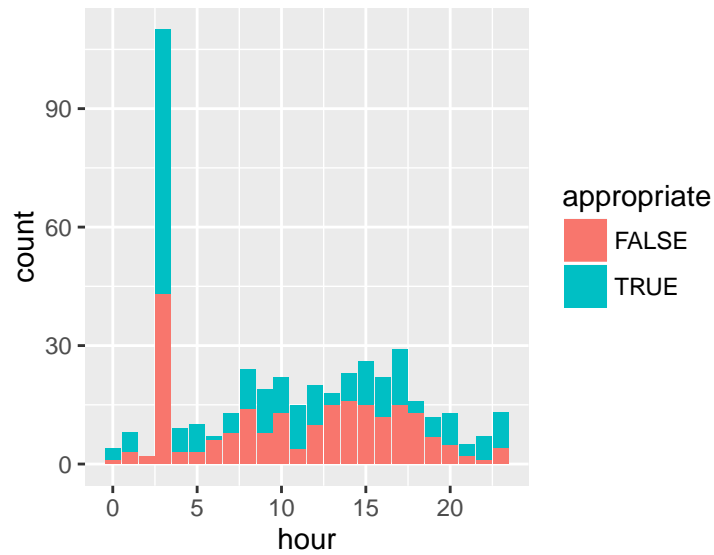


Figure 4: Appropriately vs. Inappropriately Collected Levels by Hour of Day

`## Warning: Removed 1 rows containing non-finite values (stat_count).`

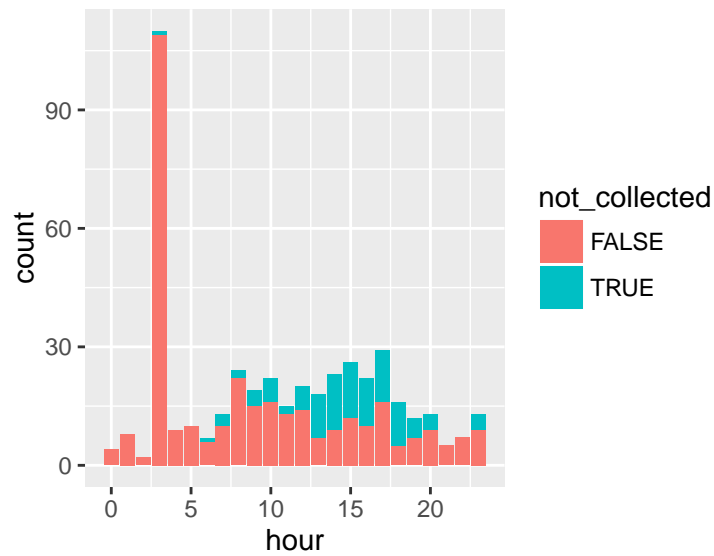


Figure 5: Collected vs. Un-Collected Levels by Hour of Day

## Timing

Distribution of difference between desired draw time and actual draw time.

`## Warning: Removed 114 rows containing non-finite values (stat_density).`

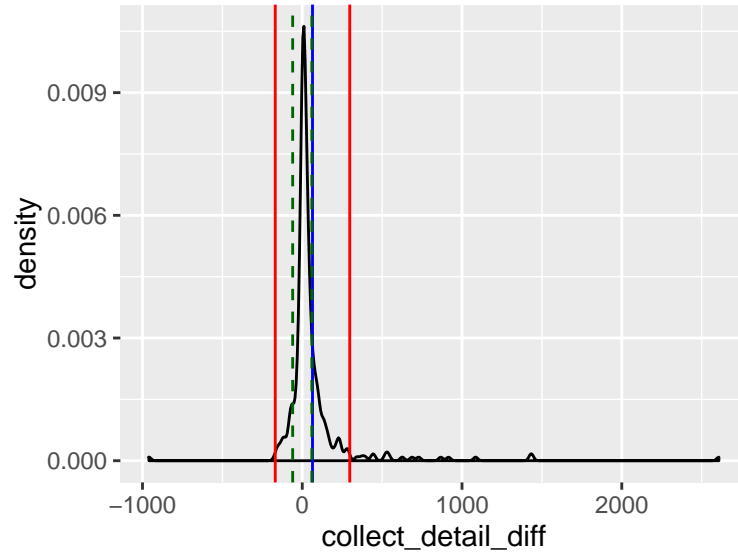


Figure 6: Distribution of Time Difference Between Desired and Actual Collection

- Blue line represents mean
- Red lines represent standard deviation
- Green dashed lines represent 60 minutes

#### Remove extreme outliers

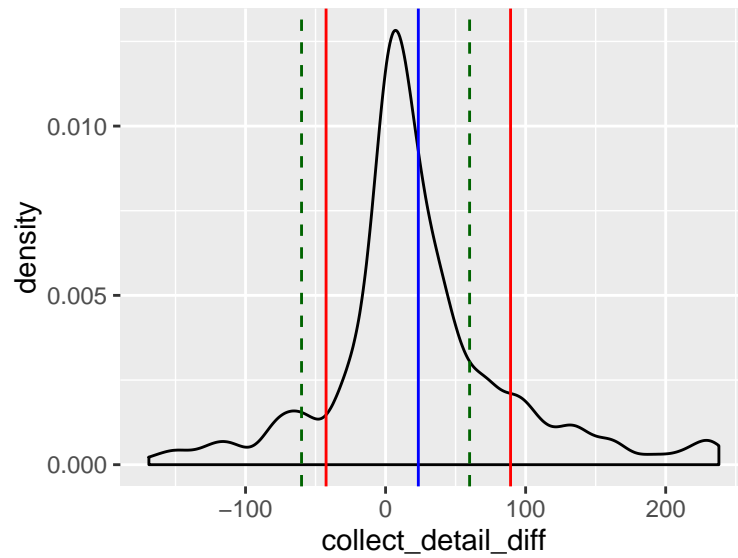


Figure 7: Distribution of Time Difference Without Outliers

Relationship between how far in advance the level was ordered, and how close to desired draw time the level was actually drawn.

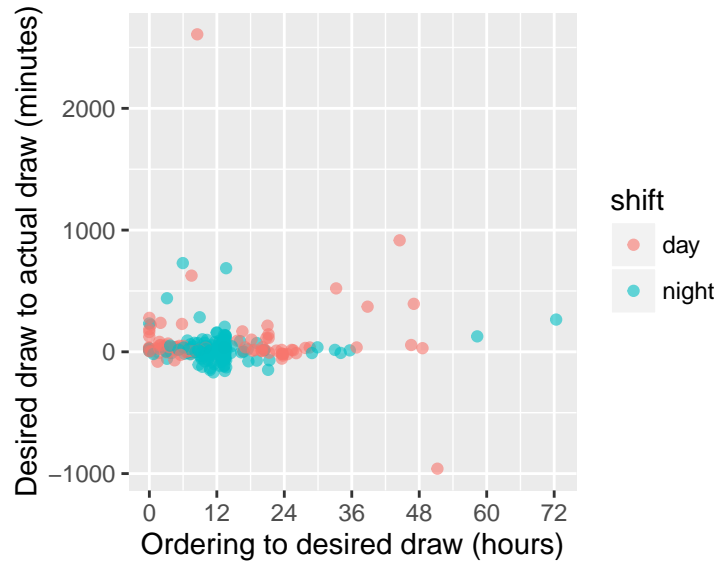


Figure 8: Time from order to draw vs. time to actual draw

### Time Differences

Time (in minutes) between when levels was scheduled to be drawn and when it was actually drawn.

### By Shift

## Warning: Removed 114 rows containing non-finite values (stat\_boxplot).

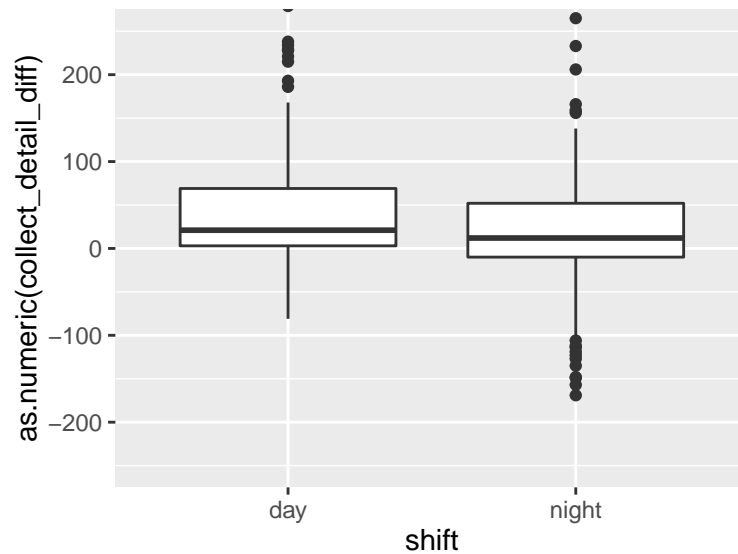


Figure 9: Time Difference Between Scheduled and Actual Level Collection

```
##
## Welch Two Sample t-test
##
```

```
## data: collect_detail_diff by shift
## t = 1.812, df = 226.61, p-value = 0.07131
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## -4.273111 101.978680
## sample estimates:
## mean in group day mean in group night
## 91.18792 42.33514
```

## Notes

- There are automatic vancomycin requests created by a Discern Advisor
  - Unclear where this is generated from
  - Request detail was usually several days prior to the order date
- Levels ordered as Early AM generate a child order with a scheduled time of 0300 the following day
  - The parent Early AM order was removed from this analysis due to an invalid scheduled collection time