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---
title: "QualDash"
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date: "10 December 2020"
output: html_document
editor_options:
  chunk_output_type: console
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```{r setup, include=FALSE}
knitr::opts_chunk$set(echo = TRUE)
```

```{r Load libraries}
setwd("D:/Docs/Research/RebeccaRandell")
#
library(Hmisc)
library(rms)
library(ggplot2)
library(dplyr)
library(tidyr)
library(tidyverse)
library(finalfit)
```

```{r Read data for PICU Site A}
picuA <- read.csv("picuA.csv")
names(picuA)[1] <- "Month"
```

```{r Calculate proportion for PICU Site A}
picuA$Proportion.Ad.Precise <-
picuA$AdTime.Precise/picuA$AdTime.Completed
mean.propn <-  mean(picuA$Proportion.Ad.Precise)
picuA$Proportion.Dis.Precise <-
picuA$DisTime.Precise/picuA$DisTime.Complete
```

```{r Plot for PICU Site A}
# ggplot(data = picuA, aes(x = Month.number, y =
Proportion.Ad.Precise)) + geom_point() + geom_line() +
geom_hline(yintercept=mean.propn, color = "red")
```

```{r Regression precise admission for PICU Site A}
model <- glm(cbind(AdTime.Precise, AdTime.Imprecise) ~ QualDash,
data = picuA, family = binomial())
summary(model)
picuA$expected <- predict(model, type = "response")
ggplot(data = picuA, aes(x = Month.number, y =
Proportion.Ad.Precise)) + geom_point() + geom_line(colour = "grey")
+ geom_line(data = picuA, aes(x = Month.number, y = expected),
colour = "red") + ylab("Proportion of precise admission times") +
xlab("Month") + geom_vline(xintercept = 24.5, linetype = 2, colour =
"blue") + ggtitle("PICU Site A admission times QualDash p = 0.472")
+ ylim(0,1)
````
````

```

```{r Regression discharge for PICU Site A}
model.dis <- glm(cbind(DisTime.Precise, DisTime.Imprecise) ~
QualDash, data = picuA, family = binomial())
summary(model.dis)
picuA$expected.dis <- predict(model.dis, type = "response")
ggplot(data = picuA, aes(x = Month.number, y =
Proportion.Dis.Precise)) + geom_point() + geom_line(colour = "grey")
+ geom_line(data = picuA, aes(x = Month.number, y = expected.dis),
colour = "red") + ylab("Proportion of precise discharge times") +
xlab("Month") + geom_vline(xintercept = 24.5, linetype = 2, colour =
"blue") + ggtitle("PICU Site A discharge times QualDash p < 0.001")
+ ylim(0,1)
```

```{r Regression proportion of known ethnicity for PICU Site A}
# NO analysis here as ethnicity recorded for all, both before and
after QualDash.
```

```{r Read data for PICU Site B}
picuB <- read.csv("picuB.csv")
names(picuB)[1] <- "Month"
```

```{r Calculate proportion for PICU Site B}
picuB$Proportion.Ad.Precise <-
picuB$AdTime.Precise./picuB$AdTime.Completed.
mean.propn <-  mean(picuB$Proportion.Ad.Precise, na.rm = TRUE)
picuB$Proportion.Dis.Precise <-
picuB$DisTime.Precise./picuB$DisTime.Completed.
```

```{r Plot for PICU Site B}
# ggplot(data = picuB, aes(x = Month.number, y =
Proportion.Ad.Precise)) + geom_point() + geom_line() +
geom_hline(yintercept=mean.propn, color = "red")
```

```{r Regression precise admission for PICU Site B}
picuB.complete <- na.omit(picuB)
model.B <- glm(cbind(AdTime.Precise., AdTime.Imprecise.) ~ QualDash,
data = picuB.complete, family = binomial())
summary(model.B)
picuB.complete$expected <- predict(model.B, type = "response")
ggplot(data = picuB.complete, aes(x = Month.number, y =
Proportion.Ad.Precise)) + geom_point() + geom_line(colour = "grey")
+ geom_line(data = picuB.complete, aes(x = Month.number, y =
expected), colour = "red") + ylab("Proportion of precise admission
times") + xlab("Month") + geom_vline(xintercept = 24.5, linetype =
2, colour = "blue") + ggtitle("PICU Site B admission times times
QualDash p = 0.074") + ylim(0,1)
```

```{r Regression precise discharge for PICU Site B}

```
model.dis.B <- glm(cbind(DisTime.Precise., DisTime.Imprecise.) ~
QualDash, data = picuB.complete, family = binomial())
summary(model.dis.B)
picuB.complete$expected.dis <- predict(model.dis.B, type =
"response")
ggplot(data = picuB.complete, aes(x = Month.number, y =
Proportion.Dis.Precise)) + geom_point() + geom_line(colour = "grey")
+ geom_line(data = picuB.complete, aes(x = Month.number, y =
expected.dis), colour = "red") + ylab("Proportion of precise
discharge times") + xlab("Month") + geom_vline(xintercept = 24.5,
linetype = 2, colour = "blue") + ggtitle("PICU Site B admission
times times QualDash p = 0.155") + ylim(0,1)
```

```{r Regression proportion of known ethnicity for PICU Site B}
picuB$Proportion.Ethnicity.Known <-
picuB$Ethnic.Known./picuB$AdTime.Completed.
model.ethnicity.PICU.B <- glm(cbind(Ethnic.Known., Ethnic.Unknown.)
~ QualDash, data = picuB.complete, family = binomial())
summary(model.ethnicity.PICU.B)
picuB.complete$expected.eth <- predict(model.ethnicity.PICU.B, type
= "response")
ggplot(data = picuB, aes(x = Month.number, y =
Proportion.Ethnicity.Known)) + geom_point() + geom_line(colour =
"grey") + geom_line(data = picuB.complete, aes(x = Month.number, y =
expected.eth), colour = "red") + ylab("Proportion of patients with
known ethnicity") + xlab("Month") + geom_vline(xintercept = 24.5,
linetype = 2, colour = "blue") + ggtitle("PICU Site B proportion
known ethnicity QualDash p = 0.135") + ylim(0,1)
```

```{r Read data for PICU Site C}
picuC <- read.csv("picuC.csv")
names(picuC)[1] <- "Month"
```

```{r Calculate proportion for PICU Site C}
picuC$Proportion.Ad.Precise <-
picuC$AdTime.Precise./picuC$AdTime.Completed.
mean.propn <-  mean(picuC$Proportion.Ad.Precise, na.rm = TRUE)
picuC$Proportion.Dis.Precise <-
picuC$DisTime.Precise./picuC$DisTime.Completed.
```

```{r Plot for PICU Site C}
# ggplot(data = picuC, aes(x = Month.number, y =
Proportion.Ad.Precise)) + geom_point() + geom_line() +
geom_hline(yintercept=mean.propn, color = "red")
```

```{r Regression precise discharge for PICU Site C}
model.C <- glm(cbind(AdTime.Precise., AdTime.Imprecise.) ~ QualDash,
data = picuC, family = binomial())
summary(model.C)
picuC$expected <- predict(model.C, type = "response")
```

```
ggplot(data = picuC, aes(x = Month.number, y =
Proportion.Ad.Precise)) + geom_point() + geom_line(colour = "grey")
+ geom_line(data = picuC, aes(x = Month.number, y = expected),
colour = "red") + ylab("Proportion of precise admission times") +
xlab("Month") + geom_vline(xintercept = 24.5, linetype = 2, colour =
"blue") + ggtitle("PICU Site C admission times times QualDash p <
0.001") + ylim(0,1)
```

```{r Regression precise admission for PICU Site C}
model.dis.C <- glm(cbind(DisTime.Precise., DisTime.Imprecise.) ~
QualDash, data = picuC, family = binomial())
summary(model.dis.C)
picuC$expected.dis <- predict(model.dis.C, type = "response")
ggplot(data = picuC, aes(x = Month.number, y =
Proportion.Dis.Precise)) + geom_point() + geom_line(colour = "grey")
+ geom_line(data = picuC, aes(x = Month.number, y = expected.dis),
colour = "red") + ylab("Proportion of precise discharge times") +
xlab("Month") + geom_vline(xintercept = 24.5, linetype = 2, colour =
"blue") + ggtitle("PICU Site C admission times times QualDash p <
0.001") + ylim(0,1)
```

```{r Regression proportion of known ethnicity for PICU Site C}
picuC$Proportion.Ethnicity.Known <-
picuC$Ethnic.Known./picuC$AdTime.Completed.
model.ethnicity.PICU.C <- glm(cbind(Ethnic.Known., Ethnic.Unknown.)
~ QualDash, data = picuC, family = binomial())
summary(model.ethnicity.PICU.C)
picuC$expected.eth <- predict(model.ethnicity.PICU.C, type =
"response")
ggplot(data = picuC, aes(x = Month.number, y =
Proportion.Ethnicity.Known)) + geom_point() + geom_line(colour =
"grey") + geom_line(data = picuC, aes(x = Month.number, y =
expected.eth), colour = "red") + ylab("Proportion of patients with
known ethnicity") + xlab("Month") + geom_vline(xintercept = 24.5,
linetype = 2, colour = "blue") + ggtitle("PICU Site C proportion
known ethnicity QualDash p = 0.003") + ylim(0,1)
```

```{r Read data for MINAP Site A}
minapA <- read.csv("minapA.csv")
names(minapA)[1] <- "Month"
```

```{r Calculate proportion for MINAP Site A}
minapA$Proportion.Arrival.Precise <-
minapA$Arrival.time.precise/minapA$Arrival.time.completed
mean.propn <-  mean(minapA$Proportion.Arrival.Precise)
minapA$Proportion.Ethnicity.Known <-
minapA$Ethnic.known/minapA$Arrival.time.completed
```

```{r Plot for MINAP Site A}
```

```
# ggplot(data = minapA, aes(x = Month.number, y =
Proportion.Arrival.Precise)) + geom_point() + geom_line() +
geom_hline(yintercept=mean.propn, color = "red")
```

```{r Regression precise arrival MINAP Site A}
model.minap.A <- glm(cbind(Arrival.time.precise,
Arrival.time.imprecise) ~ QualDash, data = minapA, family =
binomial())
summary(model.minap.A)
minapA$expected <- predict(model.minap.A, type = "response")
ggplot(data = minapA, aes(x = Month.number, y =
Proportion.Arrival.Precise)) + geom_point() + geom_line(colour =
"grey") + geom_line(data = minapA, aes(x = Month.number, y =
expected), colour = "red") + ylab("Proportion of precise arrival
times") + xlab("Month") + geom_vline(xintercept = 24.5, linetype =
2, colour = "blue") + ggtitle("MINAP Site A arrival times QualDash p
= 0.016") + ylim(0,1)
```

```{r Regression proportion of known ethnicity for MINAP Site A}
model.ethnicity.minap.A <- glm(cbind(Ethnic.known, Ethnic.unknown) ~
QualDash, data = minapA, family = binomial())
summary(model.ethnicity.minap.A)
minapA$expected.eth <- predict(model.ethnicity.minap.A, type =
"response")
ggplot(data = minapA, aes(x = Month.number, y =
Proportion.Ethnicity.Known)) + geom_point() + geom_line(colour =
"grey") + geom_line(data = minapA, aes(x = Month.number, y =
expected.eth), colour = "red") + ylab("Proportion of patients with
known ethnicity") + xlab("Month") + geom_vline(xintercept = 24.5,
linetype = 2, colour = "blue") + ggtitle("MINAP Site A proportion
known ethnicity QualDash p < 0.001") + ylim(0,1)
```

```{r Read data for MINAP Site B}
minapB <- read.csv("minapB.csv")
names(minapB)[1] <- "Month"
```

```{r Calculate proportion for MINAP Site B}
minapB$Proportion.Arrival.Precise <-
minapB$Arrival.time.precise/minapB$Arrival.time.completed
mean.propn <-  mean(minapB$Proportion.Arrival.Precise)
minapB$Proportion.Ethnicity.Known <-
minapB$Ethnic.known/minapB$Arrival.time.completed
```

```{r Plot for MINAP Site B}
# ggplot(data = minapB, aes(x = Month.number, y =
Proportion.Arrival.Precise)) + geom_point() + geom_line() +
geom_hline(yintercept=mean.propn, color = "red")
```

```{r Regression precise arrival MINAP Site B}
```

```
model.minap.B <- glm(cbind(Arrival.time.precise,
Arrival.time.imprecise) ~ QualDash, data = minapB, family =
binomial())
summary(model.minap.B)
minapB$expected <- predict(model.minap.B, type = "response")
ggplot(data = minapB, aes(x = Month.number, y =
Proportion.Arrival.Precise)) + geom_point() + geom_line(colour =
"grey") + geom_line(data = minapB, aes(x = Month.number, y =
expected), colour = "red") + ylab("Proportion of precise arrival
times") + xlab("Month") + geom_vline(xintercept = 24.5, linetype =
2, colour = "blue") + ggtitle("MINAP Site B arrival times QualDash p
= 0.016") + ylim(0,1)
```

```{r Regression proportion of known ethnicity for MINAP Site B}
model.ethnicity.minap.B <- glm(cbind(Ethnic.known, Ethnic.unknown) ~
QualDash, data = minapB, family = binomial())
summary(model.ethnicity.minap.B)
minapB$expected.eth <- predict(model.ethnicity.minap.B, type =
"response")
ggplot(data = minapB, aes(x = Month.number, y =
Proportion.Ethnicity.Known)) + geom_point() + geom_line(colour =
"grey") + geom_line(data = minapB, aes(x = Month.number, y =
expected.eth), colour = "red") + ylab("Proportion of patients with
known ethnicity") + xlab("Month") + geom_vline(xintercept = 24.5,
linetype = 2, colour = "blue") + ggtitle("MINAP Site B proportion
known ethnicity QualDash p < 0.001") + ylim(0,1)
```


```{r Read data for MINAP Site C}
minapC <- read.csv("minapC.csv")
names(minapA)[1] <- "Month"
```

```{r Calculate proportion for MINAP Site C}
minapC$Proportion.Arrival.Precise <-
minapC$Arrival.time.precise/minapC$Arrival.time.completed
mean.propn <-  mean(minapC$Proportion.Arrival.Precise)
minapC$Proportion.Ethnicity.Known <-
minapC$Ethnic.known/minapC$Arrival.time.completed
```

```{r Plot for MINAP Site C}
# ggplot(data = minapC, aes(x = Month.number, y =
Proportion.Arrival.Precise)) + geom_point() + geom_line() +
geom_hline(yintercept=mean.propn, color = "red")
```

```{r Regression precise arrival MINAP Site C}
model.minap.C <- glm(cbind(Arrival.time.precise,
Arrival.time.imprecise) ~ QualDash, data = minapC, family =
binomial())
summary(model.minap.C)
minapC$expected <- predict(model.minap.C, type = "response")
```

```
ggplot(data = minapC, aes(x = Month.number, y =
Proportion.Arrival.Precise)) + geom_point() + geom_line(colour =
"grey") + geom_line(data = minapC, aes(x = Month.number, y =
expected), colour = "red") + ylab("Proportion of precise arrival
times") + xlab("Month") + geom_vline(xintercept = 24.5, linetype =
2, colour = "blue") + ggtitle("MINAP Site C arrival times QualDash p
= 0.008") + ylim(0,1)
```

```{r Regression proportion of known ethnicity for MINAP Site C}
model.ethnicity.minap.C <- glm(cbind(Ethnic.known, Ethnic.unknown) ~
QualDash, data = minapC, family = binomial())
summary(model.ethnicity.minap.C)
minapC$expected.eth <- predict(model.ethnicity.minap.C, type =
"response")
ggplot(data = minapC, aes(x = Month.number, y =
Proportion.Ethnicity.Known)) + geom_point() + geom_line(colour =
"grey") + geom_line(data = minapC, aes(x = Month.number, y =
expected.eth), colour = "red") + ylab("Proportion of patients with
known ethnicity") + xlab("Month") + geom_vline(xintercept = 24.5,
linetype = 2, colour = "blue") + ggtitle("MINAP Site C proportion
known ethnicity QualDash p = 0.574") + ylim(0,1)
```

```{r Read data for MINAP Site E}
minapE <- read.csv("minapE.csv")
names(minapE)[1] <- "Month"
```

```{r Calculate proportion for MINAP Site E}
minapE$Proportion.Arrival.Precise <-
minapE$Arrival.time.precise/minapE$Arrival.time.completed
mean.propn <-  mean(minapE$Proportion.Arrival.Precise)
minapE$Proportion.Ethnicity.Known <-
minapE$Ethnic.known/minapE$Arrival.time.completed
```

```{r Plot for MINAP Site E}
# ggplot(data = minapE, aes(x = Month.number, y =
Proportion.Arrival.Precise)) + geom_point() + geom_line() +
geom_hline(yintercept=mean.propn, color = "red")
```

```{r Regression precise arrival MINAP Site E}
model.minap.E <- glm(cbind(Arrival.time.precise,
Arrival.time.imprecise) ~ QualDash, data = minapE, family =
binomial())
summary(model.minap.E)
minapE$expected <- predict(model.minap.E, type = "response")
ggplot(data = minapE, aes(x = Month.number, y =
Proportion.Arrival.Precise)) + geom_point() + geom_line(colour =
"grey") + geom_line(data = minapE, aes(x = Month.number, y =
expected), colour = "red") + ylab("Proportion of precise arrival
times") + xlab("Month") + geom_vline(xintercept = 24.5, linetype =
2, colour = "blue") + ggtitle("MINAP Site E arrival times QualDash p
= 0.402") + ylim(0,1)
```

```

```{r Regression proportion of known ethnicity for MINAP Site E}
# NO analysis here as ethnicity recorded for (almost) all, both
before and after QualDash.
```
```