**Key points**

* + For optimization purposes, sometimes it is more useful to have a one number summary than studying both specificity and sensitivity. One preferred metric is **balanced accuracy**. Because specificity and sensitivity are rates, it is more appropriate to compute the ***harmonic*** average. In fact, the **F1-score**, a widely used one-number summary, is the harmonic average of precision and recall.
  + Depending on the context, some type of errors are more costly than others. The **F1-score** can be adapted to weigh specificity and sensitivity differently.
  + You can compute the **F1-score** using the F\_meas() function in the **caret** package.

**Code**

# maximize F-score

cutoff <- seq(61, 70)

F\_1 <- map\_dbl(cutoff, function(x){

y\_hat <- ifelse(train\_set$height > x, "Male", "Female") %>%

factor(levels = levels(test\_set$sex))

F\_meas(data = y\_hat, reference = factor(train\_set$sex))

})

data.frame(cutoff, F\_1) %>%

ggplot(aes(cutoff, F\_1)) +

geom\_point() +

geom\_line()

max(F\_1)

best\_cutoff <- cutoff[which.max(F\_1)]

best\_cutoff

y\_hat <- ifelse(test\_set$height > best\_cutoff, "Male", "Female") %>%

factor(levels = levels(test\_set$sex))

sensitivity(data = y\_hat, reference = test\_set$sex)

specificity(data = y\_hat, reference = test\_set$sex)