Let us introduce the method we use for predicting the bucket number.

It is called-- it is a method called classification and regression trees.

In this case, we use multi-class classification.

There are five classes, buckets one to five.

To give you an example, let us consider patients that have two types of diagnosis: coronary artery disease and diabetes.

So if a patient does not have a coronary artery disease, we'd classify the patient as bucket one.

If it has coronary artery disease, then we check whether the person has diabetes or doesn't have diabetes.

If it has diabetes, then it's bucket five, very high risk.

And if it doesn't have diabetes, but given it has coronary artery disease, it is classified as bucket three.

So this is an example in which we only have two diagnoses and we will state how the method works.

In the application of Hawkeye, the most important factors were related to cost in the beginning.

So in the beginning, the classification tree involved divisions based on cost.

For example, if the patient had paid less than $4,000-- so this is bucket one classification-- if it paid more than $4,000, then we further investigate whether the patient pays less than $40,000 or more than $40,000 and so forth.

As the tree grows, then the secondary factor is utilized later in the classification tree involve various chronic illnesses and some of the medical roles we discussed earlier.

For example, whether or not the patient has asthma and depression or not.

If it has asthma and depression, then it's bucket five.

If it doesn't, then we consider a particular indicator indicating hylan injection, which is an indication of a possible knee replacement or arthroscopy.

So if this indicator is equal to 1, then it's bucket three.

If it's indicator is equal to 0, it's not present, then it's bucket one.

So let us give some examples of bucket five.

So an example is as follows.

The patient is under 35 years old, he has between 3,300 and 3,900 in claims, coronary artery disease as a diagnosis, but no office visits in the last year.

Another example of a category of a patient that is classified as bucket five are claims between $3,900 and $43,000 with at least $8,000 paid in the last 12 months, $4,300 in pharmacy claims, and acute cost profile in cancer diagnosis.

And another final example is more than $58,000 in claims, but at least $50,000 paid in the last 12 months, but not an accurate profile.

Classification trees have the major advantage as being interpretable by the physicians who observe them and judge them.

In other words, people were able to identify these cases as reasonable.

In other words, the human intuition agreed with the output of the analytics model.