A more meaningful question is whether smokers are different from non-smokers when holding other variables constant, such as age. To address this question, you need to add age into the model.

It might be natural to consider each age — 35, 36, 37, and so on — as a separate group, but you won't get very many members of each group. And, likely, the data for 35 year-olds has quite a lot to say about 36 year-olds, so it doesn't make sense to treat them as completely separate groups.

You can use the `cut()` function to divide up a quantitative variable into groups. You get to specify the breaks between groups. Using `transform()`, you can add the new variable to an existing data frame.

```
> w = transform(w, ageGroups=cut(age,breaks=c(0,30,40,53,64,75,100)))
> mean( outcome=="Alive" ~ ageGroups, data=w )
  (0,30]  (30,40]  (40,53]  (53,64]  (64,75] (75,100]
   0.979    0.948    0.832    0.625    0.201    0.000
> mean( outcome=="Alive" ~ smoker + ageGroups, data=w )
   No.(0,30]   Yes.(0,30]   No.(30,40]  Yes.(30,40]   No.(40,53]  Yes.(40,53]
       0.982        0.976        0.955        0.941        0.876        0.802
  No.(53,64]  Yes.(53,64]   No.(64,75]  Yes.(64,75] No.(75,100] Yes.(75,100]
       0.669        0.581        0.214        0.158        0.000        0.000
```

The mean has been calculated group-by-group. This is a very widely used technique, but there is a better approach that will be introduced in later chapters: use quantitative variables directly without dividing them into groups.

4.6.1 Model Values and Residuals

A group-wise model tells you the model value for each group. There is additional information that you will want to generate about models. Two fundamental aspects of a model are the **fitted model values** for each case and the **residual** for each case. To make it easy to do these calculations, R has a set of modeling functions that keep track of the data used in creating the model. Later chapters will introduce the `lm()` function — `l` for "linear", `m` for "model" — that is central to statistical modeling. To create a model based on groupwise means, use the `mm()` function — the first `m` for means, the second `m` for "model." `mm()` does the same sorts of calculations as `mean()`, but packages up its results in a different way:

```
> kids = fetchData("kidsfeet.csv")
> mod = mm( width ~ sex, data=kids )
> mod

Groupwise Model
Coefficients:

   B    G
9.19 8.78
```