

## Observational Studies: Confounding

Consider the comparison of transfusion rates in hospitals B and C (omitting A). It appears that Hospital C has a much higher transfusion rate.

	Transf-No	Transf-Yes
Hosp-B	114/132(86.4%)	18/132(13.6%)
Hosp-C	350/450(77.8%)	100/450(22.2%)

In attempting to draw helpful conclusions, one must consider the various possible explanations for this apparent difference. One factor to consider is that the above orthopedic surgeries described above consist of a mix of hip and knee replacement procedures. Below we see that Hospital C does fewer knee replacements than B.

	Hips	Knees
Hosp-B	45/132(34.1%)	87/132(65.9%)
Hosp-C	342/450(76.0%)	108/450(24.0%)

It is also informative to compare transfusion rates by type of surgery:

	Transf-No	Transf-Yes
Hips	285/387(73.6%)	102/387(26.4%)
Knees	179/195(91.8%)	16/195( 8.2%)

In order to establish more meaningful patterns, one must examine the stratified tables corresponding to a 3-way cross-tabulation of the data. Below we consider the stratified versions of the Hospital by Transfusion table, stratifying by Hip/Knee

Hips:

	Transf-No	Transf-Yes
Hosp-B	34/45(75.6%)	11/45(24.4%)
Hosp-C	251/342(73.4%)	91/342(26.6%)

Knees:

	Transf-No	Transf-Yes
Hosp-B	80/87(92.0%)	7/87( 8.0%)
Hosp-C	99/108(91.7%)	9/108( 8.3%)

Thus it appears that the difference in transfusion rates between hospitals B and C can be attributed to differing distributions of Hip vs Knee procedures.