Chapter 8

IMPERFECT EXPERIMENTS: BOUNDING EFFECTS AND COUNTERFACTUALS

Would that I could discover truth
as easily as I can uncover falsehood.
Cicero (44 B.C.)

Preface

In this chapter we describe how graphical and counterfactual models (Sections 3.2 and 7.1) can combine to elicit causal information from imperfect experiments: experiments that deviate from the ideal protocol of randomized control. A common deviation occurs, for example, when subjects in a randomized clinical trial do not fully comply with their assigned treatment, thus compromising the identification of causal effects. When conditions for identification are not met, the best one can do is derive *bounds* for the quantities of interest—namely, a range of possible values that represents our ignorance about the data-generating process

and that cannot be improved with increasing sample size. The aim of this chapter is to demonstrate (i) that such bounds can be derived by simple algebraic methods and (ii) that, despite the imperfection of the experiments, the derived bounds can yield significant and sometimes accurate information on the impact of a policy on the entire population as well as on a particular individual who participated in the study.