You have been hired by the Department of Health and Human Services to estimate a supply equation for doctors, nurses, and psychologists and then to estimate how the supply of doctors, nurses, and psychologists affects infant mortality, alcoholism, and the need for psychiatric institutionalization. You have the following information for each county in the United States for 1995:

- Number of physicians
- Number of nurses
- Number of psychologists
- Infant mortality rate
- Alcoholism rate
- Psychiatric institutionalization rate
- Per capita income
- Per cent black
- Poverty rate
- Unemployment rate
- Dummy for rural
- Dummy for urban
- Number of hospitals
- Wage rate of unskilled workers
- Medicare reimbursement rate for doctors
- Medicaid reimbursement rate for doctors
- Wage rate for nurses
- Geographic coordinates of the center of the county
- Number of shopping centers
- Number of automobiles
- Population

You get to hire a research assistant to collect data on any three other measurable variables. Choose them.

Write a model of supply that allows for a reasonable correlation structure of errors across different kinds of medical professionals and geography. Explain why the parameters of your model are identified, let’s say, from a demand equation. Provide detail on how to estimate the parameters of your model.

Write a model of how infant mortality, alcoholism, and the need for psychiatric institutionalization depend upon the supply of doctors, nurses, and psychologists. Make sure your model allows for interactions in the “production function” among the various inputs in a flexible way and that it controls for other community characteristics. Also, your model should allow the infant
mortality, alcoholism, and the need for psychiatric institutionalization to depend upon the supply of doctors, nurses, and psychologists in nearby counties. Provide details on how to estimate your model.

In a second data set, you observe a random sample of nurses. For each nurse, you observe which county she lives in, which county she works in, and some demographic characteristics of the nurse. You can also merge this data set with the first one. Write a model of the choice of where to live and where to work (many nurses live and work in different places). Provide details on how to estimate the parameters of your model.

Discuss the advantages and disadvantages of the estimates you get of nurse supply from the two different estimation exercises.