Developing Software for Using Bayesian Regression to Evaluate Heterogeneity of Treatment Effects in Data from Randomized Controlled Trials

**What was the research about?**
Comparative effectiveness research compares two or more treatments to see which one works better for which patients. Sometimes, groups of people respond differently to the same treatment. For example, women might, on average, receive more benefit from a treatment than men do. If researchers group women and men together when they analyze study data, they may miss this difference and overlook some of the benefits of a treatment.

Researchers can analyze data on the effects of a treatment in many ways. Each way has strengths and weaknesses. Bayesian regression is one method that allows researchers to consider various factors in their analysis, such as patients’ ages, sex, or health problems. This method can help researchers understand how different groups of people respond to a treatment. But it requires advanced computer programs that are not readily available to all researchers.

In this study, the research team wanted to make it easier for researchers to use Bayesian regression.

**What were the results?**
The research team created a new type of software. The software helps researchers use Bayesian regression to understand how different groups of people respond to a treatment. The team also provided

- Instructions on how to use the software
- A detailed example using data from a past study on heart disease
- Tips to help researchers know how best to analyze data and report the results

**What did the research team do?**
First, the research team identified the best ways to use Bayesian regression to understand how different groups of people respond to a treatment. The research team then designed the new software. During the study, the team worked with a panel of experts in statistics. The panel gave input on the best ways to use Bayesian regression. The panel also gave feedback on the software.

To find out how best to analyze data and report results, the team talked with the panel. The team also reviewed studies on methods to understand how different groups of people respond to a treatment.
What were the limits of the study?
The software only works for randomized controlled trials, a type of study where researchers assign the treatment a patient receives by chance. Future research can look at how to develop software for other types of studies.

How can people use the results?
Researchers can download the software from this study for free. The software may help researchers to see when treatments work well for some groups of people but not for others.

To learn more about this project, visit www.pcori.org/Varadhan115.