A press release by AAAS (American Association for the Advancement of Science), published 2007-02-16:

Charting our health by the stars

Natural Sciences and Engineering Research Council grantee Peter Austin and three other researchers at the Institute for Clinical Evaluative Sciences in Toronto have just completed a survey of hospital visits in Ontario, showing that, compared to people born under other astrological signs, Virgos have an increased risk of vomiting during pregnancy, Pisces have an increased risk of heart failure, and Libras have an increased risk of fracturing their pelvises.

In fact, each of the 12 astrological signs had at least two medical disorders associated with them, thus placing people born under a given sign at increased risk compared to those born under different signs.

The study, which used data from 10,000,000 Ontario residents in 2000, was conducted with tongue firmly in cheek.

"Replace astrological signs with another characteristic such as gender or age, and immediately your mind starts to form explanations for the observed associations," says Austin. "Then we leap to conclusions, constructing reasons for why we saw the results we did. We did this study to prove a larger point – the more we look for patterns, the more likely we are to find them, particularly when we don't begin with a particular question."

Austin will discuss his results at the American Association for the Advancement of Science (AAAS) Conference in San Francisco, which runs from Feb. 15 to 19, 2007. What he found was that even though each astrological sign had its own unique disorders, his initial results were not reproduced when they were explicitly tested in a second population.

"Scientists take pains to make sure their clinical studies are conducted accurately," says Austin, "but sometimes erroneous conclusions will be obtained solely due to chance." Statistical chance means that 5 per cent of the time, scientists will incorrectly conclude that an association exists, when in reality no such association exists in the population that the scientists are studying.

One way to reduce the chances of drawing a wrong conclusion is to try and reproduce unexpected results in further studies.

"There is a danger in basing scientific decisions on the results of one study, particularly if the results were unanticipated or the association was one that we did not initially decide to examine," says Austin. "But when several studies all arrive at similar conclusions, we reduce the risk of arriving at an incorrect outcome."

Discuss:

a) According to this report, can we say that each astrological sign is associated with a particular medical disorder?

b) In what way does the study in question use statistical inference?

c) Which steps can be undertaken to arrive at valid conclusions?

d) How is it possible that "statistical chance means that 5 per cent of the time, scientists will incorrectly conclude that an association exists, when in reality no such association exists. . . "? Would you agree with this statement?