Altnough people use science to make value judgements, they do not make these judgements according to the principles of science.

The ethical principles of science were recognized by Fresenius, the founder of analytical chemistry in the 19th century[2]: He said

> Knowledge and ability must be combined with ambition as well as with a sense of honesty and a severe conscience. Every analyst occasionally has doubts about the accuracy of his results, and also there are times when he knows his results to be incorrect.

And further on:

> A chemist who would not take an oath guaranteeing the authenticity, as well as the accuracy of his work, should never publish his results, for if he were to, then the result would be detrimental, not only to himself, but to the whole of science.

And J R Ravetz was right when he wrote[3]:

> In scholarship, a good name is achieved by talent and protected by integrity; and an over-riding commitment to the quality and trustworthiness of work with which one is personally associated in any way is the essence of a genuine scientific ethic.

We can add two of the Fresenius terms to those of Ravetz to give us four essential characteristics of ethical science: quality, trustworthiness, authenticity, and accuracy.

Research into the consequences on health of asbestos depends not upon well-organized scientific experiments but often on epidemiological surveys based upon observations of people, their working lives, and their deaths, where the data were largely gathered for other purposes, and where the research may be focused on the questions of the researchers rather than the concerns of the decision makers.

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[2]F Szabadvary, History of Analytical Chemistry (Pergamon Press, 1966), p 176.

[3]J R Ravetz, Scientific Knowledge and Its Social Proolem, Oxford: 1971.