

Nick Fisher warns against believing Disraeli's infamous quip about statistics and urges a professional approach to its practice.

Figures Fool When Fools Figure

Nick Fisher, Past President of the Statistical Society of Australia

Australian governments and public agencies are risking bad policy decisions through poor statistical practice.

We live in a world awash with numbers. They underpin far-reaching decisions being made about our health, safety, security, social and economic progress, environment, jobs, and daily lives.

You are unlikely to trust your life to an untrained doctor, your office building to an unqualified engineer, or your teeth to an unaccredited dentist. You probably wouldn't risk your money with an accountant lacking professional recognition. Yet, every day we are made to rely on policies affecting our health, prosperity, and security that are founded on unprofessional use of statistical methods.

Many of the people who collect, analyze, and interpret these numbers are not trained or qualified to do so—managers, public servants, doctors, engineers, economists, journalists, politicians, and sociologists. They may be well qualified in their own fields, but do not have any statistical training or background. Resulting decisions can be fatally flawed, and may adversely affect millions of people.

Statistics is a complex and delicate science requiring high-level training and experience. An aptitude for figures or the ability to use a computer isn't enough. We need to be certain that policy decisions are anchored on a solid quantitative base.

When practitioners are not regarded as professionals, anyone can call themselves a statistician, regardless of training and experience. A typical professionally accredited statistician will have many years of experience as a professional statistician in addition to at least one degree in statistics.

The several hundred members of the Statistical Society of Australia realize, however, that statistics as a discipline and statisticians as practitioners have image problems, typified by the following exchange 40 years ago between Prince Philip, Duke of Edinburgh, and the late Oliver Lancaster, then professor of mathematical statistics at Sydney University:

Prince to Professor (quoting from Benjamin Disraeli): "There are lies, damned lies, and statistics."

Professor to Prince: "Figures fool when fools figure."

Whereas statements by financial institutions about probity and risk have to be authorized legally by properly qualified accountants and actuaries, statistical conclusions derived from major environmental impact studies require no similar authorization. Yet, decisions of huge community significance are made as a result of the effect of airport noise on housing prices, or the degree of residual contamination in a major industrial site.

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Quantitative concepts are intrinsic to all stages of major scientific and technological projects, from the design of the data to be captured to its analysis and then to the presentation of results. To many, statistics is simply a branch of mathematics that concerns itself with data and probability, but I define statistics as “the science of managing uncertainty.”

An extraordinary catalogue of misadventures—some hilarious, some disastrous—have resulted from failure to deal with statistical issues with due care (see www.statsoc.org.au). For example, an Australian doctor who had made more than 17,000 Medicare claims in one year was scrutinized under the Health Insurance Commission Act for over-servicing. However, the investigative procedure failed in court because the correct sampling procedure wasn't followed, possibly due to its complexity.

Before the space shuttle *Challenger* exploded after launch in 1986, informal estimates by engineers and management put the chance of failure at between one in 100 and one in 100,000. Later, a proper statistical analysis of the data available pre-launch showed that the actual risk had been one in eight.

Members of the Statistical Society of Australia want government departments and agencies responsible for major policy issues to employ professionally accredited statisticians with oversight of the collection, analysis, and interpretation of data that underpin any major policy decision. ■

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