

Toxicologists' Opinions on Chemical Risk: A Survey of the Society of Toxicology

Conducted By

Statistical Assessment Service (STATS)

and

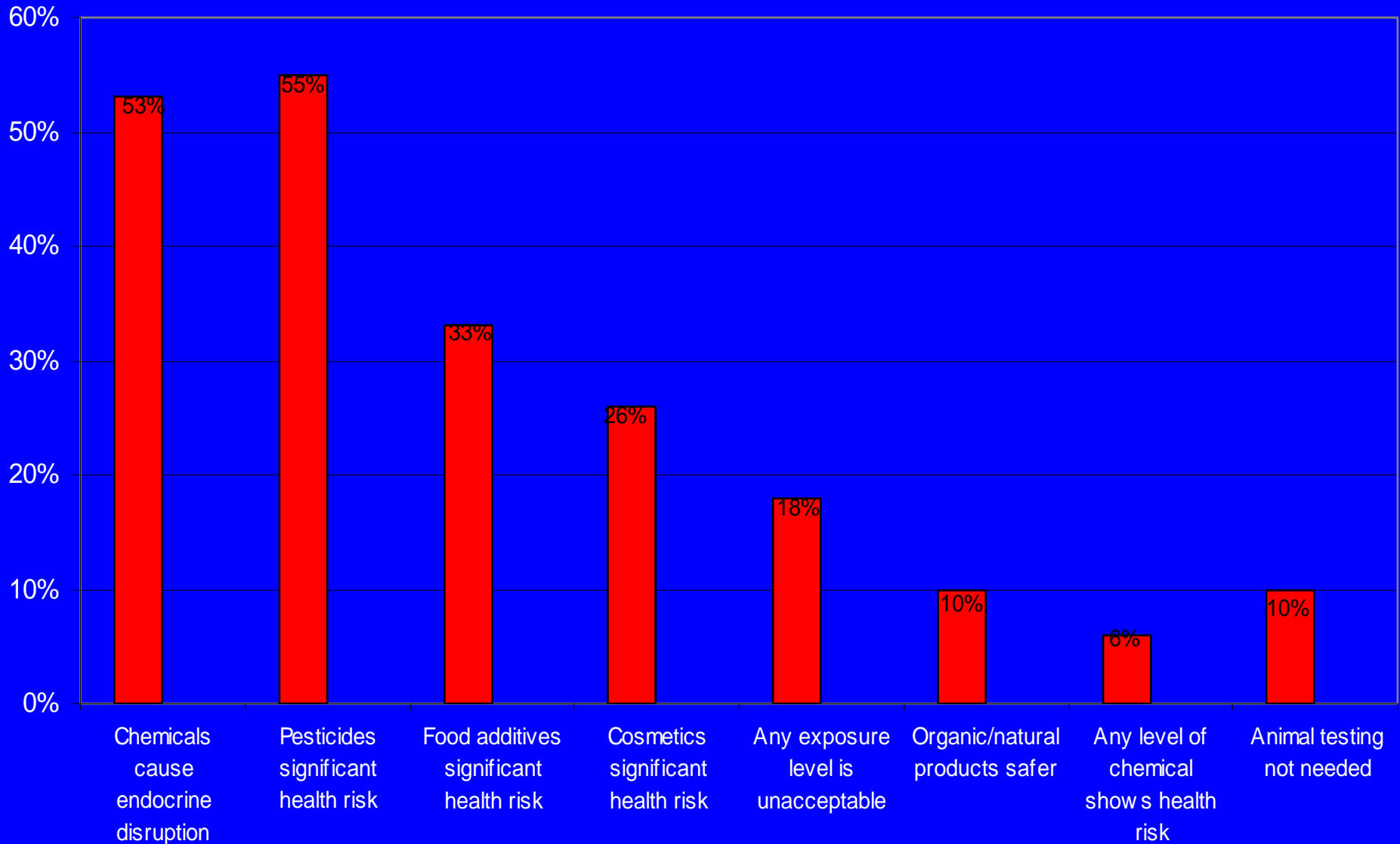
Center for Health and Risk Communication

at

George Mason University

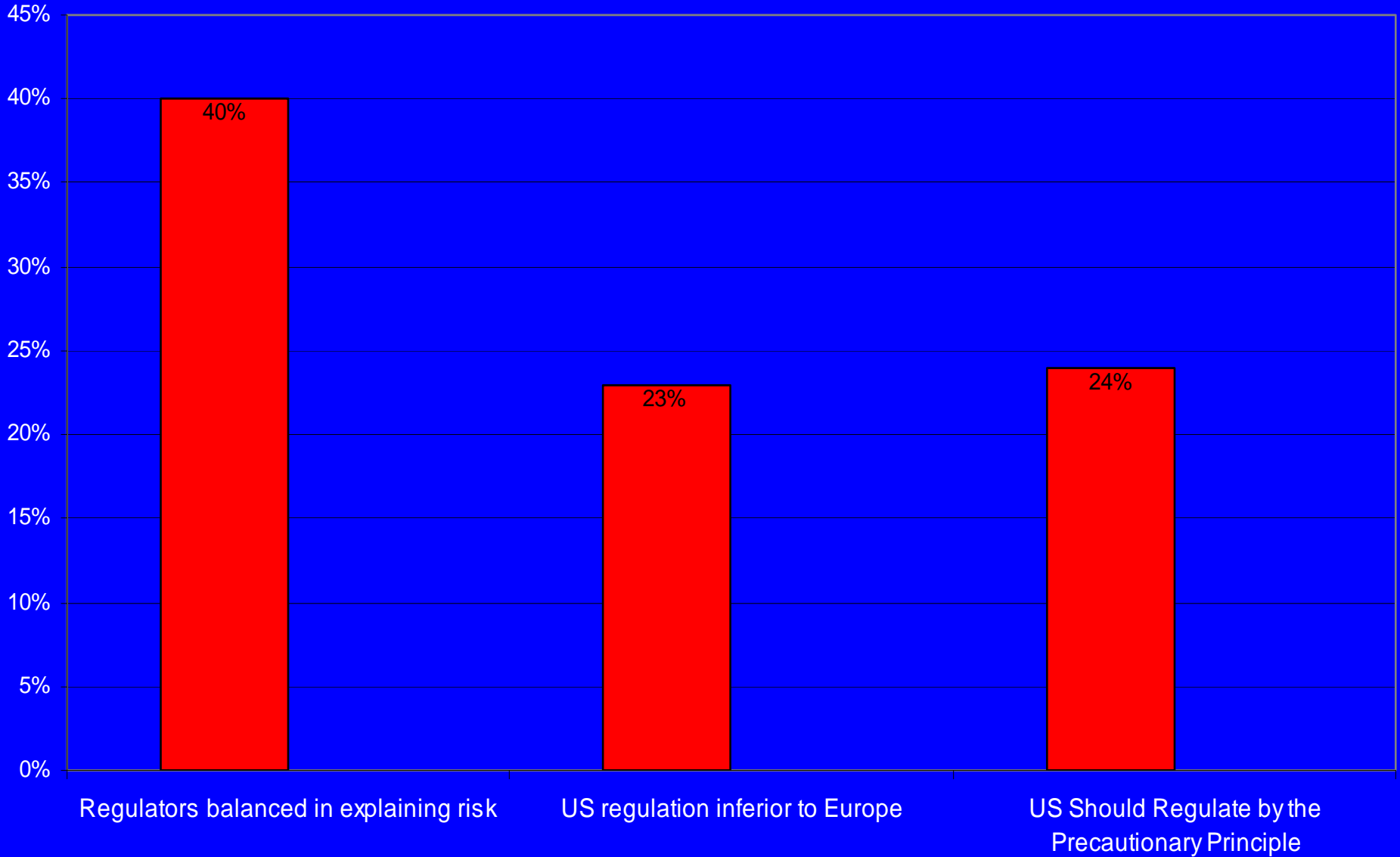
SOT Attitudes on Chemical Risk

Percentage of toxicologists that agree with the following statements



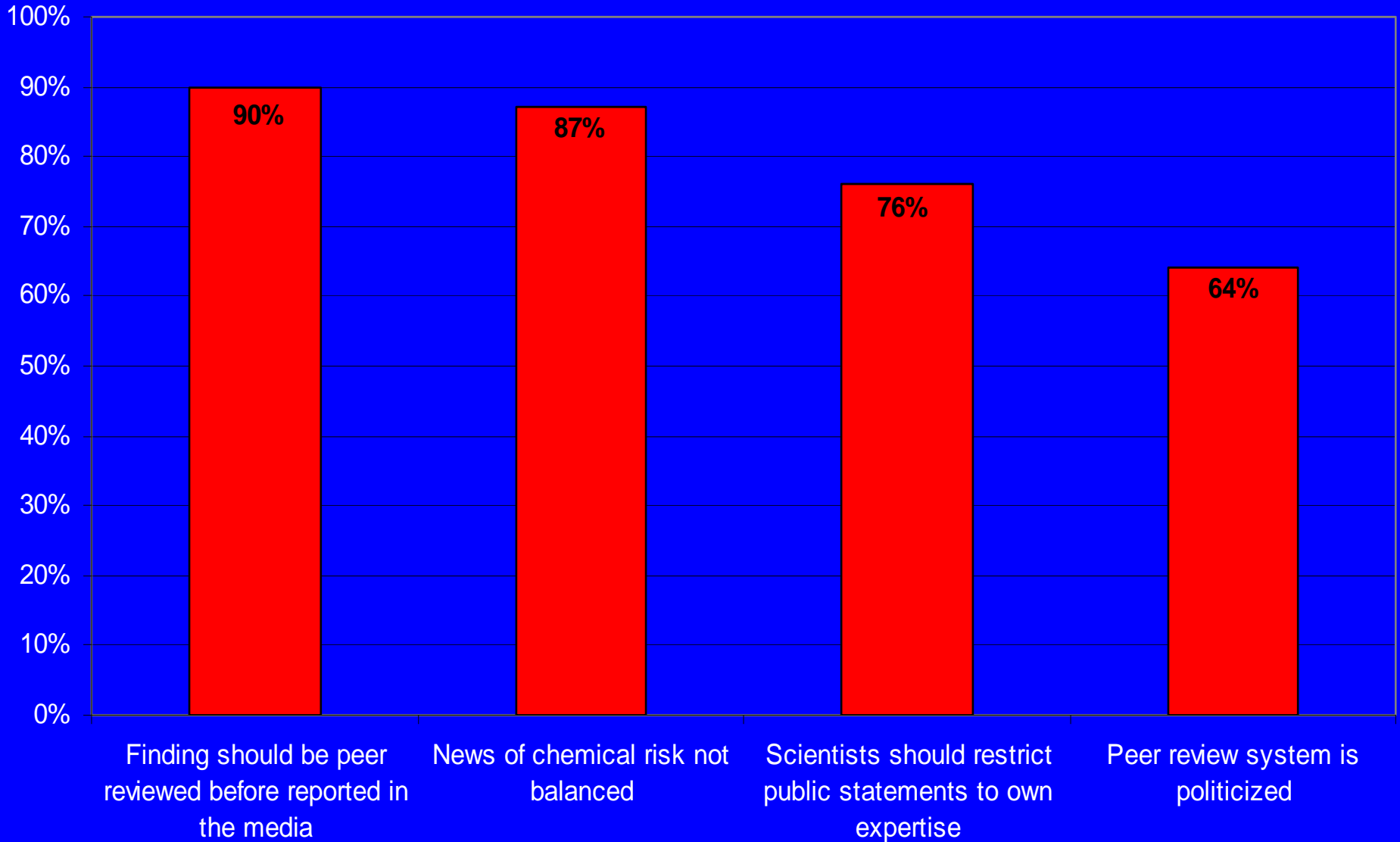
SOT Attitudes on Regulating Chemicals

Percentage of toxicologists that agree with the following statements

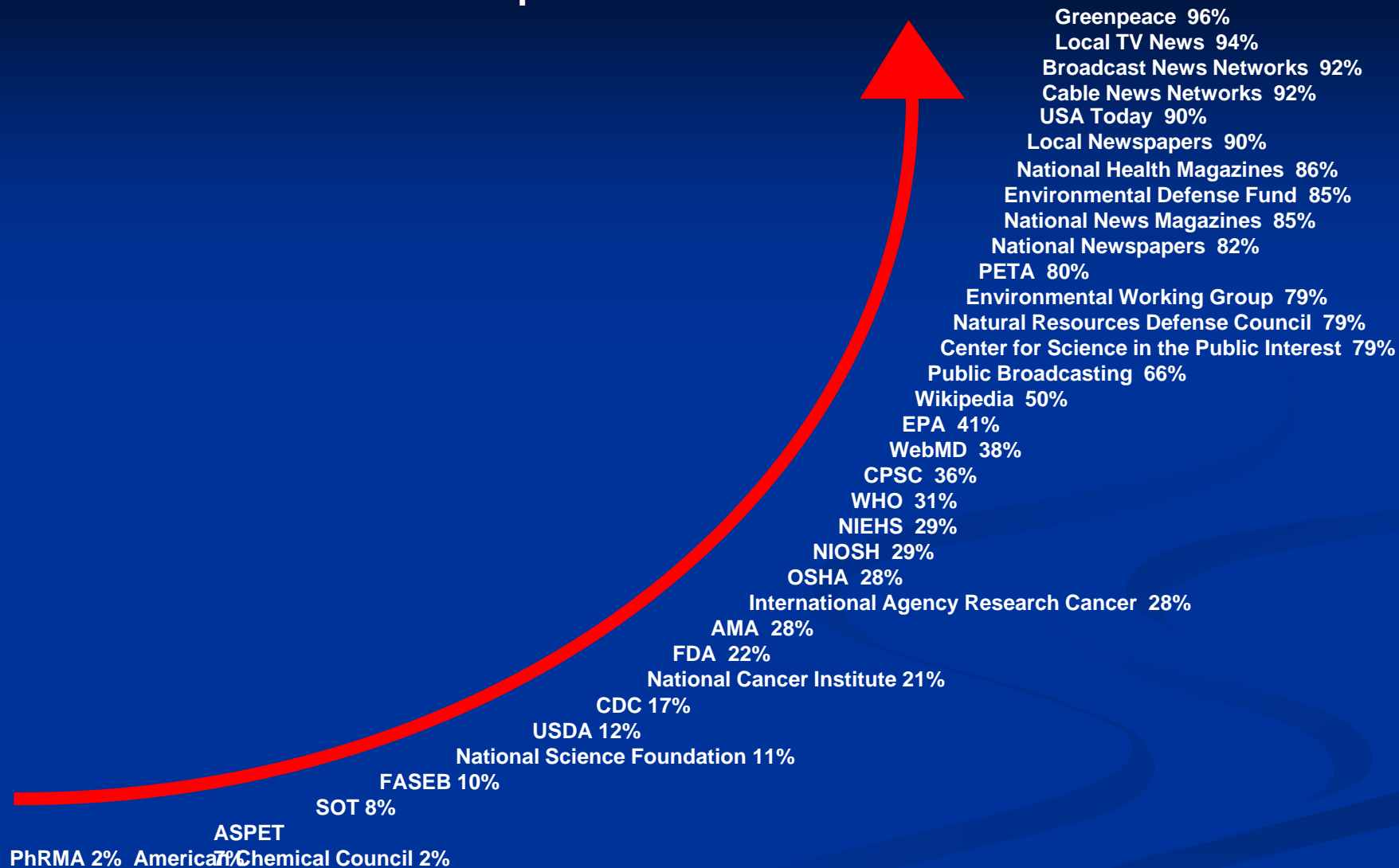


SOT Attitudes on Informing the Public

Percentage of toxicologists that agree with the following statements



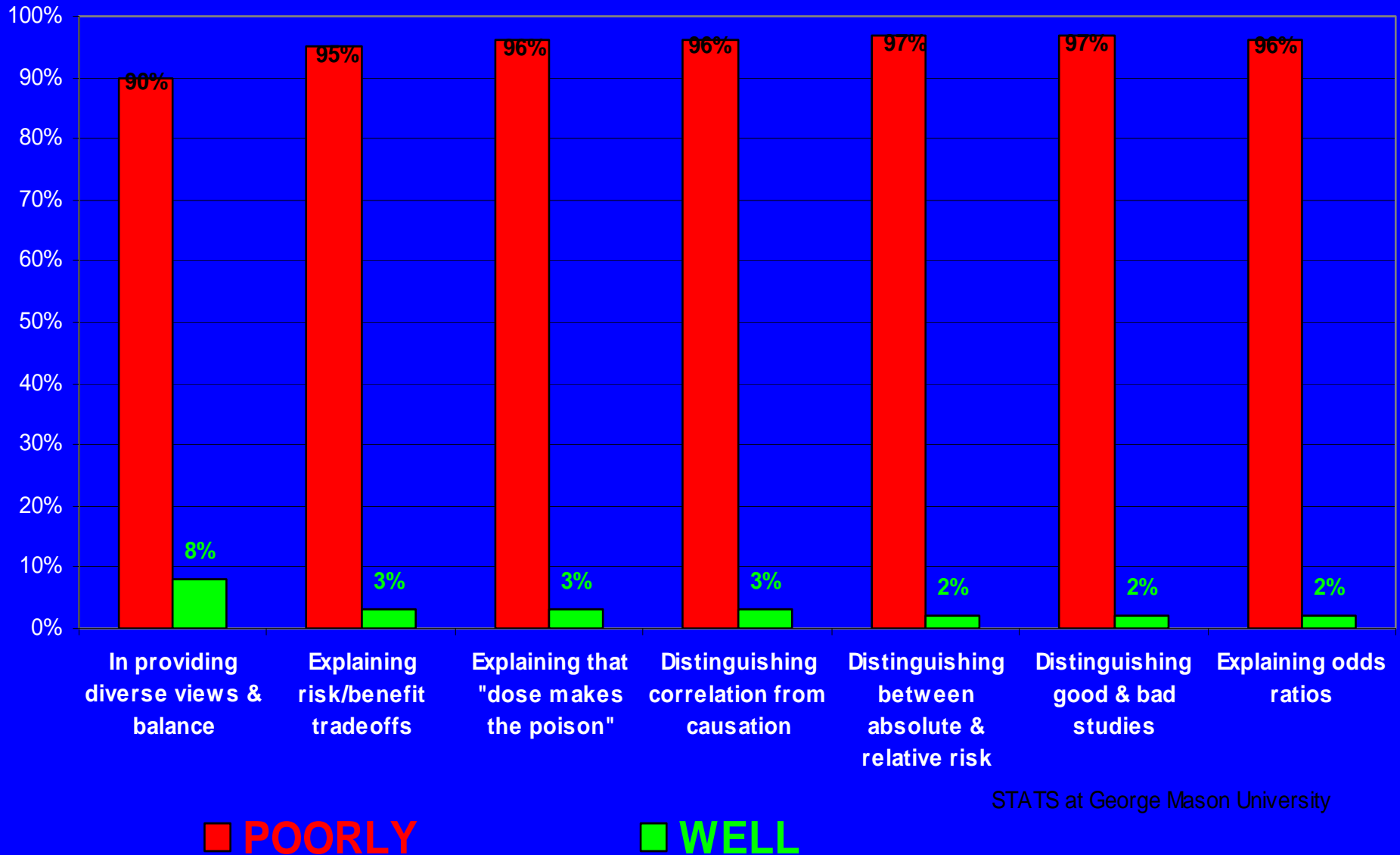
Percentage of SOT Respondents Who Believe Certain Organizations Overstate Health Risks of Exposure to Chemicals*



*Note: Respondents expressing no opinion excluded from calculation

How SOT Members Rate the Accuracy of the Media's Reporting on Certain Scientific Issues and Principles

Percentage Rating Poorly/Well



BPA – A Paradigm Shift in Toxicology?

- **“In science, this is called a paradigm inversion. The paradigm is the way people are doing things, and then periodically information comes along that says it's upside down, it's backwards, and if you ask the question a different way you get a totally different outcome. And whenever this happens, there is a convulsion in the field that is being turned upside down and there's a very documented series of responses because this has happened over and over through science. It's not the first time that the fundamental tenets of a field of science have been shown to be wrong.”**

- Frederick vom Saal, Frontline, “Fooling with Nature,” February, 1998

Kuhn's theory of paradigm shifts

- A paradigm is what members of a scientific community share. A shift can apply to:
 - The entire constellation of beliefs, values, techniques
 - An element in that constellation
 - Incommensurable viewpoints – the same situation perceived differently through same vocabulary

Replication and BPA 1998

- “What is important is clearly that information that is presented by one group be **replicated** by another group, and information extended. And this is the case with our finding concerning bisphenyl-A that we only published one year ago, where we said that this is a chemical that operates at very, very low doses and can have profound effects that were not predicted based on the way chemical testing was done. And in the last six months, two other studies from major independent laboratories have come to exactly the same conclusion. Now, all of a sudden, it is not just me anymore. **And that is the kind of information that wins over the scientific community.** Now we are up to **three independent replications** coming to the same conclusion.”

- Frederick vom Saal, Frontline, 1998

Replication and BPA 1998-2009

- “...the low-dose effects in rodents have not been demonstrated in a robust and reproducible way such as they could be used as pivotal studies for risk assessment.”

- European Food Safety Authority, 2006

- “A significant portion of the literature was not able to be fully considered in the [National Toxicology Program] NTP evaluation due to a variety of experimental limitations including the use of a single dose, small numbers of animals per group, non-oral route of administration, lack of proper statistics and lack of data on specific phenotypic endpoints.”

- National Institute of Environmental Health Sciences, 2009

Replication and BPA 2010

- “Ryan *et al.* (2009) and other similarly detailed studies in rodents more or less close the door on the possibility that bisphenol A is an environmental chemical to be concerned about because of its ER-mediated estrogenic activity...
...If an earlier result **cannot be reproduced** in a huge study conducted in a scientifically rigorous manner, as exemplified by Ryan *et al.* (2009), then **the original result fails one of the golden rules that govern scientific research**. When this **happens repeatedly**, as is the case with bisphenol A, then there can be no logical, scientifically based reason for continuing to espouse that the original results are the only ones that are correct, rather the converse.”

- Richard M. Sharpe, MRC, Toxicological Sciences, 2010

Politics and BPA

- “What one must understand...is the manner in which a particular set of shared values interacts with the particular experiences shared by a community of specialists to ensure that most members of the group will ultimately find one set of arguments rather than another decisive.”

- Thomas Kuhn, *The Structure of Scientific Revolutions*,
postscript 1969 edition.