DESK GUIDE

Where science meets the headlines

Media covering science

Science Media Centre. SMC NZ

Bula vinaka, Tālofa, Mālō e lelei, Halo, Kia orāna, Fakaalofa lahi atu, Mālō, Noa'ia, Ekomowir omo, 'Ia ora na, Mauri, Kia ora and warm Pacific greetings!

Welcome to the Desk Guide for Media Covering Science

This guide is designed to make it easier for journalists across the Pacific to report on science issues that matter to their communities. From energy and food security, cyclones and rising sea levels, pandemics and vaccines, the environment and fisheries, social issues and psychology, through to new digital technologies like AI and beyond, science is at the heart of everyday issues that affect peoples' lives.

Inside you will find tips and insights drawn from the Science Media Centres' decades of experience helping time-pressured journalists gain access to the experts and information they need to breakdown these kinds of complex issues in ways that make sense for their audiences.

You'll also find information about Scimex.org, our go-to portal for journalists, where you will gain embargoed access to new research and an expert database with a growing network of Pacific researchers ready to talk to media.

Keep your Desk Guide handy. We hope you'll find it useful next time science is in the headlines.

Dacia Herbulock
SMC NZ Director

ABOUT

SMC New Zealand is an independent centre set up in 2008 to help journalists work more effectively with the scientific and research community, to inform public discussion of important issues for society. We are publicly funded by the NZ Ministry of Business, Innovation and Employment through A Nation of Curious Minds–He Whenua Hihiri i te Mahara.

Our work in the wider Pacific region is a partnership with the Australian SMC, supported by the International Science Council's Regional Focal Point for Asia and the Pacific.

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Need some help?
We are here for you!

The Science Media Centres are a network of independent not-for-profit organisations that have been working since 2002 to connect scientists and the media.

Here's how we can assist you:

Expert Reaction

When a science story is breaking or complex, the SMC rounds up comments from experts, offering quotes in an SMC Expert Reaction. These email alerts are designed to give journalists a quick overview of relevant context on emerging issues, with a range of evidence-based perspectives. Comments can be quoted directly, or followed up for in-depth interviews using contact details provided. You can tailor the alerts you receive to suit your areas of interest on topics from health and environment to business and sport.

Sign up for alerts at scimex.org/journo.

Scimex: Science Media Exchange

Scimex features everything journalists need to report on cutting-edge research. Its embargoed news feed highlights the best new studies, providing reporters with easy access to press releases, multimedia, expert commentary and more - before they hit global headlines. Pacific, Australian and New Zealand journalists can choose regions and topics of interest for weekly emails or daily alerts.

Register for access at scimex.org/journo

Find an Expert

Need help with a complex issue or looking for an expert to quote in your story? Scimex has a growing list of researchers who are keen to speak with the media about everything from sustainable energy to sea cucumbers.

Head to scimex.org/find-an-expert, or contact pacific@sciencemedia.nz if you can't find the expert you need.

ON THE WEB

sciencemedia.nz

scimex.org

smc.org.au

smcglobal.org

Best practice guidelines for reporting on science

Developed in consultation with science reporters and experts around the world, these guidelines are intended for newsrooms and general reporters to use as a checklist to help ensure the accurate reporting of science, health and related stories.

Source

State the source of the story – e.g. interview, conference, journal article, a survey from a charity or trade body, etc. – ideally with enough information for readers to look it up or a web link.

Type of study

Specify the size and nature of the study – e.g. who/what were the subjects, how long did it last, what was tested or was it an observation? If there's space, mention the major limitations.

Cause and effect

When reporting a link between two things, indicate whether or not there is evidence that one causes the other.

Research time-frame

Give a sense of the stage of the research – e.g. cells in a laboratory or trials in humans – and a realistic time-frame for any new treatment or technology.

Risk

On health risks, include the absolute risk whenever it is available in the press release or the research paper – e.g. if 'cupcakes double cancer risk' state the outright risk of that cancer, with and without cupcakes.

Context

Try to frame a new finding in the context of other evidence – especially on a story with public health implications. Does it reinforce or conflict with previous studies? If it attracts serious scientific concerns, they should not be ignored.

Hype

Be wary of scientists and press releases over-claiming for studies – if there is space, quote both the researchers themselves and external sources with appropriate expertise.

Speculation

Distinguish between findings and interpretation or extrapolation – don't suggest health advice if none has been offered.

Emotional impact

Remember patients – don't call something a 'cure' that is not a cure.

Misleading headlines

Headlines should not mislead the reader about a story's contents and quotation marks should not be used to dress up overstatement.

Adapted from the UK Science Media Centre

When is research ready for primetime?

Often the first time you hear about an interesting area of science is when a press release arrives proclaiming the latest discovery or scientific breakthrough. Understanding how scientists work can show another side of the story, and may affect how you cover it.

Scientists deal with uncertainty all the time because they are pushing the boundaries of what is known. "Breakthroughs" nearly always build on years of incremental progress, with many false starts and dead ends.

Most scientists collect data through observation and experiments to test a hypothesis - a potential explanation. The testing needs to be designed in a way so that the results are objective, to reduce the likelihood of a biased interpretation of the results.

After analysing their results, scientists will determine whether the new evidence supports their hypothesis and write up preliminary findings. The answer, which may eventually be reported in the form of a scientific paper in a peer-reviewed journal, will add to a growing body of evidence but will rarely be conclusive on its own.

Research in fields such as the social sciences, mathematics and economics may draw on theories and ideas that, while important, cannot be easily tested using experiments and observation.

There is also a growing recognition of different 'ways of knowing' such as traditional cultural knowledge and wisdom.

Traditional and Indigenous Knowledge

Traditional knowledge refers to the knowledge, innovations and practices of indigenous peoples. Developed from experience gained over the centuries and adapted to the local culture and environment, traditional knowledge is commonly transmitted orally from generation to generation and tends to be collectively owned. In recent years, there has been a revival of traditional knowledge in the Pacific Islands and a growing recognition of both its value and relevance to current scientific challenges in a rapidly changing world.

UN Permanent Forum on Indigenous Issues (2019), Nunn et al. (2024)

When to report

Research proposals and funding announcements make for good stories, but we are a long way off getting results.

Approach with caution

Reporting on experiments and scientific fieldwork is fine, but scientists don't have the whole picture yet.

Best for human interest stories

Results may be presented at conferences and meetings, but haven't been subjected to external scrutiny.

High caution

Research is published in peer-reviewed journals and literature reviews.

Safest time to report

Peer review

How does the peer review system work, and why is it important?

Scientists spend a lot of time writing up, revising and publishing their research. It's an extremely important part of the scientific process, because it allows other scientists to offer feedback and test the research for themselves to verify its accuracy. Publishing is also an important measure of output for many scientists. Before a study can be published in a reputable journal, it must be peer reviewed.

Who reviews?

In a process that can last months, the study is sent to scientists working in the same field, who are best positioned to decide whether the methods used were appropriate and the conclusions make sense.

These 'peer reviewers' offer journal editors advice on the quality of the paper, whether or not it should be published and what changes should be made if it is to be published.

Preprints

In some fields, researchers may publish their preliminary findings and drafts on a 'preprint' server such as arXiv.org or bioRxiv.org. Use caution in reporting on preprint papers, as they have not been through peer review.

After the review

While peer review acts as an internal check on the quality of research, it isn't infallible. There is potential for bias among reviewers and not all mistakes are identified. Peer review is based on trust that the data are real and cannot identify fraudulent results.

The evaluation of research doesn't end after peer review. Once published, a study may receive further critique from other scientists through letters to the editor of the journal, commentary articles or further research attempting to replicate the finding of the original study - science is an ongoing process.

Peer reviewed research
QUALITY MAY VARY

Scientific journals are ranked according to various measures of their impact.

- Prestigious, multidisciplinary journals (Nature, Science, etc.)
- Field-specific journals (e.g. physics, agriculture) with varying degrees of selectivity
- Wide assortment of less well-known journals that may be narrow in scope or unselective

Publication in top journals is incredibly competitive, while more obscure journals may struggle to get enough submissions to fill their pages. Some journals require researchers to pay for publication, while others rely on subscription fees.

Types of evidence

Understanding what evidence lies behind a claim is important. Here, different types of scientific evidence relevant to health and medical reporting are ranked and described.

WEAKER EVIDENCE → **STRONGER EVIDENCE**

NOTE

In some cases, it will not be possible to gather experimental evidence for practical or ethical reasons.

ANECDOTAL & EXPERT OPINIONS

Anecdotal evidence is a person's own personal experience or view, not necessarily representative of typical experiences. An expert's stand-alone opinion, or that given in a written news article, are both considered weak forms of evidence without scientific studies to back them up.

ANIMAL & CELL STUDIES (experimental)

Animal research can be useful, and can predict effects also seen in humans. However, observed effects can also differ, so subsequent human trials are required before a particular effect can be said to be seen in humans. Tests on isolated cells can also produce different results to those in the body.

CASE REPORTS & CASE SERIES (observational)

A case report is a written record on a particular subject. Though low on the hierarchy of evidence, they can aid detection of new diseases, or side effects of treatments. A case series is similar, but tracks multiple subjects. Both types of study cannot prove causation, only correlation.

CASE-CONTROL STUDIES (observational)

Case control studies are retrospective, involving two groups of subjects, one with a particular condition or symptom, and one without. They then track back to determine an attribute or exposure that could have caused this. Again, these studies show correlation, but it is hard to prove causation.

COHORT STUDIES (observational)

A cohort study is similar to a case-control study. It involves selection of a group of people sharing a certain characteristic or treatment (e.g. exposure to a chemical), and compares them over time to a group of people who do not have this characteristic or treatment, noting any difference in outcome.

RANDOMISED CONTROLLED TRIALS (experimental)

Subjects are randomly assigned to a test group, which receives the treatment, or a control group, which commonly receives a placebo. In 'blind' trials, participants do not know which group they are in; in 'double blind' trials, the experimenters do not know either. Blinding trials helps remove bias.

SYSTEMATIC REVIEW

Systematic reviews draw on multiple randomised controlled trials to draw their conclusions, and also take into consideration the quality of the studies included. Reviews can help mitigate bias in individual studies and give us a more complete picture, making them the best form of evidence.

Scientists as sources

Scimex.org features a growing network of Pacific experts in their field who are willing to talk to the media.

Some tips on approaching and interviewing researchers:

Cultivate your sources
Spend time talking to scientists when you're not on deadline. Help them get to know and trust you, and understand how you work. If a researcher seems approachable, they might help you get your head around a crucial bit of research or fact-check an assertion on short notice in future.

Make your deadline clear up front
Scientists are often not used to journalists' tight time frames. If you need a response within the next few hours or days, spell it out clearly (and go ahead and show your appreciation if they drop everything to accommodate you).

Try email
Many scientists who are virtually unreachable by phone respond obsessively to emails. Scientists tend to travel frequently, work at multiple research institutions or have teaching commitments or lab / field work. That said, the SMC can also provide mobile numbers for many media-friendly scientists.

Head off over-preparation
Scientists will often spend unnecessary hours prepping with background research on in-depth facts and figures you'll never cover. Give your scientist a rough idea of the outcome you want from them, and any constraints on your word or time limit. (Are you producing a 7 minute segment? 300 words? A 30 second bulletin item?) Give them an idea of what you'll be covering in an interview.

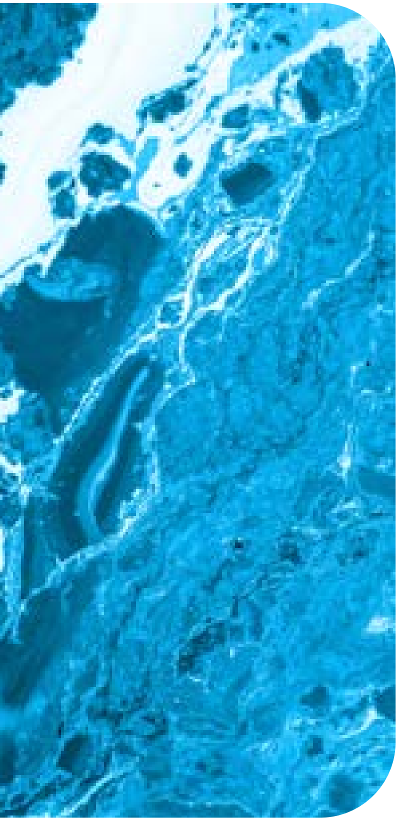
Don't be intimidated
If you're not following something, or the scientist starts slipping into jargon, don't hesitate to interrupt or ask them to explain in simpler terms. It's often hard for scientists to judge exactly how much background explanation they should provide.

NOTE
Our teams can also connect reporters with experts on a wide range of topics. Contact an SMC if you can't find what you're looking for:
pacific@sciencemedia.nz

Agriculture
Climate change
Computer science
Earth science
Engineering
Environmental management
Food technology
Forensics
Forestry
Marine science
Medicine
Natural hazard
Psychology
Social science
Sports science

Getting access to research

Science news is frequently driven by publications in the major peer-reviewed scientific journals. Scimex.org can help journalists find out about new and noteworthy research in the Pacific before it is released to the public.



Staying in close contact with key scientists and press officers and asking regularly about upcoming research is a great way to find out what's in the pipeline. However, this approach can be time-consuming and may not yield consistent results. Here, the SMCs can help.

Scimex

To help busy journalists find new and relevant studies published in international research journals, the Aus and NZ SMCs created Scimex, a website which provides journalists with access to the latest embargoed and breaking research from the Pacific and overseas.

Register for access at scimex.org/journo

You can also contact the SMCs any time for help tracking down specific research papers:

pacific@sciencemedia.nz

How to read a research study

We recommend that, wherever possible, journalists seek out the full research article when reporting on a new study.

Not every new study comes with a handy press release and not every press release tells the full story.

Being able to read an original research article offers journalists deeper insight and can unearth hidden gems.

Here are some tips to help you navigate the sometimes complex content of research articles.

Read the abstract (summary) carefully, then skim the whole article first to get a 'big picture' view of the study - focus on the introduction and conclusions.

Take a closer look and figure out what problem the study is trying to solve. Look up any unfamiliar terms or concepts to help cut through jargon.

When reading the results and discussion section, identify the key findings the authors think are most important.

Check if the authors make any recommendations (e.g. for doctors, government or the general public) based on their conclusions.

Make a note of any funding sources or any conflicts of interest. This information is often left out of press material but can have an important bearing on how you report on the study.

Balance in science reporting

'Giving both sides their due' is a basic principle of newsgathering, particularly when covering political and social debates. But good reporting on science and research issues requires more than a 'he says, she says' approach to balance.

In science, claims need to be backed by evidence. Science, at its best, embraces transparency and subjects new results to intensive scrutiny. Persuasive arguments are not enough - science advances by accumulating evidence to support, refine or overturn current understanding.

Scientific consensus evolves over time, but the majority opinion represents the cumulative effort of thousands of scientists around the world and carries the weight of countless hours of analysis and refinement. The best way to provide balance and help the public gauge the truth of competing claims is to provide this essential context for a research report or scientific viewpoint.

The balance of evidence

On controversial issues, rather than merely presenting opposing views of the science, it's important to weigh their merits.

Scientists engage in vigorous debate as a way of progressing understanding within their fields. From an outsider's perspective, it can be easy to mistake normal debate over a nuanced interpretation of the facts for a more fundamental controversy.

The majority opinion may not always be right, but a solitary dissenting voice or outlier study doesn't always deserve an equal platform. Scientific claims that fall outside the mainstream should be approached with healthy scepticism. Beware of isolated, obscure or long out-of-date research findings. A single study or two can easily present a distorted view of the science when taken out of context. The more extraordinary the claim, the more extraordinary the evidence required to back it up.

Weighing claims

Of course, figuring out how much credibility a scientific opinion deserves can require substantial background knowledge. Start by looking at published research on the topic, and what major peer-reviewed assessments or reviews have to say about it.

Supplement what you can find out on your own by consulting scientists who are knowledgeable in the field, but not directly involved with the research in question. SMCs can help suggest relevant experts.

Some things to consider when choosing sources:

- Does the expert have a research background that is relevant to the area?
- Do they have established credentials? An active research career? A reasonable standing among fellow researchers?
- Are there any conflicts of interest or ties to organisations that may unduly influence their views?

There is often a diverse range of opinion within the scientific consensus. By exploring several scientists' views, you may uncover new angles.

"Scientific research and reputable journalism serve as antidotes to the cacophony made louder by technology, where everyone has a voice, an opinion, and a platform to express it.

The foundations shared by both—critical inquiry, evidence-led approaches, peer review, and transparency—provide meaningful context and understanding amid social polarisation and the spread of misinformation.

This underlines the vital roles that science and journalism play as pillars of democracy in our highly contested Pacific region."

Don Mann,
Kaihautū | CEO
Pacific Media Network
Vava'u, Tonga; Ngāti Ruapani, Ngāti Kahungunu

How to talk about risk

It can be difficult to talk about risks in a way that is both responsible, and easily understood. Here are some tips to keep your writing out of the danger zone.

Present balanced information

Risk almost always has two sides of the story: the probability of benefit and the probability of harm. By talking about both, people can weigh them up and make their own decisions.

Example: A new weather forecasting system using artificial intelligence can produce much faster updates to extreme weather alerts, but may trigger more evacuation notices that turn out to be false alarms.

Relative and absolute risk

Absolute risk refers to the ordinary frequency of an event, using an easy-to-understand frame of reference.

Example: Four out of every 1000 women will die of breast cancer in the next 10 years.

Relative risk refers to a change in the level of risk.

Example: This drug reduces a woman's risk of dying from breast cancer by 25%.

This kind of figure can sound very impressive, and is frequently used in reports of new treatments, but it has little meaning unless it is put into the correct context.

In the example above, when we look at both the absolute and relative risks, the 25% decrease actually means that for every 1000 women taking the drug, three will die of breast cancer instead of four. In other words, this treatment could potentially save one life in 1000.

If we report the percentage in terms of a woman's overall risk of dying from breast cancer, the reduction is just 0.1%. This is because the risk of dying from breast cancer is relatively small to begin with, so even a large reduction in that risk will not save many lives.

Mixing up these two types of risk can be very misleading. Place any relative risks in their proper context (or get an expert to help do this) whenever you explain what a risk will mean for your audience in their daily lives.

ON THE WEB

riskknowhow.org

realrisk.wintoncentre.uk

Positive vs. negative frame

Pay attention to the perspective used when describing a risk. While a "97% chance of survival" and a "3% chance of dying" may both be correct, they will have a different impact on your audience.

Evidence shows that positive framing is more likely to persuade people to pursue risky treatment options than negative framing.

Single event probabilities

A one-time event's chance tells us how likely it is to occur now. It doesn't provide information about how big its impacts will be, how long it will last, or past occurrences.

Example: A 40% chance of flooding does not mean that 40% of the area will flood, nor that it will rain 40% of the day. It means that, in 4 out of every 10 warnings like this, flooding will happen.

When presenting probabilities for a hazard or other one-time event, help ensure your audience doesn't confuse this with the everyday likelihood of something going wrong.

Adapted from the SMC España and from content reviewed by Professor of Statistics Thomas Lumley, University of Auckland

Dealing with scientific uncertainty

Uncertainty is part of the process:
No matter how many carefully designed experiments they've run, scientists will never be able to say they're "100% certain" that something is safe. They are always open to the possibility that new research tomorrow could overturn current understanding. This flexibility of approach is one of science's great strengths.

Enough is enough:
That said, when the studies start to stack up, most scientists will do everything in their power to rule out a given risk or association. Accept a "high confidence" level as the scientist's most strongly worded statement on the subject.

Experts may focus on the gaps in knowledge:
Scientists may spend less time talking about what they do know (which they assume everyone knows already), than talking about what they don't know. The unknown is an area of intense interest and potential discovery for scientists. Overall, this can give a skewed view of how important the gaps in knowledge actually are.

Qualifiers and caveats are essential:
Sub-editors hate them, but qualifiers indicate the level of scientific uncertainty and are not the result of weak writing in science-related stories. Leave notes to the sub-editors when you file your story to try and avoid qualifiers and caveats being cut and inappropriate headlines being created for your stories. (Qualifiers can include: "as far as we know", "research suggests", etc.)

Avoid single-source stories:
It can be tempting to report from a well-crafted press release and the one scientist it quotes, but seek views from other scientists, particularly when dealing with uncertainty in results. Scientists are often too close to their work to accurately say how much weight their findings should be given. Check their claims against the peer-reviewed literature and their peers.

The flipside – don't exaggerate uncertainty: Sometimes media reports give the impression that scientists can't even agree on the basics. Contrasting scientific views should be noted but not beaten up to suggest uncertainty reigns supreme.

Be careful about "duelling experts":
There's nothing as quote-worthy as a good argument between experts. But two opposing views doesn't mean a rift in the scientific community. Go to scientific bodies, societies and associations for a big picture view.

Don't pit scientist against non-scientist:
A science-related story may originate from a politician, lobby group or a man in the street. While their points of view are important, save the discussion of scientific uncertainty to experts.

"Virtually all new technologies pose risks along with benefits. Thus 'safe' and 'effective', whether applied to new drugs, devices or processes, are always relative terms. Nothing is 100 percent safe. Policy decisions involving science must balance risks and benefits."

Boyce Rensberger,
Science writer, editor and former
Director of Knight Science Journalism

Misinformation: What to watch out for

Familiarise yourself with these common red flags and you'll start to see how many misleading claims are dressed up as science.

CORRELATION & CAUSATION

Be wary of confusion of correlation and causation. A correlation between variables doesn't always mean one causes the other. Global warming has increased since the 1800s, and pirate numbers decreased, but lack of pirates doesn't cause global warming.

UNSUPPORTED CONCLUSIONS

Speculation can often help to drive science forward. However, studies should be clear on the facts their study proves, and which conclusions are as yet unsupported ones. A statement framed by speculative language may require further evidence to confirm.

PROBLEMS WITH SAMPLE SIZE

In trials, the smaller a sample size, the lower the confidence in the results from that sample. Conclusions drawn can still be valid, and in some cases small samples are unavoidable, but larger samples often give more representative results.

UNREPRESENTATIVE SAMPLES USED

In human trials, subjects are selected that are representative of a larger population. If the sample is different from the population as a whole, then the conclusions from the trial may be biased towards a particular outcome.

NO CONTROL GROUP USED

In clinical trials, results from test subjects should be compared to a 'control group' not given the substance being tested. Groups should also be allocated randomly. In general experiments, a control test should be used where all variables are controlled.

NO BLIND TESTING USED

To try and prevent any bias, subjects should not know if they are in the test or the control group. In 'double-blind' testing, even researchers don't know which group subjects are in until after testing. Note, blind testing isn't always feasible, or ethical.

SENSATIONALISED HEADLINES

Article headlines are commonly designed to entice viewers into clicking on and reading the article. At times, they can over-simplify the findings of scientific research. At worst, they sensationalise and misrepresent them.

MISINTERPRETED RESULTS

News articles can distort or misinterpret the findings of research for the sake of a good story, intentionally or otherwise. If possible, try to read the original research, rather than relying on the article based on it for information.

CONFLICT OF INTERESTS

Many companies employ scientists to carry out and publish research - whilst this doesn't necessarily invalidate research, it should be analysed with this in mind. Research can also be misrepresented for personal or financial gain.

SELECTIVE REPORTING OF DATA

Also known as 'cherry-picking', this involves selecting data from results which support the conclusion of the research, whilst ignoring those that do not. If a research paper draws conclusions from a selection of its results, not all, it may be guilty of this.

UNREPLICABLE RESULTS

Results should be replicable by independent research, and tested over a wide range of conditions (where possible) to ensure they are consistent. Extraordinary claims require extraordinary evidence - that is, much more than one independent study!

NON-PEER REVIEWED MATERIAL

Peer review is an important part of the scientific process. Other scientists appraise and critique studies, before publication in a journal. Research that has not gone through this process is not as reputable, and may be flawed.

International Science Council

The Science Media Centre's work in the Pacific is supported by the International Science Council's Regional Focal Point for Asia and the Pacific.

The ISC-RFP-AP is led by the Australian Academy of Science and funded by the Australian Department of Industry, Science and Resources

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ISBN 978-0-473-73940-9