Science Media Centre. SMC NZ

Where **science** meets the **headlines**

DESK GUIDE

Media covering science

Haere mai!

Welcome to the fifth edition of our *Desk Guide: Media Covering Science.*

The Desk Guide is designed for all reporters who want to get the science right. It covers the basics of everything from the peer review process in scientific research, through to writing a "balanced" science story when the weight of scientific evidence may be overwhelmingly on one side.

You'll find a ten-point checklist for approaching science-related subjects, tips on accessing and reading research articles, and a guide for spotting bad science. There's a centre-spread infographic which gives a quick introduction to the diverse areas of research underway in Aotearoa.

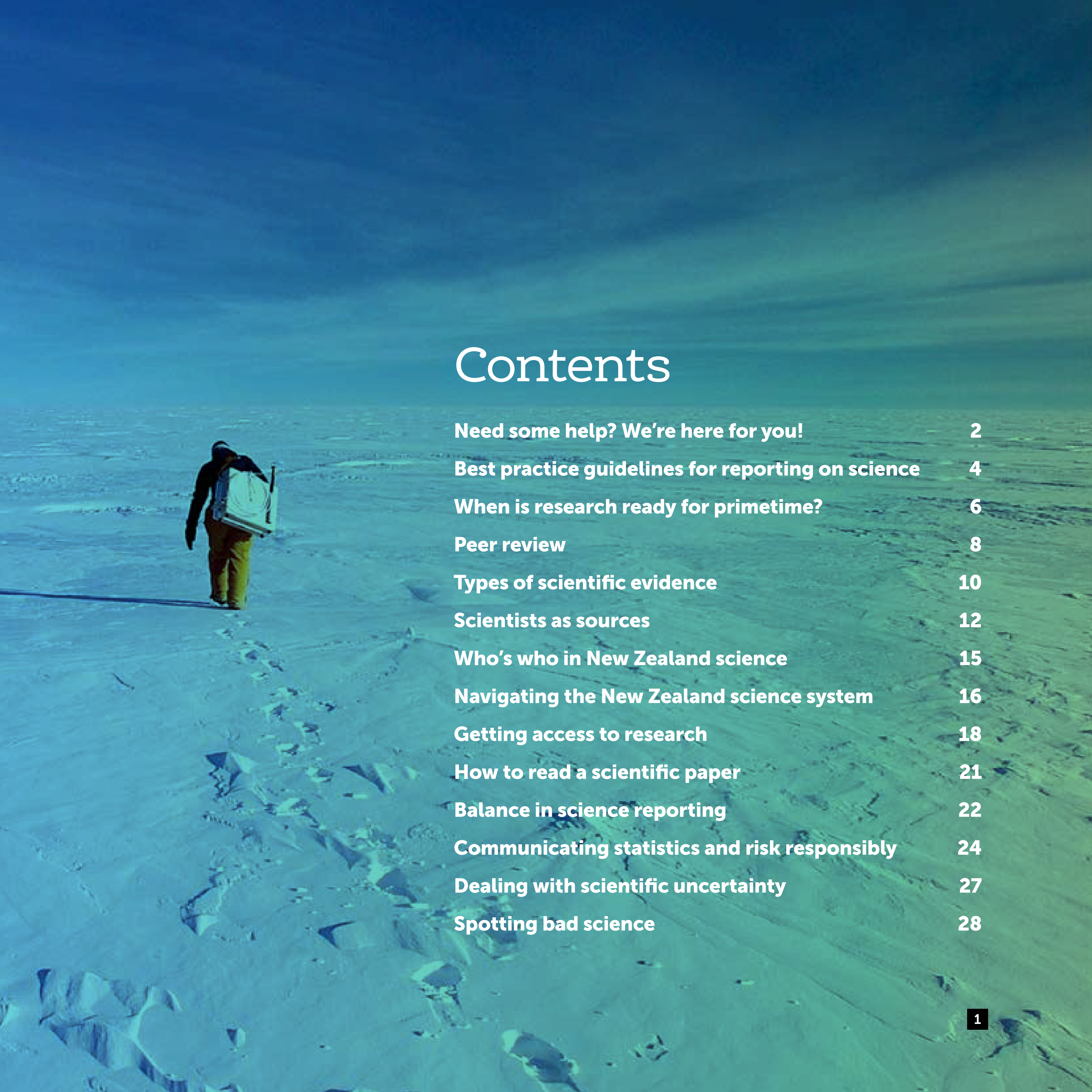
You'll also find information about Scimex.org, our go-to portal for journalists, where you will gain embargoed access to new research and a database of experts ready to talk to journalists.

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

Dacia Herbulock
SMC Director

About

SMC is an independent centre established by Royal Society Te Apārangi with funding from the Ministry of Business, Innovation and Employment Hīkina Whakatutuki. We help journalists work more effectively with the scientific and research community to inform public discussion of important issues for society.



Contents

Need some help? We're here for you!

The Science Media Centre (SMC) is an independent centre that was set up in 2008 specifically to help journalists work more effectively with the scientific and research community.

Here's how we can help you

Find an Expert

Need help with a complex issue or looking for an expert to quote in your story? One of the more than 8,000 researchers in our Expert Database should be able to help you. Drawn from organisations across Aotearoa, this list of experts willing to speak with the media covers everything from climate change to criminal psychology.

Contact the SMC to find an expert.

Scimex: The Science Media Exchange

Scimex is your one-stop-shop for science news. We collate the best embargoed and breaking research stories for New Zealand and abroad, providing easy access to press material, research papers, multimedia, expert commentary and more – before it hits the headlines. We highlight the most relevant and newsworthy research every week in the SMC Picks, which can be emailed to you as a twice-weekly or daily alert.

Register for access at scimex.org

Expert Reaction

When a science story is breaking the SMC will round up comment from experts across the country, offering quotes in an SMC Expert Reaction email designed to give journalists a quick overview of how scientists are responding. These alerts are great sources of comment, offering a range of evidence-based perspectives on breaking stories in the agriculture, environment, health science, technology and even political and business rounds. You can tailor the alerts you receive to suit your areas of interest.

Expert Q&A

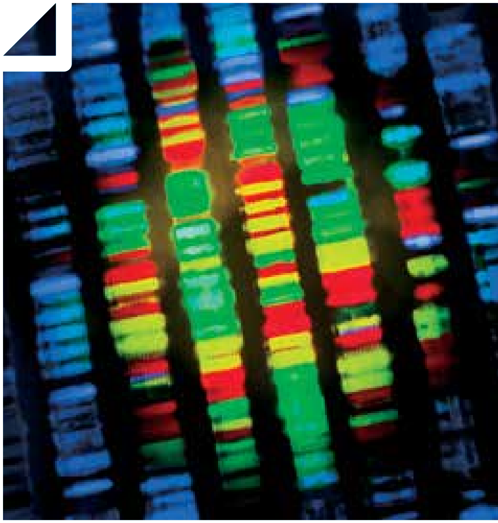
When complex research or difficult science hits the headlines, the SMC also sends out commentary from scientists and researchers in a longer Q&A format. These more in-depth and detailed Q&As really get to the heart of an issue and give busy journalists a comprehensive yet concise background on issues like water quality, antimicrobial resistance and synthetic drugs.

International connections

The New Zealand SMC is part of a growing network of Science Media Centres helping journalists cover science all over the world. If you are looking for overseas experts, we can connect you to the SMC network in the United Kingdom, Australia, North America and Europe. Registering to receive alerts from the SMCs also grants access to relevant information from the rest of the SMC network and access to joint briefings.

Sciblogs network

Established by the SMC, Sciblogs is the largest science blog network in Australasia. It is a vibrant forum for discussion of topical science-related issues and a good place to identify confident science communicators.



ON THE WEB

sciencemediacentre.co.nz
sciblogs.co.nz
scimex.org

Best practice guidelines for reporting on science

Developed in consultation with scientists, science reporters, editors and sub-editors, these guidelines are intended for use by newsrooms and general reporters as a checklist to help ensure the accurate reporting of science and health 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 – i.e. 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, e.g. 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?

Rather than just reading the press release, understanding how scientists work may affect how you cover a topic.

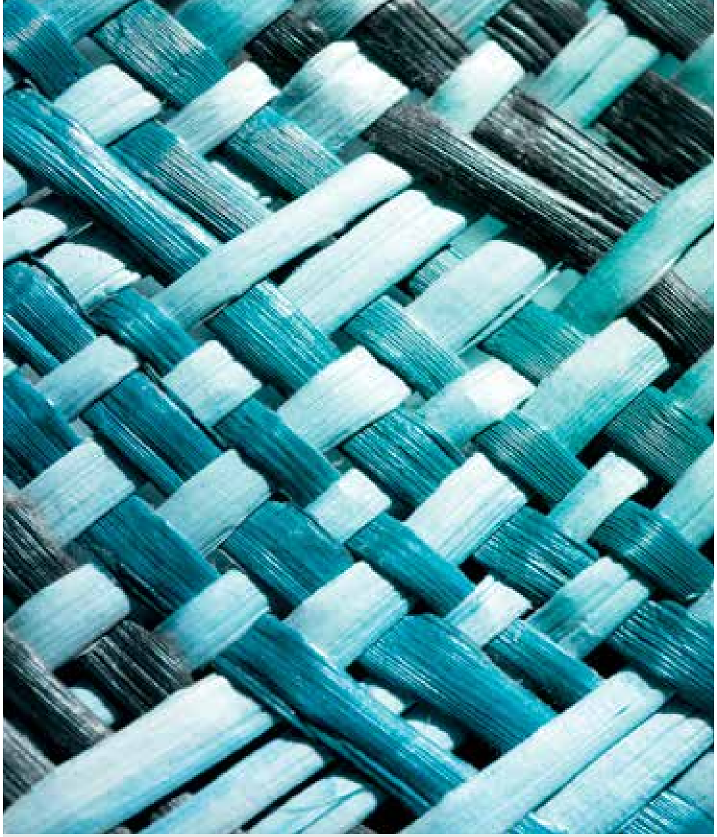
Scientists deal with uncertainty all the time because they are pushing the boundaries of what is known. "Breakthroughs" nearly always build on years of incremental progress, with many false starts and dead ends.

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. In New Zealand, mātauranga Māori – traditional Māori knowledge – plays a key role in the science system.



Mātauranga Māori is a modern term for the combined knowledge of Polynesian ancestors and the experiences of Māori living in the environment of Aotearoa. The term takes many forms, such as language (te reo), education (mātauranga), traditional environmental knowledge (taonga tuku iho, mātauranga o te taiao), traditional knowledge of cultural practice, such as healing and medicines (rongoā), fishing (hī ika) and cultivation (mahinga kai).

Science Learning Hub – Pokapū Akoranga Pūtaiao (2020)

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.

Extreme caution

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. In a process which 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.

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.

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.

Publications
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 scientific evidence

Being able to evaluate the evidence behind a claim is important, but scientific evidence comes in a variety of forms.

Here, different types of scientific evidence are ranked and described, particularly those relevant to health and medical claims.

Note

In certain cases, some of these types of evidence may not be possible to procure, for ethical or other 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.

INCREASING STRENGTH OF EVIDENCE

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

The SMC's Expert Database lists over 8,000 scientists who are experts in their field and willing to talk to the media.

Some tips on approaching and interviewing scientists:

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).

Use email

We've found that many scientists are virtually unreachable by phone but respond obsessively to emails. Scientists tend to travel frequently, work at multiple research institutions or have teaching commitments or lab/field work. The SMC has mobile numbers for many media-friendly scientists.

Head off over-preparation

Scientists will often spend unnecessary hours prepping 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?) 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

Contact the SMC if you are looking for an expert.

Who's who in New Zealand science

There are a number of different types of organisations involved in science and research in Aotearoa. On the following page we have mapped out the major players in the science sector and their research specialties.*

Who is doing research in New Zealand?

Universities: These institutions house the majority of New Zealand's researchers. Most comprise a broad range of experts beyond the major specialties highlighted overleaf.

Crown Research Institutes (CRIs): Crown-owned science research companies, formed when the government's Department of Scientific and Industrial Research was disbanded in 1992.

Centres of Research Excellence (COREs): Collaborative networks focused on discovery-led research, hosted by a university and involving multiple science organisations as partners.

Independent Research Institutes: Outside of the University and CRI systems, many independent organisations also contribute to New Zealand research. The next page gives just a few examples.

National Science Challenges: Eleven separate challenges focus funding and research effort towards issues of national significance, such as healthy ageing, unlocking the potential of mātauranga Māori and protecting biodiversity. Each challenge involves multiple institutions.

Major Funding Agencies: Ministry of Business, Innovation and Employment (MBIE); Callaghan Innovation; Health Research Council; Marsden Fund, Royal Society Te Apārangi, Ministry of Primary Industries (MPI) and Tertiary Education Commission.

** Disclaimer: Specialties indicate key research strengths and are not intended to be exhaustive.*

ON THE WEB

Universities
universitiesnz.ac.nz

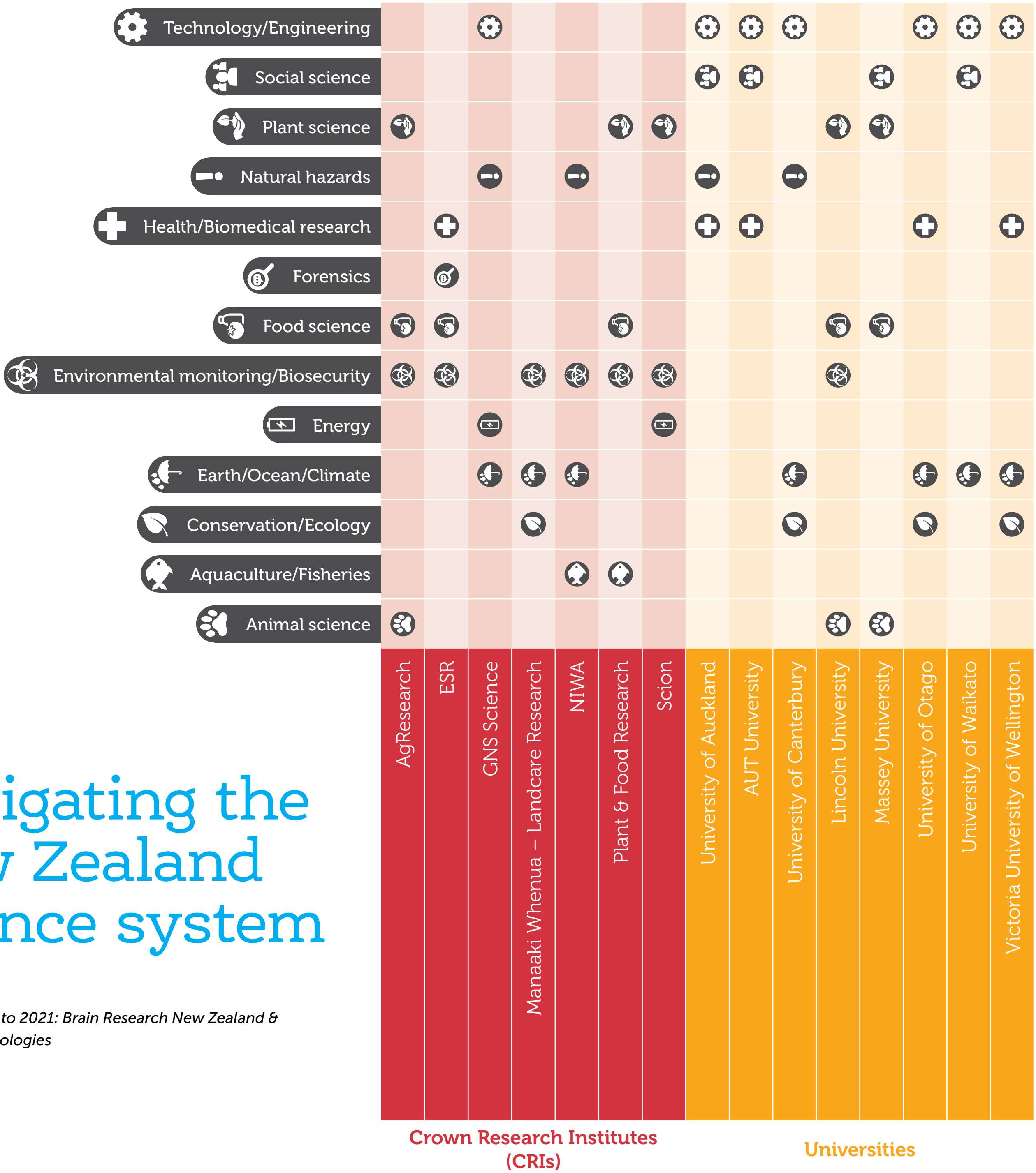
CRIs
sciencenewzealand.org

COREs
bit.ly/corenz

Independent Research Institutes
iranz.org.nz

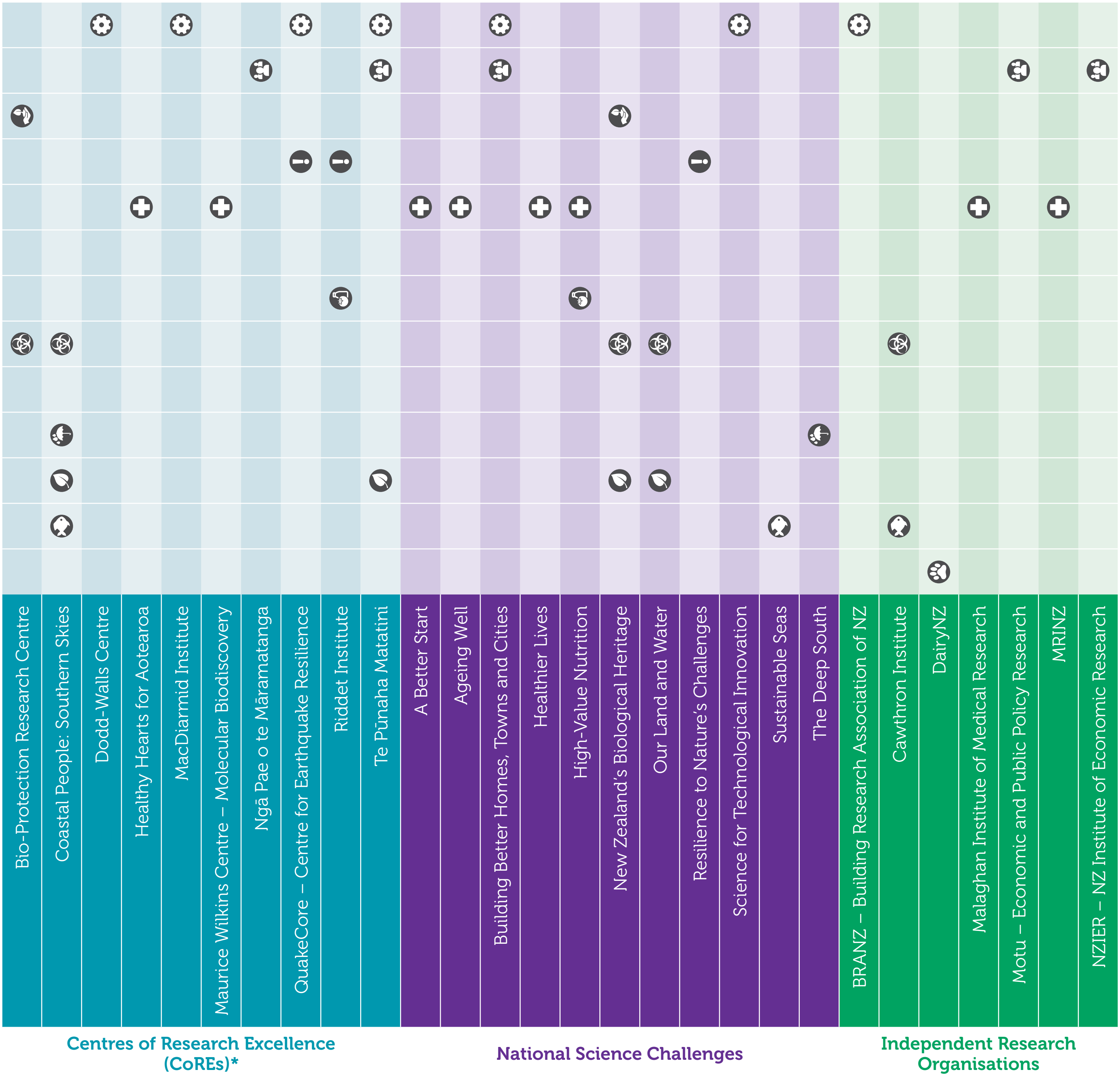
National Science Challenges
bit.ly/nsc-nz

PM's Chief Science Advisor
pmcsa.ac.nz



Navigating the New Zealand science system

* *CoREs funded to 2021: Brain Research New Zealand & Medical Technologies*


Bio-Protection Research Centre
Coastal People: Southern Skies
Dodd-Walls Centre
Healthy Hearts for Aotearoa
MacDiarmid Institute
Maurice Wilkins Centre – Molecular Biodiscovery
Ngā Pae o te Māramatanga
QuakeCore – Centre for Earthquake Resilience
Riddet Institute
Te Pūnaha Matatini
A Better Start
Ageing Well
Building Better Homes, Towns and Cities
Healthier Lives
High-Value Nutrition
New Zealand's Biological Heritage
Our Land and Water
Resilience to Nature's Challenges
Science for Technological Innovation
Sustainable Seas
The Deep South
BRANZ – Building Research Association of NZ
Cawthron Institute
DairyNZ
Malaghan Institute of Medical Research
Motu – Economic and Public Policy Research
MRINZ
NZIER – NZ Institute of Economic Research
Centres of Research Excellence (CoREs)*
National Science Challenges
Independent Research Organisations

Getting access to research

Science news is frequently driven by publications in the major peer-reviewed scientific journals. So for journalists covering science, health and related fields, getting access to research ahead of time is crucial.

Staying in close contact with key scientists and press officers and asking regularly about forthcoming research is a great way to find out what is coming up. However, we appreciate that this approach can be time-consuming and sometimes uneven. Here, the SMC can help.

Scimex

To help busy journalists, the SMC created Scimex, a website which provides journalists with access to the latest embargoed and breaking research from NZ and overseas. We curate the best research from sources around the world, including those on the following page.

Register for access at scimex.org/journo

scimex
science media exchange

Many research journals provide free, early access to scientific papers to journalists under embargo. You'll generally be asked by journal publishers to prove your credentials, often with a letter of introduction from your editor. Here are some of the main points of contact:

EurekAlert: An indispensable resource for thousands of journalists worldwide, the EurekAlert portal provides embargoed access to major journals including *Science, PLOS ONE, PNAS* and *Cell Press*, as well as press releases from scientific conferences and institutions.

Nature: A prestigious multidisciplinary scientific journal published weekly. *Nature* has an extensive press portal allowing access to the journal papers, press releases and multimedia resources as well as to related publications such as *Nature Geoscience* and *Nature Genetics.*

TIP

You can contact the SMC any time for help tracking down specific research papers.

Royal Society of London: The 360-year-old Royal Society of London publishes numerous journals such as *Proceedings B*, its respected biological research journal. Registered journalists can gain embargoed access to journal papers and associated resources.

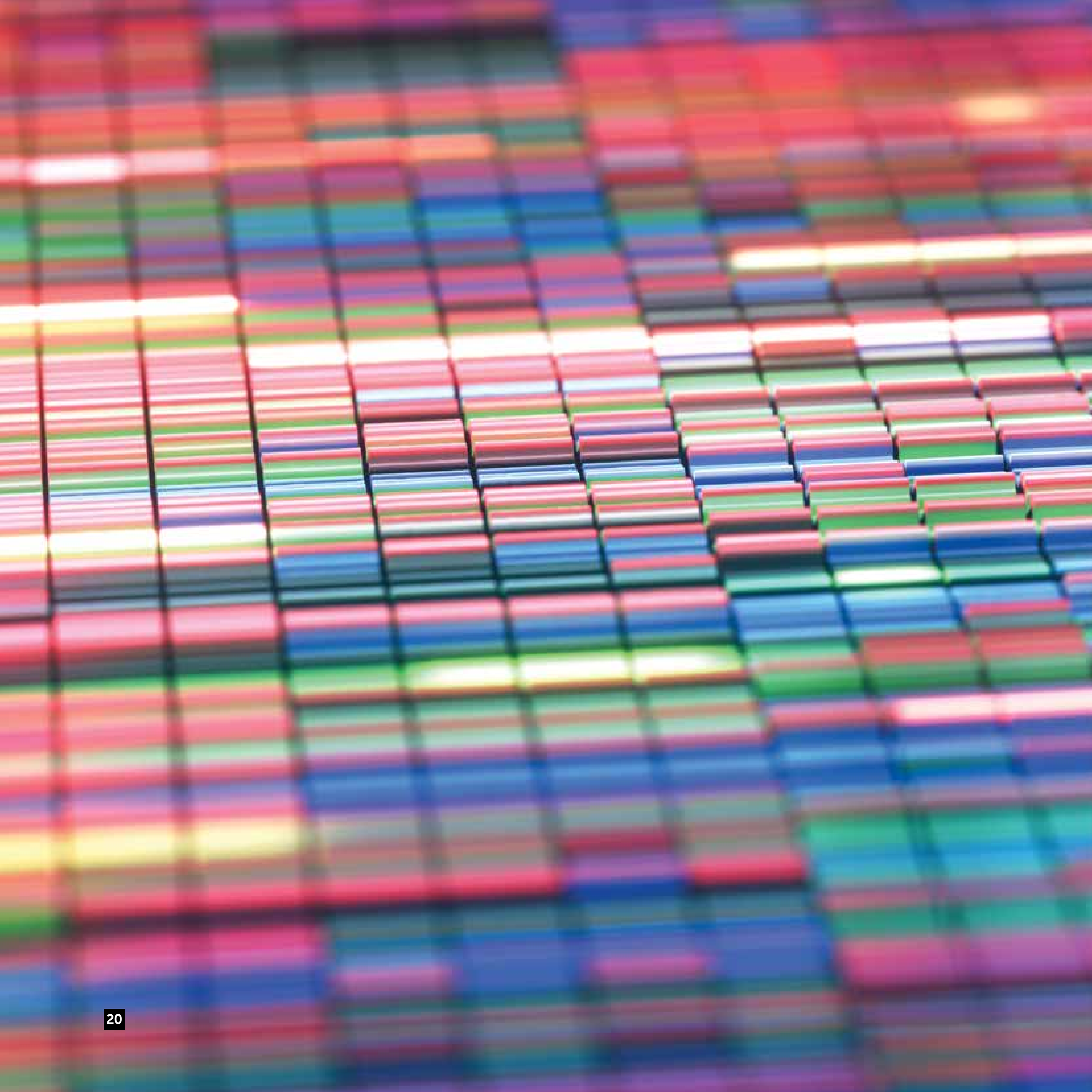
ScienceDirect: Publishing company Elsevier provides registered journalists free online access to over 2,000 of their journals on the ScienceDirect platform.

Medical research: Several journals publish weekly on medical science, including *The Lancet, BMJ* and *JAMA*. *Cochrane Reviews* publishes systematic reviews of medical treatments and drugs. A major source for local medical research is the *New Zealand Medical Journal.*

Local research: Royal Society Te Apārangi has a stable of journals covering everything from agriculture and botany to geology and zoology. These can be accessed via publisher Taylor & Francis' Press Pass feature, which offers registered journalists free online access to all their journals.

MAI Journal is an open access journal that publishes multidisciplinary peer-reviewed articles on Indigenous and Pacific issues.

Government-commissioned research reports are regularly posted to the Ministry of Health Manatū Hauora, Ministry for the Environment Manatū Mō Te Taiao, Ministry for Primary Industries Manatū Ahu Matua and other government sites, usually without prior notification.



How to read a scientific paper

We recommend that, wherever possible, journalists ask for and read 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.

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.

> "Journalists and scientists espouse similar goals. Both seek truth and want to make it known. Both devote considerable energy to guard against being misled. Both observe a discipline of verifying information. Both insist that society allow them freedom to pursue investigations wherever they lead."
>
> **BOYCE RENSBERGER**
>
> SCIENCE WRITER, EDITOR AND FORMER DIRECTOR OF MIT'S KNIGHT SCIENCE JOURNALISM FELLOWSHIPS

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.

The SMC can help suggest relevant experts.

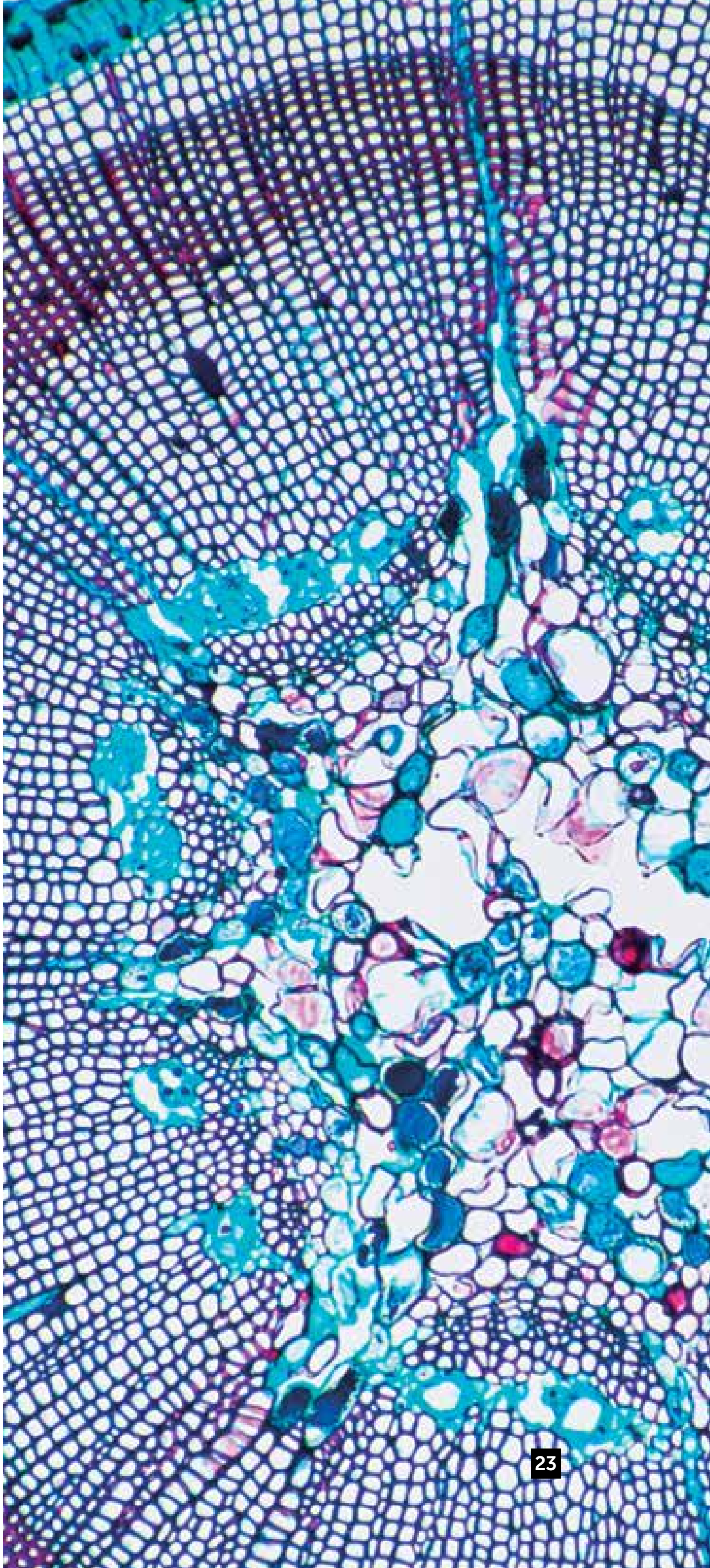
Some things to consider when choosing sources:

- Does the expert have a scientific background that is relevant to the area?
- Do they have established credentials? An active research career? A reasonable standing among fellow scientists and 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.

ON THE WEB

World Federation of Science Journalists
http://www.wfsj.org/



Communicating statistics and risk responsibly

Comparing risks

It may be tempting to try to put risk in perspective by comparing it to something your audience is familiar with (e.g. road accidents, smoking a pack of cigarettes a day). But be careful! Translating statistics and risks has pitfalls.

> "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. It is irrational to ask whether something is safe or not. Nothing is 100 percent safe. Policy decisions involving science must balance risks and benefits."
>
> **BOYCE RENSBERGER**
>
> SCIENCE WRITER, EDITOR AND FORMER DIRECTOR OF MIT'S KNIGHT SCIENCE JOURNALISM FELLOWSHIPS

Absolute risk vs. relative risk

Absolute risk refers to the naturally-occurring frequency of an event. It gives an ordinary frame of reference that is easy to understand.

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. This kind of figure often sounds very impressive, and is frequently used in reports of drug trials or new treatments, but it has little meaning unless it is put into the correct context.

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

In the example above, 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.

When the percentage is given in terms of a woman's overall risk of dying from breast cancer, it means a reduction of 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 does not equate to many lives saved.

One of the most common confusions occurs when these two types of risk are mixed up. Using the context of absolute risk (or getting an expert to provide this) is the best way to explain what a result will mean for your audience in their daily lives.

Positive vs. negative frame

Pay attention to the way statistics are framed. While a 97% chance of survival, and a 3% chance of dying may both be correct, they don't always mean the same to the person listening.

Evidence shows that positive framing is more effective than negative framing in persuading people to take risky treatment options.

Single event probabilities

The chances of a single, undesirable event taking place can be easily confused with the everyday likelihood of things going wrong.

Example: *A psychiatrist prescribes a drug to his patients with the warning that they will have a "30% to 50% chance of developing a sexual problem" such as impotence or loss of sexual interest.*

Their patients may understand this to mean 30 to 50% of their own sexual encounters will be problematic, and refuse the drug. But the psychiatrist actually means that of every 10 patients taking the drug, three to five will experience a sexual problem at some stage. Explaining it this way, they find their patients are less concerned about the risk.

Rare exposures

If being exposed to some harmful factor increases your risk a lot, but that harmful exposure is very rare, it may be important for a small number of individuals but cannot have a big impact on the average reader.

Example: *Angelina Jolie has a particular genetic variant in the BRCA gene that gives her an 85% lifetime risk of breast cancer.*

This is a very high risk, but the genetic variant is rare – only about 1% of women have it – so only a very small fraction of all breast cancer could be prevented by genetic testing.

Reviewed by Professor Thomas Lumley, University of Auckland Te Whare Wānanga o Tāmaki Makaurau statistician and founder of the blog Stats Chat, which aims to help improve statistical literacy by scrutinising facts and figures used in the media and in the world around us.

ON THE WEB

statschat.org.nz
stats.govt.nz
senseaboutscience.org

"Uncertainty is a sign of honest science and reveals a need for further research before reaching a conclusion. Cutting-edge science is highly uncertain and often flat-out wrong."

BOYCE RENSBERGER

SCIENCE WRITER, EDITOR AND FORMER DIRECTOR OF MIT'S KNIGHT SCIENCE JOURNALISM FELLOWSHIPS

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, and don't vilify scientists who won't categorically rule out a given possibility.

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 when you file your story to try and avoid qualifiers and caveats being cut and inappropriate headlines being created for your stories.

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. But science is a process and the big picture changes as new studies are completed and scientists add to the body of work that came before them. Contrasting scientific views should be noted but not inflated 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. Be careful you are not playing up disagreement between scientists. 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.

Spotting bad science

Being able to evaluate the evidence behind a scientific claim is important. Being able to recognise bad science reporting, or faults in scientific studies is equally important. These 12 points will help you separate the science from the pseudoscience.

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.

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.

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.

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.

CONTACT US

04 499 5476
027 3333 000 (after hours)
smc@sciencemediacentre.co.nz
sciencemediacentre.co.nz
Twitter: @smcnz

LOCATION
11 Turnbull St,
Thorndon, Wellington

POST
PO Box 598,
Wellington, 6140

ISBN 978-0-473-54927-5