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EXCHANGE

Ethics in Research:

Dos and Don’ts

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Ethics in Research:
Dos and Don'ts

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1.

Don’t falsify your results.

Never alter your results by manipulating your research methods, materials, and equipment or by selectively presenting your data to suit the conclusions you prefer. Falsification is one of the 3 main types of scientific misconduct and can have serious professional and social consequences.

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M. Mawazo's Example:

M. Mawazo's research project involves measuring water quality indicators at three sites along the Ziwa River and surveying local communities to understand the socioeconomic impact of river pollution. Unlike past research connecting exposure to heavy metal pollutants with worse school performance among children, M. Mawazo finds that children in the community near her downstream site don't perform worse at school despite higher concentrations of lead and mercury in the water. A colleague suggests to M. Mawazo that if she reports lower concentrations of lead and mercury, or worse school performance, than she found, her work will not contradict past research. However, M. Mawazo recognizes that this would be data falsification and reports her results as measured.

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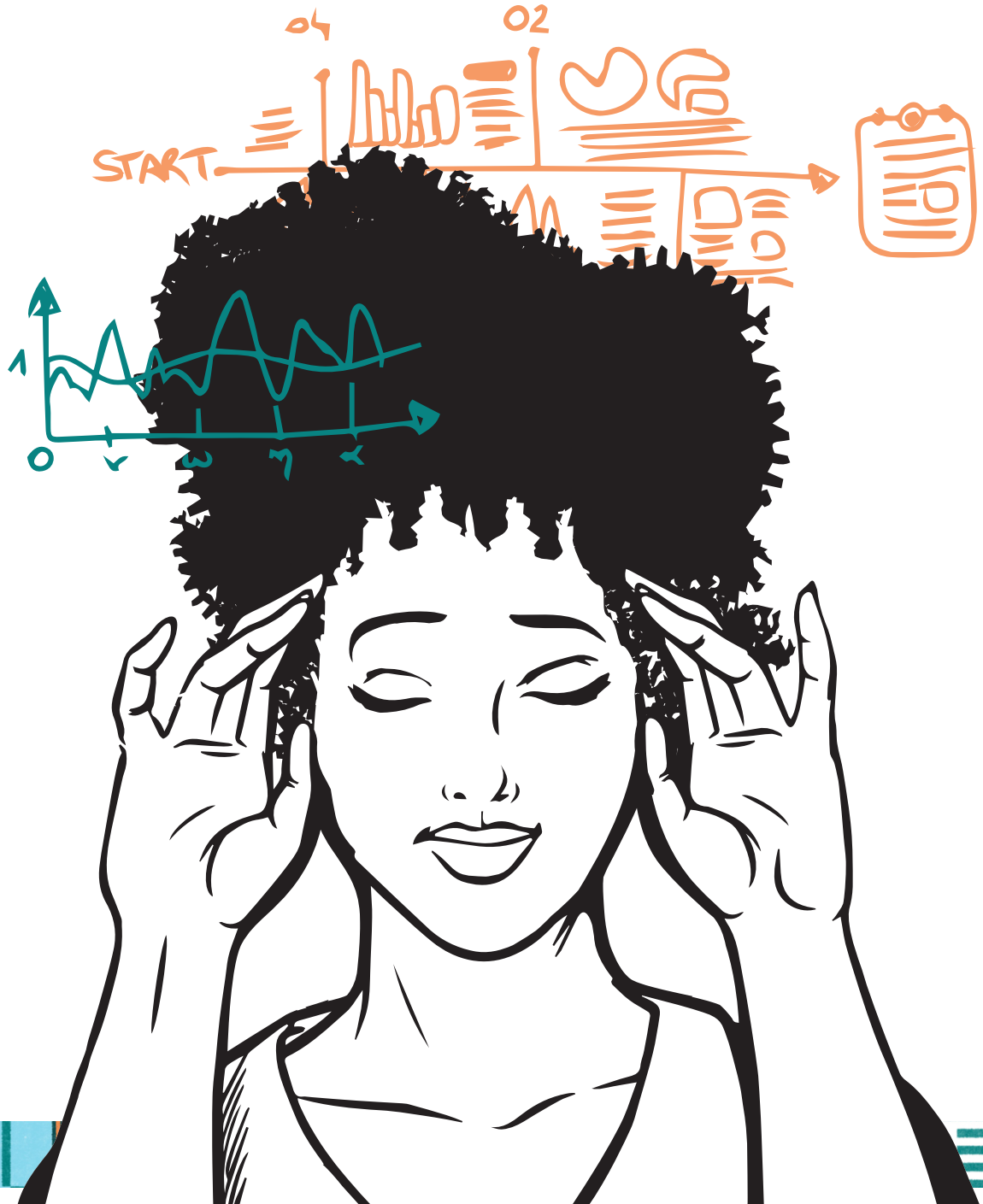
2.

Don't fabricate your results.

Never make up data or results. Fabrication is one of the 3 main types of scientific misconduct and, like the others, it threatens your research career and violates the trust of stakeholders in the community who rely on credible science.



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M. Mawazo's Example:

During the first visit to the upstream site she is studying, M. Mawazo forgets to trap a Lionel Bullfrog, one of the three types of fauna she needs to collect a tissue sample from to study the effects of the Ziwa River's pollution on plant and animal life. After analyzing the tissue samples from the fauna she did collect, M. Mawazo finds no evidence of exposure to mercury pollutants. Her supervisor suggests that she can record similar results for the missing Bullfrog tissue sample, and that they would be close to accurate since water samples from the area have low levels of mercury. However, M. Mawazo argues that this would be data fabrication, and instead reports that a tissue sample from the Bullfrog was not collected.

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3.

Don’t plagiarize past work.

Never reuse or copy results from previous work without correct attribution, even if that work is your own. Plagiarism is one of the 3 main types of scientific misconduct. Avoid it by making sure you cite the sources of all the concepts, quotes, and data you use in your academic writing.

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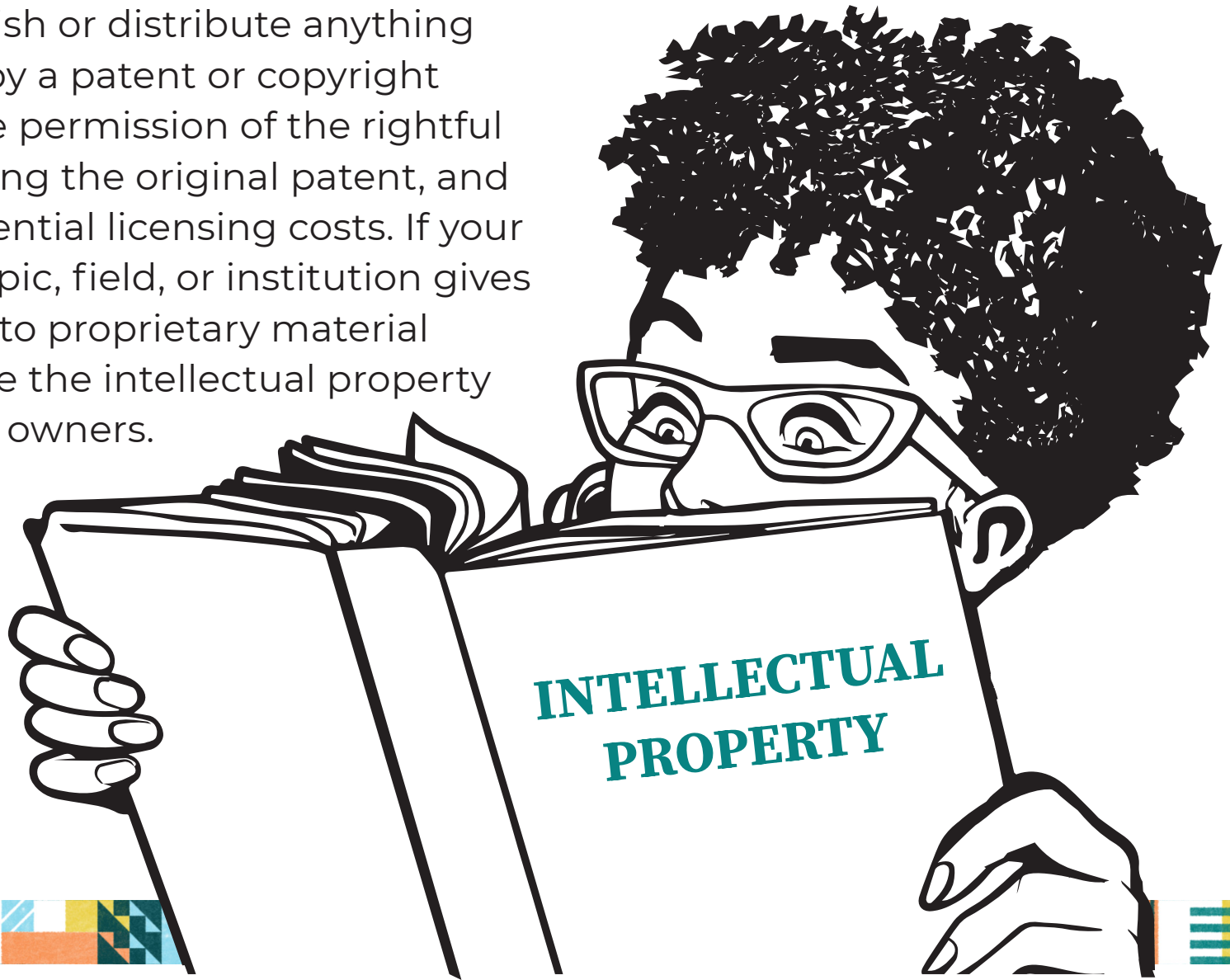
M. Mawazo's Example:

During her master's degree, M. Mawazo read a paper titled Mercury and Other Trace Elements in Farmed and Wild Salmon from British Columbia, Canada by Barry C. Kelly et al that strongly influenced her PhD research interests. One sentence in the introduction of the paper reads: "Elevated human dietary exposure to some chemicals can potentially increase the risk of cancer, immune and cognitive dysfunction, and birth and developmental effects." While drafting her dissertation, M. Mawazo unintentionally uses the exact same sentence. A fellow student in the field notices the similarity while editing the draft but argues that M. Mawazo should not be worried since the effects of human exposure to the chemicals described are common knowledge. However, M. Mawazo knows that verbatim similarity without citation would be plagiarism, and realizes she should cite her sources to be safe and either put quotation marks around the sentence or rephrase it in her own words.

4. Don’t violate intellectual property.

Never publish or distribute anything protected by a patent or copyright without the permission of the rightful owners, citing the original patent, and paying potential licensing costs. If your research topic, field, or institution gives you access to proprietary material don’t violate the intellectual property rights of its owners.



M. Mawazo's Example:

At a recent conference on water quality in the Ziwa River, M. Mawazo met a researcher working for the Mount Sayansi Water Company at a water bottling plant near the river's source. As a result of this meeting, M. Mawazo learned that the company regularly measures water quality in the river at a location very close to the upstream site she is studying for her PhD research project. The researcher, who is personally interested in M. Mawazo's work, offers to secretly share the company's data, arguing that since M. Mawazo will likely get similar results in the end, she can use the company's data to save on the costs of sample collection and lab analysis. However, M. Mawazo refuses, knowing that using the proprietary data without properly seeking the consent of the Mount Sayansi Water Company would be a violation of intellectual property.

5.

Don't avoid contrary evidence.

Never suppress sources that counter your position. If your research includes a literature review, or if you are aware of previous work that addresses questions or uses methods similar to those in your own research, it is important to discuss this work, even if it disagrees with your own.

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M. Mawazo's Example:

After measuring water pollution at her downstream site on the Ziwa River, M. Mawazo compares her data to the results from a 1999 report by the Sayansi Environmental Health and Safety Department. She notices that while her results show similar concentrations of chemical pollutants such as nitrates and phosphates, they also show lower levels of dissolved oxygen. A lab assistant suggests that M. Mawazo should not mention these differences in her paper, since disagreeing with a well-regarded source may damage the credibility of her work. However, M. Mawazo does not believe in concealing evidence that disagrees with her own. Instead, she mentions the difference and explains that confounding variables, such as increases in the average temperature of the region, may explain the differences.

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6.

Don’t manipulate your research record.

Never manipulate your research and publication record. Although young researchers often benefit from frequent citation and publication, you should not intentionally inflate your academic record by citing yourself more than necessary or by submitting the same work to multiple journals without explicit permission.

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M. Mawazo's Example:

Like many PhD students, M. Mawazo plans to pursue a career in research and higher education after graduation. However, she knows that there are very few positions available at universities in Sayansi and that whenever a position is available several strong candidates from Sanyasi and its neighboring countries apply. In conversation with a new faculty member, M. Mawazo is told that she should be willing to cite her own previous work in her dissertation since it may help her applications stand out to hiring committees in the future. After reviewing the papers she co-authored during her master's degree, M. Mawazo decides she would not consider them relevant if they had been written by somebody else and chooses not to cite them.

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7.

Do be open and transparent.

Always be transparent about the methods, assumptions, and resources that inform your work. Researchers cannot replicate and build on past work if the results and methods are not presented clearly and directly. If your discipline, institution, and research subjects allow it, you may even consider making your data publicly available.

M. Mawazo's Example:

As mentioned, M. Mawazo's research project aims to measure pollution in the Ziwa River and to understand its effect on the plants, animals, and people that rely on its water. To do this, M. Mawazo measures the water's physical and biochemical parameters and to study the concentration of chemical pollutants such as pesticides and toxic metals. Although she has been careful about describing her results and methods as clearly as possible, M. Mawazo realizes after collecting her data and writing her draft that although some researchers have previously classified pathogens such as Escherichia coli as pollutants, her project design has assumed they are not. To be transparent as possible, she decides to openly explain how she is defining pollutants in her introduction and identifies the impacts of pathogenic microorganisms in the Ziwa River as a potential avenue for future research.

8.

Do acknowledge collaborators.

Always credit the researchers who contribute to your work. Research is often a collaborative effort, so it is important to build and maintain healthy working relationships with others by recognizing their contributions to your work according to the standards of your field, whether that is in a footnote, an acknowledgments section or, in the case of a very significant contribution, by listing the contributor as a co-author.

M. Mawazo's Example:

To help with data collection during her research project, M. Mawazo hired 2 field research assistants to collect water samples, 1 lab assistant to carry out the analysis, and 2 additional survey research assistants to administer her survey on the socio-economic impacts of water pollution to 90 families. Although they were not involved in the writing and did not contribute to the overall design and conception of the project, all five of these assistants were essential to the successful completion of her project. After consulting her PhD supervisor and other senior members of the department to better understand the authorship guidelines in her field, M. Mawazo makes sure to build goodwill by thanking every research assistant by name in the acknowledgements section.

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9.

Do manage your research finances well.

Always respect approved budgets and observe grant management guidelines. It is important to spend your research funds only on tasks and items and that you follow the reporting guidelines provided by the institutions supporting you. If you need to change your budget, always seek consent first. For more on best practices in financial management for research, Mawazo's **Top Ten Principles for Budgeting and Financial Management**.

M. Mawazo's Example:

Due to a discount from the manufacturer, M. Mawazo managed to buy the hand-held GPS devices she needed to precisely locate her study sites along the Ziwa River for $200 dollars less than the budgeted amount. During data collection, one of M. Mawazo's research assistants suggested that she should use the unspent $200 to buy fast tablets to replace the slow and unreliable phones they were using to administer surveys to families affected by the river's pollution. However, M. Mawazo did not believe she should do this without first seeking the approval of her funding institution, the Sayansi National Research Fund. Afterwards, M. Mawazo made sure to describe the reasons for the funding change in her grant reports as requested in her grant management guidelines.

10.

Do disclose conflicts of interest.

Always disclose conflicts of interest. Conflicts of interest arise when your relationship to an individual or organization may compromise the quality and objectivity of your research. If you have a conflict, make sure you openly acknowledge it according to the guidance offered by your funder, institution, or publisher.

M. Mawazo's Example:

Due to her passion for the environment, M. Mawazo works as a part-time scientific consultant for the Sayansi River Health Network (SRHN), an advocacy group that fights river pollution from farms and factories in Sayansi. In this role, M. Mawazo finds and vets research that the organization can use to inform its outreach to the public and its materials for protests and other political actions. A fellow scientist at SRHN suggests that M. Mawazo should hide her connection to the organization, since it may lead industry groups in agriculture and manufacturing to call her research biased. However, M. Mawazo believes that hiding a conflict of interest is more likely to hurt rather than help perceptions of her objectivity, so with guidance from her institution and publishers she acknowledges her connection to the SRHN in every publication produced from her research.

11.

Do follow guidelines and laws.

Always follow guidelines, policies, and laws regarding research ethics. Many research institutions, governments, and funders outline what researchers can and cannot do when working with humans, animals, plants, and other subjects. Carefully review any requirements that might be relevant to your project and make sure you have any special approvals and permits. For more on the approvals and permits required in East Africa, see Mawazo's **Standards for Research Ethics Across East Africa**[1] handout.

1 <https://mawazolearningexchange.org/wp-content/uploads/2020/10/MLEx-Research-Ethics-Standards-26_10_2020.pdf>

M. Mawazo's Example:

As already mentioned, M. Mawazo's research project involves collecting tissue samples from animals and surveying families affected by river pollution. A fellow Environmental Science student using geographic information systems to track weather patterns in Sayansi tells M. Mawazo that environmental scientists only need a research permit from the Sayansi National Commission for Science Technology & Innovation to begin their work. However, M. Mawazo realizes that, whatever her department, she may need different types of approval because she is working with animal and human subjects. After researching the local requirements in Sayansi and consulting with her university, M. Mawazo applies for a Letter of Ethical Approval to work with human subjects from the Ethics Review Committee at the National University of Sayansi.

12.

Do create an inclusive working environment.

Always create a working environment that is inclusive, diverse, and open. Creating a space where everyone feels comfortable and respected will improve the quality of research being conducted because every aspect of the research process – from the questions asked to the conclusions derived – will have input from researchers from a variety of backgrounds. This will also create opportunities for greater innovation.

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M. Mawazo's Example:

As the chairperson of the Sayansi Graduate Student Association, M. Mawazo works with her peers to introduce and sign a pledge to create a welcoming environment for all colleagues, students, and community members regardless of their nationality, ethnicity, religion, gender, sexuality, age, or ability.

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13.

Do give back to your communities.

Always give back to the communities that support your research. Build up the research community by promoting the welfare of your peers, offering mentorship and guidance to less experienced researchers, supporting the global scholarly community by volunteering your time as a peer reviewer and other roles, contributing positively to society by doing no harm in your research and sharing your knowledge with policymakers and the public.

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M. Mawazo's Example:

As a student at the National University of Sayansi's Department of Environmental Science, M. Mawazo has access to some of the best lab equipment, lecturers, and libraries in her country and has the opportunity to work with top students in her field. She understands that thriving communities are built by members willing to give back. To play her part, M. Mawazo signs up to join a department mentorship scheme to mentor younger students and regularly participates in outreach activities to promote science among local school children.

14.

Do keep growing.

Always seek support and resources to further develop your understanding of research and publishing ethics. Ethics in research is a wide, deep, and ever-changing topic. To improve your understanding of your obligations as a member of your field, a member of your institution, and a member of the wider community keep learning from online resources, your university administrators, your lecturers, and your peers.

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Real Life Example:

In 1998, a now-discredited doctor and researcher named Andrew Wakefield published a paper in The Lancet, a well-established medical journal, that studied 12 children and claimed to find a link between the measles, mumps, and rubella (MMR) vaccine and autism spectrum disorders. After years of investigation, it was discovered that Andrew Wakefield **falsified his data and violated guidelines for humans subjects research** by **manipulating his research results and subjecting children to invasive procedures without ethical approval**[1], and **concealed a conflict of interest** by **receiving undisclosed funding from groups seeking evidence against vaccine manufacturers**[2]. Although he lost his medical license, the paper was eventually **retracted**[3], and the results have been rigorously debunked **time**[4] and **time**[5] and **time**[6] again, Andrew Wakefield's disregard for research ethics spread misinformation that has contributed to declining MMR vaccination rates in multiple countries and the growth of an international anti-vaccination movement that has "caused multiple measles outbreaks in Western countries where the measles virus was previously considered eliminated"[7].

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1 Deer, B., *How the case against the MMR vaccine was fixed,* 2011, <https://www.bmj.com/content/342/bmj.c5347>
2 Deer, B., *Revealed: MMR research scandal*, 2004, < https://www.thetimes.co.uk/article/revealed-mmr-research-scandal-7ncfntn8mjq>
3 Dyer, C., *Lancet retracts Wakefield's MMR paper,* 2010, <https://www.bmj.com/content/340/bmj.c696>
4 Madsen, K. et al, A Population-Based Study of Measles, Mumps and Rubella Vaccination and Autism, the Massachusetts Medical Society, 2002, <https://www.nejm.org/doi/pdf/10.1056/NEJMoa021134?>
5 Elliman D., Bedford, H, *MMR: where are we now?*, 2007, < https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2066086/>
6 Jain, A. et al, *Autism Occurrence by MMR Vaccine Status Among US Children With Older Siblings With and Without Autism,* 2015 <https://jamanetwork.com/journals/jama/fullarticle/2275444#Results>
7 Hussain, *Azhar et al. The Anti-vaccination Movement: A Regression in Modern Medicine.* Cureus vol. 10,7 e2919. 3 Jul. 2018, doi:10.7759/cureus.2919

Additional Resources

Albert, T., & Wager, E. (2010). **How to handle authorship disputes: a guide for new researchers.**, <https://publicationethics.org/files/2003pdf12_0.pdf>

David, B., & Resnik, J. D. (2011). **What is ethics in research & why is it important.** National Institute of Environmental Health Science, <https://www.niehs.nih.gov/research/resources/bioethics/whatis/index.cfm>

Roig, M. (2006). **Avoiding plagiarism, self-plagiarism, and other questionable writing practices: A guide to ethical writing.**, <https://ori.hhs.gov/sites/default/files/plagiarism.pdf>

Rutgers University Libraries - Health Sciences - Scientific misconduct. Libraries.rbhs.rutgers.edu. Retrieved 19 February 2021, <http://libraries.rbhs.rutgers.edu/rwjlbweb/posters/scimisconduct.html>

Smith, D. (2003). **Five principles for research ethics. Monitor on psychology, 34(1)**, 56, <https://www.apa.org/monitor/jan03/principles>

Welcome: How to Recognize Plagiarism: Tutorial and Tests, School of Education, Indiana University Bloomington, <https://plagiarism.iu.edu/>

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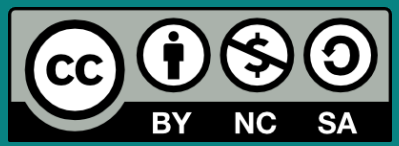
These training materials are provided as part of the Mawazo Learning Exchange, a professional development platform for African researchers. The Mawazo Learning Exchange is a programme of the Mawazo Institute, a non-profit research organisation based in Nairobi, Kenya. Mawazo's mission is to support the next generation of female thought leaders and scholars in Africa, and get policymakers and the public engaged with their research.



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