THE MALAYSIAN CODE OF RESPONSIBLE CONDUCT IN RESEARCH

2nd Edition

NATIONAL SCIENCE COUNCIL

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FOREWORD
by the Minister of Science, Technology & Innovation

In today's world, innovation is the key ingredient in developing a robust economy. Malaysia, aspiring to be a developed nation by 2050, is recalibrating its science and technology model so that we can be a global player in innovation and help the nation be a lighthouse in the region.

At the heart of a good innovative ecosystem is research that is steeped in integrity. Our innovative contributors, be it from the academia or community, need to ensure that their innovations can be held to the light and not have flaws exposed.

Malaysia is not devoid of capable and proven scientists and researchers; she is also neither devoid of the resources for research and research materials - our rich biodiversity, geographical location and multi-ethnic diversity are ample sources for research projects.

Our research can possibly contribute not just to the country but to the world, as has been achieved in the past. The recently established Research Management Agency, as originally proposed by the then National Science and Research Council's commissioned Public Research Asset Study in 2013, could be the platform to further enhance research in this country.

But research needs more than just capabilities and resources; intertwined are ethics and accountability.

The Malaysian Code of Responsible Conduct in Research (MCRCR) guide is a necessary tool for the academic community to remain as experts in the eyes of the global community while also carving a name for themselves in the area of science and technology. Instilling the MCRCR in our researchers, research entities and research ecosystem is a demanding task but one which is necessary and important. With this framework, I hope that our researchers feel empowered to take on new heights in their respective research area.

I would like to commend the Academy of Sciences Malaysia and MIGHT for spearheading this task over the past three years. I would also like to congratulate the National Committee on Research Integrity for improving the MCRCR with this Second Edition. With all these in place, I look forward to seeing Malaysia being established as a hub for research innovation, particularly in science and technology.

Thank you.

YB Khairy Jamaluddin
Minister of Science, Technology & Innovation (MOSTI)
Secretary, National Science Council

FOREWORD
by the Chairman, National Committee on Research Integrity

The Malaysian Code of Responsible Conduct in Research (MCRCR) is an effort to further promote research in this country by encouraging doing the right things right in research. Inculcating ethics and accountability will ensure that the outcome of research is correct, unbiased and verifiable and that the research has been conducted fairly, with safety and dignity for all involved and resources have been used wisely with prudence and justification. This will ensure the continuing trust and support from the public at large for research endeavours. The public, after all, are the recipients of the research outputs. Thus, inculcating ethics and accountability is crucial to ensure and promote a robust research environment.

Since its inception in 2017, there has been a number of discussions, workshops and training sessions involving ministries, research entities, research management, and individual researchers. These are, of course, important necessary next steps in instilling the awareness and implementation of the concepts, aspirations and processes as adopted by the MCRCR. Along the way, we have gained an invaluable insight to clarify further and improve the MCRCR. We feel that it is important that these be formally incorporated into the MCRCR, hence this Second Edition. Readers of MCRCR 2nd Edition will find it easier reading with much more clarity, especially in the often-contentious areas of authorship and management of breaches to MCRCR.

I wish to acknowledge the original Steering Committee which had put together this MCRCR through a large consultative process involving many relevant agencies and individuals. I wish to thank MIGHT and the Academy of Sciences Malaysia for their continuing support. The enthusiasm of research entities and researchers in embracing MCRCR is quite infectious. The commitment of the team of speakers, facilitators and assessors is exemplary. The continuing support and encouragement of the National Science Council to MCRCR to its wide acceptance across the research ecosystem in this country is very important and is much gratefully appreciated.

Academician Emeritus Professor Dato' Dr Khalid Yusoff, FASc
Vice-Chancellor and President, UCSI University
Council Member, Academy Sciences Malaysia
Chairman, National Committee on Research Integrity
The Malaysian Code of Responsible Conduct in Research

PART A
INTRODUCTION

The pursuit of science and research is an important and essential undertaking to enhance knowledge which ultimately benefits mankind and their environment. It is not pursued in a void or a vacuum, or for the mere sake of the scientist's or researcher's satisfaction only. Often it involves many interested parties, with consequences and impacts affecting many parties, including society. As such, it needs to be guided along with certain principles and practices, incorporating certain moral and ethical values, which are accepted and embraced by the scientific community and the society at large. Further, by and large, this pursuit is supported in substance and/or spirit by the society; the support and trust which need to be always carefully nurtured and cultivated, acknowledged and respected. This accountability to the public is crucial for the sustenance and sustainability of the scientific enterprise.

There is, however, an ever-increasing risk of contradicting and contravening the good principles of research practices through direct or even indirect means such as avoidance, erosion and violation. There is an increasing number of reports of research misconduct and retraction of research papers. The push to publish and commercialise, the ever-demanding evaluation process and reporting on research funds, and the current promotion procedures and prospects for scientists could directly or inadvertently encourage shortcuts, misconduct and fraud. Research misconduct and fraud are certainly unacceptable; they may lead to false pursuits by other scientists, acceptance of false ideas or harmful, unsafe, deficient or inappropriate products, procedures or formulations. They may lead to the adoption of poor policies and legislation, which can erode public confidence in science leasing to their distrust in it. This, in turn, may result in various restrictions of otherwise acceptable research, thus hampering the pursuit of knowledge and the progress of science. This will not be in the best interest of individuals and communities.

Therefore, the culture of research integrity and values has to be instilled not only by universities, research institutes, laboratories and entities, but also research management and others involved in the research enterprise such as funding agencies and the media. Clear policies, procedures and processes as well as training and mentoring, and robust management, which includes a monitoring and evaluation system have to be specifically stipulated and established.

In July 2010, the 2nd World Conference on Research Integrity at its meeting in Singapore issued a set of principles which serves as a "global guide to the responsible conduct of research". This Singapore Statement on Research Integrity[5] (see Appendix) was later adopted by the Global Research Council at its Berlin meeting in 2013.

The Malaysian Code of Responsible Conduct in Research (MCRCR) is a comprehensive, robust, and contextually-appropriate guideline which is aligned to the best practices in research and accord with international standards and practice, yet congruent with local ethical and cultural milieu and legal requirements. MCRCR also draws guidance from several other well-established Codes around the world, including the Singapore Statement on Research Integrity 2010. The National Science Council has established the ***National Committee on Research Integrity (NCRI)*** to educate and nurture among the researchers, research entities/institutions, the media and the public on the MCRCR.

The MCRCR has been adopted and endorsed by the National Science Council in 2017. Its formulation had been in consultation with various relevant parties such as universities, research institutions, Ministries, research funders, governmental agencies and non governmental organisations (NGOs), individual researchers and legal authorities. It serves to provide a code by which research and scientific enquiries are conducted and pursued in Malaysia. It provides a strong basis to enhance the pursuit and entrepreneurship in science; its acceptance and adherence will be good to all.

This second edition improves the format of MCRCR for easy readability and reference, and it includes some revisions in Part D: Breaches of the Code for clarity.

PART B
PRINCIPLE OF RESPONSIBLE CONDUCT IN RESEARCH

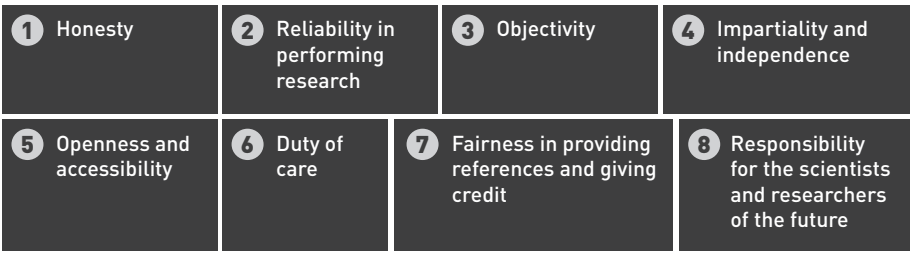
Section 1
Integrity in Research

Science refers to "the systematised knowledge obtained through observation and experimentation, study and thinking"[1]. The need to understand his creation and his existence, his physical and emotional being and the wonders of the surroundings has been an enduring motivation for man to seek knowledge, quench his curiosity and master his existence. Reflection and philosophy – and theology – provide a measure of understanding and sense to his queries and questions but it is the direct observation, empiricism and experimentation, and intervention - the realm of science - which provide answers allowing him to progress the most. Science is his trustworthy vehicle to further his understanding and knowledge beyond what is already known and accepted.

The United Kingdom Research Assessment Exercise (RAE)[2] defines research as "original investigation was undertaken in order to gain knowledge and understanding. It includes work of direct relevance to the needs of commerce, industry, and to the public and voluntary sectors; scholarship; the invention and generation of ideas, images, performances, artefacts including design, where these lead to new or substantially improved insights; and the use of existing knowledge in experiential development to produce new or substantially improved materials, devices, products and processes, including design and construction. It excludes routine testing and routine analysis of materials, components and processes such as for the maintenance of national standards, as distinct from the development of new analytical techniques. It also excludes the development of teaching materials that do not embody original research".

The RAE regards scholarship as "the creation, development and maintenance of the intellectual infrastructure of subjects and disciplines, in forms such as dictionaries, scholarly editions, catalogues and contributions to major research databases". The National Health and Medical Research Council/Australian Research Council defines research as "original investigation undertaken to gain knowledge, understanding and insight"[3]. In pursuing research and science, it is of utmost importance that we need to gain the trust and support from the community at large, and not just that of the peers, researchers and funders. Embracing a code of professional conduct will go a long way to achieve this. The community can then be fully convinced that research is conducted properly, with a high level of responsibility, accountability and integrity and that the resources are utilised prudently, appropriately and with care.

All European Academies and European Science Foundation[1,4] enumerated eight principles that form the basis of integrity in research which needs to be understood and embraced:



These can be elaborated as such:

Honesty is the conduct of research in conformity with its declared aims, objectives, and methodology, including employing appropriate and correct analysis, and communication of results and potential applications free of deception or deviation.

Reliability refers when research is carried out diligently, with meticulous care and attention to details such that it is reproducible, replicable and verifiable.

Objectivity demands that researchers are free from their personal biases, and evaluate results with scepticism and detachment, such that interpretations and conclusions are evidence-based. Exaggerated, unsubstantiated and unjustifiable claims should be avoided. Analysis and interpretation of results are done scientifically, transparently and verifiably, based on scientific reasoning and sound methodology.

Impartiality and independence mean the absence of perceived or actual conflict of interest, including those from funders, ideological or political groups, or financial interests.

Openness and accessibility indicate that the researcher is open to independent, even contrary views, including different or contrary interpretations of data or observations. Honest communication to the scientific community and the general public is a critical and essential part of good scientific research. Data need to be kept with care and be easily retrievable for verification by colleagues if necessary or required.

Duty of care towards the research subjects - humans, animals, inanimate or environmental is essential so that risk, disruptions or destruction is minimised, thus ensuring the safety, well-being, dignity of and respect to research subjects.

Fairness in providing references and giving credit incorporate due and justifiable recognition to those who have significantly contributed to the research as authors, co-researchers, contributors, funders or affiliated institutions.

Responsibility for the scientists and researchers of the future ensures adequate training and mentoring in the scientific method for the next generation of scientists, thus ensuring sustainable scientific work. This goes beyond the technical aspects of science; it involves the philosophy on which science is founded that is well understood, embraced and adhered to by the next generation of scientists. Resources including finance, utilities and human have to be used with meticulous care and prudence, and waste and duplication avoided.

Section 2
Good Research Practices

Apart from misconduct and fraud, there are unacceptable practices which can be more than just a mere aberration, nuisance, dissension or indignation as they may have ethical, moral or legal implications. These too can diminish public trust in science with its attendant consequences, hence the need for the scientific community to seriously be sensitive to these areas which include:

1. ***Research management.*** Appropriate and adequate management of research needs to be carried out throughout the research. This involves priority setting, finalising and writing the research proposal, conducting the research, monitoring, evaluation and extension of research, research products, output, outcome and impact and writing the final report and/or publication as well as prudent and meticulous use of financial, physical and intellectual resources. This commitment should be instituted and embraced at personal, institutional and national levels.

2. ***Research should not be pursued ad hoc.*** Systematic and full commitment to specific tasks and overall research environment is required. Appropriate ethical behaviour is expected at each and every level.

3. ***Research policies and procedures.*** These must be clearly and specifically developed and communicated to ensure adherence and compliance at national, institutional, team/group and individual levels. One should be aware of one's role, including the objectives and targets, and procedures and processes, as well as of responsibilities to and of others at each level are required. Duplication, unless for verification, is wasteful of resources and is deemed unethical and should be avoided. Research should be conducted formally and in a planned manner; haste, negligence, carelessness and inattention should be avoided. Researchers should strive to achieve the objectives of the research and the promises made during application; neglect, dishonouring, or self-abrogation of this commitment is unacceptable. Resources should be used prudently, efficiently and diligently. Legal and ethical tenets should be strictly observed. Publication of results should be timely. The use and reference of the research results and appropriate acknowledgements should be in order.

4. ***Data management.*** All data (primary and secondary) should not only be correctly collected and recorded but kept securely yet easily retrievable and in accordance with the Personal Data Protection Act 7097 of Malaysia. Data should be archived with strict confidentiality for a duration as required by the specific research.

5. ***Research expertise and the necessary equipment.*** These should be available and/or accessible; research should not be carried out if this requirement is deficient. All researchers should be well-versed with the protocol/methodology adopted in the research and are qualified to perform or carry out their respective roles. If the research is a team effort, then each member of the team should know each other's role in that research. Regular team/group meetings to discuss, identify and sort out problems are encouraged.

6. ***Publication-related conduct.*** All requirements pertaining to publication including timeliness, openness, transparency and accuracy, appropriate authorship, affiliation and acknowledgement should be observed. Ghost or guest authors are unacceptable. It is good practice to have an agreement on authorship and the line-up of authorship be agreed upon at the start of the research. The contents of the publication are the responsibility of all authors who should declare any conflict of interests. Intellectual contributions of others, with their consent, should be acknowledged and accurately cited, so too financial or in-kind contributions.

7. ***Reviewing and editorial issues.*** Reviewing of research proposals and publication should be conducted formally, confidentially, prudently and correctly with appropriate justifications. Those with conflict of interest should recuse themselves from performing this duty. Reviewers are not allowed to use in any form the material reviewed unless consent is obtained, or the research is published or presented.

8. ***Research collaborations.*** Collaborations between universities, research institutes, teams, groups or individuals within Malaysia or abroad are increasing and should be encouraged. Clear roles and responsibilities for various parties should be clearly defined from the start.

PART C
PRACTICE OF RESPONSIBLE CONDUCT IN RESEARCH

Section 1
Handling research proposal

It is necessary that all those involved in the research enterprise (the researchers, the reviewers, research management bodies, research entities, research funders, assessors and evaluators) be aware of, adopt, embrace and put to practice this MCRCR. Individuals in this research ecosystem need to undergo formal training on this MCRCR.

1.1 Writing the research proposal

Apart from satisfying the needs and requirements of each research grant application, the novelty and the place of the proposal in the current state of knowledge and know-how must be clearly and concisely stated. The research problem needs to be accurately articulated within an adequate and appropriate background. The likely outcomes of the research, without exaggeration, should be spelt out and the impact to knowledge and/or benefit be pointed out. The suggested methodology should be well-defined and well within the capability and expertise of the research team, and the analysis of the data is appropriate and feasible. The team assembled to undertake the research should have the necessary experience and expertise and commitment in terms of time and resources. The research material should be available, appropriate care is provided, and the ethics are observed, while the budget requested is both appropriate and prudent. Thus, the proposal needs to demonstrate that the commitment is realistic and the research is doable, and clearly a contribution to the field of interest. The Principal Investigator needs to declare that the research team has the necessary experience and expertise to conduct the study and has demonstrated an acceptable level of prior research performance. The quality of the proposal should reflect maturity and scholarship; hurriedly written proposals with glaring short-comings should be shunned.

Care has to be taken to avoid any form of plagiarism. Adequate reference and acknowledgement should be observed. Exaggerated claims, either of potential impact or importance of the research or the standing or stature of any of the research team, should be avoided. Ethics in research, including the care of research subjects or material including archiving of human tissues and care of animals, be strictly observed. Researchers need to be sensitive to wasting of resources, particularly animals or disrespect to subjects or disregard of vulnerable subjects. Compliance to safety standards and regulations such as exposing students and staff to potential or real biological or chemical risks

should be strict and demonstrable. Colleagues should not be included as a co-researcher for a favour if the colleagues have not or are not expected to make a significant contribution to the proposal/project. The budget must be adequate, accountable and prudent. Proposal recycling should be shunned. Acknowledgements should also specify the source of any funding for the study.

1.2 Reviewing of research proposal

Research proposals are the intellectual property of the researchers and thus should be handled in the same way just as any intellectual property with care, confidentiality and sensitivity. Reviewers are only those with expertise and experience in the technical aspects of the research area, research methodology and/or research management. Reviewers should have adequate training in reviewing and be formally appointed and authorised. The review process should be conducted formally, professionally, diligently, intelligently and with decorum, without bias or prejudice. Reviewers or others involved in the review process are strictly prohibited from using the material submitted in the research proposal, unless duly published or written permission from the researchers has been granted prior to such use. Institutions should publish the list of their reviewers annually together with their area of expertise and experience. Reviewers should declare any conflict of interest. Reviewers should be given ample time to review. In addition, other principles on peer-reviewing are in Section 13.

1.2.1 The reviewer

- Should have the relevant expertise
- Must be able to review the proposal diligently
- Should be properly trained and understands the criteria of the review
- Must declare any conflict of interest such as
    - o Institutional affiliations including current, past (recent enough to have close associations) and future institution (e.g. negotiating for a position)
    - o Consultant to applicant's institution
    - o Collaborators and colleagues of the applicant(s)
    - o Holding a substantive post in the relevant institutions
    - o Close affiliation to the applicant(s), e.g. relatives and family, personal friends
    - o Other relationships such as the applicant(s) are people the reviewer hold opposing views or people whom the reviewer would be reluctant or afraid to give a harsh review

The reviewer should not be biased in their review, and their comments and critique should be considered, measured and constructive, avoiding derogatory comments or personal attacks. Budgets should not be trimmed without

adequate justification. Confidentiality needs to be maintained as this is privileged information; revealing to irrelevant third parties or colleagues is prohibited. Reviewers are not allowed to make unauthorised copies of the proposal or bringing it out from the designated evaluation room or space. The review must be completed in time and be done professionally and competently without expecting or returning favours or discrimination. Rejecting a proposal without giving it adequate thought or sabotaging someone's proposal are practices incongruent with research ethics.

1.2.2 Reviewing Process

All applications are judged on their scientific merit through a process of peer review by appropriate experts. Recommendations are passed to the relevant awarding committee for final decision on awards. Ample time and circumstance are provided for the reviewer to discharge this duty professionally and fairly. Clear criteria for evaluation should be provided to the reviewer. Confidentiality should be maintained, and the applicant(s)/researcher(s) should be oblivious of the reviewer.

Section 2
Conducting research

Upon receiving approval from regulatory and/or institutional authorities, Research Ethics Committee, Medical Ethics Committee, Biosafety Committee or Animal Care and Use Committee, review panel and funding agencies, the research should commence with minimal delay. The research is not complete until publication, use or commercialisation of the research findings.

The Principal Investigator has a critically important task and responsibility in the conduct of research. He is involved and responsible, often with others, in conceptualising and designing the research project, and working out and completing all that is necessary for the submission of the research proposal (see Part C Section 1.1) and the expeditious but proper conduct of the research including making available what is required for the successful completion of the research such as adequate expertise and budget, experience and team members, research materials and research infrastructure, and the proper and adequate management of the research. He is also responsible for communications with relevant others including team members, heads of departments, IRB, research entity heads, patients, suppliers of research materials, finance officers, public and the media, ensuring at all times decorum, ethics and good practice are being upheld. He is also responsible to ensure the smooth running of the project, making sure that the *espirit des corps* and enthusiasm and passion, communication and commitment among team

members remain high. He is responsible for a prudent expenditure which is accountable and reasonable, with no wastage or redundancies. He is responsible for the defence of the proposal and submission in time of reports to the funders and those in authority (such as adverse events report to the IRB). He is responsible for all publications (academic or lay press) related to the research and communications connected to it. He is responsible for submitting the final report to the agencies (funder, research institute and IRB) as well as the correct termination of the research, complying with all relevant regulations and procedures. The Principal Investigator is a co-owner of the research together with the relevant institution in public-funded research projects.

The Co-Principal Investigator acts on behalf of the Principal Investigator at times identified by the Principal Investigator.

Researchers are involved in all or any of these: conceptualisation and design of the research, provide the experience and expertise required by the research project, conduct the research and involved in interpreting the data and writing up communications about the research and its output. Providing research material, financial support, routine testing or allowing the use of laboratory or equipment alone without intellectual contribution does not constitute a 'researcher'.

Co-Researchers are researchers in collaboration with the PI or the researchers.

Study Coordinators are involved in assisting the PI with the management and running of the research. They can be recognised as researchers if they fulfil the roles of a researcher.

Science Officers are employed to assist the PI in whatever roles it is deemed required. They can be recognised as researchers if they fulfil the roles of a researcher.

Research Assistants are employed to assist PI or researchers in the conduct of a research project, often in gathering or obtaining data. They can be recognised as researchers if they fulfil the roles of a researcher.

Student assistants are students assisting PI or researchers in the conduct of a research project, often in gathering or obtaining data. They can be recognised as researchers if they fulfil the roles of a researcher.

Research Administrators are those involved in the management of research, such as keeping files related to the research.

Funding agencies are agencies which provide funds for the research.

Section 3
Research involving human participants or animals

Researchers in life or medical sciences, social sciences or humanities, often involve human participants in their research. These human participants must be treated with extreme care and respect.

The main guiding documents on research ethics pertaining to these human participants are the Helsinki Declaration and the US Belmont Report. The Belmont Report list out the basic ethical principles on research involving human participants as "respect of persons, beneficence and justice"[12]. The Helsinki Declaration further states that it is the duty of researchers to "protect the life, health, dignity, integrity, right to self-determination, privacy, and confidentiality of personal information of research subjects"[13].

In Malaysia, these principals, as well as the rules and regulations on research involving human participants, are stated in the Malaysian Guidelines for Good Clinical Practice (2018)[14]. All research involving human participants must obtain approval from the IRB before commencing recruitment of the participants.

The welfare of animals also needs to be observed. The widely accepted ethical principle in research using animals is the three R – Replacement, Reduction and Refinement. In doing so, the welfare and well-being of animals are protected. Institutional Animal Care and Use Committee (IACUC) is established to review and oversee the use of animals in research. Researchers who plan to use animal(s) in research must first obtain the approval of the respective IACUC. Researchers should also comply with the Malaysia Animal Welfare Act (2015), Act 772[15].

Section 4
Management of research data

Institutions should have policies, standard operating procedures and resources to handle research data, their storage, retention and access. Keeping sufficient, relevant and appropriate research data securely but easily retrievable is necessary as these may be all that remains at the end of the project. These data may help justify the outcomes of the research in the future and may be of value for future research, especially when the research is difficult or impossible to repeat. Researchers and research institutions should comply with specific requirements of the funding agency, publisher, convention, ethics and sometimes the law. It may not be feasible to keep all the primary material such as biological tissues, questionnaires or recordings but permanent records of these such as assays, test results, laboratory and field records must be kept

and accessible for a period required by the research. Generally, this is for 7 years after the date of publication but most clinical trials 15 years whereas for gene therapy and work with community or heritage value permanent storage is required. Researchers and institutions need to demonstrate that the security, safety and confidentiality of the data and the participants in the study are ensured, taking into account professional standards, legal requirements and contractual obligations.

Research materials such as biological samples and the data are co-owned by the Principal Investigator and the research entity where the research is managed from. As such, the care of these materials, such as storage of biological tissues are the responsibilities of both co-owners. Access to others is to be mutually agreed by both co-owners.

Researchers must manage and keep research data according to the policy of the institution. This includes:

- Keeping a clear, complete and accurate record of research data and materials, research methods and data sources, grant approvals, approvals granted and all communications including press statements during and after the research process;

- Safe, secure, durable, and accessible storage (indexed and catalogued) in compliance with legal and professional requirements, ethical standards and confidentiality requirements, even when not in current use.

Section 5
Management of research resources

Research resources include:

a. Assets/facilities/equipment/infrastructure, where the following are strictly observed: Institutional/government policy/regulation from purchase to disposable, from beginning to end of the project
    - Proper maintenance
    - Handled by competent personnel
    - Follow clear SOP of usage

b. Financial/money:
    - Must follow "sponsors"/institution/government policies on managing/spending money
    - Do not use research funds for unrelated expenditures
    - Clear reporting and accounting

c. Personnel:
- Must be adequately and appropriately trained, and competent
- Must be adequately supervised
- Must embrace and exhibit integrity
- Must be taught on the protection of confidential information

d. Research materials/specimen/reagents:
- Must be properly handled, stored, documented, transferred, and complied with guidelines and policy.

Section 6
Management of research team

A research team comprises researchers who are working together on a specific research topic or project. A typical research team may include the following: the Principle Investigator (PI), co-Principal Investigator, researchers, co-researchers, postgraduate research students and/or research assistants, research coordinators and research managers /administrators. There is a need to identify those who are in the research team from the beginning of the research project.

An important element for managing a research team is the role of the leader of the team (for most teams, this is the PI). An organisational structure should be established by the PI to facilitate coordination. Some common ground rules should also be established within the group to facilitate research and to prevent conflicts. In contrast to working alone, researchers in a team have to know their roles and responsibilities towards each other. Documented Terms of Reference (TOR) should be mutually agreed to ensure there are no conflicting roles or overlooked responsibilities. Trust and respect among members of the team are very important, especially in multidisciplinary research projects where the success of the projects depends on how well the team can work together.

In an effort to maintain a healthy and productive group, the leader also needs to acknowledge and appreciate the contributions put in by members in making the project a success. Training and mentoring of young members in the team are often not sufficiently emphasised. Young members are mostly unaware about ethical issues if they are not formally exposed through some form of training. The attitude of leaders towards ethical conduct and expectations can influence young researchers in their career and personal development towards becoming the future scientific leaders in the country. Sustaining a good research culture should be an important point in managing a research team.

The importance of communication among team members is pertinent. Infrequent and ineffective transmission of information between the leader and team members can fragment the project, and also result in lack of oversight (from the leader as well as from peers) on the direction and quality of the research. Frequent meetings among members are crucial not just for information dissemination but also for detecting early tell-tale signs which could lead to serious research misconducts in the future. When researchers meet, a comprehensive discussion on the research work can be done, early detection in data discrepancy would be possible, and actions can be taken to remedy the situation.

The formation of any research team should be based on the mutual agreement among researchers with common goals. This type of group formation will also build a healthy research culture which is a strong factor in preventing scientific misconduct in every step of the research process.

Section 7
Training and responsibility of researchers

Researchers are required to uphold quality, excellence and integrity in their pursuits of research. They should contribute to a research environment driven by "intellectual honesty and integrity, and scholarly and scientific rigour"[3] where prudence, accountability and collegiality are evident, including respect for fellow researchers, participants, animate and inanimate objects, environment, and prudent use of resources. They need to adhere to the principles espoused in this Code, thus ensuring integrity and high standards in their research. They need to report research misconduct when this is known to them.

Researchers should not just possess the intellectual and technical skills in and passion for their research but must also be trained in research methodology and research management including care for research participants, data storage and retention, financial management, resource management including personnel management, analysis of data including statistics, research communications, ethics and legal requirements related to their research, and be aware of and adhere to MCRCR. Research institutions must provide adequate training formally and/or through effective mentoring and supervision in these areas for their researchers. New researchers must undergo training on research ethics, this Code and institutional policies related to research early in their career. Researchers who apply for grants must prove that they have undergone MCRCR training by showing certificates. In addition to MCRCR training, researchers should undergo training in specific areas where their research requires, such as Good Clinical Practice (GCP), animal handling, biosafety, and Good Laboratory Practice (GLP).

Section 8
Responsibilities of research entities

Research entities are places where research is conducted. This can be a university, laboratory or research institute. Research entities should actively promote an understanding, awareness and adherence of the Code, ethical principles and requirements, guidelines, legislation and encourage assimilation of technical, intellectual and managerial skills to ensure not only success but as importantly proper conduct of research. This can be through the website, multi-media, newsletters, forums, workshops, seminars or formal training programmes. Policies and standard operating procedures must be specifically formulated, clearly documented, easily accessible, widely distributed and publicised. Collaboration between researchers within and across disciplines and institutions should be encouraged – platforms and opportunities for this should be identified, supported, encouraged and publicised. A clear guideline for research collaboration should be developed, publicised and followed through. An environment of responsible research and ethical behaviour should be nurtured and propagated through responsive and responsible governance, and forward-looking leadership where among others quality, safety, confidentiality, prudence, responsibility, accountability and risk management are evident. This will enhance the standing, stature and reputation of the researchers and the institution. Research entities should have a clear procedure for receiving and handling complaints of research misconduct, thus creating a safe research environment - physically, ethically and legally - for all involved in the research. Regular monitoring of the institution's performance, preferably by national bodies, regulatory authorities, funding agencies such as ministries in charge of education or science and technology, august learned bodies such as the Academy of Sciences Malaysia, or the National Science Council is required.

In relation to the responsible conduct of research, research entities (universities) and institutions) carry equal responsibility with individual researchers. First and foremost, institutions should place support of good research as the main consideration when deciding on the establishment of any institutional policies, rules or guidelines. Policies that hinder research progress are frustrating to researchers and will act as catalysts for misconduct. Nevertheless, it is necessary for the institution to set regulations to ensure smooth research management processes such as applications for grants, management of funds, procurement of equipment and reagents, employment of staff and negotiations for sharing of intellectual property rights.

Smooth and efficient management can serve to relieve the research leader from logistic difficulties and also prevent procurement and fund abuses. However, a balanced consideration should be placed before setting such guidelines and rules. Consideration of the impact and consequences of any new policy on researchers from varying angles should be emphasised.

Faulty or inadequate communication of new and current policies, regulations and guidelines is a common problem in many institutions. The divide between the perceptions and expectations of administrators and researchers has been the source of constant complaints of both parties.

Staff promotion and research assessment criteria set by institutions were identified as key factors behind research misconducts. High publication targets specifically provoke a high amount of stress and pressure on researchers and may drive them to publish unreliable, unverified, substandard and sometimes fabricated data. This also affects the stringency of managing research team to self-assess themselves and detect and remedy misconducts as time is limited when high numbers of publications are expected year by year.

Fairness of assessment is also another concern of researchers. Some fields of study are less able to generate publication or patent outcomes than others. Policymakers should not use a "one size fits all" policy when assessing the performance of researchers.

In order to prevent unethical practices and misconduct, it is also the responsibility of the research entities to educate their researchers and inculcate ethical values. Awareness and training programmes (seminars, workshops, certifications) should be organised with the allocation of adequate resources It was noted that training of researchers frequently focused on scientific techniques and skills, but young researchers are left untutored on research and publication ethics and the consequences of unethical conduct.

Research entities are also responsible for providing tools and mechanisms to aid in detecting misconduct. An example is to facilitate easy access by researchers and students to the Turnitin anti-plagiarism software. Sometimes, misconduct such as plagiarism and copyright violations can be the result of unintentional action of inexperienced researchers (especially students). With the correct tools, detection and prevention are possible.

Section 9
Responsibilities of research funders/funding agencies

9.1 In striving to ensure a fair opportunity for access to research funding and to meet the objectives set by the Funding Agencies, Funding Agencies are responsible for:

a. communicating all funding opportunities to research entities and researchers;
b. responding promptly to enquiries regarding the applications of funding;
c. acknowledging receiving applications for funding that it receives from research entities or researchers;
d. evaluating all applications fairly and professionally;
e. disbursing funds to the Research Entities in accordance with the Funding Agency's policies and procedures with minimal administrative obstacles;
f. monitoring the progress of the funded projects;
g. assessing research projects and research performance;
h. providing Annual Reports; and
i. conducting regular institutional evaluation preferably done by external bodies/personnel free of vested interest or conflict of interest.

9.2 Funding Agencies are also responsible for ensuring that funded projects will make the biggest possible research impact. The Australian Research Council defines research impact as "the demonstrable contribution that research makes to the economy, society, culture, national security, public policy or services, health, the environment, or quality of life beyond contributions to academia"[9].

9.3 The impact of research, be it academic, economic and social may include[10]:
a. Instrumental: influencing the development of policy, practise or service provision, shaping legislation, altering behaviour, or developing new products or methods;
b. Conceptual: contributing to knowledge and the understanding of policy issues, or reframing debates;
c. Capacity building: through technical and personal skill development.

9.4 In response to research misconduct, the Funding Agencies are responsible for:
a. responding to allegations of breaches of policies set by the Funding Agencies;
b. communicating the case to the Research Entities;
c. responding promptly to enquiries regarding the case;
d. assisting individuals and Research Entities with the investigation and interpretation of this Code.

9.5 Each Funding Agency shall communicate with the Research Entities on changes to its policies that may have a significant impact on them.

Section 10
Publication

It is important that the results of the research be published, regardless of its perceived value. Dissemination of research results is an integral part of research; research is incomplete until there is publication, commercialisation or use of the research findings. The publication can be in many forms – in journals or books, or reports, conference proceedings or electronic media, including non-refereed publications, web pages or films as well as professional and institutional repositories. Good publication practice should be adopted – complete, timely, honest, accurate, responsible, respecting confidentiality, integrity and ensuring the protection of intellectual property rights, due to acknowledgement to partner institutions and sponsors. Citation of the work of others must be done accurately. Multiple, concurrent and/or duplicate submissions of the same research data should be avoided except in reviews, anthologies, collections or translations (with appropriate disclosures or references). Salami slicing is to be avoided. Prior permission from the original publisher should be obtained before republishing research findings. Acknowledgement has to be made for any research funding, in-kind support, or institution(s) involved in the research. Conflict of interest need be disclosed. Research involving human participants, especially clinical trials, must be registered with National Medical Research Registry and approval from the institutional Research Ethics Committee duly obtained. Predatory journals are often driven by their financial self-interest, and not the interest of knowledge sharing and expansion. They undermine the integrity of the research ecosystem and adversely affect the reputation and integrity of the researchers. Researchers should not publish in these predatory or fake journals. Researchers should continue to publish in reputable journals.

Section 11
Authorship

Leading journals and editorial groups already have strong and clear guidelines in defining who an author is, e.g. International Committee of Medical Journal Editors (ICMJE) and Committee on Publication Ethics (COPE). An author must significantly contribute to the research and/or publication, including some or all of the following:

Contributing to the designing and conceptualisation of the research	Organising and conducting the research including obtaining of data	Analysis and interpretation of the research data	Drafting significant parts of the paper or critical appraisal of the work (i.e. involved in the preparation and approval of the manuscript)

The author is accountable for all aspects of the work and publication.

The institution should have a policy on the criteria of authorship consistent with this Code which should be complied with by the researchers. Collaborating researchers should agree on authorship and the line-up of authorship early in their collaboration which can be reviewed from time to time. Persons who do not qualify for authorship should not be offered or recognised as authors such as guest or honorary author. Ghost authorship is not acceptable. Researchers who have contributed significantly to the research are not to be excluded from authorship.

The following in itself without intellectual contribution does not merit authorship:

a. Being in a position of authority (Head of institution, department or laboratory);
b. Providing routine technical contribution or assistance;
c. Acquisition of funding;
d. Providing general supervision to the research team;
e. Providing paid-service;
f. Providing lab space, access to research equipment or infrastructure;
g. Providing published data or materials without intellectual contribution from third parties;
h. Providing basic assistance in writing manuscripts such as editing language or proofreading.

Researchers must acknowledge the contribution of others who have contributed to the research including funding, facilities, materials, resources, technical support and technical writing. It is a good practice to identify whom the authors are and in which order they appear soon on starting a research project.

Section 12
Affiliated institutions

Research affiliation means any direct, formal and official connection a researcher or a group of researchers has with one or more institutions such as sponsoring and funding agencies or research institutions or entities, or place of employment. The affiliation between the researchers and the institution has to be reasonably meaningful.

It is usual and acceptable to have single or multiple affiliations in a large-scale research project at the national and international levels.

It is the responsibility of the researcher or the research group(s) to carefully evaluate the implication of having affiliation with any institution pertaining to matters related to employment, funding and resource provision.

It is the responsibility of the researcher or the research group(s) or research institution(s) to mutually declare any kind of affiliation among them.

Section 13
Peer review

Peer review refers to "an impartial and independent assessment of research by others working in the same or related field"[3]. It is an essential component of the research pathway, from grant application, evaluation of the conduct of research and research performance, and paper and other research products. Participation in peer review is encouraged as it will maintain and enhance standards.

The USA National Academy of Sciences provides the following advisory on peer review[11]:

• **Timeliness and Responsiveness.** Reviewers are responsible for acting promptly, adhering to the instructions for completing a review and submitting it in a timely manner. Every effort should be made to complete the review within the requested time frame.

• **Confidential material under review** is a privileged communication that should not be shared or discussed with anyone outside the designated review process unless necessary and approved by the editors or funding agencies. Reviewers should not retain copies of the submitted material and should not use the knowledge of material content for any purpose unrelated to the peer-review process. The review process is conducted anonymously for all

submissions. Reviewers are encouraged to keep their identities from outsiders or members of the press.

• **Constructive Critique.** Reviewer comments should acknowledge positive aspects of the material under review, identify negative aspects constructively, and indicate the improvements needed. Reviewers should explain and support their judgment so that editors or funding agencies and authors may understand the basis of the comments. Relevant references must support any statement that an observation or argument has been previously reported. The editors or funding agencies should be immediately alerted if the reviewer has concerns about research misconducts. Although reviews are confidential, all comments should be courteous and capable of withstanding public scrutiny.

• **Competence.** Reviewers who realise that their expertise in the subject of the submitted material is limited have a responsibility to make their level of competence clear to the editors or funding agencies. Although reviewers need not be expert in every aspect of the content, the assignment should be accepted only if they have adequate expertise to provide an authoritative assessment.

• **Impartiality and Integrity.** Reviewer comments and conclusions should be based on an objective and impartial consideration of the facts, devoid of personal or professional bias. All comments by reviewers should be based solely on scientific merit, originality, and quality of writing as well as on its relevance to the scope and purpose of the journals or funding agencies.

• **Conflict of Interest.** To the extent possible, the peer-review process should minimiseactual or perceived bias on the reviewer's part. If reviewers have any interest that might interfere with an objective review, they should either decline to review or disclose the potential conflict of interest to the editors or funding agencies.

The reviewers should also observe the following:

Conflicts of interest should be disclosed	Refrain from taking undue advantage obtained from the peer review process	Refrain from participating in peer review outside one's own expertise	Proper consideration be given to researchers which question and change the current paradigm

Researchers should refrain from influencing the peer review process.

Training in peer review should be undertaken conducted by senior and experienced researchers.

Section 14
Collaborative research

Increasingly, research is conducted in a collaborative arrangement between institutions and individuals within or outside the country through the sharing of resources, intellectual property, research findings and commercial products, or managing conflicts of interest. A written agreement should be signed before commencing collaborative research, specifying how these and other matters such as the responsibility of ethics and safety approvals, reporting to agencies, protocols adopted, management of research materials and data, are agreed upon. The written agreement may be in the form of a legal contract, letters, research management plans or management plans signed by the relevant parties. The policies and rules of the host institution apply to the collaborating researcher. Any actual or perceived conflict of interest need be duly disclosed.

Collaborative research denotes meaningful engagement between two or more researchers, research groups or entities in conceptualisation and design of research project, the contribution of idea and materials, conducting research, and analysis and interpretation of data, and report writing. Contributing materials or research funding and resources does not in itself constitute research collaboration.

It is the responsibility of the research group(s) and research institution(s) to manage and to share the research outcome.

A written agreement is strongly encouraged to be signed before the commencement of the project by the research groups or affiliated institutions and the affiliated agencies covering matters which may include but are not limited to the following:

IP Ownership*	Royalty Sharing	Technology Transfer
Publication	Ethics	Funding
Other Terms and Conditions	Use of Data or Materials	Secondary Data

*Researchers should always refer to the funder's IP policy. Reference should be made to the Malaysian Government's IP Policy when the funds are from the Government.

Sharing of funding in collaborative research must comply with rules / agreement of funding agency and relevant agencies.

Research data and outputs (publication) shall be shared among collaborators.

Roles of the researcher in collaborative projects shall be spelt out in the agreement (such as those for biodiversity and medical research).

If employed by university or institutions, all researchers are subjected to rules and regulations of the institution.

Section 15
Conflict of interest

A conflict of interest influences professional judgment or actions such that a primary interest may be unduly influenced by a secondary interest. Thus, it can compromise research integrity, public confidence and trust in research. Hence, it should be identified, disclosed and appropriately managed, preferably early and soonest. Reference can be made to various laws of Malaysia, in particular, the Malaysian Anti-Corruption Commission Act 694 Section 36[8].

All stakeholders should sign a declaration of Conflict of Interest, and this should be recorded, documented, and provided when required.

The institution should have a clear, well displayed, readily accessible policy on how to manage conflicts of interest. Those with potential conflicts of interest should fully declare it. Whilst they may be required to provide information or evidence during the discussion, they should not be involved or be present during the decision-making process, even if they remain silent. The proceedings should be carefully and fully recorded. Researchers are advised to keep a record of activities that may lead to conflicts of interest such as specific consultancies, paid speaking engagements, membership of boards, committees, advisory groups, financial delegations, or receipt of cash, services or equipment. When invited to join a committee, the researcher should assess potential conflict of interest and have this declared. An actual or apparent conflict of interest needs to be timely disclosed by the relevant parties.

Section 16
Public dissemination of research findings

Public dissemination of research findings through the various mass media may have a bigger impact with a wider audience group, including the general public, as compared to scientific publications. Channels of media include but are not exclusive to:

a. Newspapers, Magazines, Newsletters, Bulletins (including online formats or medium);
b. Non-print media including Radio, Television, Internet;
c. Institutional or Agency Websites;
d. Social Media including but not exclusive to Instagram, Facebook, Twitter;
e. Music, Theatre, Films, Artworks, Documentaries;
f. Seminar, Forum, Conference, Exhibitions and Talks; and
g. Classrooms, Intellectual Discourse and Lectures.

There are many exciting and significant research findings should leverage on the mass media channels to inform the general public. Some of the positive impacts of public dissemination are to:

a. Create awareness and educate the general public;
b. Encourage others especially the younger generations to explore new and undiscovered areas of research;
c. Promote creativity and innovation;
d. Inculcate "right values"; this includes considerations of culture, philosophy, beliefs and religion;
e. Promote multidisciplinary research practice;
f. Correct misperceptions, e.g. common myths, prejudices, biased opinions, "sales talks", non-evidence-based statements;
g. Improve scientific information sharing;
h. Facilitate establishment and opportunities for new businesses; and
i. Promote or sustain cultural heritage.

There is concern about violations of public dissemination of research findings which may be common, such as:

a. Premature claims on findings or fabrications;
b. Unfairness when giving credit to research colleagues, collaborators, students, funding agencies;
c. Unprofessional conduct;
d. Disclosure of sensitive information that violates "personal rights" or personal data protection or breach of confidentiality;

e. Over-sensationalise findings or irresponsible media reporting;
f. Withholding beneficial information;
g. Non-sharing of public information or data funded by public funds;
h. Use of an inappropriate medium that can reach an inappropriate audience, resulting in unwanted consequences, e.g. causing a panic situation amongst the general public; and
i. Approval or permissions were not obtained, resulting in a situation as in (h) above.

Preventive actions:

In order to ensure dissemination of correct information, some of the preventive actions include:

a. Promulgation of a Code of conduct in all research institutions, industry or media channels;
b. Establish a Code of Conduct Committee in the respective institutions, guided by best practices guidelines;
c. A national body that monitors "complaints" and directs it to the relevant committee for further action (including false claims); and
d. All agreements (between researchers and funding organisations) should include clauses to safeguard and prevent violations as per above.

Section 17
Awareness and acculturation of Responsible Conduct in Research

The MCRCR upholds the integrity of all parties in the research ecosystem. This Code covers a broad range of areas including:

1. Research misconduct;
2. Human and animal ethics;
3. Biosafety and biosecurity;
4. Occupational health and safety;
5. Conflict of interest;
6. Data management and acquisition;
7. Collaborative research;
8. Mentoring and supervision
9. Peer review and assessment;
10. Responsible authorship and publication;
11. Public dissemination of research output; and
12. Values (beliefs, religion and culture).

All parties should report their work honestly, accurately and objectively to ensure public trust in research is not compromised. This Code of practice should be communicated, disseminated and made available to all the relevant parties concerned. This Code should be acculturated in all research entities and institutions. It is the responsibility of the top management of the individual entities and institutions to communicate the importance of this Code. Regular training and refresher programmes (for new as well as established researchers) should be organised by the respective research management centres to create awareness and to inculcate ethical and responsible conduct in research.

PART D
BREACHES OF THE CODE

Section 1
Definitions

Research Misconduct, which is fabrication, falsification, plagiarism and deception, committed "intentionally, knowingly or recklessly"[4] is considered Breaches of the Code.

Fabrication is "making up results and recording them as if they were real"[4].

Falsification is "manipulating research processes or changing or omitting data"[4] resulting in data that no longer represents the truth.

Plagiarism is "appropriating another person's ideas, research results, or words without giving appropriate credit"[1].

Deception is when there is intent to lead others to a false conclusion.

Research misconduct also includes "misrepresentation of interests, breach of confidentiality, lack of informed consent, abuse of research subjects or materials, covering up misconduct, reprisals against whistle-blowers"[1,4] or inappropriate authorship.

Falsification or misrepresentation in obtaining funding, and misappropriation or misuse of research funds is a form of research misconduct.

Research misconduct also includes conducting research before obtaining ethics approval or avoidable failure to conduct the research as proposed and approved by the research ethics committee, especially when this can lead to detrimental effect to those involved in the research including investigators, research participants – humans, animals, inanimate or environmental. Research misconduct also includes "wilful concealment or facilitation of research misconduct by others"[3].

Research misconduct can happen at various stages of the research process: from the research proposal, conducting the research, managing the data and communication of the research results. Honest differences in opinion and judgment in research do not constitute research misconduct, as do honest errors which are of minimal consequences or unintentional.

Breaches of the Code may also refer to other minor transgressions such as selectively publishing or quoting parts of a study which can mislead people into accepting a proposition in line with one's position or idea, whilst the whole study may not do so. Other Breaches of the Code may include intimidating or harassing students or assistants, inadequate mentoring or counselling of students, misrepresentation of credentials, insensitivity to social or cultural norms, prejudice against members of a particular group or gender, misuse of funds and failure to disclose conflict of interest. These may be subjected to legal and social penalties. Repeated and persistent transgressions, particularly when counselling and warning had been ignored, may however constitute a Research Misconduct.

This unacceptable behaviour is incompatible with Science and may be detrimental to society through acceptance of deficient products or drugs, inadequate instruments or dangerous procedures. These can adversely affect or terminate a researcher's career, discredit colleagues, and damage the whole of the research enterprise. Public trust and support for Science can be put to risk and possibly withdrawn, adversely affecting scholarship and ultimately, society's well-being.

Section 2
Managing breaches of the Code

Institutions should have a written policy and a standard operating procedure on receiving complaints regarding breaches of the Code.

Minor transgressions of the Code should be resolved by counselling or advice.

Major breaches, such as Research Misconduct, will warrant a formal investigation.

A complaint is a report of breaches of the Code made by a member of the institution or the public to the **Research Integrity Officer (RIO)** of the Research Entity.

The complaint is substantiated if any of the following conditions exist[3]:

1. a conduct which has breached the Code;
2. there are intent and deliberation, carelessness or persistent and gross negligence; and
3. the conduct can result in serious consequences, such as the false information may affect policies and practices, or lead to adverse effects on research participants, animals and the environment.

Raising concerns about possible transgression of this Code can be difficult or even hazardous, especially when the person in question is senior or holds a position of authority.

The institution thus should have adequate avenues for these concerns to be raised with the **RIO** duly appointed by the **Head of the Research Entity (HRE)** (the Vice-Chancellor or President or Rector of the university, or the Director of the research institute). Upon receiving a written complaint **(Step 1)**, the **RIO** will conduct a preliminary investigation, with the full authority of securing and maintaining all relevant materials and documents, while ensuring fairness and confidentiality in the process. In completing the preliminary investigation, the **RIO** must report to the **HRE (Step 2)** the fact of the findings and whether breaches of the Code have occurred and recommend either to:

1. dismiss the complaint;
2. deal under other misconduct provisions unrelated to research misconduct;
3. refer the complaint to a person in a senior position for resolution at the local or departmental level; or
4. refer to Research Integrity Advisory Committee **(RIAC)** for full advice.

The legitimacy of a complaint must be assessed or accompanied by adequate supportive documents or evidence.

The National Committee on Research Integrity **(NCRI)** may receive complaints on breaches of the Code **(Step 3)**, whereby it will forward the complaints to the **RIO** of the relevant research entity **(Step 4)**.

A **Research Integrity Advisory Committee (RIAC)** is appointed by the **HRE** among three senior researchers to advise the **HRE** on the recommendation from the **RIO (Step 5)**. The advisory role does not extend into the investigation of the complaint. The **RIAC** should not contact the accused nor be involved in any subsequent inquiry. This advisory role is to ensure that the matter has been thoroughly looked into before specific actions are taken by the **HRE (Step 6)**. The members of the **RIAC** should be those with vast experience in research and administration, endowed with wisdom and understanding of the research culture.

If the **RIAC** is satisfied with the recommendation from the **RIO** that there is a prima facie case to proceed with charging the accused, the **HRE** will refer the case to the **Research Integrity Disciplinary Board (RIDB) (Step 7)** chaired by a Senior Academic/Researcher appointed by the HRE with members consisting of the Head of Research Management Centre or equivalent, the Legal Advisor, a Member of the Senate or equivalent, and two senior academics/ researchers. The Legal Advisor's roles are to prepare the material to be put to the **RIDB,** assist **RIDB** in examining the witnesses and to advise on the proceedings of

RIDB to ensure that principles of natural justice prevail. The accused will be treated fairly and given the complaint in writing. The accused has the right to be heard and defend himself or herself, and given the opportunity to explain or rebut the accusation. The accused is entitled to legal representation. The inquiry is not bound to the rules of evidence but its procedures must be consistent with the principles of natural justice, and in line with the civil standard of proof though in serious cases, it must be higher than a mere balance of probabilities[3]. Members of the **RIDB** conducting the inquiry must be free of conflict of interest, bias or preconceived ideas and conduct themselves with propriety and dignity. The inquiry can be held in a closed or open manner depending on the perceived public interest. The whole process should be completed within a specified period of time (within 2 months of receiving the complaint) and a decision made speedily (within 3 months of receiving the complaint).

At the end of the enquiry, **RIDB** will come out with a written report to the **HRE** for action **(Step 8)**. This may be one or several of the following:

a. Dismissal of the case
b. The complaint is upheld and any of the following redress is recommended:
    i. A warning letter is issued
    ii. A reprimand is issued
    iii. Blacklisted from future projects for a period of time
    iv. A demotion
    v. Removal from the research project
    vi. Dismissal from employment
    vii. Reclamation of the perceived or actual loss

The **HRE** must, within 4 weeks of receiving the report from **RIDB**, inform all relevant parties of the findings and the action taken by the institution **(Step 9)**.The relevant parties include the relevant staff and students, research collaborators including those from other institutions, the Head of Department (or equivalent), the Head of the Research Laboratory, the Dean (or equivalent), **RIO, RIDB**, the University or Research Institute Research Management Committee, the University or Research Institute Research Ethics Committee (or other Ethics Committee that the research project receives the ethics clearance from), the University or Research Institute Board or Board of Directors, funding agencies such as Research Management Agency, and ministries in charge of education or science and technology, journal editors, professional registration authorities and the National Science Council. Public record, including publications, need be notified. Appeals to the decision may be managed according to the respective research entity's usual procedures. Persons who made the complaint need to be treated fairly. If the complaint is found to be unfounded, every effort must be made to reinstate the good reputation of the accused researcher. Persons making mischievous or frivolous complaints should face disciplinary action.

In cases where the **RIO** and the **RIAC** deem that the complaint may relate to national security, the **HRE** will immediately refer the case directly to **NCRI (Step 10)** which will then notify the **National Security Council (Step 11)** for further action. Issues related to national security include but are not limited to national integrity, cybersecurity and bioterrorism.

Failure of the research entity to adequately respond to complaints of research misconduct is considered a breach of the Code.

The **HRE** will submit reports of **RIDB** to **NCRI (Step 12)**. The **NCRI** shall publish an Annual Report to the National Science Council on the state of research integrity in this country, including the number of complaints of the transgression of this Code and how these have been managed.

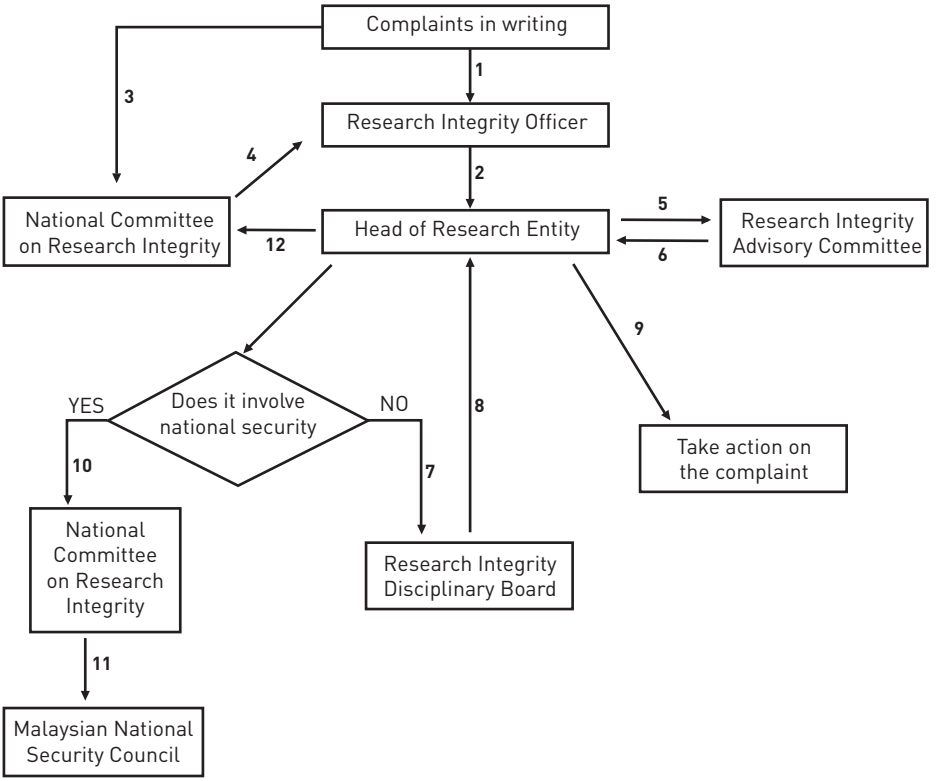


Figure 1: Process for dealing with research integrity complaints

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APPENDIX THE SINGAPORE STATEMENT 2020

The 2nd World Conference on Research Integrity at its meeting in Singapore in July 2010 issued a set of principles which serves as a "global guide to the responsible conduct of research". This Singapore Statement on Research Integrity[5] states the following:

Principles

- Honesty in all aspects of research
- Accountability in the conduct of research
- Professional courtesy and fairness in working with others
- Good stewardship of research on behalf of others

Responsibilities

1. Integrity:
Researchers should take responsibility for the trustworthiness of their research.

2. Adherence to Regulations:
Researchers should be aware of and strictly follow the regulations and policies related to research.

3. Research Methods:
Researchers should employ appropriate research methods and make conclusions based on critical analysis of the evidence and report findings and interpret these fully and objectively.

4. Research Records:
Researchers should keep clear,accurate, complete and secure records of all research which will enable verification and replication of their work by others.

5. Research Findings:
Researchers should share data and findings openly and promptly, soon after they have had an opportunity to establish priority and ownership claims.

6. Authorship:
Researchers should take responsibility for their contributions to all publications, funding applications, reports and other representations of their research. Authors should include all those and only those who meet the authorship criteria.

8. Peer Review:
Researchers should provide fair, prompt and rigorous evaluations and respect confidentiality when reviewing others' work.

9. Conflict of interest:
Researchers should disclose financial and other conflict of interest that could compromise the trustworthiness of their work in research proposals, publications and public communications, including all review activities.

10. Public communication:
Researchers should confine professional comments to their recognised expertise when involved in public discussions regarding the status, application importance of research findings and clearly distinguish professional comments from personal views or opinions.

11. Reporting Irresponsible Research Practices:
Researchers should report to the appropriate authorities perceived research misconduct, including fabrication, falsification or plagiarism, and other irresponsible research practices that compromise the trustworthiness of research, such as carelessness, improperly listing authors, failing to report conflicting data, or the use of misleading analytical methods.

12. Responding to Irresponsible Research Practices:
Research institutions, journals, professional organisations and agencies that have commitments to research, should have procedures for dealing with allegations of misconduct and other irresponsible research practices and for protecting those who report such behaviour in good faith. When misconduct or other irresponsible research practice is ascertained, appropriate actions should be instituted promptly, including correcting the research record.

13. Research Environments:
Research institutions should set up and nurture environments that encourage integrity through education, clear policies, and reasonable standards for advancement, while encouraging work environment that support research integrity.

14. Societal considerations:
Researchers and research institutions should realise that they have an ethical obligation to consider societal benefits against risks related to their work.

The **Malaysian Code of Responsible Conduct in Research (MCRCR)** was endorsed by the National Science Council to be the national code of ethics in research to enhance the country's competitiveness in research, development and innovation. It will be the reference code of ethics in research for all stakeholders such as government agencies, universities and industry that conducts research in Malaysia. The National Committee on Research Integrity established by the National Science Council has the mandate to facilitate, coordinate and monitor the implementation of the code.

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