

**SAFEGUARDING GOOD
SCIENTIFIC PRACTICE**

January 2014

Section 1: Principles of Good Scientific Practice

1. Good Scientific Practice:

Includes:

- Fundamentals of scientific work such as:
 - Maintaining professional standards;
 - Documenting results;
 - Questioning one's own findings;
 - Attributing honestly the contribution of others;
- Leadership and co-operation in research groups;
- Taking special account of the needs of new researchers; and
- Securing and storing primary data.

These principles should be widely disseminated within the University and should be integrated into academic teaching and research training of post-graduate students. These principles, and those elaborated below, are supplementary to standards issued by professional societies and to international standards such as the Helsinki Declaration and to the University's Code of Practice for Research Involving Human Participants.

2. Leadership and Organisation:

It is the responsibility of the University's senior management, Deans of School, Directors of Research and Heads of Research Groups and Units to ensure that a climate is created that allows research to be conducted within the principles of good scientific practice.

Whilst adherence to the principle of good scientific practice is the responsibility of each individual, the University and each of its research groups and units has a responsibility to provide an environment conducive to such good practice. This includes:

- Providing an environment that allows for mutual trust in conversations, discussion and even disagreements;
- Ensuring a division of labour within research groups and units that must allow for reciprocal criticism and verification of new findings within the group or unit;
- Ensuring that Research leaders maintain an awareness of activity within their group or unit and that the leadership chain in any group or unit should not become too long;
- Ensuring that commercial pressures do not influence research outcomes;
- Introducing adequate induction programmes for new or inexperienced research staff.

3. Education of New Researchers:

The education and development of new researchers needs special attention. Schools, Research Groups and Units should ensure that responsibility for mentoring new researchers is clear.

3.1 Each new researcher should have a more senior researcher primarily responsible for his or her progress and should receive adequate supervision. It might also be advisable to nominate additional experienced scientists who are available for advice and help if needed.

3.2 It is important to ensure that students and research assistants are not put under unwarranted or unsupervised pressure to produce results at any cost.

3.3 All research staff should be managed in accordance with the standards and conditions set out in the 2008 Concordat to Support the Career Development of Researchers, the details of which can be found on the RCUK website at:

<http://www.rcuk.ac.uk/per/Pages/Concordat.aspx>

3.4 The University shall ensure that all doctoral students receive appropriate training in key areas of research skills through its Key Skills training programme.

3.5 The University shall provide training for all researchers to develop their knowledge and skills throughout their career, as well as assistance in identifying unmet needs.

4. Retention of Primary Data:

Primary data produced at the University as the basis for publication should be stored at the University, for a period at least as long as that required by any sponsor which has funded the research.

4.1 Storage of primary data is essential for reproducibility, both internally and by external laboratories, and is therefore a sine qua non of good science. The loss of primary data is common to cases of scientific misconduct and justifies a prima facie assumption of dishonesty or negligence.

4.2 Retention of data is also a key to working efficiency. It becomes all the more important where the published results are challenged by others. Such data should be available for reference and verification purposes for a period of at least five years after completion of the research work or longer if stipulated by

the appropriate research body or the research is of major societal or environmental importance. Data may be stored on space saving techniques, where appropriate (such as a memory stick or CD-ROM) but it is important that data is retained at the University even following relocation of principal investigators to other institutions, irrespective of statutory or professional obligations.

4.3 In addition, the maintenance of laboratory notes is increasingly important for the protection of intellectual property.

4.3.1 In scientific/laboratory-based research it is established practice to record data and procedures as they are observed in:

- Permanently bound laboratory/notebooks with consecutively numbered pages. The notebook should either include details of the data, materials and their source and research/statistical methods utilised or provide a clear cross-reference to the source of such information which should also be available as evidence. Such information may include any unique materials that have been prepared or discovered. These should be kept and labelled appropriately and the notebook should include details of their location.
- In the event of a mistaken entry, such information must not be erased or covered out but should be crossed out by a line and initialled by the researcher. Each page of the laboratory/notebooks should be signed and dated by the researcher. The last page of an entry should be counter-signed and dated by another person, confirming that the entries in the notebook have been completed correctly according to any guidelines outlined in each notebook.

The counter-signatory is not verifying any of the statements made or that the research has been carried out as indicated in the notebook. The system may be subject to audit from time to time as required by a funding body to ensure that procedures are working efficiently and named computer files that are saved and archived regularly and retrievable in read-only files. Data sets may also be stored securely as hard copy. Any coded information must have documented definitions. The rules for applying the experimental data sets must also be recorded. The names of any computer files/hard copy data sets should be documented appropriately in the laboratory/notebooks and also cross-referenced to any other records that form part of the research.

In areas of research which include human subjects (e.g. social sciences) there is a need to protect the identity of the individual while still assuring that data can be audited for accuracy. Any such primary data e.g. questionnaires, interview tapes or field notes should be available for review but shall be stored confidentially. The rules

and procedures utilised to remove key identifiers for individual subjects should be documented appropriately.

5. Responsibility for Publications:

Authors of scientific publications are always responsible for their content. So-called 'honorary authorships' are not permissible.

5.1 Other contributions to the work from which the publication arises, including significant ones, such as:

- Responsibility for obtaining the funds for the research;
- The contribution of important materials;
- The training of co-authors in certain methods;
- Involvement in the collection and assembly of data;
- Directing an institution or working unit in which a publication arises; are not by themselves regarded as sufficient to justify authorship.

5.2 Where there are a large number of contributors to a piece of research, it may be advisable for an agreement to clarify the authorship and other rights. In this context, it is also important to note that only the person who reduces the research to text will have copyright in the work depending on the individual's contract of employment conditions.

6. Responsibility for Integrity of Externally Submitted Research:

Applications:

Principal Investigators and those responsible within Departments and Research Groups and Units for authorising external applications are responsible for taking all reasonable measures to ensure accuracy of information included in funding applications.

6.1 The University acting through its officers – primarily through those authorised to sign-off external applications, such as Deans of School, Directors of Research and the Central Research Support Office – also have a responsibility to ensure that scientific misconduct does not occur.

6.2 In this respect, Departments and Research Groups and Units should also seek to encourage the practice of internal and/or external peer review as appropriate to the subject content, over and above the signing off of applications by the appropriate Dean of School and/or Head of Department.

7. Standards in Public Life:

Attention should also be drawn to the recommendations of the Nolan Committee on Standards in Public Life. The Committee sees higher education as one of the key areas of public life and the seven principles outlined by the Committee have relevance to best practice in the conduct of research, namely: selflessness, integrity, objectivity, accountability, openness, honesty and leadership.

Practical applications of this other than those previously outlined include;

7.1 Honesty and Integrity:

Practising strict honesty and integrity in the conduct of every aspect of research, including applications, proposals, analysis of research itself and the presentation and publication of results. Integrity in research requires that all relevant information be reported. It is considered fraudulent to deliberately deceive i.e. to include false information or statements and to omit any data, which may distort the truth. This does not include any honest errors or honest misinterpretation of data/analysis. If it is decided to disregard any data from the published research for a particular reason then this should be detailed appropriately.

7.2 Maintaining Confidentiality Resulting from Access to Privileged Information:

Maintaining any confidentiality required as to information gleaned as a result of grant applications or peer review or assessment of research work. Any information gleaned should only be used in accordance with the express wishes or authority of the supplier of the information in a manner which adheres to accepted scholarly practice in the research area.

7.3 Reporting any Conflict of Interest

Ensuring that any conflict of interest arising from undertaking any research is reported to the appropriate authority. Such conflict of interest may include e.g. personal financial gain which could be gleaned from the research.

7.4 Health and Safety:

Observing the health and safety regulations as laid down by the University to ensure a safe research environment⁶.

7.5 Legal and Ethical Requirements

Observing any legal and ethical requirements as stipulated by the University Research Ethics Committee, professional bodies and those of recognised research bodies as may be appropriate in the area of research.

7.6 Proper use of Resources

The monies or other resources allocated for the research must be utilized appropriately in accordance with the requirements of the research body.

7.7 Openness

Disseminating research findings as widely as possible and in a timely manner to ensure maximum impact. Where there are delays in publication due to protection of Intellectual Property and obligations of confidentiality, seeking to keep such delays to a minimum.

Once published, allowing access to research data and materials, subject to any obligations of confidentiality or commercial sensitivity.

Seeking to exploit any viable intellectual property resulting from the research and owned by the University for the benefit of society and the economy, in particular where the research has been funded by a public or charitable body.

References and Acknowledgements

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