RESEARCH CODE Maastricht UMC+

Contents

Preface

Scientific research, and clinical research in particular, takes place in an arena of competing interests. It is the task of the Executive Board Maastricht UMC+ and the researchers to protect the integrity of scientific research in such an arena. Scientific integrity means following the principles and guidelines for ethical and socially responsible research.
The Executive Board Maastricht UMC+ considers it very important that all researchers employed by Maastricht UMC+ work in accordance with the current laws and regulations. The Research Code Maastricht UMC+ defines the principles and framework for conducting scientific research within Maastricht UMC+[1].

The Research Code Maastricht UMC+ provides those involved in research with a clear description of the rules for ethical and socially responsible conduct in scientific research. For stakeholders, the Research Code offers a description of the principles observed by Maastricht UMC+ when preparing, performing and publishing scientific research.

Because the scientific world is very dynamic, the most recent version of the Research Code Maastricht UMC+ is available in digital format. This allows quick incorporation of new developments and changes in laws and regulations into the code. Thus researchers at Maastricht UMC+ are always assured of the most current information. The Research Code is available for download via the website of CRISP, Centre for Research, Innovation Support and Policy; www.crispmaastricht.nl.

The Executive Board Maastricht UMC+ is confident that the Research Code Maastricht UMC+ will ensure scientific research with independence, due care and integrity as leading principles.

Kind regards,
on behalf of the Executive Board Maastricht UMC+,

Drs. G.J.H.C.M. Peeters
CEO

Prof.dr. A.J.J.A. Scherpbier
Dean/Vice Chairman

[1] The research codes of AMC, UMCG and Erasmus MC were consulted for the drafting of the Research Code Maastricht UMC+.

List of abbreviations

azM (academisch ziekenhuis Maastricht): university hospital Maastricht

CAPHRI: School for Public Health and primary Care

CARIM: School for Cardiovascular Diseases

CCMO (Centrale Commissie Mensgebonden Onderzoek): Central Committee on Research Involving Human Subjects

CPV (Centrale Proefdier Voorzieningen): Central lab animal facility

CRISP: Centre for Research Innovation, Support and Policy

CTCM: Clinical Trial Center Maastricht

DEC (Dierenexperimentcommissie): Animal Experiments Committee

FHML: Faculty of Health Medicine and Life Sciences

GCP: Good Clinical Practice

GMO: Genetically Modified Organisms

GROW: School of Oncology and Developmental Biology

KNAW (Koninklijke Nederlandse Academie van Wetenschappen): Royal Netherlands Academy of Arts and Sciences

METC (Medisch Ethisch Toetsingscommissie): Medical Ethics Review Committee

MHeNS: School of Mental Health & Neuroscience

NWO (Nederlandse organisatie voor Wetenschappelijk Onderzoek): The Netherlands Organisation for Scientific Research

NUTRIM: School of Nutrition, Toxicology & Metabolism

OBP (opleidings- en begeleidingsplan): Training and Supervision plan

SBE (Stralingsbeschermingseenheid): Radiation Protection Unit

SHE: School of Health Professions Education

UM (Universiteit Maastricht): Maastricht University

Maastricht UMC+: Maastricht University Medical Center+

VSNU (Vereniging van Samenwerkende Nederlandse Universiteiten): Association of Universities in the Netherlands

WMO (Wet medisch-wetenschappelijk onderzoek met mensen): Medical Research Involving Human Subjects Act

WOD (Wet Op de Dierenproeven): Animal Testing Act

VWS (ministerie van Volksgezondheid, Welzijn en Sport): Ministry of Health, Welfare and Sport

1. Background

The university hospital Maastricht (azM) and the Faculty of Health, Medicine and Life Sciences (FHML) of Maastricht University collaborate under the name Maastricht University Medical Center+ or Maastricht UMC+.

Maastricht UMC+ has three core tasks: patient care, education & training and research. In addition, the organization focuses specifically on health promotion & prevention, risk factors, and early diagnostics. Hence the '+' in the name. It is this combination that makes Maastricht University unique. The integration of research, education, public health and patient care is another distinctive feature. Thus Maastricht UMC+ has the broadest orientation of all university medical centers in The Netherlands. Maastricht UMC+ bundles research and education that cover the total spectrum of biomedical sciences, health sciences (including public health and primary care) and medicine. This promotes diversity and depth in research. And by using this specific and integral approach, Maastricht UMC+ is carving out a position as a top rated academic center for education, training, research and patient care that focuses on the entire continuum of health and disease, instead of just the field of disease.

For whom

The Research Code applies to anyone who is involved in research within Maastricht UMC+. Employees of Maastricht UMC+ who are elsewhere in the world involved in scientific research, as well as (scholarship) students who are not employed by Maastricht UMC+, are also required to conduct their research in accordance with this code. This Research Code is also intended for third parties, such as clients, sponsors, politicians, society at large and patient organizations, to inform them about de principles held by Maastricht UMC+ in regard to conducting scientific research.

2. Principles

In 2004 the Association of Universities in the Netherlands (VSNU) introduced The Netherlands Code of Conduct for Scientific Practice[2]. This code of conduct identifies and defines five principles. It describes the conduct desired of researchers. Since January 1, 2005 this code applies to all universities in The Netherlands[3]. It is not only in the interest of the researcher, but also in the interest of the institute, that these principles are taken into account.

The five principles are:

1. Due care: Scientific activities are performed with due care. Mounting pressure to succeed may not undermine this principle.
2. Reliability: The reputation of science as being reliable is confirmed and enhanced through the conduct of every scientist. A scientist is reliable in performing and reporting on his or her research, and equally reliable in disseminating knowledge through education and publications.
3. Verifiability: Presented information is verifiable. When research results are made public, it is clear what the data and conclusions are based on, and where they can be verified.
4. Impartiality: In his or her scientific activities, the scientist heeds no other interest than the scientific interest. He/she is always willing to account for his or her actions. If the scientific research involves people or animals, the interests of the human subject and the test animal must also be carefully considered.
5. Independence: Scientists operate in a context of academic freedom and independence. Insofar as restrictions of that freedom are inevitable, these are clearly stated.

[2] http://www.vsnu.nl/Media-item/Nederlandse-Gedragscode-Wetenschapsbeoefening.htm

[3] Increasingly, research takes place in an international (for example, European) context. Codes and regulations in other countries are different, sometimes have an ad hoc character or are lacking. Because of international collaboration, improving international coordination and harmonization is an important goal. The draft of an European Code of Conduct is an attempt to a first step in this direction. See also: http://www.knaw.nl/Content/Internet_KNAW/publicaties/pdf/20101046.pdf

Respect for people and test animals involved in scientific research

In addition to the aforementioned principles, respect for each individual and for the rights of each participant, regardless of his or her level of involvement in the study, is an absolute requirement in any kind of scientific research. This applies particularly to the right to protection of physical and mental integrity of individuals involved in research and their right to protection of privacy. Research with human subjects can only take on voluntary cooperation after they are fully informed about the research. In addition to humans, animals can also be the subjects of scientific research. Animal testing for research purposes is only allowed if there are no suitable alternatives available.

3. Involvement of human subjects in scientific research

In scientific research a general distinction can be made between three types of research involving people (human subjects):

- Scientific research with human participants that is subject to the Medical Research Involving Human Subjects Act (WMO)
- Scientific research using human biological materials (non-WMO)
- Scientific research using personal information (non-WMO)

For each of these three types of research, more details are given below about the following three aspects:

- whether a medical ethics review is mandatory,
- the most important substantive rules, and
- other available sources of information.

3.1. Scientific research with human participants that is subject to the Medical Research Involving Human Subjects Act (WMO)

Research involving human subjects that is subject to the WMO must undergo a medical ethics review. This is the case if the following two criteria are met:

1. medical-scientific research is to be conducted,
2. the research will involve subjecting people to treatments or requiring them to engage in specific behavior.

METC

WMO-research can only be conducted if a Medical Ethics Review Committee (METC) that is recognized by the Central Committee on Research Involving Human Subjects (CCMO) has approved the research protocol. Maastricht UMC+ has its own recognized, independent METC, the MEC azM/UM[4]. For a scientific study to be conducted within Maastricht UMC+, the Executive Board Maastricht UMC+ must have approved the scientific research proposal beforehand. The Clinical Trial Center Maastricht (CTCM) coordinates the applications and the central registration of these reviews on behalf of the Executive Board Maastricht UMC+. In addition to approval of the research by a METC, the subject has to be fully informed about the research and a written 'informed consent' needs to be obtained from each trial subject who has been asked to participate in the research. For research involving human subjects, clinical trials insurance must be taken out. The METC will check whether this has been done (or may grant an insurance exemption at the written request of the researchers) and whether liability insurance is applicable.

In some cases, additional guidelines may need to be followed when applying for WMO-research:

- research in which human subjects are exposed to sources of ionizing radiation does not only need to be reviewed and approved by the MEC azM/UM, but also by the general coordinating radiation expert[5].
- if the research involves gene therapy or genetically modified organisms (GMOs), the review can only be carried out by the CCMO, together with the Environmental Safety Officer (MVF)[6].
- drug research not only requires a positive review by the MEC azM/UM, but also a declaration of no objection from the authorized organization (CCMO). In addition, the WMO stipulates additional requirements for drug research, as a result of the implementation of the Guideline Good Clinical Practice (GCP) in 2006.

The CCMO[7] website offers a step-by-step guide to find out how a particular research study needs to be reviewed.

Research conducted by Maastricht UMC+ researchers in Europe or in developing countries is the responsibility of the METC in the country where the research takes place. Also in these kinds of studies, human subjects must give written consent for participation in the research study by ways of 'informed consent'.

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[4] For more information regarding the Medical Ethics Committee MEC azM/UM: http://www.azm.nl/info/azMorganisatie/MEC/

[5] The Radiation Protection Unit (SBE) is part of CRISP. See http://crispmaastricht.nl/

[6] The biological safety unit is part of CRISP. See http://crispmaastricht.nl/

[7] http://www.ccmo-online.nl/main.asp

GCP

For all WMO research that takes place within Maastricht UMC+ the clinical researcher must have the national GCP certificate or acquire it within 6 months after the study has commenced. The CTCM frequently organizes so-called BROK (legislation and organization for clinical researchers) courses [8]. This course covers the GCP, laws and regulations, ethics and practices of the CCMO and METCs.

Local feasibility of multicenter research

Multicenter research, which is research that is conducted at a number of locations in The Netherlands, can only commence once it has received a positive recommendation from one of the METCs. The Executive Board of each of the other centers participating in the multicenter research must inform the reviewing METC that they are able and willing to participate in the research study by means of a local feasibility declaration. Within Maastricht UMC+, advice on local feasibility is coordinated by the CTCM. As from march 1st 2012, the local feasibility does not have to be part of the researchfile anymore. The revising METC will include in the revision of multicenter research the new ''research declaration''[9]. This research declaration has to been given by the head of the department or the division where the local researcher is working.

Figure 1 shows a summary of the procedures a researcher will come across in each phase of research involving human subjects that is subject to the WMO:

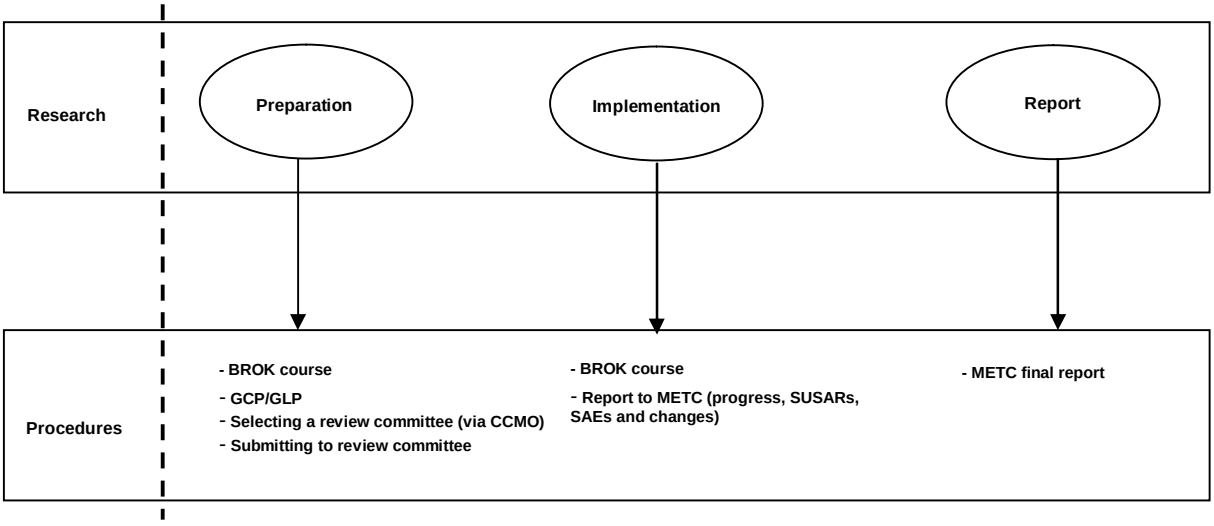

Figure 2: procedures during each phase of research that is subject to the WMO.

[8] http://www.ctcm.nl/Voordeonderzoeker/Trainingenencursussen/tabid/79/language/nl-NL/Default.aspx

[9] http://www.ccmo-online.nl/main.asp

3.2. Scientific research using human biological materials (non-WMO)

The use of human biological materials that are already available (taken during diagnosis and/or treatment) for the purpose of scientific research is subject to regulations.

Research involving human biological materials that is conducted within Maastricht UMC+ must meet all legal requirements as stipulated in the Safety and Quality of Human Tissues Act and the Code for Proper Secondary Use of Human Tissue[10], which include rules of conduct for the use of human biological materials (taken during diagnosis and/or treatment) for the purpose of scientific research.

The Code for Proper Secondary Use of Human Tissue makes a distinction between:

a. *identifiable human biological materials*: the researcher can trace these materials back to the individual from whom they originated;
b. *anonymous human biological materials*: it is reasonable to assume that it is impossible to trace these materials back to the individual from whom they originated;
c. *coded human biological materials*: the provider can only trace these materials back to the individual from whom they originated via a code.

The use of *identifiable human biological materials* requires written consent (signed informed consent) from the individual from whom the human biological materials originated.

This also applies to 'biobank research', when extra tissue is taken during diagnosis and/or treatment for the purpose of future, not yet defined research.

Anonymous and *coded human biological materials*, conform Article 467 (1) of the Dutch Civil Code (Burgerlijk Wetboek), may be used for scientific research as long as the patient from whom the material has been taken, does not object and the research is conducted with due care. The researcher must submit the research protocol for this non-WMO research to the medical ethics review committee and explain the recourse to the rule of 'no objection'. The researcher must also check the patient's medical records to see whether the patient has objected. Maastricht UMC+ informs patients about the use of human biological materials in medical scientific research via the brochure (in Dutch) "Medisch-wetenschappelijk onderzoek met uw gegevens en/of lichaammateriaal[11]". This brochure informs patients about the possibility to object to the use of their (anonymous or coded) human biological materials in scientific research.

[10] The 'Code for Proper Secondary Use of Human Tissue', latest version May 2011, established by the Dutch federation of Biomedical Scientific Societies (FMWV), is available online: http://www.federa.org/?s=1&m=82

[11] This brochure is available via the patient information office of azM or online: http://www.azm.nl/onderbehandeling/meewerkenaanonderzoek1

3.3. Scientific research using personal data (non-WMO)

This concerns research with data acquired from either patients' medical records and other sources where data are stored, or from individuals themselves.

Out of the three types of research involving human subjects, data research is in principle the least invasive. This includes research that involves data collection via interviews/surveys as well as research using patient data that are already available to the researcher in his or her role as health care provider. Please note that scientific research comprising interviews or surveys (single or in series) that could pose a burden and/or risk on the participants, may fall under the scope of the WMO.

If there is any doubt whether a research project is or is not subject to the WMO, MEC azM/UM will take the final decision.

In addition, when conducting research using personal data the following points must be taken into account:

- The results of data research must not be traceable to the data subjects; direct or indirect traceability in publications is absolutely prohibited.
- The breach of privacy of data subjects must be as limited as possible; which means, for example a) not collecting materials from those involved if sufficient secondary data are available, b) not using identifiable data if the research can be conducted by using anonymous data, and c) using coded data if the latter is not possible.
- In general, data processing for scientific research is subject to the Personal Data Protection Act (WBP)[12], and to Act on Consent to Medical Treatment (WGBO)[13] in particular. The latter does not require a patient's consent for research using data that the researcher collected in his or her role as health care provider. It does, however, stipulate that a patient has given consent before personal data are shared with other researchers (including perusal of the patient's medical records by others).

4. Animal testing

In Maastricht UMC+ researchers treat animals with respect. The framework of the Animal Testing Act (WOD)[14] provides guidance on this issue. The purpose of the WOD is to protect animals: it is prohibited to carry out animal testing for purposes that can be achieved by alternative means, by animal testing that requires fewer test animals, or by animal testing that inflicts less discomfort than the test in question.

[12] http://www.cbpweb.nl/Pages/ind_wetten_wbp.aspx

[13] http://www.rbng.nl/userfiles/file/wetten/WGBO.pdf

[14] The original law from 1977, the changes to the law (2003), the General Administrative Orders (AMvBs) and a number of ministerial regulations can be found at http://wetten.overheid.nl/zoeken/ (search 'dierproeven').

The importance of animal testing must outweigh the discomfort inflicted on the test animal. The researcher is required to reduce the consequences of the intervention as much as possible, following the so-called 3Rs[15]:

- Refining animal testing in order to minimalize the discomfort inflicted on test animals;
- Replacing animal testing by animal-free (testing) methods, or
- Reducing the number of test animals involved in the experiment.

Animal Experiments Committee (DEC)

The WOD states that animal testing can only be conducted when the research proposal has received an approval from a recognized Animal Experiments Committee (DEC). The DEC[16] [17] of Maastricht UMC+ is a recognized DEC that, in all cases of animal testing for scientific research purposes, must review whether the importance of the test outweighs the discomfort the test inflicts on the animals involved. Animal testing can only take place after an approvement by the DEC has been received.
In case of deviation from the original protocol, the Animal Welfare Officer (Saskia Seeldrayers) has to been consulted *in advance*. Furthermore, such deviations must be submitted to the DEC for approval.
The Dutch Law on Animal Experiments is very clear in this respect: every animal experiment that has not been approved by the DEC is prohibited and violation of this prohibition, intentionally or unintentionally, is a criminal offence.

Additional conditions

Additional conditions apply to research with transgenic animals. Activities that involve transgenic test animals are subject to licensing. Therefore, in addition to the review by the DEC, the biological safety officer[18] will also need to review the application and give permission before the activities commence.
The application of sources of ionizing radiation in animal testing are reviewed by the general coordinating radiation expert[19], who is authorized to issue permits.

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[15] In The Netherlands, the National Knowledge Centre on Alternatives (NCA), the Platform alternatives for animal experiments and the ZonMw Programme Committee for Alternatives to Animal Experimentation actively promote development, acceptance and implementation of the 3R's.

[16] See also Code of Practice, published under the responsibility of the Inspectorate for animal experiments, called: 'Welzijnsbewaking van proefdieren' (2001 http://www.minvws.nl/images/codewelzijn_tcm19-110844.pdf)

[17] More information about the Animal Experiments Committee (DEC) of Maastricht UMC+ is available online www.cpv.unimaas.nl

[18] The biological safety unit is part of CRISP. See http://crispmaastricht.nl/

[19] The SBE is part of CRISP. See http://crispmaastricht.nl/

Article 9 official

In order to conduct animal testing, a researcher must meet the requirements stated in article 9 of the WOD. In short, this means that the researcher must have taken a course in laboratory animal science. This course focuses on responsible care and use of test animals in biomedical research and earns participants the title of article 9 official. The course is offered three times per year by the Central lab animal facility (CPV)[20].

Central lab animal facility (CPV)

The Central lab animal facility is a service of the FHML of the Maastricht University and facilitates, in accordance with legal requirements, animal testing for Maastricht UMC+, Maastricht University (Faculty of Psychology and Neuroscience) and Eindhoven University of Technology (Biomedical Technology).
Figure 2 shows a summary of the procedures a researcher comes across in each phase of animal testing:

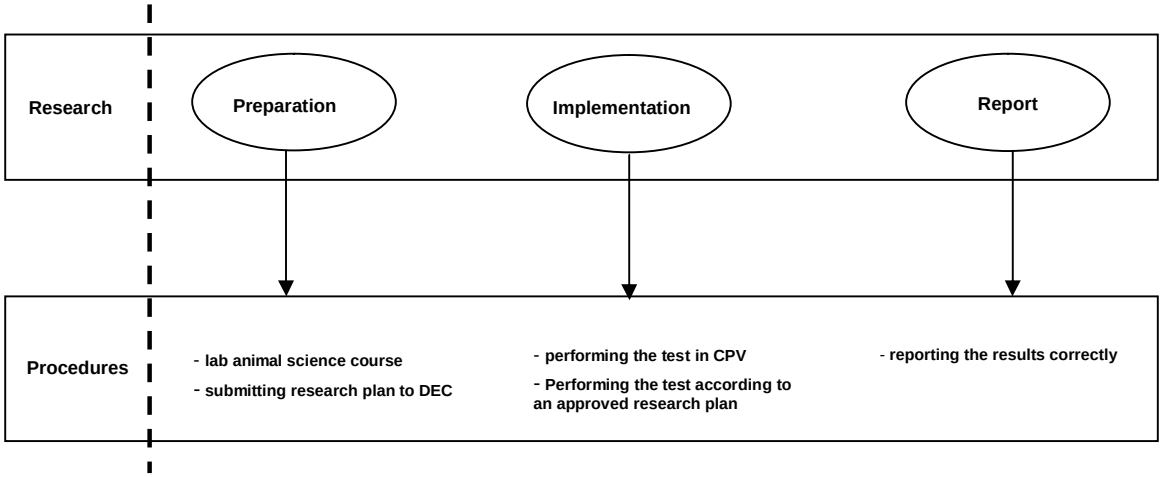

Figure 2: procedures during each phase of animal testing.

5. Biological and Radiation Safety

The biological safety unit is part of CRISP and the biological safety officer monitors any work that involves biological agents, test animals or genetically modified organisms (GMOs).
Work involving GMOs and potential pathogenic microorganisms is subject to a number of different regulations. Activities that involve GMOs are subject to the Decree and Regulations GMO (Besluit en de Regeling GGO), while activities involving pathogens (human as well as animal materials) are subject to the Working Conditions Decree (ARBO-besluit)[21].

[20] The brochure is available for download via www.cpv.unimaas.nl/alleen_UM_AZM/onderwijs/cursus_art.9/Folder_Cursus_Proefdierkunde.doc

[21] http://www.unimaas.nl/default.asp?template=werkveld.htm&id=WTTU7W6OH5MD5R2OMTTV&taal=nl

The radiation protection expert of CRISP/SBE independently monitors activities involving ionizing radiation and is responsible for radiation protection in accordance with the legal requirements stipulated in the nuclear energy legislation. He gives permission/approval for application. Specific conditions, requirements and information regarding biological and radiation safety are published on the CRISP website[22]. The required forms can also be downloaded from this site.

6. Good mentorship

In many cases, research is conducted by junior researchers, who may or may not be working on a dissertation, under supervision of a more experienced researcher (postdoc or staff member) and ultimately under the responsibility of a full professor. Adequate supervision of the junior researcher is an important aspect of good scientific conduct. Often, a junior researcher is dependent on the supervisor. Therefore, this guideline focuses primarily on what may be expected of a good supervisor. However, this does not alter the fact that the junior researcher also has important duties towards his or her supervisor: enthusiasm, effort, keeping agreements and taking the supervisor's feedback seriously.

Duties of the supervisor

The duties of an individual who supervises a junior researcher can broadly be summarized under the following four headings:

- to encourage and show a passion for the activities of the junior researcher;
- (helping) to give concrete shape to the desired activities of the junior researcher;
- to supervise the junior researcher with appropriate intensity and respect;
- to support the development of the junior researcher into an independent all-round researcher.

Points to remember

In order to fulfill these duties a supervisor should observe the following points:

1. The supervisor must ensure there is a clear work plan defining the activities expected of the junior researcher. The nature of the work plan can vary greatly and depends on the phase or sub phase the research project has reached. A work plan may cover: developing an idea, drafting a research protocol, performing a literature review, conducting experiments or collecting data, analyzing data that has already been collected, or preparing a publication or lecture. In addition, the junior researcher and his or her supervisor will draw up a training and supervision plan (OBP)[23] at the start of the project.

[22] http://crispmaastricht.nl/

[23] The OBP is the same for all six FHML Schools and is available on their websites. See for example NUTRIM's OBP:
http://www.nutrim.unimaas.nl/contentnl/0502/aioopleidingsplanform%20word%20format.doc

2. There must be a clear and explicit agreement regarding the goal of the collaboration between the junior researcher and the supervisor. This goal can be to produce a thesis, but also an article, report or lecture. In some cases the ultimate goal is just to conduct a part of the research.
3. The supervisor is required to make sure that there are sufficient facilities and appropriate support available to the junior researcher to make his or her work possible. This concerns not only facilities in a physical sense, but also the assistance of other employees from within or outside the department (if necessary).
4. The junior researcher can expect regular help, advice on and support for his/her research work. This can be provided at set times, but there must also be scope for *ad hoc* consultation in the event of unexpected developments.
5. The intensity and form of the supervision can vary greatly depending on the people involved. It must be based on the level and approach of the junior researcher. Thus the form and intensity of the supervision of a junior researcher may well differ from the supervision of a PhD student in the last phase of his or her research.
6. In order to provide adequate supervision and monitoring to junior researchers, there is a progress monitoring procedure, which stipulates that every junior researcher has an annual performance review, using the OBP (see 1.) and the progress monitoring form (filled in beforehand by both the junior researcher and the supervisor) [24]. During this meeting the next steps to be taken in the research project may be discussed, but it should also provide the opportunity to mutually comment on each other's performance as junior researcher and as supervisor. The meeting should preferably result in concrete, short-term and (if necessary) medium-term agreements.
7. The supervisor must be available for the junior researcher as much as possible – albeit within reasonable limits. He or she must make time for providing adequate and substantive critical feedback. This also includes returning corrected manuscripts, reports and other work written by the junior researcher within an acceptable timeframe.
8. In the case of PhD research, the supervisor must provide the junior researcher with a concrete, phased training plan before the research commences. This plan must ensure that the junior researcher will be able to explore and study a somewhat broader field beyond the scope of the research project itself. It must also take into account any specific wishes the junior researcher may have. Training courses[25] aimed at improving competencies that are required for performing the research and for the junior researcher's future career, may also be included in the training plan.

[24] At the UM, this is centrally organised:
http://www.maastrichtuniversity.nl/web/Main1/SiteWide/SiteWide10/Jaargesprekken.htm

[25]See general UM courses, such as self management for Ph.D. students and communicating in scientific English
http://www.maastrichtuniversity.nl/web/faculteiten/fhml/doelgroep1/phdstudenten/algemenecursussen.htm

9. Irrespective of the hierarchical relationship between the supervisor and junior researcher, both of them should maintain an open and critical attitude towards the academic goals as originally formulated by the supervisor, and they should realize that the original hypotheses could turn out to be incorrect on the basis of their own or other people's findings. If this is the case, the original hypotheses, goals and plans should be revised.
10. The supervisor and junior researcher must preferably be part of a School and conform to the quality policies of this School. A doctoral student tracking system for the purpose of systematic evaluation of the progress and the quality of the supervision can play an important role, as can the availability of a doctoral student coordinator and a confidential counsellor to whom the supervisor as well as the researcher can turn in case of questions or problems.

7. Scientific integrity

Prevention of fraud and plagiarism

In academic circles the dictum 'publish or perish' generally prevails. As a result, researchers are sometimes unable to resist the temptation to tell a 'white lie' in order to 'save' their line of research or to secure a grant. This varies from flagrant fraud with data being literally made up to less severe cases of scientific misconduct, such as making scientific data look better than it really is. Plagiarism, i.e. borrowing work of others without adequately citing the source and thus giving the impression that it is the scientist's own work, constitutes a particular type of fraud.

The aforementioned cases all concern some kind of scientific dishonesty. This is different from unintended deceit resulting from misuse of statistical methods and improper reporting of results. Despite obvious differences between intended and unintended deceit, it is hard to draw a line between the two, especially because different people have different norms and values. Unintended deceit is condemnable if it results from a lack of due care.

The overview below lists the types of dishonesty per phase of the scientific process:

Types of fraud and plagiarism:

Research

- Misleading applications for grants or jobs;
- making up data;
- adding fictitious data;
- fully or partially failing to observe the inclusion and exclusion criteria in the protocol;
- selective and unreported omission of undesired results.

Reporting

- Distorted interpretation of data or distorted conclusions;
- manipulating ('massaging') data in order to obtain better results;
- improper use of statistical methods to reach different conclusions;
- incorrect or distorted representation of other people's findings (miscitation) or failing to acknowledge other people's original observation (undercitation).

Submission for publication

- Unreported multiple submission or publication;
- so-called 'salami' publications (where the research study is unnecessarily divided and published in parts) and publications in which the sample size increases with each subsequent publication and new data are repeatedly added to previously published data while the results remain unchanged);
- unreported conflict of interest;
- deliberately withholding authorship from a person.

Article review

- Use of original ideas by abstractors or editors.

Published literature

- Plagiarism of results, parts of articles or entire articles;
- miscitation and undercitation (see reporting).

Rules of conduct to prevent fraud

When it comes to integrity in the practice of science, the best safeguards against fraud are cooperation between colleagues, evaluation of research and a publication policy that includes thorough, independent peer review. The following rules of conduct apply:

1. *Promote collaboration among colleagues in research groups.*
   Most research at Maastricht UMC+ is conducted by research groups. Although there may be a clear division of labor within a research group, it is important for the team to work as a unit when it comes to determining how data will be collected, assessed and interpreted, and when it comes to writing research reports. Frequent mutual verification and feedback reduce the chances of fraud. This also applies to writing articles. Proper supervision and feedback about the rules of conduct when citing others prevents plagiarism.
2. *Document the various stages and decisions in the research process.*
   If a journal is kept of the various decisions made during the research process, the argumentation can be properly reconstructed after the event. This will provide a clear insight in what went on during the project, not only for the researcher but also for outsiders.

3. *It can be advisable to set up a steering committee.*
   In addition to a project group, many research projects also have a steering committee. The risk of fraud is reduced if the progress of the research is discussed and the results are presented to outsiders on a regular basis. The participation of employees in a research project steering committees is therefore very valuable to the quality and integrity of all research conducted at Maastricht UMC+, even though it does not directly result in publication credits being awarded to the individual employee.
4. *Publish research findings in journals that have peer review procedures.*
   Peer review procedures of scientific journals provide a fourth safety for fraud prevention. Besides providing worthwhile feedback on content, peer review helps to detect misleading representation of data, and plagiarism before it is too late.

Rules of conduct to prevent plagiarism

The practice of science continually builds upon the work of scientific predecessors. Therefore it is customary to indicate how ideas (theories) and research (results) of others have been used. This needs to be done scrupulously. On the one hand, excessive (self-) citation (Jansen 1997, Jansen 1998, Jansen 1999a, Jansen 1999b, Jansen en Pietersen 2000, Jansen 2001) can make a text stilted (Pietersen 1990, Zeilstra 2000) and unreadable (Klaassen 2000, Johnson 1998, Erichson en Jung 1998, Mitsumota, Kualika, Titorathia 1999). On the other hand, neglecting to cite references causes a risk of plagiarism. As with fraud, it is difficult to ascertain exactly where the border lies between deliberate plagiarism and carelessness. The following rules of conduct could help prevent problems:

1. Give a reference when your text describes somebody else's theory, standpoint or research results.
2. Try to make your references as accurate as possible.
3. Try to refer to an article or book in which a particular theory or standpoint was first published and check all the references yourself.
4. Indicate clearly in the text when you are quoting and where each citation begins and ends.

Since September 2007, the UM has its own 'Regulation Scientific Integrity' [26]. It states that complaints regarding UM matters that can be reasonably perceived as a possible breach of scientific etiquette may be reported to the confidential counsellor scientific integrity UM[27].
More information about scientific misconduct and prevention can be found in *Scientific Integrity*, a joint publication of The Netherlands Organisation for Scientific Research (NWO), the Association of

[26] http://www.maastrichtuniversity.nl/web/main1/sitewide/sitewide10/rechtsbescherming.htm and click on scientific integrity UM.

[27] The chairman of the Committee for Scientific Integrity is Prof. Theo van Boven; Prof. Gauke Kootstra is vice-chairman

Universities in the Netherlands (VSNU) and the Royal Netherlands Academy of Arts and Sciences (KNAW)[28]. In addition, the Code of Conduct for Medical Research (Gedragscode Gezondheidsonderzoek) can be consulted[29].

Authorship

Externally, authorship is the most important instrument for a researcher to publish research results and to assess the quality of his or her research (or to have this assessed). The authorship guideline of Maastricht UMC+ is based on the general guidelines for manuscripts that are submitted to biomedical journals, drawn up by the 'International Committee of Medical Journals Editors'[30].

All individuals designated as authors must qualify for authorship. Every author must have participated sufficiently in the research project in order to be able to accept responsibility for the content of the article.

Right of authorship

Right of authorship depends on the extent to which a person has made a substantial contribution to each of the following:

1. *to conception and design of the research, acquisition of data, or analysis or interpretation of data.*
   This contribution entails the original idea for a series of experiments or the research project, the design of these experiments or the research project, actually performing the experiment, the acquisition of clinical or clinical-epidemiological data, the analysis and the interpretation of the data.
2. *to drafting the article or revising it critically for important intellectual content.*
3. *to final approval of the version to be published.*
   All authors must have read and commented on the initial version of the article, and thus been given the opportunity to make an intellectual contribution or to contribute his or her experimental expertise. In addition, every author must have read and agreed on the final version. In most cases, journals require a statement signed by all authors to confirm their authorship. Sometimes, journals also require this statement to include information about the nature and extent of the contribution of each of the authors.

All three of these conditions must be met.

[28] The entire publication is available online: http://www.knaw.nl/publicaties/pdf/20011082.pdf

[29] www.federa.org/?s=1&m=82

[30] See also: www.icmje.org

The conditions above imply that:

- Acquisition of funding, collection of data, or general supervision of the research group alone does not constitute authorship.
  Acquisition of funding alone does not constitute authorship, unless it is based on the design of the research line. Only if the original ideas for the research, as stated in the grant application, are the brainchild of the applicant AND the applicant will carry out proposed research (in part), the applicant qualifies for authorship. Right of authorship is not linked to certain job positions or professions and is does not depend on paid or voluntary contributions to the research.
- All individuals designated as authors should qualify for authorship, and all those who qualify should be listed. This not only means that authorship should be justified, but also that it should not be deliberately withheld when a person is entitled to it.
- Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content.
- The order of authors must be jointly determined by all authors. All authors must declare themselves willing to explain the choice for the particular order.
  This means that there must be consensus among the authors about the order in which they are listed.
- The right of authorship is linked to the duty to accept this right. It is important that the list of authors adequately reflects who the creators of the publication are. It should not include one or more authors who are not aware of this ('planted authors'). This is sometimes done to increase the chance of publication of the manuscript.

Authorship for research groups

When a large, multicenter group has conducted the research, the group should identify those people who accept direct responsibility for the work. All persons designated as authors should qualify for authorship. When submitting a manuscript authored by an institutional group (for example a working group or committee), the corresponding author must clearly indicate the preferred citation and identify all individual authors as well as the group name.

Order of authors

Even though no international agreement exists on the matter, the researcher who has done the most important part of the work and who prepared the first draft of the manuscript is usually mentioned first in the order of authors. If the first and second authors have each made equal contributions, this must be mentioned in a footnote. The researcher who carries final responsibility for the project and who meets the criteria above, is mentioned last. All other authors are mentioned in order of contribution. There are great advantages to reaching an agreement during the project's preparations about the way the list of authors will be determined and the way changes can be made once the actual contributions of each of the co-authors are known. It is advisable to name a senior researcher involved in the research project to

have the authority to make a final decision in case a problem concerning authorship arises. If a dispute cannot be solved, it will initially be referred to the dean, and then to Rector Magnificus, who may ask a confidential counsellor for scientific integrity UM to deal with the matter (see above: rules of conduct to prevent plagiarism).

Acknowledgements

All contributors who do not meet the criteria for authorship should be listed in an acknowledgments section. Examples of those who might be acknowledged include people who provided purely technical help, writing assistance, or only general support, as department chairperson for example. Financial and material support should also be acknowledged. Because readers may assume they endorse the data and conclusions, these persons must provide written permission to be acknowledged. Thus the right to be acknowledged is also linked to the duty to accept the acknowledgement, as is the case with authorship.

Due care in reviewing articles and research proposals

The comments of external reviewers on articles and research proposals, or grant applications can have far reaching consequences for the authors, project leaders and junior researchers[31]. It is therefore important that the review bears witness of substantive quality, respect and independence. Ownership of ideas and confidentiality must also be warranted.

Substantive quality

In order to warrant substantive quality, the following guidelines should be considered:

- If the reviewer has the feeling that he or she has insufficient expertise to provide sound comments, it is better to decline the request for a review.
- It is advisable to open the review with a short summary of the research question, design and findings. This will show that the reviewer has properly understood the content.
- The comments given must be substantively correct. In case of doubt regarding some parts, comments should be withheld or relevant experts /literature should be consulted to check whether the comments that are made are right. Sometimes it is also possible for the reviewer to explicitly indicate on which parts he or she cannot comment due to insufficient expertise.
- It is helpful for the author if the review includes literature references.
- If the report or proposal discusses the testing of a hypothesis or a point of departure that differs from the reviewer's own principles, it is important to make sure that the formulated concepts are only rejected on strictly scientific grounds.

[31] In 2006 ZonMW established a Conflict of Interest Code in regard to its review procedures. URL http://www.zonmw.nl search term < belangenverstrengeling >
In 2006 NWO established a Code of Conduct Regarding Conflicts of Interest in relation to research programming. URL http://www.nwo.nl search term < gedragscode belangenverstrengeling >

- Make a clear distinction between matters of taste and scientific errors.

Respect

A spirit of respect is promoted if the following is taken into account:

- It helps to ask yourself how you would like to receive your comments.
- Comments will be more useful to the authors or researchers if they do not only include negative criticism, but also positive feedback. Attention can be paid to the strengths of the reported or proposed research.
- In cases of serious, fundamental shortcomings, it is hardly necessary to provide a list of comments on details.
- The tone of the comments should not be destructive. Even negative criticism can be presented a constructive way: 1) focus on the work reported and not on the researcher; it is not about negatively commenting on the latter as a person; 2) comments can be worded as the reviewer's opinion; 3) consider wording your criticism as a question.
- Suggestions for improvement help the author to submit a better article or proposal next time.

Independence

Independence is promoted if the following is taken into account:

- When involved in the research or the research group, the request to provide a review should be declined, because of the conflict of interest.
- If it concerns work of a competing research group, it is very important to consider whether it is possible to provide an impartial review.

Ownership of ideas

Naturally, the article or proposal will provide the reviewer with new ideas. However, it is wrong to copy ideas from reviewed research proposals and present them as your own.

It is even more unacceptable to then negatively comment on the research proposal in order to make sure that the sponsor will reject it, which will increase the chances for the reviewer to be the first to find the answer to the research question.

Confidentiality

- It is wrong to discuss in detail the content and/or quality of the article or proposal with outsiders. This is one of the reasons why articles are sometimes anonymized before a review is requested.
- Even in the case of anonymous publications, the reviewer may have strong suspicions about whom the authors might be or what background they might have, however the reviewer must respect the confidentiality.
- If the reviewer wants to contact the authors, this needs to be done via the editor of the journal concerned.

Suspicions of fraud

Suspicions of fraud may arise, for example, when an article by the same authors has been published somewhere else (double publication) or in cases of plagiarism. One may also get the impression that reported data are incorrect. In such instances, it is in the interest of science to report these suspicions, along with underlying arguments, to the editor of the journal or to the scientific advisory board of the sponsor.

8. Relationship between researcher and sponsor

Scientific research conducted within Maastricht UMC+ is supported by four types of funding:

- 'eerste geldstroom' or 'primary funding': which is the rijksbijdrage (government contribution) azM and FHML,
- 'tweede geldstroom' or 'secondary funding': public funding via NWO or KNAW,
- 'derde geldstroom' or 'tertiary funding': funding by charities or foreign sources. The research programs of the European Union, and the EU Framework Programs in particular, are the main sources of foreign funding.
- 'vierde geldstroom' or 'quaternary funding': funding by the private sector (companies and government agencies).

In the past it has turned out that inadequate agreements about the study design, implementation and disclosure of research results can lead to conflicts. This is true for fundamental as well as for applied research.

For researchers of Maastricht UMC+ it is important to know that the researcher is not authorized to sign contracts. When it is necessary to enter into a contract with an external partner, the researcher must therefore contact CRISP[32], the Management Department azM[33] or the support unit of the School[34]. They provide support by drawing up/ checking and completing contracts and, if necessary, they will determine who is authorized to sign. Researchers who intend to submit a proposal to Euroregional, Provincial and/or National programs have to report this to CRISP and/or the Management Department azM. They will assess whether the proposal is in line with the Maastricht UMC+ strategy.

It should be noted that the name Maastricht UMC+ is used to externally represent two legal entities (azM and/or UM) when carrying out a joint policy as described in a joint policy document. Maastricht

[32] CRISP will make sure the right experts are consulted (for example, Legal affairs).

[33] For collaboration agreements with a (clinical) research component.

[34] The majority of the research within FHML takes place within one of the 6 Schools (CAPHRI, CARIM, GROW, MHeNS, NUTRIM and SHE)

UMC+ itself cannot independently enter into (legal) obligations: this is always done via the two legal entities behind the name: azM and/or UM.

8.1. Points requiring attention

Please pay attention to the following when drawing up a research contract, as it may be helpful in avoiding potential conflicts. Transparency in the relationship between the researcher and the sponsor and the independence of the researcher are the guiding principles in this.

1. The researcher(s) should be involved in drawing up the research protocol, in order to provide input for the exact research question(s), research design and planned analyses. Preferably, the researcher should be the author of the protocol. If, however, the protocol has already been drawn up, the researcher must carefully check whether he or she agrees with all details of the proposed research.
2. It is necessary to check whether the research design and implementation meet the requirements of the sponsor with respect to 'good laboratory practice'. In case of research involving human subjects, the Executive Board of Maastricht UMC+ has determined that all WMO research that takes place within Maastricht UMC+ has to meet the requrements of GCP (see page 11).
3. A solid agreement must be reached regarding the exact method for research data collection, the transfer to the sponsor, and the location and method of analysis. Key points to address are: careful documentation, independent data collection and analysis – or at least an independent check of the data collection and analysis – an analysis plan drawn up in advance and protection of privacy if the research involves personal data. Finally, the parties involved must reach an agreement about the conditions under which the research can be terminated prematurely.
4. Explicit agreements must be drawn up regarding the publication strategy. The point of departure in this is that the researcher always has the liberty to publish the findings within a reasonable timeframe. It is advisable to include details in the protocol about who will prepare the manuscript and what procedure will be followed to give the sponsor the opportunity to comment on the draft. The responsibility for the final version of the manuscript must lie with the researcher. Strategic of patent interests should be respected, but may never stand in the way of publication. It is advisable to agree to a timeframe for this[35]. Similar agreements must be made about presentations during scientific conferences. Finally, it is also recommended to come to an agreement early on in the process about who will be entitled to authorship and about the order of authors (see also 7. scientific integrity-authorship).
5. The property rights to research data must be put down in writing. Strictly speaking, they belong to the institute employing the researcher. However, in consultation a copy may be provided to the

[35] The CCMO directive for assessment of clinical trial agreements by the METC (CCMO-Directive assessment clinical trial agreements) even requires to agree to a timeframe for this, with a maximum of 90 days (from the time of submitting the draft of the publication to the sponsor).

sponsor[36]. Agreement must also be reached regarding the length of time research data will be stored, in compliance with applicable guidelines.

6. Before the research commences, a clear financial agreement must be reached. This must include information about what will be compensated (personnel, animals, experimental and/or laboratory costs) and the payment intervals. It also needs to be determined what will happen if the research ends prematurely. Agreements that do not provide sufficient detail may lead to misunderstandings or manipulation and must therefore be avoided. In addition, any lack of clarity regarding the relationship between medical treatment and funding/personal rewards must be avoided.
7. Because of the desired transparency, in publications as well as presentations of the research results, it is advisable to explain the role of the sponsor in the realization of the project in any external reports. This also applies to the relationship between the researcher and the sponsor.

8.2. Checklist for agreements

If scientific research is financed by another source than Maastricht UMC+ itself – industries, charities, government agencies – a number of matters must be put down in a written agreement. This goes without saying for clinical trials, but it is also important to put detailed agreements on paper for collaboration projects or when exchanging research material. The checklist below contains a number of important topics that must be addressed in the agreement.
Situations vary, interests may differ and specific conditions may apply for each research project. Therefore, it is important to always contact CRISP, the support unit of the School or the Management Department azM before entering an agreement with an external partner. Especially when a collaboration contract includes a (clinical) research component, the checklist may not apply to all aspects. The Management Department azM supervises the processes leading up to these kinds of contractual agreements.

Duty to inform

The intent to submit a project to a Euroregional, Provincial and/or National program must be reported to CRISP and/or the Management Department azM. They will check whether the proposal is in line with the Maastricht UMC+ strategy. Without pre-notification, approval cannot be guaranteed.

Parties and authorized signatories

A contract is an agreement between two or more parties. The contract must correctly define these parties, including the type of legal entity and registered address of each party. Any person signing the contract on behalf of a party must be explicitly authorized to do so.

[36] In contracts with pharmaceutical companies for research involving human subjects, the sponsor will almost always claim ownership of the data.

An individual researcher may neither sign on behalf of him/herself, nor on behalf of Maastricht UMC+. Contract – or similar - negotiations are dealt with by the support unit of the School conform valid university procedures and mandates. If a researcher takes matters into his or her own hands, he/she may be held personally liable and there will be a real chance that any damage resulting from conducting the research project may not be compensated by the insurance company. As mentioned, it is advisable to consult CRISP or the support unit of the School before an agreement is drawn up. In case of clinical research or collaboration agreements that include a research component, the Management Department azM must always be contacted.
It depends on the value of the contract whether the scientific directors of the Schools, the dean FHML/Executive Board Maastricht UMC+, or the President of the University is authorized to sign. The procedure for obtaining a signature is available from CRISP or the Management Department azM.

All clinical trials and other clinical research studies that receive quaternary (private sector) funding are placed under the responsibility of the CTCM. All other types of research are placed under the responsibility of the Schools. If research involving trial subjects takes place, including those by UM researchers, and azM facilities are being used, a CTCM must be filled out because of quotations. The Executive Board Maastricht UMC+ will not sign until CTCM has received all information required, including approval by the METC.

Contracts in which Maastricht UMC+ represents both UM and azM as contract partners, or in which it represents one of the two, are signed by both the dean and the chairman of the Executive Board Maastricht UMC+. Contact CRISP or the Management Department azM for information about the procedure required.

Considerations
The considerations indicate the parties' intentions regarding the contract and the interests involved. If there is a difference of opinion, these considerations are taken into account when interpreting the contract.

Project/Study
The project or study is usually described in a research protocol or project description appended to the contract and is part of this contract[37]. As a rule, the contract merely refers to the appendix. This appendix is extremely important. The researcher must make sure beforehand that everything set out in the research protocol or project description can actually be done.

[37] The text of the agreement, the research proposal and the reports must be available to the confidential counsellor scientific integrity at his or her request, and -on appeal- to the National Board for Scientific integrity (LOWI).

Obligation of best efforts

In scientific research, one can never take on a duty to achieve specific results. After all, if a researcher would know the results of the research beforehand, the research would not be necessary. Therefore, the only obligation that can be agreed to is an obligation of best efforts. This also applies to the number of patients /volunteers to be included in the study. The research can do his/her utmost to include a certain (minimum) number of patients, but cannot guarantee what number will ultimately be feasible.

Finances

If research is conducted on behalf of a company, the company usually pays for it. In order to determine how much should be paid, it is necessary to draw up a budget that includes all costs that will be incurred as part of the research project. This budget is drawn up by the managing director of the School involved, in consultation with the researcher responsible for the project. If the company puts forward a budget proposal, this proposal must be assessed in terms of its financial feasibility and taxation (including the VAT rates each party needs to pay or charge).

A budget can be based on a number of different principles, for example per unit of time, per patient or related to the salary of the member of staff appointed to the project. If the research involves payment per patient, the budget must state clearly how much will be reimbursed for patients who withdraw from the study. The reimbursement then depends on achieving certain milestones. In that case, the researcher should determine whether the milestones are realistic, before entering into the contract. There can also be situations in which a company provides funding for research initiated by Maastricht UMC+ researchers themselves (the so-called unrestricted grant). The amount of such payments can vary greatly and does not have to be related to the actual costs of the research.

Confidentiality

Research commissioned by a company usually involves a mutual confidentiality agreement, in which both parties (the Maastricht UMC+ researcher and the company) agree to treat the information of the other party as confidential. Such confidentiality does not apply to information obtained before the start of the project (in contracts often referred to as Background or background IP) or for information obtained outside the framework of the project (often referred to as Sideground or Sideground IP).

Publishing rights

In all agreements, it is extremely important to reserve the right of Maastricht UMC+ to publish the results of research carried out by Maastricht UMC+ or commissioned by Maastricht UMC+ and carried out elsewhere. The company has the right to see the draft of the article before it is submitted. During a specified period (4-6 weeks, for example, but no longer than 90 days) the company may comment on the researcher's draft. A company will often have specific knowledge that is very valuable when it comes

to reviewing articles. Therefore, it is important to take the company's opinion seriously. However, the scientific integrity of the researcher and the author's own responsibility for the article should not be compromised by a company's right of veto.

Besides providing substantive comments, a company may also object to publication because:

- the publication contains confidential information about the company (see above, under confidentiality). In that case, Maastricht UMC+ may be required to remove this information from the publication.
- premature publication may jeopardize patent application. In that case, a company is given time to protect this information. An acceptable time limit is 60 to 90 days from the moment the draft was submitted to the company for review.

A passage stating that a company may have information removed, because of 'harm to their commercial interests' is not acceptable. Commercial interests must never stand in the way of publication.

Intellectual property rights

Intellectual property rights fall under two headings: industrial property rights, and copyrights and neighboring rights. Industrial property rights include patent law, trademark law and design law. Please go to chapter 9 'Financial gain from research'[38] for a more detailed explanation.

Whether intellectual property rights (patent law, copyrights) derived from the research can be transferred to the company that financed the study, depends on a number of factors. In cases of clinical trials initiated by a company, it is fairly standard practice to transfer rights to possible new inventions derived from the research to this company. First of all, the likelihood of a new invention resulting from a trial is small. After all, the trial is designed to study products that already exist and of which the intellectual property rights are protected. Secondly, the invention has been the work of the company. The company has developed the drug.

The situation is completely different in the case of fundamental scientific research, for example into the development of new drugs. In that case, it is important to carefully consider the consequences of transferring property rights to newly obtained knowledge. Transferring patents, for example, could mean that the (employer of the) researcher is no longer allowed to use the technology he or she has developed. If a commercially worthwhile development could arise from the research, it is reasonable for Maastricht UMC+ to have a share in the financial rewards. Whether the transfer of rights should be

[38] See also the NFU framework regulation for valorization:
http://www.nfu.nl/fileadmin/documents/Kernt-NaareengoedewaardeNFU091018mrt09.pdf

considered also depends on the sum the company is paying. Agreement on these issues should be reached before the research commences. And the following principles should be taken into consideration:

- In principle, all intellectual property rights to the results of fundamental research should not be transferred.
- Only findings that are derived directly from the project funded by the company may be transferred. Findings dating back to prior to the start of the project (Background IP) or discoveries made outside the scope of the research project (Sideground or Sideground IP) must not be included in the agreement.
- If (patent) rights are transferred, they must be licensed to Maastricht UMC+ for purposes of research, education and (if applicable) patient care.

Whether intellectual property rights can be transferred to a company in the case of fundamental research, depends on a number of factors. Please consult BioMedbooster[39] at Maastricht UMC holding for advice on this matter.

Liability

In all contracts the company must be liable for any damage caused by fulfilling the contract, unless there is intent or gross negligence on the part of Maastricht UMC+. If development is done by Maastricht UMC+, it is important that the company should indemnify Maastricht UMC+ of all damages to third parties as a result of applying the results developed by Maastricht UMC+. The agreement may also stipulate that Maastricht UMC+ is not liable for damages due to a third party rightly or wrongly claiming that the results infringe upon its intellectual property rights, and that the company must safeguard Maastricht UMC+ against this.

As indicated before (3.1. Scientific research with human participants), a clinical trial insurance must be taken out for any research involving human participants, as stipulated in the Medical Research Involving Human Subjects Act. If a company commissions a clinical trial, this company must take out this medical trials insurance.

Applicable law

In principle, foreign law is not acceptable and contracts are solely governed by Dutch law. Only the Dutch courts can decide disputes. This is defensible given that the research is taking place in The Netherlands. Currently, collaboration contracts with foreign partners that include a research component may be exempt.

[39] www.BiomedBooster.nl

8.3. Secondary employment and conflict of interest

It is reasonable to expect that scientific staff will apply their knowledge and expertise for which they were appointed in the interests of Maastricht UMC+. The regulations concerning secondary employment are stipulated in the collective employment agreement (CAO). For Maastricht UMC+ employees, it depends on their individual contract whether the CAO of UMC or the CAO of the VSNU applies.

Secondary employment

azM employees:

The latest collective employment agreement (CAO) contains a regulation for the secondary employment that applies to all employees whose contracts are subject to the CAO. The CAO (art. 9.3(1)) contains a regulation stipulating that secondary employment that may affect the interests of Maastricht UMC+ must be reported, and in what cases explicit permission of the Executive Board Maastricht UMC+ may be required[40].

FHML/UM employees:

Employees who have - or would like to take on – secondary employment, must notify their manager beforehand. If the secondary employment does not interfere with the employee's principal activities for which he or she has been hired by the UM, and if they don't harm the interests of the UM, there is usually no objection to these outside activities[41].

Conflict of interest

Until recently, academic researchers were relatively independent players in the field of medical science. Guided by scientific principles, they were able to independently determine the shape, content and timing of the research question, data acquisition and publication of the results. However, due to increasing pressure to acquire external funding and to sponsors' considerable interests in research conducted within the academic centers, the independence of researchers can come under threat. A lack of independence can lead to science of inferior quality, undermine the reputation of science, impact negatively on patient care, create a lack of transparency, and damage the good name of an institute.

There is a conflict of interest if a researcher, or the institute he or she works for, has financial or personal ties with other individuals or organizations that influence his or her conduct. When pharmaceutical industries, the government, quasi non-governmental organizations or other interest groups are

[40] For a description of the regulations concerning outside activities of azM employees, please go to: http://www.nfu.nl/fileadmin/documents/Werkg-NFU083958-CAOmetzoekf-v20090301.pdf

[41] For a description of the regulations concerning outside activities of FHML/UM employees, please go to: http://www.maastrichtuniversity.nl/web/main1/sitewide/sitewide10/nevenwerkzaamheden.htm

financing research, there is a danger of a conflict of interest[42]. Such a conflict of interest can result from personal relationships, academic competition and intellectual passion.
Certain guidelines apply when weighing up the pros and cons of favors offered by companies [43]. Central to these guidelines is the notion that employees themselves are always responsible for weighing up the interests, keeping in mind that reliability, due care and impartiality of Maastricht UMC+ are the absolute norm.

As a general rule, researchers are never allowed to accept any gifts, invitations and sponsoring in exchange for a favor. And the researcher must always consult with his or her manager before accepting any offer. Moreover, any financial sponsorship is added to the departmental budget.

Researchers are expected to inform their manager once a year whether they are facing a possible conflict of interest, or whether they have potentially conflicting interests outside the institute. In addition, they must speak to their manager whenever a potential conflict of interest arises.

Examples of situations that may lead to a conflict of interest[44]:
Situations that may involve research bias

- Research funded by third parties if the researcher or his/her family has financial interests with the funding party.
- Accepting favors from parties funding the research.
- Working as a consultant for research sponsors.

Situations that involve the use of facilities of the institute

- Allowing students and staff to work for a company in which the researcher holds an interest.
- Improper use of facilities for personal gain or to support a company in which the researcher holds an interest.
- Associating one's name or work with the institute to take benefit from the goodwill of the institute.

Situations that involve the use of information

- Improper use of confidential information.
- Accepting support for research under conditions that require the results to remain confidential or unpublished, or which lead to a serious delay of publication.

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[42] Conflict of interest code ZonMw (http://www.zonmw.nl/nl/subsidie/procedure/code-belangenverstrengeling-zonmw/) and NWO (http://www.nwo.nl/nwohome.nsf/pages/NWOP_6CYFSB)
[43] NFU advice:
http://www.nfu.nl/fileadmin/documents/Richtlijn_Gunstbetoon_door_bedrijven_3611.pdf
[44] From the Medical Association of Medical Colleges

- Providing an organization in which the researcher holds a financial interest with access to the institute's confidential information.

Situations in which the researcher negotiates with him/herself.

- Purchasing materials, instruments or supplies from a company in which the researcher holds a financial interest.
- Influencing the negotiation of agreements between institute and the company in which the researcher holds a financial interest.
- Requiring the use of books written by the researcher.

9. Financial gain from research[45]

Ownership of research data

When conducting research, a researcher will encounter different types of property rights regarding research data, materials, lab journals and publications. There are a number of laws for determining the rightful owner of these materials: the Copyright Act (Auteurswet) for publications and software and the 1995 Patent Act (Rijksoctrooiwet) for a patent on, for example, a drug, a device or a production method.

The following is a description per type of research result of the important principles and points to consider for determining which law applies and who will own the results. When entering a contract, parties may come to a different agreement about who will own the generated research results (see also 8.2. Checklist for agreements).

Publications

According to the 1912 Copyright Act, the author of a document is the owner of the publication. Within an academic institution, however, many are important for teaching and for conducting research. Therefore, the employer often demands (co-) ownership; by stipulation in the collective employment agreement (CAO), for example. When publishing scientific work, the copyright is usually transferred to the publisher of the journal concerned. This means that whenever the work is multiplied, the publisher must be asked for permission and/or paid a fee. However, an increasing number of sponsors demand to publish data in 'open access' journals.

Inventions

Conform the 1995 Patent Act, Maastricht UMC+ is, as an employer, the owner of all patentable inventions: products, methods and devices, for example. If the patent is exploited, the inventor is entitled to reasonable financial compensation.

[45] See also the NFU framework regulation for valorisation: http://www.nfu.nl/fileadmin/documents/Kernt-NaareengoedewaardeNFU091018mrt09.pdf

Patenting knowledge does not stand in the way of publishing. The day after a patent application has been submitted, information about an invention can be published or discussed. Internet increases the speed with which information can disseminated, including scientific publications and lecture titles. Before sending out a publication or a title, it is advisable to enquire when information will be made public. Contracts may deviate from the information provided above. If that is the case, it is best to consult a legal advisor.

For example: A researcher has come up with a valuable invention for the treatment of patients with a hereditary disease. While the ownership of the invention is being determined, it is established that multiple parties have been funding the research. The contracts and the project descriptions to which these contracts refer provide the basis on which ownership of the generated results will be determined.

Data and lab journal

According to the 1995 Patent Act, as soon as there is a patentable invention, the underlying data, results and lab journals are the property of the employer. The owner of a patent needs the lab journals to show how the invention came about.

Also, in view of quality assurance, Maastricht UMC+ must be able to have its research audited. Therefore, all data needs to be stored in a place, either at or outside Maastricht UMC+, that is accessible to an auditor. When an employee leaves the organization, all lab journals and files on research, or research- or trial subjects must be transferred to the head of the department. In the case of an externally funded project, it is possible to enter a contractual agreement regarding the transfer of a copy of the data and the results. An increasing number of sponsors demand to make data public available (‘open access’, see for example www.nwo.nl).

Human biological materials

In principle, this material cannot be sold or transferred to third parties. However, the hospital providing treatment may allow a third party to use the materials for a specifically defined research purpose. This purpose must be in line with the reason why the human biological materials were collected, such as research on diseases. To make sure this is the case, the original research purposes for which the human biological materials were collected needs to be determined. This information is then included in a Material Transfer Agreement, which is drawn up next. This contract also specifies who will own the results generated from the study of the human biological materials.

Other materials

As soon as there is a patent established of which a cell line, vector or clone is an essential part, then these materials are, according to the 1995 Patent Act, property of the employer. However, other

materials derived from research are also property of Maastricht UMC+, unless a contractual agreement stipulates differently. There is a grey area where it is not clear whether property rights belong to the employer, or in the public domain. Ownership of a human gene is one such example. In Europe, a human gene belongs to the public domain, because every human being has a copy of this gene in his or her genome, while the application of the gene as a drug or diagnostic marker is subject to patent law. In the United States, however, one may indeed apply for a patent on a human gene.

Exchanging materials with other institutes is important in research. Often, a so-called 'Material Transfer Agreement' is signed for this purpose. This type of agreement is based on the principle that the material is and will remain the property of the lender. The lender owns the research results that are directly linked to the material - improving the effectiveness of a vector, for example. However, the receiver owns the research results that are linked to the research question - cloning a gene using the vector, for example.

Software

Ownership of software is subject to the 1912 Copyright Act. However, it is subject to the 1995 Patent Act if a patent application has been submitted. Patented software is, just like the invention described above, property of Maastricht UMC+. In most cases, there are no patent applications for software, and therefore the aforementioned system for publications applies.

Financial gain from patents, licenses and limited companies

Sometimes there is an opportunity to convert the results of scientific research into a new product via a patent, a license or a limited company (BV). In such cases, BiomedBooster[46] makes sure that the intellectual property rights for Maastricht UMC+ are warranted. It has the knowledge and expertise to choose and put into place the right form of knowledge transfer and it can help authors and departments to take the necessary, formal steps.

In some cases, a patent or limited company may generate revenues. Such revenues are first of all intended to finance new research within Maastricht UMC+. However, Maastricht UMC+ wants to reward the inventors as well. The Maastricht UMC+ 'Kennisregeling', which is currently considered for approval, will provide a uniform regulation for all Maastricht UMC+ and UM employees.

10. Dealing with the media

Out of all scientific disciplines, biomedical research generates the most interest from the press. This media attention does offer certain advantages. Explaining research results in the media allows

[46] See also www.BiomedBooster.com

researchers and their institutes to publicly render account for the way public funds and other types of funding have been spent[47].

Favorable coverage may speed up acquisition of funding and – if sustainable – provide research institutes with a reputation of solid expertise. Moreover, the media play such a major role in society, that researchers can profit from favorable media attention for their own personal career.

However, there are also risks involved. It is not always easy to get the desired message across intact. The media are increasingly becoming an arena in which commercial interests play a large role. Sometimes, publicity about scientific research results impacts directly on the commercial goals of often internationally operating pharmaceutical companies and suppliers of biomedical technology. In the public sector – on local, national and European level – publicity regarding scientific research is often 'spun' to better suit political goals that are not always explicitly mentioned. And the media themselves are not free from commercial self-interest either. Surprisingly often, news coverage is related to opportunities for obtaining advertising revenue. Even reputable journals such as The Lancet, Science, The New England Journal of Medicine, and Nature inundate the media with press releases every week in order to maintain their authority status.

The arena of the mass media increasingly resembles a battleground where different interests compete for priority and where 'personal attention' or 'public recognition of expertise' put the ever-present (after all – human) vanity of researchers to the test. When talking to the media, researchers must be aware of the pitfalls. More importantly, however, the researcher must be aware that in almost all cases, the commercial or political proprietors are dependent on the researchers' cooperation. It is indeed this dependence that offers many possibilities for conveying information about the research findings independently and with integrity.

Due care

In order to exercise due care when dealing with the media, the following points and recommendations should be considered:

1. A digital newsletter is distributed within Maastricht UMC+. Publicity about a scientific research conducted by a scientist him/herself within Maastricht UMC+ can be reported via one's own organization, i.e. the Press and science communication department (UM)[48] or the Communications

[47] The UM offers the training course 'Omgaan met de media' (in Dutch). This course is intended for all scientific staff who regularly speak to the media. More information: https://myum.unimaas.nl/irj/portal

[48] http://www.maastrichtuniversity.nl/web/Main1/Pers.htm or phone (043) 3885222

Department azM[49]. Linking the news to the quality mark of the organization emphasizes the independent status of the research.

2. The independent position of their own organization also helps researchers to withstand pressures of (co-) financing organizations or authorities to seek publicity.
3. There must be transparency about the research funding if primary funding (one's own research budget) is not the only financial source. Transparency can prevent possible allegations or accusations. It is important to fully inform the Press and science communication department or the Communications Department about these matters.
4. Responsible popularization of expectations regarding research projects or research findings can be difficult. In the media, the importance of fundamental research is almost always measured by its potential for clinical application. Many a 'medical breakthrough' has reached ordinary people's living rooms, because the researcher got carried away by exciting, theoretical visions, instead of sticking to the factual scope of the results. A classic example in this context is the scientist who almost indiscriminately applies the positive results of *in vitro* or animal research to humans. The presentation of clinical research requires the same degree of due care.
5. Extreme caution should also be exercised when interim research results point toward success. In such instances, it is very tempting to publicize the results prematurely.
6. It can be advisable to inform the media pro-actively when media interest is expected and the research (the results or the theme) can easily lead to misunderstandings or touches on a subject that is the focus of a (fierce) public debate. In such circumstances it is often effective to send out a press release (to set the right tone), drawn up in collaboration with Press and science communication department (UM) or the Communications Department azM, or to present the news to the media via an article in our own magazine (providing more space for careful argumentation).
7. Premature publicity about research that has been submitted to a scientific journal for publication is inappropriate. The leading journals in particular have strict regulations regarding this practice, which can ultimately lead to the sanction of rejecting the article for publication. However, the regulations of these journals do not always provide sufficient clarity. It is, for example, unclear whether participation in a conference or PhD defense before the publication date constitutes premature publicity. Therefore the Press and science communication department (UM) or the Communications Department azM should be contacted regarding these matters. If there is any doubt, they will make sure a conclusive agreement is reached with the editors of the journal concerned. Making prior arrangements with editors is sometimes also recommended if the publication is mentioned in a press release about the upcoming edition of the journal. In such cases, the focus is usually on determining the exact moment at which the news embargo will end.
8. When recruiting trial subjects via a press release or advertisement, pay close attention to correctly describing the conditions. Especially in drug trials involving human subjects, the wording of the

[49] www.azm.nl or phone (043) 3875182

potential effects of the substance that is being tested requires great precision. Information about potential side effects and onerous research may not be vague, while the chance of being placed in a placebo group must also be clearly pointed out and explained. The publicity about these aspects must be exactly in line with the research protocol. If research is conducted as part of a multicenter-trial that is coordinated by an institute that is not the researcher's own, the researcher nevertheless remains responsible – even in the eyes of his own institute.

Epilogue

This chapter does not cover every eventuality in dealing with the media. There are simply too many different scenarios possible. Internet may well require separate guidelines in the near future, although at this point in time the same recommendations apply to this medium.

If questions arise that have not been addressed in this chapter, please contact the Press and science communication department (UM)[50] or the Communications Department azM[51]. The press protocol of the Communications Department azM states that the press officers of the Communication Department azM should always be the first point of contact for the media.

[50] http://www.maastrichtuniversity.nl/web/main1/pers.htm or phone: (043) 3885222

[51] www.azm.nl or phone: (043) 3875182