SOPs4RI

# D3.3: Report on the results of explorative interviews

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# Contents



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# 1. About SOPs4RI

The Standard Operating Procedures for Research Integrity (SOPs4RI) project aims to contribute to the promotion of excellent research and a robust research integrity culture aligned with the principles and norms of the European Code of Conduct for Research Integrity. The overall objective is to create a toolbox to support and guide research performing organisations (RPOs) and research funding organisations (RFOs) in fostering research integrity and consequently preventing, detecting and handling research misconduct.

The project focuses on providing Standard Operating Procedures (SOPs) and guidelines that will make it possible for RPOs and RFOs to create and implement Research Integrity Promotion Plans (RIPPs). SOPs4RI will thus stimulate transformational processes across European organisations involved in performing and funding research. SOPs4RI takes a mixed-methods, co-creative approach to the development and empirical validation of SOPs and guidelines.

The expected end-users of the tools provided by SOPs4RI are decision makers within RPOs and RFOs, e.g. university senior management (rectors, vice chancellors, deans, heads of administration), university academic councils, boards and directors of funding agencies, and their extended administrations. The development of SOPs and guidelines will take national, epistemic, and organisational differences into account, and the final toolbox will enable end-users to create Research Integrity Promotion Plans by the needs of their organisation.

## 1.1. About WP3 – Systematic review of practices and research cultures

To develop a toolbox for supporting RPOs and RFOs in fostering research integrity, it is necessary to create the evidence base regarding the existence and implementation of research integrity practices in RPOs and RFOs. The evidence base concerns the factors that have a positive or negative influence on the implementation of research integrity in RPOs and RFOs, a model of the culture of research systems in different disciplines, and knowledge on existing practices for research integrity promotion.

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WP3 contributes to the aim of the SOPs4RI project with scoping reviews on the existing documents related to the best practices for research integrity promotion and factors influencing the implementation of the practices for research integrity promotion in RPOs and RFOs. The WP3 also includes interviews with the research integrity experts and a Delphi survey study that will broaden the knowledge gathered through scoping reviews and develop it further for creating a first version of the SOPs and guidelines.

## 1.2. About D3.3 – Report on the results of the explorative interviews

This report presents the results of the explorative interviews with research integrity experts. To get a broad overview of the current state of affairs, the interviews included stakeholders of different scientific background and various roles regarding research integrity.

The interviews provided more in-depth knowledge of existing practices, innovative practices, and practices that should be developed in the future. Moreover, the conducted interviews recorded the experience about the implementation of research integrity policies within organisations, as well as their relation to other policies, such as research funding structures, career perspectives and research culture in general.

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# 2. Expert interviews

## 2.1. Introduction

Among existing professional rules and practices for responsible conduct of research (RCR), researchers have difficulties identifying best practices for avoiding research misconduct (1). Hence, for the promotion and fostering of research integrity (RI) in science, best practices for research integrity should be embedded in research performing organisations (RPOs) and research funding organisations (RFOs).

Moreover, to understand why researchers engage in research misconduct, it is vital to explore the elements of a research culture that may influence the implementation of professional rules and practices for research integrity promotion (2). This can also help identify in which way research culture may incentivise research misconduct as well as address necessary changes for the improvement of responsible research (3).

Since the responsibility for fostering research integrity lays on everyone involved in research – researchers, research organisations, funding organisations, scientific publishers and journals, and policymakers – improvements in research integrity will be possible only with the joint efforts of all.

## 2.2. Aim of the interviews

SOPs4RI is specifically focussed on RPOs and RFOs, and the interviews therefore aimed to provide expert knowledge of general elements for fostering research integrity in RPOs and RFOs. In conducting interviews, the focus was on identifying novel and innovative SOPs, as well as SOPs and guidelines that could be universally applicable, i.e. among different countries, different scientific disciplines, and various institutions.

Moreover, the interviews aimed to identify prominent institutional and research culture elements necessary for the further development of SOPs and guidelines. This includes the factors that determine successful implementation of the SOPs and guidelines, both at the level of individual researchers and at the institutional level.

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## 2.3. Methods

### 2.3.1. Protocol

The interview study was conducted using the methodology outlined in the protocol "Protocol for the expert interviews" (D3.1: Protocol for the literature review, the expert interviews and the Delphi procedure). The protocol was registered at the Open Science Framework under the registration of the WP3 component (Systematic reviews of practices and research cultures) of the SOPs4RI project, on April 11, 2019. The protocol is available at https://osf.io/saj4u.

### 2.3.2. Study design and description of the study

We used a qualitative approach and conducted face-to-face and online interviews. This method was used to get an insight into experts' opinions on professional rules for the promotion of research integrity. The interviews were semi-structured, which allowed new ideas to be brought up during the interview and enabled a more comprehensive approach for the questions of interest (4).

The interviews explored the participants' knowledge of the existing practices for RI promotion, as well as the use and applicability of these practices in different geographical settings, disciplines, and institutions. This was important because research integrity is an intrinsic part of research but is often influenced by external factors, such as institutional rules or research systems (5). Moreover, the interviews explored researchers' knowledge on innovative practices (guidance) aiming at fostering research integrity in different settings, as well as guidance that is not existent but may have a great importance for the promotion and fostering of RI.

Further, the interviews explored the elements of the currently existing research culture at different levels, i.e. individual, institutional, and the research system. Besides the impact of the existent research culture, the interviews explored other elements that may determine the successful implementation of the SOPs and guidelines. The study was not limited to RPOs. Instead, interview questions addressed the implementation of the SOPs and guidelines in both RPOs and RFOs.

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### 2.3.3. Study population and sample size

For the study population, heterogeneous stratified purposive sample was used to conduct interviews with participants from different domains (6). The aim was to include stakeholders across various scientific fields as well as stakeholders from different countries to ensure a diversity of experiences and suggestions. The study aimed to recruit at least 20 stakeholders from different areas as follows: researchers/educators (n=4), RI committees (n=4), funding and process organisations (n=4), policy-makers (n=4), industry (n=4).

### 2.3.4. Eligibility criteria

Eligibility criteria for the recruitment of participants were determined beforehand as follows:

1) Experts in the field of RI

For recruitment purposes, we defined an RI expert as a person who has relevant education in research integrity and practical experience working in the field of research integrity (6). In order to be classified as a stakeholder, the participant had to fulfil one of the following criteria:

- researcher/educator: experience in scientific research (any scientific discipline) supported by published articles in the field of RI; experience in teaching or training in the field of RI,
- member of the RI committee: local or national RI committee; experience in teaching or training in the field of RI; participation in handling cases of research misconduct,
- funding organisations member: knowledge and experience in the field of RI; participation in the institutional project assessment and decision-making bodies,
- policy-makers: members of a policy-making/decision-making body within or outside the research institution; members of national bodies with experience in developing legal acts, codes, and policies,
- industry: experience in working with research institutions on RI issues; publishers.

2) participation and experience in developing codes of conduct, guidelines or SOPs for RI;

3) published articles or other documents in the field of RI;

4) participation in EU projects dealing with RI.

The participants had to meat at least one of the above criteria.

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### 2.3.5. Recruitment strategy

Participants were identified mostly through personal contacts and the project consortium. The recruitment strategy included contacting participants and sending an invitation letter in which the aims of the SOPs4RI project were presented. The invitation letter contained additional information regarding the requirements of the interview, benefits and risks of participation, and information on data processing and storage.

After confirming that they wanted to participate, the participants received the informed consent form, which had to be signed in order to participate in the interview. The template of the invitation letter and informed consent is presented in Appendix A. The participants also received a questionnaire about their background: gender, age, role regarding RI, years of experience in the RI, nationality and country of residence. The questionnaire included two open questions about characteristics and examples of SOPs. The questionnaire is presented in Appendix B.

### 2.3.6. Conducting interviews

The interviews were conducted face to face and online, depending on the availability of the respondents. We used meetings of other European projects (VIRT2UE and EnTIRE) and the World Conference on Research Integrity to recruit additional participants.

Online interviews were conducted using the Free Conference Call or Skype for Business platforms which meet the requirements for the protection of personal data in alignment with the General Data Protection Regulation (GDPR).

All interviews were voice-recorded, based on the approval obtained through informed consents. The language of the interviews was predominantly English. Two interviews were conducted in Italian, and one interview was conducted in Polish. These interviews were transcribed and then translated into English.

The interviews were conducted following the prepared interview guide and questions. The first interview, conducted by MEFST, served as a pilot to test whether the proposed questions provided sufficient answers that would contribute to the aim of the study. After the first interview, all interview questions were revised to better fit to the objectives of the study and themes we wanted to explore. The interview guide with original and revised questions is presented in Appendix C.

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The workload of conducting interviews was divided among WP partners taking into account the contribution to the work package and access to experts from different stakeholder groups. The number of obtained interviews is presented in Table 1.

Table 1. The workload of WP partners in performed interviews

| WP PARTNERS | NO. OF CONDUCTED INTERVIEWS |
|---|---|
| MEFST | 15 |
| STICHTING VUMC | 2 |
| CWTS | 2 |
| KU LEUVEN | 1 |
| UNITN | 2 |
| UNIWARSAW | 1 |
| **TOTAL** | **23** |

### 2.3.7. Ethical considerations

This study involved research with human subjects. Therefore, before the start of the study ethics approval for conducting all interviews in the WP 3 has been obtained by the Ethics Committee at the University of Split School of Medicine. Ethics approval was obtained under the registration number 2181-198-03-04-19-0011.

### 2.3.8. Analysis

The recordings of the interviews were transcribed verbatim and further analysed using the computer software NVivo 12 Plus for Windows (QSR International, London, UK).

The obtained qualitative data were analysed following the thematic analysis approach based on the identification of the important topics within data. For this study, we followed the Braun & Clarke's framework (7).

From the preliminary data collection categories and interview topics, a deductive coding scheme was developed. The developed scheme was used in the initial line-by-line coding of the transcripts from the conducted interviews. Further codes were developed when the

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deductive scheme insufficiently described a concept. Codes were organised into emerged themes which is presented in the final coding scheme in the *Thematic findings section*. All transcripts were line by line coded by researcher from the University of Split School of Medicine (Vicko Tomić). Statements from the transcripts presented in the report have not been modified in any way, including language editing. They are verbatim transcripts of the interviews.

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# 3. Results

## 3.1. Participants

A total of 23 individual stakeholders participated in the semi-structured interviews. The purposively selected participants from different stakeholder groups are described in Table 2. Three participants belonged to two different stakeholder groups. Researchers/educator were most strongly represented, followed by participants from the private sector. The median years of work experience related to research integrity was 11 (range 2-32).

Table 2. Representation of stakeholder groups

| STAKEHOLDER GROUPS | NO. OF STAKEHOLDERS | PERCENT OF CASES (%) |
|---|---|---|
| RESEARCHER/EDUCATOR | 16 | 69.6 |
| POLICYMAKER | 5 | 21.7 |
| MEMBER OF RESEARCH INTEGRITY COMMITTEE | 5 | 21.7 |
| INDUSTRY | 6 | 26.1 |
| FUNDING ORGANISATION | 1 | 4.3 |

The sums do not add up to the total number of participants because participants could select multiple stakeholder groups

The participants in the sample were of both genders: 56.5% women and 43.5% men. The median age of participants was 53 years (range 33-68). Twelve European nationalities were represented in our sample. Also, one participant was from the United States and one from Australia (Table 3).

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Table 3. Countries of residence of participants

| COUNTRY OF RESIDENCE | NO. OF PARTICIPANTS | % |
|---|---|---|
| AUSTRALIA | 1 | 4.3 |
| AUSTRIA | 1 | 4.3 |
| BELGIUM | 2 | 8.7 |
| CROATIA | 2 | 8.7 |
| FRANCE | 1 | 4.3 |
| GERMANY | 1 | 4.3 |
| ITALY | 3 | 13.0 |
| LUXEMBOURG | 1 | 4.3 |
| NORWAY | 1 | 4.3 |
| POLAND | 1 | 4.3 |
| PORTUGAL | 1 | 4.3 |
| THE NETHERLANDS | 4 | 17.4 |
| UNITED KINGDOM | 3 | 13.0 |
| USA | 1 | 4.3 |
| TOTAL | 23 | 100.0 |

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## 3.2. Thematic findings

A qualitative analysis of the interviews identified three main themes: 1) Research culture, 2) Practices for RI promotion, and 3) Implementation of practices for RI promotion. The thematic map of the identified themes is presented in Figure 1.

The participants addressed the practices for the promotion of research integrity with which they were familiar, and those they thought were innovative regarding the potential to foster research integrity. Moreover, participants addressed practices that could be developed as a potential solution for specific issues emerging within the research. With regard to that, participants mentioned the elements or functions of the practices they thought would be beneficial to be developed for promoting researchers' adherence to the principles of RI.

They discussed the implementation of practices for the promotion of RI in the context of their application among individual researchers or organisations. In the interviews, issues related to 'publish or perish' and other incentives for researchers to get involved in research misconduct were the dominating subthemes.

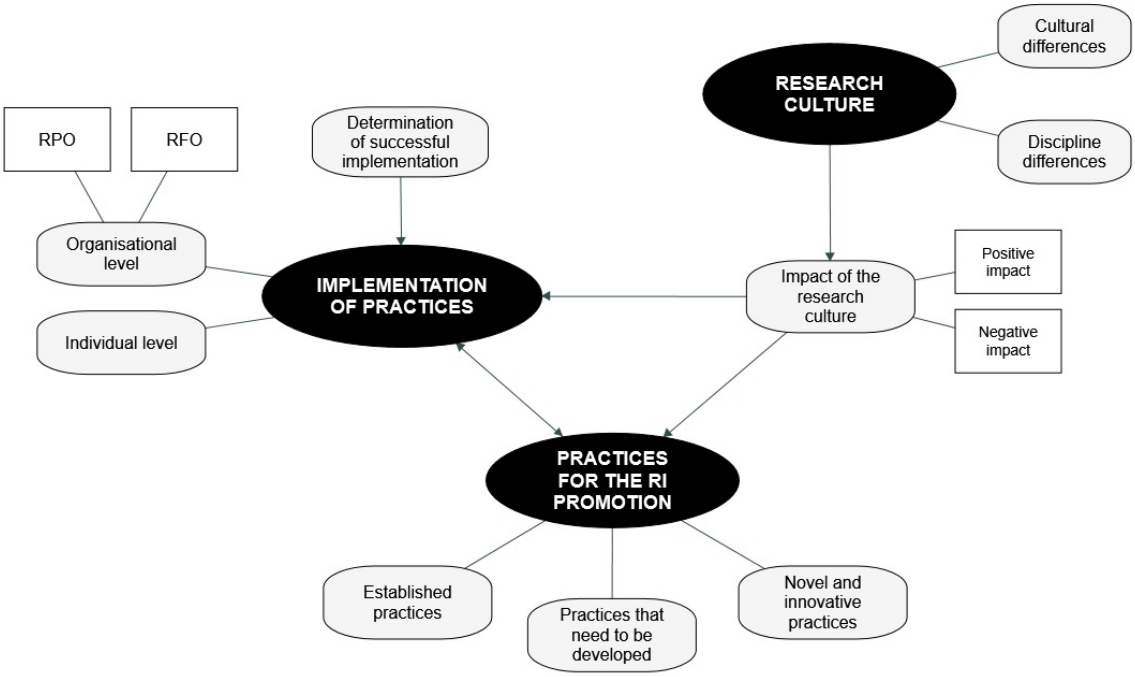


Figure 1. Thematic map of practices for the promotion of research integrity.

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### 3.2.1. Research culture

Research culture was identified as one of the main themes. In this theme, participants addressed different elements that pervade the research system and that can be seen as potential causes for researchers' involvement in research misconduct. Participants also pointed out that the negative impact of the research culture may be very different within different countries, disciplines and organisations because of variances in RI policies and differences between scientific disciplines.

In the context of research culture, the participants mentioned national differences regarding research integrity. Here, the differences were addressed both for research integrity as a concept and for research integrity policies. Participants referred to these differences as possible challenges in the implementation and promotion of research integrity.

> *P2: I think where you get a little tricky maybe, is trying to apply our western things to Asia. Because Asia is a very different set of rules or thought practice, let me say, culturally. They have a very different mind-set about ethics, let's just put it that way.*
>
> *Participant 2, Researcher/educator and member of research integrity committee, Europe*
>
> *P11: Also within Europe, to move between different countries. You are going from Germany to, I don't know, Finland or something like that. They have different rules and different procedures we apply. It's difficult to follow and perhaps you could have a kind of harmonisation. […] Taking into account the US one who is more formal, who has some legal basis and Europe sometimes guidance or just funding agencies practices where we have requirement. And having different definition, within the Europe also make it not easier.*
>
> *[…] The European Code of Conduct tried to put a definition but if you look at the Danish code and the ALLEA code it's not the same definition. Or the aspect if you look at the German ones, DFG and ALLEA code there's also not she same translation. So at the Europe level we have some difficulties to understand how we could harmonise. And if I take the US one, they just use the FFP, fabrication, falsification and plagiarism definition. And that's definitely not enough.*
>
> *Participant 11, Policymaker and funding organisation, Europe*

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The implementation and promotion of research integrity across different scientific fields was also often described by the participants as a challenge.

> *P2: But I think where it becomes a little bit tricky is…it's easier to look at it when it's the sciences. Meaning life science, health science, even social sciences. It's easier to pick up. But when you're looking at other things like the creative arts and music, and people who do music research and conservatories type of stuff, that's a lot harder.*
>
> *Participant 2, Researcher/educator and member of research integrity committee, Europe*
>
> *P3: So you can't say that it's completely, across the whole discipline but it would certainly be true to say that those guidelines probably don't apply in the humanities or in other areas where there are different conventions about authorship. In physics for example, it's considered quite acceptable, anybody who contributes any small part even the technical part to a piece of research is an author. Now in medicine that wouldn't apply.*
>
> *Participant 3, Researcher/educator and industry, Europe*
>
> *P9: I have background in philosophy. Philosophy of Science is a very different research culture than an Applied Ethics. Which is related to the previous, so on. In philosophy it's a little bit more the, kind of the old fashioned model, is still very much in vigour. You know, we, we give a lot of feedback on each other's papers, we discuss ideas before they are published. And it is quite normal for people to [inaudible] sometimes you don't have a lot of input into another person's paper but only to be mentioned in the acknowledgement. Whereas in bioethics, probably drawing on the research culture in medicine, the idea is that, well you need to safeguard your ideas and can't share too much before publication. If you want to involve somebody, then you're going to have to give them some type of co- authorship because otherwise they won't contribute much to your paper.*
>
> *Participant 9, Researcher/educator, Europe*
>
> *P11: If you are going, in social science perhaps you have other approach on the interview level that you have by scientists in biomedicine for example. They are still aware of the patient, of the right of everyone and informed consent. This was ten years ago still common sense but at the social sciences it's just coming up.*

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*Participant 11, Policymaker and funding organisation, Europe*

*P21: And, for example, I think even more with the field of science than with the country, the culture. To clarify, let me say for example that you can't do any medical research in Poland without written permission. If we applied it to psychology, we would lose the anonymity.*

*Participant 21, Researcher/educator and member of the ethics committee, Europe*

When asked about the elements of research culture that may have positive or negative impact on the implementation of the practices for research integrity promotion, participants often referred to the 'publish or perish' problem as a negative factor.

*P5: So I think currently, the, the main negative impact on the research cultures is the publish or perish situation. Where even if everybody want to produce research and, and I think the goal should be to produce less research but better research as the government say. […]*

*Participant 5, Researcher/educator and policymaker, Europe*

*P8: I think, I think probably the most important thing is start to change the way you evaluate the scientists. At least to give a sign that quantity is not all. And that things will change in the future,*

*…so we will not be so pressured to publish, to get money for projects and everything that of course have impact in a…in research integrity [inaudible] and research ethics also.*

*Participant 8, Researcher/educator, Portugal*

*P21: But I thought that this element is what occurred here, I mean "Publish or Perish", which has now turned into a disease, which is called "philadelphism" or "punktoza"[…]*

*Participant 21, Researcher/educator and member of research integrity committee, Europe*

As another negative factor embedded in contemporary research culture, participants pointed towards problems related to incentives.

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*P5: […] … and I think the goal should be to produce less research but better research as the government say. And, and, and that's not at all in the research culture. And it's not at all in the incentive provided to researcher. So I think if you want to change research culture amount you need to change the incentives.*

*Participant 5, Researcher/educator and policymaker, Europe*

*P15: I think the incentives in terms of doing research, churning out research are very similar it is again about self-promotion, so an individual would want to churn out a lot of research to promote themselves and their name but then institutions also want to protect their reputation, they want to be seen as you know, high, high, you know, producing a lot of research and producing high standard research and so, I think the incentives, the incentives are the same and I can imagine although I haven't seen evidence of this myself but I can speculate that an institution can incentivize, its staff and its researchers to produce research, or churn out lots of research because the institution itself wants to bask in the glory [laughs] of the output.*

*Participant 15, Industry, Europe*

*P21: Because you are writing a request for a grant, you want to get it, right? I mean too much, not necessarily from this point of view, that it should be well written, so that we could get a grant. No. You should choose a topic that's important.*

*Participant 21, Researcher/educator and member of research integrity committee, Europe*

*P7: But also, but also like finding…finding different incentives that do not, do not…do not imply that, that, like the more you, like publish and perish, the more you published the… the more successful you are.*

*Participant 7, Policymaker, Europe*

Participants also mentioned scientific journals as key players in our contemporary research culture.

*P5: By journals, especially big journals, have very big role. Because people are listening to journals because if you publish in big journal, you will have a good*

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*career. And so researchers are really listening to journals. …So every time I need to convince a research, researcher that he has to do, for example in his protocol to plan data sharing…if I try to explain, they well don't really understand. When I say well journals ask in fact requesting it, they will do it. So journals really, they just say something and implement something, it happens, but yeah, I really get used to it. Big journals!*

*Participant 5, Researcher/ educator and policymaker, Europe*

*P9: Well yes. So I mean I think the journals should implement that such SOP when you go to an article submission. That, I mean, you know, you give the details of individual authors and that, you know, together with your affiliation, email address and corresponding author, all that stuff that you…And some journals already ask that, like, so, they ask…data collection, writing the drafts, kind of design of the paper.*

*Participant 9, Researcher/educator, Europe*

Participants addressed publishing of negative results as an initiative that could be undertaken by journals for the promotion of RI and to incentivise positive changes in research culture.

*P6: I agree with publishing negative results but the journals not. It was our cases last, 2 years ago, because I was really convinced that this procedure give me, this, this drug give me a results, increasing, a functional response. At the end nothing. But this data are in my library. Because I try to send this paper to a journal, not only I, it's my experience but it's not only my. This is specifically happens in clinical research. In clinical trial this is really important because it is demonstrated that the study published, the final study published more or less than the initial clinical trial. Because the negative results are not so interesting. And journal are not interested to publish.*

*Participant 6, Researcher/educator, Italy*

*P8: Yes. Specially I think, specially the, the most famous journals like [inaudible] Science should give that example on saying that we really trust that negative results are also results…*

*Participant 8, Researcher/educator, Portugal*

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### 3.2.2. Practices for RI promotion

This theme describes different practices for the promotion of research integrity and included three subthemes: 1. established practices, 2. novel and innovative practices, and 3. practices that need to be developed. Under "practices for RI promotion", we understand all different standard operating procedures, codes of conduct, guidelines, checklists, toolboxes, research integrity promotion plans and other tools. Participants in our study often understood these terms as synonyms so, when asked about SOPs, they would talk about other practices, for example codes or guidelines. Also, some participants needed a clear definition of SOPs in order to give their opinions on this topic.

> *Interviewer: So the first question is: of the currently existing practices, but mainly like SOPs, so standard operating procedures that you know…Which of those practices do you consider as useful and universally applicable? So, this means among different countries, and different scientific fields and different research institutions.*
>
> *P2: Okay. So standard operating procedures and codes of practice?*
>
> *Interviewer: Yeah.*
>
> *P2: Okay. Yeah. Well I guess the first one, the basic one is the ALLEA code.*
>
> ***Participant 2, Researcher/educator and member of research integrity committee, Europe***
>
> *Interviewer: So of the existing practices, and mainly we consider standard operating procedures, that currently exist and that you currently know of, which of those practices you think are…or you consider useful and universally applicable? So mainly we want to focus on research integrity but also any other, for example research ethics and the fields connected with it. You can also tell us about them.*
>
> *P3: So, can I go step back and say do you have a definition for a standard operating procedures?*
>
> ***Participant 3, Researcher/educator and industry, Europe***

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One of the reasons for this lack of understanding seemed to lie in the absence of SOPs for RI, which our participants often emphasized, especially those with a lot of experience in this field.

> *P3: I am not aware of anything that you would call an SOP. […] And they tend to be very high level things like honour codes which are designed to influence behaviour but I wouldn't say fall under the category of an SOP because they just don't have the detail. They basically say be a good person and don't cheat and be honest.*
>
> *Participant 3, Researcher/educator and industry, Europe*
>
> *P4: The thing is that I'm working in the (country) scientific community and system, academic context for, I don't know fifteen years or so. And I, I don't recall seeing any kind of standard operating procedure.*
>
> *Participant 4, Researcher/educator, Europe*
>
> *P10: No, frankly…I am myself not aware of existing SOPs pertaining to research integrity. I have to admit that.*
>
> *Participant 10, Researcher/educator, Europe*
>
> *P12: I do not know of any SOP or procedures that are called standard operating procedures in that field, I know of SOPs in my research field, like… in epidemiology when you do a survey, you have standard operating procedures, if you take samples you have SOPs and that is a protocol with the detailed spelling out of what you should do it and how you should do it. So, I am not aware of SOPs in the field of RI.*
>
> *Participant 12, Researcher/educator, Europe*

The participants also mentioned the possibility that some of their colleagues may be using procedures similar to SOPs, even though they did not call it SOPs.

> *P12: I can imagine that my colleagues working here in the lab next door, have a procedure that is not called SOPs, it is laboratory procedure that they have read in an article and the method section of an article is not an SOP, the method*

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*section will say what you have done but an SOPs is much, much more detailed and goes really from...*

*Participant 12, Researcher/educator, Europe*

However, participants pointed out that having SOPs could be very useful. This was especially noticeable in examples when lack of formal procedures leads to actions that can differ from case to case.

*P22: Standardizing all kinds of procedures is very, very helpful for those who have to work with it and do the work because they hardly have a grip on, on all kinds of processes. So the better is written out, the bigger the chances that it will prevent sloppy science and because that is the most important thing, the most important problem at the moment as far as I can see.*

*Participant 22, Researcher/educator and member of research integrity committee, Europe*

*Interviewer: And when issues of this sort plagiarism or theft of ideas comes up, how do you handle them? What is the kind of procedure there?*

*P16: Yeah, we don't have a formal procedure yet, although yeah, it is, it depends, the usual penalty is that you are not allowed to publish any more with us [laughs] so someone who is caught doing plagiarism…*

*Interviewer: You terminate them probably…*

*P16: Yes, yes and so we recently, we had this case where it was not plagiarism but it was academic dishonesty and we decided that this author could not publish in this particular journal any more.*

*Participant 16, Industry, Europe*

#### 3.2.2.1. Established practices

Participants identified a number of practices that had been already established as useful tools in the area of RI. They were most familiar with the European Code of Conduct for

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Research Integrity, published by ALLEA in 2017, which can be understood as the European framework for self-regulation of research practices across all scientific disciplines and research settings. Also, some participants pointed to their national codes of conduct which are based on ALLEA or similar to ALLEA.

> *P11: The new code of Research Integrity published just last year by ALLEA who just tried to put together both practices on the ethics as well on the good practice. And this should be standard for everyone and every domain. So applicable in the sense also for university as well as for individuals. And this is for me the common of the standard that could be used for that.*
>
> *Participant 11, Funding organisation and policymaker, Europe*
>
> *P7: So, there's, there's one equivalent, like original equivalent to the…in our country that is… has been published from an, our agency to, to, that, that is specific for the country's… for the country's situation. But it is quite comparable to the European Code of Conduct.*
>
> *Interviewer: Uh-hm. So what is it consisted of?*
>
> *P7: It is a…It is guidelines for good scientific practice and consisting of definitions of research misconduct.*
>
> *Interviewer: Uh-hm. And it can also be applied, for example in different disciplines? Like Humanities and Social Sciences, Biomedicine?*
>
> *P7: It could be said that it is the least common denominator for all, all different disciplines comp… like, like the European Code of Conduct.*
>
> *Participant 7, Policymaker, Europe*

Participants were also familiar with the COPE flowcharts (see Table 4 below), which they found helpful when dealing with cases of suspected misconduct.

> *P3: The ones that I'm most familiar with are the COPE flowcharts. […] The COPE flowcharts are not really an SOP, they are more a problem solving. So more like*

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*an algorithm in clinical practice. You know, I have this problem, what do I do about it. So, I suspect plagiarism in this manuscript. What should I do?*

*Participant 3, Researcher/educator and industry, Europe*

*Interviewer: Besides those practices you mentioned, do you know of some innovative SOPs or standardized procedures connected with your area of work?*

*P23: Yeah. Not… there are some efforts. There are some discussions going on but really solid standards, of course many different publishers… no there's of course lot of guidelines, yeah there's definitely the COPE… from… what it is stands for… well you know COPE?*

*Participant 23, Researcher/educator and Industry, Europe*

Different guidelines that provide advice for reporting research methods and findings were also recognised as helpful tools for the promotion of research integrity. Participants most frequently described their experiences with the CONSORT guidelines for reporting parallel, two-group randomised trial designs. They pointed out that CONSORT guidelines work well because they have been available for a long time and there has been a broad consensus across institutions, publishers and researchers in the field of clinical trials.

*P18: So one of the guidelines that works well out is CONSORT. Because I think when it comes to clinical trials you know, there's been a good level of consensus across institutions and publishers to collectively have a consensus to say if you're conducting a trial this is how it should be reported no matter where you publish it. But that level doesn't really exist for many other study designs.*

*Participant 18, Industry, Europe*

*P15: I think so because I think the actual, there are policies in place, for clinical research which aren't necessarily in place for other types of research, because for clinical research, there have been reporting guidelines available for over 10 year so the consort, [the xxx] network consort statement and all of those…*

*Participant 15, Industry, Europe*

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Participants also mentioned other reporting guidelines such as ARRIVE, CHEERS, ISPOR, MOOSE, PRISMA, STREGA, and STROBE, as well as guidelines developed by the ORI and the UK Research Integrity Office (see Table 4 below). The EQUATOR Network was recognised as an important source that provides a great collection of reporting guidelines on scientific writing and publication ethics.

> *P19: For many years we started with reporting guidelines and checklists, CONSORT, for clinical trials. And then PRISMA and MOOSE for meta-analysis. We've now begun to expand that to 20 defined study types. […] And then we link to the STROBE guidelines. Or we link to for cost effectiveness analysis, the CHEERS guideline. For survey studies, or no, no for comparative effectiveness, we link ISPOR. For genetic association STREGA. So, and the thing about this you know there are more than, there are more than 360 reporting guidelines on the Equator site.*
>
> ***Participant 19, Industry, USA***
>
> *P17: Well what I sometimes use is the Equator Network. They collect like reporting guidelines …on various, yeah, different kinds of research. So I think that's useful. So there are, there are a lot of reporting guidelines connected, so it's not just one standard operating procedures that is there, but it's a collection. And I think that is very useful because you could search for something that suits the project. What I'm also familiar with is a preregistration of the Open Science Framework.*
>
> ***Participant 17, Researcher/educator, Europe***

Participants often mentioned practices of RI promotion developed by scientific associations, such as the International Committee of Medical Journal Editors (ICMJE)[2] for medical journals or the American Psychological Association (APA)[3], but they also pointed

[2] Available at http://www.icmje.org/.

[3] Available at https://www.apa.org/.

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out to different declarations and statements, most frequently the Singapore statement[4] and the Declaration of Helsinki[5]. Some participants also described their national and local practices, typically national codes of conduct, protection of whistle-blowers, the use of plagiarism software or their institutional SOPs.

> *P6: First of all, I don't remember the name of the, of the SOP that we are using in our laboratory.*
>
> ***Participant 6, Researcher/educator, Europe***
>
> *P19: When we retract and replace we ask for a letter of explanation detailing what happened. We ask for a track change version of the article. The tables and new figures if needed. And then we…we correct the article online. We put a note at the top that we've done so. And in the supplement we have a copy, a PDF copy of the original article with all the errors highlighted in yellow. And another PDF of the corrected article with all the corrections highlighted in yellow. So readers can see what happened if they wish. And then of course if it's determined to be misconduct we retract. So I can send this to you but I actually have…This is our SOP internal.*
>
> ***Participant 19, Industry, USA***

> *Interviewer: Yeah, yeah, and as you said, you say, you said that there are regulations for whistle-blowers that are already available in the (country)?*
>
> *P22: Yes, we have a special regulation on the whistleblowing. And a house for whistle-blowers also.*
>
> ***Participant 22, Researcher/educator and member of research integrity committee, Europe***

[4] Available at https://www.jsps.go.jp/english/e-kousei/data/singapore_statement_EN.pdf.

[5] Available at WMA Declaration of Helsinki – Ethical Principles for Medical Research Involving Human Subjects – WMA – The World Medical Association.

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Some practices were recognised as universally applicable. Participants emphasized that some moral norms should be universal standards no matter the cultural differences, for example, principles addressed in the European Code of Conduct for Research Integrity or criteria for authorship.

> *P9: Yeah. Well…Universally applicable standards…You know the European Code of Conduct talks about honesty, reliability, respect. Well, I mean this is kind of a research interest of mine. But, yeah, I mean those, those things are universally applicable, yeah. They're also applicable to other fields, not only just scientific research. […] I mean moral norms should certainly should be universally applicable. I don't think that there's nothing that there should be or that there are any relevant cultural differences…in how to do integrase research…I mean every, all cultures have the same trade-offs between more in personal incentives for career advancement or financial gain…those things need to be weighed versus wanting to do good research. Those, those things don't always align perfectly. So, you know, when I do, I do things that are universal or more or less universal standards that are not dependent on cultures.*
>
> ***Participant 9, Researcher/educator, Europe***
>
> *P15: Yeah, I think there are some things which are universal. So, for example, things like authorship disputes, and what constitutes authorship I think, the standards can be put in place that are universal in defining what an author is, you know, on how it's decided, but definitely there are fields specific things like, for example the clinical medicine I have just talked, a clinical research I've just told you.*
>
> ***Participant 15, Industry, Europe***

The complete list of the practices for RI promotion which were most frequently mentioned during these interviews is shown in Table 4.

Table 4. List of the most frequently mentioned practices for RI promotion

| | | |
|---|---|---|
| ALLEA documents<br>ALLEA Publications | Open Science Framework<br>OSF | UK research integrity office guidelines |

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| | | |
|---|---|---|
| | | UKRIO » Publications |
| APA guidelines<br>https://www.apa.org/about/policy/approved-guidelines | ORI guidelines<br>https://ori.hhs.gov/ | Vancouver guidelines<br>ICMJE \| Recommendations \| Defining the Role of Authors and Contributors |
| ARRIVE guidelines<br>ARRIVE guidelines \| NC3Rs | Plagiarism detection software | Allegations of Research Misconduct SOP<br>https://www.niaid.nih.gov/research/research-misconduct-allegations |
| CHEERS guidelines<br>Consolidated Health Economic Evaluation Reporting Standards (CHEERS) Statement \| The EQUATOR Network | Preregistration of clinical trials | The OSF preregistration<br>OSF \| OSF Preregistration |
| Code of conduct code of ethics for research in the social and behavioural sciences involving human participants<br>https://www.utwente.nl/en/bms/research/forms-and-downloads/code-of-ethics-for-research-in-the-social-and-behavioural-sciences-dsw.pdf | PRIMR<br>PRIM&R \| Public Responsibility in Medicine and Research | Ethical standards in research (2007)<br>Ethical Standards in Research \| Society for Research in Child Development SRCD \| for developmental scientists & professionals |
| CONSORT guidelines<br>Consort - Welcome to the CONSORT Website | PRISMA guidelines<br>PRISMA | Society for research in child development<br>Society for Research in Child Development SRCD \| for developmental scientists & professionals |
| COPE flowcharts<br>Search results flowcharts \| Committee on Publication Ethics: COPE | Singapore statement<br>https://www.jsps.go.jp/english/e-kousei/data/singapore_statement_en.pdf | Guidelines for the archiving of academic research for faculties of Behavioural and social sciences of the Netherlands<br>https://www.uu.nl/sites/default/files/faculty_of_social_and_behavioura |

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| | | |
|---|---|---|
| | | l sciences research data storage archiving protocol 2016.pdf |
| Declaration of Helsinki<br>WMA Declaration of Helsinki – Ethical Principles for Medical Research Involving Human Subjects – WMA – The World Medical Association | STREGA<br>STrengthening the REporting of Genetic Association Studies (STREGA): An Extension of the STROBE Statement. \| The EQUATOR Network | CRediT<br>CRediT - CASRAI |
| EQUATOR network<br>The EQUATOR Network \| Enhancing the QUAlity and Transparency Of Health Research | STROBE<br>STROBE Statement: Home | Research Data Availability Statements (Springer Nature)<br>https://www.springernature.com/gp/authors/research-data-policy/data-availability-statements/12330880 |
| GDPR<br>EUGDPR – Information Portal | The Netherlands Code of Conduct for Research Integrity<br>https://www.vsnu.nl/files/documents/netherlands%20code%20of%20conduct%20for%20research%20integrity%202018.pdf | Journal of Development Economics. Pre-Results Review (Registered Reports). Guidelines for Authors<br>https://www.elsevier.com/__data/promis_misc/JDE_RR_Author_Guidelines.pdf |
| ISPOR guidelines<br>ISPOR - Good Practices for Outcomes Research | The European Code of Conduct for Research Integrity<br>The European Code of Conduct for Research Integrity | |
| MOOSE guidelines<br>http://www.ijo.in/documents/14moose_ss.pdf | TOP guidelines<br>https://cos.io/top/ | |

### 3.2.2.2. Novel and innovative practices

During the interviews, we asked the participants to describe practices which they find novel or innovative. Most frequently they were not aware of these practices, especially when asked about SOPs.

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*Interviewer: So besides those you mentioned of your institution and some other, do you know maybe some other innovative standard operating procedures that can be applied to or are applied to your area of work?*

*P10: No, frankly…I am myself not aware of existing SOPs pertaining to research integrity. I have to admit that.*

*Participant 10, Researcher/educator, Europe*

*Interviewer: In your field, do you know of some innovative SOPs connected with you area of work?*

*P12: I do not know, to be honest, I do not think I have worked with very formal SOPs myself, and in the lab…*

*Participant 12, Researcher/educator, Europe*

*Interviewer: Yeah. And besides, these SOPs that you have mentioned and that you find important, do you know some innovative SOPs connected to your area of work?*

*P22: My own area of work, in law, there are no standard operations.*

*Participant 22, Researcher/educator and member of research integrity committee, Europe*

Some participants heard about the existence of some new practices but they did not have precise information about them.

*Interviewer: Okay. And do you also, besides that, that are related to your institution, do you also know, maybe some other that, that can also…are related to research integrity and that can be in some form, like standard operating procedures?*

*P7: I don't know if this, if this applies to your question but, there is, there has been recently approaches to, to fund only projects that agreed to be open access.*

*Interviewer: Uh-hm.*

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*P7: I don't know if this is with a certain procedures for researchers who apply. To a…for a project or for funding to, to engage in a, in open access…or sharing the data with an open access platforms.*

*Interviewer: Uh-hm. And, what are they consisted of? Like, specifically?*

*P7: I could not tell. It's just, it's just…I'm sorry.*

*Interviewer: Okay.*

*P7: I just know of the existence [laughter].*

*Participant 7, Policymaker, Europe*

However, some participants described practices that can be understood as novel or innovative. One of them was the implementation of the position of an additional science ombudsman in the university in order to solve conflicts as soon as possible.

*P10: We have just implemented at over university a new position for a science ombudsman. There will be two science ombudsman. Now there is one science ombudsman, will start and he will be in charge of… taking action in relation to conflicts that take place between for example PhD students and supervisors. And try to solve these conflicts as early as possible.*

*Participant 10, Researcher/educator, Europe*

One participant described a new procedure in the appointment of new professors at universities, which takes into consideration a variety of indicators, not just their research outputs but also educational evaluation.

*P17: For example, in Utrecht in the Netherlands, they made a new guideline on how they appoint new professors. So instead of looking at like research outputs they also look at education evaluations. Well, so the candidate to become a professor has to hand in a portfolio with lots of different aspects. And then the committee has to review all that and not only like the standard metrics. And so this is not a national guideline but it's started in this institution. And I think that*

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*is a nice example of something innovative that hopefully will be used in a broader context in the future.*

*Interviewer: So do you…sorry for interrupting you. Do you mean that they have to fulfil some other requirements to obtain the professor position? So it's not based just on for example publications and impact factor but there are…*

*P17: Yeah. It's based on a variety of indicators, yeah. And…so it is a lot more work for the committee to review all of that. But on the other hand people get a more honest chance.*

*Participant 17, Researcher/educator, Europe*

Participants from the private sector emphasized their willingness to follow new trends and technological innovations.

*P23: We have, we are quite innovative in the area of data submission. So connecting submission system with the data repository. We are innovative with respect to measures and materials for articles. Which is called STAR methods. We are innovative…well maybe you'll get another standard in that the use of the credit taxonomy. That is contributor taxonomy. That could be another standard. So yes, there's standards. And we are implementing them. Of course all journals that's not really innovative because the taxonomy is already there. But the fact that we implement that across all journals is definitely something that is I think innovative. Then…yeah, some best practices are, what we implement is around image manipulation detection. […] So yeah, those are not standards but they're definitely innovative approach that we are working on.*

*Participant 23, Researcher/educator and industry, Europe*

*P16: Yeah, so we are, because we think, we hope that the software does a more thorough job than an editor, and of course, we as a publisher we always like trend followers so we follow the trends that are in use for a specific field of study and in [natural sciences discipline] as in other more beta sciences this is common practice, actually, or becomes common practice so we wanted to do a pilot and starting with the more hard sciences like [natural sciences discipline] although,*

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> *well you can debate that, but to see how much of a hassle it would be, if it would be a burden if it would take a lot of time so just to see what would be the consequences of using software, would it help the editors or would they be hindered by it.*
>
> *Participant 16, Industry, Europe*

Participants also pointed out that some new practices were sometimes introduced without proper evaluation, which can create additional problems to researchers.

> *P5: I think, we really need some evaluations before large implementations. Just give you an example of (country). They changed the procedure for the ethics committee. So now all we have to go through the website and the ethics committee that we have, will be randomised. Okay? And so that's a completely new procedure. And we just didn't evaluate it. And when they implemented it, it was complete mess. And so people had to wait six months to evaluate it by an ethics committee. So again, that was a new procedure because they felt that it was very important that ethics committee were not always the same. But there was no evaluation [inaudible] its implementation.*
>
> *Participant 5, Researcher/educator and policymaker, Europe*

#### 3.2.2.3. Practices that need to be developed

Participants also identified practices that need to be upgraded or developed. One of them is finding a good balance between administrative procedures that can decrease the autonomy of researcher and the usefulness of these procedures.

> *P5: […] I think some of the procedure are…One of the issues with procedure is that they look like administrative burden for most of the, of the researcher. And they are organised in a way that it really is an administrative burden. And, and I think that's, that's, for me that's an issue, and we need to find the good balance between the administrative burden and the usefulness of these procedures.*
>
> *Participant 5, Researcher/educator and policymaker, Europe*

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> *P9: So, these standards, you know you can also have standards of procedures that try to minimize the chance of the researcher doing a questionable research practice. But if that then decreases the autonomy of an individual scientific researcher that can be harmful for science then as a whole. So I think, yeah...*
>
> *Participant 9, Researcher/educator, Europe*

The lack of clear definitions and regulations in the field of research integrity was recognized as problematic by our participants. Some of them called out for legislation that could be implemented in national laws.

> *P10: Well, the hard way would be, would be to plead to, to, to the parliament to install laws. That, that, to obtain an academic position you have to sign, or you have, you have to undergo regular training and updating regularly during your whole, academic career. That would be the, you could say the hard way of doing it. We need legislation.*
>
> *Participant 10, Researcher/educator, Europe*
>
> *P22: So, although there are regulations, but that's another thing, it's not always helpful.*
>
> *Participant 22, Researcher/educator and member of research integrity committee, Europe*

Some participants pointed out that there is a need for more standardised practices, which should be implemented on a global scale in order to deal with different cultural interpretations of research misconduct.

> *P2: Well, I can tell you one thing. There's still not a harmonisation on even the definition of research misconduct. And so, when you have people writing SOPs about what is research misconduct, at the base line there's not even agreement on what research misconduct is. And I think one of the big areas is, some people still think, are still okay with, myself included, honest errors and disagreements, you know, strong opinions and things like that, not being misconduct. And other people saying, oh no that's still, that's misconduct. We can do an agreement on*

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*this. Can we have a definition of misconduct that could be harmonised truly globally.*

*Interviewer: Uh-hm.*

*P2: I think that would help us a lot. Foundationally, and then we start writing our SOPs. Otherwise, you know, the plagiarism SOP is gonna look a little different here then it is over here and fabrication over here, and over here. Because, foundationally we still don't have one platform for what is misconduct.*

***Participant 2, Researcher/educator and member of research integrity committee, Europe***

*P13: By now everyone is going crazy to respect research integrity, but everyone risks interpreting it in their own way. We need to make a move to think about how to integrate these themes into the path that leads me to be a researcher. […] Taking into account the US one who is more formal, who has some legal basis and Europe sometimes guidance or just funding agencies practices where we have requirement. And having different definition, within the Europe also make it not easier.*

***Participant 13, Researcher/educator and member of research integrity committee, Europe***

The importance of education was a frequently discussed topic amongst participants during the interviews. They pointed out that we do not have enough education in research integrity, and suggested that training should be mandatory.

*P20: So I think that one important part for the next steps is educating the people.*

***Participant 20, Researcher/educator and policymaker, Australia***

*P21: But maybe education should look differently. We surly don't have enough education. We don't talk enough.*

***Participant 21, Researcher/educator and member of research integrity committee, Europe***

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> *P2: The first answer is, some of the training is mandatory. So, you can't say no. That's the very basic course in good scientific practice. So you gotta go.*
>
> *Participant 2, Researcher/educator and member of research integrity committee, Europe*

Participants also emphasized that the lack of information about research integrity often leads to research misconduct. So, if we want to reduce misconduct, first we need to give adequate information to researchers.

> *P15: But is just a lack of understanding, so sometimes authors will perform a research study and try and get it published and then we say: Did you get IRB approval and then they would say: I didn't need it and then you look at the study and clearly it involves human participants…*
>
> *Participant 15, Industry, Europe*
>
> *P6: But first in advance you need to have information about the research integrity.*
>
> *Participant 6, Researcher/educator, Europe*

Participants emphasized the importance of early engagement in research with adequate mentoring. However, since supervisors/mentors have a large impact on the behaviour of their students, adequate training of mentors is also important.

> *Interviewer: You mentioned the mentorship also as an important process?*
>
> *P1: Oh definitely! Yeah, yeah. That's, that's the part, you know, of education…educating. So, early stage researchers are educated by their mentors but then mentors also need to get educated in about how to mentor and, well hopefully they already know what responsible research is, but if not than that's also…*
>
> *Participant 1, Researcher/educator and policymaker, Europe*

The need for RI education at all levels was also emphasised by the participants.

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*P8: I really think that research committees members should have a certification that they have enough knowledge, enough practice to be in a research committee. Because at least in my country most of the research committee members don't have enough preparation to be in the research committee.*

*Participant 8, Researcher/educator, Portugal*

*P11: And this is normal soft skills that could, should have different stage, different level and perhaps more important at senior level, but also the very senior perhaps should also have the kind of appel that they should get aware what is new, the [inaudible] what's going on. What different ethical aspect they should also include in their project.*

*Participant 11, Funding organisation and policymaker, Germany*

*P1: So, education on all levels, starting from undergrad to graduated level, I think is immensely important…I would, yeah, definitely, as a part of educating students in scientific methodology and then…probably something like guidelines. […] So, I guess what I'm advocating now is value education in [inaudible] even elementary school level, yeah, something like that.*

*Participant 1, Researcher/educator and policymaker, Croatia*

Participants also suggested that researchers need more general guidelines.

*P1: I would say that there should be a general code of conduct that should at least have the main points explicit and then maybe direct readers to different documents. Because there is so much that, I mean, that's, I think that's the main problem with responsible conduct of research. Because you could write a thousand pages, you know, about all the, and still not cover everything that can go wrong. So, by definition you have to be…reductive and make, like, more general, you know, more general rules I guess or, you know.*

*Participant 1, Researcher/educator and policymaker, Croatia*

*Interviewer: So do you think it is better to have more documents like for example ALLEA code that you mentioned? So the documents that will guide but they are not actually step by step procedures for something. Or is it more to have an*

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> *approach that institutions would have more standard operating procedures on how to perform different things?*
>
> *P11: I'm in favour of the first one. To have something general. Kind of common agreement based on that and not on the details, step one, two, three to have them. Because every case is a new challenging case for the existing procedure. And you will adapt every time the procedure. So it's better to avoid changing every time the way we handling and having something more general helping you to understand the general approach and then having common definition to just address the same thing in the same approach. So the first one will be my, yeah, my favourite one in the sense.*
>
> *Participant 11, Funding organisation and policymaker, Germany*

Others pointed out that more specific SOPs could be beneficial.

> *P20: And having specific SOPs targeted to their role will be very beneficial. Because they may have like some, something different to focus on. In comparison with the person at the…research integrity office. Like director level which are dealing with a different part of the case and so on. So definitely specific SOPs for the research integrity advisors it's a really good, yeah, thing.*
>
> *Participant 20, Researcher/educator and policymaker, Australia*

Some participants also described some procedures that could be transformed into SOPs. Participants mentioned procedures related to authorship, registration of manuscripts, and ethics approval.

> *P10: Yeah…and then and then I would focus on, on the, the issues, that are most prevalent, and it pertains to co-authorship. This is, this is, this is the kind of violation of the rules of research ethics of scientific conduct of research integrity that which is most prevalent.*
>
> *Interviewer: So you think that today's existing guidelines on that themes are not sufficient?*

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*P10: It's not sufficient. It's, it's always the reference to the Vancouver guidelines, but, but to my knowledge there is hardly any institution, and at least not in my country that have transformed these guidelines into SOPs.*

*Participant 10, Researcher/educator, Europe*

*P5: You can imagine that a…if ethics committee asks for registrations before, before being submitted, well we would have hundred per cent of what manuscript registrated. Also, you could have a bigger role of ethics committee verifying that when the study is finished to [inaudible]. You don't have a procedure for that.*

*Participant 5, Researcher/educator and policymaker, Europe*

*P18: […] I think it should be a requirement in all research institutions that they have an ethics approval of this. For any kind of conduct of research, even if it's qualitative. So even if it's serving you, people. I mean as long, as long as you involved any living organism in your research then there has to be an independent ethics approval committee that oversees and approves the approval of the actual research.*

*Participant 18, Industry, Europe*

They also suggested that creativity in the development of new procedures would be beneficial.

*P20: So that's why I think that even going a bit more creative, gone like a, moving away from only like written SOPs in a form of like 15 pages document, but having something, using infographics and some pictures, some graphs would be helpful for people to understand. And also it will give them like a full picture of what to expect.*

*Participant 20, Researcher/educator and policymaker, Australia*

It is also very important that the essential practices in RI promotion are mandatory at the institutions.

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*P1: You can use somebody else's rules so you don't have to develop them yourself. But I think it's crucial that you enforce them, because if you don't enforce them, then it's better not to have any, then, you know, to have rules…which, you know, is often the case.*

*Participant 1, Researcher/educator and policymaker, Europe*

*P6: [W]e need to have the information about which kind of analysis you performed on that sample. That, this is standard operating procedures, but it is not mandatory. So the journal ask about the data but only about this. I think it's not enough.*

*Participant 6, Researcher/educator, Europe*

## 3.2.3. Implementation of the practices for RI promotion

The implementation of practices for research integrity promotion was identified as one of the main themes. Within this main theme, several sub-themes emerged, and they addressed the assessment of successful implementation, implementation of RI practices at the organisational level, and implementation of the practices among researchers.

### 3.2.3.1. Determination of successful implementation

A successful implementation of the practices for RI promotion is, according to the participants, dependent on the involvement of researchers and other stakeholders in the process of the development of SOPs and guidelines. Only in this way it can be ensured that the SOPs and guidelines address researchers' concrete needs and problems.

*P2: […] So, one of the biggest comments I had, back to the people, was you didn't involve any stakeholders, you did not involve any scientists in putting this document together. So it's totally useless for scientists. So you've gotta involve the stakeholders. You've gotta have some scientists involved on the team, but you also have to have professional, true ethicists. 'Cause the scientists don't know much about ethics.*

*Participant 2, Researcher/educator and member of research integrity committee, Europe*

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*P2: I think that if it's well known from the start, that the researchers themselves are actually involved in writing them, that will send a positive message to the institution that these just didn't come from the dean or the rector and we're throwing these on you. So I think that's a really good place to start.*

*Participant 2, Researcher/educator and member of research integrity committee, Europe*

*P4: […] They need to be as close to the real practice as possible, and the people who are involved in this practice should be, should be involved in developing those SOPs. […]*

*Participant 4, Researcher/educator, Europe*

As elements that may have an impact on the implementation, the participants identified the number of SOPs that should be developed as well as their content.

*P2: So you have to be prudent when you're talking about SOPs and really write the ones that need to be there. And then they have to be very well written and like I was saying before version control; you have to have enough details so that people kind of know what to do but not so much detail that if you deviate in a way then you would, you know, be a non-compliant.*

*Participant 2, Researcher/educator and member of research integrity committee, Europe*

*P2: But also if the output, if the end product, these SOPs are in fact well written, they're not eighty pages' long, they are even visually easy to follow, the structure, you know with bullets and how you write them is…yeah, visually appealing.*

*Participant 2, Researcher/educator and member of research integrity committee, Europe*

*P3: If you try and encompass everything you just end up with a document that is so long no one's going to read it. Also, a lot parts of it won't apply to people, you know, who say aren't using that technique. And so it gets difficult. By so, you sort of have a top down approach so you have the very high level stuff and then you have the detailed stuff as well.*

*Participant 3, Researcher/educator and industry, Europe*

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*P4: […] Then the detail, if they are detailed it will be, you know even, perhaps a deterrent and perhaps, yeah, users will not be inclined to use them. Because they don't find them relevant for their work and on top of that they are to detail so that just, you know, don't want to bother with that. So I think that the crucial feature, one other I guess, crucial feature is, is the relevance. So you can come up with beautiful SOPs but if users don't find them relevant or perhaps don't need…don't feel they need them, then I don't think you'll…you'll reap much success with that.*

*Participant 4, Researcher/educator Europe*

*P5: I think, I think they should be organised in a way it will be minimised burden, it will be minimal burden for the researcher […]*

*Participant 5, Researcher/educator and policymaker, Europe*

*P5: Yeah, I think we should perhaps make sure that the number of procedures is not…Because it looks like we always keep adding new procedures. So sometimes perhaps we should define ones that are the exception procedures that we want hundred per cent of people to do and make sure they are done well. […]*

*Participant 5, Researcher/educator and policymaker, Europe*

*P9: But for individual researchers, well one, they would need to respect the autonomy of individual scientists. Otherwise they just won't be, won't be followed and…*

*Participant 9, Researcher/educator, Europe*

*P11: To have something general. Kind of common agreement based on that and not on the details, step one, two, three to have them. Because every case is a new challenging case for the existing procedure. And you will adapt every time the procedure. So it's better to avoid changing every time the way we handling and having something more general helping you to understand the general approach and then having common definition to just address the same thing in the same approach. […]*

*Participant 11, Funding organisation and policymaker, Europe*

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> *P19: When we moved from two forms to one we got lots of positive comments. Thank you, thank you, thank you. Because they didn't have to do two. They didn't want. So that was an efficiency.*
>
> *Participant 19, Industry, USA*

Some other participants pointed out the importance of detailed procedures for RI.

> *P4: […] That's one thing. The other thing is that it needs to, well it's, it's purpose is, well among others I guess, but that different people can take it and, and use it and basically repeat the standard or, or perform the standard procedure and in a way this SOP then guarantees that the procedure will always be done in the same manner regardless of who is performing it. And so in order to, to achieve that it needs to be very detailed and unambiguous in its wording and in how it's written. So it needs to be so clear and it needs to be very detailed. I think that's, that's very important.*
>
> *Participant 4, Researcher/educator, Europe*
>
> *P12: I think SOPs should be clear, if you do SOPs, they should be very clear and very detailed […]*
>
> *Participant 12, Researcher/educator, Europe*

Participants also mentioned possible bureaucratic connotations of procedures or the possibility that researchers perceive the procedures as an administrative burden.

> *P9: Yeah. So, I mean research ethics has gone down that path…of creating an extra layer of bureaucracy for researchers. Now maybe that is the best way of doing it but research integrity is still…its younger as a field it'… it's kind of, these codes of conduct, I mean, only more recently been, been written and all these standards of procedure et cetera, are much, much newer. So there is that danger that all of these developments become an extra layer of bureaucracy for scientists but that they're not really interested in that.*
>
> *Participant 9, Researcher/educator, Europe*
>
> *P5: […] And so it's always presented like an administrative stuff. To be done. For example, send it to the ethics committee. Well people, lots of people say well*

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*you have to send it because, because it's what you have to do. Like, you know, any administrative staff. […]*

*Participant 5, Researcher/educator and policymaker, Europe*

Participants also discussed the mixed approach to the development of practices, which concerns the possibility of combining general and specific policies and guidance.

*P3: I think perhaps you need an element of those. The high level works well because it works across disciplines, there's sort of broad agreement, you know. Dishonesty of any kind is not acceptable. And, and so you can sort of look at it in a very high level. So things like the Singapore statement can be, can be applied. I think then, there are elements, so I take the example of the image manipulation. You want to avoid people breaking the rules because they didn't know what the rules were, you know. And if there are some technical things, so if people have agreed that you shouldn't adjust parts of an image even to make it just look cleaner, then that needs to be codified and that will be a very technical specific, you know, detailed example. There may be other techniques, I'm sure there are, where there is good practice and not so good practice and good practice will need to be set out with detail and step by step procedures […]*

*Participant 3, Researcher/educator and industry, United Kingdom*

*P19: I think that codes that are general are needed. Cause they're foundational and they have the principles. But they don't have the steps. And I think you need the foundation and then the actual steps. And hopefully they don't contradict.*

*Participant 19, Industry, USA*

When asked what determines the successful implementation of the SOPs and guidelines, participants frequently mentioned the training for researchers.

*P2: […] And then if you bundle it with good training and…so you roll it out well, instead of just saying okay guys, great there's a link now on the website…we just loaded twenty-five SOPs for you. They're there. Enjoy. That's not gonna do anything. You have to have the way to roll it out now, to actually implement*

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*those…How do you get people? If you gonna require people to adhere to them, you have to train people to them. So you need to set up a training plan, so everybody knows…knows about them, knows how to find them and knows the content and understands the content of those SOPs. So training to them and having a formal roll out plan is important. You need to step among people.*

*Participant 2, Researcher/educator and member of research integrity committee, Europe*

*P10: […] So I think, I think then the middle position is this to at least focus, focus training of all academic stuff. In research ethics, science ethics and research integrity. And that this each, each faculty should make these mandatory.*

*Participant 10, Researcher/educator, Europe*

*P20: […] I think that there should be at least one basic like course. Like module. If not course but module where all the basic principles, the overarching principles of research integrity can be like disseminated through this course. And then there might be like specific modules targeted for particular disciplines. […]*

*Participant 20, Researcher/educator and policymaker, Australia*

Besides the training in the form of mandatory courses, the participants mentioned the need for novel forms of training that could be more engaging.

*P2: I do it through trainings and workshops, absolutely. And through fun videos. So (name of the interviewee organisation), we have a (name) channel and we do videos that are no more than three minutes long. Two to three minutes and we try to make them fun. And we try to teach one concept where somebody might do a one-hour lecture, we'll teach it in three minutes. With fun music and in a fun way and we try to show the plus side, yeah. […]*

*[…] So we are very happy to tailor, find tailor, find two courses to specific departments and then it's not like some generic class, okay whatever, it doesn't apply to me. It's totally pin pointed to their specific thing. And we can even drill it, even further, more narrow if that's needed within their specific department or domain of work. So, then they file like it's more personalised and, yeah.*

*Participant 2, Researcher/educator and member of research integrity committee, Europe*

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*P20: […] So I think that one of the approaches could be that we need to put ourselves in their shoes and then prepare educational materials which can be easy digested. So if these people are time poor and they are too busy in the form of like quick videos, something offered online, something which is like a bite sized information rather than five hour or three hour face to face session. Like using the technology webinars are really popular these days. Something which won't take much time. And then if there're like two or three like consecutive sessions but only like half an hour each or 20 minutes each the chances of getting these people to engage are higher rather than inviting them to be at like long meeting sessions. You know.*

*Participant 20, Researcher/educator and policymaker, Australia*

The importance of training at all levels in a researcher's career has also been mentioned as a factor relevant for implementation. Here, participants addressed problems regarding the education of senior researchers.

*P6: Yeah, training of the researchers. Of the PI. Because if the PI is engaged only in publish or perish, for him is important this publish.*

*Participant 6, Researcher/educator, Europe*

*P9: I presume, a senior researcher who has already done many experiments will not be so inclined to, I mean either the SOP is just common sense or, you know, I mean if the individual researcher does not agree with this particular SOP, I can easily imagine a senior researcher just not following that SOP.*

*Participant 9, Researcher/educator, Europe*

*P10: […] As I said one should, one should do both a bottom up and a top down approach. It is not sufficient to target the youngest ones. The PhD students, the master students. One should target those certainly, but at the same time the other individuals in academia. Professors all with a permanent position all with…all who work as supervisors. Because in order to, in order to change a culture, you will achieve this change much faster, if you also target the permanent academic staff.*

*Participant 10, Researcher/educator, Europe*

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*P20: I have had experience when it's really difficult to get like supervisors to attend like information sessions about research integrity or like case studies and so on. […]*

*Participant 20, Researcher/educator and policymaker, Australia*

*P22: It starts with the policy of the institute, but one very important part of it has to be education. We have to train… To start with the maybe master student, research master students, and PHD. And we have to train them better than we did before on research integrity and that is I think it should be done partly in training of methodology in research methods and statistical analysis etc. […]*

*Participant 22, Member of research integrity committee, Europe*

Besides training, the participants pointed out the importance of raising awareness about RI in general and active engagement in RI discussions.

*P14: I would say that could be, could be regulated but certainly regulation is not enough regulation. It should probably be accompanied and followed by a strong awareness-raising work. Why just put the rule is of no use? […]*

*Participant 14, Member of research integrity committee, Europe*

*P19: I think education for responsible conduct of research is key. I've heard at this conference that the passive approach to that is not sufficient. Just, an institution that says we are, we have this course and, you know […]*

*Participant 19, Industry, USA*

*P22: And, and that in… so… there should be a kind of awareness otherwise it will not work. That is, that it is necessary, and that is growing. I mentioned this paper I wrote for the [inaudible] universities and that is what I experienced meeting also all the rectors of these universities. There is a growing awareness that it is an important thing and that is what the…*

*Participant 22, Member of research integrity committee, Europe*

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### 3.2.3.2. Implementation of practices for RI promotion at the organisational level

When asked what should be taken into consideration for the implementation of the practices for RI promotion at the organisational level, some participants addressed the importance of culture and the overall system rather than institutional initiatives only.

> *P3: I do think, you know, you need to be looking at the whole culture of the organization, ensuring that mentors and supervisors have time to discuss these things, really encouraging them to do that and that must come from [inaudible] institutional, level I guess.*
>
> *Participant 3, Researcher/educator and industry, Europe*
>
> *P4: In my view it's, it's actually not just an academic society and community, it's just part of a broader social setup. And I think that in a society where, where corruption is prevailing on all levels, when there is overwhelming mistrust in institutions, where, you know, misconduct of various kinds is just tolerated. Sometimes even favoured. In that kind of society academic community is just a reflection of that. And it's just repeats the same patterns. So it's very difficult. I think it's almost impossible to make the changes by implementing or introducing some procedures in an academic setting.*
>
> *Participant 4, Researcher/educator, Europe*
>
> *P7: But of course any institution is…is embedded in a global system which has, which seems to have all these…these imperatives. So an institution is a small, you know, like a victim of the system. […]*
>
> *Participant 7, Policymaker, Europe*

Some participants stated that the initiative for the implementation of the practices for RI promotion should come from state authorities rather than just institutions. Higher authority is perceived as an agent for the implementation of the RI policies across institutions.

> *P5: So yeah, it' like…probably I would…I think some rules should be imposed by the governments and probably other should be only done at the level of the institution. Because the…of course some very big rules like imposing a*

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*training…it's because we're implementing a training on research integrity which is something that should be done. Well, actually, in fact, it was implemented because it's law. But I think for some procedures it should not be the law, it shouldn't be a law for all procedures…that's for sure. […]*

*Participant 5, Researcher/educator and policymaker, Europe*

*P11: […] In Europe the [inaudible] the Commission could have the lead on that. To turn both, the definition and the procedure that they have. In a sense they are imposed in a soft way to every country member. […]*

*Participant 11, Funding organisation and policymaker, Europe*

*P13: This regulation, however, is often not at the level of single institution or university but often the regulation that is required, to produce documentation is at European or national level.*

*Participant 13, Researcher/educator and member of research integrity committee, Europe*

*P18: […] You can't say there's one rule for everyone here. It has to be with the local laws in mind. And that's why you need the governments involved. Because then you can maybe have a bit more consistency.*

*Participant 18, Industry, Europe*

In some cases, participants linked the existence of ethics committees and other administrative structures with successful implementation.

*P4: At central level organisations or bodies can perhaps facilitate, provide some support for that, encourage that, provide, I don't know, perhaps special expert teams to help with this process, or some funding if possible. But it's definitely…And then and perhaps guidance on how to develop that. […]*

*Participant 4, Researcher/educator, Europe*

*P21: Well, there has to be an ethics committee. This is a simple matter. I mean there has to be an ethics committee and this committee should have control over two things, I mean it has to develop, develop procedures, it's their job to*

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*develop procedures, say what, how should be written and how it should be done. It's the committee that should control it. […]*

*Participant 21, Researcher/educator and member of research integrity committee, Europe*

*P14: […] …technology transfer division is working a lot and there will now be a new person hired who will deal with these issues that together with the administrative and support offices and with us can see from the point of view of general theory and also of concrete application how to solve this gap trend between the two dimensions and therefore the idea is precisely to set up an office division or to find effective tools that will increase this thing by working on two levels: 1) the institutional one, so in perspective I could be some staff that deals precisely with this at the organizational level, 2) and then working at the level of awareness, then starting with the doctoral students.*

*Participant 14, Member of research integrity committee, Europe*

*P20: So from institutional levels definitely research integrity officers have been working on putting together online training like modules.*

*Participant 20, Researcher/educator and policymaker, Australia*

*P22: So the administrators also should express within the organization because and it is also important that you have also the necessary financial resources to make people to appoint people who do the work who set up things to develop things policy but also new practices and… We should start with the administrators because… if they do not feel that it's something that is important it will not help.*

*Participant 22, Member of research integrity committee, Europe*

When participants were asked about implementing SOPs in RFOs, they provided examples related to training and evaluation of research proposals.

*P2: Yeah. So, one thing we've done here in Luxembourg is, I've met with the funding organisation and I've looked at all their documents that they give out to people who want to apply for a grant. And I edited their documents to be sure that there's sort of the pre-screening for ethics and integrity as part of any*

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*documents that get sent in to the funder. So…they can look for ethical problems, things that should be on their radar with a project or whatever.*

*Participant 2, Researcher/educator and member of research integrity committee, Europe*

*P2: And the other thing is, we put a research ethics coach at the funding organisation. So that person there is a go to person that can answer questions about research ethics and integrity by researchers PhD students who want apply for grants. So he's right there in, working in the funding organisation. That's part of his role.*

*Participant 2, Researcher/educator and member of research integrity committee, Europe*

*P4: […] Yes, so yes I mean that's a good example though, that I believe EMBO, European Molecular Biology Organisation will only fund you if you have been through the EMBO course. […]*

*Participant 4, Researcher/educator, Europe*

*P11: It's a case by case and…they should definitely promote it but not doing another way that is the normal way of given at the institutions. There's a good perhaps strength to this training activities at those level and say you need to undergo this course to get allowed to submit or something like that.*

*Participant 11, Funding organisation and policymaker, Europe*

*P17: And funders can do a bit the same thing. They can require from the researchers that they, that they are transparent, that they register their studies or that they make their data available and things like that. So for example, they could, well they could, they could demand that the researchers do this otherwise they won't get the full grant for example.*

*Participant 17, Researcher/educator, Europe*

*P18: I've never worked at the research funder [inaudible]. So I don't know the details of how they work. I only know from a, you know, sort of an observer stand point. But I would imagine they would have similar mechanisms in place things like triage. For things like peer review, like the criteria. Who can review this, who should be on the decision committee. So I can imagine there will be similar things to that.*

*Participant 18, Industry, Europe*

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*P20: And I know that the two big funding agencies in (country), they have policies for research integrity and research misconduct. And most of the researchers is going for these like, we call category one funding. They know that they have to comply with the funding rules and, and the requirements by the funding body. Otherwise they're not gonna get the grant.*

*Participant 20, Researcher/educator and policymaker, Australia*

### 3.2.3.3. Implementation of the practices for RI promotion at the individual level

For the implementation of the practices for RI promotion at the level of individual researchers, participants mentioned the importance of the relationship between mentors and PhD students.

*P3: I think mentoring is incredibly important and it's probably an area that we need to look out more. And support, in order to be effective you then need to support the mentors as well. I actually think that the whole system of, or the lack of training within research for how to supervise is something we ought to look at.*

*Participant 3, Researcher/educator and industry, Europe*

*P4: So I think that in mentoring relationships there's quite a lot of potential for misconduct, especially on the side of mentors. And then, and then in order perhaps to increase the awareness of this, of this potential risks of that relationship, perhaps some stories might, you know, be useful. Stories both of good practice and stories of bad practice.*

*Participant 4, Researcher/educator, Europe*

Participants also emphasised how important it is that researchers understand RI procedures.

*P5: […] Currently the way it's presented it's that's the law we just have to do it, and there's no explanation such why is it so important to do that. And, and the way it's presented is very often in termins, which is much more for lawyers than for a researcher.*

*Participant 5, Researcher/educator and policymaker, Europe*

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*P6: One page, two page at least of a clear explanation of what are SOP, and what are the mean off the SOPs. And in particular that this mandatory means is not to have to end other work, but to give more, more of…more knowledge and more…at the end, at the end more confidence that my work is true. This is, I think only one page. With a clear explanation. This is why I ask you to work according SOP, procedures. This a thing, a good way.*

*Participant 6, Researcher/educator, Europe*

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# Conclusion

In this study, we conducted semi-structured interviews with research integrity experts to identify novel SOPs and other practices for RI promotion in RPOs and RFOs. Moreover, we aimed to explore how practices for RI promotion can be implemented in RPOs and RFOs and what the influence of research culture is on the implementation of practices for RI promotion. A qualitative analysis of the interviews identified three main themes: 1) Research culture, 2) Practices for RI promotion, and 3) Implementation of practices for RI promotion.

Regarding the main theme 'research culture', participants addressed different elements of the research system, discrepancies regarding research integrity among different countries and different scientific disciplines. Current emphasis on 'publish or perish' and other perverse incentives are perceived as the main causes for researchers' involvement in research misconduct.

In the second theme, 'Practices for RI promotion', participants shared their knowledge about established practices, novel and innovative practices, and practices that needed to be developed in future. We noticed that there is no consensus on what SOPs are. Participants, when asked about SOPs, would talk about other practices, e.g. codes, guidelines or checklists. The potential reason for addressing different practices as SOPs could be that there are not many SOPs developed in the area of research integrity. Participants generally agreed that having written step-by-step procedures for the promotion of RI could be very useful in some cases. However, based on the interviews it is also clear that in the process of developing SOPs in SOPs4RI, it is important for us to consider how many SOPs (and guidelines) we may be able to develop and how detailed the procedures should be. Although participants agreed that SOPs should be relatively detailed, these should still be flexible and adaptable to different disciplines and environments. It is also important that SOPs have legitimacy among researchers, so that they can look at them as a helpful tool and not an additional burden they have to carry when conducting research. One of the proposed solutions is to develop practices that will have general principles, like the ones presented in codes, followed by specific, detailed steps on how to conduct research according to research integrity principles.

The third identified theme was related to the implementation of the practices for RI promotion. Participants pointed out that institutions should have an active approach to the

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implementation of the practices. This means that just adopting the practices is not enough for researchers to adhere to the RI practices. RI training, identified as the most convenient method for the implementation of the practices for RI promotion, should be mandatory for junior and senior researchers, as well as discipline-tailored. The interviews with the RI experts enabled us to get more insight into the researchers' knowledge on SOPs and what SOPs they would like to have and use in their research. Together with other material from Work Package 3, these examples can be used in in other SOPs4RI packages as a basis for the development of new procedures for RI promotion.

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# References

1. Marusic A, Wager E, Utrobicic A, Rothstein HR, Sambunjak D. Interventions to prevent misconduct and promote integrity in research and publication. Cochrane Database Syst Rev. 2016;4:MR000038.

2. Fanelli D, Costas R, Larivière V. Misconduct policies, academic culture and career stage, not gender or pressures to publish, affect scientific integrity. PLoS One. 2015;10:e0127556.

3. Buljan I, Barać L, Marušić A. How researchers perceive research misconduct in biomedicine and how they would prevent it: A qualitative study in a small scientific community. Account Res. 2018;25:220-38.

4. Adams WC. Conducting Semi-Structured Interviews. Handbook of Practical Program Evaluation. New Jersey: John Wiley & Sons, Inc; 2015;492–505.

5. National Academies of Sciences, Engineering, and Medicine. Fostering Integrity in Research. Washington, DC: The National Academies Press; 2017.

6. Harsh S. Purposeful Sampling in Qualitative Research Synthesis. Qual Res. 2011;11:63-75.

7. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006;3:77-101.

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# Appendices

## Appendix A. Information letter and informed consent form for interviews

Information in red was adapted based on the conducting interviews by WP partners.

### Invitation to participate in the interview and informed consent for the stakeholder consultation 'Standard Operating Procedures for Research Integrity (SOPs4RI)'

Dear Sir/Madam,

The Horizon 2020 project SOPs4RI aims to contribute to the promotion of excellent research and a strong research integrity culture aligned with the principles and norms of the 'European Code of Conduct for Research Integrity' (ALLEA 2017). We at the SOPs4RI project aim to collect existing standard operating procedures and guidelines and to develop them further for the implementation in research performing organisations and research funding organisations across Europe. We will create an online toolbox taking into account differences between disciplines and countries. The toolbox will present key elements, i.e. standard operating procedures and guidelines, which will help research performing organisations and research funding organisations create their own institution-tailored Research Integrity Promotion Plans (RIPP).

We would like to invite you to participate in this stakeholder consultation via participation in the interview. By agreeing, you commit to participating in the face to face or online interview (depending on your schedule and availability). As this is a Europe-wide consultation, the language of the interview will be English. The interviews will be conducted anytime from March to June.

Hereafter you can read details about the project and the stakeholder consultation so you can make an informed decision whether you would like to participate in the interview or not.

#### 1. The aim of the research

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To create a toolbox of standard operating procedures and guidelines for Research Integrity Promotion Plans it is important to gain a better understanding of existing professional rules, practices, and factors influencing their implementation. The interviews with experts in the field of research integrity will provide us with additional knowledge on general elements for fostering research integrity in research performing organisations and research funding organisations. In this interview, we would like to hear your experience regarding practices for the promotion of research integrity and their implementation within research organisations. Further, we would like to hear your opinion regarding the influence of research culture and thoughts about research misconduct.

Knowledge gained through the interviews, together with previously conducted literature search, will be used as a basis for the further development of the project and the discussion for the Delphi survey and focus groups. Ultimately, the knowledge gained in this project will be used for the development of the toolbox, consisting of standard operating procedures and guidelines, which can be applied among different academic disciplines.

## 2. What do we ask from you?

If you would like to participate, the interview will be conducted by the researcher from the University of Split School of Medicine. The estimated duration of the interview is up to 1 hour. Before attending the interview, we will ask you to complete a brief questionnaire (sent via email beforehand) about your background: gender, age, role regarding research integrity, years of experience, nationality and country of residence. The questionnaire will also include a couple of open questions about SOPs for research integrity. You can bring the printed survey answers to the interview or fill them in before the interview. If you decide to participate in the online interview, we kindly ask you to send us a filled survey via e-mail.

## 3. Benefits and risks of participating

Interviews with research integrity experts are essential for the development of the framework for the SOPs4RI project which will enable us to build a toolbox with SOPs and guidelines for the promotion of research integrity. This will help research performing organisations and research funding organisations to create plans with details to foster and promote responsible research practices, avoid detrimental practices and handle misconduct. Thus, by sharing your knowledge and experience you will help us contribute to the development of better science.

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The risk associated with the interview is that participants may feel uncomfortable to discuss research misconduct and express opinion about possible negative factors influencing implementation of research integrity practices.

To avoid possible risks we would like to point out that information provided during the interview are confidential. Moreover, if you would like to provide an example of research misconduct we advise you not to mention personal information or personal names but rather present an anonymous case. This way the cases presented in the interview will not be directly linked with the specific organisation or individuals.

Your personal data provided during the interview will be anonymised in the course of the transcription process. The information provided during the interview will not be linked with a specific participant. The information will be connected only with the type of stakeholder (researcher, member of the RI committee, funding and process organisations employee, policy-makers or industry employee).

The information provided during the interview will be used only for the purposes of the SOPs4RI project.

### 4. If you decide not to participate or to withdraw from the interview

Participation in the interview is voluntary. **If you decide to participate, we kindly ask you to sign the attached informed consent and return it to us via the e-mail.**

If you have agreed to participate but change your mind, you can withdraw at any point (including during the interview). When you withdraw from the study, all your non-anonymised data will be destroyed. If your data has already been analysed, the results will be used but the source of the data will not be retrievable.

### 5. Data processing and storage

Storage and use of the data collected during the interview will be in alignment with the data protection procedures contained in the European Union Law, specifically Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data (General Data Protection Regulation - applicable as of 25 May 2018 in all European Union member states) and Danish Ministry of Higher Education and Science's recommendation in the Danish Code of Conduct for Research Integrity - Section II. 2. 1. i. (https://ufm.dk/en/publications/2014/the-danish-code-of-conduct-for-research-

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integrity). All data collected through the interviews will be stored on the SharePoint, a web-based collaborative platform, administered by the project coordinator, i.e. Aarhus University. The access to the stored data will be enabled only for the partners of the SOPs4RI consortium.

The ethics approval for conducting all interviews in the Work Package 3 has been obtained by the Ethics Committee at the University of Split School of Medicine.

If you decide to participate in the online interview, we would like to point out that the Skype Business platform is GDPR compliant.

All collected data will be stored for a period of five years after the last publication. This includes original audio-visual files, transcriptions, signed consent forms and questionnaires. Only anonymised data will be used for analysis.

In line with the open access movement, we will make the anonymised data publicly available on the Open Science Framework. If we notice that there is any data that even after anonymisation has the potential to be sensitive, we will send it to you to obtain consent to either deleting it, anonymising it further or making it publicly accessible. If you would like to have access to your non-anonymised data (stored encrypted on SharePoint), you can always contact Rea Scepanovic (rea.scepanovic@mefst.hr) to have it sent to you. The findings from the stakeholder consultation will also be published and made publically available on the Project's page on the European Commission research information portal: https://cordis.europa.eu/en.

## 6. Financial aspects

There is no fee paid for participation in the study.

## 7. Do you have any questions?

Please do not hesitate to contact, Prof. Ana Marušić, MD, PhD, ana.marusic@mefst.hr, if you have any questions.

If you would like to contact Data Protection Officer at the University of Split School of Medicine for additional information regarding data protection, privacy issues, and use of data in this research please use this address: dpo@mefst.hr.

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## Informed consent and confidentiality agreement

Please read the statements below in connection with the research 'Standard Operating Procedures for Research Integrity (SOPs4RI): stakeholder consultation – interviews'. By signing the consent, you indicate you are in the agreement **with all** of the statements below.

- I have read the information provided about the study. I had the opportunity to ask questions and my questions have been sufficiently answered. I have had enough time to decide whether I would like to participate.
- I am aware that participation in the study is voluntary. I also know that I can decide at any moment to not participate or withdraw from the study. I do not have to provide any reasons for not participating or terminating enrolment in the study.
- I give consent to the audio recording of the interview (and video recording for online interview).
- I give consent to the collection and use of my data as described in the information sheet. I give consent to having my data stored for five years on SharePoint after the study has been completed.
- I give consent to having my anonymised data publicly available. I understand that this means that the anonymised data can be used for research purposes other than the ones described in the information sheet. I am also aware that this means that my anonymised information may be used in countries outside of Europe and that the regulations for data processing and storage in those countries may not comply with those of the European Union.
- I want to participate in this study.

Name:

Signature: Date: __ / __ / __

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# Appendix B. Questionnaire for interviews

As stated in the invitation letter, this questionnaire is a part of the SOPs4RI project task related to the expert interviews. The questions address your demographic data (gender, age, nationality and country of residence) and questions concerning information relevant for research integrity and standard operating procedures (SOPs).

Storage and use of the personal data collected through the questionnaire will be in alignment with the data protection procedures stated in the invitation letter.

Your age (in years): _____

Your gender: a) Male b) Female c) Prefer not to say

Country of residence: _____

1. How are you involved in research?

a) Researcher/educator

b) Member of research integrity committee

c) Funding and process organisations

d) Policymaker

e) Industry

2. Years of work experience related to research integrity: _____

3. Can you specify 3 characteristics of SOPs that are, in your opinion, crucial for their quality? (e.g. if SOPs should be clear, detailed, extensive, up to date, action-oriented etc.)

4. Can you give us an example of SOP containing characteristic you specified above and that is, in your opinion, an example of good SOP for research integrity?

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# Appendix C. Interview guide and questions

First, I would like to thank you for accepting our invitation to participate in this interview. As it was mentioned in the invitation letter, this interview will be conducted as a part of the Horizon 2020 project SOPs4RI (Standard Operating Procedures for Research Integrity).

The aim of the project is to create an online toolbox consisting of SOPs and guidelines for the promotion of research integrity in research performing organisations (RPOs) and research funding organisation (RFOs). These SOPs and guidelines will be offered as flexible tools for RPOs and RFOs to develop Research Integrity Promotion Plans.

To be able to create a toolbox containing best practices for RI, in this interview we would like to hear your experience with practices for the promotion of research integrity and their implementation within research organisations. Further, we would like to hear your opinion regarding the influence of research culture and thoughts about research misconduct.

I would like to point out that there are no right or wrong answers so please feel comfortable to express your opinion. Your opinion is very valuable to us and will contribute to the further development and the goal of the project.

This interview is confidential; hence everything said will be used, as mentioned in the invitation letter, only for the purposes of the SOPs4RI project.

During the interview, I will take notes and the conversation will be recorded. The recording is only to ensure we have all your answers. As we stated in the invitation letter the tapes will be stored for the period of five years after the last publication.

Do you agree for this interview to be tape-recorded?

This interview will last about an hour. If you don't have any additional questions we can start the interview.

1) Can you briefly tell us what behaviour you consider as responsible research conduct and what practices can help researchers to adhere to research integrity and responsible research conduct?

Possible probes:

How can those practices be implemented into research institutions?

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How important is for the institution to develop and enforce rules which will be assembled as codes, guidelines and SOPs, and in which good and bad research practices will be described?

In your opinion, should codes, guidelines, and SOPs be optional or mandatory for research institutions and whether researchers should be obligated to adhere to those norms?

2) What would you address as prominent reasons why researchers get involved in research misconduct?

Possible probes:

Is research culture sufficiently detailed and what other practices, other than FFP, would you consider a violation of research integrity and which need to be regulated?

How are factors such us publishing, obtaining funding for research, career perspectives, and the behaviour of supervisors influencing researchers to involve in research misconduct?

3) What would you address as the most important practices for avoiding research misconduct and what can be done by RPOs and RFOs to avoid research misconduct?

Possible probes:

How important is the training of PhD-students and their mentors?

In which way research integrity committees should deal with research misconduct?

What do you think about rehabilitation exercises for researchers involved in research misconduct?

How can funding agencies and journals contribute to the avoiding of research misconduct?

4) Which elements of research culture may have an impact on the implementation of RI practices (positive or negative) and what changes within research culture would be desirable?

Possible probes:

Would publishing negative research results have any impact on the reducement of cases of research misconduct?

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What are the pros and cons of temporary and permanent job contracts in terms of conducting research and the researcher's career?

## Revised interview guide and questions

First, I would like to thank you for accepting our invitation to participate in this interview. As it was mentioned in the invitation letter, this interview will be conducted as a part of the Horizon 2020 project SOPs4RI (Standard Operating Procedures for Research Integrity).

The aim of the project is to create an online toolbox consisting of SOPs and guidelines for the promotion of research integrity in research performing organisations (RPOs) and research funding organisation (RFOs). These SOPs and guidelines will be offered as flexible tools for RPOs and RFOs to develop Research Integrity Promotion Plans.

To be able to create a toolbox containing best practices for RI, in this interview we would like to hear your experience with practices for the promotion of research integrity and their implementation within research organisations. The word "practice" refers to SOPs, guidelines, codes of conduct, charters, checklists, procedures, and policies for research integrity, as well as training methods and education for research integrity and procedures to deal with research misconduct. Further, we would appreciate your opinion regarding the influence of research culture on the implementation of RI practices. The research culture in this context refers to factors as overall quality assurance/peer review system, trends in research funding, national science and 'RI' policy, science culture, and concepts such as 'academic capitalism', 'publish or perish culture', 'accelerated academies', 'mode II'.

I want to point out that there are no right or wrong answers so please feel comfortable to express your opinion. Your opinion is very valuable to us and will contribute to the further development and the goal of the project.

This interview is confidential; hence everything said will be used, as mentioned in the invitation letter, only for the purposes of the SOPs4RI project.

During the interview, I will take notes, and the conversation will be recorded. The recording is only to ensure we have all your answers. As we stated in the invitation letter, the tapes will be stored for a period of five years after the last publication.

Do you agree for this interview to be tape-recorded?

This interview will last about an hour. If you don't have any additional questions, we can start the interview.

A) Standard Operating Procedures

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1. Of the existing practices (SOPs), in the area of research integrity and research ethics, you currently know, which of those practices do you consider useful and universally applicable (among different countries, different scientific fields and different research institutions)?
2. Besides the SOPs you mention, do you know of some innovative SOPs connected with your area of work?
3. Are there SOPs that need to be developed? Do you know of SOPs and practices that are needed but are either not developed or are insufficiently developed?

B) Research culture

1. In your experience, which elements of research culture may have an impact (positive or negative) on the implementation of SOPs? Are there any differences related to research culture between RPOs and RFOs?
2. In your opinion, what determines the successful implementation of SOPs?
3. What should be taken into consideration for successful implementation at the level of an organisation and the level of an individual?
4. Are there differences in implementing SOPs between RPOs and RFOs?

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