Generating ideas to address factors limiting reporting guideline impact: workshops with EQUATOR and focus groups with developers, publishers, and experts

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| Known todos:   * Multi-panel figure not rendering nicely in docx format * Might take out Intervention Funcitons from each theme as I’ll have a separate table linking * I need to name and cite bias in methods section |

# Introduction

In chapter 8 I described how I led EQUATOR UK staff members through the stages recommended in Michie et al.’s book “The Behaviour Change Wheel - A Guide to Designing Interventions” [1]. I also described how I modifed Michie’s approach by adding an “ideas generation” step before identifying behaviour change techniques (step 7).

This chapter describes that additional step in more detail. The purpose was to gather ideas from the reporting guideline community on how to address reporting guideline limitations. I wanted to include this broader community because, although EQUATOR is a key part of the reporting guideline landscape, they are *only* a part of it. Ultimately, all stakeholders within the academic system influence the impact of reporting guidelines. Guideline developers and publishers arguably do so most directly, and so it was important to draw on their experience and opinions. I expected that seeking input from a more diverse group would lead to *more* ideas and that those ideas would be more likely to gain traction. It hadn’t been feasible to include these stakeholders through all stages of the BCW approach as a) the time commitment was too great, b) it would have required stakeholders to become familiar with the framework and its terminologies which was too big an ask. In contrast, brainstorming ideas was a convenient and important stage to include them in.

# Methods

The purpose of this study was to elicit ideas from experts familiar with RG dissemination, on how to address factors that may influence the application of (and thereby adherence to) reporting guidance. My methods had two parts: 1) brainstorming ideas with EQUATOR during workshops and 2) extending this list through focus-groups with guideline developers, publishers, and guideline advocates. I then describe the combined results.

Before describing my workshop and focus group methods in detail, I will briefly outline the key differences. Whereas I actively contributed during the EQUATOR workshops, I tried to remain a passive facilitator during the focus groups - I wanted to capture the thoughts of participants whilst minimising my influence as far as possible. Whereas in the workshops, EQUATOR staff and I spent many hours, across multiple sessions, working through behavioural influences one at a time, focus group participants had limited time and so selected their own influences.

## Workshopping Ideas with EQUATOR

I described the workshops I ran with EQUATOR in chapter , including the techniques I used to encourage rich discussion and to navigate my position as a participating researcher, contributing ideas myself whilst facilitating others’ to share their voices. For this particular step, I asked workshop participants to consider each intervention function in turn and suggest ideas that would employ that function. After the workshop, I then labelled each idea with the influence(s) it would be addressing to create an “ideas document” with two columns: influences were described in the left hand column, and ideas in the right hand column. I invited workshop participants to review and comment on this document. The file can be seen in Appendix #TODO.

## Focus groups with external stakeholders

Focus groups are researcher-led group discussions that use conversation as a form of data collection [**givenFocusGroups2008?**]. A key element of focus groups is interactions between participants as they agree, disagree, challenge, and ‘feed off’ of each other. I chose focus groups because I expected this interaction to lead to more ideas being generated than if I interviewed participants in isolation. Focus groups are also a practical way to collect data from larger groups of people. This is in contrast to in-depth interviews which are more useful in eliciting detail about individuals’ perspectives.

## Sampling

To seek variation and ideas from broad range of stakeholders, I invited a purposive sample including the developers of popular reporting guidelines, publishing professionals, and academics that have studied reporting guidelines. I asked participants to extend the invite to others they felt would be appropriate. Because the BCW requires input from experts with insight into the intervention, I decided to elicit the opinions of authors in a separate study (see chapter 11).

Following best-practice, I used information power [2] to guide my estimated sample size. Malterud et al. posit that the more relevant information a sample holds, the fewer participants are needed. They argue that sample size sufficiency depends on five factors: 1) whether the study’s aim is narrow or broad, 2) whether samples are considered dense (they have a lot of relevant experience or knowledge of the phenomena) or sparse, 3) whether the study is well supported by theory, 4) the quality of dialogue, and 5) whether data will between compared between participants/groups.

My aim was narrow and well defined. My sample was dense in that participants knew a lot about how reporting guidance is disseminated but also showed variance in terms of which guidelines they work on and which parts of the academic system they represented. I used the BCW as an applied theory. I used open questioning and to encourage strong dialogue (I elaborate on this later), and I was not planning a cross-case analysis. Therefore, I deemed my information power sufficient to justify initially recruiting 15-20 participants in 4-5 groups.

I used the dialogue criteria from Information Power to decide when to stop recruiting. By monitoring the number of edits to the co-produced file I could be confident that my information power was good. Once groups began to add fewer and fewer comments, I judged that the benefit of continued recruitment was insufficient given time constraints.

## Materials

I used the ideas document generated in the workshops with EQUATOR to prompt discussion in the focus groups. However, because ideas generated by previous participants could bias or limit the creativity of current participants I initially hid them by turning the text in the ideas column white before sharing. I would reveal the text only after participants had exhausted their own imagination (see [Figure 1](#fig-ideas-document) for an example). All participants could edit this file to record their own ideas or elaborate on other people’s ideas. At the end of each focus group, I would then turn the ideas column white again, ready for the next group to continue the process. In this way, each group built upon the output of the previous groups.

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| --- | --- | --- | --- | --- | --- |
| |  |  |  | | --- | --- | --- | | |  | | --- | | Ideas initially hidden | |  |  |  |  | | --- | --- | | |  | | --- | | Ideas showing | |   Figure 1: An example entry in the Ideas Document that was co-edited by participants. Existing ideas were initially hidden (by turning the text white), and only made visible once participants had discussed their own ideas. |

## Focus Groups

I conducted focus groups between May-July 2022 online using Zoom. Before each focus group, I asked participants to spend some time thinking about barriers and facilitators. I did this because I wanted participants to get into the frame of mind and come to the focus group “armed” with influences they were ready to discuss. I was also interested to see whether participants would contribute influences that I did not identify in chapters 3.

Each focus group lasted 2 hours. Following standard practice, I began by introducing myself and the project in a way that I hoped would help participants relax and to think open-mindedly, not defensively. I explained where the list of influences had come from, and that the influences were in reference to reporting guidelines *in general*, and not necessarily a comment on *their* guideline. I encouraged participants to think beyond the guideline documents themselves, and to consider all stakeholders and resources involved. I explained the goal was to brainstorm as many ideas as possible, and not worry about whether ideas were good or bad.

It was not possible for a single focus group to cover all influences within a reasonable amount of time, so I allowed participants to select which items they wanted to discuss. I did this by giving them a few minutes to read through a list of influences, raise any additional influences they felt were missing, and mark those that they wanted to talk about. I occasionally selected influences to discuss myself, either because they had been neglected by previous groups or because I expected participants to have insight into it.

For each influence discussed, I would explain it and allow participants to ask questions. I then asked participants to spend a couple of minutes reflecting on the influence and brainstorming solutions on their own before discussing them as a group. I encouraged this solo reflection because I wanted all participants to engage with the problem. (#REF)

To facilitate discussion, I would ask open ended questions, often drawing on intervention functions from the BCW by asking questions like “how could this be easier to do?” or “how could we change how people feel about this?”. I did this when participants ran out of ideas, or when they got fixated on a particular type of intervention, in which case I would reassure participants that their fixated solution was already documented and that it would be useful to think of alternatives.

Once participants had discussed all of their own ideas, I would reveal the ideas identified by previous groups by changing the colour of text from white to black. Participants could then edit and extend the text until it reflected all of their thoughts too. Ideas were never removed from the document, but participants could add concerns or disagreements if they wanted to. Editing the file in this way allowed participants to document their thoughts in their own words.

After each focus groups I made notes on how the session went and reflected on what I could have done differently. I made a copy of the ideas document and then turned the text in the ideas column white again, ready for the next group. Taking copies after each group created a paper trail of how the document had evolved after each session, and counted the number of additions so that I could monitor how many new ideas had been added and, therefore, whether I could stop data collection.

### Data processing and analysis

I imported the final ideas document into NVivo and applied descriptive codes to ideas. If a sentence contained multiple ideas, I would code each idea separately. I also coded the barriers and stakeholders that were related to each idea. I then grouped ideas that appeared against multiple influences.

I used qualitative description for my analysis ([3]; [4]), which involved aggregating and summarising ideas. I did not interpret data as doing so would erase the views captured during co-production. I grouped ideas inductively in ways that felt cohesive and made the results easy for my intended audience (the reporting guideline community) to understand and act upon. For example, I aggregated “ask authors to cite reporting guidelines” and “display citation metrics on reporting guideline resources” into a group about “Citations”, even though they target different barriers (discoverability and perceived trustworthiness) and employ different intervention functions (education and persuasion).

I discussed and refined my coding, aggregating and summarising with JdB. I sent the aggregated, summarised ideas to focus group participants and EQUATOR members, inviting them to check that it reflected their ideas faithfully. I also invited feedback from guideline developers who had shown an interest in the study but had been unable to attend a focus group.

## Reflexivity & Trust

In chapter 8 I described my active role within my workshops with EQUATOR. In contrast, I tried to remain objective when running focus groups with external stakeholders, in order to capture the perspectives of participants without influencing them. My research paradigm for the focus groups was post-positivist, in that I considered that ideas were “out there”, but that differences in context, experience, and opinion would affect what I (and participants) observed, understood, and concluded.

Whereas I argued in chapter 8 that my subjectivity was an asset within the workshops, I still wanted to ensure that my results could be trusted as an account of participants’ views. Lincoln and Guba [5] argue that for a study to be trustworthy, the researcher must show that the findings are credible (‘true’), transferable (applicable to other contexts), dependable (consistent and repeatable), and confirmable (shaped by participants, not by the researcher’s bias or motivation). Lincon and Guba propose a number of techniques to achieve these criteria, and I describe the techniques I used in [Table 1](#tbl-trust).

Table 1: Techniques for establishing trustworthiness. Based on Lincoln and Guba’s Evaluative Criteria [5]

| **Technique** | Implementation |
| --- | --- |
| **Techniques for establishing credibility** |  |
| *Member-checking* | Lincoln and Guba argue that member checking is the most important way to the establish validity of an account [5]. Accordingly, I invited participants to comment on my synthesised results, asking for feedback on the structure of categories, my interpretation of their data, and my findings and conclusions. I also 3 invited participants to comment on the product of my data analysis in the form of itemized information and condensed notes. |
| *Peer debriefing* | Throughout the design, data collection, analysis and reporting, CA acted as a disinterested peer. By questioning my reasoning and exploring my assumptions, she helped me become aware of biases, perspectives that I was taking for granted, and assumptions I was making. JdB acted as a disinterested peer during data analysis. |
| **Techniques for establishing transferability** |  |
| *Thick description* | I aspired to report my results with context by indicating when ideas were common or rare, and who they originated from when I felt this was particularly relevant. I reported disagreements, provide quotes, and relationships between ideas. |
| **Techniques for establishing confirmability** |  |
| *Audit trail* | I referred to audio recordings of the focus groups whenever he needed to clarify parts of the document. I kept versions of raw data collected from all stages. I made a note of my own ideas before commencing data collection, documented all stages of the workshops I held internally with the EQUATOR Network, and kept copies of the co-produced file after every focus group. I kept a copy of my coding in NVivo, and versions of the unitized information and summaries that I sent to participants before and after member checking. This audit trail meant that I could be certain of which stages of research ideas originated from. |
| *Reflexivity* | I wrote down my own ideas before commencing the study (see chapter 8), along with my beliefs and experiences of reporting guidelines. I continued to keep personal notes throughout planning, data collection, analysis and reporting, in an attempt to remain aware of my own perspectives and positions, and how they may influence my research. |

## Ethics & Data Management

The study was approved by the Medical Sciences Interdivisional Research Ethics Committee (R80414/RE001). Participants gave informed consent by completing an online form. Participant’s edits to the co-produced file were anonymous. I recorded the audio of focus groups so that I could refer to them during analysis, if necessary. All data and recordings were kept on secure university storage.

# Results

## Units of study

I held 7 focus groups involving 16 participants in total. Participants included guideline developers (n=11), publishing professionals (n=3), and academics that study reporting guidelines (n=2).

Of the 15 guideline groups I invited, 5 took part. Of the remainder, 4 guideline groups wanted to participate but were unable to coordinate a time, 5 groups did not respond, and 1 group refused to participate; they felt that their guideline didn’t need updating because it was highly cited.

Of the 23 invitations that I sent in total, 7 received no response. But because I invited people to share the invitation (which they did), I have no way of knowing my recruitment rate.

Although I had intended to include 4 or 5 participants per focus group, in practice it was difficult to coordinate participants across time zones, and so sessions only had 2 or 3 participants.

Before the focus groups, my workshops with EQUATOR had generated a list of TODO ideas, which formed the initial “ideas document” presented to the first focus group. After the final focus group, participants had extended this list further to include 128 ideas to address 32 barriers. Participants identified 10 stakeholders that could enact these ideas including funders, ethics committees, institutions, publishers, equator network, guideline developers, registries, preprint servers, conference organisers, and societies. I grouped these ideas into 28 broader ideas, which I categorised according to whether they could be considered before developing guidance, when developing guidance, when writing guidance down and creating resources, when disseminating resources, or on an ongoing basis.

I do not describe which stakeholder ideas came from for three reasons. Firstly, stakeholders were all editing the same file, so some ideas would be revisited multiple times by different stakeholders who would build upon the thoughts of previous contributors, editing and extending ideas. Consequently, it wasn’t always possible to definitively say *who* any particular idea came from, as it may have been the product of multiple stakeholders. Secondly, just because a stakeholder didn’t edit an idea in the document didn’t mean that the idea hadn’t also occurred to them. Hence allocating an idea to a stakeholder just because they were the one that wrote it down may be misleading. Thirdly, I didn’t consider labelling the *origin* of an idea to be useful because I didn’t see it as an indication of that idea’s *quality*. In chapter 8 I describe how I judged options according to their acceptability, practicability, effectiveness, affordability, side-effects, and equity, and how these criteria are subjective and will differ between stakeholders. I had sought input from stakeholders because I expected that doing so would lead to *more* ideas, and ideas that were more likely to gain traction. But I didn’t expect *all* of their ideas to be “good”. To the contrary, I had explicitly encouraged participants not to worry about whether or not an ideas was “good”. #TODO: edit the paragraph above.

## Synthesis and summary

Here I describe the aggregated ideas. I use the term “stakeholders” instead of “participants” to clarify that ideas came from the focus group participants *and* the workshop participants.

### Before developing guidance

#### Create reporting guidance for protocols and applications

Stakeholders suggested “developing [reporting guidance] for protocols”, funding, and ethics applications as a way to encourage authors to consult reporting guidance earlier in their work when they are more likely to have the time, motivation, and ability to reflect and act on it.

Intervention Functions: Education

#### Avoid confusing authors with too many reporting guidelines

“We need fewer, better, reporting guidelines” wrote one stakeholder, when discussing how authors may struggle to identify which reporting guidelines apply to their work.

Acknowledging that reporting guideline developers may duplicate each other’s work unwittingly, stakeholders wrote that developers should consult EQUATOR’s register of reporting guidelines under development before creating a new guideline. Stakeholders noted that “EQUATOR cannot prevent guideline developers from creating duplicate guidelines” but could “improve the registration process for reporting guidelines that are under development”, better “highlight [reporting guidelines] that are under development in the main search results”, and could “create options and instructions to encourage developers to extend existing guidance instead of duplicating. This could go in the new guidance for guideline developers”.

Stakeholders had ideas of how this “extend”ing could be done. They suggested that developers could tailor existing guidance to a particular niche by making different “versions” or “extensions” of existing guidance “e.g., STROBE split into STROBE Cohort, Case-control etc”. If only a few items need to be edited or added, stakeholders suggested creating “modular” guidance instead of duplicating an entire guideline. Stakeholders spoke of modules in two different ways. Firstly, new reporting guidelines can be created to substitute for particular items in existing reporting guidelines. Stakeholders named TIDIER as an example of this strategy, which can be substituted for item 5 in CONSORT. Stakeholders identified a second kind of modularity in the JARS guidelines, where a general reporting guideline covering all quantitative psychology research can be mixed-and-matched by modules for specific designs (non-experimental and experimental designs, with or without random assignment, or special modules for longitudinal, n-of-1, or replication studies [6]).

When discussing how modules or extensions could be “harmonized” so that they “speak to another”, participants suggested resources could have compatible structure, and should not “use different wording for what is essentially the same item”. Participant’s recommendation to “use similar terminology [across] related guidelines” extended to the title; STROBE-nut, STROBE-ME and STROBE-RDS are more readily identifiable as STROBE extensions than STREGA, ROSES-I, or STROME-ID are. Naming can also indicate when a guideline has been revised: “ARRIVE 2.0 is recognisable as a replacement of ARRIVE”, whereas “TIDIER Placebo appears to be an extension but should be called TIDIER 2.0”.

Intervention Functions: Enablement

#### Avoid prescribing structure

Stakeholders suggested that “[reporting] guidelines should avoid prescribing structure as [it] may clash with journal guidelines”.

Intervention Functions: Enablement

#### Keep reporting guidelines agnostic to design choices

Stakeholders discussed how *designing* research is a separate task to *reporting* it, and that many authors will only encounter reporting guidelines *after* the manuscript has been written, at which point design advice is less useful.

Nevertheless, stakeholders cited multiple reasons for including design opinions in reporting guidance. Some suggested it should be included so that authors can “learn for next time”, and others wrote that consequences of design choices justify why an item was important to report, but acknowledged that that justifying items in this way can be problematic if developers do not consider all contexts or study types in which their guidance may be used.

Some participants argued that design advice could be removed from reporting guidelines entirely. This was proposed as a solution when considering how authors may feel afraid to report transparently if what they did goes against the design recommendation, or may feel restricted if forced to use a reporting guideline that prescribes design choices.

Instead, developers could encourage authors to “explain reasons for methods choices, [which may] be legitimate”, noting that “the consequence of not choosing one [design] option over another, even if the choice is a rarely used option, may not have major consequence on the results of the study”. One stakeholder wrote that authors may feel reassured if told that “editors and peer-reviewers may not judge as harshly when they understand the rationale for the choice”. Stakeholders wrote that developers should “encourage transparent reporting over and above good design”, and that authors could be encouraged to “describe what they did in plain language to make it clear - if what they did doesn’t quite fit with standard terminology (e.g., if they didn’t really do theoretical sampling or aren’t sure if they did theoretical sampling) then just describe what they did, how they made sampling decisions”.

Discussions about removing design advice also arose when considering how including design advice elongates guidance, potentially deterring authors from reading it. To solve this, stakeholders suggested reporting guidelines could link to design resources “elsewhere”. For example, if reporting guidance were presented on a website, authors could be given options to “display or hide” design advice by choice, or depending on whether the author was “designing [research], applying for funding, or drafting” a manuscript.

Intervention Functions: Enablement, persuasion, (removal of) coercion

#### Describe reporting items fully

Many barriers prompted stakeholders to suggest that specific content should be included for every reporting item.

Firstly, stakeholders noted that authors need to know what to write, and that a brief description could go in checklists and a longer description in the full guidance. Stakeholders suggested this description should include what to write if they didn’t or couldn’t do something to make it “easy for researchers to report things they are embarrassed about”. In these instances, developers could suggest authors “explain reasons” for their choices or “consider the item in their discussion section as a possible limitation” if necessary. Stakeholders also wrote that developers could suggest what to write when an item doesn’t apply.

Stakeholders suggested explaining “why [an item] is important and who it is important to” as this isn’t always obvious to authors. To make guidelines faster to use, stakeholders suggested indicating which items are most important, perhaps “prioritise[ing] certain items as essential vs. recommended, like ARRIVE 2.0 essential 10” and indicating conditions that make items less or more important, including circumstances that make the item non-applicable.

To help authors who want to keep writing concise or need to reduce word counts, stakeholders suggested advising “when an item can be put into a table, figure, box, supplement, or appendix etc” and to “explain the pros and cons of different options e.g., whether content will be peer reviewed or indexed” by search tools.

Many stakeholders suggested including examples to help authors understand and apply guidance. These examples could include both “good and bad reporting” with an explanation of “how [bad reporting] could be improved”. To help authors who are afraid to transparently report limitations, stakeholders suggested including examples of imperfect research that is perfectly-reported. Examples could also include “reporting in different contexts”, from different disciplines, “in multiple languages”, and concise reporting e.g. reporting “TIDIER items nicely in a table”.

Because examples from the published literature can be “difficult to […] find and list”, stakeholders suggested that examples could be “real or generated” by developers. Examples should be “easy to find” from within the guidance resources. Others suggested a searchable “bank” of examples, or ways to showcase “exemplar papers (e.g., badges)”.

Finally, stakeholders discussed the pros and cons of including item-specific design advice, procedural instructions, and appraisal advice, and the different ways of doing it (see [Keep reporting guidelines agnostic to design choices](@sec-keep-reporting-guidelines-agnostic-to-design-choices)).

Intervention Functions: Education, modelling, persuasion

#### Describe each reporting guideline fully

Stakeholders identified that many of the barriers they discussed could be addressed by editing the text that authors might read before using a guideline or checklist.

For example, stakeholders suggested that reporting guidelines and resources should “clearly state what kind of research the guidance applies to” when considering how authors may struggle to identify which reporting guideline they should use. Additionally, stakeholders suggested guidelines could “point researchers to other guidelines if more relevant, perhaps using ‘if, then’ rules e.g., ‘if you did X then use Y instead of this guideline’”. If no better guideline exists for a particular type of study, stakeholders suggested to “warn the user that they can still use this guideline but that they may need to ignore certain questions e.g. ‘This guideline is for studies that did X. You can still use it if you did Y, but you will need to ignore items 4, 6, and 8-10’”.

To ensure that a reporting guideline for writing manuscripts can also be used for writing protocols, developers could specify “which items need to be considered at protocol/planning stage, and which at results reporting stage.”

Stakeholders warned that developers should be mindful when using words like *standard* instead of *guideline* when introducing a reporting guideline, as these words may influence how prescriptive the user expects the resource to be. In choosing their wording, stakeholders suggested developers should be honest and clear about a guideline’s “aim”. Developers could also “be clear about what reporting guidelines *are not*”. For instance, “when they are not design guidelines or critical appraisal tools” this could be specified and authors could be directed to other tools instead.

Noting that it might not be obvious how or when to use guidance, participants suggested being explicit about this. For example, “tell authors that they don’t need to fill out templates [or checklists] sequentially but can use an order that matches their workflow or decision making. Put this instruction on the template, checklists, and other tools. Example from PRISMA – population and subgroup items are separated in the checklist but go together when thinking/making decisions.”. Similarly, authors could benefit from explicit suggestions of how to use reporting guidelines as a team, perhaps by asking “their co-researchers to check their reporting”. Finally, stakeholders suggested telling authors how much time the guideline is expected to take them to read and use, why it can be trusted, and where they can read about its development.

Intervention Functions: Education, enablement, persuasion

#### Keep guidance short

“Make guidance shorter” wrote one stakeholder, and “Make checklists shorter”, wrote another, when considering how “guideline length […] may put researchers off” as “long guidelines appear more complex and time consuming” and can challenge word limits.

One stakeholder posited that guidelines could be shorter if developers were “realistic about what they ask for”. Another challenged developers to “try using a guideline from start to finish and see how the manuscript ends up”. Others wrote that guidelines could be shortened by linking out to content that wasn’t directly related to reporting, like design or appraisal advice (see [Keep reporting guidelines agnostic to design choices](@sec-keep-reporting-guidelines-agnostic-to-design-choices)). Guidelines that are “very long or [have] lots of optional items” could be split into multiple versions (see STROBE as an example in [Avoid confusing authors with too many reporting guidelines](@sec-avoid-confusing-authors-with-too-many-reporting-guidelines)).

Others suggested presenting guidance online with non-essential content collapsed so that guidance appeared short but authors could choose to “display or hide” content. Stakeholders noted that “itemisation can make guidance more digestible, but can also make it harder to get the bigger picture” and makes text appear longer.

Intervention Functions: Enablement

### When developing guidance

#### Make resources ready-to-use

Stakeholders suggested that resources should be in ready-to-use formats. For instance, “checklists should be editable (not PDFs)”.

Intervention Functions: Enablement

#### Make reporting guidelines easy to understand

“Make guidance easier to understand” was written as a solution to help authors who misinterpret, or can’t understand, guidance. Stakeholders suggested developers could “make guidance as ‘plain language’ as possible” os “create plain language versions of existing guidance”, whilst being “mindful of language that may appear patronizing”.

Stakeholders suggested defining “key words or phrases in a glossary or tooltips”, using consistent terms across related resources, translating guidelines and examples, and ensuring these translations are easy to find by making them “searchable”, “linked properly” to each other, and “more evident on [the] EQUATOR site”.

Stakeholders recognised a need to collect and respond to feedback from “international researchers” representative of the user base across disciplines and institutions, and that this could be sought when developing guidance to “test” it, but also on an ongoing basis to “continually revisit the items in the guidelines that may be confusing or difficult to implement”. As an example, one guideline developer contributed that collecting feedback had lead them to remove “the word ‘context’ because users struggled to understand it”.

Intervention Functions: Education, enablement

#### Use persuasive language and design

When discussing how authors feel about reporting guidelines and checklists, stakeholders reflected on how the wording and presentation of resources can influence authors’ perceptions of it.

Stakeholders noted that a poorly formatted checklist, lacking “visual appeal/graphic design”, can “appear outdated” or “larger than it is”. Stakeholders suggested that developers could use design to “foster feelings of simplicity”, and “engage graphic designers” if necessary.

Reassurance seemed especially important to stakeholders when considering how to motivate authors to transparently report items that aren’t perfect. Stakeholders suggested that developers could use language and tone of voice to “foster a feeling of confidence, not judgement”, perhaps reminding “researchers that all research has limitations”. Stakeholders also wrote that reassurance could also be given by including notes aimed at reviewers, and cited JARS as an example “which explains to reviewers why an author may make certain choices”, thereby educating reviewers whilst reassuring authors that they won’t be penalised for transparency. Stakeholders suggested rewording text and tone of voice to make reporting guidelines and checklists “appear less like ‘red tape’”, and to reassure authors that “reporting guidelines are just that: guidelines!”.

Intervention Functions: Persuasion

#### Create additional tools

Stakeholders noted that checklists may be easier to use if they are editable (see [Make resources ready-to-use](@sec-make-resources-ready-to-use)), and if authors could complete them with “the relevant text, rather than [the] page/section number” which can be frustrating to keep updated. Although one stakeholder, a publisher, noted that checklists completed with text are difficult to double check, and therefore it would be most useful to include the text *and* the page number.

To aid writing, stakeholders suggested “templates for drafting” manuscripts, interactive forms and “writing tools (e.g., COBWEB)”, “tools for creating figures and tables like PRISMA’s flowchart generator”, and tools for generating text, like TIDIER’s tool for generating intervention description ([#REF](http://www.tidierguide.org/#/author-tool)). However, one stakeholder warned that these kinds of structured writing “provide opportunities for inclusion [of reporting items] but there is always the risk that they exclude more [important items] that are outside the boundaries of the template”.

To encourage authors to consider reporting guidance earlier in their research, stakeholders considered to-do lists with items “in the order they are done”, or “embed[ing] items into data collection tools” like software for systematic reviewers.

To help reviewers check reporting, stakeholders suggested creating “tools for co-researchers to check each others’ work”, creating extra guidance for peer reviewers, providing text that can be pasted in reviewer feedback forms to “request additional information” for poorly reported items, or even building a “reviewer tool that generates a report”.

Stakeholders noted that tools should presented in ways that “better differentiate” how and when they should be used “e.g., resources for writing vs. checking vs. reviewing”.

Intervention Functions: Enablement

#### Make resources easy to discover and find

Stakeholders had ideas for how to help authors discover and find resources. Stakeholders wrote about hyperlinks being an important way for authors to discover related guidelines and tools. These could be “horizontal links between related guidelines” and between guideline “documents and tools” like checklists. All resources should “link to one another”, ideally “item by item” so that checklist items could link directly to the relevant section of full guidance. Stakeholders noted that hyperlinks can become out of date, and so stakeholders should “fix broken links”.

Stakeholders also wrote that resources could be hosted on “a convenient place, such as a unified website”. EQUATOR’s website is one such place, and participants suggested making it “easier to navigate” and its “search tool more prominent and easier to use”. Although some authors will use such search tools, stakeholders recognised that those who browse may benefit from “curated” collections of reporting guidelines or a “manageable list of related, commonly used guidelines”. As an example, an author writing a review article may be helped by a page listing “PRISMA, MOOSE, ENTREQ, PRISMA-SRc etc.” and that “this page could be kept up to date as guidelines are revised”. Another stakeholder (a publisher) warned, however, that journals may not want to link to these pages if the collection has “a much broader scope” and includes guidelines that the journal doesn’t endorse.

When discussing how to help authors who are less familiar with study designs, one stakeholder suggested creating “tools to help researchers identify study designs (e.g., a questionnaire)”, and another, already familiar with such a tool previously developed by EQUATOR suggested it should “use plain language”.

Intervention Functions: Environmental restructuring

#### Make information digestible

Stakeholders acknowledged that authors’ needs may differ between tasks (e.g. drafting an article vs demonstrating compliance), and that authors may use guidance in different ways; some will read the whole thing from start to finish, whilst others will dip in and out as-and-when they need. Consequently, stakeholders wrote that “having different options available that meet the needs of different users is vital” and that authors should be able to consult guidance in ways that “work for them”.

One suggested way of doing this may be to “structure guidance using navigation menus and subheadings” so that “it is easy to find the information you need”, making reporting guidelines faster to use and less overwhelming. Another noted that checklists can also be designed, citing TIDIER as “a nice example” that has “integrated the intervention and placebo into one table” with the active intervention and placebo in adjacent columns.

Dynamically hiding and showing content was floated here again (see [Keep guidance short](@sec-keep-guidance-short)), with one stakeholder suggesting that users could “filter out” irrelevant content, to only see instructions for their task (e.g. planning, writing, reviewing) or specific to their study. This could be done with a “decision tree” or “branching questions” to determine specific features of the study (“e.g., a systematic review *with* network meta-analysis *of* individual participant data”). Answers to these questions could then be used to to “modify” items to create “personalised guidelines”, or to generate a “customised reporting checklist” that includes all “main and relevant extension items”.

Dynamic content was also seen as a favourable way to embed guideline extensions, with the aim of making them easier to discover without overwhelming the author. For example, noting that “some guidelines ‘fit together’…e.g., PRISMA and PRISMA-Abstracts”, stakeholders wrote that PRISMA-Abstracts could be “embedded” as collapsed content that interested authors could expand.

Intervention Functions: Enablement

### When disseminating resources

#### Describe reporting guidelines where they are encountered

When first introducing reporting guidelines stakeholders suggested telling authors what reporting guidelines are, “when and how best to use” them, and what benefits to expect. This information could go wherever authors are advised to use reporting guidelines (like like journal instruction pages, registries), EQUATOR’s website, social media campaigns, at the start of the guidelines, and could go at the beginning of checklists too “in case people don’t read the whole [guideline] paper”. This introductory text could be “short, sweet, and to the point”. Benefits could be even more prominent by putting them “in a box, or [by using] font or positioning”.

Intervention Functions: Education

#### Make resources accessible

Stakeholders wrote “Ensure guidance is open access” so that all authors can it. Stakeholders also noted that if guidance is published under a permissive license then others can reuse the content to extend the guidance or build new tools.

Intervention Functions: Enablement

#### Show and encourage citations

Displaying citation counts on the EQUATOR Network website (or other websites where authors search for reporting guidelines) was described as a way to “provide social proof” and convince authors that guidelines are credible.

To generate these citations, stakeholders suggested explicitly asking “researchers to cite the guideline they used”. Stakeholders wrote that if an author cites a guideline they have used, then readers may discover the guideline from that authors’ article.

Intervention Functions: Persuasion, Education

#### Provide testimonials

Stakeholders suggested providing “testimonials” as a way to tackle a few different barriers using education and persuasion. Stakeholders suggested providing “quotes from authors/researchers who felt that reporting guidelines helped their work and who have had positive experiences” such as making “writing easier” or helping “with co-authorship communications”. Stakeholders proposed that testimonials could bring benefits to life, thereby making them more believable.

To make authors care more about research waste caused by poor reporting, stakeholders suggested testimonials from “research consumers for whom an item is important”, or quotes that illustrate “how detrimental poor reporting is for end users”.

Stakeholders wrote that testimonials from decision makers (like editors, reviewers, and grant-givers) could communicate their “preference for transparent reporting” and convince authors that reporting will be checked. If these testimonials conveyed that transparency is valued above perfectionism, participants suggested this could reassure authors. Stakeholders also suggested collecting positive testimonials from such “nervous researchers”.

Finally, stakeholders suggested collecting testimonials from researchers “with a range of experience”, including “experienced researchers who have benefited by changing their practices”. Diverse case studies would help engage a diverse user base, and challenge assumptions that reporting guidelines are too patronizing for experienced researchers or too complicated for inexperienced ones.

Intervention Functions: Modelling, Persuasion

### On an ongoing basis

#### Budget for reporting

Stakeholders noted that “researchers need budget to allocate time to writing” and that “funders could encourage proper financial/time budgeting for writing”, as could research supervisors.

Intervention Functions: Enablement

#### Create rewards

Stakeholders suggested “offer[ing] some sort of tangible reward/benefit” to motivate guideline use, creating new rewards when necessary. Ideas included “publishers offering a fast-track review/discount”, “badges on published articles” or platforms “like publons”, or “a certificate after completing training”.

Intervention Functions: Incentivization

#### Create discussion spaces

Multiple barriers lead stakeholders to suggest “create[ing] spaces for researchers to connect with other researchers to celebrate and share experiences”. These spaces could include “forums, meetings, tea clubs, [and] clinics both in real life and virtual”. Such spaces could help authors solicit help and could act as social proof, as seeing “others using and talking about the guidance” may be motivational.

Online discussion spaces were also considered a useful way to gather feedback from users directly (by asking for it) and indirectly (by monitoring discussions). Stakeholders wrote that feedback channels “could be useful to guideline developers”, and may also “cultivate a feeling of community ownership” by “communicating an invitational attitude”, thereby making guidelines appear less bureaucratic.

Intervention Functions: Persuasion, Enablement

#### Create ways to catch authors earlier

Stakeholders thought of ways to “try and shift the time at which researchers discover or use guidelines”, hypothesising that “it’s more likely that guidelines will save them time” if used earlier or “at the right time” and “not just upon submission”.

Most simply, stakeholders suggested “telling” or “encouraging” authors to use reporting guidelines for planning or drafting research (and not just for demonstrating compliance upon submission). Building upon this, stakeholders suggested organising the EQUATOR Network website to make it obvious which stages of work resources can be used for.

Stakeholders suggested “including [reporting guidelines] in the university teaching and training curriculum and text books” so that students learn about them before running or writing up their first study.

Stakeholders suggested creating reporting guidance for early research outputs like funding applications and protocols (as previously described in [Create reporting guidance for early stages of research](@sec-create-reporting-guidance-for-early-stages-of-research)), and advertising resources through funders, ethics committees, and writing training programmes.

When considering whether authors may need reminders to use a reporting guideline for their next study, stakeholders suggested publishers and EQUATOR could use “email reminders” or strategies used by e-commerce sites “like when you buy something from an online business…then they work hard to gain your custom again”.

Intervention Functions: Education, enablement, environmental-restructuring

#### Endorse and enforce reporting guidelines

Stakeholders suggested “encouraging more journals to endorse guidelines” and drew a distinction between endorsing reporting guidelines and promoting them on a website, social media, or email (see [Promote reporting guidelines](@sec-)). Endorsement was described as a long term commitment to recommend or encourage guideline use, requiring buy-in from organisational leaders, and possibly changes to policies, instructions, infrastructure, and workflows. Promotion, conversely, was described as ephemeral and does not require organisational changes.

Stakeholders drew another distinction between endorsement and enforcement, whereby enforcement meant reporting guidelines are “a requirement” or “condition”. Enforcement was further divided into enforcing checklist completion or, noting that checklists may not always accurately reflect manuscript content, checking text for adherence to guidance.

When considering *who* could enforce guidelines, stakeholders noted that reporting guidelines could be “a requirement for publication”, “for registration (where applicable) (e.g. clinical trial registries, PROSPERO)”, or when submitting conference abstracts. “Ethics committees and funding organisations” could require that adhere to guidelines, “for example, completion of SPIRIT for clinical trial submissions”, or to declare that they will use a guideline when writing their results. To facilitate enforcement, stakeholders suggested that the software academics use to provide funders with updates could ask for completed checklists. One stakeholder suggested that reporting guideline adherence should be a condition of university employment and that a “digital dashboard [may] help audit[ing] and monitoring”. Noting that enforcement requires resources, stakeholders suggested to “focus on main RGs and being compliant with them”.

Intervention Functions: Education, restriction, persuasion

#### Evidence the benefits

Stakeholders suggested that benefits may be more believable if there were evidenced. This could be “evidence that [reporting guidelines] improve the completeness and transparency of the output”. For quantifiable benefits, the suggestion was to collect and report data on “acceptance rates, publishing speed, writing speed”. One stakeholder posited that “more transparent reporting / structured reporting may lead to faster editorial processes as it becomes easy for peer reviewers and editors to review papers about their study” and another suggested to “provide statistics about processing times of articles that follow / don’t follow reporting standards” would help evidence this claim and “emphasise to researchers that clear reporting will minimise the number of times others contact them for clarification”. However, some stakeholders were sceptical whether data on acceptance rates would show any benefit at all: “Likelihood of being accepted might not be heavily influenced – bad research well reported would still be rejected”.

For experiential benefits that cannot be quantified, stakeholders suggested providing case studies or testimonials (see [Provide testimonials](@sec-provide-testimonials)).

Intervention Functions: Persuasion, education

#### Make reporting guidelines appear as a priority

When a journal endorses or enforces reporting guidelines, a few stakeholders suggested making reporting guidelines more prominent within the journal’s workflow to make them appear more important. Notes included that “reporting guidelines could be more prominent on journal author guideline pages”, or that “if the journal uses any sort of structured peer review (e.g., specific questions related to methodology) to tell authors this explicitly [on author guideline pages and within review feedback] and link it to the reporting guideline content”. A third suggestion was that “when journals ‘stitch’ or ‘build’ together the manuscript pdf (including cover letter, manuscript main text, appendices, etc.), prioritise the reporting guideline or move it earlier in the pdf”.

However, a few stakeholders (publishers) warned that prioritising guidelines on author instruction pages “is complicated as these [pages] already have to do a lot”, although guidelines could be more prominent if the pages “were better organised and/or filterable”.

Intervention Functions: Persuasion

#### Promote reporting guidelines

Stakeholders noted may bodies that could help spread the word that reporting guidelines exist. For example, “professional societies” could “advertise” reporting guidelines, despite not having a role in the funding, regulation or dissemination of research.

Promotion could occur online. Most obviously, on stakeholder guidance web pages. “Email campaigns, social media, blogs” could be useful channels to “share and connect with others [and] drive traffic to guideline website[s]”, but “these require time and energy” from the reporting guideline community to set up and manage.

“Conferences and workshops at institutions” were cited as channels to promote reporting guideline offline, as were ” seminars, webinars, and presentations” especially in “hard to reach countries/fields”. These events were described as useful ways “to assist in the interpretation and use of the guidelines” and could be opportunities for “universities/funders/journals [to speak] together about the importance of reporting guidelines”.

To reach students, participants suggested that universities could include reporting guidelines in their curricula, learning materials, or through reporting champions (see [Install reporting champions](@sec-install-reporting-champions)).

Stakeholders wrote that “promotion can begin before a guideline has been published so that researchers know about guidelines being developed” and suggested “the provision of a time buffer/phasing period for updating new reporting guidelines which would allow researchers to have information about these new guidelines”.

Intervention Functions: Education

#### Install reporting champions

Stakeholders wrote that publishers, universities, funders, and ethics committees could have members to promote and facilitate the usage of reporting guidelines, centring on the terms “champions” and “EQUATOR ambassadors”. Within publishers, funders, or ethics board, a champion’s responsibility may be to “expand knowledge/awareness of guidelines”. Within institutions, champions could also “help researchers” by “providing feedback on writing” and that ECRs may feel most comfortable talking with a champion from “an accessible level (e.g., post-doc, library staff)”. This could follow a local network model (UKRN was cited as an example) with EQUATOR as the central organiser, and could utilize existing reproducibility networks.

Intervention Functions: Education, enablement

#### Provide additional teaching

Stakeholders proposed additional teaching as a way to promote reporting guidelines, make them easier to use, and a way to communicate the impacts of poor reporting. Education and training could be general (EQUATOR’s publication school was cited as an example) of could be “guideline-specific”, and could be delivered in person or online, as courses, videos, or text.

In addition to learning about a particular guideline, stakeholders suggested that students could learn about “writing as a process” and “workflows for documenting and communicating research”. This was considered useful as “researchers don’t necessarily understand that reporting is a stage in the research process”. Curricula could include “methods studies that indicate the research waste” to teach students why reporting matters, or students could learn for themselves by attempting “to replicate a study or do a systematic review to discover how poorly research is currently reported”.

To gain experience in using reporting guidelines, stakeholders suggested students could develop “research protocols (as Bachelor or Master Theses) using reporting guidelines” and that these could “be assessed based on the compliance with the appropriate reporting guideline” in addition to “other criteria more related with methodology”. To make this easier, stakeholders suggested structuring courses around reporting guideline items “for example: a course on [randomized controlled trials] covering every single SPIRIT or CONSORT item”.

Intervention Functions: Education, training

#### Make updating guidelines easier

Stakeholders acknowledged that “researchers have opinions on how the guidance could be improved including how to make it clearer, and whether items should be rearranged, separated, combined, added or removed” and that “this information could be useful to guideline developers”. Some stakeholders went further, expressing that guidance and websites should be updated “in response to user feedback or changes in the field”. Others suggested that “developers could consult different user groups when creating guidance” and “engage as many health professions as possible” so that “professional cultural issues can be usefully accommodated.”

However, stakeholders were not forthcoming on how to go about gathering this feedback. One wrote “provide ways for researchers to give feedback to guideline developers” without suggesting any ways to do this. Another simply asked “how can we enable users to give feedback on guidance?”. Many guideline developers noted that they required access to extra funding to evaluate, refine, and update their resources. One developer suggested that “minor updates could be made without publishing a new article” if the guidance were disseminated on a website.

Intervention Functions: Enablement

# Discussion

## Description of findings

### Summary of results

My objective was to identify ideas to address factors that may influence adherence to reporting guidelines by running workshops with the EQUATOR Network and focus groups with guideline developers, publishers, and other experts. Stakeholders identified 128 ideas employing all intervention functions. There were ideas to consider before, during, and after creating guidance, ideas to consider when writing the guidance down, ideas about tools to help guidance application, ideas about ongoing activities to support or promote guidance use, and ideas about refining guidance over time in response to feedback. Many of these ideas could be enacted by guideline developers, publishers, and EQUATOR, but participants also saw opportunities for ethics committees, funders, academics, registries, and syllabus writers; stakeholders who are typically less frequently considered.

I believed that including perspectives from a range of stakeholders would lead to more ideas. This seems to be the case: EQUATOR staff thought of TODO which was then expanded to 128 through the focus groups.

This is the first time that guideline developers from different groups have come together with publishers and academics to consider reporting guidance dissemination as a system. I had a fair response rate from guideline groups and of their responses were generally supportive, even if they were unable to take part. Multiple guideline developers volunteered their guideline to be a “guinneapig” and expressed support for my work. All stakeholders were open minded to the barriers I presented except for one developer who expressed scepticism that reporting guidelines were anything but perfect, and requested additional evidence of authors’ negative experiences.

### Implications

These results will also be of interest to the reporting guideline community. Publishers, funders, and institutions will find food for thought on how to create effective policies to support reporting guidelines. Many of the ideas could be enacted by the EQUATOR Network. Guideline developers may find inspiration here when writing or revising guidance. At the time of writing, the EQUATOR Network was in the process of updating its advice for guideline developers, which I hope will be informed by these results. The ideas generated may also be of interest to publishers, funders, and Universities.

Although only a few reporting guideline development groups took part in this study, most ideas identified were abstract enough to generalise to most reporting guidance, which tend to be developed and distributed in similar ways; (e.g., all development groups will have to consider what guidance to create, its scope, how to communicate it clearly and how to disseminate it). Some ideas may even generalise to other interventions to encourage good research practices (e.g., to communicate personal benefits, not to patronize researchers).

### Limitations

The study may have benefited from more diversity in participants’ backgrounds and expertise. We could have recruited participants from funders, ethics committees, or registries, behaviour change experts or experts familiar with user experience of websites or written documents. All participants were western and proficient in English. Although this is partly a limitation of who writes reporting guideline, we could have sought input from publishing houses that cater to non-western authors. Broadening the participant pool in this way would have led to more ideas.

My focus groups were smaller than I had planned. Some would consider these group sizes too small to be called focus groups, and may instead call them paired interviews, dyads, or triads ([#REF](https://www.aqr.org.uk/glossary/triad)). A hallmark of focus groups is that they use “group interaction to produce data” [7], and these interactions may include sharing experiences and challenging each other. However, I did not feel the small group sizes to be a limitation in this study for two reasons. Firstly, because participants were co-editing a file and building upon the thoughts of previous groups, participants could react and respond to to participants from previous groups. Secondly, participants had deep understandings of the topic (evidenced by sessions overrunning and participants dwelling on a single topic) which meant that even pairs of participants had plenty to discuss, share, and debate. If I had condensed participants into, say, 3 groups of 5-6 participants, each participants would have had less time to speak and I anticipate that many ideas would have gone un-spoken.

### Future work

I purposefully did not seek input from authors as this study required input from experts familiar with reporting guideline dissemination. Instead, I describe how I sought input from authors in chapter 11. I also purposefully did not ask stakeholders to prioritize or rank ideas. In chapter 8 I explained that prioritization is subjective and, therefore, should be done by stakeholder separately. I also described how EQUATOR began to prioritize intervention options. In the next chapter I describe how I decided which ideas to act on and how I turned them into intervention components.

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