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REVIEW ARTICLE

Review finds core outcome set uptake in new studies and systematic reviews needs improvement

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Abstract

Objectives: To review evidence about the uptake of core outcome sets (COS). A COS is an agreed standardized set of outcomes that should be measured and reported, as a minimum, in all clinical trials in a specific area of health or healthcare.

Study Design and Setting: This article provides an analysis of what is known about the uptake of COS in research. Similarities between COS and outcomes recommended by stakeholders in the evidence ecosystem is reviewed and actions taken by them to facilitate COS uptake described.

Results: COS uptake is low in most research areas. Common facilitators relate to trialist awareness and understanding. Common barriers were not including in the development process all specialties that might use the COS and the lack of recommendations for how to measure the outcomes. Increasingly, COS developers are considering strategies for promoting uptake earlier in the process, including actions beyond traditional dissemination approaches. An overlap between COS and outcomes in regulatory documents and health technology assessments is good. An increasing number and variety of organizations are recommending COS be considered.

Conclusion: We suggest actions for various stakeholders for improving COS uptake. Research is needed to assess the impact of these actions to identify effective evidence-based strategies.

Keywords: Core outcome set; COS; Uptake; Research waste; Clinical trials; Outcome reporting bias

1. Introduction

It is increasingly recognized that insufficient attention has been given to the choice of outcomes measured in clinical research, often neglecting those of greatest importance to decision makers, including patients and the public [1]. In addition, evidence exists in various fields that outcomes are selectively reported by researchers based on

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What is new?

Key findings

- Greater emphasis on encouraging and facilitating COS uptake is essential to minimize research waste.

What this adds to what is known?

- Facilitators and barriers found to be common across research areas include the need to increase trialist awareness and understanding of COS and the need to include in the development process those stakeholders for whom the COS is relevant to their work.
- COS developers are starting to include actions beyond traditional dissemination methods in their strategy to promote uptake.
- The number and variety of organizations now recommending COS be considered in their work is increasing.

What is the implication, what should change now?

- COS developers should collaborate with key organizations to identify specific uptake strategies for their health area and ensure consensus recommendations regarding how to measure the core outcomes are provided.
- Stakeholders from many organizations and communities can do more to promote the uptake of COS for research.
- Research to find evidence-based strategies for an increasing uptake among trialists is needed and should include initiatives and interventions that can push and pull trialists towards considering COS in their studies.

the results [2], a problem known as outcome-reporting bias [3]. One solution to these problems is the use of core outcome sets (COS), with a COS for clinical trials being defined as ''an agreed standardized set of outcomes that should be measured and reported, as a minimum, in all clinical trials in specific areas of health or healthcare'' [4]. The use of COS should improve the reporting of patient-relevant outcomes and facilitate pooling and comparison of results. The Core Outcome Measures in Effectiveness Trials (COMET) Initiative brings together published and ongoing COS in a free, publicly available database (www.comet-initiative.org), which as of May 2022 contains records for 440 published and 421 ongoing COS for research across dozens of health areas.

However, end users of trial results will benefit from the existence of COS only if trialists measure and report the core outcomes in their trials. One investigation revealed that a COS for rheumatoid arthritis has been measured and reported in around 80% of recent trials of disease-modifying antirheumatic drugs [5]. The COS developers had worked closely with trialists, regulators, and other stakeholders throughout the process, requiring many years of active outreach and engagement, demonstrating what is possible with awareness, motivation, recognition by regulators, and deliberate dissemination.

The COVID-19 pandemic brought into sharp focus the value of clinical trials for efficiently identifying effective and ineffective healthcare interventions but has also highlighted ongoing problems with the choice of outcomes measured. For example, Cochrane systematic reviewers have noted the problems caused by heterogeneity of outcomes measured in trials of personal protective equipment to reduce infection [6]. A COS for COVID-19 studies was developed, and although the measurement of two core domains (mortality and respiratory symptoms) increased from 50% early on [7] to 75% more recently [8], improvements are needed.

The COVID-19 pandemic also gave rise to collective guidance around evidence assessment among regulatory bodies in some countries, including the requirement to consider COS in new trials in the United Kingdom [9]. Such a systems approach to the use of COS, as illustrated in Fig. 1, may be implicit to a large degree in some health conditions (e.g., type 2 diabetes [10]), but previous work has identified differences in outcomes recommended as a component of scientific advice from the European Medicines Agency (EMA) and Health Technology Assessment (HTA) bodies [11]. There have been recent calls for wider consideration of how evidence is used throughout the healthcare ecosystem [12], including the consideration of COS [13].

This article provides an analysis of the current situation, reviewing what is known about COS uptake in research; the overlap (or not) between COS and those outcomes recommended by various stakeholders in the evidence ecosystem; and what those stakeholders have done, plan to do, or could do to encourage, facilitate, and normalize the consideration of COS.

2. Methods

The COMET database is populated using annually updated systematic reviews of COS; other COS-related articles identified during the reviews are also included. The database was searched (repeated on May 13, 2022) for publications classified as 'COS methods research', 'COS uptake study', or 'systematic review of COS uptake studies'. Eligible studies were those describing COS uptake assessments or factors affecting uptake in research. Articles related to COS endorsement and other references were those known

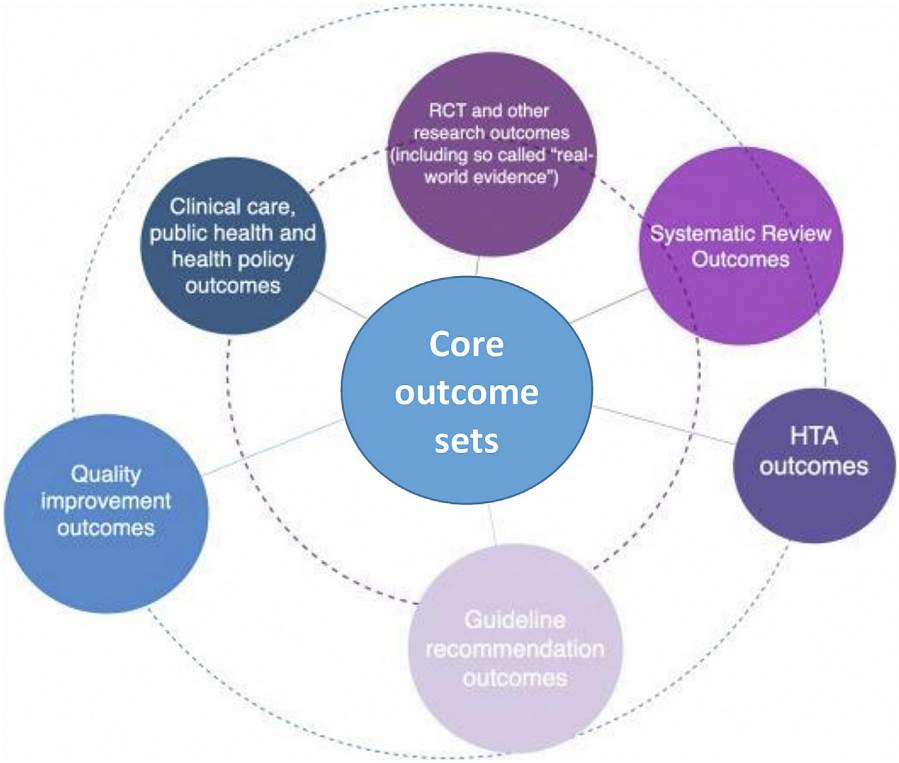

Fig. 1. Systems approach to the use of COS. Adapted from Schünemann et al. *Journal of Clinical Epidemiology* 125 (2020) 216-221.

to the authors. Evidence was classified as per the stakeholder group it related to (Fig. 1) and COS developers.

3. Results

3.1. Evidence for core outcome sets uptake in research

3.1.1. Are clinical trialists aware of and using core outcome sets?

The SPIRIT 2013 Statement, a reporting guideline for clinical trial protocols, encourages trialists "*to ascertain whether there is a core outcome set relevant to their trial and, if so, to include those outcomes in their trial*" [14,15]. Various studies have assessed the uptake of a particular COS in published and ongoing clinical trials. A recent systematic review [16] of these studies found that 17 (5%) of 337 published COS had been assessed, with full COS uptake ranging from 0% to 82% of trials, remaining low for most even 5 years after COS publication.

COS awareness and uptake was found to be low among trialists whose studies were published in major medical journals [17], with 2% noting a COS in their protocol and 29% measuring core outcomes where they existed but without explicitly referring to a COS (Table 1). A forthcoming statement to improve outcome reporting in trials is awaited and may refer to specifying whether a COS was considered in the rationale for an outcome choice [23].

It has been noted that industry funding was associated with increased use of COS in trials [24]. Pharmaceutical companies are beginning to consider COS in their drug development policies [25].

These studies of uptake included trialists largely in higher-income settings and need to be extended; work is ongoing to understand the levels of awareness, views, and experiences of stakeholders from low-income and middle-income countries with COS use (https://globalresearchmethods.tghn.org/mrc-nihr-trials-methodology-research-partnership/cos/).

3.1.2. Why do trialists use or not use core outcome sets?

Interviews [26] with and surveys [17,27] of trialists have revealed the main facilitators of COS uptake related to trialist awareness and understanding of COS. Trialists also noted the influence of the wider research system, for example, recommendations to use COS from funders and journals [26]. Barriers to uptake included a lack of awareness, perception of increased patient burden, the COS development process not including all specialties who might use the COS, and trialists' own outcome preferences.

The lack of recommendations for how to measure the outcomes in the COS has also been identified as a barrier to uptake [28−31]. Of 337 COS published by the end of 2018, only just more than a third had included recommendations for both what and how to measure core outcomes [32].

Table 1. Studies linked to the promotion or assessment of COS uptake among various stakeholders

Agent	Type of study or policy document	Source and years	Result of interest	Frequency
Those who undertake the research that should have considered the COS				
Trialists	Trial publication	Major medical journals, 2019–2020 [17]	COS listed in protocol	2/95 (2%)
			Potentially relevant COS[a]	31/93 (33%)
			Measured COS without listing	9/31 (29%)
Trial funders	Funding applications	NIHR, 2012–2015 [18]	Searched for COS at time of application	36/95 (38%)
			Found a potentially relevant COS	13/36 (36%)
			Included COS	7/13 (54%)
		KCE and ZonMW, 2018–2019	Searched for COS at time of application	13%
Those who review and use the research that should have considered the COS				
Regulatory bodies	Guidance documents for IMIDs[b]	EMA and FDA, inception to 2019 [19]	COS referenced	EMA: 1/8 FDA: 1/4
Systematic reviewers	Systematic reviews	Cochrane, 2019 [20]	COS listed in review	7/100 (7%)
			Potentially relevant COS	34/100 (34%)
			Included COS	7/34 (21%)
		AHRQ, 2018–2020 [21]	COS listed in review	0/67
			Potentially relevant COS	36/67 (54%)
			Coverage of core outcomes	Median 62%,
				Range 0%–100%
HTA organisations	HTA documents	INAHTA, 2021 [22]	Coverage of core outcomes	Median 40%,
				Range 0%–100%
		NICE, 2019–2021 [22]	Coverage of core outcomes	Median 75%,
				Range 44%–100%

[a] Published prior to either trial registration, protocol publication, or commencement of participant recruitment.
[b] IMIDs, immune-mediated inflammatory diseases.

Finally, because decisions about the use of COS are a form of behaviour, ongoing work aims to classify behaviour change techniques related to trialists' behaviours [33]. The eventual goal of this work is to use those techniques to further motivate trialists to use COS.

3.2. Actions to increase core outcome sets uptake in research

3.2.1. Core outcome sets developers

To increase COS uptake, it has been recommended that developers, together with key organizations that promote the development, methodological advances, and update of COS, engage with other stakeholders in the system, such as trialists, patient organizations, relevant Cochrane review groups, and other groups responsible for systematic reviews and systematic reviewers themselves, clinical guideline developers, research funders, journal editors, clinical professional bodies, regulators, research ethics committees, and trial registries [4]. However, as studies on the uptake of COS are rare, uncertainties exist about the most appropriate methods for organizations and COS developers to facilitate and promote COS uptake. A survey of COS developers' approaches to implementation in November 2019 found a somewhat passive approach, with the vast majority relying on publication as the sole means of dissemination (Table 2). However, more active strategies have been implemented by some COS groups [34]. The survey showed that a higher proportion of those currently developing COS were considering strategies for promoting uptake compared with those already publishing their COS (84% vs. 62%) and that this occurred earlier in the process, before starting the COS development process (55% vs. 35%).

It has been recommended that COS developers should develop an implementation plan at the start of the development process [4,35], include a planned assessment of uptake over time, and understand barriers for those wanting to use the COS. Workshops focussing specifically on the uptake of particular COS may prove helpful [36,37]. A review of implementation plans described in 55 COS reports

Table 2. Survey of COS developers in 2019

Approach to implementation	Ongoing[a] N	Published[b] N
Response rate	127/237 (54%)	77/302 (26%)
Had tried/were planning to promote the uptake of COS	106/127 (84%)	48/77 (62%)
Before starting the COS development process	58 (55%)	17 (35%)
During the COS development process	38 (36%)	18 (38%)
Once the COS had been developed	10 (8%)	13 (27%)
Implementation plans/strategies	80/106 (76%) provided more information[c]	42/48 (88%) provided more information[c]
Publication/dissemination	55	33[d]
Involvement of particular stakeholders in the development of the COS	13	3
Inclusion in trial registries, Cochrane reviews, guidelines, journals, funding guidance	4	7
Ideally develop as part of wider initiative[e]	0	0
Meeting with/focus on specific stakeholders, for example, professional organizations	7	5
Providing CRFs/a manual	1	1
Providing training	1	0

[a] Ongoing developers were asked to complete the survey once for all COS, the response rate for ongoing COS ($n = 276$) is therefore calculated using number of COS developers ($n = 237$).
[b] Published developers were asked to complete the survey for each COS, the response rate is therefore calculated using number of COS.
[c] Developers could suggest more than one plan/strategy.
[d] Dissemination beyond the publication.
[e] This category reflects where COS development was one element of a wider collaboration about research design.

and 32 COS protocols, published in 2020 and sourced from the COMET database, revealed that most COS teams with recently published results or protocols are largely relying on other standard approaches to publication and dissemination at conferences or through social media (Table 3).

3.2.2. Those who interact with researchers

3.2.2.1. Can trial funders have influence? Increasing numbers of public research funding organizations are including formal guidance to applicants to consider a COS and include it unless there is a good reason to do otherwise. Evaluations of the impact of such guidance are available for some funders [18]. Of the two-fifths of trialists who searched for a COS at the time of application, just more than a third found a potentially relevant COS, and of these just more than half included the COS in their trial (Table 1). Other evaluations are ongoing (NIHR applications 2016–2019; DFG 2017–2020; HRB 2014–2020 [38]) and some are needed (e.g., PCORI, https://www.comet-initiative.org/COSEndorsement/TrialFunders).

3.2.2.2. Can Research Ethics Committees have influence? In the United Kingdom, the Health Research Authority, responsible for an oversight of Research Ethics Committees, recommends that trialists should consider COS [39]. To our knowledge, no assessment has been undertaken as to whether this issue is raised during ethics review or whether committee members may benefit from training regarding COS.

3.2.2.3. Can trial registries have influence? The quality of information about outcomes recorded in 17 trials registries within the World Health Organization International Clinical Trials Registry Platform has been improving and previous work showed a significant increase from 38% to 58% in the specification of primary outcome measurement between 2008 and 2012 [40]. Registries vary in data recording format for outcomes, some having only free-text fields, some requiring structured outcome categorization, and some asking for measurement methods to be specified. Interactions between registry personnel and trialists registering their studies provide opportunities to raise awareness of COS through guidance [41].

3.2.2.4. Can professional bodies have influence? Increasingly, COS are being developed with the endorsement of

Table 3. Review of COS results and protocols published in 2020

	COS publication	COS protocol
Approach to implementation	***N***	***N***
Total published in 2020	55	32
Implementation plans/strategies	17/55 (31%) provided information	28/32 (88%) provided information
Publication/dissemination	1[a]	26
Involvement of particular stakeholders in the development of the COS	3	4
Inclusion in trial registries, Cochrane reviews, guidelines, journals, funding guidance	8	6
Ideally develop as part of wider initiative[b]	0	3
Meeting with/focus on specific stakeholders, for example, professional organizations	5	0
Providing CRFs/a manual	0	0
Providing training	0	0

[a] Dissemination beyond the publication.
[b] This category reflects where COS development was one element of a wider collaboration about research design.

relevant professional bodies, for example, a recent COS for chronic obstructive pulmonary disease was funded and endorsed by the European Respiratory Society [42]. To our knowledge, the effect of such endorsements on a subsequent uptake has not yet been assessed.

3.2.3. Those who review and use the research that should have considered core outcome sets

3.2.3.1. Regulatory bodies. Comparisons between COS and outcomes recommended by Food and Drug Administration (FDA) and EMA have been undertaken for immune-mediated inflammatory diseases [19], with limited references made by these regulators to existing COS (Table 1). The EMA has previously recommended COS in one other specific regulatory guideline [43]. A broader assessment across multiple health areas is ongoing [44].

The FDA is encouraging greater attention to patient-important outcomes through their Patient-Focused Drug Development program [45] and clinical outcome assessment compendium [46]. They offer guidance on primary outcomes but do not recommend or require COS. However, a guidance document out for consultation discusses a set of core patient-reported outcomes in cancer trials [47] and references previous work [48].

3.2.3.2. Journals. Many medical specialty journals have published articles about COS. Core Outcomes in Women's and Newborn Health is one notable initiative, http://www.crown-initiative.org/, bringing together more than 70 obstetrics and gynaecology journal editors to "*harmonize outcome reporting in women's health research*" [49].

3.2.3.3. Systematic reviewers. Despite the inclusion of trials in systematic reviews, differences between outcomes chosen for trials and reviews of the same topic have been noted [50,51]. The recommendation to consider COS has been made in the Methodological Expectations of Cochrane Intervention Reviews standards [52], with further emphasis in the Cochrane Handbook [53] and guidance from specific Cochrane review groups [54,55]. Use of COS in reviews has been assessed in both Cochrane reviews [20] and Agency for Healthcare Review and Quality–funded reviews [21] (Table 1). Of the third of Cochrane reviews where a potentially relevant COS existed, a fifth of reviews included the COS; a COS existed for a similar proportion of Agency for Healthcare Review and Quality–funded reviews.

3.2.3.4. Health technology assessments and value assessment organisations. In the United Kingdom, the National Institute for Health and Care Excellence (NICE), the body responsible for providing '*national guidance and advice to improve health and social care*', recommends that COS "*should be used if suitable based on quality and validity*' for health technology evaluations" [56].

Comparisons between outcomes used in HTAs and those in COS for research have been undertaken for a range of health conditions and international HTA organizations [22], sometimes with inclusion of all core outcomes but more typically with only partial coverage (Table 1). Outcome measures used in oncology have also been compared for HTAs and COS for routine care with some overlaps and some discrepancies [57].

3.2.3.5. Clinical guideline developers. Organizations that develop clinical guidelines are recognizing the relevance of COS when considering outcomes to choose for Population, Intervention, Comparator, Outcome or eligibility statements during the scoping stage of guideline development (e.g., https://www.comet-initiative.org/COSEndorsement/ClinicalGuideline, https://www.youtube.com/watch?v=PGMhUkdoZag, https://www.nice.org.uk/guidance/cg124/update/cg124-update-1/documents/consultation-comments-and-responses). In particular, NICE has identified the need for COS development among their research

recommendations (Myalgic encephalomyelitis or encephalopathy/chronic fatigue syndrome: diagnosis and management | NICE, Lyme disease | NICE). A recent review of the usefulness of Cochrane reviews in Danish guideline development led the authors to emphasize "*the demand for using core outcome sets in clinical trials, Cochrane reviews, and guidelines*" [58].

Members of the Grading of Recommendations Assessment, Development, and Evaluation working group have illustrated how clinical guideline panels "*lowered the certainty in the evidence because of serious concerns about the relation between the reported outcome and the one that would matter to patients*". High-quality COS are those developed with patient input [59], providing the reference point against which outcomes reported in studies used to develop a clinical guideline can be rated in the outcome subdomain in Grading of Recommendations Assessment, Development, and Evaluation's indirectness tables [60] and are referenced in formal training courses for guideline developers [61].

3.2.4. Patients and patient organizations

A minimum standard for COS development is the inclusion in the process of those with relevant lived experience [59]. Patient organizations can help optimize patient participation in COS development but are also key stakeholders with potential to influence those seeking, generating, and reviewing evidence about healthcare. Some patient organizations are funding COS development [62,63] and also recommending the consideration of COS [64,65]. Their policies may include recommendations for research requirements, clinical guideline development, patient information, and lobbying campaigns. Patients and their representatives are increasingly involved throughout the healthcare ecosystem with representation in many of the activities described above including as members of research funding panels [66], clinical guideline groups [67], and HTA committees [68], with potential to encourage COS uptake.

Increasingly, clinical trial teams include patient research partners (PRPs) and awareness about COS is being raised among PRP communities [69]. To our knowledge, the impact of initiatives targeted at PRPs, whether PRPs recommend that COS are considered and whether the trial team follows these recommendations, have not yet been assessed.

4. Discussion

COS uptake in new studies and systematic reviews needs improvement. This is essential to maximize research efficiency. COS exist for between a third and half of health areas in the research reviewed here. However, uptake is poor. Work is needed to improve COS uptake, to realize the benefits for patients and other decision makers. Raising awareness is a priority if COS are to truly improve patient health. Unless this is done, developing COS could add to, rather than reduce, the mountain of research waste [70].

The question of how to achieve "normalization", whereby researchers would search for a COS and decide whether to adopt it as it is, adapt it as needed (e.g., to use only some of the core outcomes), or choose not to adopt it at all while providing reasons for their decision, is an open one. A framework has been developed for assessing the relevance of a COS to the research question being addressed [21], but more examples of how use of a COS has made a difference will be a helpful resource. It will be important to collect information on the benefits of using COS as examples materialize, for example, the inclusion of data from more studies in systematic reviews and meta-analyses enabling conclusions about healthcare interventions to be reached earlier and the provision of evidence about the effect of such interventions on outcomes that matter most to decision makers including patients. To the extent that patients, clinicians, regulators, payers, and others rely on scientific evidence to inform clinical and policy decisions, consistent reporting of health outcomes that matter most to patients seems essential to support decisions that optimize individual and public health.

Areas of health and healthcare will vary as per context, in terms of current research practice. Some have well-established COS groups [36], while others such as obstetrics and gynaecology have been gathering pace with the support of journal editors. The pace of change is likely to vary but sharing best practices will be helpful. Planning implementation from the beginning is needed, taking these contextual factors into account. COS developers should be encouraged to engage with the various stakeholders in their particular area to discuss endorsement of the COS and participation in its development. These stakeholders may include trial groups or specific companies, patient organizations, professional associations, specific funders, Cochrane review groups or other prominent systematic reviewers, others working on summaries of reviews, area leads at FDA or EMA, journal editors, and others.

Box 1 includes some suggested actions that various stakeholders could take. There is a need for research into the impact of these and any other actions undertaken, to identify effective and efficient strategies. Ongoing work to classify trialists' behaviours [33] may identify actions to enable COS uptake. The successful history of how researchers have been encouraged to find or undertake a systematic review before proposing a new study ('evidence-based research' [71]) is noteworthy in this regard. An important forum for such discussions is the Ensuring Value in Research forum, https://evir.org/, and COS have been discussed and promoted through this initiative.

The focus of this article has been on the uptake of COS by researchers, to realize the aim of having this agreed standardized set of outcomes measured and reported, as a minimum, in all clinical trials in a specific area of health or healthcare. This is also relevant to the growing interest in harmonization of outcomes measured in routine healthcare, which derives from two areas of increased activity. First, a

Box 1 Actions for consideration and subsequent evaluation in relation to improving COS uptake

COS developers

(i) Develop an implementation plan at the start of the COS development process. Include in the plan an assessment of COS uptake a few years after dissemination, with a request for feedback from trialists to assess implementation barriers and facilitators.
(ii) After completing the 'what' stage, move on to the 'how' stage so that researchers are pointed to the tools that they could use to measure the core outcomes, which may require more support from the funders of COS development.
(iii) Be more active around dissemination, for example, comment on relevant regulatory guidance consultations; enter into correspondence as new research appears in a journal, highlighting the need for use of the COS; and provide feedback or peer review on protocols, other plans for research, and reports of research.

Trialists

(i) Search the COMET database for COS. If a relevant, high-quality COS is identified but will not be used, explain why not so that the COS developers may address this feedback.
(ii) When implementing a COS, provide feedback to the COS developers on any implementation barriers and facilitators.
(iii) Register for the COMET initiative alerts system, to receive information about newly initiated or published COS in your area of interest.

Patient organizations

(i) Register for the COMET initiative alerts system, to receive information about newly initiated or published COS in your area of interest.
(ii) Make public research partners aware that relevant COS exist and encourage them to champion the use of high-quality COS.

Professional bodies

(i) Provide information about COS and promote uptake at educational activities during annual meetings.
(ii) Professional bodies linked to clinical trials (e.g., Society for Clinical Trials) could have a particular emphasis in this activity and work closely with COS organizations to promote uptake.

Research funders

(i) Identify and implement effective strategies for encouraging the 'use of design, conduct, or methodological standards and guidelines' (https://evir.org/contact-us/), which would include COS.
(ii) Test active approaches (e.g., adding a specific question to the application form, adding the recommendation to consider COS in a funder's feedback letter), which may be more effective than passive ones (e.g., a recommendation in a funder's guidance document).
(iii) Evaluate strategies and share findings with other funders.

Trial registries

(i) Provide information about COS in guidance given to trialists registering their studies.
(ii) Improve the data recording format for outcomes to enable easier assessment of COS uptake. Consider adding fields for trialists to record any COS used.

Regulators

(i) During the drafting of a new or updated guidance document, review the COMET database for evidence about relevant high-quality COS, with an accompanying recommendation appropriate to the scope of the guidance.
(ii) Engage with the COS development process, to help identify barriers and facilitators early on.

Journal editors

(i) Encourage authors of protocols of trials or systematic reviews to consider COS.

(ii) When editorials and commentaries accompany the results of trials or systematic reviews, refer to the benefits of using a relevant COS and the potential for research waste of not doing so.

Systematic reviewers

(i) Follow the recommendation in the Methodological Expectations of Cochrane Intervention Reviews standards to consider a COS when choosing outcomes for the review. If a relevant, high-quality COS is identified but will not be used, explain why not so that the COS developers may address this feedback.
(ii) Assess uptake of the COS, if one exists, in the studies in the review. Identify any challenges posed by outcome heterogeneity arising in the review and make recommendations about future use of the COS.
(iii) If no COS exists, and outcome heterogeneity is evident, include the need to develop a COS in the research recommendations arising from the review.

Systematic review protocol registries (e.g., PROSPERO)

(i) Provide information about COS in guidance provided to systematic reviewers registering their systematic review protocol.
(ii) Improve the data recording format for outcomes to enable an easier assessment of COS uptake. Consider adding fields for systematic reviewers to record any COS used.

Clinical guideline development groups

(i) Consider the use of a relevant high-quality COS, if one exists, for assessing the evidence in the development of clinical guidelines.

HTA and value assessment organizations

(i) Consider the use of a relevant high-quality COS, if one exists, for health technology evaluations.
(ii) Evaluate the influence of such a policy of endorsing COS as a factor in determining access to and pricing of medical products.

recognition that greater standardization is needed to facilitate value-based healthcare [72]. Second, a desire to make research more efficient by using healthcare systems data [73]. There has been a noticeable increase in the development of COS that could be applied to both research and routine care settings; up to 2019, 12% of published COS were developed to be applicable to both, compared to 60% of ongoing COS registered in the COMET database. Case studies of how and where core outcome data are collected in research and routine care settings are starting to appear [10,74], although it remains to be seen whether these initiatives will result in an increased use of COS in research.

To improve COS uptake in new studies and systematic reviews, it is clear that an increased emphasis on raising awareness needs to involve many diverse organizations internationally. The Red Hat Group (https://www.comet-initiative.org/About/Collaborations) is a global forum that brings together representatives of many of the stakeholder groups mentioned here, with a shared interest in promoting uptake and the intent to find ways to better align their efforts around those outcomes which matter most to patients, clinicians, regulators, payers, and other key decision makers.

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