

BMJ Open Conceptualising Centres of Clinical Excellence: A Scoping Review

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ABSTRACT

Objectives Centres of clinical excellence (CoCE) are healthcare facilities that provide excellent healthcare. However, despite their increasing prevalence, it is unclear how CoCE are identified and monitored. This paper explores how CoCE has been described in the literature, including its defining characteristics and selection and monitoring processes.

Design We conducted a scoping review following Arksey and O'Malley's framework, enhanced by Levac *et al.* Additionally, we adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews guidelines.

Data sources A comprehensive search using MEDLINE Ovid, PubMed, Web of Science, CINAHL and Scopus was conducted to identify relevant literature from January 2010 to June 2022.

Eligibility criteria for selecting studies We included published studies and grey literature that described how a CoCE was defined, established, monitored or evaluated.

Data extraction and synthesis Two independent reviewers completed the title and abstract screening, reviewed the full texts and extracted data.

Results 50 records describing 45 initiatives were included. More than half were published in the USA (n=25, 56%). All but one initiative focused on one clinical condition/population, most commonly cardiovascular disease (n=8, 17%), spinal surgeries (n=4, 9%) and pituitary tumours (n=4, 9%). Most initiatives (n=30, 67%) described a structured process to establish CoCE. The definitions of CoCE were not uniform. Common defining features included the volume of patients treated, medical expertise, a highly skilled multidisciplinary team, high-quality care and excellent patient outcomes. Identification as a CoCE varied from self-identification with no explicit criteria to application and assessment by an approval panel.

Conclusion Despite a growing prevalence of CoCE, there are inconsistencies in how CoCE are established, identified, monitored and evaluated. Common (but not uniform) features of CoCE are highly skilled staff, high-quality care delivery and optimal patient outcomes.

INTRODUCTION

Healthcare facilities worldwide have a shared goal to continually improve healthcare delivery, often using stringent standards and indicators.^{1 2} Improvements in healthcare delivery can take the form of defining best

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The study used inclusive search strategies (peer-reviewed journals and grey literature) and a stringent review process using two independent reviewers throughout the process.
- ⇒ The study used Arksey and O'Malley's framework with enhancement from Levac *et al.* and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews guidelines.
- ⇒ We may have missed established centres of clinical excellence that have not published any studies or reports or published in non-indexed sources.

clinical practice or demonstrating important aspects of care, such as safety, access, affordability, equity, effectiveness and efficiency.

Most healthcare organisations must meet national quality and safety standards to address clinical practice and organisational performance.¹ Accreditation is instrumental in achieving a baseline standard of care; however, it is not usually designed to recognise excellent care or to optimise patient-reported outcomes and experience. Recognising this gap between care that meets accreditation standards and 'excellent' care, some healthcare facilities are taking proactive steps to engage in self-improvement and seek recognition for delivering exceptional care.

Excellence within healthcare is often labelled 'clinical excellence',³ and organisations that deliver exceptional patient care have been called centres of excellence or centres of clinical excellence (CoCE).⁴⁻⁶ Other dimensions of excellence that have been described in healthcare include 'research excellence',⁷ 'service excellence'⁸ and 'operational excellence'.⁹ A recently published review⁶ summarised evidence pertaining to centres of excellence in healthcare, education, research, industry and information technology. The authors of this review concluded that there are inconsistencies in how healthcare facilities are designated as centres of excellence and ambiguity between

centres of excellence and regular healthcare facilities, with limited information on how these centres were evaluated. Similarly, research excellence has been reviewed from education and clinical research perspectives, and frameworks are frequently not comprehensive,⁶ with unclear methods used to determine excellence.

Attaining recognition as a CoCE could be a source of inspiration to facilities that are recognised as leads in healthcare provision.¹⁰ Health professionals within the facilities can be inspired to pursue and maintain the best clinical care for their patients by promoting high-quality, up-to-date, evidence-based care to their community.¹⁰ Additionally, CoCE can work with accreditation bodies to set higher benchmarks that encourage innovative patient-centred care. Accreditation bodies can adopt and maintain advanced standards of care over time, helping healthcare centres to continually raise the standards of patient outcomes.¹¹

Despite the increasing use of the term CoCE, there is a lack of clarity about how this term is defined, how sites are nominated and selected as CoCE and how CoCE are evaluated and monitored. Therefore, the primary aim of this scoping review was to map evidence on CoCE in healthcare. We sought to explore and answer the following questions systematically:

1. What CoCE have been described in the literature?
2. What are the defining characteristics of CoCE?
3. How are CoCE selected or nominated?
4. What monitoring processes are employed to remain as CoCE?

Through conducting this review, we planned to explore the multifaceted dimensions of CoCE.

METHOD

Protocol and registration

We registered the scoping review protocol on Open Science Framework. We employed the scoping review framework proposed by Arksey and O'Malley¹² with the refinement outlined by Levac *et al*¹³ to evaluate the evidence on CoCE. We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews.¹⁴

Identifying relevant studies

We developed a search strategy with the support of a research librarian (online supplemental file 1). We searched MEDLINE Ovid, PubMed, Web of Science, CINAHL and Scopus to identify published records between January 2010 and June 2022. We also searched for grey literature (government reports, policies, protocols, conference proceedings and unpublished studies) and relevant websites using Google and Google Scholar. We also searched the reference lists of included records to check for further relevant records.

Inclusion and exclusion criteria are presented in box 1. We included records that discussed CoCE that provided clinical care for people with any health condition in any

Box 1 Eligibility criteria for article selection

Inclusion criteria

- ⇒ Available in the English language.
- ⇒ Information on CoCE.
- ⇒ Healthcare organisations or services providing clinical care to people with any healthcare condition.
- ⇒ Published from January 2010.
- ⇒ Any geographical location.
- ⇒ Studies describing the development/defining/monitoring/evaluation/frameworks of CoCE.

Exclusion criteria

- ⇒ Records that describe a study conducted at CoCE (eg, using participants from CoCE).
- ⇒ Centres that do not provide clinical care (eg, Centres of Research Excellence or Centres of Leadership Excellence).
- ⇒ Conference abstracts/papers, letters, NICE guidelines, JBI guidelines.
- ⇒ Only looking at costs associated with one CoCE (no comparator).
- ⇒ Only looking at clinical outcomes for people receiving care at CoCE (no comparator).
- ⇒ Using the term 'CoCE' without outlining the criteria.

CoCE, centres of clinical excellence; JBI, Joanna Briggs Institute; NICE, National Institute for Health and Care Excellence.

setting (primary care, inpatient, outpatient or community). To be included, records had to describe how a CoCE was defined, established, monitored or evaluated. We excluded records that used the term 'CoCE' without outlining any criteria. Centres of excellence that were not designed to provide clinical care (such as centres of research excellence) were excluded. Given the exploratory nature of the research questions, there was no limitation to study populations or interventions.

Study selection

The search results were imported into Covidence, and duplicates were removed. As recommended by Levac *et al*,¹³ two reviewers independently screened titles and abstracts and reviewed full-text documents using the inclusion criteria (see box 1). One reviewer (TK) conducted the online search for relevant websites (first 20 pages on Google search) and two reviewers (TK and LNB) independently completed the screening and review of the grey literature. The inclusion and exclusion criteria were reviewed periodically throughout the title and abstract screening process to ensure the criteria facilitated the identification and inclusion of relevant studies.

Charting the data

A data extraction form was developed for the study (online supplemental tables 1 and 2). We pilot-tested the extraction form with the first 15 eligible records to ensure consistent data collection. Two reviewers (TK and EAL) independently extracted data on all included studies using the extraction form on Covidence. The quality of individual records was not assessed due to the descriptive nature of the review aims.

Collating, summarising and reporting the results

We synthesised the research findings according to the research questions and presented data from all included studies in tables. Study characteristics were presented descriptively, and the research questions were presented narratively. Henceforth, the CoCE will be identified as initiatives and the search results will be defined as records. Each initiative will be described either as a theoretical centre (describing aspirational criteria/frameworks to develop a CoCE) or a physical centre where clinical care is provided. Initiatives that described a framework were classified as ‘creating’ a framework, ‘using’ or ‘adapting’ a pre-existing framework.

Patient and public involvement

Patients were not involved in the design or completion of this study.

RESULTS

Selection of sources of evidence

Overall, 9077 records were identified from a database search, and 36 records were identified through a grey literature search. A further three records were identified by reviewing reference lists of included records. 50 records describing 45 CoCE initiatives were included in the analysis (figure 1). The complete search results and strategies are available in online supplemental file 1. Among the records excluded at full-text review, 25 (n=28%) records described or labelled a centre as a CoCE but did not provide any selection criteria or any details about how the centres were nominated or monitored.

Characteristics of sources of evidence

Most records (n=43, 86%) were published in or after 2015. Nearly all the included records (n=44, 88%) were published in peer-reviewed journals, but only 15 (30%) were research articles, the remaining 28 (56%) records

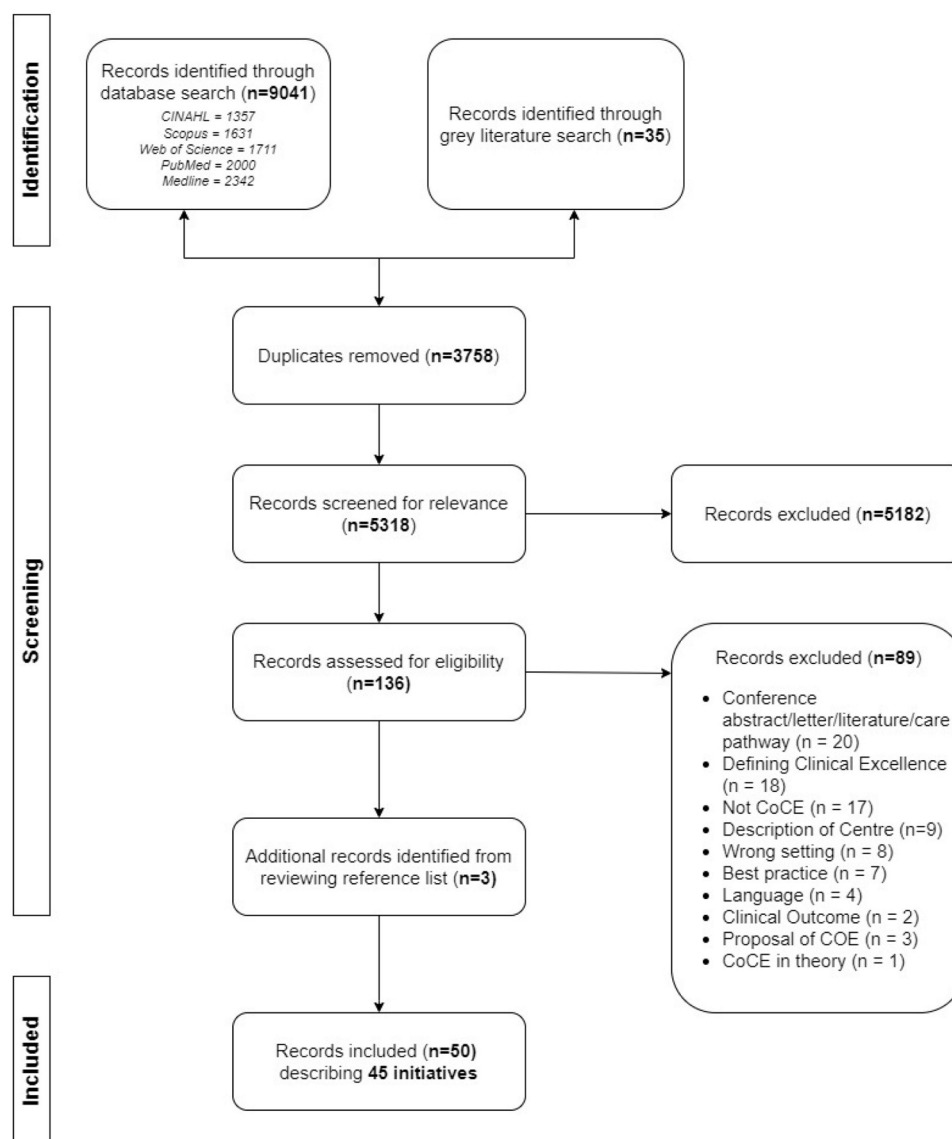


Figure 1 PRISMA flow diagram. CoCE, centres of clinical excellence; COE, centre of excellence; PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.



Table 1 Characteristics of included records

	N (%)
Types of literature from included records (n=50)	
Research articles	15 (30)
Others (editorial, reports, case reports) from peer-reviewed journals	28 (56)
Book chapters	3 (6)
Websites	2 (4)
Systematic review	1 (2)
Government report	1 (2)
Country of Centre or initiatives described (n=45)	
USA	25 (56)
Others	20 (44)
Clinical conditions from initiatives described (n=45)	
Cardiovascular disease	8 (18)
Spinal surgery	4 (9)
Pituitary tumours	4 (9)
Diabetes	3 (7)
Pregnancy related	2 (4)
Others	24 (53)

were other article types such as editorials or case reports. Two websites were identified as additional records for initiatives identified through the literature search (see [tables 1 and 2](#)).

Synthesis of results

Less than half (n=20, 47%) of the identified initiatives were physical CoCE. With the exception of one CoCE which provided care for people with diabetes and cardiovascular disease,¹⁵ all identified CoCE treated a single clinical condition or population. The most commonly described conditions were cardiovascular disease^{16–23} (n=8, 17%), spinal surgeries^{24–27} (n=4, 9%), pituitary tumours^{28–31} (n=4, 9%), diabetes^{15 32 33} (n=3, 6%) and obstetrics^{34 35} (n=2, 4%).

Some CoCE (n=6, 13%) were located across several countries,^{17 21 25 28 36 37} whereas the majority were described as stand-alone clinical centres, such as wards, surgical centres or clinics. Eight CoCE (18%) were located in low-income and middle-income countries.^{20 32 38–43} More than half of the included CoCE were located in the USA (n=25, 53%). CoCE established in high-income countries were typically described in terms of high quality of care delivery, such as standardised care and optimal outcome (n=12, 27%),^{19 21–23 25 33 35 38 39 44–46} comprehensive multidisciplinary care (n=8, 18%)^{16 28 31 32 40 47–49} or accessible patient-centred care (n=7, 16%).^{4 15 29 36 42 50–52}

More than half of the initiatives (n=30, 67%) described a structured process to establish a CoCE. While many initiatives reported that the CoCE was established using a framework or series of developmental stages, details regarding the developmental stages were rarely available.

Five initiatives were reported using published frameworks (Elrod and Fortenberry,^{29 37 45} Christmas⁵³ and National Cancer Institute²³) to guide their process to establish the CoCE (see [table 2](#) for further details).

Defining characteristics of CoCE

Less than half (n=19, 42%) of the initiatives explicitly defined the characteristics of the CoCE. Seven (16%) initiatives^{20 24 26 29 37 45 54} used the definition from Elrod and Fortenberry⁴: ‘a programme within a healthcare institution which is assembled to supply an exceptionally high concentration of expertise and related resource centred on a particular area of medicine, delivering associated care in a comprehensive, interdisciplinary fashion to afford the best patient outcomes possible’ (p.16).⁴

High volumes of patients treated or numbers of procedures performed, staffing, infrastructure, high quality of care and above-average patient outcomes were the most commonly described defining features of CoCE. Staffing components included medical expertise, highly skilled multidisciplinary teams and staff-to-patient ratios. Other resources that were described as part of the CoCEs were infrastructure (n=15, 33%), such as building space and examination rooms and specialised equipment (n=9, 20%). High quality of care delivery was described in terms of standardised care and optimal outcome (n=12, 27%),^{19 21–23 25 33 35 38 39 44–46} comprehensive multidisciplinary care (n=8, 18%)^{16 28 31 32 40 47–49} or accessible patient-centred care (n=7, 16%).^{4 15 29 36 42 50 51} The availability of treatment protocols was described as an important feature in seven initiatives (15%) (see [table 2](#) for details).

There were differences noted in the defining characteristics of CoCE in low-income, middle-income and high-income countries. Universally, most CoCE had common features regarding staff expertise, equipment and patient outcomes. However, CoCE in low-income and middle-income countries tended to provide a healthcare service that otherwise was not available in the region, for instance, neurosurgery in Peru³⁹ and comprehensive dental care in Guwahati, India.³⁸

Selection or nomination process of CoCE

No details were available about how sites were selected as CoCE in half (n=24, 53%) of the included initiatives. While 21 initiatives reported that there was a selection or nomination process to be recognised as a CoCE, the details of the selection or nomination process were inconsistently reported. When reported, processes used to select centres as CoCE were varied and included application and assessment by an approval panel (n=9, 45%),^{4 8 23 34 43 45 54–56} self-identification as a CoCE with no explicit criteria or external assessment (n=6, 30%)^{15 16 19 29 41 50} and site visit by funding body to assess suitability (n=1, 5%).¹⁸ Only four (20%)^{36 46 48 57} initiatives presented the process used to select the CoCE in its entirety, which are presented in [table 3](#). The bodies

Continued

Table 2 Characteristics of CoCE initiatives									
First author of main record describing initiative	Theoretical centre (T) or physical centre (P)	Resources			Processes used or suggested for CoCE			Processes to establish a CoCE	Processes to monitor a CoCE
		Framework adapted/created	Personnel	Infrastructure	Equipment	Criteria described	CoCE		
Bitzer <i>et al</i> ⁴⁷	T	X	X	X		X		X	X
Burkett <i>et al</i> ²⁴	T		X			X			X
Campbell <i>et al</i> ³⁸	P	X	X			X	X		
Carvalho and Jill ³⁴	T	X	X		X	X	X	X	X
Casanueva <i>et al</i> ²⁸ & Tritos ³¹	T	X	X			X			
Chang <i>et al</i> ⁴⁸ & Lymphatic Education & Research Network ⁶⁸	P	X	X			X	X	X	X
Choque-Velasquez <i>et al</i> ³⁹	P		X		X				X
Coon <i>et al</i> ⁶⁹	P	X	X			X			
Creehan <i>et al</i> ⁷⁰	T	X	X			X			
Daming <i>et al</i> ¹⁹	P	X	X	X		X	X	X	X
Deshmukh <i>et al</i> ⁴⁰	P	X	X			X			X
Dietz <i>et al</i> ⁴⁴	T	X	X		X	X			
Distiller and Brown ³²	P		X			X			X
Draznin <i>et al</i> ³³	T	X	X			X			
El-Eshmawi <i>et al</i> ¹⁶	P	X	X	X		X	X	X	X
Elrod and Fortenberry ⁴	P	X	X			X			
Ferguson and Froehlich ⁵⁰	P		X				X	X	X
Frara <i>et al</i> ²⁹	T	X	X	X		X	X	X	X
Geetha <i>et al</i> ⁵³	P	X				X			
Haider <i>et al</i> ³⁷	T	X	X			X			X
King, Jamieson and Berg ⁴⁵	P	X				X	X	X	X
Kullar <i>et al</i> ⁵⁴	P	X	X			X	X	X	X
Lancellotti <i>et al</i> ¹⁷ & Chambers <i>et al</i> ¹⁸	T		X			X			X
Li <i>et al</i> ⁵⁵	T					X	X		
Marinoff and Heiberger ⁴¹	P		X				X		
Martin <i>et al</i> ²⁵	T	X				X			
McLaughlin <i>et al</i> ³⁰	T		X		X	X			X
Nakov <i>et al</i> ²⁰	P		X			X			
Piccini <i>et al</i> ²¹	T	X	X	X		X			

Table 2 Continued

First author of main record describing initiative	Theoretical centre (T) or physical centre (P)	Resources			Processes used or suggested for CoCE		
		Framework adapted/created	Personnel	Infrastructure	Equipment	Criteria described	Processes to establish a CoCE
Pronovost et al ⁴⁹	T	X				X	X
Safer Care Victoria ⁵¹	T	X				X	
Sandhu et al ²²	T	X	X				
Santos-Moreno et al ^{36 71 72}	P	X	X	X	X	X	X
Sheha and Iyer ²⁶	T		X			X	X
Shikora et al ⁵⁷	P	X	X	X	X	X	X
Shommu et al ⁷³	T					X	
Silver et al ³⁵	T		X	X		X	
Steiner et al ⁵⁶	T		X			X	
Tapela et al ⁴²	P		X	X	X	X	
Thomas et al ¹⁵	P		X			X	X
Vivian et al ⁴⁶	P	X	X	X	X	X	
Williams ²³	T	X	X		X	X	
Wirth et al ⁵²	T	X	X			X	X
Wu et al ²⁷	T	X				X	X
Yao and Zhou ⁴³	P	X	X			X	X
Total	21 (P) 24 (T)	30	37	15	9	39	24
CoCE, centres of clinical excellence.							

Table 3 Outline of selection/nomination process of CoCE

First author	Steps outlined
Chang <i>et al</i> ⁴⁸ & Lymphatic Education & Research Network ⁶⁸	1. Applications will be reviewed by the LE&RN Global Oversight Committee (GOC). All applications will be scored, using the following three individual criteria: 1. The quality of the overall application/services. 2. Unique offerings or particular characteristics that add to the lymphatic disease clinic. 3. Miscellaneous (eg, lymphatic disease community citizenship, research).
Santos-Moreno <i>et al</i> ³⁶	1. Implementing an attention model for the patients diagnosed with rheumatoid arthritis, in accordance with the requirements of each type of centre of excellence. 2. Filling the self-assessment form of each type of centre of excellence and implementing improvement actions. 3. Requesting and preparing for a verification visit. 4. Receiving a verification visit from REAL-PANLAR. 5. Official notice of the results of the assistance and verification visit.
Shikora, Delegge and Van Way III ⁵⁷	1. Online application completed by surgeon or facility. 2. Successful application results in provisional status. 3. Within 2 years must seek full approval and pass on-site inspection and indicates has an excellent outcome. 4. Mandatory submission of all patient data to a database.
Vivian <i>et al</i> ⁴⁶	1. Establishing the foundation (leadership structure and purpose). 2. Formalising the centre of excellence programme (clinical education training, multidisciplinary team involvement). 3. Solidifying the centre of excellence status (certification/accreditation by external institute).
CoCE, centres of clinical excellence.	

providing oversight of the nomination or selection of the CoCE were professional bodies,^{23 26 34 36 48 54} insurers^{45 55} and organisations.^{4 38 46}

Monitoring protocols to remain a designated centre of clinical excellence

Only 24 (53%) of the included initiatives reported a monitoring process for the CoCE. Monitoring was mandatory for 6 (25%)^{34 36 48 52 54 57} initiatives through recertification process. Other initiatives reported the importance of monitoring outcomes such as productivity (n=5, 21%),^{17 19 39 43 50} patient outcomes (n=9, 36%),^{15 16 27 29 30 32 45 47 49} quality metrics (n=3, 13%)^{24 26 37} and cost-effectiveness of the programme (n=1, 4%),⁴⁰ but there was no evidence that this monitoring process was routinely performed or overseen by any parties.

DISCUSSION

Summary of evidence

To our knowledge, this is the first scoping review to summarise what is known about CoCE in healthcare.

Despite identifying numerous CoCE initiatives, we were unable to identify selection processes used in more than half of the included initiatives. When selection processes were documented, they varied between initiatives. Further, there were inconsistencies in monitoring CoCE performance. Without consensus on what defines a CoCE, and

without a recognised body to monitor the performance within each CoCE, there is no guarantee that care being delivered by sites claiming to be CoCE are delivering excellent (or even better-than-usual) healthcare.

The most common defining feature of CoCE included in this review was resource availability, specifically personnel, infrastructure and equipment. These findings are not surprising; it is well established that there are associations between staffing levels, skill mix, infrastructure and patient outcomes.^{58–62} For example, higher nursing staffing levels and employment of more skilled staff are associated with better patient outcomes such as reduced rates of pressure injuries, mortality and falls.^{58 60} Features such as infrastructure and specialised expertise are also key factors in centres of excellence in other industries.⁸ The inclusion of these features within CoCE reinforces that the included CoCE were designed to align with what is known about healthcare delivery that leads to improved patient outcomes.

While frameworks or processes used to establish or describe CoCE may be valuable to guide others in the field, they may have limitations if these processes were developed for a specific healthcare facility, stakeholder cohort or disease group. For example, the Willis-Knighton Health System is a not-for-profit healthcare network in Louisiana, USA, that operates 11 self-nominated centres of excellence. The framework used to establish these

better patient outcomes, so including staff well-being in a CoCE framework may be of value. The findings from this review will contribute to international efforts to establish CoCE using robust, transparent criteria and key performance indicators.

Strengths and limitations

The strengths of our scoping review include the inclusive search strategies (peer-reviewed journals and grey literature) and stringent review process using two independent reviewers throughout the process. There is a potential that there may be established CoCE that have not published any studies or reports, which we then have not identified. While we sought assistance from an academic librarian to ensure the search strategies were clear and comprehensive, centres that describe excellence using different terms and relevant information published in non-indexed sources may have been missed. This is a particular challenge of this focus of work which straddles healthcare organisation, clinical practice and academic research.

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Contributors All authors were involved in the screening of records and data extractions. TK was the main author of this work and was responsible for the study design and coordination of the team. TK and EAL were responsible for drafting the manuscript and all authors helped with the critical review of the manuscript. TK is the guarantor.

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