This paper reviews and critiques the different approaches to the use of narrative in quality improvement research. The defining characteristics of narrative are chronology (unfolding over time); emplotment (the literary juxtaposing of actions and events in an implicitly causal sequence); trouble (that is, harm or the risk of harm); and embeddedness (the personal story nests within a particular social, historical and organisational context). Stories are about purposeful action unfolding in the face of trouble and, as such, have much to offer quality improvement researchers. But the quality improvement report (a story about efforts to implement change), which is common, must be distinguished carefully from narrative based quality improvement research (focused systematic enquiry that uses narrative methods to generate new knowledge), which is currently none. We distinguish four approaches to the use of narrative in quality improvement research—narrative interview; naturalistic story gathering; organisational case study; and collective sense-making—and offer a rationale, describe how data can be collected and analysed, and discuss the strengths and limitations of each using examples from the quality improvement literature. Narrative research raises epistemological questions about the nature of narrative truth (characterised by sense-making and emotional impact rather than scientific objectivity), which has implications for how rigour should be defined (and how it might be achieved) in this type of research. We offer some provisional guidance for distinguishing high quality narrative research in a quality improvement setting from other forms of narrative account such as report, anecdote, and journalism.

WHAT IS NARRATIVE?

Bruner distinguishes two forms of human cognition: logico-scientific (“science of the concrete”) and narrative (“science of the imagination”). Logico-scientific reasoning seeks to understand specific phenomena as examples of general laws, while narrative reasoning seeks to understand them in terms of human experience and purpose. Conventional research relies mostly on the former.

Stories do not convince by their objective truth but by their emotional impact on the reader—achieved through such literary features as aesthetic appeal (the story is seen as touching, humorous, ironic, for example), metaphor (one thing is made more meaningful or vivid through subjective comparison with something else), and moral order (actors are constructed as heroes who get their just rewards and villains who deserve come-uppance).

In one of the great works of literary analysis, Poetics, Aristotle suggested that a story (narrative) has three key characteristics: an unfolding of events and actions over time; emplotment (the rhetorical juxtaposition of these events and actions to evoke meaning, motive, and causality); and trouble (peripeteia – the unexpected in the form of surprise, “twist in the plot”, and so on). Burke later proposed that story is about purposeful action in the face of adversity and risk, and comprises five key elements: the act (what is done); the scene (the context in which it is done); the agent or actor (who does it); the agency (how it is done); and the purpose (why it is done). Box 1 lists some unique advantages of narrative in relation to quality improvement research.

In this article (building on earlier taxonomies), we discuss four approaches to using narrative in quality improvement research (table 1):

- narrative interview;
- naturalistic story gathering;
- organisational case study; and collective sense-making—
- the purpose (why it is done); and the place (where it is done).
Box 1 Ten unique selling points of stories in quality improvement research (compiled from various sources\textsuperscript{(7)–(10)})

(1) Stories are perspectival. They are told subjectively from the viewpoint of the narrator, thus drawing attention to the individual rather than the institution.

(2) Stories make sense of experience. The structuring devices of time and plot retrospectively align events and actions so as to modify mental schemas.

(3) Stories are non-linear. They convey multiple and complex truths, depicting events as emerging from the interplay of actions, relationships and environments.

(4) Stories are embedded in a context. A particular story about what went on in an organisation is nested within an over-arching meta-narrative of “what tends to go on around here”.

(5) Stories have an ethical dimension. They depict both acts and omissions, reflecting society’s expectations about what a “good doctor” or “good daughter” should have done in such circumstances.

(6) Stories bridge the gap between the formal codified space of an organisation (roles, job descriptions, and lines of accountability) and informal uncodified space (relationships, feelings, “unwritten rules”, and subcultures).

(7) Stories offer insights into what might have been (what Bruner calls “subjunctivization’’). The imaginative reconstruction of the end of a story allows us to consider different options for change.

(8) Stories are action-oriented, depicting what people did (and what happened to them), and also igniting and shaping their future action.

(9) Stories are inherently subversive since (in Bruner’s terminology) they embrace the tension between the canonical (i.e. an organisation’s standard routines and procedures) and the unexpected (i.e. new ways of thinking and working).

(10) Leadership is related to storytelling. “Leaders are people who tell good stories, and about whom good stories are told”:\textsuperscript{(44)}

- organisational case study; and
- narrative dimensions of collective sense-making.

For each we discuss the rationale, method, approach to data analysis, strengths and limitations. Readers unfamiliar with qualitative research might also find a general introductory text helpful.\textsuperscript{(11)}

**APPROACH 1: NARRATIVE INTERVIEW**

**Rationale**

Personal stories are readily collected and can provide a vivid window to the healthcare system within which people’s illness experiences are embedded. The study of end of life care based on the collection of the narratives of people dying from lung cancer or heart failure by Murray et al\textsuperscript{(45)} is a good example.

**Method**

In narrative interview the researcher invites participants to “tell me what happened” and allows them to speak uninterrupted until the story ends. The key structuring devices are *chronology* (linking events in time) and *emplotment* (use of metaphors, imagery and rhetorical devices to imply causality and agency). The interview may be semi-structured (driven by a series of questions set out in advance) or unstructured (conducted in a more emergent, conversational style). In either case, prompts should only be used to preserve the flow of the story (hence “how did you feel at that point?” or “what happened next?”). The researcher might invite ideas for change in the form of a different ending to the story—as in “if you went through that experience again, what would make it easier for you?” Indeed, the prompt itself might be presented in the form of a short narrative fragment (vignette) and the respondent invited to continue the story. For a detailed methodology of narrative interviewing see Wengraf\textsuperscript{(46)} or Riessman.\textsuperscript{(47)}

**Analysis of data**

Narrative interviews are, of course, qualitative data, and on one level can be approached using any mainstream method for analysing text. But narrative analysis per se takes the story as a whole, rather than segments of text, as its focus. Muller\textsuperscript{(48)} describes five overlapping stages of narrative analysis: entering the text (reading and preliminary coding to gain familiarity), interpreting (finding connections in the data through successive readings and reflection), verifying (searching the text and other sources for alternative explanations and confirmatory and disconfirming data), representing (writing up an account of what has been learned), and illustrating (selecting representative quotes).

These analytical stages can be approached through one of several disciplinary lenses. All share what Muller calls “the focus on the broad contours of the story”—that is, the context in which it is told, its structure, the dynamics of how the plot unfolds, and any patterns that emerge from multiple stories about the same event.\textsuperscript{(49)} Riessman, for example, suggests that narratives can be analysed conversationally (as teller-listener dialogue), performatively (as drama), or politically (the unfolding of events is seen as constrained by prevailing social and institutional norms).\textsuperscript{(50)} Frank uses a literary framework to analyse the stories of people with serious illness.\textsuperscript{(51)} Their narratives, he suggests, fall into three basic categories: “restitution”, “quest”, and “chaos”, corresponding to the literary genres of adventure, [coping with] tragedy, and nonsense. The narrator constructs their experiences respectively as restorative, heroic, or absurd using devices such as metaphor, exaggeration, understatement, and humour.

**Strengths and limitations**

The main strength of the narrative interview is its inherent subjectivity. The story is irreducibly perspectival. A frequent theme in classical literature (consider Great Expectations or The Grapes of Wrath) is the struggle of society’s underdogs against social injustice or institutional incompetence. Perhaps for this reason, the narrative interview comes into its own when considering a quality improvement initiative from the perspective of disadvantaged groups such as the socially excluded, the seriously ill, and the very old.\textsuperscript{(52)}

But the perspectival nature of stories is potentially a major limitation when they are used as research data. Furthermore, a story is an interaction—an artistic and rhetorical performance for an audience who (actively or passively) shapes the telling. The narrative interview has been described as “practical production, the meaning of which is accomplished at the intersection of the interaction of interviewer and respondent”.\textsuperscript{(53)} A different interviewer on a different day will never be able to collect the “same” story from a respondent.

The challenge of narrative research is not to “control for” the inherent subjectivity, inconsistency, and emotionality of stories but to capture these phenomena as data and interpret them appropriately. Gabriel\textsuperscript{(54)} offers some sound methodological advice: “It is the researcher’s task not merely to celebrate the story or the narrative but to seek to use it as a vehicle for accessing
Table 1: Approaches to the use of narrative in quality improvement research

<table>
<thead>
<tr>
<th>Approach</th>
<th>Operational definition</th>
<th>Unit of analysis and analytical approach</th>
<th>Main research methods</th>
<th>Intended output of research</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narrative interview</td>
<td>Researcher collects the stories of service users and/or the people involved in the quality improvement initiative</td>
<td>Individual narrative, analysed for structure, coherence, and meaning in a particular social context</td>
<td>Unstructured or semi-structured interview</td>
<td>Insights into individual experiences in the hands of the organisation/system</td>
<td>Patients’ experiences of dying of heart failure or lung cancer</td>
</tr>
<tr>
<td>Naturalistic story gathering</td>
<td>Researcher becomes a field worker immersed in the organisation so as to collect “real” stories in informal space and interpret them in context</td>
<td>Organisational subgroup, e.g. junior nurses. Analysed for subtleties in individuals’ and groups’ different interpretations of the same event/action over time</td>
<td>Ethnography</td>
<td>Thick description of organisational culture and how it influences particular behaviours and choices of individuals</td>
<td>Nurses’ experience of introduction of computerised records (involved both formal interviews and informal story-gathering)</td>
</tr>
<tr>
<td>Organisational case study</td>
<td>Researcher presents an account of the quality improvement initiative in the form of a detailed story</td>
<td>“The case” (perhaps the organisation), analysed for complex and dynamic influences on key events and processes</td>
<td>Multiple qualitative and quantitative methods, e.g. interviews, questionnaires, documentary analysis</td>
<td>Detailed description of “the case” as a context for events, plus chronological account of particular events as they unfolded during the study</td>
<td>Impact of learning facilitators on organisational change</td>
</tr>
<tr>
<td>Collective sense-making</td>
<td>Researcher joins quality improvement team and works with them to develop a shared perspective on the problem and its causes, and to plan and implement action</td>
<td>Change team analysed for development and enaction of shared meanings/purpose</td>
<td>Action research</td>
<td>Action intended to change (“organisational drama”)</td>
<td>Action research study of quality improvement in a “failing” hospital trust</td>
</tr>
</tbody>
</table>

Note: In practice, many empirical studies contain elements of more than one of these (e.g. the organisational case study that includes narrative interviews as one data source).

Deeper truths than the truths, half-truths and fictions of undigested personal experience.”

The process of “accessing deeper truths” is not straightforward, and narrative research should not be equated with privileging the judgement of the researcher over that of the informant. The validity of the research process rests heavily on evidence of the researcher’s reflexive awareness. Aristotle’s definition of good literature is that it has a powerful emotional impact on the reader. The researcher must acknowledge and engage with this emotional dimension—thus turning sympathy, joy, revulsion, and even “mixed emotions” into research data. As in all qualitative research, there should also be a transparent account of how the researcher decided what aspects of the story to include and exclude as data, and how inferences were made.

Incidentally, the need to systematically and repeatedly interrogate the “truth” of narratives collected in a research study is one reason why it is generally poor practice to use stories supplied for one purpose (for example, in a clinical encounter) for research. It would also be unethical. A more in-depth discussion of these and other issues of methodological rigour in narrative research can be found elsewhere in the literature.

**Approach 2: Naturalistic Story Gathering**

**Rationale**

As table 1 shows, stories told informally may be especially valuable for accessing that elusive composite of shared values and meaning systems that can make or break a quality improvement initiative—namely, organisational culture. Through the interplay and exchange of stories, members of an organisation interpret, contextualise and collaboratively reframe the events they hold in common. Clifford Geertz states: “Believing, with Max Weber, that man is an animal suspended in webs of significance he himself has spun, I take culture to be those webs, and the analysis of it to be therefore not an experimental science in search of law but an interpretive one in search of meaning” (page 5).

This semantic (meaning based) view of culture is strongly echoed by three leading organisational anthropologists, Czarniawska states that “Modern institutions … run on fictions, and the task of the scholar is to study how these fictions are created and sustained” (page 10). Gabriel highlights that stories exchanged by people in organisations have multiple functions in the creation of meaning: they variously inform, entertain, warn, advise, justify, explain, reassure, console, educate, sustain and transmit ideas or values, and draw moral lessons. Boje has observed that informal stories in organisations are generally multi-authored (with different members alternating the role of teller and listener); highly reflexive (that is, the past is continually re-created and re-interpreted in the light of the present); dialogical (that is, the narrative is co-constructed through a dynamic interaction between each teller and listener); and often allusory and fragmented (emerging “in bits” rather than as fully formed narratives with a fixed cast of characters).

**Method**

The subtle complexities of organisational culture will be inaccessible to the researcher who arrives with a tape recorder and only collects narrative interviews as in Approach 1. Naturalistic enquiry, in which researchers undergo “immersion in the field” to study actors in their own environment, relatively free of intervention or control, offers scope to produce what Geertz has called “thick description”—that is, multilayered interpretation of social actions in context. The main data source for such enquiry is the stories and story fragments exchanged in informal interaction with staff. The researcher must, of course, be selective in deciding which of the hundreds of stories heard during the course of the field work to capture as data, and also in assigning the status of “story” to what might be no more than a sentence, and (as with ethnography in general) the naive or incompetent researcher will lack the skill and sensitivity to select appropriately. For more detail on these methodological challenges in organisational research, see Boje’s recent book.

In one variant of the naturalistic approach, the researcher is appointed from within the quality improvement team rather than from an external research team (an example of autoethnography). In another variant, known as applied autoethnography.
ethnography, the researcher explicitly feeds their ethnographic findings back into the organisation in order to effect change.25

Analysis
The principles of narrative analysis set out in Approach 1 above are also pertinent to the analysis of stories gathered in naturalistic settings. Close analysis of the stories as texts will not, of course, be possible if they have been recorded second-order as retrospective field notes (as is usual practice in ethnography). However, collecting and interpreting particular stories within a wider ethnographic study of the organisation gives the researcher a rich context within which to interpret their significance. Atkinson (cited in Hosburgh26) has strongly criticised the conventional narrative interview as characterised by “… an extraordinary absence of social context, social action, and social interaction [and]… remarkably little sense of how narratives are forged in face-to-face interaction or how they are elicited in given social contexts”.27 In other words, Atkinson sees a very positive trade-off between the accuracy with which the text of a narrative is recorded and the richness (and hence validity) of the context in which it is captured. For a more detailed methodology of ethnography in general, see Geertz,22 and for organisational ethnography, see Gabriel29 or Boje.24

Strengths and limitations
A naturalistic approach enables the collection and comparison of multiple stories about a single issue or event. “Trouble” within the organisation will generate stories from different actors, and each person’s story will change with repeated tellings. Not only is the “real” version of events an unhelpful concept, but the very plasticity of stories is the key to what Gabriel calls the “organisational dreamworld”—with multiple narratives interacting and challenging one another.28 Gabriel’s own field work has highlighted the contrast between organisations’ official version of their own story (“well oiled machine, cutting edge technology”) and the subversive metaphors used by the members (“the [pompous, incompetent] management, nothing works round here”).20

The limitations of naturalistic story gathering are both practical and theoretical. “Prolonged immersion in the field” holds little currency with today’s cost conscious research funders and, in any case, quality improvement initiatives may move too quickly. Being an “insider” to the quality improvement initiative has both advantages (in-depth knowledge and understanding of issues, rich social networks, mutual trust, timelines, a longitudinal perspective, ability to effect change and integrate research with development) and disadvantages (lack of critical distance, a specific role in the organisation, prejudices arising from past personal experience, lack of knowledge of wider context). These issues are discussed further by Winter et al.29

APPROACH 3: ORGANISATIONAL CASE STUDY
Rationale
Case study research considers a social system (“case”) in context and explores it in sufficient detail to illuminate relationships and processes and provide insights into why particular events unfold as they do.29 30 Like ethnography (with which it overlaps considerably), case study involves detailed reflexive field work leading to rich authentic description.

Method
Case study requires the prospective in-depth investigation of an organisation, team, or inter-agency initiative using multiple methods—typically, a combination of formal interviews, focus groups, participant observation, and collection of contemporaneous materials (minutes of meetings, emails, memos, etc.). We must distinguish case study research, which can take years to produce, from the much more common quality improvement case report in which one or more members of a team tell a personal story about their initiative and its impact.

Constructing a case study requires considerable judgement and skill. The elements of the case must be iteratively defined through a sequence of sampling (to identify somewhere to start), progressive focusing (to refine and systematically explore what has been sampled), theorising (about interactions within the arbitrarily defined case and across the boundary with the world beyond it), analysing (testing how well the data fit the theory), and interpreting (deriving meaning from the data).29 30

Analysis
Organisations are complex, containing much social action (and a good bit of trouble) so, in practice, most organisational case studies get analysed and written up in a story-like way. An organisational case study is generally based on a large, heterogeneous, dynamic and complex collection of empirical data, each component of which will first need to be analysed separately—for example, quantitative data statistically; qualitative data thematically—before being woven into a higher order interpretation of the whole picture and how and why it has changed through time.

“Storying” the case—that is, constructing a chronological emplotted account of the key actions and events—is a way of selecting which data to focus on and which to omit. It is also a way of drawing meaning from different data sources and making causal links between aspects of the case, either tentatively (as hypotheses to be tested in further research) or more firmly as lessons or conclusions (if the links are particularly strong and plausible). In practice, organisational case studies tend to be the product of several researchers working together over months or years, and the task of processing, interpreting and integrating the data into a coherent story is achieved through interaction between team members—especially the repeated exchange and negotiation of stories.

Stake30 draws on Van Maanen31 to suggest four approaches to “storying” that researchers may use to present in-depth case studies:

- realist tales: a direct, matter-of-fact portrait, a chronological or biographical development of the case;
- confessional tales: the researcher’s personal account of coming to know the case and the challenges they faced;
- impressionist tales: a sequential description of several major components of the case, “personalised accounts of fleeting moments of fieldwork case in dramatic form”; and
- illustrative tales: the use of vignettes (strored episodes) to illustrate particular aspects of the case.

In all these approaches a good case study researcher, like a good storyteller, will use literary devices to place emphasis and convey surprises and ambiguities, and will “zoom in” judiciously to analyse the behaviour of individuals within (and as influenced by) the wider system. Once again, an important criterion for judging the rigour of a case study is evidence of the researchers’ reflexive awareness and the transparency of their inferences from the data.

Strengths and limitations
Case study has been described as “strong in reality”—that is, as having high potential for validity within the confines of the case itself.29 But researchers who have been raised on the conventional hierarchy of evidence (with randomised controlled trials at the top and anecdote at the bottom) often find it hard to identify much value in case study research. The

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central epistemological question might be put: to what extent does case study trade external validity (i.e. direct transferability to other contexts) for internal coherence and richness, and (conversely) to what extent will a detailed and systematic analysis of one unique “case” give us robust, transferable lessons for elsewhere?

This question is much debated amongst case study theorists (see, for example, a recent compilation). Yin takes a conventional scientific view that a case is only meaningful as a member of a sociological family of cases which provide the analytical framework to understand it (“previously developed theory is used as a template with which to compare the empirical results of case studies”). Stake, in contrast, argues from an interpretive perspective that the case is meaningful in its own right (the “sample of one” or what he calls “the intrinsic study of the valued particular”).

May, quoted in Simons, describes how his understanding of trees was changed forever when he saw a painting by Cézanne. The tree in the painting was not statistically representative of trees in general, nor did it contain features present in every tree. Nevertheless, the qualities that Cézanne had illuminated in his particular tree enabled the author to see every subsequent tree through new eyes. Simons argues that the hallmark of a good case study is this metaphorical (rather than scientific) generalisability.

Thor et al. describe a five year case study of an ambitious quality improvement initiative in an acute hospital, based on “learning facilitators” who helped a total of 93 project teams. The researchers attributed the success of the facilitators to allowing each clinical team to remain in charge of their ideas and adopting a supporting role that comprised (a) providing feedback on ideas and progress; (b) helping with demanding (and sometimes menial) tasks; (c) developing specialist skill and experience in quality improvement; and (d) taking responsibility for small practicalities such as refreshments for meetings. Arguably, the validity of this case does not rest on (nor would it be enhanced by) the presence of a “control group” or “comparative cases”: it rests on the authenticity of the observations and interpretations about what happened in this case. Of course, we cannot extrapolate these findings to every quality improvement project (for example, we cannot say that providing cookies at meetings will always improve the quality of decisions). But we can learn a general lesson from a facilitation approach characterised by “mucking in” and taking account of specific contextual features (in this case, that meetings were often held over mealtimes).

Another potential limitation of in-depth case study is that, because of the detailed contextual information necessary to understand the case, organisations (and the individuals within them) may be identifiable. Elwyn et al. have described a way of fictionalising organisational case studies by first abstracting the key themes from a sample of cases—for example, high user expectations, lack of cash, external policy mandates, and so on—and then writing a new story that includes all these key themes.

**APPRAoch 4: USING NARRATIVE IN COLLECTIVE SENSE-MAKING**

Rofiateele

An alternative conception of narrative research is developing (and enacting) shared meanings rather than collecting or writing stories. Contemporary theories of organisational development centre on the construction, acquisition, transfer and use of knowledge, and on the need for the members of an organisation to make sense of change efforts by assimilating them into their cognitive schemas. Organisational members are active “framers”, cognitively making sense of the events, processes, objects and issues that comprise (say) a quality improvement initiative and fitting it into their current cognitive schemas. When the initiative (or the goals that justify it) are perceived as new, the individual may retain an outdated schema of the organisation rather than discarding or modifying it. The result is cognitive inertia—that is, the tendency to remain with the status quo and resist changes that lie “outside the frame”.

To be successfully assimilated by staff (and service users), a proposed change must make sense in a way that relates to previous understanding and experience—and this is where story comes in. People caught up in a change initiative (or who are trying to “stay afloat” in a changing environment) engage in a continuous stream of experience and action which generates a succession of equivocal situations. They then retrospectively impose a structure or schema to make these situations sensible. In other words, the act of sense-making is itself the construction of a narrative, requiring elements to be selected out, highlighted as significant or surprising, juxtaposed with one another (and with the existing cognitive schema), given meaning, and so on. For a taxonomy of such interpretive approaches, see Czarniawska.

The notion of narrative as sense-making fits closely with a rapidly expanding “knowledge based” tradition within organisational research (including Senge’s work on the learning organisation). In this tradition, “management” is seen not as a technical process of keeping the cogs oiled and maintaining throughput, but as the effective creation and circulation of knowledge. Leadership is conceptualised not as “command and control” but as providing the opportunities and facilitation needed for people to build and exchange knowledge. In a change effort the leader’s role is to pull a team together around a shared story of innovation, improvement, and action. In practice, this means initiating and leading discussions around the meaning of any proposed changes.

**Method**

A good example of this research approach is Paul Bate’s story of a quality improvement initiative in a “failing” UK NHS hospital trust. Change was achieved through an action research design (defined as “a mutual learning process within which people work together to discover what the issues are, why they exist, and how they might be addressed”) in which members of the organisation met periodically for facilitated discussion, reflection, and action planning. A striking aspect of the change effort in this study was the perception that all the members of the change team, from the chief executive to the cleaner, felt that they were all pulling together in a common ethical endeavour about which they had strong (and positive) personal feelings. The conventional narrative of organisational change, Bate argues, is couched in “the vocabulary of coercion, competition, tyranny, hegemony, control, subjection, engineering, manipulation, domination, subordination, resistance, opposition, diversity, negotiation, obedience and compliance”. The more contemporary “knowledge creation” approach uses different vocabulary: “cooperation, convergence, coherence, integration and consensus”, for which the development of a shared story can prove the critical mechanism.

In emphasising the critical role of enacting stories as a vehicle for collective action, Bate cites the commentary by Kling on social movements:

“Social movements are constituted by the stories people tell to themselves and to one another. They reflect the deepest ways in which people understand who they are and to whom they are connected … They are constructed from the interweaving of personal and social biographies – from the narratives people rehearse to themselves about the nature of their lives … The construction of collective action, therefore, is inseparable from the construction of personal biography.”

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CONCLUSIONS

The richness and flexibility of the story form make it an enticing addition to the researcher’s toolkit in the hard to research world of quality improvement. This paper has attempted to classify the different theoretical positions that might underpin a narrative approach to quality improvement research, and to provide some practical advice for those who seek to use these methods in empirical work. The slippery nature of narrative truth means that we must be wary of so-called “narrative research” that is nothing of the sort. Box 2 lists a provisional checklist of questions to ask when considering whether stories elicited, interpreted, analysed, or constructed in relation to a quality improvement initiative should count as research at all, and to assess the rigour of such research.

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REFERENCES