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TABLE OF CONTENTS

ABSTRACT	1
PLAIN LANGUAGE SUMMARY	2
BACKGROUND	3
OBJECTIVES	4
METHODS	4
RESULTS	7
Figure 1.	7
DISCUSSION	8
AUTHORS' CONCLUSIONS	9
ACKNOWLEDGEMENTS	9
REFERENCES	11
CHARACTERISTICS OF STUDIES	21
ADDITIONAL TABLES	25
APPENDICES	29
CONTRIBUTIONS OF AUTHORS	64
DECLARATIONS OF INTEREST	65
SOURCES OF SUPPORT	66
DIFFERENCES BETWEEN PROTOCOL AND REVIEW	66
INDEX TERMS	66

[Intervention Review]

Collaborative writing applications in healthcare: effects on professional practice and healthcare outcomes

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ABSTRACT

Background

Collaborative writing applications (CWAs), such as wikis and Google Documents, hold the potential to improve the use of evidence in both public health and healthcare. Although a growing body of literature indicates that CWAs could have positive effects on healthcare, such as improved collaboration, behavioural change, learning, knowledge management, and adaptation of knowledge to local context, this has never been assessed systematically. Moreover, several questions regarding safety, reliability, and legal aspects exist.

Objectives

The objectives of this review were to (1) assess the effects of the use of CWAs on process (including the behaviour of healthcare professionals) and patient outcomes, (2) critically appraise and summarise current evidence on the use of resources, costs, and cost-effectiveness associated with CWAs to improve professional practices and patient outcomes, and (3) explore the effects of different CWA features (e.g. open versus closed) and different implementation factors (e.g. the presence of a moderator) on process and patient outcomes.

Search methods

We searched CENTRAL, MEDLINE, Embase, and 11 other electronic databases. We searched the grey literature, two trial registries, CWA websites, individual journals, and conference proceedings. We also contacted authors and experts in the field. We did not apply date or language limits. We searched for published literature to August 2016, and grey literature to September 2015.

Selection criteria

We included randomised controlled trials (RCTs), non-randomised controlled trials (NRCTs), controlled before-and-after (CBA) studies, interrupted time series (ITS) studies, and repeated measures studies (RMS), in which CWAs were used as an intervention to improve the process of care, patient outcomes, or healthcare costs.

Data collection and analysis

Teams of two review authors independently assessed the eligibility of studies. Disagreements were resolved by discussion, and when consensus was not reached, a third review author was consulted.

Main results

We screened 11,993 studies identified from the electronic database searches and 346 studies from grey literature sources. We analysed the full text of 99 studies. None of the studies met the eligibility criteria; two potentially relevant studies are ongoing.

Authors' conclusions

While there is a high number of published studies about CWAs, indicating that this is an active field of research, additional studies using rigorous experimental designs are needed to assess their impact and cost-effectiveness on process and patient outcomes.

PLAIN LANGUAGE SUMMARY

Collaborative writing applications to support the implementation of best practices in healthcare.

What is the aim of this review?

The aim of this Cochrane review was to find out whether collaborative writing applications (CWAs), also known as collaborative writing tools, could improve the way health professionals work, and improve patients' health. Another goal of our study was to examine the costs and resources needed to use CWAs. Finally, we wanted to know if certain CWA features (for example, being open, like Wikipedia, versus being closed, like the Canadian CPOE toolkit), and different clinical practice change factors (for example, the presence of a moderator) increased the CWAs' impact on healthcare. We searched for studies to answer these questions.

Key messages

We did not identify any studies that measured the effect of CWAs on how healthcare professionals care for their patients.

What was studied in this review?

When people receive healthcare, it is important that they are treated according to best practices. However, decision makers, health professionals, researchers, and patients need tools to support best practices. Collaborative writing applications are a new category of information and communication technologies that allow multiple individuals to share, create, and revise online documents at the same time. They could help implement best practices in healthcare. Collaborative writing applications could also help adapt online documents to local contexts. This could help reduce duplication and waste of resources. The most widely known example of a CWA is Wikipedia, the online encyclopaedia. However, there are many other examples of CWAs (e.g. WikEM, WikiDoc, Canadian CPOE toolkit, WikiTrauma). Despite the fact that CWAs are promising tools, it is not yet known if they improve how healthcare professionals care for their patients.

What are the main results of the review?

We searched 14 scientific bibliographic databases, two trial registries, and grey literature sources. We also contacted 106 authors and experts in the field to ask for relevant papers. No studies met our eligibility criteria; two potentially relevant studies are ongoing.

How up to date is this review?

We searched for evidence to August 2016.

BACKGROUND

Description of the condition

Clinical practice does not always reflect best evidence. Different healthcare systems and settings report a high proportion of inappropriate care, due to inadequate use of knowledge (Grol 2003). This translates into sub optimal patient outcomes, and no added value for money spent in healthcare. Uptake of evidence is paltry in the absence of specific, targeted interventions, therefore, many have advocated for specific strategies to encourage implementation of research-based guidelines and changes in practices (Bero 1998). A major barrier to the implementation of best-practice guidelines is that these guidelines cannot be easily transferred into different cultural, organizational, and technical contexts. Knowledge producers (researchers) and knowledge users (patients, clinicians, and decision makers) lack effective interventions to adapt knowledge to the local context, a crucial step in the knowledge-to-action framework (KTA; Gagliardi 2015; Graham 2006). Potential knowledge users may lack the skills, resources, or institutional culture necessary to apply knowledge locally, and support their local institutions to learn new ways of operating. Experts have challenged researchers to find innovative solutions that support the involvement of local knowledge users to adapt knowledge tools to their contexts (Dobbins 2009; Grilli 1994; McKillop 2012; Shekelle 2000). Although local adaptation is a key step of the KTA framework, little is known about how to accomplish this step effectively (Gagliardi 2015; Gagliardi 2015b; Greenhalgh 2014).

Description of the intervention

Information and communication technologies (ICTs) have been suggested as possible solutions to improve research uptake and increase evidence-based practice (Health Canada 1999). Governments are investing billions of dollars to implement ICTs, in the hope of improving care and reducing costs (Black 2011; Catz 2003; Health Canada 2007). Some ICTs, like computer physician order entry, are effective in improving the quality and safety of healthcare (Durieux 2008; Van Rosse 2009). However, the impact of other ICTs on healthcare professional performance has been modest in other contexts (computer generated reminders (Shojania 2009a), nursing record systems (Urquhart 2009), clinical decision support systems (Moxey 2010; Pearson 2009; Riggio 2009; Shojania 2009b), handheld and mobile computers (Prgomet 2009), or have yet to be proven (Black 2011; Currell 2000; Martin 2008; McGowan 2009). Due to innovative and expanded capabilities, social media, such as collaborative writing applications (CWAs), have been suggested as a pathway to greater impacts (Archambault 2013; Eysenbach 2008).

Collaborative writing applications are a category of social media that has surged in popularity in recent years, including within the healthcare sector (Chu 2010; Eapen 2007; Eysenbach 2008; Heilman 2011; McLean 2007). Although no two applications are identical, in principal, all consist of software that allows any user to create and edit online content (Kaplan 2010). For example, internet users have turned to wikis to produce a Wikipedia entry, *Stop Tuberculosis* (Boulos 2006; Heilman 2011); to Google Knol to exchange research on influenza at the Public Library of Science (Cowling 2009; Levy 2008; Manber 2007); and to Google Docs to review the literature on emergency medicine (Archambault 2011; Archambault 2015a; Eapen 2007; Phadtare 2009). For the purposes of the present study,

we defined 'collaborative writing applications' as a category of social media that enables the joint and simultaneous editing of a webpage or online document by at least two users, e.g. wikis, Google Docs (Boulos 2006; Eapen 2007; Kaplan 2010).

While there are different types of CWAs, wikis are perhaps the most popular, with Wikipedia being the most famous. A wiki is defined as a page, or collection of interlinked webpages, designed to enable anyone who accesses it, to easily contribute to or modify its content (Boulos 2006; Chu 2010). Wiki software (e.g. MediaWiki) keeps track of changes and acknowledges authors, which makes it possible to easily go back to previous wiki versions, and clearly see who changed the content. Another well known CWA is the Google Docs online office suite of word processing, spreadsheet, and slide show applications that allow users to access their documents from any computer via a web browser. Google Docs applications share some common features with wikis, as they allow multiple users to add, edit, or delete the content of a document. However, Google Docs applications also differ from wikis; they don't use the same type of software, and Google Docs applications allow simultaneous collaborative writing, compared to wikis that do not allow simultaneous editing of the same section. A scoping review about CWAs identified that wikis and Google Docs are the main types of CWAs used in health care (Archambault 2013). This scoping review also identified a host of other CWAs that offer similar collaborative authoring of documents, such as certain knowledge management applications (e.g. Google Sites (Dhillon 2011), Microsoft Sharepoint (Yates 2011), social media platforms (e.g. MijnZorgNet (Van de Belt 2014), Atlassian Confluence (Seebregts 2009), MinJournal (Moen 2009), and certain virtual learning environments that contain wiki pages (e.g. Blackboard (Varga-Atkins 2010)). These CWAs also integrate additional features that favour conversation and deliberation between users, such as blogs and social networking services. Although blogs and social networking applications are not CWAs, because they don't allow the editing of a common document, they do offer additional conversational features that can support the processes of collaborative writing. Finally, CWAs also include hybrid wikis, such as Wikibreathe (Gupta 2010), Orthochina (Ma 2008), and FreyaWIKI (Den Breejen 2012), which are CWAs that are custom-built for specific projects.

How the intervention might work

The scoping review done by Archambault 2013 found a number of mechanisms of change that could explain how CWAs might improve the implementation of best practices at multiple levels within the KTA framework (knowledge synthesis (Bender 2011), knowledge tool creation (Brown 2013), adapting knowledge to local context (Yates 2011), monitoring knowledge use (Culley 2012), and sustaining knowledge use (Archambault 2015a)). The most frequently reported mechanisms of change in the literature suggested that CWAs improved collaboration, influenced domains of behaviour change, positively impacted learning, facilitated knowledge management, and increased access to information (Appendix 1). The use of CWAs has been reported to positively influence self-efficacy, motivation, emotion, skills, and knowledge.

More specifically, CWAs can support collaboration between multiple stakeholders (including patients, healthcare professionals, decision makers, and researchers), who can participate in the construction of content. This sharing of evidence-based knowledge tools within a community of healthcare

stakeholders can increase the social influences the community has on the practice of evidence-based health care (Godin 2008). As it is often very difficult to get all stakeholders in a healthcare institution to meet at the same time and place to discuss care processes and the implementation of new knowledge tools (e.g. protocols or care pathways), CWAs could help to gather feedback from a wide range of stakeholders, to facilitate the adaptation of knowledge tools to their local needs. Therefore, CWAs can generate quick and open feedback on the evaluation, update, and implementation of old and new care processes, in the light of new evidence (Archambault 2012).

By involving knowledge users in the creation and dissemination of knowledge, CWAs—highly accessible, web-based, interactive vehicles of communication—have the potential to empower users to apply new knowledge to their practice (Eysenbach 2008). Collaborative writing applications facilitate the adoption of proactive behaviours among knowledge users, who in the past, would have remained passive targets of knowledge translation initiatives. Eysenbach 2008 describes this as turning the consumer into a ‘prosumer’ or co-producer of information. Applied to the healthcare field, this transformation of the traditional knowledge user into an active agent for the implementation and dissemination of knowledge, has the potential to increase healthcare professionals’ self-efficacy to implement evidence-based knowledge into practice. By actively getting healthcare professionals to participate in the creation of evidence-based knowledge tools within a CWA, a user’s own knowledge of the evidence would increase. Self-efficacy is an important social determinant of practice change (Godin 2008; Michie 2005).

The type of interaction between stakeholders and knowledge users and the feedback they provide will differ, based on the type of CWAs used. Collaborative writing applications can be open or public, such as Wikipedia, which can be seen and edited by nearly anyone in the world. There are also partially public CWAs, which can be seen by anyone, but can only be edited by certain members of a restricted community (e.g. Ganfyd, which is a wiki viewed by all, but only edited by health professionals (Ganfyd)). There are also closed or private CWAs, which are part of central knowledge management systems (e.g. Intelink (US Government 2013)), or online learning systems (e.g. Blackboard), which are only seen and edited by members of the institution. Hence, based on who has access to view and edit the content in these applications, the target and the effect of CWAs will be different.

Finally, CWAs have different features or implementation facilitators that can make them more or less effective in changing professional behaviours and health outcomes. Among these factors, the following have been shown to be potentially important to consider: the level of openness of the CWA (i.e. the level of control, or who is allowed to edit the content); the presence of a moderator; the presence of a formal community of practice; the disclosure of authorship; the number and type of conversational features added to the CWA (e.g. email alerts integrated into the CWA, and integration with other social media platforms); the format of knowledge being shared within the CWA (e.g. knowledge tools versus textbook-style knowledge); and being part of a theory-based intervention (Archambault 2013). The last feature is important, because developing an intervention based on a behaviour change framework (e.g. the Theoretical Domains Framework (Michie 2008), the Theory of Planned Behaviour (Godin 1996), or the Technology

Acceptance Model (Davis 1989)), helps implementers to target specific behaviour change domains that are important to consider when implementing a complex intervention.

Why it is important to do this review

Even though different stakeholders in healthcare, including professionals, patients, decision makers and researchers are increasing their use of CWAs, questions remain about their safety (Devgan 2007; Goodman 2006; Mason 2009), reliability (Arita 2009; Callis 2009; Clauson 2008; Pender 2009; Rosenzweig 2006), lack of traditional authorship (Giles 2006; Kittur 2007), and the legal implications of decision making with CWAs in health care (Cohen 2009; Jain 2009). Researchers have questioned clinicians’ intentions to use the applications in their practice (Archambault 2010), and to contribute knowledge collaboratively (Archambault 2015a; Heilman 2011; Logan 2010). Furthermore, it is unknown whether CWAs are effective in enhancing the delivery of health care, by empowering patients in decision making (Adams 2010; Vogel 2011), by improving healthcare communication and education (Chu 2010; Collier 2010; Kim 2010; Kohli 2011; Naik 2010; Phadtare 2009; Tangient LLC 2013; Varga-Atkins 2010;), or benefiting health in developing countries (Godlee 2004; Heilman 2011; Seebregts 2009).

Therefore, there have been calls to study how CWAs could improve the delivery of health care, decrease its cost, and increase the access to knowledge within developing countries (de Silva 2010; Eysenbach 2008; Heilman 2011; Mandl 2008). Specifically focusing on CWAs was important, since not all social media share the same mechanisms of change (Kietzmann 2011). While researchers have conducted scoping and systematic reviews on internet and communication technologies (Black 2011; Gagnon 2010), social media in healthcare (Cheston 2013; Chou 2013; Eysenbach 2004; Hollinderbäumer 2013; Moorhead 2013; von Muhlen 2012), and research on Wikipedia in general (Okoli 2012), there has yet to be a systematic review on the impact of CWAs on professional practices and health outcomes. This knowledge gap has been confirmed by a scoping review on CWAs in health care (Archambault 2013). Current research exploring CWAs and how they could support collaboration in health care would benefit from the results of a systematic review focusing on the effects of CWAs on professional practice and patient outcomes.

OBJECTIVES

1. Assess the effects of the use of CWAs on process outcomes (including the behaviour of healthcare professionals) and patient outcomes;
2. Critically appraise and summarise current evidence on the resource use, costs, and cost-effectiveness associated with CWAs to improve professional practice and patient outcomes;
3. Explore the effects of different CWA features (e.g. open versus closed), and different implementation factors (e.g. the presence of a moderator) on process outcomes and patient outcomes.

METHODS

Criteria for considering studies for this review

Types of studies

We considered randomised controlled trials (RCTs), non randomised controlled trials (NRCTs), controlled before-and-after

(CBA) studies, interrupted time series (ITS) studies, and repeated measures studies (RMS) that met the EPOC study design criteria (EPOC 2016). Following EPOC guidelines, we included non-randomised study designs in our review as randomised trials are often not available to address questions about the effects of health system interventions and implementation strategies (EPOC 2016). We considered studies regardless of their publication status or language of publication.

Types of participants

We considered studies that involved healthcare stakeholders (healthcare professionals, decision makers, researchers, and patients). We included studies of single groups of stakeholders (e.g. patients) as the only target of a CWA intervention only if the ultimate goal was to improve professional practice (e.g. involving patients in the development of clinical practice guidelines using a CWA). Studies involving healthcare students were included, as long as the majority of the participants were certified health professionals.

Types of interventions

We included studies that evaluated any CWA intervention aimed at improving processes of care, patient outcomes, and healthcare costs.

A CWA intervention was included if it met the following criteria:

- allowed for content to be created collaboratively; and
- a webpage that allowed a group of authors to access and edit simultaneously; and
- web-based software that audited revisions to the original content; and
- public or private access.

Since we aimed to compare the specific effects of wikis to other CWAs, we included wiki interventions that met all the following criteria:

- a webpage or a collection of interlinked webpages, designed to enable anyone who accessed them, to easily contribute or modify the content, using a web browser; and
- wiki software that kept track of all authors, their internet protocol (IP) addresses, and their changes (e.g. MediaWiki and Tiki Wiki CMS Groupware); and
- collaboratively created content; and
- public access (e.g. Wikipedia, community websites) or private access (e.g. corporate intranets, knowledge management systems).

We excluded studies of blogs, microblogs (e.g. Twitter), online communities of practice, discussion fora, media sharing websites, and social bookmarking websites that did not include a collaborative writing feature, defined as a common page that allows joint or simultaneous editing by more than one person.

For control groups, we accepted studies that did not have an active intervention (i.e. practice as usual), and studies that had a control intervention, as long as the intervention and control groups received the same type and intensity of care, except for the CWA in the intervention group.

Types of outcome measures

Primary outcomes

We considered studies that reported at least one outcome that measured a healthcare process or a clinical endpoint.

Healthcare process outcomes included, but were not limited to: (1) any objective measure of professional performance; (2) interprofessional collaboration; (3) cost of care delivery (economic data); (4) length of hospital stay. For the cost of care delivery (economic data), we also included the following items: (a) measures of resource use (e.g. planned or unplanned consultations); (b) measures of costs (e.g. direct medical costs, costs of time spent); and (c) measures of cost-effectiveness (e.g. incremental cost-effectiveness ratios (ICERs), incremental cost per quality-adjusted life-years (QALY), and cost-benefit ratios).

Clinical endpoints included, but were not restricted to: mortality and other markers of health (e.g. blood pressure, quality of life).

If, and only if, the primary outcome of interest were met, we included secondary outcomes.

Secondary outcomes

We used a specific framework, developed to evaluate collaborative adaptive interactive technologies to determine secondary outcomes of interest (O'Grady 2009):

- Outcomes about the people affected by the CWA, which included measures of:
 - self-efficacy;
 - motivation;
 - skills;
 - knowledge; and
 - satisfaction.
- Outcomes about the content of the website, which included measures of:
 - quality of content; and
 - credibility of the content.
- Outcomes about the CWA technology, which included measures of:
 - number of visits; and
 - number of edits.
- Outcomes about the human-computer interaction, which included measures of:
 - usability;
 - collaboration; and
 - knowledge management.
- Outcomes about the greater healthcare community, which included measures of:
 - adverse events related to using information from CWAs; and
 - service utilisation (e.g. number of visits to a physician) due to use of CWAs.

Search methods for identification of studies

Electronic searches

In consultation with the review authors, Michelle Fiander, the former EPOC Information Specialist (formerly known as Trials Search Co-ordinator), developed search strategies for MEDLINE

and a number of additional databases (see [Appendix 3](#)). A second information Specialist (William Witteman) peer-reviewed this strategy using the Peer Review of Electronic Search Strategies (PRESS) criteria ([Sampson 2008](#)).

We searched the Cochrane Database of Systematic Reviews (CDSR) and the Database of Abstracts of Reviews of Effects (DARE) for related systematic reviews.

We searched the following databases for primary studies:

- Cochrane Central Register of Controlled Trials (CENTRAL; 2016, issue 8) in the Cochrane Library (searched August 2016)
- MEDLINE Ovid, in-process and other non-indexed citations (1946 to August 2016);
- Embase Ovid (1947 to August 2016);
- CINAHL EBSCO (Cumulative Index to Nursing and Allied Health Literature; 1980 to August 2016);
- Health Technology Assessment Database (2016, issue 8) in the Cochrane Library (searched August 2016);
- NHS Economic Evaluation Database (2016, issue 8) in the Cochrane Library (searched August 2016);
- Health Economic Evaluations Database (1994 to August 2016);
- Dissertations and Theses Full Text, ProQuest (1861 to August 2016);
- ERIC Ovid (Education Resources Information Center; <http://eric.ed.gov/>; 1965 to August 2016);
- Science Citation Index Expanded (SCI-EXPANDED; Web of Science via Web of Knowledge; 1900 to August 2016);
- Social Sciences Citation Index (SSCI; Web of Science via Web of Knowledge; 1900 to August 2016);
- Conference Proceedings Citation Index - Science (CPCI-S; Web of Science via Web of Knowledge; 1990 to August 2016);
- Conference Proceedings Citation Index - Social Science & Humanities (CPCI-SSH; Web of Science via Web of Knowledge; 1990 to August 2016).

We used two methodological filters: the Cochrane Highly Sensitive Search Strategy (sensitivity- and precision-maximizing version (2008 revision)) to identify randomised trials ([Higgins 2011](#)), and a Cochrane EPOC Group methodology filter to identify non-RCT designs ([Lefebvre 2011](#)).

We searched for economic analysis reviews in MEDLINE and Embase, using the filter strategies developed by the Canadian Agency for Drugs and Technologies in Health ([Glanville 2009](#)).

We applied no limits on language or date of publication on any of our searches.

Searching other resources

Grey literature

We searched the grey literature for studies not indexed in the databases listed above to September 2015.

We searched:

- Open Grey (www.opengrey.eu/);
- Grey Literature Report (New York Academy of Medicine; greylit.org/);

- Agency for Healthcare Research and Quality (AHRQ; www.ahrq.gov/);
- National Institute for Health and Care Excellence (NICE; www.nice.org.uk/);
- Research Papers in Economics (RePEc; econpapers.repec.org/);
- IDEAS, the complete RePEc database (ideas.repec.org/);
- The New York Academy of Medicine Library Grey Literature Reports (www.nyam.org/library/online-resources/grey-literature-report/);
- Centre for Evidence-based Purchasing (nhscep.useconnect.co.uk/CEPProducts/Default.aspx);
- Quality Improvement Scotland (www.nhshealthquality.org/nhsqis/4567.html);
- Euroscan (new and emerging techs; www.euroscan.org.uk).

Trial registries

We searched the following trial registries for ongoing and completed trials to February 2017:

- World Health Organization International Clinical Trials Registry Platform (www.who.int/ictrp/en/);
- US National Institutes of Health Ongoing Trials Register ClinicalTrials.gov (clinicaltrials.gov/).

Others

We also:

- screened conference proceedings (Medicine 2.0; www.medicine20congress.com (2012 to 2014), WikiSym; www.opensym.org (2012 to 2014), American Medical Informatics Association; www.amia.org (2012 to 2014) and MedInfo 2013; www.medinfo2013.dk);
- contacted the authors of relevant studies or reviews to clarify published information, or to seek unpublished results and data ([Appendix 9](#));
- contacted researchers with expertise in the review topic or EPOC interventions;
- contacted experts from the Campbell and Cochrane Economics Methods Group;
- searched for relevant papers that evaluated different CWAs on the web by hand-searching each CWA website ([Appendix 10](#));
- contacted the authors of existing projects using CWAs on the web ([Appendix 10](#)).

Data collection and analysis

Selection of studies

Using EPPI Reviewer 4 ([Thomas 2010](#)), three pairs of independent review authors (PA, AP, TvdB, CK, AD, WW, RF, CM) independently assessed the eligibility of papers identified from the electronic databases, based on their title and abstract, using the pre-established inclusion criteria. We then obtained the full-text copies of potentially relevant papers or papers of which we were unsure, in order to fully assess their eligibility. Two authors (PA and TvdB) independently completed the full text screening. Any disagreements were resolved by discussion between the two review authors, and where consensus was not reached, we consulted a third review author. One review author screened the grey literature (AD), reviewed all responses to our emails

(AD), handsearched individual journal and conference proceedings (AP), handsearched the CWA website (AD), and screened the trial registries (PA), looking for papers we might have missed.

We documented the selection process in a PRISMA flow diagram (Moher 2009).

As no studies met our inclusion criteria, we will follow the steps set out in Table 1 for future updates of this review.

Results of the search

After excluding duplicates, two review authors reviewed 11,993 abstracts (Figure 1). After independently reviewing these abstracts, we retrieved 96 publications for full text assessment. After reviewing the full text, none of the studies met the inclusion criteria. However, we did identify one ongoing study that appeared to meet our inclusion criteria: a published study protocol for an ongoing interrupted time series (Archambault 2015).

RESULTS

Description of studies

No study met the eligibility criteria.

Figure 1. Study flow diagram.

We identified 277 documents from screening the 10 grey literature databases. After reviewing the available title and summary documents, we did not retain any for full text review. We did not identify any new studies from the conference proceedings from four international informatics and medical informatics conferences held between January 2012 and August 2014. From searches of the two trial registries, we identified three potential ongoing trials. We excluded one trial after confirming with the lead investigator that the study had stopped ([NCT01051050](#)), and another because both intervention and control groups had access to the same wiki ([ACTRN12615000064505](#)). The third trial will be considered for inclusion in the next update of this review once completed ([ACTRN12616000968471](#)). None of the 51 CWA websites we screened included studies about their impact on process or patient outcomes. We contacted 106 authors, researchers, and experts seeking unpublished studies or unpublished results or data ([Appendix 9](#)). Of the 106 authors contacted, 29 replied and suggested 58 papers. One reviewer (AD) screened the suggested papers; none met our inclusion criteria.

Included studies

No study met the eligibility criteria.

Excluded studies

From the 99 studies that were retrieved for full-text review, 47 (47%) were excluded because they did not involve a CWA intervention ([Characteristics of excluded studies](#)). Thirty (32%) were excluded because they did not measure the appropriate outcomes. Fourteen (14%) were excluded because they did not include certified healthcare professionals. Six studies (6%) were excluded based on their design (e.g. non experimental design).

Risk of bias in included studies

No study met the eligibility criteria.

Effects of interventions

No study met the eligibility criteria.

DISCUSSION

Summary of main results

This review shows that there is currently no rigorous evidence about the impact of CWAs on health care. The absence of rigorous studies about CWAs in health care can be explained by several reasons.

First, CWAs are relatively new technologies that have been made possible by the recent increase in cloud-based data storage and computing capacities ([Sobeslav 2015](#)). Therefore, many current projects involving CWAs are still exploratory or preliminary pilot projects that will help inform rigorous evaluation designs, such as randomised trials ([Donaldson 2016](#); [Gupta 2010](#); [Lamontagne 2014](#); [NCT01051050](#); [Stutsky 2010](#); [Stutsky 2014](#)). One ongoing interrupted time series might generate results that could be included in a future update of this review ([Archambault 2015](#)). This study will measure the impact of a CWA intervention, built using a theory-based development phase on the quality of care in trauma centres. It will do so by exploring the impact of a Google sites wiki that contains different knowledge tools, including care protocols, patient decision aids, and treatment algorithms, on the quality

of care delivered by health professionals working in the selected trauma centres. Another ongoing randomised trial might generate results that could also be included in a future update of this review ([ACTRN12616000968471](#)). This project is studying the effect of a moderated, online social therapy intervention that includes a wiki component on caregiver stress, and wellbeing for caregivers of first-episode patients with psychosis.

Although CWAs are a recent technological innovation, the number of studies using such applications in the field of healthcare education (case-based learning, e-learning, use of Web 2.0 tools for teaching; [Archambault 2011](#); [Archambault 2015a](#); [Dodson 2011](#); [Donaldson 2016](#); [Harris 2010](#); [Lemley 2009](#); [Moeller 2010](#); [Phadtare 2009](#); [Sandars 2007](#); [Sandars 2008](#); [Stutsky 2010](#); [Williams 2011](#)), patient care (to support patient care, to obtain drug information, to stay updated; [Brokowski 2009](#); [Devgan 2007](#); [Dodson 2011](#); [Donaldson 2016](#); [Ioannis 2011](#); [Iyer 2011](#); [Usher 2011](#)); and patient information seeking ([Hickerson 2009](#); [Judd 2010](#); [Judd 2011](#); [Laurent 2009](#); [Law 2011](#); [Limdi 2007](#); [Martin 2011](#); [Rahn 2015](#); [Santos Arrontes 2007](#)), seems to be increasing ([Archambault 2013](#)). We found four papers with experimental designs in the fields of: (1) nursing education ([Stutsky 2010](#)); (2) medical student case-based learning ([Moeller 2010](#)); (3) biomedical student learning ([Phadtare 2009](#)); and (4) residency training ([NCT01051050](#)). These papers had to be excluded because they either did not include any patient outcomes, or only included students. In the current context, in which social media interventions seem to be gaining in popularity with a new generation of health professionals that has readily adopted social media as a way of communicating, there is a need for rigorous evaluations of the effect of CWAs on the care of patients in our healthcare system ([Maloney 2015](#)).

A second reason may be related to the complex nature of CWAs, and the difficulty to perform randomised trials, which has been recognised for the field of social media in general ([Moorhead 2013](#)). Performing randomised trials with CWAs is particularly challenging, since the intervention, it's users, the environment, and the causal link with the outcomes are complex ([Medical Research Council 2006](#)). The intervention is dynamic, which means that the content of CWAs can change over time (e.g. as contributors add new content to the website). Although this is a challenge, it is also the *raison d'être* of CWAs. Without this dynamic nature, CWAs would simply be static webpages. They would not foster the empowerment of local knowledge users, and would lose the causal mechanism that supports their potential effectiveness. As a result, it may be difficult, or even impossible, to control for all confounders ([Victoria 2004](#)). Another possible way of dealing with this challenge would be to conduct a large, pragmatic, stepped-wedge cluster-randomised trial to measure the effectiveness of CWAs, as opposed to their efficacy ([Hemming 2015](#)). In order to do so, researchers must partner with the leaders and decision makers within organisations who will embrace the use of the CWA for their organisation, and motivate the individual healthcare professionals to contribute to, and use content from the CWA. This mobilisation within organisations takes time and financial investments to train health professionals to use these novel communication technologies. Notwithstanding these difficulties, CWAs' inherent low-cost has the potential to be cost-effective in supporting widespread knowledge implementation, improved processes, and patient outcomes. Future research should continue to investigate the impact of CWAs. [O'Grady 2009](#) has suggested the use of a conceptual framework to determine the process and

outcome measures of dynamic interventions such as CWAs. Using the Medical Research Council's guidance to develop and evaluate complex interventions would also help to inform future researchers who are planning such evaluation studies to: (1) use theory (e.g. Theoretical Domains Framework to develop a CWA intervention (Cane 2012)); (2) assess feasibility and pilot CWA interventions before full effectiveness evaluation; (3) plan the study design (i.e. choosing between experimental or non-experimental designs), the processes to evaluate, and the outcomes to measure; (4) conduct an economic evaluation; and (5) plan implementation and follow-up of long-term positive and negative impacts (Medical Research Council 2006).

Third, CWAs are usually open-source and free collaborative platforms. Currently, the technological, commercial, and legal environments into which these open-source platforms must fit, do not support their interoperability and easy, low-cost integration. Current communication and information systems do not support the local development of applications and systems that can easily interoperate with larger established systems (Mandl 2014). Therefore, there may be little commercial or financial interest from CWA developers to fund or support rigorous randomised trials for CWA evaluation. However, public institutions and public health organisations that promote excellence in care would benefit from such evidence, to show that investing in the use and deployment of CWAs could facilitate knowledge utilisation on a wider scale, and more cost-efficiently than is currently the case in health systems around the world. Low- and medium-income countries would also benefit from the free and open access to knowledge tools developed in countries with more resources. To allow this wide scale sharing, individuals and healthcare organisations must learn how to work collaboratively, and share content developed locally with a global audience, so that others can copy, or minimally adapt, work done elsewhere. Moreover, a critical mass of contributors and users are needed for CWA projects, to keep the CWA website content current and up-to-date. This new way of collaborating on the web will take time to be widely adopted, and explains the lack of rigorous experimental designs even in the presence of positive case reports (Ioannis 2011; Theal 2014; Yates 2011; Yu 2011).

Aside from the difficulties in conducting rigorous experimental studies with health professionals, an interesting emerging field that still needs to be explored is the use of CWAs to engage consumers and patients in research priority setting, knowledge implementation, and knowledge tool creation. We found three studies that explored this concept, but excluded all three: one study protocol for a pragmatic trial engaged recovering traumatic brain injury patients in the development of patient-centred clinical practice guidelines, but did not include process or patient outcomes (Lamontagne 2014); a randomised trial studied the use of a wiki-supported nominal group technique to elicit research priorities by patients for chronic kidney disease research, but it also lacked process outcomes or clinical endpoints (Elliott 2016); the third trial explored the impact of nurse-led decision coaching on decision making about treatment in multiple sclerosis. It also included a CWA (wiki) as a source of information for patients, but the wiki was not the experimental intervention and was accessible in both arms of the study (Rahn 2015).

Overall completeness and applicability of evidence

No study met the eligibility criteria.

Quality of the evidence

No study met the eligibility criteria.

Potential biases in the review process

Our review had some limitations. First, because of the lack of studies using experimental designs, we were not able to reach conclusions about the efficacy, effectiveness, or cost-effectiveness of CWAs in health care. Second, our review was limited to only studies that included process and patient outcomes. We did find studies on the impact of CWAs using rigorous experimental designs in the field of healthcare education, however, these papers did not include the appropriate outcomes, so we did not include any studies (Excluded studies). Even though our strict inclusion criteria were intentionally chosen to select only the highest level of evidence about CWAs in health care, we acknowledge that other qualitative evidence must be considered when trying to understand the impact CWAs could have in healthcare. Finally, we made every effort to contact all experts and authors in the field, but were unable to get a response from all. We will try to contact these authors for future updates of our review.

Agreements and disagreements with other studies or reviews

This review concurs with a previous scoping review on the same topic: that there is currently a lack of experimental evidence to support the effectiveness of CWAs in health care (Archambault 2013). Although this review's objective targeted a much narrower question about the effects of CWAs on professional practice and healthcare outcomes, and thus excluded qualitative and local case reports, we were able to update the previous scoping review's search strategy, and were able to identify ongoing studies that will be included in future updates of this review.

AUTHORS' CONCLUSIONS

Implications for practice

We were unable to locate evidence from rigorously designed studies to indicate whether CWAs had a benefit for health care.

Implications for research

There are a number of studies about CWAs. However, our review did not find any that met our inclusion criteria. This indicates that rigorously designed trials are needed to assess the efficacy and cost-effectiveness of using CWAs in health care. Future projects should make sure that sufficient pilot testing has been done before randomised trials are started. An emerging field of research about using CWAs to involve patients in research priority setting and guideline development also needs further investigation.

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CHARACTERISTICS OF STUDIES

Characteristics of excluded studies [ordered by study ID]

Study	Reason for exclusion
ACTRN12615000064505	Both intervention and control groups have access to the same wiki.
Anderson 2013	The population and study design did not meet our inclusion criteria.

Study	Reason for exclusion
Atreja 2006	The study design did not meet our inclusion criteria.
Bonacina 2009	The intervention and study design did not meet our inclusion criteria.
Bossen 2013	The intervention and study design did not meet our inclusion criteria
Burke 2004	The intervention did not meet our inclusion criteria (not a wiki or a collaborative writing application). This study was about a shared patient medical record on the Internet.
Campbell 2010	The outcomes did not meet our inclusion criteria.
Curran-Smith 2004	The study design did not meet our inclusion criteria. This was a case study about a virtual learning environment.
Dinh 2011	The outcomes did not meet our inclusion criteria.
Donaldson 2016	The study design did not meet our inclusion criteria.
Elliott 2016	The outcomes did not meet our inclusion criteria.
Flood 2012	The population did not meet our inclusion criteria.
Gilchrist 2012	The outcomes did not meet our inclusion criteria.
Hamm 2009	The outcomes did not meet our inclusion criteria.
Hamm 2014	The outcomes did not meet our inclusion criteria.
Hanberger 2013	The intervention did not meet our inclusion criteria. This Web 2.0 platform did not have any wiki functionality. It only included a discussion forum and blog.
Ioannis 2011	We unsuccessfully attempted to contact the authors of this abstract that presented the potentially positive impact of using Google Docs in collaboration with patients to help empower patients in the management of their chronic hypertension. We were unable to get a full description of the design of the study and obtain a full presentation of the results.
Johnson 2007	The outcomes did not meet our inclusion criteria.
Kardong-Edgren 2009	The study design and population (students) did not meet our inclusion criteria.
Keene 2012	The intervention did not meet our inclusion criteria. This project used Google Forms which is not really a collaborative writing platform.
Krist 2007	The intervention did not meet our inclusion criteria. This web-based system was not a CWA.
Kwok 2009	The intervention did not meet our inclusion criteria.
Lamontagne 2014	The outcomes did not meet our inclusion criteria.
Lang 2011	The outcomes did not meet our inclusion criteria.
Llambi 2011	The design did not meet our inclusion criteria.

Study	Reason for exclusion
Martinez-Garcia 2013	The intervention did not meet our inclusion criteria. There was no clear indication that there was a CWA aspect to this project other than a discussion forum. The study design did not meet our inclusion criteria.
Masseroli 2006	The intervention did not meet our inclusion criteria.
Mayer 2001	The intervention did not meet our inclusion criteria.
McCarrier 2009	The intervention did not meet our inclusion criteria as only patients could contribute to the online action plan.
Meenan 2010	The outcomes did not meet our inclusion criteria.
Miller 2009	The population (students) did not meet our inclusion criteria.
Mitchell 2013	The population did not meet our inclusion criteria.
Moeller 2010	The population did not meet our inclusion criteria.
Morreti 2009	The design did not meet our inclusion criteria.
Morrow 2010	The intervention did not meet our inclusion criteria.
Morrow 2013	The intervention did not meet our inclusion criteria.
Naik 2010	The outcomes did not meet our inclusion criteria.
NCT01051050	Even though ClinicalTrials.gov stated that this study was completed, the principal author of the trial was contacted and confirmed that the study was stopped because of lack of time on behalf of the author. The study was planning to study the impact of using a wiki intervention for teaching critical appraisal skills to surgical residents.
Olver 2013	The outcomes did not meet our inclusion criteria.
Olver 2013b	The outcomes did not meet our inclusion criteria.
Phadtare 2009	The population and the outcomes did not meet our inclusion criteria.
Rosenbluth 2012	The outcomes did not meet our inclusion criteria.
Safran 2003	The intervention did not meet our inclusion criteria.
Shepherd 2012	The intervention did not meet our inclusion criteria. Although this project used PBworks as a collaborative writing tool to develop content, it did not test this application with its population of spinal cord injury patients.
Silva 2012	The intervention did not meet our inclusion criteria.
Steel 2013	The intervention did not meet our inclusion criteria.
Steel 2014	The intervention did not meet our inclusion criteria.
Street 2007	The intervention did not meet our inclusion criteria.
Stutsky 2010	The outcomes did not meet our inclusion criteria.

Study	Reason for exclusion
Stutsky 2014	The outcomes did not meet our inclusion criteria.
Theodore 2013	The outcomes did not meet our inclusion criteria.
Von Dincklage 2013	The outcomes did not meet our inclusion criteria.
Von Wangenheim 2009	The design did not meet our inclusion criteria.

Characteristics of ongoing studies [ordered by study ID]

ACTRN12616000968471

Trial name or title	The Altitudes Project: an online social media intervention for stress reduction in relatives of young people with first-episode psychosis
Methods	Randomised controlled trial
Participants	<p>Inclusion criteria for the study will be carers (e.g. parent, grandparent, spouse) of a young person (age 15 to 27 years inclusive) who is currently receiving treatment for first-episode psychosis, or who has been recently discharged from specialist care. More than one family member from each family will be eligible to participate. Participants will be recruited from The Early Psychosis Prevention and Intervention Centre (EPPIC), a program of Orygen Youth Health in Parkville and Sunshine, Melbourne. EPPIC clients (a) have a diagnosis of a first episode of a DSM-IV psychotic disorder or mood disorder with psychotic features; (b) are aged 15 to 27 years inclusive; (c) have up to 6 months treatment with an antipsychotic medication prior to registration with the early psychosis service.</p> <p>Exclusion criteria: Carers who are currently engaged in legal action (e.g. intervention order) against the identified patient</p>
Interventions	An online application, entitled 'Altitudes', will integrate purpose-built online social networking, expert and peer moderation, and evidence-based psychoeducation within a single application. Specifically, Altitudes, will utilize a Moderated Online Social Therapy (MOST) software framework, the three major functions of this framework include: (i) online psychoeducation (divided into specific thematic pathways, which are further separated into individual 'steps'); (ii) expert moderated social networking (via a 'cafe menu'); and (iii) peer moderation. Users can suggest everyday problems in caring for their relative, and the moderator invites other users to join in the problem solving 'group'. The system stores previous problems and solutions, providing an easily accessible 'solution wiki' to subsequent users. The social networking combined with problem solving and psychoeducation has been designed to provide social support, increase carers' understanding of their relative's disorder, and increase flexibility of interpersonal problem solving and communication.
Outcomes	The primary outcome will be carer perceived stress at 6 months, measured by The Perceived Stress Scale PSS. The PSS will be employed to measure perceived stress over the preceding 1 month. The PSS is a valid and reliable 10-item measure rated on a Likert scale ranging from 0 (never) to 4 (very often).
Starting date	20 October 2015
Contact information	www.anzctr.org.au/ACTRN12616000968471.aspx
Notes	

Archambault 2015

Trial name or title	Implementation and evaluation of a wiki involving multiple stakeholders including patients in the promotion of best practices in trauma care: the WikiTrauma interrupted time series protocol
Methods	Interrupted Time Series
Participants	Health care professionals
Interventions	Wiki101 and WikiTrauma
Outcomes	Primary: Trauma performance indicators. Secondary: Rates of complications; Length of stay; Mortality; FIM. Other secondary outcome measures: Intention to use WikiTrauma and the social cognitive determinants of this intention; The self-reported use of WikiTrauma in clinical practice; The actual frequency of WikiTrauma use - number of visits, length of visits, number of visitors, and number of unique visitors; The quality of information contained within WikiTrauma; The frequency of content modifications-number of visitors having modified content, number of pages modified, number of new pages created, and number of pages having generated an edit war; Participants' comments about what worked and improvements suggested; The estimated annual cost of maintaining WikiTrauma; The cost of delivering Wiki101; The estimated cost of creating new knowledge-decision tools; The estimated cost of updating old knowledge-decision tools.
Starting date	January 2016
Contact information	Patrick Michel Archambault patrick.m.archambault@gmail.com Centre intégré de santé et de services sociaux de Chaudière-Appalaches (Hôtel-Dieu de Lévis) Faculté de médecine, Université Laval Phone: 1-418-835-7121 # 3905
Notes	

ADDITIONAL TABLES

Table 1. Review methods for future updates of this review

Data extraction and management	Two review authors will independently undertake data extraction from all included studies using a modified version of the Cochrane EPOC data extraction template (EPOC 2015). We will resolve discrepancies in judgment by discussion and consensus, or by consulting a third review author if necessary. Where information will be missing, we will attempt to contact the study authors, and if data are not available, the study will be recorded as an 'Included study without data'. In addition to capturing EPOC standardised data extraction criteria, we will consider the following study or intervention characteristics: a) clinical area addressed; b) type of healthcare professionals (e.g. physician, nurse, physiotherapist, student nurse, resident); c) pre-licensure healthcare professionals (student nurses, residents); d) type of healthcare stakeholders (e.g. patients, consumer, decision maker, researcher); e) conceptual or theoretical underpinnings of the intervention (i.e. part of a theory based intervention); f) known effectiveness of the intervention for changing of healthcare professional behaviours (e.g. evidence-based intervention); g) number of components included in the intervention; h) source and authors of the intervention (e.g. professional organisation, governmental agency, health professionals training schools); i) mode of delivery (e.g. individuals or groups); j) frequency and timing of the intervention and its duration; k) type of CWA (i.e. Wiki, Google Knol, Google Docs, Google Wave); l) presence of a moderator; m) presence of a pre-existing community of practice or community of learners; n) open versus closed wiki or CWA; o) authorship clearly stated; p) type of conversational features integrated with the CWA (e.g. discussion pages, email, comment page); q) format of knowledge being shared within the CWA (e.g. reminders, care pathways,
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Table 1. Review methods for future updates of this review (Continued)

	<p>textbook format); r) formal teaching about how to use a wiki. For economic analysis data extraction, we plan to develop a data collection form specifically for use with health economic studies, based on the template used to produce the National Health Service (NHS) Economic Evaluation Database (EED) structured abstracts (Craig 2007).</p>
Assessment of risk of bias in included studies	<p>We plan for two review authors to independently assess the risk of bias of included studies, with disagreements resolved by discussion and consensus. For RCT, NRCT, and CBA study designs, we intend to assess and report the risk of bias for the following nine domains in accordance with Cochrane EPOC guidance (EPOC 2016): 1) adequate sequence generation; 2) allocation concealment; 3) blinding; 4) incomplete outcome data addressed; 5) free of selective reporting; 6) free of other bias; 7) baseline outcomes similar; 8) free of contamination; and 9) baseline characteristics similar.</p> <p>For ITS studies and repeated measure studies, we plan to assess and report the risk of bias for the following seven domains (EPOC 2016): 1) independence from other changes in time; 2) shape of the intervention effect pre-specified; 3) intervention unlikely to affect data collection; 4) blinding; 5) incomplete data outcome; 6) free from selective outcome reporting; and 7) free from other biases.</p> <p>We plan to assign an overall assessment of the risk of bias (high, moderate, or low risk of bias) to each of the included studies using the approach suggested in the <i>Cochrane Handbook for Systematic Reviews of Interventions</i> (Higgins 2011). We will prepare a summary table presenting an assessment of the risk of bias within and across studies for important outcomes.</p> <p>For health economic studies, we plan to assess risk of bias using Cochrane's tool for assessing risk of bias as well as the Consolidated health economic evaluation reporting standards (CHEERS) developed by the International Society for Pharmacoeconomics and Outcomes Research (ISPOR (Higgins 2011; Husereau 2013)).</p>
Measures of treatment effect	<p>Reporting</p> <p>For each study, we will report data in natural units. Where baseline results are available from RCTs, NRCTs, CBA studies, ITS studies, and RMSs, we will report pre- and post-intervention means or proportions for both study and control groups. We will calculate the unadjusted and adjusted (for any baseline imbalance) absolute change from baseline with 95% confidence intervals (CIs). For ITS studies, we will report the main outcomes in natural units and two effect sizes: the change in the level of outcome immediately after the introduction of the intervention, and the change in the slopes of the regression lines. Both of these estimates will be necessary for interpreting the results of each comparison. For example, there could be no change in the level immediately after the intervention, but there could be a significant change in slope.</p> <p>Analytic approach</p> <p>We will use the statistical methods proposed in Grimshaw 2004 to guide data analysis and presentation. Our statistical analysis will be based upon consideration of dichotomous practitioner process outcomes, continuous practitioner process outcomes, dichotomous patient outcome measures, and continuous patient outcome measures. In cases where there are insufficient data to calculate these effect sizes, we will present results of studies as reported by the authors.</p> <p>Where studies report more than one outcome, we will extract data on the primary outcome (as defined by the authors of the study). However, if the study reports more than one outcome and none of them are denoted as the primary variable, we will rank the effect sizes for all the variables and take the median value. In all cases, the direction of the effect size will be standardised so that a positive difference between post-intervention percentages or means will indicate a positive outcome.</p> <p>Primary analyses</p> <p>Where possible, we will present the results for all comparisons using a standard method of presentation. We will report results for categorical and continuous outcomes separately. For comparisons of RCTs, NRCTs, CBA studies, ITS studies, and RMSs, we will report (separately for each study design) median effect sizes across included studies, interquartile ranges (IQRs) of effect sizes across included studies, and the range of effect sizes across included studies. We will calculate standard-</p>

Table 1. Review methods for future updates of this review (Continued)

ized effect sizes for continuous measures by dividing the difference in mean scores between the intervention and comparison group in each study by the standard deviation of the comparison group. This results in a 'scale free' estimate of the effect for each study, which can be interpreted and pooled across studies regardless of the original scale of measurement used in each study (Laird 1990). When available, we will also report the pre- and post-intervention study and control data in natural units, with statistical significance provided across groups. For ITS studies, we will follow the recommendation of Ramsay 2003 and compute, where possible, a difference in slopes and/or a level effect.

Secondary analyses

Secondary analyses will explore the consistency of primary analyses with other types of endpoints.

Unit of analysis issues	Methods for re-analysis of RCTs, NRCTs and CBA studies with potential unit of analysis errors
	<p>Comparisons that randomise or allocate clusters (healthcare professionals or organisations) but do not account for clustering during analysis have 'potential unit of analysis errors' resulting in artificially extreme P values and overly narrow CIs (Ukoumunne 1999). Therefore, when possible, we will attempt to re-analyse studies with potential unit of analysis errors, by contacting primary authors for missing information. If a comparison is re-analysed, we will quote the P value and will annotate it as being 're-analysed'. If this is not possible, we will only report the point estimate.</p>
	<h3>Methods for re-analysis of ITS studies comparisons with inappropriate analysis</h3>
	<p>Where possible, we will use time series regression to re-analyse each comparison. We will estimate the best-fit pre-intervention and post-intervention lines using linear regression and autocorrelation adjusted for using the Cochrane-Orcutt method where appropriate (Draper 1981). We will test for first-order autocorrelation statistically using the Durbin-Watson statistic and higher order autocorrelations will be investigated using the autocorrelation and partial autocorrelation function.</p>
Dealing with missing data	<p>All efforts will be made to contact the original authors if missing data are noted in an included study. If this is impossible, we will clearly state if the data seemed to be 'missing at random'. If this is the case, we will analyse only the available data and ignore the missing data (Higgins 2011). If data seems 'not to be missing at random', we will clearly state our assumptions and we will either impute the missing data with replacement values, and treat these as if they were observed (e.g. last observation carried forward, imputing an assumed outcome such as assessing all were poor outcomes, imputing the mean, imputing based on predicted values from a regression analysis). We will also explore the impact of missing values on our results with the use of statistical models that allow for missing data, making clearly stated assumptions about their relationship with the available data. We will perform sensitivity analyses to assess how sensitive our results are to reasonable changes in the stated assumptions (Sensitivity analysis). Finally, we will address the potential of missing data on the findings of our review in our discussion section.</p>
Assessment of heterogeneity	<p>We will analyse included studies to determine whether there were studies sufficiently similar in participants characteristics (e.g. age, gender), study design, type of CWA (e.g. wiki, Google Docs), type of knowledge contained in CWA (e.g. wikis sharing reminders), environmental setting (e.g. critical care), health condition (e.g. acute disease), and outcome measurement, to allow for a meta-analysis of their combined data using a random-effects model. If studies are too heterogeneous, we will present a descriptive review of the included studies, using a narrative summary along with extracted data in tables and figures.</p> <p>Where meta-analysis is possible, we will assess statistical heterogeneity between trials using the χ^2 test and the I^2 statistic (a χ^2 P value of less than 0.05, or an I^2 value of 50% or higher will be considered to indicate substantial heterogeneity). If heterogeneity is identified, we will undertake a subgroup analysis to investigate its possible sources (Subgroup analysis and investigation of heterogeneity). We will also conduct a meta-regression if there are enough studies to assess the effect of the possible sources of heterogeneity.</p>
Assessment of reporting biases	<p>If sufficient studies are found, we will assess publication bias graphically using funnel plots and statistically using Begg and Egger tests (Egger 1997). While funnel plot asymmetry may indicate publi-</p>

Table 1. Review methods for future updates of this review (Continued)

cation bias, this is not always the case. We will consider all possible explanations for this asymmetry and discuss them in the review.

Data synthesis	<p>We expect to find statistical heterogeneity, given the range of disparate settings where wikis and CWAs have been tested, and the different content within these different CWAs. This makes it unlikely that statistical pooling will be feasible, but if there appears to be a body of studies amenable to meta-analysis, then we will display their results graphically, and view them to assess heterogeneity. It is unlikely that this review will find many studies for inclusion in a meta-analysis, and so statistical tests for heterogeneity will be insensitive. We will nevertheless carry out these tests. We will conduct any subsequent meta-analyses using a random-effects model. In comparisons of homogeneous groups of studies with different outcome measures, we will consider using a single effect size measure (standardised mean differences).</p> <p>If meta-analysis is not possible, we will provide narrative and qualitative summaries. We will group studies by criteria included in this protocol (e.g. type of CWA), and vote count studies grouped according to simple trichotomies on outcome: effective, no difference, or harm. We will perform formal qualitative textual analysis for each of these groups of studies, looking for common themes in the description of the intervention within each outcome group, and systematic differences between groups of studies with different outcomes.</p> <p>We plan to summarise the findings using the GRADE approach with input on the most important outcomes from patients and other decision makers, and produce a 'Summary of findings' table with selected studies, according to the <i>Cochrane Handbook for Systematic Reviews of Interventions</i> (Guyatt 2011; Higgins 2011).</p>
Subgroup analysis and investigation of heterogeneity	<p>We plan to investigate heterogeneity by preparing tables and bubble plots, and comparing effect sizes of studies grouped according to potential effect modifiers to investigate heterogeneity. For example, the following variables will guide our exploration of heterogeneity: the type of CWA (wikis compared to Google Docs), the age of wiki users and editors ('Internet generation' (born between 1976 and 1994) compared to participants born before the 'Internet generation'). We will also consider the following subgroups to explore the following effect modifiers of the intervention on the magnitude of effects observed across studies: a) open versus closed CWAs; b) clear authorship identification; c) the presence of a moderator; and d) being part of a theory-based intervention.</p> <p>Data allowing, we also plan to conduct the following comparisons: a) CWA intervention versus no intervention; b) CWA intervention versus any single intervention (any static intervention where users did not have the capability to edit the content of the page); c) a non-wiki CWA intervention versus a wiki CWA intervention; d) multifaceted intervention where a CWA was included versus any multifaceted intervention without a CWA (any intervention where a CWA is a part of the intervention but was not the only active ingredient); e) a CWA with an implementation strategy versus a wiki or CWA without an implementation strategy.</p> <p>A single intervention will be any static resource (e.g., a traditional web page) intervention where users do not have the capability in editing the content of the page. A multifaceted intervention will be any intervention where a CWA is a part of the intervention but is not the only active ingredient. For example, a study could explore the impact of a virtual learning environment that contains a wiki and other applications (e.g., discussion boards, social networks, live virtual classroom meetings) compared to traditional teacher-led classroom meetings or other educational interventions like problem-based learning groups.</p>
Sensitivity analysis	<p>We will undertake sensitivity analyses for the allocation of missing data by best and worst case analysis and will also undertake a sensitivity analysis on the basis of our evaluation of the risk of bias of each study. Since studies would not have been blinded, and already contained one domain with high risk of bias, our sensitivity analyses would include studies with at least two high risk of bias domains.</p>
Economics issues	<p>As described in the <i>Cochrane Handbook for Systematic Reviews of Interventions</i> (Higgins 2011), we will summarise methodological characteristics and results of included economic evaluations using additional tables (Additional tables), supplemented by a narrative summary that will compare and evaluate methods used and principal results between studies. We will tabulate unit cost data when available. We will report the currency and price year that applies to measures of costs in each</p>

Table 1. Review methods for future updates of this review (Continued)

original study, alongside measures of costs, incremental costs, and incremental cost-effectiveness, by study. Where details of currency and price year are available in original studies, we will convert measures of costs, incremental costs, and cost-effectiveness to current US dollar value, using implicit price deflators for gross domestic product (GDP) and purchasing power parities (PPPs). We will use the Campbell and Cochrane Economics Methods Group (CCEMG) and the Evidence for Policy and Practice Information and Coordinating Centre (EPPI-Centre) 'CCEMG-EPPI Cost Converter' (eppi.ioe.ac.uk/costconversion/), which is a web-based tool for adjusting estimates of cost expressed in one currency and price year to a specific target currency and price year (Shemilt 2010).

APPENDICES

Appendix 1. Mechanisms of action for collaborative writing applications

Mechanisms of action	References
Improve collaboration	Adams 2010; Andrus 2010; Bookstaver 2011; Ciesielka 2008; Cinnamon 2010; Cobus 2009; Culley 2012; Dhillon 2011; Gupta 2010; Hamilton 2008; Hamm 2009; Hawkins 2010; Hollinderbäumer 2013; Hulbert-Williams 2010; Jones 2010; Kardong-Edgren 2009; Llambi 2011; Meenan 2009; Mirk 2010; Montano 2010; Morley 2012; Morose 2007; Muir 2010; Philip 2008; Shaw 2010; Streeter 2007; Van Der Schoor-Knijnenburg 2009; Welsh 2007; Williams 2011
Influence behaviour change domains	Andrus 2010; Bookstaver 2011; Ciesielka 2008; Cinnamon 2010; Cobus 2009; Hickerson 2009; Kitson-Reynolds 2009; Hamilton 2008; Hamm 2009; Hulbert-Williams 2010; Kardong-Edgren 2009; Koerner 2011; Llambi 2011; McGee 2008; Moeller 2010; Musil 2011; Phadtare 2009; Philip 2008; Shaw 2010; Van Der Schoor-Knijnenburg 2009; Wan 2009; Williams 2011
Positively impact learning	Adams 2010; Andrus 2010; Bookstaver 2011; Ciesielka 2008; Culley 2012; Dhillon 2011; Hamilton 2008; Hawkins 2010; Hulbert-Williams 2010; Jones 2010; Koerner 2011; Lanning 2010; Llambi 2011; McGee 2008; Miller 2009; Moeller 2010; Musil 2011; Shaw 2010; Stutsky 2010; Umland 2011; Williams 2011
Facilitate knowledge management and increase access to information	Bookstaver 2011; Chiarella 2009; Cinnamon 2010; Culley 2012; Felsen 2010; Gerber 2010; Hamilton 2008; Koerner 2011; Meenan 2009; Muir 2010; Streeter 2007; Welsh 2007; Williams 2011; Wright 2009; Yates 2011; Yu 2011

Appendix 2. CENTRAL search strategy

#	Syntax	Hits
1	wiki?:ti	1
2	(a????wiki? or b????wiki? or c????wiki? or d????wiki? or e????wiki? or f????wiki? or g????wiki? or h????wiki? or i????wiki? or j????wiki? or k????wiki? or l????wiki? or m????wiki? or n????wiki? or o????wiki? or p????wiki? or q????wiki? or r????wiki? or s????wiki? or t????wiki? or u????wiki? or v????wiki? or w????wiki? or x????wiki? or y????wiki? or z????wiki?):ti,ab	0
3	wiki*:ti,ab	7

(Continued)

4	((web2* or "web 2.0") and collaborat*):ti,ab	6
5	(collaborat* near/5 (internet or software or app or apps)):ti,ab	41
6	(online near/5 collaborat*):ti,ab	8
7	(electronic near/5 collaborat*):ti,ab	14
8	(collaborat* near/4 (web or web-based)):ti,ab	18
9	(collaborat* near/3 (authoring or writing)):ti,ab	2
10	(collaborat* near/4 online).ti,ab	5
11	(collaborat* near/3 technolog*):ti,ab	8
12	collaborat* platform?:ti,ab	11
13	(collaborat* near/2 app?):ti,ab	0
14	(google near (app or apps or collaborat* or docs or doc or draw or knol or wave or sites)):ti,ab	8
15	(mediawiki or meetingwords* or collabedit* or etherpad*):ti,ab	1
16	((social near/2 (web or media)) and (annotat\$ or editing or authoring or writing)):ti,ab	0
17	(social near/2 (web or media) near/10 (collaborat\$ or interactiv\$)):ti,ab	0
18	(mashup? or (mash NEAR/1 up?)):ti,ab	0
19	("group writing" or "group authoring" or "community authoring" or "community writing"):ti,ab	6
20	("community annotation" or "collaborat* annotat*" or "online annotat*"):ti,ab	0
21	((group or online) near/3 (edit or editing)):ti,ab	2
22	(online near/2 writing):ti,ab	3
23	real time edit*:ti,ab	39
24	online editor?:ti,ab	22
25	{or #2-#24} not #1	203
26	Internet	2538
27	Online systems	132
28	Cooperative behavior	844
29	collaborative:ti,ab	2733
30	{(or #26-#27} and {or #28-#29}) not {or #1, #25}	25

(Continued)

31	{(or #25, #30)}	228
32	#1 not 31	1
33	#31 or #32	229
34	(Specialist OR Specialists OR Health OR Medical OR "Decision maker" OR "decision makers" OR Patient OR Patients OR "Family member" OR "Family members" OR "Next of kin" OR "Next-of-kin" OR Researcher OR researchers OR Technician OR technicians OR Technologist OR technologists OR Therapist OR therapists OR Caregiver OR caregivers OR Doctor OR doctors OR GP OR Practitioner OR practitioners OR "Primary care provider" OR "primary care providers" OR Clinician OR clinicians OR Physician OR physicians OR "Clinical Officer" OR "Clinical officers" OR "Clinical director" OR "clinical directors" OR Surgeon OR surgeons OR Nurse OR nurses OR "Hospital orderly" OR "Hospital orderlies" OR "ward assistant" OR "ward assistants" OR Dental OR Dentist OR dentists OR Denturist OR denturists OR Orthodontist OR Orthodontists OR Periodontist OR Periodontists OR Paedodontist OR Paedodontists OR pedodontist OR pedodontists OR Prosthodontist OR prosthodontists OR Stomatologist OR stomatologists OR Hygienist OR Hygienists OR Audiologist OR audiologists OR Otolaryngologist OR Otolaryngologists OR ENT OR Allergist OR Allergists OR Anesthesiologist OR Anesthesiologists OR Cardiologist OR Cardiologists OR Dermatologist Dermatologists OR Gynecologist Gynecologists OR Obstetrician OR Obstetricians OR Midwives OR Midwife OR Neonatologist OR Neonatologists OR Pediatrician OR Pediatricians OR Primatologist OR Primatologists OR Endocrinologist OR Endocrinologists OR Immunologist OR Immunologists OR Andrologist OR Andrologists OR Rheumatologist OR Rheumatologists OR Neurologist OR Neurologists OR Neurosurgeon OR Neurosurgeons OR Intensivist OR Intensivists OR Oncologist OR Oncologists OR Physiologist OR Physiologists OR Physiotherapist OR Physiotherapists OR "ambulance attendants" OR "ambulance attendant" OR "Ambulance officer" OR "Ambulance officers" OR EMT OR Paramedic OR Paramedics OR Feldsher OR Feldshers OR Dietitian OR Dietitians OR Nutritionist OR Nutritionists OR Pharmacist OR Pharmacists OR "Dispensing chemist" OR "Dispensing chemists" OR "Pharmaceutical assistant" OR "Pharmaceutical assistants" OR Psychiatrist OR Psychiatrists OR Psychologist OR Psychologists OR "Social worker" OR "social workers" OR Counsellor OR Counsellors OR Radiologist OR Radiologists OR Radiographer OR Radiographers OR Radiotherapist OR Radiotherapists OR Mammographer OR Mammographers OR Sonographer OR Sonographers OR "Medical imaging assistant" OR "Medical imaging assistants" OR Gastrologist OR Gastrologists OR Hepatologist OR Hepatologists OR Nephrologist OR Nephrologists OR Urologist OR Urologists OR Pulmonologist OR Pulmonologists OR Hematologist OR Hematologists OR Phlebotomist OR Phlebotomists OR Orthopedist OR Orthopedists OR Podiatrist OR Podiatrists OR Geriatrician OR Geriatricians OR "Home care aid" OR "Home care aids" OR "Personal care provider" OR "Personal care providers" OR "Personal care assistant" OR "Personal care assistants" OR "First aid attendant" OR "First aid attendants" OR Ophthalmologist OR Ophthalmologists OR Optometrist OR Optometrists OR Optician OR Opticians OR Orthoptist OR Orthoptists OR Internist OR Internists OR Diagnostician OR Diagnosticians OR Pathologist OR Pathologists OR Orthotist OR Orthotists OR Prosthetist OR Prosthetists OR Acupuncturist OR Acupuncturists OR Homeopath OR Homeopaths OR Electrotherapist OR Electrotherapists OR Hydrotherapist OR Hydrotherapists OR Naturopath OR Naturopaths OR Osteopath OR Osteopaths OR Chiropractor OR Chiropractors OR "Clinical Coder" OR "Clinical Coders" OR "Healthcare worker" OR "Healthcare workers" OR "Healthcare professional" OR "Healthcare professionals");ti,ab	562153
35	patients	2309

(Continued)

36	health personnel	7041
37	research personnel	71
38	{or #34-#37}	563902
39	31 and 39	177

Appendix 3. MEDLINE and ERIC search strategy (via OVID)

#	Syntax	Hits
1	wiki?.ti.	456
2	(a????wiki? or b????wiki? or c????wiki? or d????wiki? or e????wiki? or f????wiki? or g????wiki? or h????wiki? or i????wiki? or j????wiki? or k????wiki? or l????wiki? or m????wiki? or n????wiki? or o????wiki? or p????wiki? or q????wiki? or r????wiki? or s????wiki? or t????wiki? or u????wiki? or v????wiki? or w????wiki? or x????wiki? or y????wiki? or z????wiki?).ti,ab.	102
3	wiki\$.ti,ab.	1894
4	((web2\$ or "web 2.0") and collaborat\$).ti,ab.	481
5	(collaborat\$ adj5 (internet or software or app or apps)).ti,ab.	924
6	(online adj5 collaborat\$).ti,ab.	1132
7	(electronic adj5 collaborat\$).ti,ab.	296
8	(collaborat\$ adj4 (web or web-based)).ti,ab.	577
9	(collaborat\$ adj3 (authoring or writing)).ti,ab.	1008
10	(collaborat\$ adj4 online).ti,ab.	1012
11	(collaborat\$ adj3 technolog\$).ti,ab.	1102
12	collaborat\$ platform?.ti,ab.	81
13	(collaborat\$ adj2 app?).ti,ab.	11
14	(google adj (app or apps or collaborat\$ or docs or doc or draw or knol or wave or sites)).ti,ab.	133
15	(mediawiki or meetingwords\$ or collabedit\$ or etherpad\$).ti,ab.	44
16	((social adj2 (web or media)) and (annotat\$ or editing or authoring or writing)).ti,ab.	172
17	(social adj2 (web or media) adj10 (collaborat\$ or interactiv\$)).ti,ab.	209
18	(mashup? or "mash up?").ti,ab.	91

(Continued)

19	(group writing or group authoring or community authoring or community writing).ti,ab.	167
20	(community annotation or collaborat\$ annotat\$ or online annotat\$).ti,ab.	108
21	((group or online) adj3 (edit or editing)).ti,ab.	89
22	(online adj2 writing).ti,ab.	276
23	real time edit\$.ti,ab.	5
24	online editor?.ti,ab.	2
25	(or/2-24) not 1	7198
26	Internet/	78331
27	Online systems/	14732
28	Cooperative behavior/	36673
29	collaborative.ti,ab.	65492
30	((or/26-27) and (or/28-29)) not (or/1,25)	1821
31	(randomized controlled trial or controlled clinical trial).pt. or randomized.ab. or placebo.ab. or clinical trials as topic.sh. or randomly.ab. or trial.ti.	10 813 939
32	exp animals/ not humans.sh.	4 308 350
33	31 not 32	999 061
34	intervention?.ti. or (intervention? adj6 (clinician? or collaborat\$ or community or complex or DESIGN\$ or doctor? or educational or family doctor? or family physician? or family practitioner? or financial or GP or general practice? or hospital? or impact? or improv\$ or individuali?e? or individuali?ing or interdisciplin\$ or multicomponent or multi-component or multidisciplin\$ or multi-disciplin\$ or multifacet\$ or multi-facet\$ or multimodal\$ or multi-modal\$ or personali?e? or personali?ing or pharmacies or pharmacist? or pharmacy or physician? or practitioner? or prescrib\$ or prescription? or primary care or professional\$ or provider? or regulatory or regulatory or tailor\$ or target\$ or team\$ or usual care)).ab.	242 381
35	(pre-intervention? or preintervention? or "pre intervention?" or post-intervention? or postintervention? or "post intervention?").ti,ab.	16 894
36	(hospital\$ or patient?).hw. and (study or studies or care or health\$ or practitioner? or provider? or physician? or nurse? or nursing or doctor?).ti,hw.	816 866
37	demonstration project?.ti,ab.	4326
38	(pre-post or "pre test\$" or pretest\$ or posttest\$ or "post test\$" or (pre adj5 post)).ti,ab.	111246
39	(pre-workshop or post-workshop or (before adj3 workshop) or (after adj3 workshop)).ti,ab.	1247

(Continued)

40	trial.ti. or ((study adj3 aim?) or "our study").ab.	851960
41	(before adj10 (after or during)).ti,ab.	424920
42	("quasi-experiment\$" or quasiexperiment\$ or "quasi random\$" or quasirandom\$ or "quasi control\$" or quasicontrol\$ or ((quasi\$ or experimental) adj3 (method\$ or study or trial or design\$))).ti,ab,hw.	133 349
43	("time series" adj2 interrupt\$).ti,ab,hw.	1814
44	(time points adj3 (over or multiple or three or four or five or six or seven or eight or nine or ten or eleven or twelve or month\$ or hour? or day? or "more than")).ab.	13095
45	pilot.ti.	55525
46	Pilot projects/	102498
47	(clinical trial or controlled clinical trial or multicenter study).pt.	682423
48	(multicentre or multicenter or multi-centre or multi-center).ti.	37603
49	random\$.ti,ab. or controlled.ti.	962422
50	(control adj3 (area or cohort? or compare? or condition or design or group? or intervention? or participant? or study)).ab. not (controlled clinical trial or randomized controlled trial).pt.	525499
51	(control year? or experimental year? or (control period? or experimental period?)).ti,ab.	15193
52	evaluation studies as topic/ or prospective studies/ or retrospective studies/	1127398
53	(utili?ation or programme or programmes).ti.	71056
54	(during adj5 period).ti,ab.	354094
55	((strategy or strategies) adj2 (improv\$ or education\$)).ti,ab.	30962
56	(purpose adj3 study).ab.	304117
57	comment on.cm. or review.pt. or (review not "peer review\$").ti. or randomized controlled trial.pt.	3424963
58	(rat or rats or cow or cows or chicken? or horse or horses or mice or mouse or bovine or animal?).ti,hw. or veterinar\$.ti,ab,hw.	6097129
59	exp animals/ not humans.sh.	4308350
60	(or/34-56) not (or/57-59)	3559048
61	(or/25,30) and 33	442
62	((or/25,30) and 60) not 61	1185
63	1 not (or/61-62)	456

(Continued)

64	61 or 62 or 63	2082
65	(Specialist? or Health or Medical or "Decision maker?" or Patient? or "Next-of-kin" or "Next of kin" or "Family member?" or Researcher? or Technician? or Technologist? or Therapist? or Caregiver? or Doctor? or GP or Practitioner? or "Primary care provider?" or Clinician? or Physician? or "Clinical Officer?" or "Clinical director?" or Surgeon? or Nurse? or "Hospital orderly" or "Hospital orderlies" or "Ward assistant?" or Dental or Dentist? or Denturist? or Orthodontist? or Periodontist? or Paedodontist? or Pedodontist? or Prosthodontist? or Stomatologist? or Hygienist? or Audiologist? or Otolaryngologist? or ENT or Allergist? or Anesthesiologists? or Cardiologist? or Dermatologist? or Gynecologist? or Obstetrician? or Midwives or Midwife or Neonatologist? or Pediatrician? or Primatologist? or Endocrinologist? or Immunologist? or Andrologist? or Rheumatologist? or Neurologist? or Neurosurgeon? or Intensivist? or Oncologist? or Physiologist? or Physiotherapist? or "Ambulance attendant?" or "Ambulance officer?" or EMT or Paramedic? or Feldsher? or Dietitian? or Nutritionist? or Pharmacist? or "Dispensing chemist?" or "Pharmaceutical assistant?" or Psychiatrist? or Psychologist? or "Social worker?" or Counsellor? or Radiologist? or Radiographer? or Radiotherapist? or Mammographer? or Sonographer? or "Medical imaging assistant?" or Gastrologist? or Hepatologist? or Nephrologist? or Urologist? or Pulmonologist? or Hematologist? or Phlebotomist? or Orthopedist? or Podiatrist? or Geriatrician? or "Home care aid?" or "Personal care provider?" or "Personal care assistant?" or "First aid attendant?" or Ophthalmologist? or Optometrist? or Optician? or Orthoptist? or Internist? or Diagnostician? or Pathologist? or Orthotist? or Prosthetist? OR "Healthcare workers?" OR "Healthcare professional?").ti,ab.	7630007
66	(Acupuncturist? or Homeopath? or Electrotherapist? or Hydrotherapist? or Naturopath? or Osteopath? or Chiropractor? or "Clinical Coder?").ti,ab.	25666
67	exp "health personnel"/	445510
68	exp "Patients"/	59073
69	"research personnel"/	13155
70	/65-69	7810850
	70 and 64	1086

Appendix 4. Embase search strategy

#	Syntax	Hits
1	wiki*:ti	248
2	(a????wiki? OR b????wiki? OR c????wiki? OR d????wiki? OR e????wiki? OR f????wiki? OR g????wiki? OR h????wiki? OR i????wiki? OR j????wiki? OR k????wiki? OR l????wiki? OR m????wiki? OR n????wiki? OR o????wiki? OR p????wiki? OR q????wiki? OR r????wiki? OR s????wiki? OR t????wiki? OR u????wiki? OR v????wiki? OR w????wiki? OR x????wiki? OR y????wiki? OR z????wiki?) OR AB (a????wiki? OR b????wiki? OR c????wiki? OR d????wiki? OR e????wiki? OR f????wiki? OR g????wiki? OR h????wiki? OR i????wiki? OR j????wiki? OR k????wiki? OR l????wiki? OR m????wiki? OR n????wiki? OR o????wiki? OR p????wiki? OR q????wiki?	2

(Continued)

ki? OR r????wiki? OR s????wiki? OR t????wiki? OR u????wiki? OR v????wiki? OR
w????wiki? OR x????wiki? OR y????wiki? OR z????wiki?)

3	wiki*:ti,ab	811
4	((web2* OR "web 2.0") AND collaborat*):ti,ab	83
5	(collaborat* NEAR/5 (internet OR software OR app OR apps)):ti,ab	601
6	(online NEAR/5 collaborat*):ti,ab	215
7	(electronic NEAR/5 collaborat*):ti,ab	154
8	(collaborat* NEAR/4 (web OR web-based)):ti,ab	222
9	(collaborat* NEAR/3 (authoring OR writing)):ti,ab	43
10	(collaborat* NEAR/4 online):ti,ab	181
11	(collaborat* NEAR/3 technolog*):ti,ab	300
12	(collaborat* NEAR/5 (platform OR platforms)):ti,ab	346
13	(collaborat* NEAR/2 (app OR apps)):ti,ab	6
14	(google NEAR/1 (app OR apps OR collaborat* OR docs OR doc OR draw OR knol OR wave OR sites)):ti,ab	117
15	(mediawiki OR meetingwords* OR collabedit* OR etherpad*):ti,ab	22
16	((social NEAR/2 (web OR media)) AND (annotat* OR editing OR authoring OR writing)):ti,ab	79
17	((social NEAR/2 (web OR media)) AND (collaborat* OR interactiv*)):ti,ab	410
18	(mashup OR mash-up OR mashups OR "mash up" OR "mash ups"):ti,ab	30
19	(group writing OR group authoring OR community authoring OR community writing):ti,ab	748
20	(community NEAR/7 annotation):ab,ti OR (collaborat* NEAR/7 annotat*):ab,ti OR (online NEAR/7 annotat*):ab,ti	338
21	((group OR online) NEAR/3 (edit OR editing)):ti,ab	21
22	(online NEAR/2 writing):ti,ab	20
23	(real time edit*):ab,ti	789
24	(online editor*):ti,ab	565
25	(#2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24) NOT #1	5 264
26	"internet"/de	55770

(Continued)

27	"online system"/de	16 531
28	cooperation'/de	12 177
29	collaborative:ti,ab	36 601
30	((#26 OR #27) AND (#28 OR #29)) NOT (#1 OR #25)	806
31	random*:ab,ti OR placebo*:de,ab,ti OR (double NEXT/1 blind*):ab,ti	1 145 697
32	animals'/de NOT 'human'/de	25 369
33	#31 NOT #32	1 145 418
33	randomized controlled trials'/de OR 'controlled clinical trial'/de OR 'quasi experimental study'/de OR 'pretest posttest control group design'/de OR 'time series analysis'/de OR 'experimental design'/de OR 'multicenter study'/de OR randomis*:ab,ti OR randomiz*:ab,ti OR randomly:ab,ti OR groups:ab OR trial:ti OR multicentre:ti OR multicenter:ti OR multi centre:ti OR multi center:ti OR (intervention OR interventions OR effect OR effects OR impact OR impacts OR controlled OR control group OR control groups OR (before NEAR/5 after) OR (pre NEAR/5 post) OR ((pretest OR pre test) AND (posttest OR post test)) OR quasiexperiment* OR quasi experiment* OR pseudo experiment* OR pseudo-experiment* OR evaluat* OR time series OR time point OR time points OR repeated measur*):ab,ti	132 837
34	systematic review'/exp OR systematic review OR literature review:ti OR 'cochrane database of systematic reviews':jt	168 162
35	animals'/exp OR 'invertebrate'/exp OR 'animal experiment'/de OR 'animal model'/de OR 'animal tissue'/de OR 'animal cell'/de OR 'nonhuman'/de	16 664 860
36	human'/de OR 'normal human'/de OR 'human cell'/de	12 077 704
37	#35 NOT (#35 AND #36)	4 633 203
38	#33 OR #37	4 799 482
39	#33 NOT #38	109 204

Appendix 5. CINAHL search strategy

#	Syntax	Hits
1	TI wiki?	64
2	TI (a????wiki? OR b????wiki? OR c????wiki? OR d????wiki? OR e????wiki? OR f????wiki? OR g????wiki? OR h????wiki? OR i????wiki? OR j????wiki? OR k????wiki? OR l????wiki? OR m????wiki? OR n????wiki? OR o????wiki? OR p????wiki? OR q????wiki? OR r????wiki? OR s????wiki? OR t????wiki? OR u????wiki? OR v????wiki? OR w????wiki? OR x????wiki? OR y????wiki? OR z????wiki?) AB (a????wiki? OR b????wiki? OR c????wiki? OR d????wiki? OR e????wiki? OR f????wiki? OR g????wiki? OR h????wiki? OR i????wiki? OR j????wiki? OR k????wiki? OR l????wiki? OR m????wiki? OR n????wiki? OR o????wiki? OR p????wiki? OR	0

(Continued)

q????wiki? OR r????wiki? OR s????wiki? OR t????wiki? OR u????wiki? OR v????
wiki? OR w????wiki? OR x????wiki? OR y????wiki? OR z????wiki?)

3	TI wiki* AB wiki*	518
4	TI ((web2* OR "web 2.0") and collaborat*) AB ((web2* OR "web 2.0") and collaborat*)	73
5	TI (collaborat* N5 (internet OR software OR app OR apps) AB (collaborat* N5 (internet OR software OR app OR apps))	5 849
6	TI (online N5 collaborat*) AB (online N5 collaborat*)	176
7	TI (electronic N5 collaborat*) AB (electronic N5 collaborat*)	95
8	TI (collaborat* N4 (web OR web-based)) AB (collaborat* N4 (web OR web-based))	139
9	TI (collaborat* N3 (authoring OR writing)) AB (collaborat* N3 (authoring OR writing))	84
10	TI (collaborat* N4 online) AB (collaborat* N4 online)	153
11	TI (collaborat* N3 technolog*) AB (collaborat* N3 technolog*)	265
12	TI (collaborat* N5 platform?) AB (collaborat* N5 platform?)	12
13	TI (collaborat* N2 app?) AB (collaborat* N2 app?)	3
14	TI (google N (app OR apps OR collaborat\$ OR docs OR doc OR draw OR knol OR wave OR sites)) AB (google N (app OR apps OR collaborat\$ OR docs OR doc OR draw OR knol OR wave OR sites))	29
15	TI (mediawiki OR meetingwords* OR collabedit* OR etherpad*) AB (mediawiki OR meetingwords* OR collabedit* OR etherpad*)	4
16	TI ((social N2 (web OR media)) and (annotat* OR editing OR authoring OR writ- ing)) AB ((social N2 (web OR media)) and (annotat* OR editing OR authoring OR writing))	35
17	TI (social N2 (web OR media) N10 (collaborat* OR interactiv*)) AB (social N2 (web OR media) N10 (collaborat* OR interactiv*))	65
18	TI (mashup? OR (mash N1 up?) AB (mashup? OR (mash N1 up?)	35
19	TI ("group writing" OR "group authoring" OR "community authoring" OR "community writing")	13

(Continued)

	AB ("group writing" OR "group authoring" OR "community authoring" OR "community writing")	
20	TI ((community N7 annotation) OR (collaborat* N7 annotat*) OR (online N7 annotat*)) AB ((community N7 annotation) OR (collaborat* N7 annotat*) OR (online N7 annotat*))	22
21	TI ((group OR online) N3 (edit OR editing)) AB ((group OR online) N3 (edit OR editing))	8
22	TI (online N2 writing) AB (online N2 writing)	26
23	TI "real time" N7 edit* AB "real time" N7 edit*	7
24	TI online N7 editor? AB online N7 editor?	18
25	(S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24) NOT S1	7244
26	(MH "Internet")	36 234
27	(MH "Online systems")	1553
28	(MH "Cooperative behavior")	6415
29	TI collaborative AB collaborative	16 364
30	((#26 OR #27) AND (#28 OR #29)) NOT (#1 OR #25)	271
31	(MH "Randomized Controlled Trials") or (MH "Random Assignment") or (MH "Random Sample+")	111 632
32	(MH "Clinical Trials") or (MH "Intervention Trials") or (MH "Therapeutic Trials")	130 573
33	(MH "Double-Blind Studies") or (MH "Single-Blind Studies") or (MH "Triple-Blind Studies")	43 650
34	(MH "Control (Research)") or (MH "Control Group") or (MH "Placebos") or (MH "Placebo Effect")	18 105
35	(MH "Crossover Design") OR (MH "Quasi-Experimental Studies")	21 802
36	PT (clinical trial or randomized controlled trial)	135 419
37	TI (random* or RCT or RCTs) or AB (random* or RCT or RCTs)	179 118
38	TI (controlled N5 (trial* or stud*)) or AB (controlled N5 (trial* or stud*))	83 431
39	TI (clinical* N5 trial*) or AB (clinical* N5 trial*)	57 373

(Continued)

40	TI ((control or treatment or experiment* or intervention) N5 (group* or subject* or patient*)) or AB ((control or treatment or experiment* or intervention) N5 (group* or subject* or patient*))	206 351
41	TI ((control or experiment* or conservative) N5 (treatment or therapy or procedure or manage*)) or AB ((control or experiment* or conservative) N5 (treatment or therapy or procedure or manage*))	27 520
42	TI ((singl* or doubl* or tripl* or trebl*) N5 (blind* or mask*)) or AB ((singl* or doubl* or tripl* or trebl*) N5 (blind* or mask*))	25 746
43	TI (cross-over or cross over or crossover) or AB (cross-over or cross over or crossover)	18 641
44	TI (placebo* or sham) or AB (placebo* or sham)	37 882
45	TI trial	63 320
46	TI (assign* or allocat*) or AB (assign* or allocat*)	52 686
47	TI controls or AB controls	208 745
48	TI (quasi-random* or quasi random* or pseudo-random* or pseudo random*) or AB (quasi-random* or quasi random* or pseudo-random* or pseudo random*)	2 931
49	S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48	639 060
50	(PT randomized controlled trial) OR (PT clinical trial) OR (PT research) OR (MH "Randomized Controlled Trials") OR (MH "Clinical Trials") OR (MH "Intervention Trials") OR (MH "Nonrandomized Trials") OR (MH "Experimental Studies") OR (MH "Pretest-Posttest Design+") OR (MH "Quasi-Experimental Studies+") OR (MH "Multicenter Studies") OR (MH "Health Services Research") OR (TI (randomis* OR randomiz* OR randomly) OR AB (randomis* OR randomiz* OR randomly)) OR (TI (trial OR effect* OR impact* OR intervention* OR (before N5 after) OR (pre N5 post) OR ((pretest OR "pre test") AND (posttest OR "post test"))) OR quasiexperiment* OR (quasi W0 experiment*) OR pseudoexperiment* OR pseudoexperiment* OR evaluat* OR "time series" OR (time W0 point*) OR (repeated W0 measur*)) OR AB (trial OR effect* OR impact* OR intervention* OR (before N5 after) OR (pre N5 post) OR ((pretest OR "pre test") AND (posttest OR "post test"))) OR quasiexperiment* OR (quasi W0 experiment*) OR (pseudo experiment*) OR pseudoexperiment* OR evaluat* OR "time series" OR (time W0 point*) or (repeated W0 measur*))	1 941 996
51	(S25 OR S30) AND S49	5 982
52	((S25 OR S30) AND S50) NOT S51	726
53	S1 NOT (S51 OR S52)	64
54	S51 OR S52 OR S53	6 772
55	TI (Specialist? OR Health OR Medical OR "Decision maker" OR "decision makers" OR Patient? OR "Next-of-kin" OR "Next of kin" OR "family member" OR "family members" OR Researcher? OR Technician? OR Technologist? OR Therapist? OR Caregiver? OR Doctor?)	1 293 961

(Continued)

	AB (Specialist? OR Health OR Medical OR “Decision maker” OR “decision makers” OR Patient? OR “Next-of-kin” OR “Next of kin” OR “family member” OR “family members” OR Researcher? OR Technician? OR Technologist? OR Therapist? OR Caregiver? OR Doctor?)	
56	TI (GP OR Practitioner? OR “Primary care provider” OR “Primary care providers” OR Clinician? OR Physician? OR “Clinical Officer” OR “Clinical officers” OR “Clinical director” OR “Clinical directors” OR Surgeon? OR Nurse? OR “Hospital orderly” OR “Hospital orderlies” OR “Ward assistant”) AB (GP OR Practitioner? OR “Primary care provider” OR “Primary care providers” OR Clinician? OR Physician? OR “Clinical Officer” OR “Clinical officers” OR “Clinical director” OR “Clinical directors” OR Surgeon? OR Nurse? OR “Hospital orderly” OR “Hospital orderlies” OR “Ward assistant”)	295 717
57	TI (“Ward assistants” OR Dental OR Dentist? OR Denturist? OR Orthodontist? OR Periodontist? OR Paedodontist? OR pedodontist? OR Prosthodontist? OR Stomatologist? OR Hygienist? OR Audiologist? OR Otolaryngologist? OR ENT OR Allergist? OR Anesthesiologist? OR Cardiologist?) AB (“Ward assistants” OR Dental OR Dentist? OR Denturist? OR Orthodontist? OR Periodontist? OR Paedodontist? OR pedodontist? OR Prosthodontist? OR Stomatologist? OR Hygienist? OR Audiologist? OR Otolaryngologist? OR ENT OR Allergist? OR Anesthesiologist? OR Cardiologist?)	41 265
58	TI (Dermatologist? OR Gynecologist? OR Obstetrician? OR Midwives OR Midwife OR Neonatologist? OR Pediatrician? OR Primatologist? OR Endocrinologist? OR Immunologist? OR Andrologist? OR Rheumatologist? OR Neurologist? OR Neurosurgeon? OR Intensivist?) AB (Dermatologist? OR Gynecologist? OR Obstetrician? OR Midwives OR Midwife OR Neonatologist? OR Pediatrician? OR Primatologist? OR Endocrinologist? OR Immunologist? OR Andrologist? OR Rheumatologist? OR Neurologist? OR Neurosurgeon? OR Intensivist?)	23 449
59	TI (Oncologist? OR Physiologist? OR Physiotherapist? OR “ambulance attendants” OR “ambulance attendant” OR “Ambulance officer” OR “Ambulance officers” OR EMT OR Paramedic? OR Feldsher? OR Dietitian? OR Nutritionist? OR Pharmacist?) AB (Oncologist? OR Physiologist? OR Physiotherapist? OR “ambulance attendants” OR “ambulance attendant” OR “Ambulance officer” OR “Ambulance officers” OR EMT OR Paramedic? OR Feldsher? OR Dietitian? OR Nutritionist? OR Pharmacist?)	16 902
60	TI (“Dispensing chemist” OR “Dispensing chemists” OR “Pharmaceutical assistant” OR “Pharmaceutical assistants” OR Psychiatrist? OR Psychologist? OR “Social worker” OR “Social workers” OR Counsellor? OR Radiologist? OR Radiographer? OR Radiotherapist?) AB (“Dispensing chemist” OR “Dispensing chemists” OR “Pharmaceutical assistant” OR “Pharmaceutical assistants” OR Psychiatrist? OR Psychologist? OR “Social worker” OR “Social workers” OR Counsellor? OR Radiologist? OR Radiographer? OR Radiotherapist?)	17 391
61	TI (Mammographer? OR Sonographer? OR “Medical imaging assistant” OR “Medical imaging assistants” OR Gastrologist? OR Hepatologist? OR Nephrologist? OR Urologist? OR Pulmonologist? OR Hematologist? OR Phlebotomist? OR Orthopedist? OR Podiatrist?) AB (Mammographer? OR Sonographer? OR “Medical imaging assistant” OR “Medical imaging assistants” OR Gastrologist? OR Hepatologist? OR Nephrologist? OR Urologist? OR Pulmonologist? OR Hematologist? OR Phlebotomist? OR Orthopedist? OR Podiatrist?)	2 682

(Continued)

62	TI (Geriatrician? OR "Home care aid" or "Home care aidS" OR "Personal care provider" OR "Personal care providers" OR "Personal care assistant" OR "Personal care assistants" OR "First aid attendant" OR "First aid attendants" OR Ophthalmologist? OR Optometrist? OR Optician?) AB (Geriatrician? OR "Home care aid" or "Home care aidS" OR "Personal care provider" OR "Personal care providers" OR "Personal care assistant" OR "Personal care assistants" OR "First aid attendant" OR "First aid attendants" OR Ophthalmologist? OR Optometrist? OR Optician?)	1 344
63	TI (Orthoptist? OR Internist? OR Diagnostician? OR Pathologist? OR Orthotist? OR Prosthetist? OR Acupuncturist? OR Homeopath? OR Electrotherapist? OR Hydrotherapist? OR Naturopath? OR Osteopath? OR Chiropractor? OR "Clincial Coder" OR "Clincial Coders") AB (Orthoptist? OR Internist? OR Diagnostician? OR Pathologist? OR Orthotist? OR Prosthetist? OR Acupuncturist? OR Homeopath? OR Electrotherapist? OR Hydrotherapist? OR Naturopath? OR Osteopath? OR Chiropractor? OR "Clincial Coder" OR "Clincial Coders")	8 783
64	TI ("Healthcare worker" OR "healthcare workers" OR "healthcare professional" OR "healthcare professionals") AB ("Healthcare worker" OR "healthcare workers" OR "healthcare professional" OR "healthcare professionals")	10 526
65	#55 OR #56 OR #57 OR #58 OR #59 OR #60 OR #61 OR #62 OR #63 OR #64	1 484 459
65	(MH "Health Personnel+")	405 544
66	(MH "Patients+")	195 415
67	(MH "research personnel")	5 354
68	#65 OR #66 OR #67	582 073
69	#64 OR #68	1 812 544
70	#69 AND #54	4 580

Appendix 6. Web of Science search strategy

#	Syntax	Hits
1	TI= wiki?	298
2	TS=(a????wiki? OR b????wiki? OR c????wiki? OR d????wiki? OR e????wiki? OR f????wiki? OR g????wiki? OR h????wiki? OR i????wiki? OR j????wiki? OR k????wiki? OR l????wiki? OR m????wiki? OR n????wiki? OR o????wiki? OR p????wiki? OR q????wiki? OR r????wiki? OR s????wiki? OR t????wiki? OR u????wiki? OR v????wiki? OR w????wiki? OR x????wiki? OR y????wiki? OR z????wiki?)	2
3	TS = wiki*	5636
4	TS=((web2* OR "web 2.0") NEAR/5 collaborat*)	459
5	TS=(collaborat* NEAR/5 (internet OR software OR app OR apps))	3996

(Continued)

6	TS=(online NEAR/5 collaborat*)	2053
7	TS=(electronic NEAR/5 collaborat*)	747
8	TS=(collaborat* NEAR/4 (web OR web-based))	3141
9	TS=(collaborat* NEAR/3 (authoring OR writing))	2497
10	TS=(collaborat* NEAR/4 online)	1878
11	TS=(collaborat* NEAR/3 technolog*)	4227
12	TS = (collaborat* NEAR/5 platform?)	432
13	TS = (collaborat* NEAR/2 app?)	21
14	TS = (google NEAR (app OR apps OR collaborat* OR docs OR doc OR draw OR knol OR wave OR sites))	1280
15	TS=(mediawiki OR meetingwords* OR collabedit* OR etherpad*)	121
16	TS = ((social NEAR/2 (web OR media)) NEAR/7 (annotat* OR editing OR authoring OR writing))	318
17	TS = (social NEAR/2 (web OR media) NEAR/10 (collaborat* OR interactiv*))	755
18	TS = (mashup? OR "mash up" OR "mash ups")	813
19	TS = ("group writing" OR "group authoring" OR "community authoring" OR "community writing")	54
20	TS = ((community NEAR/5 annotation) OR (collaborat* NEAR/5 annotat*) OR (online NEAR/5 annotat*))	1024
21	TS = ((group OR online) NEAR/3 (edit OR editing))	294
22	TS = (online NEAR/2 writing)	437
23	TS = ("real time" NEAR/5 edit*)	321
24	TS = (online NEAR/5 editor?)	59
25	(#2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #11 OR #12 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24) NOT #1	24777
26	TS = Internet	167886
27	TS = "Online systems"	469
28	TS = "Cooperative behavior"	2123
29	TS = ((Internet OR "Online systems") NEAR/6 (Collaborative OR "Cooperative behavior" OR "Cooperative behaviour" OR "Cooperative behaviours" OR "Co-operative behaviors"))	787
30	(#29) NOT (#1 OR #25)	72

(Continued)

31	TS=(controlled OR trial OR "drug therapy" OR random* OR placebo OR groups OR "health care quality")	8428417
32	TS= (animals NOT humans)	685945
33	#31 NOT #32	8147429
34	TS=(randomised OR randomized OR randomly OR trial OR multicenter OR "multi center" OR multicenter OR "multi centre" OR multicentre OR intervention* OR controlled OR "control group" OR "control groups" OR compare OR compared OR "before and after" OR "pre and post" OR pretest OR "pre test" OR posttest OR "post test" OR quasiexperiment* OR "quasi experiment" OR "quasi experiments" OR "quasi experimental" OR evaluat* OR effect* OR impact* OR "time series" OR "time point" OR "time points" OR "repeated measure" OR "repeated measures" OR "repeated measurement" OR "repeated measurements")	17924311
35	((#25 OR #30) AND #33)	6388
36	((#25 OR #30) AND #34) NOT #35)	7528
37	#1 NOT (#35 OR #36)	298
38	#35 OR #36 OR #37	14 214
	TS= (Specialist? OR Health OR Medical OR "Decision maker" OR "Decision makers" OR Patient? OR "Family member" OR "Family members" OR "Next of kin" OR "Next-of-kin" OR Researcher? OR Technician? OR Technologist? OR Therapist? OR Caregiver? OR Doctor? OR GP OR Practitioner? OR Primary care provider OR Clinician? OR Physician? OR "Clinical Officer" OR "Clinical officers" OR "Clinical director" OR "clinical directors" OR Surgeon? OR Nurse? OR "Hospital orderly" OR "Hospital orderlies" OR "Ward assistant" OR "Ward assistants" OR Dental OR Dentist? OR Denturist? OR Orthodontist? OR Periodontist? OR Paedodontist? OR pedodontist? OR Prosthodontist? OR Stomatologist? OR Hygienist? OR Audiologist? OR Otolaryngologist? OR ENT OR Allergist? OR Anesthesiologist? OR Cardiologist? OR Dermatologist? OR Gynecologist? OR Obstetrician? OR Midwives OR Midwife OR Neonatologist? OR Pediatrician? OR Primatologist? OR Endocrinologist? OR Immunologist? OR Andrologist OR Rheumatologist? OR Neurologist? OR Neurosurgeon? OR Intensivist? OR Oncologist? OR Physiologist? OR Physiotherapist? OR "Ambulance attendants" OR "Ambulance attendant" OR "Ambulance officer" OR "Ambulance officers" OR EMT OR Paramedic? OR Feldsher? OR Dietitian? OR Nutritionist? OR Pharmacist? OR "Dispensing chemist" OR "Dispensing chemists" OR "Pharmaceutical assistant" OR "Pharmaceutical assistants" OR Psychiatrist? OR Psychologist? OR Social worker? OR Counsellor? OR Radiologist? OR Radiographer? OR Radiotherapist? OR Mammographer? OR Sonographer? OR "Medical imaging assistant" OR "Medical imaging assistants" OR Gastrologist? OR Hepatologist? OR Nephrologist? OR Urologist? OR Pulmonologist? OR Hematologist? OR Phlebotomist? OR Orthopedist? OR Podiatrist? OR Geriatrician? OR "home care aid" or "home care aidS" OR "personal care provider" OR "personal care providers" OR "Personal care assistant" OR "Personal care assistants" OR "First aid attendant" OR "First aid attendants" OR Ophthalmologist? OR Optometrist? OR Optician? OR Orthoptist? OR Internist? OR Diagnostician? OR Pathologist? OR Orthotist? OR Prosthetist? OR Acupuncturist? OR Homeopath? OR Electrotherapist? OR Hydrotherapist? OR Naturopath? OR Osteopath? OR Chiropractor? OR "Clinical Coder" OR "Clinical Coders" OR "Healthcare worker" OR "Healthcare workers" OR "Healthcare professional" OR "Healthcare professionals")	6 184 679

(Continued)

#38 AND #39

2905

Appendix 7. Proquest search strategy

#	Syntax	today
1	ti(wiki?)	21
2	ti(a????wiki? OR b????wiki? OR c????wiki? OR d????wiki? OR e????wiki? OR f????wiki? OR g????wiki? OR h????wiki? OR i????wiki? OR j????wiki? OR k????wiki? OR l????wiki? OR m????wiki? OR n????wiki? OR o????wiki? OR p????wiki? OR q????wiki? OR r????wiki? OR s????wiki? OR t????wiki? OR u????wiki? OR v????wiki? OR w????wiki? OR x????wiki? OR y????wiki? OR z????wiki?) OR ab(a????wiki? OR b????wiki? OR c????wiki? OR d????wiki? OR e????wiki? OR f????wiki? OR g????wiki? OR h????wiki? OR i????wiki? OR j????wiki? OR k????wiki? OR l????wiki? OR m????wiki? OR n????wiki? OR o????wiki? OR p????wiki? OR q????wiki? OR r????wiki? OR s????wiki? OR t????wiki? OR u????wiki? OR v????wiki? OR w????wiki? OR x????wiki? OR y????wiki? OR z????wiki?)	5
3	ti((wiki*)) OR ab((wiki*))	555
4	ti((web2* OR "web 2.0") AND collaborat*) OR ab((web2* OR "web 2.0") AND collaborat*)	166
5	ti(collaborat* NEAR/5 internet) OR ti(collaborat* NEAR/5 software) OR ti(collaborat* NEAR/5 app) OR ti(collaborat* NEAR/5 apps) OR ab(collaborat* NEAR/5 internet) OR ab(collaborat* NEAR/5 software) OR ab(collaborat* NEAR/5 app) OR ab(collaborat* NEAR/5 apps)	589
6	ti(online NEAR/5 collaborat*) OR ab(online NEAR/5 collaborat*)	602
7	ti(electronic NEAR/5 collaborat*) OR ab(electronic NEAR/5 collaborat*)	119
8	ti((collaborat* NEAR/4 web)) OR ti((collaborat* NEAR/4 web)) OR ti((collaborat* NEAR/4 web-based)) OR ti((collaborat* NEAR/4 web-based)) OR ab((collaborat* NEAR/4 web)) OR ab((collaborat* NEAR/4 web)) OR ab((collaborat* NEAR/4 web-based)) OR ab((collaborat* NEAR/4 web-based))	325
9	ti((collaborat* NEAR/3 authoring) OR (collaborat* NEAR/3 writing)) OR ab((collaborat* NEAR/3 authoring) OR (collaborat* NEAR/3 writing))	602
10	(ti(collaborat* NEAR/4 online) OR ab(collaborat* NEAR/4 online))	150
11	(ti(collaborat* NEAR/3 technolog*) OR ab(collaborat* NEAR/3 technolog*))	807
12	(ti(collaborat* NEAR/5 platform?) OR ab(collaborat* NEAR/5 platform?))	52
13	(ti(collaborat* NEAR/2 app?) OR ab(collaborat* NEAR/2 app?))	5
14	ti((google NEAR/ app) OR (google NEAR/apps) OR (google NEAR/collaborat*) OR (google NEAR/docs) OR (google NEAR/doc) OR (google NEAR/draw) OR (google NEAR/knol) OR (google NEAR/wave) OR (google NEAR/sites)) OR ab((google NEAR/ app) OR (google NEAR/apps) OR (google NEAR/collaborat*))	26

(Continued)

	OR (google NEAR/docs) OR (google NEAR/doc) OR (google NEAR/draw) OR (google NEAR/knol) OR (google NEAR/wave) OR (google NEAR/sites)))	
15	(ti(mediawiki OR meetingwords* OR collabedit* OR etherpad*) OR ab(mediawiki OR meetingwords* OR collabedit* OR etherpad*))	9
16	ti(((social NEAR/2 web) OR (social NEAR/2 media))) AND ti((annotat* OR editing OR authoring OR writing)) OR ab(((social NEAR/2 web) OR (social NEAR/2 media))) AND ab((annotat* OR editing OR authoring OR writing))	202
17	ti(((social NEAR/2 web) OR (social NEAR/2 media)) NEAR/10 (collaborat*) OR ((social NEAR/2 web) OR (social NEAR/2 media)) NEAR/10 (interactiv*)) OR ab(((social NEAR/2 web) OR (social NEAR/2 media)) NEAR/10 (collaborat*) OR ((social NEAR/2 web) OR (social NEAR/2 media)) NEAR/10 (interactiv*))	152
18	ti(mashup? OR (mash NEAR/1 up?)) OR ab(mashup? OR (mash NEAR/1 up?))	34
19	(ti("group writing" OR "group authoring" OR "community authoring" OR "community writing") OR ab("group writing" OR "group authoring" OR "community authoring" OR "community writing"))	91
20	ti((community NEAR/7 annotation) OR (collaborat* NEAR/7 annotat*) OR (online NEAR/7 annotat*)) OR ab((community NEAR/7 annotation) OR (collaborat* NEAR/7 annotat*) OR (online NEAR/7 annotat*))	127
21	TI(group OR online) NEAR/3 TI(edit OR editing) OR ab(group OR online) NEAR/3 ab(edit OR editing)	85
22	(ti(online NEAR/2 writing) OR ab(online NEAR/2 writing))	220
23	(ti("real time" NEAR/7 edit*) OR ab("real time" NEAR/7 edit*))	50
24	(ti(online NEAR/7 editor?) OR ab(online NEAR/7 editor?))	31
25	(S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24) NOT S1	41682
26	SU.EXACT("Internet")	3544
27	ti("Online systems") OR ab("Online systems")	166
28	ti("Cooperative behavior" OR "Cooperative behaviour" OR "Cooperative behaviours" OR "Cooperative behaviors") OR ab("Cooperative behavior" OR "Cooperative behaviour" OR "Cooperative behaviours" OR "Cooperative behaviors")	632
29	ti(collaborative) OR ab(collaborative)	23330
30	((S26 OR S27) AND (S28 OR S29)) NOT (S1 OR S25)	55
31	S25 OR S30 OR S1	4244
32	ti((Specialist? OR Health OR Medical OR "Decision maker" OR "Decision makers" OR Patient? OR "Next-of-kin" OR "Next of kin" OR "Family member" OR "Family members" OR Researcher? OR Technician? OR Technologist? OR Therapist? OR Caregiver? OR Doctor? OR GP OR Practitioner? OR "Primary care provider" OR "Primary care providers" OR Clinician? OR Physician? OR "Clin-	403 072

(Continued)

ical Officer" OR "Clinical officers" OR "Clinical director" OR "Clinical directors" OR Surgeon? OR Nurse? OR "Hospital orderly" OR "Hospital orderlies" OR "Ward assistant" OR "Ward assistants" OR Dental OR Dentist? OR Denturist? OR Orthodontist? OR Periodontist? OR Paedodontist? OR Pedodontist? OR Prosthodontist? OR Stomatologist? OR Hygienist? OR Audiologist? OR Otolaryngologist? OR ENT OR Allergist? OR Anesthesiologist? OR Cardiologist? OR Dermatologist? OR Gynecologist? OR Obstetrician? OR Midwives OR Midwife OR Neonatologist? OR Pediatrician? OR Primatologist? OR Endocrinologist? OR Immunologist? OR Andrologist? OR Rheumatologist? OR Neurologist? OR Neurosurgeon? OR Intensivist? OR Oncologist? OR Physiologist? OR Physiotherapist? OR "Ambulance attendants" OR "Ambulance attendant" OR "Ambulance officer" OR "Ambulance officers" OR EMT OR Paramedic? OR Feldsher? OR Dietitian? OR Nutritionist? OR Pharmacist? OR "Dispensing chemist" OR "Dispensing chemists" OR "Pharmaceutical assistant" OR "Pharmaceutical assistants" OR Psychiatrist? OR Psychologist? OR "Social worker" OR "Social workers" OR Counsellor? OR Radiologist? OR Radiographer? OR Radiotherapist? OR Mammographer? OR Sonographer? OR "Medical imaging assistant" OR "Medical imaging assistants" OR Gastrologist? OR Hepatologist? OR Nephrologist? OR Urologist? OR Pulmonologist? OR Hematologist? OR Phlebotomist? OR Orthopedist? OR Podiatrist? OR Geriatrician? OR "Home care aid" or "Home care aidS" OR "Personal care provider" OR "Personal care providers" OR "Personal care assistant" OR "Personal care assistants" OR "First aid attendant" OR "First aid attendants" OR Ophthalmologist? OR Optometrist? OR Optician? OR Orthoptist? OR Internist? OR Diagnostician? OR Pathologist? OR Orthotist? OR Prosthetist? OR Acupuncturist? OR Homeopath? OR Electrotherapist? OR Hydrotherapist? OR Naturopath? OR Osteopath? OR Chiropractor? OR "Clinical Coder" OR "Clinical Coders" OR "Healthcare worker" OR "Healthcare workers" OR "Healthcare professional" OR "Healthcare professionals") OR ab((Specialist? OR Health OR Medical OR "Decision maker" OR "Decision makers" OR Patient? OR "Next-of-kin" OR "Next of kin" OR "Family member" OR "Family members" OR Researcher? OR Technician? OR Technologist? OR Therapist? OR Caregiver? OR Doctor? OR GP OR Practitioner? OR "Primary care provider" OR "Primary care providers" OR Clinician? OR Physician? OR "Clinical Officer" OR "Clinical officers" OR "Clinical director" OR "Clinical directors" OR Surgeon? OR Nurse? OR "Hospital orderly" OR "Hospital orderlies" OR "Ward assistant" OR "Ward assistants" OR Dental OR Dentist? OR Denturist? OR Orthodontist? OR Periodontist? OR Paedodontist? OR Pedodontist? OR Prosthodontist? OR Stomatologist? OR Hygienist? OR Audiologist? OR Otolaryngologist? OR ENT OR Allergist? OR Anesthesiologist? OR Cardiologist? OR Dermatologist? OR Gynecologist? OR Obstetrician? OR Midwives OR Midwife OR Neonatologist? OR Pediatrician? OR Primatologist? OR Endocrinologist? OR Immunologist? OR Andrologist? OR Rheumatologist? OR Neurologist? OR Neurosurgeon? OR Intensivist? OR Oncologist? OR Physiologist? OR Physiotherapist? OR "Ambulance attendants" OR "Ambulance attendant" OR "Ambulance officer" OR "Ambulance officers" OR EMT OR Paramedic? OR Feldsher? OR Dietitian? OR Nutritionist? OR Pharmacist? OR "Dispensing chemist" OR "Dispensing chemists" OR "Pharmaceutical assistant" OR "Pharmaceutical assistants" OR Psychiatrist? OR Psychologist? OR "Social worker" OR "Social workers" OR Counsellor? OR Radiologist? OR Radiographer? OR Radiotherapist? OR Mammographer? OR Sonographer? OR "Medical imaging assistant" OR "Medical imaging assistants" OR Gastrologist? OR Hepatologist? OR Nephrologist? OR Urologist? OR Pulmonologist? OR Hematologist? OR Phlebotomist? OR Orthopedist? OR Podiatrist? OR Geriatrician? OR "home care aid" or "home care aidS" OR "personal care provider" OR "personal care providers" OR "Personal care assistant" OR "Personal care assistants" OR "First aid attendant" OR "First aid attendants" OR Ophthalmologist? OR Optometrist? OR Optician? OR Orthoptist? OR Internist? OR Diagnostician? OR Pathologist? OR Orthotist? OR Prosthetist? OR Acupuncturist? OR Homeopath? OR Electrotherapist? OR Hydrotherapist? OR Naturopath? OR Osteopath? OR Chiropractor? OR "Clinical

(Continued)

	Coder" OR "Clinical Coders" OR "Healthcare worker" OR "Healthcare workers" OR "Healthcare professional" OR "Healthcare professionals"))	
33	Exact("nurses" OR "midwifery" OR "patients" OR "physicians" OR "dentistry" OR "pharmacists" OR "dietitians" OR "psychiatrists" OR "social workers" OR "school psychologists" OR "researchers" OR "surgeons" OR "therapists" OR "psychologists")	11 038
34	#32 OR #33	405 581
35	#31 AND #34	665
NOTE 666 but 1 disappears consistently when consulting results		

Appendix 8. CRD Health Technology Assessment, Health Economic Evaluations Database and NHS Economic Evaluation Database search strategy

#	Syntax	hits
1	(wiki OR wikis) TITLE	1
2	wiki*	1
3	((web2* OR "web 2.0") AND collaborat*)	1
4	(collaborat* AND (internet OR software OR app OR apps))	27
5	(online AND collaborat*)	14
6	(electronic AND collaborat*)	73
7	(collaborat* AND (web OR web-based))	10
8	collaborat* AND (authoring OR writing)	4
9	collaborat* AND online	14
10	(collaborat* AND technolog*)	402
11	(collaborat* AND platform) OR (collaborat* AND platforms)	3
12	collaborat* AND app OR apps	0
13	(google AND (app OR apps OR collaborat* OR docs OR doc OR draw OR knol OR wave OR sites))	7
14	(mediawiki OR meetingwords* OR collabedit* OR etherpad*)	0
15	((social AND (web OR media)) AND (annotat* OR editing OR authoring OR writing))	1

(Continued)

16	(social AND (web OR media) AND (collaborat* OR interactiv*))	3
17	mashup OR mash-up OR mashups OR "mash up" OR "mash ups"	0
18	(group writing OR group authoring OR community authoring OR community writing)	0
19	(community annotation OR collaborat* annotat* OR online annotat*)	0
20	((group OR online) AND (edit OR editing))	1
21	(online AND writing)	4
22	real time edit*	0
23	online editor*	0
24	(#2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22 OR #23) NOT #1	431
25	Internet[mesh:noexp]	93
26	"Online systems"	4
27	"Cooperative behavior"	47
28	collaborative	168
29	(#25 OR #26) AND (#27 OR #28)	1
30	(#29 NOT #1) OR (#29 NOT #24)	1
31	#24 OR #30 OR #1	432
32	Specialist OR Specialists OR Health OR Medical OR (Decision maker) OR (Decision makers) OR Patient OR Patients OR (Family member) OR (Family members) OR Researcher OR Researchers OR Technician OR technicians OR Technologist OR technologists OR Therapist OR therapists OR Caregiver OR caregivers OR Doctor OR Doctors OR GP OR Practitioner OR Practitioners OR (Primary care provider) OR (Primary care providers) OR Clinician OR Clinicians OR Physician OR Physicians OR (Clinical Officer) OR (Clinical officers) OR (Clinical director) OR (Clinical directors) OR Surgeon OR surgeons OR Nurse OR nurses OR (Hospital orderly) OR (Hospital orderlies) OR (Ward assistant) OR (Ward assistants) OR Dental OR Dentist OR Dentists OR Denturist OR Denturists OR Orthodontist OR Orthodontists OR Periodontist OR Periodontists OR Paedodontist OR Paedodontists OR Pedodontist OR Pedodontists OR Prosthodontist OR Prosthodontists OR Stomatologist OR Stomatologists OR Hygienist OR Hygienists OR Audiologist OR Audiologists OR Otolaryngologist OR Otolaryngologists OR ENT OR Allergist OR Allergists OR Anesthesiologist OR Anesthesiologists OR Cardiologist OR Cardiologists OR Dermatologist OR Dermatologists OR Gynecologist OR Gynecologists OR Obstetrician OR Obstetricians OR Midwives OR Midwife OR Neonatologist OR Neonatologists OR Pediatrician OR Pediatricians OR Primatologist OR Primatologists OR Endocrinologist OR Endocrinologists OR Immunologist OR Immunologists OR Andrologist OR Andrologists OR Rheumatologist OR Rheumatologists OR Neurologist OR Neurologists OR Neurosurgeon OR Neurosurgeons OR Intensivist OR Intensivists OR Oncologist OR Oncologists OR Physiologist OR Physiologists OR Physiotherapist OR Physio-	60 390

(Continued)

therapists OR (Ambulance attendants) OR (Ambulance attendant) OR (Ambulance officer) OR (Ambulance officers) OR EMT OR Paramedic OR Paramedics OR Feldsher OR Feldshers OR Dietitian OR Dietitians OR Nutritionist OR Nutritionists OR Pharmacist OR Pharmacists OR (Dispensing chemist) OR (Dispensing chemists) OR (Pharmaceutical assistant) OR (Pharmaceutical assistants) OR Psychiatrist OR Psychiatrists OR Psychologist OR Psychologists OR (Social worker) OR (Social workers) OR Counsellor OR Counsellors OR Radiologist OR Radiologists OR Radiographer OR Radiographers OR Radiotherapist OR Radiotherapists OR Mammographer OR Mammographers OR Sonographer OR Sonographers OR (Medical imaging assistant) OR (Medical imaging assistants) OR Gastrologist OR Gastrologists OR Hepatologist OR Hepatologists OR Nephrologist OR Nephrologists OR Urologist OR Urologists OR Pulmonologist OR Pulmonologists OR Hematologist OR Hematologists OR Phlebotomist OR Phlebotomists OR Orthopedist OR Orthopedists OR Podiatrist OR Podiatrists OR Geriatrician OR Geriatricians OR (Home care aid) or (Home care aids) OR (Personal care provider) OR (Personal care providers) OR (Personal care assistant) OR (Personal care assistants) OR (First aid attendant) OR (First aid attendants) OR Ophthalmologist OR Ophthalmologists OR Optometrist OR Optometrists OR Optician OR Opticians OR Orthoptist OR Orthoptists OR Internist OR Internists OR Diagnostician OR Diagnosticians OR Pathologist OR Pathologists OR Orthotist OR Orthotists OR Prosthetist OR Prosthetists OR Acupuncturist OR Acupuncturists OR Homeopath OR Homeopaths OR Electrotherapist OR Electrotherapists OR Hydrotherapist OR Hydrotherapists OR Naturopath OR Naturopaths OR Osteopath OR Osteopaths OR Chiropractor OR Chiropractors OR (Clinical Coder) OR (Clinical Coders) OR (Healthcare worker) OR (Healthcare workers) OR (Healthcare professional) OR (Healthcare professionals)

33	Health Personnel [mesh:exp]	612
34	Patients [mesh:exp]	228
35	Research Personnel [mesh:exp]	0
36	#32 OR #33 OR #34 OR #35	60 410
37	#36 AND #31	432

Appendix 9. Authors contacted

Names of authors	Title	Year of publication - if applicable	Response (Yes (Y) or No (N))	Papers suggested if (Y)
Aal Ali KH, Alolama MA, Christie SD	Author listed in the scoping review for the text "Neurosurgery 2.0: The use of Web 2.0 applications in neurosurgery"		N	
Alvarez M		2017	Y	The Altitudes Project: an online social media intervention for stress reduction in relatives of young people with first episode psychosis

(Continued)

Anderson JR	Web 2.0 tools as interventions for training and performance improvement	2013	N	
Andrus LC	Author listed in the scoping review for the text "Demonstration of interactive wiki website for clinical nursing student documentation"		N	
Ayes KB, Bardsley CH	Author listed in the scoping review for the text "Wikipedia information for toxicologic emergencies: How reliable is it?"		N	
Beyer F	Author of an ongoing Cochrane review	19 August 2015	Y	None
Boulos MNK, Maramba I, Wheeler S	Wikis, blogs and podcasts: a new generation of Web-based tools for virtual collaborative clinical practice and education	2006	N	
Bonert M	Author listed in the scoping review	23 July 2015	Y	www.ncbi.nlm.nih.gov/pubmed/25736385 www.ncbi.nlm.nih.gov/pubmed/23943888 www.ncbi.nlm.nih.gov/pubmed/25427336 www.ncbi.nlm.nih.gov/pubmed/25106954 www.ncbi.nlm.nih.gov/pubmed/25500418 thepathologist.com/fileadmin/pdf/TP_0215_Issue.pdf utmj.org/index.php/UTMJ/article/view/447/429 catb.org en.wikiversity.org/wiki/Wikiversity_Journal_of_Medicine pathinfo.wikia.com/wiki/Pathology_Resident_Wiki hlwiki.slais.ubc.ca/index.php/Top_Fifty_(50)_Medical_Wikis_You_Might_Want_to_Know
Boyer C	Author listed in the scoping review for the text "Education and consumer informatics"		N	
Bricon-Souf N, Bringay S, Hamek S, An-	Informal notes to support the asynchronous collaborative activities	2007	N	

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ceaux F, Barry C,
Charlet J

Campbell L, Novak I, McIntyre S, Dickson A	Patterns and rates of use of an evidence-based practice intranet resource for allied health professionals: A randomised controlled trial	2010	N	
Crotty BH, Mostaghimi A, Reynolds EE	Adoption of a wiki within a large internal medicine residency program: a 3-year experience Author also listed in the scoping review for this text "Wikis to better manage shared information in a hospitalist group"	2012	N	
den Breejen, Elvira ME, Nelen WL, Knijnenburg J, Burgers JS, Hermens RP, Kremer JA	Feasibility of a wiki as a participatory tool for patients in clinical guideline development	2012	N	
Deshpande A	Author listed in the scoping review for the "asynchronous telehealth project: scoping review published as a wiki"		N	
Dinh M, Tan T, Bein K, Hayman J, Wong YK, Dinh D	Emergency department knowledge management in the age of Web 2.0: Evaluation of a new concept	2011	N	
Donaldson RI	Authors of existing projects using CWAs on the web	7 July 2015	Y	<p>Smith R. Strategies for coping with information overload. <i>BMJ</i>. 2010;341:c7126</p> <p>Scott KR, Hsu CH, Johnson NJ, Mamtani M, Conlon LW, DeRoos FJ. Integration of social media in emergency medicine residency curriculum. <i>Ann Emerg Med</i>. 2014;64(4):396-404. doi:10.1016/j.annemergmed.2014.05.030</p> <p>Thoma B, Joshi N, Trueger NS, Chan TM, Lin M. Five strategies to effectively use online resources in emergency medicine. <i>Ann Emerg Med</i>. 2014;64(4):392-395. doi:10.1016/j.annemergmed.2014.05.029</p> <p>Clauson KA, Polen HH, Boulos MNK, Dzenowagis JH. Scope, completeness, and accuracy of drug information in Wikipedia. <i>An-</i></p>

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nals of Pharmacotherapy. 2008;42(12):1814-21.
doi:10.1345/aph.1L474

Reavley NJ, Mackinnon AJ, Morgan AJ, et al. Quality of information sources about mental disorders: a comparison of Wikipedia with centrally controlled web and printed sources. *Psychol Med*. 2012;42(8):1753-62. doi:10.1017/S003329171100287X

Hasty RT, Garbalosa RC, BarbatoVA, et al. Wikipedia vs peer-reviewed medical literature for information about the 10 most costly medical conditions. *J Am Osteopath Assoc*. 2014;114(5): 368-373. doi:10.7556/jaoa.2014.035

Tancer B. Look Who's Using Wikipedia. *Time*. 2007.

Heilman JM, Kemmann E, Bonert M, et al. Wikipedia: a key tool for global public health promotion. *J Med Internet Res*. 2011;13(1):e14. doi:10.2196/jmir.1589

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Warner JL, Cowan AJ, Hall AC, Yang PC. HemOnc.org: A Collaborative Online Knowledge Platform for Oncology Professionals. *J Oncol Pract*. 2015. doi:10.1200/JOP.2014.001511

Feldman B. The Eye-Wiki Initiative. *Virtual Mentor*. 2010;12(12):922-924. doi:10.1001/virtualmentor.2010.12.12.medu1-1012

Neuhaus SJ, Thomas D, Desai J, Vuletic C, Dincklage von J, Olver I. Wiki-based clinical practice guidelines for the management of adult onset sarcoma: a new paradigm

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in sarcoma evidence. Sarcoma. 2015;2015:614179-6. doi:10.1155/2015/614179

Eberle B	Author listed in the scoping review for the text "A web-based knowledge database (Wiki platform) for Standard Operational Procedures (SOPS) in cardiac anesthesia"		N	
Edwards M, Agha R, Coughlan J	Capturing intra-operative safety information using surgical wikis	2013	N	
EWA	Author listed in the scoping review for the text "Assessment of the quality of medical wikis using Health Summit Working Group Quality Criteria"		N	
Felsen U	Author listed in the scoping review for the text "Implementation of a wiki-based education and resource tool in a primary care residency program"		N	
Findlay M, Brown T, Bauer J	Translating research into clinical practice: Use of a Wiki platform to develop and maintain evidence-based guidelines for the nutritional management of patients with head and neck cancer	2012	Y	Brown T, Findlay M, Bauer J et al. Using a wiki platform to promote guidelines internationally and maintain their currency: Evidence based guidelines for the nutritional management of adult patients with head and neck cancer. Journal of Human Nutrition and Dietetics 2013; 26(2):182-90
Gibson M	Author of WikiDoc www.wiki-doc.org/index.php/Main Page		Y	None
Gilbert S, Thorp N, Mergel M	Author listed in the scoping review		N	
Gil-Pena H	Renal tube: Online website-based collaborative effort for the clinical and molecular study of primary tubular disorders	2013	N	
Grajales III FJ, Sheps S, Ho K, Novak-Lauscher H, Eysenbach G	Social media: A review and tutorial of applications in medicine and health care	2014	Y	None
Gupta S, Chignell M, Hall S, Straus SE	Online collaboration tool for asthma action plan with usability (OCTAPUS) Author also listed in the scoping review	2010	N	
Hamm KM, Simonov IM, Heard SE	Using technology to harness and organize expertise in the development of health education materials: How a wiki can help you collaborate.	2009	N	

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Author also listed in the scoping review for the text "Using technology to harness and organize expertise in the development of health education materials: How a wiki can help you collaborate"

Hamm MP, Klassen TP, Scott SD, Moher D, Hartling L	Education in health research methodology: use of a wiki for knowledge translation Knowledge translation to improve research and decision-making in child health	2013 2014	N	
Hanberger L, Ludvigsson J, Nordfeldt S	Use of a web 2.0 portal to improve education and communication in young patients with families: randomized controlled trial	2013	N	
Haynes, Brian	Co-author for "WhatIsKT wiki: a case study of a platform for knowledge translation terms and definitions--Descriptive analysis. Implementation Sci 2013;8:13"	2013	Y	None
Heilman J	Author of "Wikipedia: a key tool for global public health promotion". JMI 13 (1):e14.	2011	Y	en.wikipedia.org/wiki/Wikipedia:WikiProject_Medicine/Research_publications
Husereau D	Author interesting author to contact for the grey literature	7 July 2015	Y	Bender JL, O'Grady LA, Deshpande A, Cortinois AA, Saffie L, Husereau D, et al. Collaborative authoring: a case study of the use of a wiki as a tool to keep systematic reviews up to date. Open Med. 2011;5(4):e201-8
Ilic D	Author of an ongoing Cochrane review	30 June 2015	Y	None
Jalali A, Mioduszewski M, Gauthier M, Varpio L	Wiki use and challenges in undergraduate medical education Author also listed in the scoping review for this text.	2009	N	
Jeffery J, Taylor-Gjevne R, Harrison L, Dzus A, Woods R, Buchko J, Rooks K, Katz M, Rajasekaran S	MU2SCLES online: Musculoskeletal multi-professional simulated collaborative learning initiatives online	2011	N	
Kamal A, McNiff K, Prestrud AA, Lupu D, Gavigan M, Zafar	Developing a virtual collaborative to facilitate palliative care and quality improvement learning in oncology	2013	N	

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Y, Schilsky RL,
Abernethy AP

Kao LS	Author of a trial registered in Clinical-Trials.gov	2 November 2015	Y	None
Kinoshita J, Clark T	Alzforum	2007	N	
Kjaer VK	Potential use of “wikis” to continuous update and medical knowledge improvement	2007	N	
Krebs C	Author listed in the scoping review for the text “Evaluation of a comprehensive neuroanatomy website in a distributed medical curriculum”		N	
Lambert R	Author listed in the scoping review for the text "Development of an online teaching resource based on the society of skeletal radiology's musculoskeletal radiology curriculum utilizing open access web material"		Y	None
Lamontagne ME, Perreault K, Gagnon MP	Evaluation of the acceptability, feasibility and effectiveness of two methods of involving patients with disability in developing clinical guidelines: study protocol of a randomized pragmatic pilot trial	2014	Y	None
Lang TA	Clinical trials in resource-limited settings	2011	N	
Langbecker D	Author of ongoing Cochrane review		Y	None
Lanning LC, Dadig BA	A strategy for incorporating palliative care and end-of-life instruction into physician assistant education	2010	N	
Llambi L, Esteves E, Martinez E, Forster T, Garcia S, Miranda N, Arredondo A L, Margolis A	Teaching tobacco cessation skills to Uruguayan physicians using information and communication technologies	2011	Y	<p>All for One and One for All: Understanding Health Professionals' Experience in Individual Versus Collaborative Online Learning JOURNAL OF CONTINUING EDUCATION IN THE HEALTH PROFESSIONS Volume 34, Issue 2, Spring 2014, Pages: 102–111, Heather MacNeill, Deanna Telner, Alexandra Sparagis-Agalotis and Elizabeth Hanna Article first published online : 17 JUN 2014, DOI: 10.1002/chp.21226</p> <p>Distance education for physicians: Adaptation of a Canadian experience to Uruguay</p>

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JOURNAL OF CONTINUING EDUCATION IN THE HEALTH PROFESSIONS Volume 28, Issue 2, Spring 2008, Pages: 79–85, Laura Llambí, Alvaro Margolis, John Toews, Juan Daputo, Elba Esteves, Elisa Martínez, Thais Forster, Antonio López and Jocelyn Lockyer Article first published online : 2 JUN 2008, DOI: 10.1002/chp.161

Teaching tobacco cessation skills to Uruguayan physicians using information and communication technologies JOURNAL OF CONTINUING EDUCATION IN THE HEALTH PROFESSIONS Volume 31, Issue 1, Winter 2011, Pages: 43–48, Laura Llambí, Elba Esteves, Elisa Martinez, Thais Forster, Sofía García, Natalia Miranda, Antonio Lopez Arredondo and Alvaro Margolis Article first published online : 21 MAR 2011, DOI: 10.1002/chp.20100

Luckett T	Author of the The Stop Cancer PAIN Trial: A guideline implementation study (trial registered in the WHO International Clinical Trials Registry Platform)	2017	Y	The Stop Cancer PAIN Trial is still ongoing. There are no published results. This study is not comparing an intervention that isolates the wiki as an intervention as both the intervention group and the control group have access to the Cancer Council Australia Wiki platform
Makary M	Author listed in the scoping review		N	
Marschark M, Johnson HA	From research to practice	2008	N	
Martinez-Garcia A, Moreno-Conde A, Jodar-Sanchez F, Leal S, Parra C	Sharing clinical decisions for multi morbidity case management using social network and open-source tools	2013	N	
McCartney PR	Wikis: virtual community collaborations	2008	N	
McCleary L	Author listed in the scoping review for the text “Wiki supports excellence in gerontological nursing education”		N	
McCormack	Author listed in the scoping review		N	

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McGowan J, Grad R, Pluye P, Hannes K, Deane K, Labrecque M, Welch V, Tugwell P	Electronic retrieval of health informa- tion by healthcare providers to im- prove practice and patient care	2009	N	
McVey RM, Clarke E, Joyce P, Turn- er M, Gannon MJ	Toward a wiki guide for obstetrics and gynaecology trainees in Ireland	2013	N	
Mehta N, Vakharia N, Wright A	EHRs in a web 2.0 world: time to em- brace a problem-list Wiki	2014	Y (Wright A)	www.ncbi.nlm.nih.gov/pubmed/18935982 www.ncbi.nlm.nih.gov/pmc/articles/PMC3930775/
Meilender T, Lieber J, Palo- mares F, Herengt G, Jay N	A semantic wiki for editing and sharing decision guidelines in oncology	2012	N	
Mesko B	Author listed in the scoping review	7 July 2015	Y	www.ncbi.nlm.nih.gov/pmc/articles/PMC3221335/link.springer.com/article/10.1007/s00726-008-0121-y#page-1
Miller AD	Author listed in the scoping review for this text "Use of Wikis in advanced pharmacy practice experiences"		N	
Miller P	Information specialist with the Cochrane EPOC group	24 August 2015		Interventions to promote the use of seat belts Uthman OA, Sinclair M, Willems B, Young T. Centre for Evidence- based Health Care, Facul- ty of Medicine and Health Sciences, Stellenbosch Uni- versity, PO Box 19063, Tyger- berg, CapeTown, 7505, South Africa. tyoung@sun.ac.za Educational programmes for primary prevention of skin cancer Langbecker D, Diaz A, Chan RJ, Marquart L, Hevey D, Hamilton J. Targeted mass media inter- ventions promoting healthy behaviours to reduce risk of non-communicable dis- eases in adult, ethnic minori- ties Mosdøl A, Lidal IB, Strau- mann GH, Vist GE Personalised digital inter- ventions for reducing haz- ardous and harmful alcohol

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				consumption in community-dwelling populations Kaner EFS, Beyer FR, Brown J, Crane D, Garnett C, Hickman M, Muirhead C, Redmore J, Michie S, de Vocht F
Moretti D, Cassapi L	Development of a radiotherapy Wiki for comprehensive document management Author also listed in the scoping review	2009	N	
Mosdøl A	Author of ongoing Cochrane review		N	
Muir S	Author listed in the scoping review for this text "Utilizing a Wikispace, dedicated iTunes/YouTube channels, podcasts and Twitter to advance radiology resident education"		N	
Murray S, Giustini D, Loubani T, Choi S, Palepu A	Medical research and social media: Can wikis be used as a publishing platform in medicine?	2009	N	
Naik AD, Singh H	Electronic health records to coordinate decision making for complex patients: what can we learn from wiki?	2010	N	
Nolen WA, Kupka RW, Smit JH	An electronic version of the Lifechart Method (e-LCM); Accessible via Internet, to be integrated with the patient file, and to be used for research	2011	N	
Olver I, Von Dincklage J, Garrett A, Holliday L, Vuletich C	Keeping cancer guidelines current using a wiki approach Assessing the use of wiki based clinical practice guidelines for lung cancer Keeping guidelines current: A six-month evaluation of Wiki-based lung cancer guidelines Developing wiki-based clinical practice guidelines for cancer Author also listed in the scoping review for the text "Use of wiki technology to update cancer care guidelines"	2013	Y (Olver I who responded to our survey on July 12, 2015)	Olver IN, Von Dincklage JJ. It is time for guidelines to enter the digital age. Med J Aust. 2013 Nov 4;199 (9): 569-70
Papakonstantinou D, Poulymenopoulou M, Malamateniou F, Vassilacopoulos G	A cloud-based semantic wiki for user training in healthcare process management	2011	N	
Park S, Parwani A, Macpherson	Use of a wiki as an interactive teaching tool in pathology residency education:	2012	N	

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T, Pantanowitz L	Experience with a genomics, research, and informatics in pathology course				
Pender MP	Author listed in the scoping review for the text "Is Wikipedia unsuitable as a clinical information resource for medical students?"		N		
Perry E, Chantada G, May D, Ribeiro R, Quintana Y, Day S	The birth of an online collaborative educational resource for paediatric oncology nurses: From conception to delivery	2011	N		
Phadtare A	Author listed in the scoping review who responded to our survey	11 July 2015	Y		www.ncbi.nlm.nih.gov/pmc/articles/PMC2893514/ www.ncbi.nlm.nih.gov/pmc/articles/PMC2701428/
Plourde A	Author who was referred to us	9 July 2015	Y		Gupta S, Wan FT, Newton D, Bhattacharyya OK, Chignell MH, Straus SE (2011) Wik-iBuild: a new online collaboration process for multi stakeholder tool development and consensus building. <i>JMIR</i> 13(4):e108 Rapport de recherche d'étudiants à la maîtrise professionnelle en ergothérapie de l'Université de Sherbrooke Le centre de collaboration nationale des méthodes et outils: www.nccmt.ca
Prikazsky V	Author listed in the scoping review		N		
Ragar, B	Co-author of "Wikipedia: a key tool for global public health promotion". <i>JMIR</i> 13 (1): e14.	2011	Y		None
Rahn A	Author of ongoing study: Evaluator-blinded trial evaluating nurse-led immunotherapy DEcision Coaching In persons with relapsing-remitting Multiple Sclerosis (DECIMS) and accompanying process evaluation: study protocol for a cluster randomised controlled trial www.trialsjournal.com/content/16/1/106#B52	2015	Y		None
Raspberry L	Author of "Wikipedia: what it is and why it matters for healthcare". <i>BMJ</i> 348 (8 April 2014): g2478–g2478	2014	Y		All the papers listed at: en.wikipedia.org/wiki/Wikipedia:WikiProject Medicine/Research publications

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Rangel-Mayoral JF, Martin-Clavo S, Gemio-Zumalave P, Romero-Soria L, Braga-Fuentes L, Bravo Garcia-Cuevas L	Web 2.0 in the hospital pharmacy	2012	N
Reavley N, Jorm A, Morgan A, Jorm D	Mental health information on the Internet: a new wiki guide	2010	N
Restivo M, van de Rijt A	Experimental study of informal rewards in peer production	2012	N
Richardson CR, Committee STFM Research	A new, dynamic resource for both students and teachers of family medicine: the Family Medicine Research wiki at FMDRL	2008	N
Rosenbaum JN	Who, what, where, wiki: Social media and crowd sourcing effectively disseminate and preserve resident community knowledge	2013	N
Ross JD, Boulos KM	Author listed in the scoping review		N
Sandars J	Using 'Google Docs and Spreadsheets' as an online collaborative learning space Twelve tips for using blogs and wikis in medical education The potential of blogs and wikis in healthcare education	2008 2006 2007	N
Shepherd JD, Badger-Brown KM, Legassic MS, Walia S, Wolfe DL	SCIU: e-learning for patient education in spinal cord injury rehabilitation	2012	N
Sittig DF	Author listed in the scoping review		N
Snodgrass S	Wiki Activities in Blended Learning for Health Professional Students: Enhancing Critical Thinking and Clinical Reasoning Skills	2011	N
Steel J	Web-based stepped collaborative care intervention in the context of advanced cancer	2014	N
Stutsky BJ, Spence Laschinger HK	Developing leadership practices in hospital-based nurse educators in an online learning community Empower-	2014 2010	N

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	ment and leadership development in an online story-based learning community				
Tolani AT	Author listed in the scoping review for the text "Many websites fail to dispel myths about IUDs, emergency contraception, birth control, and proper timing of Pap smears"		N		
Tcheremenskaia O, Benigni R, Nikolova I, Jeliaskova N, Escher SE, Batke M, Baier T, Poroikov V, Lagunin A, Rautenberg M, Hardy B	OpenTox predictive toxicology framework: toxicological ontology and semantic media wiki-based OpenToxipedia	2012	N		
Thienpont B, Breckpot J, Barriot R, Van Vooren S, Tranchevent LC, Gewillig M, Devriendt K, Moreau Y	Collaboratively charting the gene-to-phenotype network of human congenital heart defects	2010	Y		www.implementation-science.com/content/8/1/13
Trageser J, Rush M, Kahng H, Schwartz R, Beveridge RA, Patt DA	Utilization of a virtual collaboration portal to improve communication, education, and quality of care across a network of practices	2012	N		
Trevena L	Author listed in the scoping review		N		
Van Der Schoor-Knijnenburg JML; Den Breejen EME; Nelen WLDM; Hermens RPMG; Kremer JAM	Author listed in the scoping review		N		
Varga-Atkins T, Dangerfield P, Brigden D	Athors listed in the scoping review	8 December 2015	Y		<p>Pfeil U, Zaphiris P, Ang CS. Cultural Differences in Collaborative Authoring of Wikipedia. <i>Journal of Computer-Mediated Communication</i>, 12(1), Article 5</p> <p>Rand AD. (2010). Mediating at the Student-Wikipedia Intersection. <i>Journal of Library Administration</i>, 50(7), 923-932. http://doi.org/10.1080/01930826.2010.488994</p>

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Selwyn N, Gorard S. (2016). Students' use of Wikipedia as an academic resource - Patterns of use and perceptions of usefulness. The Internet and Higher Education, 28, 28-34. doi.org/10.1016/j.ihe-duc.2015.08.004

Younger P. (2010). Using wikis as an online health information resource. Nursing Standard, 24(36), 49-56

Von Wangenheim A, Prusse M, Maia RS, AbdalaDD, Regert AG, De Souza Nobre LF, Comunello E	Recording and reenactment of collaborative diagnosis sessions using DICOM	2009	N	
Wink D	Author listed in the scoping review for the text "Web-based collaboration tools"		N	
Wilson K, Keelan J, Kruesi L, Poissant L	Author listed in the scoping review		N	
Wright A	Author listed in the scoping review for the text "Creating and sharing clinical decision support content with Web 2.0: Issues and examples"		N	
Young T	Author of an ongoing Cochrane review	19 August 2015	Y	None
Younger P	Author listed in the scoping review for the text "Using wikis as an online health information resource"		N	
Yu R, Crotty B	Wikis to better manage shared information in a hospitalist group	2011	N	

Appendix 10. Existing websites using collaborative writing applications

- Ask Dr Wiki askdrwiki.com/
- Cancer Guidelines Wiki wiki.cancer.org.au/australia/Guidelines
- Clinfowiki www.clinfowiki.org/wiki/index.php/Main_Page
- Consumer Health Information Service www.clinfowiki.org/wiki/index.php/Main_Page
- Demystifying Depression en.wikibooks.org/wiki/Demystifying_Depression
- Diabetes Wiki diabetes.wikia.com/wiki/Diabetes_Wiki
- Diagnostic Radiology en.wikibooks.org/wiki/Diagnostic_Radiology
- DocCheck Flexicon en.wikibooks.org/wiki/Diagnostic_Radiology
- EBM Librarian en.wikibooks.org/wiki/Diagnostic_Radiology
- Emergency Medicine en.wikibooks.org/wiki/Emergency_Medicine
- WikEM en.wikibooks.org/wiki/Emergency_Medicine

Collaborative writing applications in healthcare: effects on professional practice and healthcare outcomes (Review)

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- Flu Wiki www.fluwiki.com/&refdoi=10.1186/1472-6920-6-41 (www.newfluwiki2.com)
- Ganfyd www.ganfyd.org
- Handbook of Genetic Counselling en.wikibooks.org/wiki/Handbook_of_Genetic_Counselling
- HealthGrid Wiki wiki.healthgrid.org/Main_Page
- Immunology en.wikibooks.org/wiki/Immunology
- Wikikidney www.wikikidney.org/index.php?title=Main_Page
- Medical Imaging medicalimaging.wikia.com/wiki/Main_Page
- Mla-hls mla-hls.wikispaces.com
- Mighealth (Migrant health) www.mighealth.net/uk/index.php/Main_Page
- ECGpedia en.ecgpedia.org/wiki/Main_Page
- The McGill Global Health Resource Guide wikisites.mcgill.ca/GlobalHealthGuide/index.php/Main_Page
- EBHC ebhcstrategies.wetpaint.com
- Neurodegeneration Research Wiki wiki.iop.kcl.ac.uk/default.aspx/Neurodegeneration/Neurodegeneration%20Research%20Wiki.html
- Pharm Lib pharmlib.pbworks.com/w/page/16284404/FrontPage
- PLoS Currents: Influenza blogs.plos.org/plos/2009/08/welcome-to-plos-currents-influenza/
- Quality of Medical Data medicaldata.wikia.com/wiki/Main_Page
- Radiation Oncology medicaldata.wikia.com/wiki/Main_Page
- RadiologyWiki medicaldata.wikia.com/wiki/Main_Page
- Radiopaedia radiopaedia.org
- Wikiversity School:Medicine en.wikiversity.org/wiki/School:Medicine
- Street Medic Wikia medic.wikia.com/wiki/Main_Page
- Surgery en.wikibooks.org/wiki/Surgery
- UBC HealthLib Wiki (HLWIKI) hlwiki.slais.ubc.ca/index.php/UBC_HealthLib-Wiki_-_A_Knowledge-Base_for_Health_Librarians
- WebHealth webhealth.com/about/
- Wellness Wiki wellness.wikispaces.com
- WikiCancer www.wikicancer.org
- WikiEcho www.wikiecho.org/wiki/Main_Page
- WikiHealth www.wikihealth.com/Main_Page
- WikiHealthCare wikihealthcare.jointcommission.org/bin/view/Home/WebHome
- WikiMD www.wikimd.org/index.php/Main_Page
- Wikisurgery www.wikisurgery.com
- WiserWiki www.elsevier.com/about/press-releases/healthsciences/
- Nursing Wiki (Pflegetwiki) www.pflegetwiki.de/wiki/Hauptseite
- OpenWetWare openwetware.org/wiki/Main_Page
- OncoWiki oncowiki.info/index.php?title=Main_Page
- Orthopaedic Surgery en.wikibooks.org/wiki/Orthopaedic_Surgery
- Human Physiology en.wikibooks.org/wiki/Human_Physiology
- Pharmacology en.wikibooks.org/wiki/Pharmacology
- Wiki Doc www.wikidoc.org/index.php/Main_Page
- Rosacea Wikibook en.wikibooks.org/wiki/Rosacea MediaWiki

CONTRIBUTIONS OF AUTHORS

Patrick Archambault (PA) led this project. He wrote the protocol and took part in the screening of articles (title, abstract, and full text), and grey literature. He also contacted authors and experts in the field. Finally, he wrote the manuscript for the final review. He is responsible for coordinating the knowledge translation and the future updating of this review. He is an Assistant Professor within the Department of Family Medicine and Emergency Medicine at Université Laval, and the Department of Anesthesia and Critical Care Medicine (Division of Critical Care Medicine).

Tom van de Belt (TvdB) contributed to writing the protocol and took part in screening articles (title, abstract, and full text) and grey literature. He also assessed the eligibility of full text articles, and contributed to the manuscript by writing a first draft and by improving the manuscript during various stages towards the final report. He is an Assistant Professor of Digital Health at Radboud University Medical Center.

Craig Kuziemycki (CK) contributed to writing the protocol and the final report for this review. He also took part in screening articles (title, abstract). He is an Associate Professor and holds the University Research Chair in Healthcare Innovation at Telfer School of Management, at the University of Ottawa.

Ariane Plaisance (AP) coordinated this project under the supervision of Patrick Archambault. She took part in writing the review protocol. She participated in all phases of this review. She led the screening of articles (title, abstract, and full text), and grey literature, contacted authors and experts in the field. Finally, she participated in writing the first draft and reviewed the final manuscript. She is a PhD student at Université Laval in the program of Community Health.

Audrey Dupuis (AD) also coordinated this project under the supervision of Patrick Archambault. She participated in screening articles (title, abstract, and full text), grey literature, and contacted authors and experts in the field. She managed the responses of authors and the list of excluded studies, references, and figures in RevMan. She participated in writing and revising the final manuscript. She is a PhD student at Université Laval in the program of Public Communication.

Carrie McGinn (CM) also coordinated this project under the supervision of Patrick Archambault. She participated in the screening of articles (title, abstract, and full text). She participated in writing and revising the final manuscript. She is a research coordinator at the Centre intégré en santé et services sociaux de Chaudière-Appalaches.

Rebecca Francois (RF) participated in the screening of articles (title, abstract, and full text). She participated in writing and revising the final manuscript. She is a MSc student in Epidemiology at Université Laval.

Marie-Pierre Gagnon (MG) contributed to writing the review protocol and reviewed the final report. She guided our screening strategy and provided expertise in conducting the review. She is Full Professor within the Faculty of Nursing at Université Laval and holds the Canada Research Chair in Technologies and Practices in Health.

Alexis Turgeon (AT) contributed in writing the review protocol and the final manuscript. He provided overall methodological expertise in conducting systematic reviews. He is Associate Professor within the Department of Anesthesia and Critical Care Medicine at Université Laval and holds the Canada Research Chair in Critical Care Neurology and Trauma.

Julien Poitras (JP) participated in writing the review protocol and reviewed the final manuscript. He participated in the analysis of the results and shared his expertise as a decision maker and future knowledge user in his role as Vice-Dean at the Faculty of Medicine at Université Laval.

Tanya Horsley (TH) participated in the development and writing the review protocol and critically reviewed the final manuscript. Throughout this review, she provided research expertise in continuing professional development. Her methodological expertise in evaluating and reporting medical education research in the context of randomised trials and systematic reviews was also invaluable for this team. Tanya is participating in the active knowledge translation of the review results. She is the Associate Director of Research at the Royal College of Physicians and Surgeons of Canada.

Jean Lapointe (JLap) participated in writing this protocol and reviewed our final manuscript. He was a designated knowledge user working at l'Institut National d'Excellence en Santé et Services Sociaux (INESSS) in the Province of Québec and now works as the Director of the Emergency Department in the Centre intégré de santé et services sociaux Chaudière-Appalaches. He is participating in the active knowledge translation of our review results.

Jean Lachaine (JLac) is a specialist in pharmacoeconomics and associate professor at the Faculty of Pharmacy at Université de Montréal. He is a member of the Scientific Committee of the Quebec Institut national d'excellence en santé et en services sociaux (INESSS) as an expert in pharmacoeconomics. He planned the economic analysis of our review and reviewed the economic evaluation aspects of our review protocol and our final manuscript.

Kevin Brand (KB) planned the economic analysis of our review and reviewed the economic evaluation aspects of this review. He is a health economist and Associate Professor at the Telfer School of Management at the University of Ottawa.

William Witteman (WW) reviewed the search strategy for this review. He created our bibliographic database, searched the grey literature and managed the information collected during this review. He also took part in screening articles (title, abstract). His previous expertise in conducting cost-effectiveness reviews also supported the team's economic analysis section.

France Légaré (FL) contributed to writing our review protocol and reviewed the final manuscript. She acted as a senior advisor and mentor for all aspects of this protocol and review having led and participated in several Cochrane reviews in the past. She is a Full Professor within the Department of Family Medicine and Emergency Medicine at Université Laval and holds the Canada Research Chair in Shared Decision Making and Knowledge Translation.

DECLARATIONS OF INTEREST

Patrick Archambault is currently leading a study to measure the impact of implementing a CWA in the field of trauma care ([Archambault 2015](#)). All authors are also co-investigators in this ongoing trial. All the authors declare having no other conflicts of interest.

SOURCES OF SUPPORT

Internal sources

- Centre de santé et services sociaux Alphonse-Desjardins (CHAU de Lévis), Canada.
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External sources

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- Fonds de recherche du Québec - Santé, Canada.

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

We did not handsearch journals because we did not think this would yield any new citations in journals that were indexed in the different bibliographic databases already searched.

INDEX TERMS

Medical Subject Headings (MeSH)

*Cooperative Behavior; *Database Management Systems; *Outcome and Process Assessment, Health Care; *Professional Practice; Data Mining [*methods] [standards]; Social Media [*standards]; Writing [*standards]

MeSH check words

Humans