

IHC Key Concepts

**Comparison of the Informed Health Choices Key Concepts to other frameworks that are relevant to learning how to think critically about treatment claims, comparisons, and choices: protocol for a mapping review**

*Oxman AD and Martínez García L.  
Working paper, 29. August 2018*

# Colophon

*Title* Comparison of the Informed Health Choices Key Concepts to other frameworks that are relevant to learning how to think critically about treatment claims, comparisons, and choices: protocol for a mapping review

*Authors* Oxman Andrew D.  
Martínez García, L

*Corresponding author* Andy Oxman  
oxman@online.no  
Centre for Informed Health Choices  
Norwegian Institute of Public Health  
Postboks 222 Skøyen  
0213 Oslo, Norway

*Keywords* critical thinking, argumentation, causal inference, cognitive biases, epistemic cognition, evidence-based practice, evidence informed decision-making, health literacy, logical fallacies, meta-cognition, philosophy of science, problem solving, science education, scientific literacy, scientific reasoning, scientific thinking, frameworks, models, competences, concepts, criteria

*Citation* Oxman AD, Martínez GL. Comparison of the Informed Health Choices Key Concepts to other frameworks that are relevant to learning how to think critically about treatment claims, comparisons, and choices: protocol for a mapping review. IHC Working Paper, October 2018. <https://www.informedhealthchoices.org/wp-content/uploads/2018/10/Critical-thinking-frameworks-review-protocol.pdf>.

*Date* October 2018

# Plain language summary

The Informed Health Choices (IHC) Key Concepts serve as standards for judgment, or principles for evaluating the trustworthiness of treatment claims, comparisons, and choices. The concepts can help people to:

- Recognise when a **claim** about the effects of treatments has an untrustworthy basis
- Recognise when evidence from **comparisons** of treatments is trustworthy and when it is not
- Make well-informed **choices** about treatments

They serve as a framework for developing learning-resources to help people understand and apply the concepts when claims about the effects of treatments (and other interventions) are made, and when they make health choices.

We present here a plan for reviewing frameworks for critical thinking. The findings of this review will inform further development of the IHC Key Concepts, development of related frameworks, and use of such frameworks.

# Abstract

## Background

The Informed Health Choices (IHC) Key Concepts serve as standards for judgment, or principles for evaluating the trustworthiness of treatment claims, comparisons, and choices. They serve as a framework for developing learning-resources to help people understand and apply the concepts when claims about the effects of treatments (and other interventions) are made, and when they make health choices.

## Objective

The objective of this study is to systematically compare the IHC Key Concepts to other frameworks that are relevant to learning how to think critically about treatment claims, comparisons, and choices.

## Methods

We will identify relevant frameworks from reviews of frameworks, searches using Google Scholar, citation searches, and contact with key informants. We will include frameworks that are intended to provide a structure for teaching or learning to think critically about the basis for claims, evidence used to support claims, or making informed choices. To be included, there must be a description of the purpose of the framework, a list of the framework's elements; and definitions of the key terms. The two authors will independently assess frameworks for eligibility and extract data from included frameworks using standardised forms. We will map the relationship of the included frameworks to the IHC Key Concepts, to frameworks for 21st century competences, and national and international curricula.

## Discussion

The findings of this review will inform further development of the IHC Key Concepts, development of related frameworks, and the use of such frameworks.

# Background

## Key Concepts for learning how to think critically about health claims, comparisons, and choices

There are endless claims about treatments in the mass media, advertisements, and everyday personal communication. Some are true, and some are false. Many are unsubstantiated: we do not know whether they are true or false. Unsubstantiated claims about the effects of treatments are often wrong. Consequently, people who believe and act on these claims suffer unnecessarily and waste resources by doing things that do not help and might be harmful, and by not doing things that do help.

In response to these challenges, we developed the Informed Health Choices (IHC) Key Concepts as the first step in the Informed Health Choices project [1-6]. The aim of the project is to help people, particularly primary and secondary school students, assess claims about treatments and make informed health choices [7].

A treatment is any intervention (action) intended to improve health, including preventive, therapeutic and rehabilitative interventions, and public health or health system interventions [8]. Although we have developed and framed the Key Concepts to address treatment claims, people in other fields have also found them relevant; for example, for assessing claims about the effects of educational interventions or environmental measures. Work to adapt these concepts to other fields is ongoing.

The IHC Key Concepts serve as the basis for developing learning resources to help people understand and apply the concepts when claims about the effects of treatments (and other interventions) are made, and when they make health choices [5]. They are also the basis for a database of multiple-choice questions that can be used for assessing people's ability to apply the IHC Key Concepts [10].

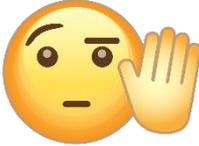
We started to develop this list of concepts in 2013. We published the first version of the list in 2015 with 32 concepts in six groups [1]. We published a revised list with 34 concepts in three groups in October 2016 [3]. The current list has 44 concepts in the same three groups (Figure 1) [6].

The IHC Key Concepts serve as standards for judgment, or principles for evaluating the trustworthiness of treatment claims and comparisons, and making informed choices. The concepts can help people to:

- Recognise when a **claim** about the effects of treatments has an untrustworthy basis

- Recognise when evidence from **comparisons** of treatments is trustworthy and when it is not
- Make well-informed **choices** about treatments

**Figure 1** *The IHC Key Concepts (short titles)*



**1. Beware of treatment claims like these**

We hear claims about the effects of treatments all the time. Many of these are not trustworthy. When you hear someone use one of these reasons to support a claim about the effects of a treatment, you should beware and ask where the evidence is.

**1.1 Beware of claims that are too good to be true.**

- a) "100% safe!"
- b) "100% effective!"
- c) "100% certain!"

- g) "Old is better!"
- h) "New is better!"
- i) "More is better!"
- j) "Early is better!"
- k) "Personalised medicine!"

**1.2 Beware of claims based on faulty logic.**

- a) "Treatment needed!"
- b) "It works like this!"
- c) "Associated with!"
- d) "Real world data!"
- e) "No comparison needed!"
- f) "A study shows!"

**1.3 Beware of claims based on trust alone.**

- a) "As advertised!"
- b) "It worked for me!"
- c) "Recommended by experts!"
- d) "Peer reviewed!"



**2. Check the evidence from treatment comparisons**

A treatment has to be compared to something else to know what would happen without the treatment. For treatment comparisons to be FAIR, the only important difference between comparison groups should be the treatments they receive. Unfair treatment comparisons and unsystematic summaries of treatment comparisons can be misleading. The way that treatment effects are described can also be misleading.

**2.1 Don't be misled by unfair comparisons!**

- a) Dissimilar comparison groups
- b) Indirect comparisons
- c) Dissimilar attention and care
- d) Dissimilar expectations or behaviours
- e) Dissimilar assessment of outcomes
- f) Unreliable assessment of outcomes
- g) Lots of people not followed-up
- h) Outcomes counted in the wrong group

- b) Selective reporting
- c) Unfounded assumptions

**2.2 Don't be misled by unreliable summaries of treatment comparisons!**

- a) Unsystematic summaries

**2.3 Don't be misled by how treatment effects are described!**

- a) Just words
- b) Relative effects
- c) Average effects
- d) Few people or events
- e) Subgroup analyses
- f) Statistically significant
- g) No confidence interval
- h) No evidence



**3. Make well-informed treatment choices**

Deciding what to do requires judgements about the relevance of the evidence, how important the good and bad outcomes are to you, and how sure you can be about the treatment effects.

**3.1 What is the problem and what are the options?**

- a) What is your health problem and what are your options?

- c) Are the treatments different from those available to you?
- d) Are the circumstances different from yours?

**3.2 Is the evidence relevant?**

- a) What outcomes matter to you?
- b) Are the people (or animals) very different from you?

**3.3 Do the advantages outweigh the disadvantages?**

- a) Do the advantages outweigh the disadvantages for you?
- b) How sure are you about the treatment effects?

6

We developed the IHC Key Concepts by searching the literature and checklists written for the public, journalists, and health professionals, and by considering concepts related to assessing the certainty of evidence about the effects of treatments [1]. We have tried to include all concepts that are important for people to consider when they assess treatment claims and make health choices. At the same time, we have tried to limit the number of concepts by minimising redundancy. We have organised the concepts in a way that makes sense to us and others who have provided feedback. They are not organised based on how complex or difficult they are to understand and apply, or in the order in which they should be learned. That is something we plan to do in the future.

Although we have written the concepts and explanations in plain language, some of them may be unfamiliar and difficult to understand. However, the list is not designed as a teaching tool. It is a framework, or starting point, for teachers, journalists and other intermediaries for identifying and developing resources (such as longer explanations, examples, games and interactive applications) to help people to understand and apply the concepts.

## **Other frameworks relevant to learning how to think critically about treatment claims, comparisons, and choices**

There are many other frameworks that include competences, dispositions, or concepts that are relevant to thinking critically about treatment claims, comparisons, and choices. These include frameworks for argumentation, causal inference, cognitive biases, critical thinking, epistemic cognition, evidence-based practice, evidence-informed decision-making, health literacy, logical fallacies, meta-cognition, philosophy of science, problem solving, science education, scientific literacy, scientific reasoning, and scientific thinking. For each category of frameworks there are disagreements about definitions and what is included. For example, learning to think critically is widely held as an aim of education [10], but there is not agreement on the definition of “critical thinking” and there are several different frameworks (conceptual structures intended to serve as a support or guide) for critical thinking [11-15]. Similarly, there are different definitions and frameworks for scientific reasoning (and scientific literacy and scientific thinking) [16-19], epistemic cognition [20], causal inference [21], problem solving [22], meta-cognition [23], health literacy [24-26], evidence-informed decision making [27,28], and evidence-based practice [29]. There is also overlap across these different categories of frameworks, some of which have been grouped together as frameworks for “productive thinking” [13].

## **Objective**

The objective of this study is to systematically compare the IHC Key Concepts to other frameworks that are relevant to learning how to think critically about treatment claims, comparisons, and choices. We will examine similarities and differences between the IHC Key Concepts and other frameworks - particularly in the context of primary and secondary school education - including:

- The purposes and definitions of key terms
- The elements they include and domains in which those are grouped

- How they have been developed and evaluated
- How they have been used as the basis for curricula, teaching and learning, and assessment tools

## Terminology

Definitions of terms that we use in this protocol are shown in Table 1.

**Table 1** Definitions of terms as used in this protocol

Choice	A decision to do something (or not to do something) with the intention of achieving a goal, such as improving or maintaining health
Claim	A statement about what will happen if one action (e.g. a treatment) is chosen compared to what would happen if another action (or “no treatment”) was chosen
Comparison	Examination of the evidence for differences between two options, such as what will happen if one action is chosen compared to what would happen if another action was chosen
Competency	The required skill, knowledge, or capacity to do something
Concept	In this review, concept (an idea, object of thought, or constituent of thought) refers to a specific type of concept: a criterion (standard for judgment) or principle (a concept that is a guide) for evaluating the trustworthiness of claims and comparisons, and for making choices; or an issue worthy of attention or consideration when assessing claims and making choices.
Curriculum	A set of learning goals that outline the intended content and process goals of a school program
Disposition	Frequent and voluntary habits of thinking and doing
Domain	A group of elements within a framework
Element	One of the components of a framework, including concepts, competences, and dispositions
Fair comparison	Studies comparing two or more treatments, which are designed, conducted, reported and interpreted to minimize systematic errors (bias) and random errors (resulting from the play of chance) in measuring treatment effects
Framework	A structure, composed of elements, designed (at least in part) to support doing something or learning to do something, such as thinking critically or learning to think critically about claims, comparisons, and choices
Intervention	Any action intended to achieve a goal
Skill	The ability to do something
Thinking critically	Using appropriate criteria (standards for judgment, or principles for evaluation) to make judgements; for example, about the trustworthiness of claims and comparisons, and what to do
Treatment	Any action intended to improve or maintain the health of individuals or communities

# Methods

We will conduct a systematic mapping review of frameworks that are relevant to learning to think critically about treatment claims, comparisons, and choices.

## Criteria for considering frameworks for inclusion

We will include frameworks that are intended to provide a structure for teaching or learning to think critically about at least one of the following:

- The basis (justification) for claims or arguments about the effects of interventions and the reliability of those justifications
- The extent to which evidence used to support claims about the effects of interventions (comparisons) is fair and reliable
- Choices about what to do in order to achieve a goal

To be included, there must be:

- a description of the purpose of the framework;
- a list of the framework's elements; and
- definitions of the key terms used to describe the purpose of the framework, its elements and domains (in which elements are grouped, if there are any)

Frameworks that are modifications of another framework will be considered together with the framework that was modified.

## Search methods for identification of frameworks

We will begin by considering the 41 frameworks reviewed in *Frameworks for Thinking: A Handbook for Teaching and Learning* [13] and reviews of frameworks used in health [24-29]. We will search for other relevant frameworks using Google Scholar and the search strategies in Appendix 1. We will supplement these searches by conducting citation searches for key references and contacting key informants for each category of frameworks. We will also search for reviews of frameworks for 21st century competences [e.g. 10] and national curricula [e.g. 30].

## Selection of frameworks

The two review authors will independently assess each identified framework for possible inclusion using the selection criteria described above, using an eligibility form (Appendix 2). The two authors will discuss disagreements and reach

a consensus. Frameworks that are considered for inclusion and then excluded will be listed with the reasons for exclusion.

## **Data collection and assessment of frameworks**

For each included framework, we will conduct focused searches and compile a list of publications that describe the framework, its development and evaluation, and its use as the basis for curricula, learning resources, and assessment tools.

The two authors will then independently record the following information for each framework, using a data collection form (Appendix 3):

- Its purpose
- Its domains and elements
- Definitions of key terms used to describe its purpose, domains, or elements
- Methods used to develop the framework
- Methods used to evaluate the framework (if any) and findings
- Ways in which the framework has been used as the basis for
  - Curricula
  - Teaching and learning
  - Assessment tools

We will then compare the data that we have collected and discuss any disagreements and reach a consensus.

For each framework for 21<sup>st</sup> century competences and national curricula included in one of the reviews that we identify, we will independently record learning goals that correspond to the purposes of the included frameworks for learning how to think critically, or the elements and domains in those frameworks.

Based on this information, we will independently assess:

- Strengths and weaknesses of how the framework was developed and evaluated
- Strengths and weaknesses of how the framework has or could be used
- Any other strengths or weaknesses

We will compare our assessments and resolve any disagreements.

## **Analysis**

1. We will summarise key characteristics of the included frameworks in tables.
2. We will map the extent to which the purposes of the different frameworks overlap using Venn diagrams, focusing particularly on overlap with the IHC Key Concepts.
3. We will prepare three matrixes with elements as columns and frameworks as rows, including one for concepts, one for competences, and one for dispositions. For concepts, we will focus particularly on overlap with the IHC Key Concepts, and concepts that are relevant to the purpose of the IHC Key Concepts, but not currently included. For competences and dispositions, we will focus particularly on those that are relevant to the purpose of the IHC

Key Concepts. If we identify elements that cannot be categorised as concepts, competences, or dispositions, we will prepare additional matrixes for any relevant categories of elements that we identify.

4. We will map the extent to which the included frameworks are reflected in frameworks for 21st century competences and national curricula, focusing particularly on the IHC Key Concepts.
5. We will reflect on our assessments of the frameworks and identify implications for how we might improve the IHC Key Concepts framework and its usefulness.

The two authors will conduct these analyses independently. We will then compare our analyses, discuss disagreements, and reach a consensus.

## **Discussion**

The findings of this review will inform future improvements of the IHC Key Concepts. In addition, they will inform the development of other frameworks, and the choice and use of frameworks by curriculum developers, teachers, and others.

# Declarations

## **Author contributions**

AO prepared the first draft of this protocol and coordinated revisions, which were co-authored by AO and LMG.

## **Competing interests**

AO has helped to coordinate the development of the IHC Key Concepts since 2013 and currently has primary responsibility for further development of that framework. Both AO and LMG are members of the IHC Network.

## **Funding**

The IHC Key Concepts were developed as part of the Informed Health Choices Project, which was funded by the Research Council of Norway (project no: 220603/H10).

## **Acknowledgments**

We would like to thank Astrid Austvoll-Dahlgren, Iain Chalmers, and Joe Chislett for comments on an earlier version of this protocol, and Steve Higgins for advice.

# References

1. Austvoll-Dahlgren A, Oxman AD, Chalmers I, et al. Key concepts that people need to understand to assess claims about treatment effects. *J Evid Based Med* 2015; 8:112-25.
2. Austvoll-Dahlgren A, Nsangi A, Semakula D. Interventions and assessment addressing key concepts people need to know to appraise claims about treatment effects: a systematic mapping review. *Syst Rev* 2016; 5:215.
3. Austvoll-Dahlgren A, Oxman AD, Chalmers I, and the Informed Health Choices Group. Key Concepts for assessing claims about treatment effects and making well-informed treatment choices. Version: 2016. <https://www.informedhealthchoices.org/wp-content/uploads/2018/10/Key-Concepts-2016-edition.pdf>. Accessed October 16, 2018.
4. Austvoll-Dahlgren A, Chalmers I, Oxman AD, and the Informed Health Choices Group. Assessing claims about treatment effects: key concepts that people need to understand. Version: 2017. <https://www.informedhealthchoices.org/wp-content/uploads/2016/08/Key-Concepts-2017-edition.pdf>. Accessed October 16, 2018.
5. Chalmers I, Oxman AD, Austvoll-Dahlgren A, et al. Key Concepts for Informed Health Choices: a framework for helping people learn how to assess treatment claims and make informed choices. *BMJ Evid Based Med*, 2018; 23:29–33.
6. Oxman AD, Chalmers I, Austvoll-Dahlgren A, and the Informed Health Choices Group. Key Concepts for assessing claims about treatment effects and making well-informed treatment choices. Version: 2018. <https://www.informedhealthchoices.org/wp-content/uploads/2018/10/Key-Concepts-2018-edition.pdf>. Accessed October 16, 2018.
7. Informed Health Choices. <https://www.informedhealthchoices.org/>. Accessed October 16, 2018.
8. GET-IT Glossary. <http://getitglossary.org/term/treatment>. Accessed October 16, 2018.
9. Austvoll-Dahlgren A, Semakula D, Nsangi A, et al. The development of the “Claim Evaluation Tools”: assessing critical thinking about effects. *BMJ Open* 2017; 7(5):e013184.

10. Voogt J, Roblin NP. A comparative analysis of international frameworks for 21st century competences: implications for national curriculum policies. *J Curric Stud* 2012;357:299-321.
11. Presseisen BZ. *Critical thinking and thinking skills: State of the art definitions and practice in public schools*. Philadelphia: Research for Better Schools, Inc., 1986.
12. Follman J. Critical thinking definitions. *Inquiry: Critical Thinking Across The Disciplines* 1991; 8(2):4-5.
13. Moseley D, Baumfield V, Elliott, et al. *Frameworks for Thinking: A Handbook for Teaching and Learning*. Cambridge: Cambridge University Press 2005.
14. Moore T. Critical thinking: seven definitions in search of a concept. *Studies in Higher Education* 2013;38:506-22.
15. Gyenes A. Definitions of critical thinking in context. *Annals of Educational Studies* 2015; 20:17-25.
16. Kind P, Osborne J. Styles of scientific reasoning: a cultural rationale for science education? *Science Education* 2017; 101: 8–31.
17. Zimmerman C. The development of scientific reasoning skills. *Developmental Review* 2000; 20:99-149.
18. Laugksch RC. Scientific literacy: a conceptual overview. *Sci Ed* 2000; 84:71-94.
19. Miller JD. Scientific literacy: a conceptual and empirical review. *Daedalus* 1983; 112:(2)29-48.
20. Bendixen LD. Teaching for epistemic change in elementary classrooms. In: Bråten I, Sandoval WA, Greene JA (eds). *Handbook of Epistemic Cognition*. New York: Routledge, 2016.
21. Glass TA, Goodman SN, Hernán MA, Samet JM. Causal inference in public health. *Annu Rev Public Health* 2013; 34:61-75.
22. Smith MU (ed). *Toward a Unified Theory of Problem Solving: Views from the Content Domains*. Hillsdale, NJ: Lawrence Erlbaum, Associates Inc., 1991.
23. Gascoine L, Higgins S, Wall K. The assessment of metacognition in children aged 4-16 years: a systematic review. *Rev Educ* 2017; 5:3–57.
24. Bröder J, Okan O, Bauer U, et al. Health literacy in childhood and youth: a systematic review of definitions and models. *BMC Public Health* 2017; 17:361.
25. Sørensen K, Van den Broucke S, Fullam J, et al. Health literacy and public health: a systematic review and integration of definitions and models. *BMC Public Health* 2012; 12:80.
26. Sykes S, Wills J, Rowlands G, Popple K. Understanding critical health literacy: a concept analysis. *BMC Public Health* 2013; 13:150.

27. Morgan RL, Kelley L, Guyatt GH, Johnson A, Lavis JN. Decision-making frameworks and considerations for informing coverage decisions for healthcare interventions: a critical interpretive synthesis. *J Clin Epidemiol* 2017. Available at <https://doi.org/10.1016/j.jclinepi.2017.09.023>.
28. Alonso-Coello P, Schunemann H, Moberg J, et al. GRADE Evidence to Decision (EtD) frameworks: a systematic and transparent approach to making well informed healthcare choices. 1: Introduction. *BMJ* 2016; 353:i2016.
29. Albarquoni L, Hoffmann T, Glasziou P, et al. Core competencies required for an educational training in evidence-based practice: consensus statement based on a systematic review and a Delphi survey. Submitted.
30. Ananiadou K, Claro M. 21st century skills and competences for new millennium learners in OECD countries. *OECD Education Working Papers*, No. 41, 2009. Available at: <http://dx.doi.org/10.1787/218525261154>.



## **Appendix 1 Google Scholar search strategies**



Our initial search strategies are summarised in the table below. We have elected initially to use search strategies that are more specific than sensitive, by searching for key terms in the titles of articles only.

## Search log

Focus	Date	Search strategy	Results
Argumentation	19/10/18	allintitle: argumentation (framework OR model OR competences OR competencies) (teaching OR teachers OR learning OR students OR school OR schools OR education)	88
Causal inference	16/10/18	allintitle: framework OR model OR competences OR competencies OR concepts OR criteria "causal inference"	146
Cognitive biases	19/10/18	allintitle: "cognitive biases" "decision making"	105
Epistemic cognition	16/10/18	allintitle: framework OR model OR competences OR competencies OR concepts OR criteria "epistemic cognition"	16
Evidence-based practice	19/10/18	allintitle: "evidence based practice" (framework OR model OR competences OR competencies) (teaching OR teachers OR learning OR students OR school OR schools OR education)	74
Evidence-informed decision-making	16/10/18	allintitle: framework OR model OR competences OR competencies OR concepts OR criteria "evidence based decision making"	31
Evidence-informed decision-making	16/10/18	allintitle: framework OR model OR competences OR competencies OR concepts OR criteria "evidence informed decision making"	6
Evidence-informed practice	16/10/18	allintitle: framework OR model OR competences OR competencies OR concepts OR criteria "evidence-informed practice"	13
Health literacy	16/10/18	allintitle: framework OR model OR competences OR competencies OR concepts OR criteria "health literacy"	221
Logical fallacies	19/10/18	allintitle: "logical fallacies" (teaching OR teachers OR learning OR students OR school OR schools OR education)	19
Meta-cognition	16/10/18	allintitle: framework OR model OR competences OR competencies OR concepts OR criteria "meta-cognition"	21
Philosophy of science	18/10/18	allintitle: framework OR model OR competences OR competencies OR concepts OR criteria "philosophy of science"	186
Problem solving	19/10/18	allintitle: "problem solving" (framework OR model OR competences OR competencies) (teaching OR teachers OR learning OR students OR school OR schools OR education) ("decision making" OR cause OR causal OR claims OR evidence OR "health literacy" OR reasoning OR science OR scientific OR thinking)	73
Science education*	19/10/18	allintitle: framework OR concepts "science education"	286
Scientific literacy	16/10/18	allintitle: framework OR model OR competences OR competencies OR concepts OR criteria "scientific literacy"	122
Scientific reasoning	16/10/18	allintitle: framework OR model OR competences OR competencies OR concepts OR criteria "scientific reasoning"	70
Scientific thinking	16/10/18	allintitle: framework OR model OR competences OR competencies OR concepts OR criteria "scientific thinking"	44
Total			1521

\* Without citations



## **Appendix 2 Eligibility form**



# Critical thinking frameworks eligibility form

For assessing potentially eligible frameworks

---

**Framework ID**

---

**Your name**

---

**Date**

---

---

Inclusion criteria (exclude if no)

**Does the framework provide a structure for teaching or learning to think critically about at least one of the following:**  Yes  No

*The basis (justification) for claims or arguments about the effects of interventions and the reliability of those justifications*  Yes  No

*The extent to which evidence used to support claims about the effects of interventions (comparisons) are fair and reliable*  Yes  No

*Informed decisions (choices about what to do in order to achieve a goal)*  Yes  No

---

*Is there a description of the purpose of the framework?*  Yes  No

---

*Is there a list of the framework's elements?*  Yes  No

---

*Are there definitions of the key terms used to describe the purpose of the framework, its elements and domains (in which elements are grouped, if there are any)?*  Yes  No

---

Exclusion criterion

*Is the framework a modification of another framework?*  Yes  No

---

Conclusion

*Should the framework be included?*

- *Yes, if yes to all of the inclusion criteria and no to the exclusion criterion*  Yes
  
  - *Note the original framework, if it is a modification of another framework*  Consider together with another framework
  
  - *Provide a concise statement of the main reason for excluding the framework, if it should be listed in the excluded frameworks table*  No, and list in excluded frameworks table
  
  - *Note why, if it is obvious that the frameworks should be excluded and not listed in the excluded frameworks table*  No, and do not list in excluded frameworks table
-

---

## Consensus

---

### Names and date

---

*Should the framework be included?*

- *Yes, if yes to all of the inclusion criteria and no to the exclusion criterion*  Yes
  
  - *Note the original framework, if it is a modification of another framework*  Consider together with another framework
  
  - *Provide a concise statement of the main reason for excluding the framework, if it should be listed in the excluded frameworks table*  No, and list in excluded frameworks table
  
  - *Note why, if it is obvious that the frameworks should be excluded and not listed in the excluded frameworks table*  No, and do not list in excluded frameworks table
-

## **Appendix 3** Data collection form



# Critical thinking frameworks data collection form

*For included frameworks*

Framework ID
Your name
Date

## Publications

**List each publication** that was used to provide information about this framework:

Data	References
What is the <b>name</b> of the framework? (note whether it is called a list, inventory, framework, taxonomy, or something else)	
<b>Who</b> developed the framework and <b>where</b> ? (name(s) of the author(s) or organization that developed the framework and the country in which it was developed)	
<b>When</b> was the framework developed (date of the first publication describing the framework and date of the most recent?)	
What is the <b>stated purpose</b> of the framework?	
What is the <b>background</b> of the framework? (including, for example, the context in which it was developed, the rationale, and the discipline(s) of the developers)	
<b>What domains (if any) and elements (within each domain) are included in the framework?</b> <b>NOTE how these overlap with IHC.</b>	
<b>Competences</b> (skill, knowledge, or capacity to do something) <input type="checkbox"/> Yes <input type="checkbox"/> No	
Are any of these clearly or potentially <b>relevant for IHC</b> ? <sup>1</sup> <input type="checkbox"/> Yes <input type="checkbox"/> No	

<sup>1</sup> IHC currently addresses two broad competences: assessing treatment claims and making informed treatment choices.

<b>Dispositions</b> (frequent and voluntary habits of thinking and doing): <input type="checkbox"/> Yes <input type="checkbox"/> No	
Are any of these clearly or potentially <b>relevant for IHC</b> ? <sup>2</sup> <input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>Concepts</b> (standards for judgment, or principles for evaluating the trustworthiness of claims, comparisons, and choices) <input type="checkbox"/> Yes <input type="checkbox"/> No	
How do these <b>overlap with the IHC Key Concepts</b> ? <sup>3</sup>	
<b>Other elements</b> (that do not fit into any of the above categories) <input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>How are <u>key terms</u> in the framework <u>defined</u>?<sup>4</sup></b>	
Key terms used to describe the framework's <b><u>purpose</u></b>	
Key terms used to describe the framework's <b><u>domains and elements</u></b>	
<b><u>Other</u></b> key terms	
<b>Evaluation of the framework</b>	
Has the framework been <b>formally evaluated</b> ? <sup>5</sup> <input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>If so, how?</b>	
<b>What were the key findings?</b>	

<sup>2</sup> IHC does not currently include dispositions. Note here dispositions that are clearly or potentially relevant for IHC.

<sup>3</sup> Note any concepts that are similar to IHC Key Concepts and any concepts that should be considered for inclusion the next time we update the IHC Key Concepts.

<sup>4</sup> Only include definitions that are necessary to understand the framework or that are potentially useful for clarifying IHC in future updates.

<sup>5</sup> Note any evaluation of any aspect of the framework using any methods. To be considered a “formal evaluation” there has to be a report with an explicit objective, a description of the methods that were used, and results.

<p>Has the framework been <b>informally evaluated</b>?<sup>6</sup></p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>	
<p>If so, <b>how</b>?</p>	
<p>What were the <b>key findings</b>?</p>	
<p><b>Strengths</b> of how the framework was evaluated</p>	
<p><b>Weaknesses</b> of how the framework was developed was evaluated</p>	
<p>Are there ways in which the framework has been evaluated that we might want to consider <b>applying to the IHC Key Concepts</b>?</p>	
<p><b>Development of the framework</b></p>	
<p>Is there a <b>clear description of the methods</b> that were used?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>	
<p>Is the <b>basis</b> for the framework clear?</p> <p><input type="checkbox"/> No</p> <p><input type="checkbox"/> Somewhat</p> <p><input type="checkbox"/> Yes</p> <p>If somewhat or yes, <b>tick all that are relevant</b> and specify:</p> <p><input type="checkbox"/> It is based on another framework</p> <p><input type="checkbox"/> It is based on a model or theory</p> <p><input type="checkbox"/> It is based on a systematic review</p> <p><input type="checkbox"/> It is based on a non-systematic review</p> <p><input type="checkbox"/> It is based on a formal consensus process</p> <p><input type="checkbox"/> It is based on an informal consensus process</p> <p><input type="checkbox"/> It is based on something else</p> <p>Notes:</p>	
<p>Are the <b>criteria</b> for including and excluding elements clear?</p> <p><input type="checkbox"/> No</p> <p><input type="checkbox"/> Somewhat</p> <p><input type="checkbox"/> Yes</p> <p>If somewhat or yes, specify:</p>	

<sup>6</sup> Note any evaluation of any aspect of the framework using any methods. To be considered a “formal evaluation” there has to be a report with an explicit objective, a description of the methods that were used, and results.

Is the framework **coherent** (i.e. does not mix type(s) and specificity of concepts, competencies, or dispositions)?

- No
- Somewhat
- Yes
- Don't know

What is the basis for this judgement?:

Are the elements and domains **distinct**?

- No
- Somewhat
- Yes
- Don't know

What is the basis for this judgement?:

Are there elements or domains that are **included that should not be**?

- No
- Possibly
- Yes
- Don't know

What is the basis for this judgement?:

Are there important elements or domains that are **missing**?

- No
- Possibly
- Yes
- Don't know

What is the basis for this judgement?:

Are the elements **grouped in a logical way**?

- No
- Possibly
- Yes
- Don't know

What is the basis for this judgement?:

Is it **clear for whom** the framework is intended?

- No
- Possibly
- Yes
- Don't know

What is the basis for this judgement?:

Other **strengths** of how the framework was developed

Other **weaknesses** of how the framework was developed

Are there ways in which the framework has been developed that we might want to consider **applying to the IHC Key Concepts**?

**What are the strengths and weaknesses of how the framework has or could be used for curriculum development, teaching and learning, and assessment?**

Based on references that describe the framework and references citing those:

Is there **evidence of that the framework has been used**?

Yes  No

If so, what evidence (references)?

**Who** has used it?

Teachers  Students  Researchers  Others

Specify types of teachers, students, researchers, and others:

Has it been used in **curriculum development**?

Yes  No

Are there teaching and **learning resources**?

Yes  No

Are there **assessment tools**?

Yes  No

Are there **other ways** in which it has been used?

Yes  No

Are there ways in which it has been **proposed that it could be used**, but for which there is not evidence that it has been used?

Yes  No

Other **strengths** of how the framework has or could be used

Other **weaknesses** of how the framework has or could be used

Are there ways in which the framework has been used that we might want to consider **applying to the IHC Key Concepts**?

Yes  No

**What other strengths and weaknesses does the framework have?**

Any **other strengths**

Any **other weaknesses**

What potential **implications** are there **for the IHC Key Concepts**?

For refining the stated **purpose**?

Yes  No

For the **scope**?

Yes  No

Modification of how the concepts are **grouped**?

Yes  No

New **concepts** or refinement of concepts that should be considered?

Yes  No

**Dispositions** that should be considered?

Yes  No

**Other elements** that should be considered?

Yes  No

**Methods** that we should consider using?

Yes  No

Ways of making the IHC Key Concepts more **useful**?

Yes  No

**Other?**

Yes  No

**Is there anything else about the framework that should be noted?**

Yes  No

If yes, what?

**Missing information**

Is there important information that is missing and, if so, whom should we contact to try to obtain that information?

Yes  No