

Mobilizing Computable Biomedical Knowledge (CBK): A Manifesto

Preamble

Knowledge has the power to improve health care, the health of individuals, and the health of populations. Every decision affecting health should be informed by the best available knowledge. For moral and ethical reasons, it is imperative that each and every member of society has access to what is known at the time they are making health-related choices and decisions .

It is no longer sufficient to represent knowledge in the form of printed words and static pictures. The increasingly rapid rate of scientific discovery needs knowledge representations that are more agile and amenable to automation and mass action. This in turn can enable the continuous cycles of discovery and improvement envisioned as Learning Health Systems.

Contemporary digital technology enables knowledge to be represented in *computable* forms expressed in machine-executable code. Computable knowledge unleashes the potential of information technology to generate and deliver relevant health advice to individuals and organizations with great speed on a world-wide scale. It is essential to take full advantage of these capabilities, while continuing established practices that validate knowledge, preserve it, and ensure that it can be trusted.

There is work to do to make what is known about health available to all. To begin, biomedical knowledge in computable form must be made openly and widely available so that it can be used to immediately impact health.

It is time for action on a global scale.

Computable Biomedical Knowledge

Computable Biomedical Knowledge is the result of an analytic and/or deliberative process about human health, or affecting human health, that is explicit and machine-executable, and therefore can be represented and reasoned upon using logic, formal standards, and mathematical approaches.

Vision

We are dedicated to:

Mobilizing biomedical knowledge that can support action toward improving human health. This should be done using computable formats that can be shared and integrated into health information systems and applications; and enabled when diverse people and organizations contribute to both its development, maintenance, and continued refinement. This will engender transparency to facilitate widespread validation of the knowledge, and empower better informed

decisions by tailoring and rendering the knowledge actionable to a broad base of individuals/communities/users of the knowledge.

Efficiently and equitably serving the learning and knowledge needs of all participants, as well as the public good. Ensuring that the knowledge properly reflects the best and most current evidence and science.

Achieving this through evolution of an open Computable Biomedical Knowledge ecosystem dedicated to achieving the FAIR principles: making Computable Biomedical Knowledge easily findable, universally accessible, highly interoperable, and readily reusable.* The current interest in making data “FAIR” should be matched by equally intense interest in making knowledge “FAIR”.

Mechanisms of Activity

We believe that all of the following are important:

- Sustain the Computable Biomedical Knowledge ecosystem through public-private partnerships.
- Establish participatory governance of the ecosystem.
- Enable the ecosystem with open standards.
- Make the ecosystem diverse and inclusive.
- Build and uphold trust in Computable Biomedical Knowledge through the ecosystem.
- Ensure the safe and effective use of Computable Biomedical Knowledge through the ecosystem.
- Explore the sciences of Computable Biomedical Knowledge collaboratively.
- Generate value for the creators of the knowledge, the users of the knowledge, and the general public.
- Be agile to reflect the increasingly rapid changes in knowledge.
- Engender equity in health and in knowledge accessibility.
- Ensure robust and unbiased methods to support transparency and expose the validity and provenance of Computable Biomedical Knowledge.
- Implement the highest standards of privacy and security for all stakeholders.
- Enable a pipeline that transitions knowledge from human-readable to fully computable through successive stages.

*- Wilkinson MD, Dumontier M, Aalbersberg IJ, Appleton G, Axton M, Baak A, Blomberg N, Boiten JW, da Silva Santos LB, Bourne PE, Bouwman J. The FAIR Guiding Principles for scientific data management and stewardship. *Scientific data*. 2016;3.