CLINICAL INVESTIGATION

Improving the implementation of evidence-based knowledge in healthcare

> " ...the amount of new information is much too large to allow busy healthcare professionals to stay aware of possibly important evidence-based information. "

Information overload & know-do gap

The pace of development of new healthcare technologies and related knowledge is very fast. Implementation of high quality evidence-based knowledge is thus mandatory to warrant an effective healthcare system and patient safety. However, even though only a small fraction of the approximate 2500 scientific publications indexed daily in Medline is actually useful to clinical practice, the amount of new information is much too large to allow busy healthcare professionals to stay aware of possibly important evidence-based information [1]. Indeed, there are well-recognized barriers to the translation of this knowledge to clinical practice and organization of care [2,3]. We focus here on 'type 2' translational research that concerns the implementation of clinical research results (e.g., clinical trials) into actual practice, in an attempt to fill the 'know-do-gap' [4]. The aforementioned barriers to knowledge translation generate delays to adopting new effective and efficient interventions, the persistence of obsolete treatments (i.e., comparatively low effectiveness and high elevated occurrence of secondary effects and inconvenience), not to mention large unexplained variations in healthcare use, the overuse of ineffective or inappropriate interventions and the underuse of effective preventive, diagnostic and therapeutic care [3,5].

Implementing evidence into practice

Different initiatives have been launched to overcome these barriers, that include the 'evidence-based healthcare' movement, the Cochrane Collaboration, which provides systematic reviews of the effectiveness of medical interventions, as well as clinical practice guidelines and healthcare technology assessments. The effectiveness of various initiatives aimed at fostering knowledge translation into practice have been evaluated in systematic reviews: clinical practice guidelines [6], audit and feedback [7], reminders [8,9], interventions tailored to identified barriers [10], medical education material and meetings [11,12], local opinion leaders [13] and health information technology (e-health) [14,15]. All these interventions show potential effectiveness to foster knowledge translation. However, the effects are most often modest, if not uncertain, with large variations in potential benefits. In addition, the quality of this evidence is often weak. To illustrate this, two complementary Cochrane reviews have examined the effectiveness of reminders. Shojania *et al.* reported that computer reminders achieved a median improvement in process adherence of 4.2% (28 studies; interquartile range: 0.8–18.8%) [8]. In the second review, Arditi *et al.* reported a similar figure, computer-generated reminders delivered on paper to healthcare professionals achieved a moderate median improvement of processes of care of 7.0% in professional practice (interquartile range: 3.9–16.4%) [9].

Implementing evidence into practice, understanding the difficulties better

Several barriers to knowledge translation processes have been described: limitations to

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guidelines accessibility, important time needed to stay informed, huge amount of information to be analyzed, logistical and technical limitations, lack of skills to appraise evidence, physician personal and professional experiences (habits, routines, inertia of previous practices), patient–doctor relationships and perceived lack of applicability of scientific evidence to individual patients [16,17]. In addition, many theories and frameworks have been proposed [1], including the knowledge-to-action framework [18], built from existing theories.

> "…we need additional developments and evidence to improve our ability to decide which efficient knowledge translation and implementation approaches will work in a given context and environment."

Nevertheless, most theories and research in usual knowledge translation research rely on mechanistic, explicit, rationalist or linear approaches [19,20]. However, knowledge translation is also made of informal, non-linear and 'holistic' approaches [19,20]. In an ethnographic study, Gabbay and Le May observed that clinicians rarely accessed explicit evidence but used what they called 'mindlines' (collectively reinforced and internalized tacit guidelines). They observed that clinicians combined information from their colleagues and opinion leaders, from brief readings of readable information, encounters with pharmaceutical representatives, and other sources of 'tacit' knowledge [20]. These results and other similar observations show that official scientific sources are not the only ones used by clinicians in their daily practice. They use various formal and informal sources and combine them in a way that needs to be better understood. They do not passively absorb scientific information, but interpret it according to the specificities of their practice and goals. These various elements testify the need for a multidisciplinary approach that draws upon sociology, psychology, anthropology and, more specifically, upon comprehensive approaches that take the social, cultural, material and interpersonal context into consideration [21], and

focus on the way in which clinicians actually refer to and use knowledge in healthcare [19,22].

Health information technologies, the magic bullet?

Given the observed difficulties and the heterogeneity in implementing evidence-based knowledge into practice, one may hope that e-health technologies become helpful. However, both McGowan and Gagnon *et al.* concluded that evidence was insufficient to support or refute the use of electronic retrieval of healthcare information by healthcare providers to improve practice and patient care [15], and to support interventions promoting the adoption of health information technologies by healthcare professionals [14]. In an updated systematic review published in 2014, Jones *et al.* reviewed a broader spectrum of studies to examine if the use of health information technology may improve healthcare quality, safety and efficiency [23]. They concluded that clinical decision support have positive effects, but that it is difficult to predict which approach may work in a given context and environment.

In conclusion, beyond the fundamental need to hold a more comprehensive web of high quality evidence knowledge about what works, and when, in healthcare, we need additional developments and evidence to improve our ability to decide which efficient knowledge translation and implementation approaches will work in a given context and environment. Interdisciplinary collaborative developments, based on solid theoretical grounds and tested in pragmatic trials, should be conducted and supported to reduce waste in research investments and improve quality in healthcare.

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