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Supporting Diagnosis With Next-Generation Artificial Intelligence

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Next-generation artificial intelligence for diagnosis

To the Editor: A recent Viewpoint¹ proposed to support diagnosis with a next-generation artificial intelligence that not only predicts diagnosis but also accompanies physicians on their journey. The wayfinding metaphor poses interesting research questions about the best way to represent the map from an ergonomic point of view, but also calls into question the volume of interventions of the system and its level of autonomy. A high volume of alerts accompanied clinical decision support systems for prescription and lab ordering. The strategy of alerting doctors initially seemed relevant and necessary to help reduce prescription errors. However, the frequent alerts led to a fatigue phenomenon, and doctors eventually ended up not taking them into account². Likewise, one can imagine observing a fatigue alert linked to the wayfinding provided by next-generation artificial intelligence. Therefore, it is vital to set the recommendation and intervention level of the system. First, the system should allow time for clinicians to ask questions and take actions on their own, when appropriate. A system that anticipates every clinician move could be irritating and fatiguing, even if always correct. Clinicians are highly qualified professionals who are trained to request help when necessary. Use of a computer system can be stressful, overloading and may be harmful in several ways. The challenge is therefore to set appropriately for the individual clinician (adjusted for specialty and training level³) the type (asynchronous vs dynamic), level (critical vs minor) and time (at consult vs at result return) for interactions.

Second, the system should be more active in the case of life-threatening situations if recommended tests are not ordered, whereas it may be less active in the diagnosis of chronic conditions. For example, the system should be able to prioritize clinical situations such as sepsis⁴, malnutrition and lower back pain⁵, helping the clinician focus on emergencies first and intervene later on lower priority conditions. At the same time, the system could screen continuously for rare diseases, which may be difficult to diagnose, to help avoid potentially delayed appropriate care. This ability of diagnosis systems using next-generation artificial intelligence to be highly adapted to the clinical context is crucial for the wayfinding to be useful to clinicians.

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1. Adler-Milstein J, Chen JH, Dhaliwal G. Next-generation artificial intelligence for diagnosis: from predicting diagnostic labels to “wayfinding”. *JAMA*. 2021;326(24):2467–2468. doi:10.1001/jama.2021.22396
2. Bittmann JA, Rein EK, Metzner M, Haefeli WE, Seidling HM. The acceptance of interruptive medication alerts in an electronic decision support system differs between different alert types. *Methods Inf Med*. 2021 Dec;60(5-06):180-184.
3. Sellier E, Colombet I, Sabatier B, Breton G, Nies J, Zapletal E, et al. Effect of alerts for drug dosage adjustment in inpatients with renal insufficiency. *J Am Med Inform Assoc*. 2009;16(2):203-10.
4. Wu M, Du X, Gu R, Wei J. Artificial intelligence for clinical decision support in sepsis. *Front Med (Lausanne)*. 2021;8:665464. doi: 10.3389/fmed.2021.665464. eCollection 2021.
5. Miotto R, Percha BL, Glicksberg BS, Lee HC, Cruz L, Dudley JT, et al. Identifying acute low back pain episodes in primary care practice from clinical notes: Observational study. *JMIR Med Inform*. 2020 Feb 27;8(2):e16878.