

Further Perspective on the Need for Medical Innovation and Data Overload from a Laboratory Results Viewpoint

Roy Malka*

Department of Systems Biology,
Harvard Medical School, Boston, Israel

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*Corresponding author:
Roy Malka

Description

Laboratory results are essential and highly utilized tools in the practice of medicine in all care settings. To improve decision-making over the years more and more tests are done by patients. Some of the tests provide full decision-making without a healthcare provider e.g., in the case of diabetics and Continuous Glucose Monitors (CGMs) [1] and their predecessors, the fingertip glucose measures that are used frequently to establish insulin shot dosage; in the more modern tools, urine dipstick analysis, obtained at most prenatal visits is done via a kit where the dipstick is analyzed using a standard smartphone via a designated mobile application [2].

Medical laboratories have a lot of focus on analytical quality, and rightly so. When we come a year after year to our annual checkup, it is essential that changes in lab results will not occur due to a drift in some equipment calibration. However, the current challenges are around laboratory results interpretation. In most traditional numerical lab results the interpretation is based on a reference interval [3]. Malka, et al. demonstrate an approach to using a reference region that accounts for the combination of two parameters (e.g., Red Blood Count (RBC) and the Mean Corpuscular Hemoglobin (MCH) content) [4]. In addition, the regions are divided by the equal-probability line (contour) for 5-year mortality, which is more accurate than each of the two traditional univariate reference intervals Malka et al. 2020.

The approach taken by Malka, et al. is pointing to two missing elements from current reference intervals: (1) we are ignoring rich informative physiological dependencies between measured quantities; (2) we are using a tool with no clear predictive power. As a result, it is frequent to observe healthy individuals have at least one abnormal result for a routine set of tests (with 13 measurements or more, it is expected to have >50% of individuals to false positive if the measurements are sufficiently independent). There are many potential undesired results to this situation, in particular its potential contribution to physician data overload and burnout.

Cadamuro, et al, provide a more comprehensive review of the challenges in interpretation. They propose that current laboratory results should aim to answer clinical questions. The answers can

be different depending on the patient medical context e.g., acute vs. chronic or depending on whom asks the question: e.g. the provider's specialty. Other answers may have a trend effect e.g., hemoglobin for anemia, or HbA1C for management of diabetics, that would be relevant to assess over the past few years [4].

However, it is clear that unfiltered data presentation is a major challenge in medicine overall and not just in laboratory medicine. Presenting many lab results that do not support any specific decision may be as counterproductive 'decision support' as not presenting essential information. In fact, these issues are highly associated with some of the challenges in health IT [3] Glaser 2020. It is not surprising that even an experienced ICU team is practicing medicine differently under a heavy load [5]. Park, et al. suggest rising the team's awareness of the situation of overload. Naturally, increasing awareness is a good start [4]. However, as an entrepreneur, I believe in the power of technology to reduce overload burdens, especially those associated with data overload. This approach was successfully implemented in the program described in Scirica, et al. where technology is utilized to dramatically increase the number of patients with cardiovascular risks that were shown to improve lipid and hypertension control via virtual management. They were able to accomplish that by adapting the vital measurements to the patient context and to the decisions that need to be made [6]. In a way Scirica, et al. demonstrate how powerful the proposal of Cadamuro, et al, to aim for an answer to clinical questions can be [5-7].

✉ roymalka@gmail.com

Department of Systems Biology, Harvard
Medical School, Boston, Israel

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Conflict of Interest

The Author is an enterpenur building a company providing health-IT tools for effecient care delivery.

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