Why Do People Use Online Lab Results and What Do They Look For: A Qualitative Study

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Abstract. Laboratory (lab) test results are increasingly available online for patient review. However, there is a dearth of research with respect to users' information needs, goals, and information processing strategies. In this exploratory qualitative study, we interviewed a sample of (N = 25) online lab results users to understand their objectives and search targets. We transcribed their responses and used affinity diagramming to identify themes in their responses. Our analysis identified six reasons why people look at their online lab results (i.e., health status, reassurance, health education, speed, self-management, and patient safety) and two themes about what people look for (i.e., abnormal and normal values, trends). Knowing what drives users and what information they are looking for can inform the design of online lab reporting, improve usefulness, and better satisfy user needs.

Keywords. Laboratory test results, patient portals, consumer health information, information needs

1. Introduction

By 2015, all Europeans should have had access to their own medical records [1]. Years later, direct-to-consumer digital health technologies have shown to be an important part of any health promotion strategy, by increasing patient knowledge, engagement, and empowerment. Patient (i.e., citizen, health consumer, layperson) empowerment has been shown to improve health outcomes [2]. Electronic medical records and related technologies with patient-facing portals can inform, empower, and engage citizens by providing access to diagnostic results (e.g., labs), notes, and other health data. Preliminary evidence suggests that access to online lab results increases patient engagement (e.g., self-management, trend monitoring [3], preparing for consultations with health care providers [4]) and also offers reassurance about one's health status [4]. Although patient access to online lab results is now commonplace in many countries, research focusing upon their use and usability has only recently gained traction. For example, some studies have explored patient search results and methods to distinguish between normal and abnormal values (e.g., [5]), but users' motivations for using these

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portals and what information they seek is understudied. User goals and needs should be a driving force behind the design of patient-facing systems. Some researchers have incidentally identified reasons why people review, or should consider reviewing, online lab results (e.g., speed of receiving the result, identifying overlooked results that warrant attention [6]),. However, researchers have not expressly studied this phenomenon and we hypothesize there are additional motivations and priorities driving user search behaviors. We sought to address this gap by examining user goals to determine 1) why people look at their online lab results, and 2) what information they seek. Therefore, we asked these questions to people accessing their online lab results and analyzed their qualitative responses to identify common themes.

2. Methods

The University of Victoria's Human Research Ethics Board approved this study. We recruited participants using a provincial platform for health research. First, participants completed a questionnaire with demographic questions (e.g., age, language, education) and questions about their online lab results experiences. We then invited them to be interviewed using ZOOM™ videoconferencing software [7]. The interviews explored user goals, context of use, and performance using different formats of online lab results displays. The focus of this study is on what motivates the use of online lab results. Therefore, we examined participants' responses to the following questions:

1. *Why* do you look at your online lab results?
2. *What* do you look for?

We recorded and transcribed the interviews and used affinity diagramming to analyze responses and identify themes [8,9]. For this phase of the research, we created one slide for each question in PowerPoint® and then created an individual note for each participant response to each of the two questions. The authors met during a videoconference to review participant responses. We examined each response individually, and then discussed to reach a consensus whether each response represented a novel or existing theme(s). We moved a novel response into its own new group, and we moved responses belonging to an existing theme into its respective group. We assigned names for each theme and modified the structure as necessary throughout the sorting process. We duplicated responses illustrating multiple themes and put a copy of the response in each corresponding thematic group. Participants could only be represented once per theme, but a response could be counted in multiple themes. Although we initially analyzed the responses for each question separately, we found overlap in participant responses (e.g., when we asked what participants were searching for, they would also describe why they were searching). Therefore, in some circumstances we coded responses to the other question rather than the one that was posed. Finally, we tallied the number of responses for each theme.

3. Results

This study was part of a larger study and some results have been accepted for publication [10]. We interviewed 25 participants, representing age categories from 18-74 years old. All primarily spoke English at home, twenty participants were born in Canada and 23

had earned a post-secondary degree. Eighteen participants in this sample had at least one chronic illness and eight participants reported five or more chronic illnesses. All subjects had at least two years' experience using an online lab results portal and nearly all of them (i.e., 24) accessed their online lab results several times a year or more.

3.1. Why do people look at their online lab results and what do they look for?

For brevity, we will only describe themes discussed by five or more participants. We identified six themes indicating *why* people look at their online lab results: health status, reassurance, health education, speed (i.e., timeliness), self-management, and patient safety (**Figure 1**). **Table 1** lists each theme with a supporting quote. Participants wanted to know about their current health status, their lab trends, and if they were responding to treatments (Health Status). Participants said viewing their normal results promptly reassured them (Reassurance). Participants wanted to know more about the tests conducted and the meaning of their results (Health Education). Participants also appreciated how rapidly their results were available for review and that they did not have to wait to get their results from their health care provider (Speed). Another theme identified was that participants used the online lab portal to manage their own conditions (Self-Management). Finally, by reviewing their lab results, participants could detect issues in their results and values that may be overlooked by their health care providers (Patient Safety). In one instance, a participant sought immediate medical assistance due to a lab value (see **Table 1**).

We identified two themes associated with the second question (i.e., *What* do you look for?). Participants commonly reported looking for abnormal findings, normal values, and trends. Participants typically described looking for abnormal values first and some would subsequently look at the normal values in more detail. Several participants also examined trends or the pattern of their results over time.
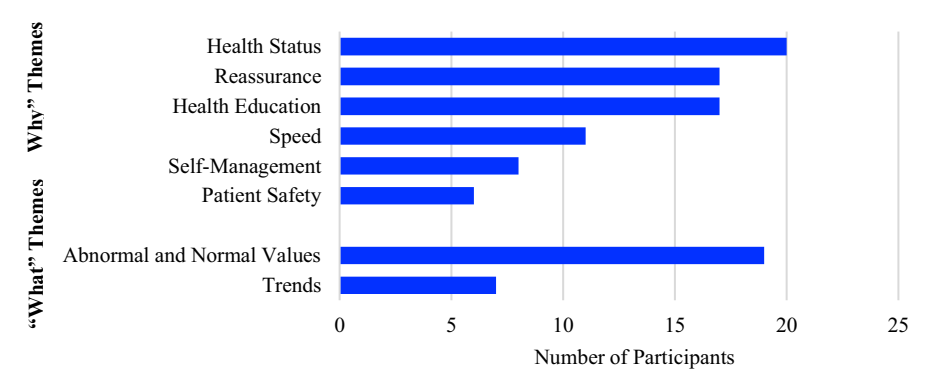

Figure 1. Number of participants whose responses represented each theme. "Why" themes depict reasons why people look at their online results and "what" themes indicate what people look for in them.

Table 1. Themes, descriptions, and quotes of why people look at online lab results and what they look for.

	Theme	Description	Illustrating Quote
Why do people look at	Health status	People want to know their lab values and health status. For example, observing trends in lab values and treatment response.	P19: Well, I'm naturally curious and controlling and like to have and gather information…I also do a lot of comparison…I find the data really useful to tell me whether or not strategies, health strategies, I'm using are hitting the marks or not.

	Reassurance	People want to know whether or not there is cause for concern	P14: And then also like peace of mind, it's pretty easy to interpret like basic lab results. Like if you got tested for strep throat, it's easy to go on and see "Oh, no, I don't have it. I'm fine."
	Health education	People want to know more about the tests performed and the clinical implications.	P6: I think it's just important to review them and try to understand them because it's part of sort of maintaining my own health.
	Speed	People want access to results as soon as possible.	P7: Oftentimes, I'll get that information before my physician gets back to me. So, I like to be informed as quickly as possible.
	Self-management	People can make adjustments to their treatment plans based upon their results.	P4: For my monthly tests, I look for being out of the range that the results should be. And one of them I can start to change my medication that's related to that immediately.
	Patient safety	People can ensure lab results are not overlooked and possibly act sooner on abnormal test results.	P25: One of the results had said that I was in heart failure, so I went to the hospital immediately.
What do they look for?	Abnormal and Normal Values	People look for values within and outside of the reference ranges.	P2: One of the first things I look at is like, are they in the range of normal…mostly, what's in the normal [range], what's abnormal?
	Trends	People look for how their values change over time.	P19: I keep a file folder, and I have things highlighted, and I track them over time. So like, long range, where was I at a year ago? Where was I three months ago, three years ago?

4. Discussion

This study contributes to published data explaining why people review online lab results including reviewing health status [4], quick access to results [6], ensuring results are not overlooked [6], facilitating self-management [3], and monitoring trends [3]. Perhaps most importantly, this study showed that patients view online lab results as a safety mechanism to identify abnormal results and alert them when to seek medical attention. Unfortunately, clinics often fail to communicate abnormal results to patients [11]. Furthermore, clinically important results may not be flagged and could be missed by both patients [10] and providers. We identified new themes including people seeking reassurance and a curiosity to learn about their own health. Participants' informational needs often required additional online research, which has also been described by other studies (e.g., [12]).

Participants typically looked for abnormal and normal results and lab trends. Given the small size and the characteristics (e.g., highly educated, chronic illness) of this sample, some findings may not be generalizable to the population. For example, most participants had one or more chronic illness, increasing their likelihood of tests conducted and the need for monitoring their values over time.

The findings from this study can inform future lab results portals to ensure they are designed to best meet user requirements. For example, future designs should provide notifications to users when their results are ready or require action and important results (abnormal or otherwise) should be highlighted. Values should also be easy to trend. Although some portals offer this feature, it is often difficult to find and use. Portals

should also be connected to trustworthy resources to facilitate users' learning about tests and their results, portals should be connected to.

5. Conclusion

Patients are no longer willing to settle for the maxim "no news is good news" when it comes to their lab results. There are many potential benefits when patients review their test results. Increased access and review of health data can translate to better patient engagement, improved health literacy, and in some cases, greater self-efficacy and self-management. Having access to results can also improve consumer satisfaction by reducing anxiety common when awaiting test results. It may also represent an important patient safety intervention by bringing attention to results that may have otherwise been overlooked. Knowing the motivation behind *why* people look at their online lab results and *what* they look for can influence the design of online lab results to better match the users' goals. For example, although we demonstrated that people want to see the trends of their values, this functionality is often limited or non-existent in online lab results.

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