

# Nurse and Physician Perspectives on Patients With Cancer Having Online Access to Their Laboratory Results

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Patient portals are Web-based applications that allow patients to communicate with their providers, pay hospital bills, view appointment information, download patient education materials, and review information from the electronic medical record (EMR) (Sorensen, Shaw, & Casey, 2009). The patient portal industry has expanded significantly since 2000 (Businger et al., 2007; Masys, Baker, Butros, & Cowles, 2002; Sorensen et al., 2009; Wald et al., 2007; Weingart, Rind, Tofias, & Sands, 2006). Growing interest exists in providing patients with online access to their EMR, specifically laboratory results, as a means for engaging patients in their health care and improving patient satisfaction (Businger et al., 2007; Ralston, Hereford, & Carrell, 2006; Wald et al., 2007; Wiljer et al., 2006).

## Background

Support exists demonstrating patient desire for online access to EMRs (Businger et al., 2007; Hassol et al., 2004; Masys et al., 2002; Ralston et al., 2006; Wald et al., 2007; Weingart et al., 2006). For those healthcare providers using patient portals, studies suggest that patient satisfaction increases along with patient empowerment to become engaged in their own health care (Businger et al., 2007; Hassol et al., 2004; Ralston et al., 2006; Ross et al., 2005; Wald et al., 2007).

In the oncology population, opportunities for empowerment can improve the quality of care. For example, Masys et al. (2002) reported that one patient in their study realized the laboratory had done the wrong test and was able to have it corrected. In addition, potential exists for improved patient-physician communication (Businger et al., 2007; Siteman et al., 2006).

Despite the interest among patients, physician concerns for causing patients anxiety, as well as increasing their own workload, remain barriers to implementing access to laboratory results on patient portals (Hassol

**Purpose/Objectives:** To compare the perspectives of oncology nurses and physicians regarding online access to laboratory results for patients with cancer pre- and postimplementation, and to evaluate the impact on workload.

**Design:** Pre- and postimplementation surveys distributed to nurses and physicians. In addition, a nursing workload study was conducted to measure the number of phone calls received from patients regarding laboratory results.

**Setting:** The outpatient department of a comprehensive cancer center in a large, urban setting in the northeastern United States with more than 500,000 patient visits each year.

**Sample:** 460 outpatient nurses and 349 attending physicians were surveyed; 10 of those nurses were invited to participate in the nursing workload study, as well.

**Methods:** A survey was sent to nurses and physicians one month prior to implementation and then repeated six months postimplementation. A nursing workload study was conducted for 16 weeks beginning one month prior to implementation and completed three months postimplementation.

**Main Research Variables:** Nurse and physician perspectives; nursing workload

**Findings:** Nurses demonstrated greater support than physicians with regard to patient access, their level of comfort with the patient access, and patients' ability to interpret results. Statistical significance was identified in all three questions ( $p < 0.05$ ). Perspectives on workload did not differ by role; nurses and physicians anticipated an increase in workload prior to implementation, but reported that workload decreased or stayed the same postimplementation ( $p < 0.005$ ). The nursing workload study supported that finding because no change was observed in the average number of phone calls per day during the implementation period.

**Conclusions:** Oncology nurses and physicians have different perspectives on providing patients with cancer with online access to laboratory results. Concerns about increasing workload were not substantiated in the current study.

**Implications for Nursing:** Providing patients with online access to their laboratory results is a growing trend. Understanding the perspectives of oncology nurses can inform future directions for increasing health-record transparency for patients with cancer. Future research may explore the impact on the nurse-patient relationship.

et al., 2004; Masys et al., 2002; Ross & Lin, 2003; Ross et al., 2005; Wald et al., 2007). Physicians worry about the potential for emotional harm on behalf of the patient related to a poor understanding of clinical information displayed in the patient portal (Masys et al., 2002; Ross et al., 2005). At the University of California–San Diego, Masys et al. (2002) addressed these concerns by (a) only displaying final results, (b) designing informed consent that included instructions for contacting the physician to resolve issues that may occur while viewing data online, and (c) providing a toll-free hotline to triage inquiries from distraught patients. Concerns that patients experience emotional harm or have poor understanding were unsupported by comments on a survey evaluating the system; instead, most patients expressed satisfaction with the availability of information (Masys et al., 2002). The worry about increased anxiety among patients who have access to the EMR appeared unsubstantiated in a review of the literature (Ross & Lin, 2003).

Worrying about patient anxiety also may feed concerns about increasing workload because of additional phone calls to respond to patients' anxiety. On a survey measuring physician attitudes, the majority of respondents indicated that they thought their workload would greatly increase as a result of allowing patients to access their EMRs (Ross et al., 2005). Wald et al. (2007) suggested that fear of increased workload prevented acceptance, and only when the physicians directly experienced patients accessing laboratory results online did the fear recede. Telephone calls, office visits, and other work did not increase, according to anecdotal reports from physicians following that pilot study (Wald et al., 2007).

Although information exists about physician impressions, little information is available regarding the impressions of oncology nurses in the ambulatory care setting. Patient portals have the greatest utility for outpatients because they offer access to healthcare information and electronic communication with clinicians while at home. Oncology nurses who work in the outpatient setting frequently are the first point of contact when patients seek information and support; therefore, understanding the perspectives of oncology nurses related to online access to laboratory results for patients with cancer may inform strategies for the sustainability of this application.

At a National Cancer Institute–designated comprehensive cancer center, a multidisciplinary team built a patient portal to provide patients with secure online access to their personal health information in 2006. At that time, applications on the patient portal included hospital and physician billing, patient education, forms, and secure messaging (i.e., e-mail) with the nursing staff. Feedback evaluations from patients, nurses, and physicians contributed to enhancements to the patient portal. In response to systematic patient feedback demonstrating the desire for online access to laboratory results,

the results of prostate-specific antigen tests were made available in 2008. In June 2009, the number of laboratory tests displayed on the patient portal expanded significantly to more than 90 results.

The objectives of the current study were to (a) compare the perspectives of oncology nurses and physicians pre- and postimplementation of online access to laboratory results for patients with cancer via a patient portal, (b) compare the perspectives between nurses and physicians pre- and postimplementation, and (c) measure changes in nursing workload during the implementation period by tracking the number of patient phone calls related to laboratory results.

## Methods

### Design

The current study included the implementation of an expanded offering of laboratory results on the patient portal, along with two distinct elements of process evaluation. The schedule of implementation and evaluation was concurrent. The first element of the process evaluation was accomplished by surveying nurses and physicians regarding their perspectives on providing online access to laboratory results for patients before and after the implementation. A nursing workload study, the second element of the evaluation, was conducted to capture whether changes in workload occurred as a result of the implementation.

Following the successful implementation of prostate-specific antigen reporting in 2008, a small multidisciplinary team (including a nurse and a physician) convened to determine the laboratory results that should be added to the patient portal. Results demonstrating HIV status, results demonstrating substance abuse, and any human leukocyte antigen typing were excluded from the interface. Results appeared in the patient portal and EMR simultaneously; therefore, no delay existed between when the patient and when the nurse or physician had access to the information.

Web site content experts from the committee made recommendations on a display format that would be patient friendly. A noteworthy adaptation from the EMR view to the patient portal view removed the red exclamation mark notation normally beside results that fall out of the normal range (see Figure 1). In addition, the team recommended modifications to common tests such as the complete blood count to include only relevant values (e.g., white blood cells, hemoglobin, hematocrit, platelets, absolute neutrophil count). Finally, [www.labtestsonline.org](http://www.labtestsonline.org), a public Web site for patients and caregivers offering a large library of definitions and explanations of common laboratory tests, was added as a link next to most common laboratory tests to provide patients with an informational resource.



Note. Each test has a hyperlink that provides more details about the test and directs the patient to [www.labtestsonline.org](http://www.labtestsonline.org) for additional information.

### Figure 1. The Patient's View of the Online Laboratory Results Display

Note. Image courtesy of Memorial Sloan-Kettering Cancer Center. Used with permission.

toxicities, conducting patient teaching, providing strategies for self-care interventions, and providing psychosocial support for patients along the continuum of cancer care. In addition to patients' visits in clinic, nurses are responsible for triaging patient phone calls and e-mail messages.

The authors sampled the entire outpatient nursing staff ( $n = 460$ ) and all attending physicians in clinical practice ( $n = 349$ ) at the center. The sample populations did not remain the same for the pre- and postimplementation surveys because of turnover in staff. The clinician surveys were anonymous, and participation was voluntary. Web links to the surveys were sent via e-mail. Data were stored securely and results were aggregated, protecting anonymity. Investigational review board exemption was obtained.

Ten female nurses from the gynecologic medical oncology service were invited to participate in the nursing workload study. The nurses were chosen because of the volume of patients using the patient portal from that service—as evidenced by the number of secure messages received monthly—and because they work in a medical oncology service where patients have laboratory tests performed on a more regular basis than a surgical service. Because of anonymity, additional participant demographics are not available. The nurses participated voluntarily, and no additional monitoring occurred to ensure nurses completed the tool every week of the study period. Investigational review board exemption also was obtained for this part of the study.

## Measures

Participants responded to four questions in the pre- and postimplementation surveys. When asked, "Do you think that patients should have access to their lab results online through the patient portal?" participants could answer yes, no, or not sure. In addition, the following questions or statements used five-point Likert-type scales: (a) "Please indicate your level of comfort with patients having immediate access to their lab results on the patient portal," and (b) "I believe patients can reasonably interpret their own results." The first- and second-level responses (e.g., strongly agree and agree) were summed, and the fourth- and fifth-level responses (e.g., strongly disagree and disagree) were summed, leaving three levels for analysis.

The final question addressed physicians' and nurses' perspectives about changes in workload. On the pre-implementation survey, participants were asked what they anticipated would happen to their workload (e.g., increase, decrease, or stay the same), and on the postimplementation survey they were asked what actually happened (i.e., increased, decreased, stayed the same, my patients do not access their laboratory results on the patient portal). Those that said their patients did not access laboratory results on the patient portal

The surveys were distributed via e-mail using the Internet-based survey tool SurveyMonkey® to all clinicians one month prior to implementation (May 2009) and six months postimplementation (December 2009). The preimplementation survey remained open for three weeks, with weekly reminders sent via e-mail. The postimplementation survey remained open for four weeks—an additional week provided because of the holidays—with the same reminder system.

The nurses collected data one day per week for four weeks prior to implementation, and continued to collect data one day per week for 12 weeks postimplementation, ending in August 2009. The nurses used a paper-and-pencil tool for data collection.

The investigator developed the surveys and the nursing workload study tool. Because this was an evaluation of an institution-specific program, contacting experts in multiple fields (e.g., nursing informatics, market survey development, oncology) assessed content validity. Revisions to the content were made based on the feedback provided by those experts.

## Sample

The study occurred at a National Cancer Institute–designated comprehensive cancer center in New York, NY. An expansive outpatient department exists where nurses collaborate closely with physicians, performing patient assessments, determining treatment-associated



were excluded from analysis for this question. Responses of “decreased” and “stayed the same” were summed, providing two levels for analysis.

All available data were used; missing data were excluded from the analysis because all questions were mutually exclusive. Results were compared using chi-square tests, and analyses were performed using SPSS®, version 17.0. The authors examined comparisons in survey responses before and after the intervention by nurses and physicians and between roles.

Nurses recorded data for the telephone interactions they had with patients regarding laboratory results on one day each week. Because of the variation in the number of responses and the overall minimal amount of data, the authors calculated the average number of calls reported per nurse per week. Descriptive statistics were used to demonstrate frequencies and percentages for the following items: (a) whether the RN or the patient initiated the contact, (b) whether an intervention (e.g., a change in medication) was required, (c) the amount of time expended (e.g., 1–5 minutes, 6–10 minutes, greater than 10 minutes), including documentation in the EMR, and (d) whether information not related to the laboratory results was discussed.

## Results

### Surveys

**Sample size and response rate:** For the preimplementation survey, 319 surveys were completed, representing a 39% response rate. Of these responses, 21% were from physicians and 79% were from nurses. Thirty-two of the surveys were incomplete, with one or more of the questions skipped. On the postimplementation survey, 291 surveys were completed, representing a 36% response rate. Of these responses, 35% were from physicians and 65% were from nurses. Thirty-six of the postimplementation surveys were incomplete.

**Demographics:** The demographic characteristics of the sample did not change significantly from pre- to postimplementation (see Table 1). The majority of respondents for both surveys was female and identified their role as a nurse, including RNs and advanced practice nurses. Nurses and physicians in the sample overwhelmingly reported that they were confident or very confident in their computer skills.

**Responses:** When queried about access to laboratory results prior to implementation, 51% of physicians felt patients should not have online access; however, postimplementation, only 32% held that belief. Forty-six percent of nurses felt patients should have access to results preimplementation and 55% of nurses agreed

**Table 1. Nurse and Physician Characteristics Pre- and Postimplementation**

Characteristic	Nurses		Physicians	
	Pre (N = 251)	Post (N = 187)	Pre (N = 66)	Post (N = 100)
<b>Age (years)</b>				
25–34	66	49	3	4
35–44	63	45	26	33
45–54	64	46	25	24
55–64	29	22	8	14
65 or older	1	1	1	7
Rather not say	5	9	–	8
No response	23	15	3	10
<b>Gender</b>				
Male	4	6	38	53
Female	215	157	23	29
Rather not say	7	9	1	7
No response	25	15	4	11
<b>Education</b>				
Diploma	11	7	–	–
Associate	22	19	1	–
Baccalaureate	111	90	–	–
Graduate	83	53	–	–
Doctorate	1	2	62	91
No response	23	16	3	9
<b>Confidence in computer skills</b>				
Very confident	75	64	42	45
Confident	110	87	16	33
Neutral	42	19	5	13
Not very confident	1	–	–	–
Not confident	1	3	–	–
No response	22	14	3	9

Note. Because of incomplete responses, two participants from the preimplementation survey and four participants from the postimplementation survey were excluded from this table.

postimplementation. Although significantly more nurses than physicians stated they felt comfortable with patients having immediate online access to their laboratory results prior to the implementation ( $p = 0.034$ ), the majority of nurses and physicians were uncomfortable with the patients having immediate access and felt patients could not interpret their own results. However, the percentage of physicians who thought patients could interpret their results did increase slightly postimplementation ( $p = 0.059$ ) (see Table 2).

On the preimplementation survey, nurses and physicians anticipated what would happen to their workload as a result of patients accessing laboratory results through the patient portal. Sixty-five percent of nurses and 74% of physicians who responded predicted an increase in workload. However, six months postimplementation, 78% of nurses and 74% of physicians reported that their workload actually decreased or stayed the same. That represented a significant difference in both groups ( $p < 0.0005$ ). Perceptions of workload change did not differ significantly by role (preimplementation  $p = 0.109$ , postimplementation  $p = 0.379$ ).

## Nursing Workload Study

Out of 10 nurses invited to participate, one to five nurses actually participated each week except for week 12, when no one participated. Missing data were excluded. A total of 189 interactions between nurses and patients regarding laboratory results occurred. Patients initiated the contact 70% of the time, with half of the calls requiring some intervention. In addition, the topics

of the calls were limited to discussions about laboratory results 50% of the time.

Prior to the implementation of the laboratory results online, each nurse received an average of five calls per week. Postimplementation, the average number of calls per nurse per week stayed the same. In addition, on average, the majority of these calls required 1–5 minutes of nursing time per call, with no change pre- to postimplementation.

## Discussion

Most studies evaluating the impact of providing patients with online access to laboratory results focused on the physician perspectives and usage of the system (Businger et al., 2007; Masys et al., 2002; Ross et al., 2005; Wald et al., 2007). Although Sorenson et al. (2009) surveyed nursing informaticists regarding the functionality of their patient portals and evaluation methods for measuring patient outcomes, the study did not include nurses providing direct patient care. In another study, researchers surveyed four nurses and one physician regarding hematology patients' access to EMRs, but did not disaggregate nurses' responses (Wiljer et al., 2006). The current study extended those findings by reporting a comparison of nurse and physician perspectives pre- and postimplementation and between roles.

Unlike other studies, physicians at this organization did not agree initially with providing patients with online access to laboratory results (Wald et al., 2007; Wiljer et al., 2006). Nurses' responses, however, demonstrated support for such transparency in information to patients before and after the implementation. That information may affect strategies for sustainability of the process, as nurses are major stakeholders in the implementation.

**Table 2. Tests of Differences Before and After Implementation**

Time Point	Yes		No		Not Sure		N	p
	n	%	n	%	n	%		
Do you think that patients should have access to their laboratory results online through the patient portal?								
Nurses								
Pre	108	46	59	25	67	29	234	0.193
Post	99	55	36	20	45	25	180	
Physicians								
Pre	16	25	32	51	15	24	63	0.055
Post	38	40	31	32	27	28	96	

Time Point	Comfortable		Neutral		Uncomfortable		N	p
	n	%	n	%	n	%		
Please indicate your level of comfort with patients having immediate access to their laboratory results on the patient portal.								
Nurses								
Pre	82	36	51	22	97	42	230	0.873
Post	69	38	42	23	73	40	184	
Physicians								
Pre	14	22	11	18	38	60	63	0.209
Post	34	35	16	17	47	48	97	

Time Point	Agree		Neutral		Disagree		N	p
	n	%	n	%	n	%		
I believe patients can reasonably interpret their own results.								
Nurses								
Pre	36	16	55	24	140	61	231	0.102
Post	43	23	45	25	96	52	184	
Physicians								
Pre	3	5	8	13	52	83	63	0.059
Post	13	13	20	21	64	66	97	

Time Point	Increase(d)		Decrease(d)/ Stay(ed) the Same		N	p
	n	%	n	%		
What do you anticipate will happen to your daily workload as a result of laboratory results being available online to patients? (Post: As a result of laboratory results being available online to patients, my workload has...)						
Nurses						
Pre	146	65	79	35	225	<0.0005
Post	28	22	96	78	124	
Physicians						
Pre	46	74	16	26	62	<0.0005
Post	15	26	43	74	58	

Note. Because of rounding, not all percentages total 100.

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Although physicians and nurses believe patients should have access to their laboratory results, the current study demonstrates an overall discomfort in providing patients with immediate access. Laboratory results in the patient portal are available at the same time as in the EMR. In a project with similar timing of results release, questions were raised about the potential for patients to experience psychological harm, particularly the possibility that patients could discover a new diagnosis of cancer before the physician had the opportunity to review the results (Masys et al., 2002). In another setting where anecdotal reports from physicians revealed them to be comfortable with online patient access, a two-day delay existed before updating the patient portal (Wald et al., 2007). In the oncology patient population, some results may indicate recurrence or progression of disease, which may heighten nurses' and physicians' concerns related to the timing of access to the information.

A few studies have documented physician concerns about causing patients increased anxiety related to their inability to interpret results (Masys et al., 2002; Ross et al., 2005). A comparison between physician and patient expectations of accessing medical records revealed that physicians were far more likely to anticipate concerns than patients, indicating that such concerns may be overstated (Ross et al., 2005). The current study's pre- and postimplementation surveys revealed that nurses and physicians did not believe patients could interpret their results reasonably, which is comparable to Ross et al.'s (2005) finding that physicians did not predict shared medical records would support patient empowerment. Wald et al. (2007) discussed the importance of providing education and support to clinicians when introducing new features. An opportunity exists to share information with nurses and physicians about what resources currently are available to patients to understand their results (e.g., [www.labtestsonline.org](http://www.labtestsonline.org)).

Nurses and physicians anticipated that their workloads would increase as a result of providing patients with access to their laboratory results through the patient portal. That finding was consistent with similar studies (Ross et al., 2005; Wald et al., 2007). However, the current study measured perspectives regarding changes in workload again six months postimplementation. At that time, the majority of nurses and physicians reported that their workloads actually had decreased or stayed the same, despite the number of registered patients on the patient portal growing by about 33%. Sharing that significant finding with nurses and physicians may encourage support for future proposals to enhance the patient portal by expanding patients' access to the EMR.

Nurses who participated in the nursing workload study did not experience an increase in the number of patient contacts regarding laboratory results or in the amount of time spent on those interactions. Those results support the nurses' perceptions that workload did

not change as a result of providing patients online access to their laboratory results. The current study represents a unique contribution to the literature because it documents the number of calls per week and the associated amount of nursing time per call spent discussing laboratory results with patients with cancer.

## Limitations

The age and education demographics of the nurses and physicians contribute to the generalizability of the results. However, caring for patients with cancer may influence the perspectives of nurses and physicians, which could limit the application of the information to healthcare providers in other disease specialties. Participants responded to the survey voluntarily, so they may have only done so if they had a strong opinion about the intervention.

The small number of participants and amount of data also are limitations to the current study. In addition, the anonymity disallowed ensuring the same nurses participated from week to week. The original intent of the 16-week study was to capture stability of the process; however, the length of time of the study may have contributed to the loss of participants. Finally, conducting the study during the summer months may have coincided with summer vacations, again contributing to the low response rate.

## Implications for Nursing Research

Nurses surveyed in the current study supported patient access and reported that it did not negatively impact their workload. Many possibilities exist to build on that knowledge, including more research focusing on the impact providing patients with information online has on the nurse-patient relationship. A case-controlled study examining the differences between patients with and without access may allow comparisons in nurse-patient communication, providing answers to questions such as (a) Does the increase in patient access to information reduce the occurrence of routine questions and create opportunities for more meaningful encounters? and (b) Does the provision of online access to the EMR lead to a more informed patient better able to provide self-care measures? Further understanding the impact may provide key information in developing strategies for sustainability.

## Conclusion

Unlike other studies, the current study clearly documents nurse and physician perspectives of providing patients with cancer online access to their laboratory results. Overall, the surveys demonstrated the differences and similarities in the perspectives of nurses and physicians. Nurses and physicians similarly felt uncomfortable

with patient access and patient ability to interpret results; however, unlike physicians, nurses supported providing access to patients both at baseline and after gaining experience with the system. As patient advocates, oncology nurses are uniquely positioned to support the implementation of online access to laboratory results and can leverage that support to increase the transparency of health information to patients. In addition, the current study demonstrates the need to address nurse and physician concerns about patient anxiety in an effort to increase their comfort levels with providing access. Incorporating nurse and physician perspectives into the development of the system may support buy-in for future enhancements. Concerns about increasing workload as a result of providing online access were not validated. Sharing that information may help to educate

nurses and physicians about the realities associated with implementation.

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