

RESEARCH LETTERS

Lost in Transition: Discrepancies in How Physicians Perceive the Actionability of the Results of Tests Pending at Discharge

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Effective communication between inpatient and primary care physicians (PCPs) is essential for safe, high-quality transitions. Unfortunately, PCPs are often not meaningfully engaged in this process; communication is frequently challenging or nonexistent.^{1,2} Instead, information is suboptimally conveyed via lengthy, disorganized discharge summaries.³ Consequently, timely knowledge is not transferred to PCPs, who instead must seek out and identify actionable information themselves. These deficiencies can lead to misinterpretation of information and patient harm.⁴

An important component of "ideal" transitions⁵ is timely communication of results of tests pending at discharge (TPADs). TPADs are variably documented in discharge summaries, and physician awareness about them is strikingly poor.^{3,6,7} Communication about TPADs should convey rationales for ordering tests and necessary actions to take in response to finalized results. Most often, this knowledge resides with the inpatient team.

Health information technology (HIT) is an effective strategy for improving test-result management. We implemented an automated system that notifies inpatient attendings and PCPs of TPAD results via email and demonstrated increased awareness by these physicians at the time of required action.^{8,9} Nevertheless, without timely knowledge transfer, attendings and PCPs may have differing opinions regarding which TPAD results require action. We conducted a secondary analysis of survey respondents from our original clustered randomized controlled trial to measure the degree of agreement between inpatient and ambulatory physicians regarding actionability of TPAD results.

METHODS

The methods of our original study are described elsewhere.⁹ In that study, the attending and PCP of each patient were independently surveyed (via email and

then by fax if the electronic survey was not completed) to determine their awareness of finalized TPAD results, and to identify actionable results and the types of actions taken (or that would need to be taken). Discharge summaries were available in our electronic medical record (EMR) within 24 hours of discharge. Network physicians (affiliated with Partners HealthCare, Inc.) had access to all components of the EMR, including the discharge summary and test results. Non-network PCPs were faxed discharge summaries within 48 hours of discharge per institutional policies. For this study, we identified all patients for whom the attending and PCP completed the survey and answered questions about TPAD actionability. We then compared the identified TPADs listed by the attending and PCP in that survey.

RESULTS

We enrolled 441 patients in our original study. We sent 441 surveys to 117 attendings and 353 surveys to 273 PCPs. Eighty-eight patients did not have an identified PCP. We received 275 responses from 83 attendings (62% response rate), and 152 responses from 112 PCPs (43% response rate). Patient and physician characteristics are reported elsewhere.⁹

For this analysis, we identified the 98 patients (aged 60 ± 18 years, 44 male, 52 Caucasian, 46 non-Caucasian, 85 network, 13 non-network) cared for by 46 attendings (aged 44 ± 11 years, 33 male, 22 hospitalists, 24 nonhospitalists) and 79 PCPs (aged 45 ± 12.5 , 33 male, 66 network, 13 non-network) for whom we received completed surveys from both physicians. For 59 patients, both thought none of the TPAD results were actionable. For 12 patients, both thought at least 1 was actionable, and they identified the same actionable TPAD result for all 12. Overall, attendings and PCPs agreed on actionability in 72.5% (71/98) (Kappa 0.29, 95% confidence interval: 0.09-0.50). Table 1 shows the type of action taken by responsible providers. There were 9 patients (9%) for whom the attending alone thought at least 1 TPAD result was actionable; of these, subsequent attending-initiated communication occurred in 77.8% (7/9). There were 18 patients (18%) for whom the PCP alone thought at least 1 TPAD result was actionable; of these, subsequent PCP-initiated communication occurred in 77.8% (14/18). Table 2 shows concordance of actionable TPAD by type. In instances of

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TABLE 1. Types of Actions Taken (or Would Need to be Taken) by Responsible Physicians

	Inpatient Attending-Initiated Action(s)*	PCP-Initiated Action(s)*
Patient was notified [†]	11.1% (1/9)	66.7% (12/18)
Subspecialist was contacted [‡]	33.3% (3/9)	16.7% (3/18)
PCP or inpatient team contacted [‡]	33.3% (3/9)	16.7% (3/18)
Further testing/modified treatment	11.1% (1/9)	33.3% (6/18)
Referred to ambulatory visit/emergency room	0% (0/9)	11.1% (2/18)
Documentation	11.1% (1/9)	16.7% (3/18)

NOTE: Abbreviations: PCP, primary care physician

*Physicians may have taken 1 or more actions per patient

[†]Inpatient attendings initiated 1 or more communication actions in 77.8% (7/9). PCPs initiated 1 or more communication actions in 77.8% (14/18).

disagreement, the attending frequently reported microbiology TPADs (eg, culture data, viral serologies) as actionable, whereas the PCP reported all TPAD types (eg, culture data, colon biopsy, vitamin D, magnetic resonance imaging) as actionable.

DISCUSSION

We found fair agreement between attendings and PCPs regarding actionability of TPAD results. In 27 patients (27.5%), either the attending or PCP considered TPAD results actionable when the other did not. Possible explanations for this include different thresholds for taking action (eg, inpatient physicians may view vitamin D levels as acceptable within broader ranges than PCPs, and PCPs may view negative results as actionable if they need to contact the patient whereas attendings may not), varying clinical context (eg, rationale for why microbiology culture data is actionable), and varying practices for escalating care (eg, referring patients back to the hospital).

Our study was limited by small sample size and low PCP response rate. Nonetheless, the findings suggest that poor concordance between inpatient and ambulatory physicians will persist without tools that promote more effective communication. Greater awareness alone may be insufficient to mitigate consequences of missed TPAD results if physicians are not “on the same page” regarding which results require action.

To better engage PCPs, healthcare systems require HIT infrastructure that facilitates seamless care team communication across care settings.² When optimally configured, HIT can facilitate greater PCP involvement in postdischarge communication. For example, our system promoted subsequent postdischarge communication in 78% of initial discordance in TPAD actionability; however, most of it was not between the attending and the PCP. Thus, improvements could be made to facilitate more effective communication among key inpatient and ambulatory providers. Furthermore, when configured to facilitate conversation among these providers regarding the discharge care

TABLE 2. Concordance of Actionable TPAD by Type

Type of TPAD	Attending and PCP Agreed on Identity of Actionable TPAD*		Attending and PCP Disagreed on Identity of Actionable TPAD*	
	TPAD Identified	No TPAD Identified, n = 59	TPAD Identified by Attending Only	TPAD Identified by PCP Only
Microbiology [†]	25% (3/12)	N/A	56% (5/9)	17% (3/18)
Pathology [‡]	17% (2/12)	N/A	0% (0/9)	17% (3/18)
Chemistry and hematology [§]	58% (7/12)	N/A	11% (1/9)	22% (4/18)
Radiology [¶]	0% (0/12)	N/A	11% (1/9)	39% (5/18)
Unclassified (left blank)	0% (0/12)	N/A	22% (1/9)	17% (3/18)

NOTE: Abbreviations: PCP, primary care physician; TPAD, tests pending at discharge

*There were 3 patients on whom the surveyed physician identified 2 actionable TPADs. In these cases, we performed our analysis on the first TPAD listed

[†]Hepatitis B serology, hepatitis C viral load, blood and urine cultures, Epstein-Barr virus serology, galactomannan[‡]Biopsy results (breast, colonoscopy), pleural effusion cytology[§]Serum protein electrophoresis, urine toxicology, urinalysis, vitamin D, CD4 counts, factor V Leiden, parathyroid hormone[¶]Magnetic resonance imaging, computed tomography, tagged red blood cell scan, shunt evaluation study.

plan throughout a patient’s entire hospital course, HIT can promote effective knowledge transfer by virtue of adding clinical context to test ordering and follow-up. Additional work is needed to understand whether such communication clarifies contingencies and facilitates appropriate postdischarge action. Nevertheless, current electronic solutions (eg, passive placement into results “in-baskets”) will likely be ineffective because they do not reliably improve awareness and active communication about context, rationale, interpretation, suggested action, or transfer of responsibility.

In summary, discrepancies in TPAD actionability by inpatient and ambulatory providers still exist, even when awareness of TPAD results is improved by HIT. By fostering more effective communication among key care-team members across care settings, HIT could mitigate the consequences of suboptimal care transitions. With regard to TPAD results, this may favorably impact unnecessary testing, diagnostic and therapeutic delays, and medical errors.

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References

- Arora VM, Prochaska ML, Farnan JM, et al. Problems after discharge and understanding of communication with their primary care physicians among hospitalized seniors: a mixed methods study. *J Hosp Med.* 2010;5:385–391.
- Tang N. A primary care physician’s ideal transitions of care—where’s the evidence? *J Hosp Med.* 2013;8(8):472–477.
- Kripalani S, LeFevre F, Phillips CO, et al. Deficits in communication and information transfer between hospital-based and primary care physicians: implications for patient safety and continuity of care. *JAMA.* 2007;297(8):831–841.
- Forster AJ, Murff HJ, Peterson JF, Gandhi TK, Bates DW. The incidence and severity of adverse events affecting patients after discharge from the hospital. *Ann Intern Med.* 2003;138:161–167.

5. Burke RE, Kripalani S, Vasilevskis EE, Schnipper JL. Moving beyond readmission penalties: creating an ideal process to improve transitional care. *J Hosp Med.* 2012;8(2):102–109.
6. Were MC, Li X, Kesterson J, et al. Adequacy of hospital discharge summaries in documenting tests with pending results and outpatient follow-up providers. *J Gen Intern Med.* 2009;24(9):1002–1006.
7. Roy CL, Poon EG, Karson AS, et al. Patient safety concerns rising from test results that return after hospital discharge. *Ann Intern Med.* 2005;143:121–128.
8. Dalal AK, Schnipper JL, Poon EG, et al. Design and implementation of an automated email notification system for results of tests pending at discharge. *J Am Med Inform Assoc.* 2012;19(4):523–528.
9. Dalal AK, Roy CL, Poon EG, et al. Impact of an automated email notification system for results of test pending at discharge: a cluster-randomized controlled trial [published online ahead of print October 23, 2013]. *J Am Med Inform Assoc.* doi:10.1136/amiainl-2013-002030.