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Obstacles Experienced by Care Managers in Managing Information for the Care of Chronically Ill Patients

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Abstract

Care managers play a key role in coordinating care, especially for patients with chronic conditions. They use multiple health information technology application in order to access, process and communicate patient-related information. Using the work system model and its extension, the SEIPS model (Carayon et al., 2006a; Smith and Carayon-Sainfort, 1989), we describe obstacles experienced by care manager in managing patient-related information. A web-based questionnaire was used to collect data from 80 care managers (61% response rate) located in clinics, hospitals and a call center. Care managers were more likely to consider ‘inefficiencies in access to patient-related information’ and ‘having to use multiple information systems’ as major obstacles than ‘lack of computer training and support’ and ‘inefficient use of case management software.’ Care managers who reported inefficient use of software as an obstacle were more likely to report high workload. Future research should explore strategies used by care managers’ to address obstacles, and efforts should be targeted at improving the health information technologies used by care managers.

Keywords

Performance obstacles; care management; care coordination; health information technology; work system

Introduction

Patients with chronic conditions¹ require coordination of their care within and across multiple healthcare organizations (McDonald et al., 2010). Unfortunately, in many instances, care for these patients is poorly coordinated, especially when the patient interacts with

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¹A chronic condition is “a condition that lasts 12 months or longer and meets one or both of the following tests: (a) it places limitations on self-care, independent living, and social interactions, and/or (b) it results in the need for ongoing intervention with

various healthcare organizations, such as their primary care clinic and a hospital; this can lead to hospital readmissions and emergency department visits (Holland and Harris, 2007; Jencks et al., 2009; Tomcavage et al., 2012; Witherington et al., 2008). A reason for these problems is that patient-related information does not flow well across healthcare organizations (Goodman et al., 2013). Health information technology (IT)-supported care management has been suggested as an intervention to improve information flow and care coordination (McDonald et al., 2010; McDonald et al., 2007; Rudin and Bates, 2014). Nurse care managers use multiple health IT applications to access patient-related information and coordinate patient care within and across healthcare organizations, e.g. hospitals, clinics, long-term care facilities and home health agencies (Carayon et al., 2015; Tomcavage et al., 2012). Care managers can, therefore, help to improve patient outcomes and prevent hospital readmissions and emergency department visits (Carayon et al., 2015; Gilfillan et al., 2010; Maeng et al., 2012; Tomcavage et al., 2012). In this study, we identify various obstacles experienced by care managers when using multiple health IT applications. This research can provide information on how to better design the work systems of care managers, including their tools and technologies, and therefore lead to improved patient care.

Care Management and Care Coordination

Care managers coordinate patient care through activities such as patient education, medication reconciliation, organizing follow-up visits, assessment of patient needs and monitoring of patient status (Carayon et al., 2015; Crabtree et al., 2010; Nutting et al., 2011; Tomcavage et al., 2012). To perform these activities, they manage a range of patient-related information across the journey of patient care, which can be challenging (Hansen et al., 2011; Naylor et al., 2011).

Care managers use various types of information as patients vary in their needs, cultural backgrounds, disease acuity, compliance and responsiveness to medical treatments. Some patients have multiple chronic conditions; others have inadequate personal situations such as the lack of a caregiver at home, insufficient financial resources or unhealthy dietary habits. Patients also vary with regard to the care services they receive such as smoking cessation and nutrition consultation services. Due to the complexity, variation and uncertainty of the health of chronically ill patients, care managers face challenges to predict patients care needs such as medical treatments and medical supplies. They need to make decisions regarding patient care that can also be challenging because of limited access to patient-related information. Care managers need to verify the scheduling and receipt of patient care, such as primary care follow-up appointments, to ensure safe patient transitions. Finally, they need to communicate patient-related information to other care providers and the patient in a timely manner. In order to access, process and communicate these different types of patient-related information, care managers use multiple health IT applications, such as various electronic health record technologies (EHRs), health information exchange² (HIE), case management software, and claims and authorization systems. Care managers often face

medical products, services, and special equipment.” AHRQ, 2011. HCUP chronic condition indicator, Healthcare Cost and Utilization Project (HCUP). Agency for Healthcare Research and Quality. Agency for Healthcare Research and Quality, Rockville, MD.

²HIE is “the electronic sharing of health-related information according to nationally recognized standards for inter-operability, privacy, and data security” The National Alliance for Health Information Technology, 2008. Report to the Office of the National

challenges related to the use of health information technologies (Alyousef et al., 2012; Carayon et al., 2012).

Health IT and Management of Patient-Related Information – A Systems Approach

Health IT can support efficient and effective management of patient-related information for care coordination (Bates, 2015; Fagnan et al., 2011; Golden et al., 2010; Kind et al., 2012; McDonald et al., 2007; Rudin and Bates, 2014; Tomcavage et al., 2012). However, it may also add obstacles to managing patient-related information flow, especially when multiple health IT applications are used (Bates, 2015; Bates and Bitton, 2010; Fagnan et al., 2011; McDonald et al., 2010). In this study, we assess obstacles experienced by care managers in managing patient-related information, and the consequences of those obstacles on care manager workload and quality of working life, i.e., burnout and intention to leave their current position.

The work system model of Smith and Carayon (Carayon, 2009; Smith and Carayon-Sainfort, 1989) and its extension, i.e. the Systems Engineering Initiative for Patient Safety (SEIPS) model of work system and patient safety (Carayon et al., 2006a; Carayon et al., 2014), provided the conceptual framework for this study of care managers' obstacles to managing patient-related information for care coordination. Obstacles to managing patient-related information are work system factors that inhibit care managers' ability to access, process and/or communicate patient-related information. These obstacles can be classified within the elements of the work system model as being related to the individual, tasks, technologies and tools, environment and organization. Our preliminary research shows that many obstacles represent task performance demands (i.e. physical, mental, emotional, and temporal demands), and inefficiencies in the care managers' work system such as duplicate documentation in multiple health IT applications (Carayon et al., 2012). According to the SEIPS model (Carayon et al., 2006a; Carayon et al., 2014), obstacles to managing patient-related information can create negative consequences on care managers and hinder their overall performance in coordinating patient care.

Methods

The primary objective of this study is to describe work system obstacles experienced by care managers in managing patient-related information. We also explore the consequences of these obstacles on care manager workload, burnout and intention to turnover.

Study setting and participants

We invited 131 care managers employed by a major health plan in central Pennsylvania to participate in the study. The care managers worked in outpatient clinics, hospitals and a "Transitions of Care" (TOC) telephonic call center. Eighty care managers responded to the survey questionnaire (response rate: 61%). Most of the respondents were female (94%) and

Coordinator for Health Information Technology on defining key health information technology terms. Office of the National Coordinator for Health Information Technology, Washington, DC..

Caucasian (99%). Other demographic and job characteristics of the respondents are described in Table 1.

Care managers reported using multiple health IT applications: case management software (100%), EHR (95%), HIE (26%) and other health IT applications such as claims and authorization systems (35%). The HIE used by care managers is Keystone Health Information Exchange (KeyHIE), which is a secure network that links physicians and other healthcare professionals and facilities throughout central and northeastern Pennsylvania. It provides care managers with secure access to patient-related information from a range of healthcare organizations (<http://www.keyhie.org/>). A total of 43 care managers (54%) used e-mail to communicate with their patients: 31 of these 43 care managers (72%) used email to communicate with 10% or less of their patients, 4 care managers (9%) used e-mail to communicate with 10%–50% of their patients, and 8 care managers (19%) used email to communicate with more than half of their patients.

Questionnaire

Using a cross-sectional study design, we implemented a web-based survey that was distributed to care managers between December 2012 and January 2013. The questionnaire included questions on obstacles experienced by care managers in managing patient-related information and care manager workload and perceptions of quality of care and patient safety (<http://cqpi.wisc.edu/keystone-beacon-community.htm>).

Twenty questions were used to measure obstacles to managing patient-related information. An initial set of sixteen questions was developed based on an analysis of interview and observation data collected from twelve care managers between May and October 2011 (Alyousef et al., 2012). The sixteen questions were used in an initial survey of the care managers in the fall of 2011. Four questions were added after analyzing care managers' responses to two open-ended questions in the initial survey, which asked care managers what they would like to improve in the health IT applications. This process ensured content validity so that all work system obstacles related to management of patient-related information were covered in the survey.

The questionnaire also included reliable and valid scales used in previous healthcare research (Gurses et al., 2009; Hoonakker et al., 2011) to measure the following dependent variables:

- Workload: six questions of the NASA-Task Load Index (TLX) (Hart and Staveland, 1988)
- Burnout: 5-item emotional exhaustion scale of Schaufeli et al. (1996)
- Intention to turnover: one question (Carayon et al., 2006b).

Study procedures

The Institutional Review Boards of the healthcare system and the researchers' academic institution approved this research. Participation was voluntary. Using the web-based survey software Qualtrics®, we developed and administered the questionnaire based on principles

by Dillman (2000). An information sheet regarding participation was included at the beginning of the survey. First, care managers received an e-mail notification from the project's principal investigator explaining the study's goal. After one week, they received an e-mail inviting them to take part in the survey. The e-mail message contained a link (URL) to the web-based survey. Three weekly e-mail reminders, each containing the link to the survey, were sent to the care managers who had not yet completed the survey. The survey was closed after 5 weeks.

Data analysis

We used IBM SPSS[®] statistical analysis software (version 20) for the data analysis. Data were checked for errors such as out-of-range values. Missing data were analyzed using Little's test for missing completely at random (MCAR) (Little, 1988). Results indicated that missing data represented 4.59% of the total data. The Little test ($\chi^2=15.677$, $df=14$, $p=0.334$) showed that missing data were random and no imputation was required.

Because the sample size included only 80 care managers, we could not conduct factor analysis to find underlying latent factors of the 20 obstacles (Costello and Osborne, 2005). Therefore, we used the affinity diagram method to group care managers' obstacles into meaningful categories. The affinity diagram method is a tool that gathers a large number of ideas and organizes them into meaningful groupings (Imai, 1986; Mears, 1995). Eight members of the research team with expertise in human factors and ergonomics and knowledge of care managers' work participated in the affinity diagram exercise that lasted 1 hour. Using this iterative process of categorization, participants achieved consensus and placed obstacles into the four categories shown in table 2: (1) lack of computer training and support (obstacles 1.1–1.3), (2) inefficient use of case management software (obstacles 2.1–2.13), (3) inefficiencies in access to patient-related information (obstacles 3.1–3.8) and (4) having to use multiple information systems (obstacles 4.1–4.7).

Scales were created for the independent variables. A scale was created by summing all the obstacles for each category and transforming the sum into a 0–100 score (Diamantopoulos and Winklhofer, 2001) (see Table 3); Cronbach's α scores for the 4 new scales of obstacles were all above 0.70 (Carmines and Zeller, 1990), indicating good reliability. Scales were also constructed for two of the dependent variables, workload and burnout (see Table 4), by summing up items and transforming the sums into 0–100 scores. A single item measures intention to turnover.

One-way within-subjects ANOVA with post-hoc multiple comparisons procedure and Bonferroni correction was used to examine differences across the four categories of obstacles with respect to how care managers perceived them as major obstacles (Iversen & Norpoth, 1976). Bivariate Pearson correlation analysis was used to examine associations between care managers' obstacles to managing patient-related information and demographic and job characteristics variables, and the dependent variables, i.e. perceived workload, burnout and intention to turnover (Lee et al., 1989). Additional exploratory analysis included a multivariate hierarchical linear regression analysis to evaluate the relationship between care managers' obstacles to managing patient related information and the dependent variables of workload, burnout and intention to turnover (Haase, 2011; Lee et al., 1989). The

background, demographics and job characteristics variables that had significant correlations with the dependent variables were entered as control variables in the first step of the regression model, with the obstacles entered in the second step.

Results

Obstacles to managing patient-related information for care coordination

Results in Table 2 show the 20 obstacles to managing patient-related information, organized in the 4 categories identified in the affinity diagram process. The 8 items most frequently reported as a major barrier are listed below, with the percent of respondents indicating that it is a major barrier in parentheses:

- 4.1: Inefficient use of the information systems such as duplicate data entry (68%)
- 4.2: Not all hospitals and clinics are, yet, participating in HIE (60%)
- 4.3: Having to log in to multiple systems (49%)
- 4.4: Transferring data between EHR, HIE and case management software (45%)
- 3.1: Finding out whether the patient has given universal authorization to transfer his or her data to other information systems (42%)
- 3.2: Timely access to patient-related information (37%)
- 3.3: Finding the correct information to perform medication reconciliation (30%)
- 4.5: Sharing patient-related information across systems (30%)

These 8 items belong to two categories of obstacles related to 1) inefficiencies in access to patient-related information and 2) having to use multiple information systems. These two categories are significantly more likely to be considered as major obstacles by care managers than the other two categories of obstacles, i.e. lack of computer training and support and inefficient use of case management software ($p < 0.001$).

Associations between care manager obstacles and workload, burnout and intention to turnover

Descriptive statistics on scale measures of care manager obstacles to managing patient-related information, workload, burnout and intention to turnover can be found in Table 3.

As shown in Table 4, care managers who reported obstacles related to the inefficient use of case management software also reported higher workload ($r = 0.24$, $p < 0.05$). Obstacles to managing patient-related information did not significantly contribute to burnout and intention to turnover. The additional exploratory analysis reported in the Appendix shows that, after controlling for care managers' demographics and background and job characteristics, obstacles to managing patient-related information were not significantly associated with workload, burnout and intention to turnover, and accounted for 2–4% of the variance in the outcomes of workload, burnout and intention to turnover (see Table in Appendix).

Discussion

We identified a range of obstacles experienced by care managers in managing patient-related information for care coordination. The obstacles related to inefficiencies in information access (e.g. difficulties in finding the most accurate patient information); processing, such as duplicate data entry into multiple health IT systems; and communication, such as inability to share patient-related information across health IT applications. Obstacles covered all elements of the work system model, including technologies and tools, such as having to log in multiple health IT applications. Many task performance demands, such as finding the correct information to perform medication reconciliation, belong to the obstacle category of inefficiencies in access to patient-related information. Organizational factors were represented by many of the obstacles in the category of lack of computer training and support. This category also included lack of computer skills, which is a characteristic of the individual. Patient-related information obstacles are related to the entire work system and, therefore, need to be addressed through a sociotechnical systems approach (Eason, 2007; Waterson, 2014).

Two of the four categories of obstacles were more frequently reported as major barriers by care managers: having to use multiple information systems and inefficiencies in access to patient-related information. The majority of care managers (68%) considered inefficient use of multiple information systems, such as duplicate data entry, as a major obstacle (Table 2). Care managers need to remember passwords for multiple health IT applications; 18% care managers reported this as a major obstacle (Table 2). They must transfer patient-related information across these systems and share that information with others: 45% of care managers considered this as a major obstacle (Table 2). Not all hospitals and clinics are yet linked to HIE: 60% of care managers reported this as a major obstacle (Table 2). This may explain why only few care managers use HIE (26%). When care managers cannot find patient-related information in the HIE, they try to find it in other EHRs or request information from other care providers via phone or fax (Alyousef et al., 2012; Carayon et al., 2012). As more healthcare organizations participate in HIE and more information is added to it, care managers are more likely to use the HIE to access information. This could have a positive effect on care managers' workload, as using HIE was correlated with a lower workload for care managers (Pearson correlation=-0.33, $p<0.01$).

On the other hand, the use of multiple information systems could potentially be a facilitator for care managers who are able to find more complete information on their patients and develop a better mental model of the patient status (Carayon et al., 2013). However, many major obstacles to managing patient-related information are related to the need to use multiple information systems. Therefore, the information systems need to be redesigned for better integration in order to minimize inefficiencies in transferring patient-related information.

In order to perform care coordination activities such as medication reconciliation, care managers need to have timely access to accurate and up-to-date patient-related information that is located in multiple health IT applications. About 42% of care managers reported that it was a major obstacle to determine whether the patient signed a universal authorization to

transfer his or her information to other information systems (Table 2); care managers need to review this information before they transfer information related to the patient. Also, more than one-third of care managers reported that timely access to patient-related information was a major barrier (37%, Table 2). These obstacles may create delays in their workflow and increase temporal demands in their tasks. Twenty-three care managers reported that finding the correct information to perform medication reconciliation was a major barrier (30%, Table 2). This obstacle may hinder care managers' ability to ensure safe transitions of patient care and therefore negatively impact quality of care and patient safety (Brown et al., 2012).

Obstacles in the other two categories were not reported as often as major barriers. For instance, only 5% of care managers reported that their computer skills or those of their colleagues were major obstacle (Table 2). This was not surprising since respondents had an average of 14.5 (SD=6.6) years of computer experience, 65% considered their computer skills as average, and 31% considered themselves to be advanced users. The respondents work in a healthcare system with an IT department that provides computer technical support. This could explain why only 14% of care managers reported lack of computer training as a major barrier and 12% reported lack of computer support in the different systems as a major barrier (Table 2). Computer training and support are important individual and organizational factors that can ensure efficient and effective management of patient-related information.

Care managers must use the case management software daily to document their work (e.g., identified care gaps and the strategies used to address the gaps), and monitor and track patient care during and after hospitalization. This software also contains their daily "to do" list and allows them to communicate with other care managers and exchange patient-related information. For example, outpatient care managers are notified through case management software when one of their patients is hospitalized or discharged. Care managers face many obstacles related to the use of this software, including inefficiencies in finding, retrieving and documenting information. Care managers who reported more of these obstacles also reported higher workload ($r=0.24$, $p<0.05$). The case management software represents an important element of the work system of care managers, and is supposed to facilitate the work of care managers by helping them to manage and document their activities. However, this technology needs to be redesigned to improve its usability and usefulness to support care managers' management of patient-related information.

Strengths and limitations

The care managers studied were all employed by a health plan that implemented a health IT-supported care coordination program in central Pennsylvania. Therefore, we cannot generalize the results to care managers in other healthcare organizations. Study respondents worked in varying care settings, such as hospitals, outpatient clinics and TOC, and faced a variety of obstacles to managing patient-related information across the journey of patient care. Care managers who work for other organizations could experience some of these obstacles; therefore, the results of this study could potentially be used to evaluate and redesign their work system. The list of obstacles identified in this study could be adapted

into a checklist to assess how well care managers in other programs work with patient-related information.

The response rate (60%), although lower than desired, is high for web-based surveys in healthcare settings (Hoonakker and Carayon, 2009). It is possible that respondents may have different characteristics than non-respondents, and therefore different perceptions of obstacles to managing patient-related information, workload, burnout and intention to turnover.

We used a cross-sectional study design that allowed us to explore the relationships between the care managers' obstacles to managing patient-related information and workload, burnout and intention to turnover. However, confounding variables may exist that we were not able to control in such design.

Conclusion

Care managers experienced work system obstacles at several stages in the management of patient-related information: access, processing and communication. Care managers considered inefficiencies in access to patient-related information and having to use multiple information systems to be major obstacles more often than the lack of computer training and support and inefficient use of case management software. Many care managers did not perceive lack of computer training and support as an obstacle to managing patient-related information.

The work of care managers is demanding. Those with less case management experience reported higher workload and burnout. Therefore, efforts to redesign the work system of care managers should expand beyond determining the optimum number of hours worked each week or the level of required staffing. They should focus on ways of reducing task demands on care managers by addressing elements of the care managers' work system. Human factor and ergonomics principles can guide such redesign by addressing work system performance obstacles and facilitators, including those related to management of patient-related information, to create balance in the work system of care managers (Carayon, 2009). Care managers develop strategies to deal with work system obstacles related to managing patient-related information; these strategies improve the resilience of the work system. Future research should identify these strategies. If the system can be redesigned to allow care managers to avoid work system obstacles, the coordination of patient care across transitions of care could be improved.

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Appendix

Table—

Multivariate hierarchical regression analysis of care managers' obstacles, demographics, background, job characteristics, and outcomes (n= 580)

	Workload		Burnout		Intention to turnover	
	Step1 (β)	Step2 (β)	Step1 (β)	Step2 (β)	Step1 (β)	Step2 (β)
Control variables						
Age	-0.28 *	-0.28 *				
Education	0.22 *	0.17				
Tenure			0.25 *	0.27 *		
Case management experience	-0.16	-0.16	-0.28 *	-0.26 *		
Work hours per week	0.26 *	0.23 *			0.24 *	0.26 *
Use of HIE software	-0.26 *	-0.19				
Obstacles						
Lack of computer training and support		-0.17		-0.03		0.15
Inefficient use of case management software		0.20		0.19		0.12
Inefficiencies in access to patient-related information		-0.05		-0.05		-0.01
Having to use multiple information systems		0.11		-0.03		-0.16
R ²	0.33	0.37	0.16	0.18	0.06	0.09
R ²		0.04		0.02		0.03

β =beta coefficients, standardized regression coefficient; R², variance explained

*
p<0.05

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Table 1—

Care managers' demographic and job characteristics

Demographic and job characteristics	N (%)	Mean (SD)	Min-Max
Job position (N=80)			
Inpatient care manager	5 (6%)		
Outpatient care manager	62 (78%)		
Transition of care (TOC) care manager, float or other care manager	13 (16%)		
Age (N=74)			
34 or less	6 (8%)		
35–44	18 (25%)		
45–54	35 (47%)		
55 or more	15 (20%)		
Education (N=72)			
Some college	11 (15%)		
2-year college degree (Associate)	25 (35%)		
4-year college degree (Bachelor, BS, BSN, etc.)	20 (42%)		
Graduate degree, professional degree or certificate	6 (8%)		
Computer skills (N=75)			
Novice user	3 (4%)		
Average user	49 (65%)		
Advanced user	23 (31%)		
Computer experience in years (N=77)		14.52 (6.62)	0–30 yrs
Tenure in years (N=80)		2.75 (3.33)	0.17–17 yrs
Case management experience in years (N=80)		2.79 (5.21)	0–22 yrs
Work hours per week (N=80)		46.20 (5.98)	35–80 hrs

Table 2—

Obstacles to managing patient-related information for care coordination

Categories	Obstacles	N	Not a barrier	Minor barrier	Major barrier
1. Lack of computer training and support	1.1 Lack of training in the different systems	78	41%	45%	14%
	1.2 Lack of computer support for the different systems	78	51%	37%	12%
	1.3 Computer skills of you and/or your colleagues	78	65%	30%	5%
2. Inefficient use of case management software	2.1 Documenting in case management software	77	34%	44%	22%
	2.2 Using case management software to cover for co-workers	78	32%	46%	22%
	2.3 Finding and retrieving information created in case management software	78	46%	36%	18%
3. Inefficiencies in access to patient-related information	3.1 Finding out whether the patient has given universal authorization to transfer his or her data to other information systems	77	27%	31%	42%
	3.2 Timely access to patient-related information	76	26%	37%	37%
	3.3 Finding the correct information to perform a medication reconciliation	77	25%	45%	30%
	3.4 Finding psycho-social background information about the patient	77	23%	53%	24%
	3.5 Finding information about the patient's family background	77	25%	52%	23%
	3.6 Finding the most accurate patient information	76	28%	51%	21%
	3.7 Finding the patient's up-to-date contact information	75	37%	44%	19%
4. Having to use multiple information systems	4.1 Inefficient use of the information systems such as duplicate data entry	78	5%	27%	68%
	4.2 Not all hospitals and clinics are yet participating in HIE	77	10%	30%	60%
	4.3 Having to log in multiple systems	78	10%	41%	49%
	4.4 Transferring data between EHR, HIE and case management software	74	20%	35%	45%
	4.5 Sharing patient-related information across systems	76	15%	55%	30%
	4.6 Remembering usernames and passwords	79	20%	62%	18%
	4.7 Identifying patients in the system that are eligible for case management	78	46%	42%	12%

Table 3—

Descriptive statistics on care managers' obstacles to managing patient-related information, workload, burnout and intention to turnover

	N	# of items	Mean (SD)	Min-Max	Cronbach's α
Obstacles					
Lack of computer training and support	78	3	28.8 (26.5)	0–100	0.73
Inefficient use of case management software	78	3	41.4 (32.3)	0–100	0.85
Inefficiencies in access to patient-related information	78	7	50.9 (26.1)	0–100	0.82
Having to use multiple information systems	79	7	60.3 (20.6)	0–92.86	0.70
Outcomes					
Workload	76	6	59.4 (10.5)	30–78	-
Burnout	75	5	48.2 (23.4)	3–100	0.89
Intention to turnover	76	1	26.7 (32.2)	0–100	-

Table 4—

Pearson correlations between care manager obstacles, demographics and background, job characteristics, and dependent variables (n=80)

	Workload	Burnout	Intention to turnover
Obstacles to managing patient-related information:			
Lack of computer training and support	−0.12	0.03	0.08
Inefficient use of case management software	0.24*	0.15	0.12
Inefficiencies in access to patient-related information	0.01	0.04	0.02
Having to use multiple information systems	0.09	0.03	0.02
Care managers' demographics and background:			
Age	−0.24*	−0.16	−0.05
Education	0.26*	0.14	0.15
Computer skills	0.11	−0.14	0.11
Computer experience	0.06	−0.01	0.04
Tenure	0.14	0.29*	−0.01
Case management experience	−0.30*	−0.31**	−0.00
Work hours per week	0.26*	−0.02	0.24*
Care managers' job characteristics:			
Job position	−0.19	−0.21	−0.07
Use of HIE software	−0.33**	−0.22	0.12
Use of other health IT applications	0.15	0.11	0.05
Percentage of patients communicated with by email	0.15	0.18	0.06