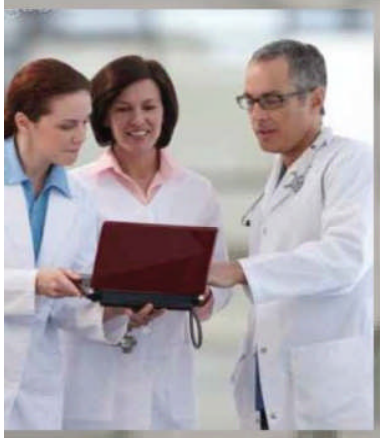

2010 Health Information Technology Survey

How Technology is Changing the Practice of Care Management

September 2010

TCS HEALTHCARE TECHNOLOGIES

CMSA® CASE MANAGEMENT SOCIETY OF AMERICA

ABQAURP
American Board of Quality Assurance and Utilization Review Physicians, Inc.

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Disclaimer

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Executive Summary

In 2008, TCS Healthcare Technologies (TCS) approached several organizations to coordinate the first in-depth survey to examine health information technology (HIT) trends in the field of care management. The American Board of Quality Assurance and Utilization Review Physicians (ABQAURP) and the Case Management Society of America (CMSA) agreed to co-sponsor the survey. The partnership reunited in 2010 to conduct the survey again.

A core objective of the HIT survey is to assess the general trends related to HIT systems, especially the trends for care management software applications, and specific HIT system functionality within those applications. In addition, the research examines additional applications used by providers, payors, care managers, and others to support care management interventions and patient care. This HIT Survey Report includes a myriad of findings which are highlighted in 28 tables and 14 figures. A primary goal is to raise public awareness about care management software applications and their role in the larger HIT arena.

Methodology

The 2008 and 2010 HIT surveys reached more than 15,000 individuals each year through electronic mail (i.e., email) communications via a non-randomized, convenience sampling methodology. Recipients were introduced to the sponsoring organizations and the objectives. They were invited to visit a website to complete the survey, which included 30 questions (many with subparts). In 2008, 521 respondents completed the online HIT questionnaire; in 2010, 670 respondents completed the survey. Respondents were not compensated for participating. In addition to analyzing the results from the entire survey pools, sub-analyses on key questions were run regarding on 64 individuals who participated in both surveys and organizations offering one or more "care management" services.

Some caution should be observed when attempting to generalize the results of this analysis to populations outside the survey participants. Although the 2008 and 2010 populations are mostly "equivalent," any self-reported survey has inherent limitations. Such limitations are especially present when studying complex HIT issues.

Findings

General Findings

The survey populations in 2008 and 2010 are very similar in terms of the types of companies with which respondents are associated. These companies represent a wide array of healthcare organizations (see Table 1). The number of respondents working for several types of medical management organizations increased slightly, especially for case management organizations (CMOs), which increased from 32% in 2008 to 42% in 2010.

For analysis purposes, three populations of respondents are used throughout the HIT survey report. The "Large Respondent Pool," or Large Pool, refers to the entire respondent pool for the two different survey years 2008 and 2010. The "Direct Comparison Pool," or Direct Pool, identifies 64 individuals who participated in both surveys, where sub-analyses were conducted on several key questions. In view of the high degree of similarity in the demographic composition of Direct Pool participants, this 64-member sub-population may be viewed as essentially equivalent.

In addition, another sub-analysis population assessed participants who work in companies identified as care management organizations (CMOs), which specifically include case or care management (CM), disease management (DM), utilization management (UM), nurse triage and health advice and educational

services (Nurse Triage), independent review organizations (IROs), pharmacy benefit management services (PBMs), and behavior health (Behavior) services, referred to collectively as the "Care Management Pool."

Integration Question Series

Several key findings from the 2010 HIT survey are highlighted in the Integration Question Series in Table 5A. Generally, the 2010 questions assess that the degree of HIT integration remains low. For most inquiries, only one out of four participants responds in the affirmative. Moreover, when comparing 2008 and 2010 trends, responses appear to indicate that progress toward fully integrated software platforms is occurring less quickly than originally anticipated. Yet, progress is occurring. The largest gain shows a 14% increase for scanning medical records (54% in 2010 versus 40% in 2008). The second largest gain is a 7% increase in responses to the question asking whether "clinical data can be shared electronically with other providers" (from 28% in 2008 to 35% in 2010). In addition when comparing 2008 and 2010 responses, 6% more respondents indicated that their offices have moved to a "completely paperless environment regarding patient or care." In the Care Management Pool, a higher degree of integration on most measures is clearly evident when compared to the 2010 Large Pool.

HIT Function Question Series

Responses involving the HIT Function Question Series are shown in Table 9A. A greater percentage of 2010 respondents report improvements in several functional capabilities in their respective software applications including the: 1) ability to use pre-defined, industry standard care plans for asthma, diabetes, and other conditions; 2) automatic generation of care plans based on responses to assessment questions; 3) integration of Case Management Adherence Guidelines (CMAG) to help case managers assess a patient's readiness to change; 4) use of stratification results to automatically assign, schedule or execute follow-up tasks; and 5) ability to predict future medical costs related to an individual or a selected population.

As seen in Table 9A, several functions associated with HIT systems appear to lose some ground since 2008 as well. Population stratification applications appear to remain an under-utilized function in care management software despite being touted as a service delivery improvement that identifies and assists patient populations who are most in need. Furthermore, while return on investment (ROI) calculations and outcomes reporting are known to be critical business interests, their apparent lack of progress may stem from the absence of predominant definitions and standardized methods of tracking outcomes and calculating ROI within the healthcare industry, especially for care management interventions. Better communication about the potential financial and quality benefits and clarity around defining and measuring outcomes and ROI are likely to encourage incorporation of these functions into software applications.

Tracking case managers' time and freeing their time to spend on patient contacts represent two dimensions of care management software that also failed to show improvements. While industry leaders anticipate that uptake of these functionalities will improve case manager efficiency and effectiveness, the 2010 trend lines do not clearly prove this assumption.

With only two of the 19 questions reported in Table 9A achieving a response rate of 50% or more, an opportunity exists for most care management system vendors to upgrade the functionality of their software products. In addition, with the wide range of applications and different levels of functionality, prospective HIT customers must do their homework to ensure the software they purchase truly includes the functions they hope they feature.

Communication Automation Question Series

Key communication channels examined in the Communication Automation Question Series (see Tables 12A and 12B) include correspondence to patients and providers generated through software systems using electronic letters, faxes, emails, text messaging, and supports for outbound and inbound calls. In both 2008 and 2010, the majority of the users report that their respective systems cannot auto-generate most of these communications. In addition, the 2010 results present surprising data reflecting sizeable decreases in the use or availability within HIT systems for four electronic communication techniques—letters, faxes, emails, and texting. This pattern may reflect privacy and confidentiality concerns regarding electronic communications or respondents' dissatisfactions with emerging software platforms that promised to perform these functions, but failed to deliver them satisfactorily. If the latter is true, then vendors who successfully execute these essential communication strategies have important windows of opportunity open to them.

Nurse Triage System Question Series

For the first time in 2010, nurse triage systems and their degree of integration with HIT systems were queried (see Tables 13 and 14). Twenty-five percent of the respondents report that they use an in-house nurse triage system. Much smaller percentages use a vendor (9%) or a combined solution (4%). While about one-third of the respondents (29%) report positively that triage systems interface with care management or electronic medical record software systems, a large majority of participants (71%) who answered this question report their systems do not integrate or interface with an HIT system. These findings demonstrate an emerging market with a number of opportunities as Nurse Triage services become a more common offering by health plans, providers and others.

Patient Communication Options Series

A majority of the 2010 survey respondents communicate with patients via telephone (93%), letter (76%), face-to-face communications (62%) or email (53%). In addition, respondents indicate a willingness to embrace emerging communication strategies to support patients over the next two years (see Patient Communication Options in Tables 17A and 17B). A three-fold increase is anticipated in the use of text messaging, 'smartphone' applications, and wireless remote monitoring. Use of online personal health records (PHRs), member and patient portals, remote monitoring devices, social networking sites such as Facebook, and blogging and micro-blogging (including Twitter) are predicted to double. Correspondingly, the survey projects decreases in telephone conversations, written letters, and face-to-face contacts by 2012.

Caseload and Activity Question Series

A series of findings regarding average numbers of cases handled per week (caseloads) were examined in the 2010 survey (see Figures 12-13 and Table 19). For the 2010 respondents, the most frequently selected caseload range is 25-49 cases per week. The survey respondents consistently identify that most of their time (average 3.2 on a 5-point Lickert scale) is spent performing indirect patient contacts (per Table 19). At the same time, they also indicate that most time spent (high of 3.0 on a 5-point Lickert scale) in face-to-face contacts with patients occurs in those who report handling 100 to 124 cases per week. While care settings with high throughput numbers and more face-to-face encounters may include physicians' offices and outpatient clinics, these responses confound the general wisdom about how case managers spend their time and present areas of inquiry that warrant further investigation and clarification.

System Satisfaction Question Series

About one in three respondents (36%) report being "very satisfied" or "satisfied" with their respective care management software applications (see Table 20). Satisfaction in these two categories is unchanged from 2008 (35%). Almost one out of every two respondents report being "very satisfied" or "satisfied" concerning electronic medical records (EMR) in 2010 (45%), up sharply from the 2008 rating (30%) (see Table 22). This 15% increase represents a true bright spot.

The study reports on satisfaction ratings for nurse triage systems for the first time in 2010. Satisfaction ratings for nurse triage systems indicate that four out of every ten respondents are "very satisfied" or "satisfied" (40%) (see Table 23).

Regarding care management software systems, challenges remain for mobilizing integrated and interoperable platforms that satisfy case managers and others who use these applications. Less than one in five respondents report their "care management software application" allows them to "spend more time" with their patients. In fact, the percentage of responses decreased from 22% in 2008 to 18% in 2010 (see Table 9B, Part M).

More work needs to done in leveraging best practices to support medical management interventions, evidenced by a slight decrease in satisfaction levels from 2008 to 2010 for care management software systems (Tables 20 and 21). In contrast, for EMR systems, satisfaction levels increase as highlighted in Table 22.

Conclusion

This Report provides an in-depth analysis of the 2010 survey and highlights the key results. Generally speaking, the findings of the 2010 survey match the findings of the 2008 survey with some noted exceptions. The application of HIT systems in various care management and other healthcare settings will continue to evolve and have a significant impact on population health management programs. Public policy and healthcare experts can reference the study findings when making strategic decisions about how to optimize the efficiency and efficacy of HIT systems. Similarly, HIT vendors and others can use the insights gained from this survey to build care management software systems that meet today's software needs while designing systems that reach beyond the current implementation curve.

Table Index

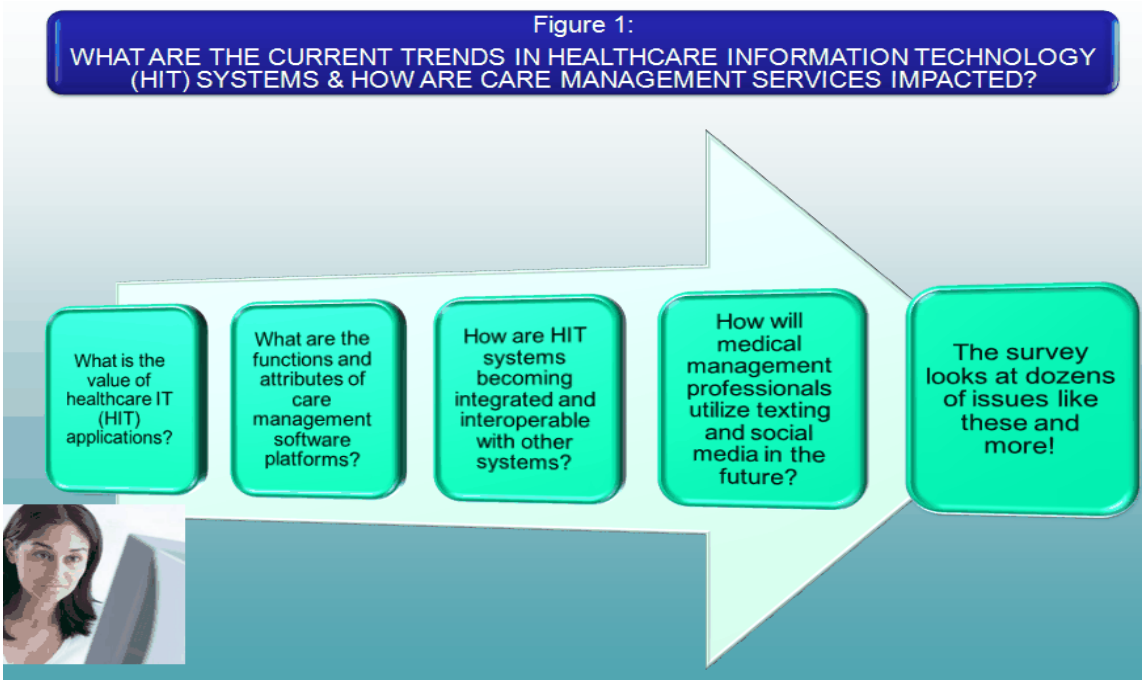
Introduction

Methodology Specifics

Survey Sponsors and Team

In early 2008, TCS Healthcare Technologies (TCS) approached a number of organizations to coordinate the first in-depth survey to examine health information technology (HIT) trends in the care management field. A primary goal of the research study was to answer some of the questions highlighted in Figure 1.

The American Board of Quality Assurance and Utilization Review Physicians, Inc. (ABQAURP) and the Case Management Society of America (CMSA) agreed to co-sponsor and help coordinate the survey. An Advisory Panel was formed with representatives from the three organizations and other healthcare experts. In June 2008, the first study was published.



In late 2009, the same team reconvened and additional members were added to the Advisory Panel to administer an updated version of the 2008 HIT study. The survey questions were reviewed and updated over a two-month review process. The second survey was completed via the same online research service, Zoomerang, two years after the first survey was sent out (specifically, March 2008 and March 2010).

Sampling Methodology

In both years, a non-randomized, convenience sampling methodology was used in which emails with web-based links to the online survey questionnaires were sent to individuals on a privately compiled distribution list of healthcare-related recipients. The emails and other solicitations introduced the objectives and invited recipients to visit and take the online survey as volunteers. These distribution channels were mostly the same for 2008 and 2010. Requests were communicated to an estimated 15,000

individuals including ABQAURP diplomats, CMSA members, and a variety of healthcare organizations. The surveys' response intervals were three weeks from the dates of distribution for both 2008 and 2010.

In 2008 and 2010, the online survey consisted of 30 questions, comprised of binary (yes or no) responses, multiple-choice options, and rating questions using Lickert scales.[1] In some questions, narrative responses were requested. While about 60% of the questions were the same both years, several new survey questions were created and a few of the original questions were rephrased for clarity in 2010.

Survey Participants

A total of 521 respondents completed the survey in 2008, and 670 respondents completed the survey in 2010. This represents an estimated response rate of about 4% for 2008 and almost 5% for 2010. Surveys that were not fully completed are not counted in these totals. Raw data tables were tabulated to verify the total number of unique responses ("N" values) for most questions. Respondents were allowed to select more than one multiple-choice answer for some of the questions. As a result, some response-count values total more than 100%, which means their counts are higher than the N value of 521 respondents and 670 respondents, respectively. In addition, percentages may total under or over 100% due to rounding. Unless otherwise noted, the percentage totals for each question are indexed against how many respondents answered that particular question. For example, if 600 individuals responded to a question and 300 responded "yes," then the "yes" percentage would be 50%.

Strategies for Analysis

Several tables in this paper include numbering of the sub-questions, which are called question "Parts" (such as Part A, Part B, etc.). All numbering and sub-numbering is used as an aid to this analysis and was not included in the actual 2008 or 2010 surveys that participants read.

For analysis purposes, three populations of respondents are used throughout the HIT survey report. First, the Large Respondent Pool ("Large Pool") is used to signify the entire respondent pool for the two respective survey years 2008 and 2010. The Direct Comparison Pool ("Direct Pool") identifies the group of 64 individuals who participated in both surveys that was used to conduct sub-analysis on several key questions. In addition to comparing the trends between 2008 and 2010 for the entire respondent pool each year (i.e., the Large Pool), a trends sub-analysis was conducted on several key questions that focused on the 64 individuals who participated in both surveys (i.e., the Direct Pool).[2]

A third population cohort of care management organizations (CMOs) is used for sub-analysis purposes. A sub-analysis was performed using the CMO cohort to see if working in these specific company "types" and healthcare settings might have impacted the responses. The "Care Management Pool" specifically includes case or care management (CM), disease management (DM), utilization management (UM), nurse triage and medical advice services (Nurse Triage), independent review organizations (IROs), pharmacy benefit management services (PBMs), and behavior health (Behavior) services. The CMO grouping allows targeted sub-analyses to be run and contrasted with the Large and Direct Pools. Differences in CMOs, as well as other provider settings, were investigated for several key questions in the 2010 survey.

Absolute Percentages

Throughout this analysis, the reported percentages represent the "absolute" change from 2008 to 2010. Absolute change refers to the actual difference, not the relative difference between two numbers. For

[1] Many of the 30 questions included sub-question "Parts," resulting in the collection of over 100 different data units of information for each respondent. This number is doubled when comparing the 2010 and 2008 surveys.

[2] Note: In both years, three individuals' surveys were not used due to reliability concerns. For example, one person completed the survey twice in 2010 both as an employee working for a large hospital and as an independent consultant. Due to duplication and other such issues, a low number (< 1%) of questionnaires was excluded.

example, 10 % in 2008 and 20% in 2010, calculates to a 10% absolute difference, where as "percent change" is calculated as (10-20) / 10), or a 100% relative percent difference between 2008 and 2010.

Drawing Conclusions and Generalizations

This report is intended to inform readers about the individuals who responded to the 2010 survey and to compare their responses to the 2008 population results. Because questions were not distributed to a fully randomized population in either year, drawing conclusions or making generalized observations about the industry or population as a whole should be done with caution. Since the demographic make-up of the 2008 and 2010 respondent pools are similar, except that more participants identified themselves as case managers in the 2010 survey, the two populations can be viewed as mostly equivalent. However, intrinsic challenges that must be considered in the generalization of any results involve using self-reported surveys and accurately capturing the complexity of the HIT issues being queried.

In addition to the analysis completed on the Large Pools of entire HIT survey populations from 2008 and 2010, several sub-analyses were computed that compare 64 individuals who participated in both the 2008 and 2010 surveys. Due to the high degree of similarity in the demographic composition of these 64 participants, this 64-member Direct Pool sub-population may be viewed as extensively equivalent. Therefore, for individual questions, results strongly bolster one another when the Direct Pool's responses mirror the directionality of change of the larger population pool's responses. Furthermore, when extrapolated from results found in the Direct Pool sub-group, generalized comments may be made with more confidence. The main limitation in drawing general implications from the 2008 and 2010 HIT surveys is the challenge of studying complex HIT issues through the self-reported answers to the online survey questions. In any event, to confirm the statistical validity of the findings reported as observations and comparisons, additional statistical analyses are necessary.

Considerations

A third HIT survey is expected to be conducted in 2012 that will add an additional time interval to the HIT survey results. Implying trajectories and propensities based on three surveys holds better reliability than using percentages of relative change in two surveys to describe trends.

Please note that most "percentage" calculations in this study are known as "relative percent differences" because the calculations are mostly between the 2008 and 2010 findings and not based upon an absolute baseline.

No specific references are inferred or made to any particular companies that participated directly or indirectly in this research. A core objective of the HIT surveys is to assess the general trends related to HIT systems, especially the trends for care management software applications and specific capabilities within those applications.

Demographics

An overview of the respondent demographics is highlighted in Figure 2. Generally speaking, the survey populations both in 2008 and 2010 represent a broad range of company types and healthcare services. As highlighted below, there were some minor changes in the demographic characteristics, but over-all the 2008 and 2010 survey populations are equivalent.

Company Types

The data reported in Table 1 demonstrate that the two Large Pool survey populations in 2008 and 2010 were employed in the same types of companies. A slight percentage increase in the number of individuals working for medical management firms – especially case/care management organizations (CMOs) – is evident. In 2008, about 33% of the respondents worked for CMOS; and in 2010, the CMO affiliation increased to 42%. Similarly, but to a lesser degree, 3% to 7% increases were reported in other types of medical management companies --specifically, Utilization Management (UM), Disease Management (DM), Independent Review Organizations (IROs), nurse triage services, and Pharmacy Benefit Management (PBMs). In most other company categories, the change was less than 1% in either a positive or negative direction.

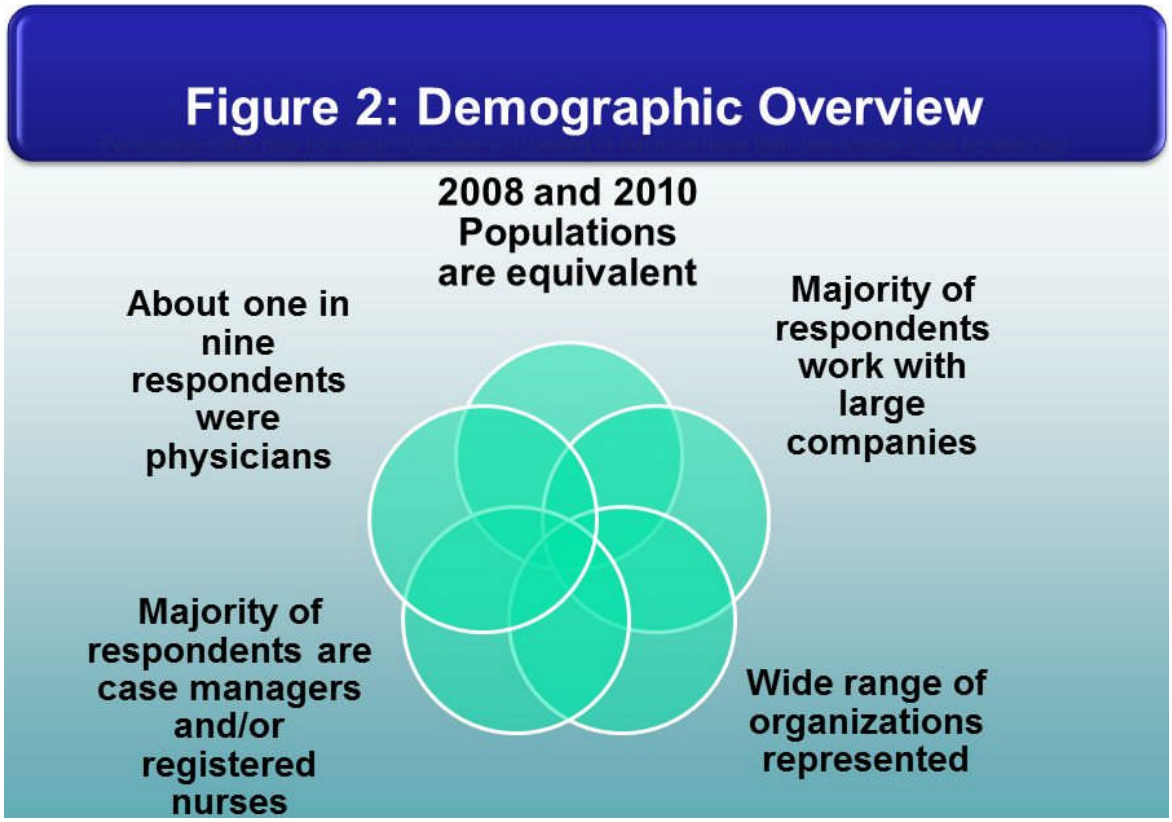


TABLE 1: COMPANY TYPE
What type of company do you work for?
(Respondents could select more than one option)

	2008	2010 (arranged most to least per group)	Change
Health Plan Options			
Health Maintenance Organization (HMO)	21%	19%	(2%)
Preferred Provider Organization (PPO)	16%	15%	(1%)
Point of Service (POS)	11%	11%	—
Indemnity / Fee-for-Service	8%	8%	—
Medical Management Options			
Case Management / Care Management Organizations (CMOs)	32%	42%	10%
Utilization Management (UM)	15%	22%	7%
Disease Management (DM)	11%	17%	6%
Nurse Triage / Medical Advice Services	3%	9%	6%
Independent Review Organization (IRO) / External Review	6%	9%	3%
Pharmacy Benefits Manager (PBM)	2%	7%	5%
Provider or Facility Settings			
Hospital or Health System	30%	32%	2%
Medical Group / Clinic Setting	7%	10%	3%
Home Care	3%	4%	1%
Skilled Nursing Facility (SNF) or Long-Term Care (LTC) Facility	2%	2%	—
Behavioral Health (BH) Facility	2%	2%	—
Research or Academic Medical Center	1%	2%	1%
Retail Clinic	0%	1%	1%
Other Company Types			
Worker's Compensation (WC)	9%	9%	—
Government: Military/Dept. of Defense (DOD)/ Veterans Affairs (VA)	5%	5%	—
Government: Medicaid	4%	4%	—
Government: Medicare	3%	3%	—
Consumer Directed Health Services	2%	3%	1%
Quality Improvement Organization	3%	2%	(1%)
Government: Indian Health	1%	0%	(1%)

Note: The sub-divisions of company types are present for analysis purposes only and were not present in the original surveys seen by participants.

Company Sizes

According to the affiliation data in Table 2, two of every three respondents in both surveys worked for large companies defined as having 101 or more employees (i.e., 66% in 2008 and 68% in 2010). About half of the respondents (48% and 54%, respectively) worked for companies with 501 or more employees,

which represents a 6% increase from 2008 to 2010. The similarities or differences of this distribution of employment per company sizes reported by HIT survey participants versus nationwide workplace demographics may provide valuable content for comparative development and product pricing purposes.

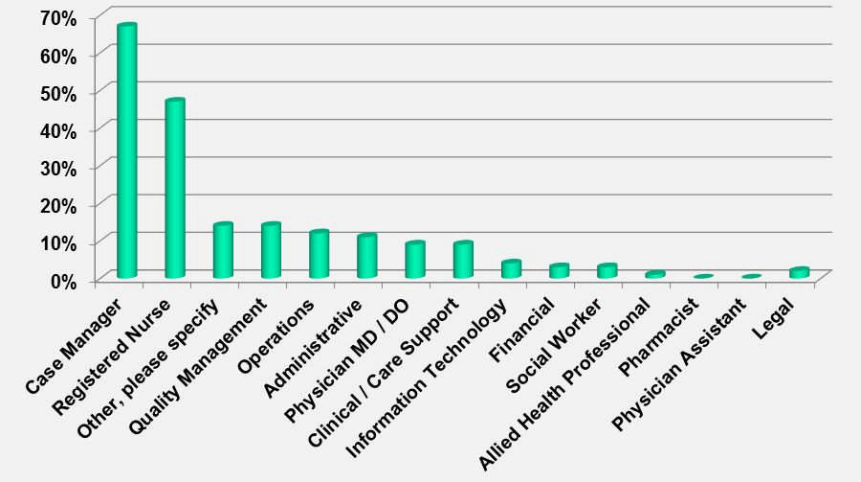
TABLE 2: COMPANY SIZE
How many employees are affiliated with your company?
(Respondents could only select one option)

	2008	2010	Change
501 or more	48%	54%	6%
101 to 500	18%	14%	(4%)
26 to 100	10%	8%	(2%)
6 to 25	7%	7%	—
1 to 5	4%	6%	(2%)
Sub-total	87% (n = 458)	89% (n = 584)	
Self-Employed	8%	7%	(1%)
Not Sure	5%	3%	(2%)
N = Respondents for this question	526	656	

Professional Focus

As highlighted in Figure 3 and Table 3, two-thirds (67%, n = 446) of the respondents in 2010 report they are case managers, and almost half (47%, n = 316) identify themselves as registered nurses.[3] Nine percent (9%, n = 63) select physician as their profession, and 11% (n = 76) report working in administration. Although these two questions were asked differently in 2008, making direct comparisons difficult, 36% reported in 2008 they were practicing clinicians (for example, physicians and nurses combined), and 33% reported they were in administration. If the results from both surveys can be combined and compared, then the number of practicing clinicians in 2010 reaches 58%, a more than 1.5-fold increase from the 36% reported in 2008.

Figure 3: What is your primary profession or focus?
2010 Results
(Respondents could select more than one option)



[3] Because respondents could select more than one response, one can assume most of the case managers also are registered nurses based on current state licensing and professional requirements.

The sizeable increase in professional affiliations may represent real differences between the two survey populations given that the distribution channel was more effective in 2010 than in 2008 in reaching members and associates of CMSA's professional community.

One speculative element that may contribute to the difference in numbers of clinicians identified in the 2010 survey is that, as a general statement, more case managers may be seen as primary providers in contrast to previous years in which CM was considered more of an administrative, value-added function.[4]

TABLE 3: PROFESSIONAL AFFILIATION(S)
What is your primary profession or focus?
2010 Results
(Respondents could select more than one option)

	N = Respondents (arranged most to least)	**Percentage of Respondents**
Case Manager	446	67%
Registered Nurse	316	47%
Other, please specify	95	14%
Quality Management	91	14%
Operations	78	12%
Administrative	76	11%
Physician MD / DO	63	9%
Clinical / Care Support	61	9%
Information Technology	29	4%
Financial	20	3%
Social Worker[5]	18	3%
Allied Health Professional	8	1%
Pharmacist	2	0%
Physician Assistant	1	0%
Legal	14	2%
Choices Total	1,330	

Care Management Service Types

A new question asked in the 2010 survey explores the types of care management services offered by the respondents' organizations. Because the survey question allowed respondents to select all categories of care management that applied, data in Table 4 exceed the absolute number of respondents. Yet, one observation clearly shown is that the overwhelming majority of respondents are associated with companies that offer an array of care management services. An exception to the majority trend is "Nurse

[4] CMSA and other stakeholders have been lobbying the American Medical Association, Congress, and the Center for Medicare and Medicaid Services (CMS) to recognize that case managers are primary providers and should be reimbursed as such through designated CPT codes.
[5] In error, the online survey questionnaire contained two response options for "social workers" in 2010. Therefore, the number of social workers may have been slightly inflated.

Triage" services in which one of three respondents (33%, n = 221) offer that service. This is still a noteworthy proportion of the respondent pool.

TABLE 4: CARE MANAGEMENT OFFERINGS

Does your organization provide the following care management programs?

2010 Results

(Respondents could select more than one option)

	N = Respondent Choices	Percentage of Respondents (arranged most to least)
Case Management (CM)	571	86%
Utilization Management (UM) Services	464	70%
Discharge Planning (DCP)	418	63%
Prevention or Wellness Support	381	58%
Disease Management (DM)	333	50%
Nurse Triage	221	33%
Choices Sub-total	2,388	—
Not Applicable	51	8%
Other, please specify	41	6%
Choices Sub-total	92	—

Defining Key Terms

In recent years, the federal government and other national quality service organizations have promoted the use of Electronic Medical Records (EMRs) by practicing physicians and healthcare institutions. Less attention has been focused on HIT systems that support the work needs of organizations that perform care management interventions, which often are funded by the health plan sponsors. These systems are often referred to as Care Management Software applications.

The 2008 and 2010 surveys cover many different types of care management applications referenced in Table 4 and other HIT systems referenced throughout this report. The following descriptive definitions are offered as background and to improve consistency in the HIT typology.

- **Care Management Organizations (CMOs)** offer a range of medical management services including utilization management (UM), case management (CM), disease management (DM), independent review, nurse triage, and preventative services.
- **Care Management Software** represents a range of HIT applications that support UM, CM, DM, and prevention/wellness interventions as well as telephonic nurse advice, level-of-care education services and other types of medical management interventions. Such systems may include demographic information, provider information, authorization forms, care assessments, care plans, clinical guidelines, and various documentation-related specifics.
- **Data Warehouse Solutions** are repositories typically containing information from claims data and other content from healthcare transactions related to an individual patient, related groups of patients, or epidemiologic populations.
- **Electronic Health Records (EHRs)** are expandable collections of health information usually about individual patients amassed and assessed electronically. An EHR is a document or record in digital format that can be shared across different healthcare settings through network associations existing among enterprise-wide information systems. An individual's EHR encompasses a whole range of data preserved in comprehensive detail or summary form, including demographics, medical history, medication and allergies, immunization status, laboratory test results, radiology images, and billing information. The purpose of an EHR is to capture a complete and ongoing recording of a patient's treatment and wellness encounters, thereby automating and streamlining the workflow in healthcare settings for increased efficiency, improved information exchange fidelity for error reduction (and elimination), and increased safety and treatment effectiveness through evidence-based decision support, quality management, and outcomes reporting.
- **Electronic Medical Records (EMRs)** are electronic versions of the traditional paper-based patient charts, which are used by front-line organizations that deliver care such as hospitals and surgery clinics. An EMR tends to be part of a local stand-alone HIT system that allows storage, retrieval, and handling of records. The EMR forms the basic link in the EHR chain.
- **Electronic Patient Records (EPRs)** are synonymous with EHRs (see definition above).
- **Nurse Triage Systems** are electronic care-priority protocol applications that support health call center nursing staff, which in turn support patients that call an 800 number or a physician's office for advice on appropriate level-of-care recommendations and reliable health- and wellness-related education.
- **Payor-Based Records (PBRs)** are HIT applications of patient and group health transactions pertinent to the information needs of the various health plan sponsors. A PBR can include billing encounters or clinical information from care management interventions, claims, pharmacy, and provider data. Although less well known, PBRs typically have the broadest picture of an individual's healthcare transactions over a period of time and settings.
- **Personal Health Record (PHR)** refers to a document that is usually initiated and maintained by an individual. An ideal PHR provides a complete, accurate, and up-to-date summary of the health and medical history of an individual by gathering specific details from many personal and professional sources. An individual's PHR can allow someone who has the necessary electronic credentials to access and use the content for prescriptions, admissions, or other appropriate activities.

- **Predictive Modeling Applications** are software program modules that use existing health information such as claims data, common disease characteristics, and recovery projections to identify risks and predict probabilities of future clinical changes, utilization likelihoods, and financial trends for specified sub-groups of individuals and patients.

Note: Definitions for these terms were not defined in the 2008 and 2010 online survey questionnaires for two reasons: 1) it would have lengthened the surveys; and 2) it could have biased or confused the responders. Therefore, the survey team decided to keep these terms open-ended for the respondents and therefore did not define the terms in the survey questions.

Integration and Interoperability

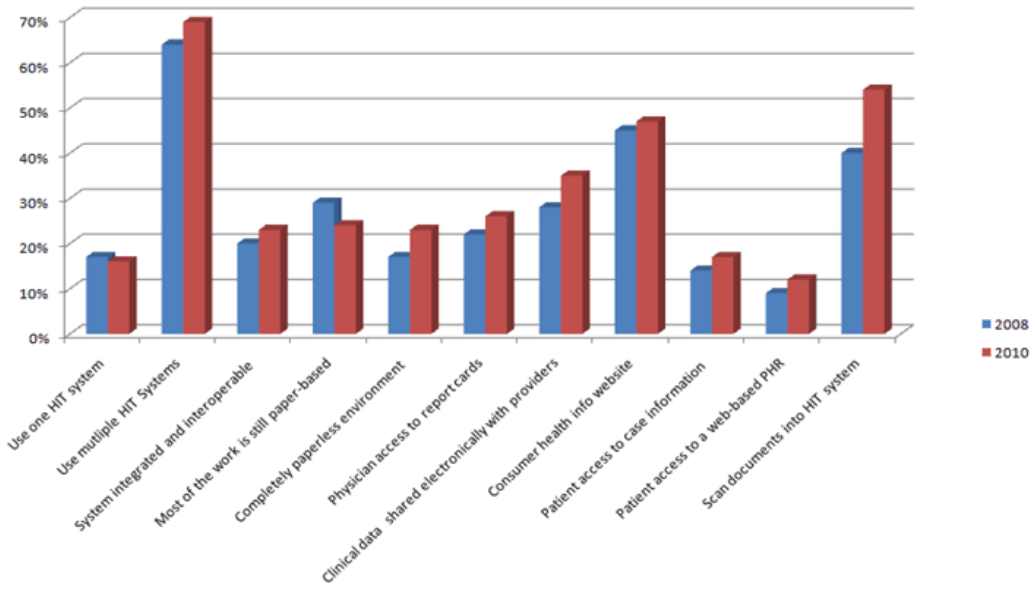
Integration Question Series

In both 2008 and 2010 online surveys, an 11-part question was included to gauge how integrated and interoperable the respondents' HIT systems are. As presented in Figure 4 and Table 5A (below) which summarizes the "Integration Question Series", the findings indicate modest gains occurred in most of the question's 11 Parts with a slight trend toward more integrated and interoperable environments.

Three analyses were run on this 11-part question. First, a "Large Respondent Pool" (or "Large Pool") analysis was performed for the two entire respondent pools (2008: n = 521; and2010: n = 670). Secondly, a sub-analysis was conducted of the "Direct Pool" responses for both years. Thirdly, a Care Management Pool sub-analysis of seven specific services was performed and reported in Table 5B. The Care Management Pool refers to CM, DM, UM, nurse triage and medical advice services (Nurse Triage), IROs, PBMs, and Behavioral health services.

Figure 4: Integration Question Series

Two-Year Comparison



In terms of the equivalency of the 2008 and 2010 Large and Direct Pools, the global trends are highly aligned and thus reinforcing. Between the two groups of survey participants, trends for eight of the question's 11 Parts show the same positive or negative directionality for each particular Part. Specifically, a negative direction trend appears only in Parts A and B, and positive direction trends are seen in Parts C, E, F, H, J, and K. For the question's two Parts that do not follow the same-direction trend (i.e., Parts G and I), respondents' answers in the Direct Pool indicated neutral, or 0% value, changes for 2010. As discussed below, Part D addressing the use of paper-based records is the sole topic in the Integration Question that does not confirm the change directionality between the Large and Direct Pools. As highlighted in the analysis for both the Large and Direct Pools, the comparisons for Parts C, E, F, J and K show moderate progress toward integration.

Table 5B presents the results of a separate sub-analysis that was run looking at the Integration Question Series for the Care Management Pool. For each Part of Table 5B, the highest value is underlined. When comparing the 2008 findings (the yellow column in Table 5B) with the seven different services in the Care Management Pool, the global patterns are the same as those in the 2010 Large Pool.

One finding in Part A of Table 5B is striking. No respondent affiliated with a company that offers nurse triage services reported that they use only "one information technology system." Furthermore, as seen in Part B, 95% of nurse triage respondents report they use multiple IT systems. These two data points underscore the anecdotal evidence that no care management software system has fully integrated a nurse triage component in the UM, CM, and DM modules.

According to the data in Table 5B, PBMs appear to have the most integrated platforms with six top percentages, followed by three top percentages for nurse triage, and one top response for IROs**.** According to Part D, IROs appear to be slightly out-pacing the other six care management services (and the 2010 Large Pool) in their ability to move away from paper-based systems (28.1%).

System Platform Details

Single IT System

In Part A of Table 5A, for the Large Respondent Pool, only one of six survey participants (16%) responded in 2010 that their companies use a single HIT system, an element that barely changed since 2008 (17%). In the Direct Pool, one in four respondents (28%) indicated in 2008 that they use a single HIT system, a decrease of six percent (6%) with one in five survey respondents (22%) reporting this in 2010. Clearly, the vast majority of respondents do not use one IT system despite the general wisdom that one integrated system is the most desirable option.

As highlighted in Part A of Table 5B and Figure 5 below, a similar trend was identified when examining the Care Management Pool with the exception of IROs. For the other six types of care management services, the percentage of respondents reporting that they use one IT system was lower than both the 2008 and 2010 four points of measurement. Participants from IROs reported the same level of use in Part A as was reported in the 2008 Large Pool (17.5% and 17%, respectively). While still a low percentage, the 17.5% for IROs indicates a much larger degree of penetration than reported by any other services in the Care Management Pool. Investigation of this circumscribed population may present interesting insights into the qualities and characteristics that promote the adoption of a single IT platform.
(Skip to next page for Table 5A)

TABLE 5A: INTEGRATION QUESTION SERIES

Please indicate which statements apply to your organization's information management practices

Large & Direct Pool Comparisons

(Respondents could select more than one option)

11-Part Question	Entire "Large Pool" Population N = 521 (2008) N = 670 (2010)			"Direct Comparison" Population Completed 2008 & 2010 N = 64		
Parts A through K	**2008**	**2010**	**Change**	**2008**	**2010**	**Change**
A. We only use one information technology system	17%	16%	(1%)	28%	22%	(6%)
B. We use multiple information technology systems	64%	69%	5%	55%	57%	2%
C. Our information technology system(s) is/are fully integrated and interoperable with other external IT applications	20%	23%	3%	20%	22%	2%
D. Even though our company uses one or more health information technology applications, most of the work still gets done through paper-based record tracking and documentation (e.g., traditional patient files)	29%	24%	(5%)	26%	29%	3%
E. Our office has moved to a completely paperless environment regarding patient or care management records	17%	23%	6%	11%	15%	4%
F. Providers have access to report cards that show physician- and patient-specific compliance with reporting initiatives (e.g. HEDIS, Bridges to Excellence, Physician Quality Reporting Initiative)	22%	26%	4%	19%	28%	9%
G. Our clinical data can be shared electronically with other providers such as specialists, facilities, etc.	28%	35%	7%	24%	24%	—
H. We offer a website that provides health information to the general public	45%	47%	2%	51%	52%	1%
I. Consumers or patients can access their case information through our online portal	14%	17%	3%	17%	17%	—
J. We provide patients with access to a web-based personalized health record from a preferred vendor	9%	12%	3%	9%	14%	5%
K. We scan medical records, documents, and/or communications into our medical management information system	40%	54%	14%	38%	48%	10%

Note: Sub-numbering is present for analysis purposes only and was not present in the original surveys seen by participants.

TABLE 5B: INTEGRATION QUESTION SERIES

Please indicate which statements apply to your organization's information management practices

2010 Care Management Organizations Sub-Analysis

(Respondents could select more than one option)

	2008	2010	2010 Care Management Pool's Seven Services Break-out (Multiple service and response choices were permitted)						
	Large Pool Total	Large Pool Total	CM	DM	UM	Nurse Triage	IRO	PBM	Behav-ioral
N = Respondents	**521**	**651**	**277**	**113**	**146**	**57**	**57**	**43**	**62**
A. We only use one information technology system	17%	15.7%	12.3%	8.8%	6.2%	0%	17.5%	2.3%	3.2%
B. We use multiple information technology systems	64%	68.8%	73.6%	82.3%	86.3%	94.7%	73.7%	90.7%	87.1%
C. Our information technology system(s) is/are fully integrated and interoperable with other external IT applications	20%	22.7%	27.4%	30.1%	30.1%	42.1%	24.6%	46.5%	41.9%
D. Even though our company uses one or more health information technology applications, most of the work still gets done through paper-based record tracking and documentation (e.g., traditional patient files)	29%	24.4%	21.7%	15.0%	17.8%	19.3%	28.1%	14.0%	16.1%
E. Our office has moved to a completely paperless environment regarding patient or care management records	17%	23.2%	27.1%	34.5%	28.1%	35.1%	29.8%	32.6%	32.3%
F. Providers have access to report cards that show physician- and patient-specific compliance with reporting initiatives (e.g. HEDIS, Bridges to Excellence, Physician Quality Reporting Initiative)	22%	26.1%	29.6%	38.9%	37.0%	40.4%	29.8%	46.5%	38.7%

TABLE 5B: INTEGRATION QUESTION SERIES (Con't.)

Please indicate which statements apply to your organization's information management practices

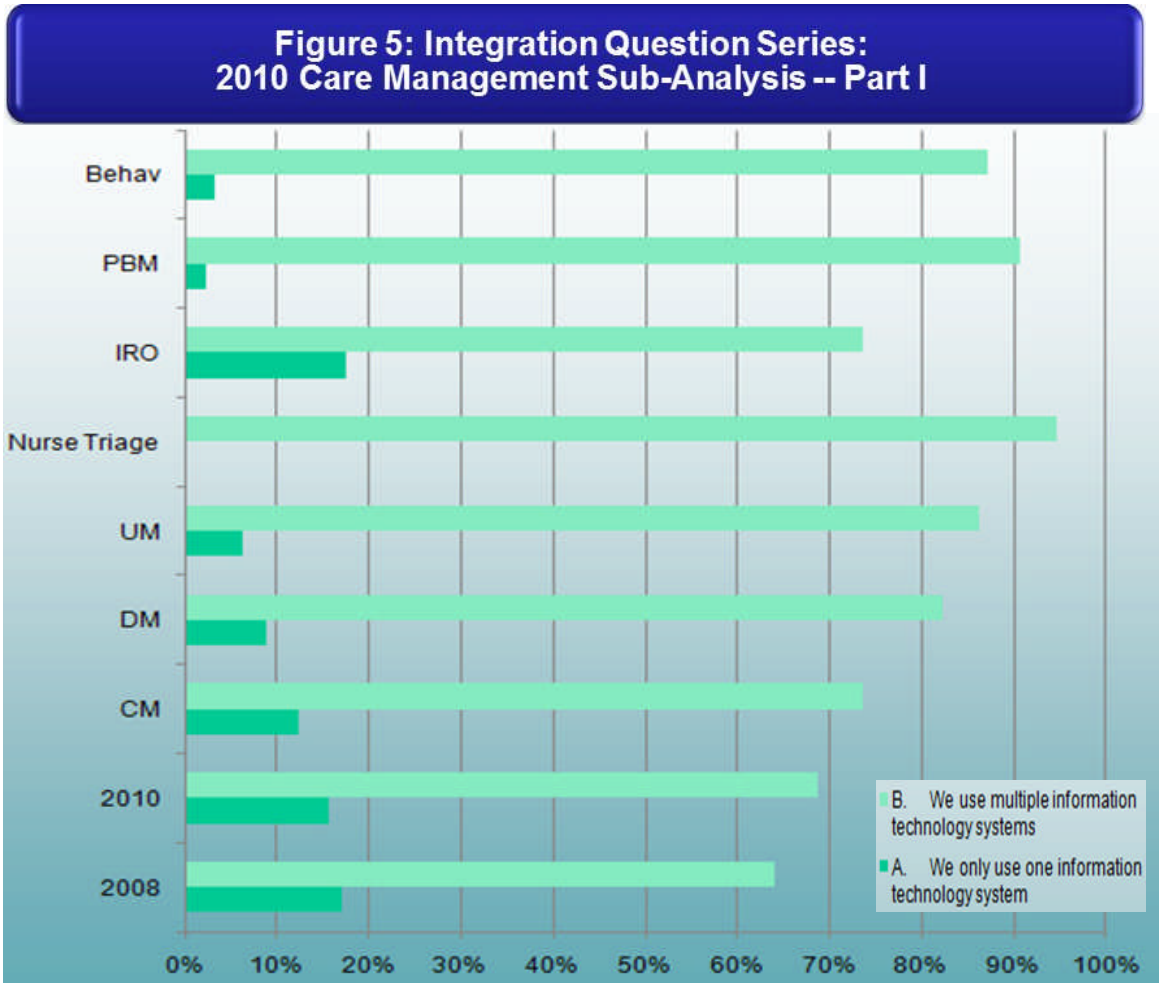
2010 Care Management Organizations Sub-Analysis

(Respondents could select more than one option)

	2008	2010	2010 Care Management Pool's Seven Services Break-out (Multiple service and response choices were permitted)						
	Large Pool Total	Large Pool Total	CM	DM	UM	Nurse Triage	IRO	PBM	Behav-ioral
N = Respondents	**521**	**651**	**277**	**113**	**146**	**57**	**57**	**43**	**62**
G. Our clinical data can be shared electronically with other providers such as specialists, facilities, etc.	28%	34.6%	33.6%	39.8%	34.9%	42.1%	28.1%	34.9%	32.3%
H. We offer a website that provides health information to the general public	45%	47.5%	49.1%	61.9%	58.2%	61.4%	47.4%	74.4%	66.1%
I. Consumers or patients can access their case information through our online portal	14%	16.6%	20.2%	30.1%	30.1%	36.8%	24.6%	46.5%	35.5%
J. We provide patients with access to a web-based personalized health record from a preferred vendor	9%	12.3%	17.7%	30.1%	23.3%	35.1%	15.8%	37.2%	33.9%
K. We scan medical records, documents, and/or communications into our medical management information system	40%	53.6%	54.5%	61.1%	65.8%	64.9%	54.4%	74.4%	58.1%

Multiple IT Systems

In contrast, the findings in Table 5B reveal that most companies continue to rely on multiple IT systems. For the Large Pool, the number of respondents who indicated their organizations use multiple HIT systems to support their "information management practices" expanded from 64% in 2008 to 69% in 2010, representing a 5% increase (see Part B, Table 5B). This increase may represents a loss of ground for some companies moving to integrated or single HIT platforms. For the Direct Pool, the same trend is detected in the analysis of the 64 respondents' selections. Specifically, an increase of 2% is reported in the use of multiple HIT systems from 55% in 2008 to 57% in 2010. The 2% increase in use of multiple HIT systems may reflect the Large Pool's reduction of fully integrated platforms.



As in Figure 5 for the Care Management Pool, the majority of participants across the seven different care management functions report the use of multiple HIT systems with a frequency ranging from 74% to 95%. Compared to the 2008 Large Pool (64%), the Care Management Pool's findings also indicate increases ranging from 10% to 30% (see Part B, Table 5B).

The survey findings highlight
that the 2008 Large Pool and the 2010 IRO group report the highest us of a single HIT system at 17% and 17.5% respectively. In contrast, the use of multiple HIT systems is much more common with at least two out of three respondents using more than one HIT system for all of both years and for all sub-groups.

The increase in reporting uses of multiple HIT systems appears to buck the current industry wisdom that more consumers will move away from multiple or fragmented systems and toward integrated ones. Perhaps this increase reflects an undesirable state of continuing disjointedness in HIT systems and lack of progress in HIT integration. In the alternative, the deployment of multiple HIT systems may be explained in part as a transitional phenomenon as many providers, facilities, and organizations are launching EMR and other electronic applications for the first time, and are interfacing with multiple data sources. In the short term, this might mean an organization must maintain more than one system during a period of transition, which may stretch into multi-year intervals before integration can be achieved. Still further in many healthcare settings there may be clinical or business reasons to host or use multiple HIT systems. More in-depth analysis is required to better understand the current HIT infrastructure trends, which is beyond the scope of this survey.

Fully Integrated IT Systems

Over the past two years in the Large Pool in Table 5A, a slight increase of 3% is seen in Part C regarding the number of HIT systems that are fully integrated and interoperable with other HIT applications. A 2% increase in Part C is reported by the Direct Pool as well. Specifically, 20% of both the Large and Direct Pools in 2008 indicated their HIT systems had fully integrated with external IT applications. In 2010, 23% of the Large Pool and 22% of the Direct Pool indicate this finding. Such modest gains are not only surprising but also disappointing given the imperative to accomplish this crucial interoperability among HIT and IT systems.

As reported in Table 5B, the respondents working for care management organizations across the board reported a higher level of system integration than the Large or Direct Pools. In fact, responses ranged between 5% and 16.5% higher for the 2010 Care Management Pool than the 20% response rate reported in the 2008 Large Pool.

Paper-Less Environments

Responses to two queries in Parts D and E (as reported in Table 5A) assess how many companies continue to rely primarily on paper-based systems. The results show mostly forward progress since 2008. In the first sub-question, respondents were asked whether most of their "work still gets done through paper-based record tracking and documentation" even though their company uses one or more HIT systems. The second sub-question asks whether their "office has moved to a completely paperless environment regarding patient or care management records." Clearly, the two questions are familiar with the first question stated from a negative frame of reference (Part D), and the second question from a positive perspective (Part E).

In 2010, less than one in four respondents report relying on paper-based processes. These findings represent forward progress on both questions (i.e., Part D 5% and Part E 6% improvement for the Large Pool when compared to 2008; and 3% and 4% respectively for the Direct Pool).

Less than one in five respondents affiliated with the seven care management services still rely on paper-based processes. In Table 5B, when compared to the 2008 and 2010 Large Pools, the results indicate that all care management company types, except IRO for the first question (i.e., Part D), show even more positive movement with less reliance on paper-based processes. For example, 10% to 18% increases are reported when compared to the 2008 Large Pool.

Sharing Clinical Information

Five of the 11 Parts of the Integration Question Series (Parts F-J, Table 5A) probe how survey participants share clinical information with providers and patients. For the 2010 Large Pool, almost one out of two respondents (47%) offer a website that provides health information to the general public representing the

highest response for the five "clinical information sharing" sub-questions; and only about one in five respondents (12%) provide patients with a web-based personal health record representing the lowest score.

For the Large Pool, improved sharing appears to be taking place for all five of these sub-questions during the past two years. For the Direct Pool, an increase is reported in three of out of the five (i.e., Parts F, H and J), with no gains reported for two sub-questions (i.e., Parts G and I). During the past two years, the average increase is about 4% across all five Parts for the Large Pool and an average 3% increase for the Direct Pool. In sum, no reverse trends were observed when comparing the 2008 and 2010 Large and Direct Pools for the five "information sharing" sub-questions.

For the Large Pool, the largest gain reported in the Integration Question Series is a 7% increase in Part G with affirmative responses when respondents were asked whether "clinical data can be shared electronically with other providers" (28% in 2008; 35% in 2010). For the Direct Pool, the largest gain reported is 9% in Part F, which indicated an increase in allowing providers to have access to report cards that show physician and patient performance information such as HEDIS scores (19% in 2008; 28% in 2010).

In addition, participants in the Care Management Pool reported steady gains for all five Parts that assess the sharing of clinical information as seen in Table 5B. When looking at the five measures (i.e., Parts F-J, Table 5B), increases are reported by respondents associated with all seven types of care management services. Specifically, this means all 35 of the 35 percentages reported show positive trend lines when compared to the respective 2008 Large Respondent Pool percentages. In addition, the Care Management Pool performed better than the 2010 Large Pool on four of the five measures, namely Parts F, H, I and J. The only feature for which the Care Management Pool shows mixed improvement across the seven services is Part G, which asked whether or not companies share their clinical data electronically with providers and others. For organizations providing CM, independent reviews, and behavioral health services, their respective percentages of 33.6%, 28.1% and 32.6% are better than the 2008 Respondent Pool (28%) but below the 2010 Respondent Pool average (34.6%). So in total the Care Management Pool out-performed the Large and Direct Pools in 67 out of 70 specific percentage comparisons for Parts F through J.[6]

Scanning Capabilities

Just over half of the 2010 Large Pool respondents report scanning medical records and other documents into their HIT system (Part K, Table 5A). The finding yielded the largest gain is observed in the Integration Question Series. The responses indicate a 14% increase in the Large Pool and a 10% increase in the Direct Pool survey participants' abilities to scan medical records. The specific findings in 2008 were 40% of the Large Pool and 38% of the Direct Pool; and for 54% and 48% respectively. For the Care Management Pool, the use of scanning is even more prevalent (Part K, Table 5B). When compared to the 40% baseline established by the 2008 Large Pool, scores ranged from 54.4% to 74.4% for the different care management service types generating increases ranging from 14% to 35%.

A number of confounding variables likely impact whether an organization can move to a paperless environment. The type of organization, the scope of work, HIT infrastructure, and reimbursement methodologies all are factors that can play major roles as either incentives or barriers. However, tracking the "paperless" percentages over time for different types of organizations may serve as a general proxy for how the healthcare industry is progressing toward a more functionally-advanced HIT system.

[6] The total number of 70 comparison points is calculated as follows: seven care management services multiplied by five sub-questions = 35; and then 35 multiplied by two, for the 2008 and 2010 surveys, = 70.

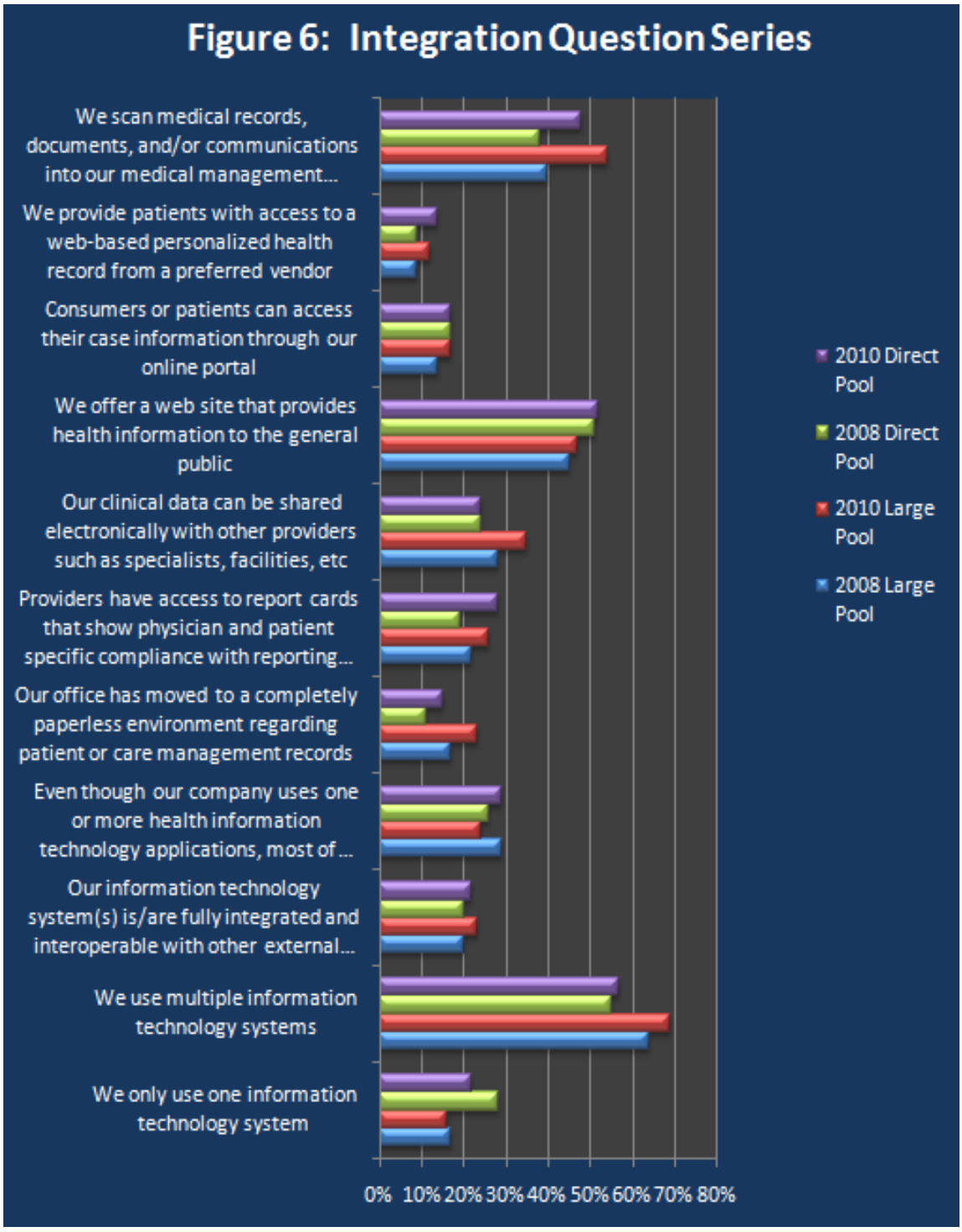


Figure 6 shows a graphic display of how the Large and Direct Pools performed to the 11 sub-questions associated with the Integration Question Series. Similar to the findings in Figure 4 for the Large Pools findings, this figure highlights that the same trends in most measures toward integration for the Direct Pools. Again, the only potentially mixed finding is the continued reliance on multiple HIT systems.

Respondent Feedback

In terms of 2010 respondent feedback, several observations are offered to provide insights relating to the challenges associated with HIT system integration.

One respondent's comment indicates the workplace setting can suffer loss of efficiency when trying to adapt to and accommodate different care management software systems. The survey participant stated, "As self-employed, it is very time-consuming using each CM account's technology system for work on that account."

In addition, streamlining workflows supporting HIT system are paramount, and can be frustrating, based on the following comments by two different respondents:

- "The current system makes us less efficient. Our current system is basically a UM system and we have several 'work a-rounds' for the CM process."
- "(HIT systems) are costly and unreliable, lots of down time and error messages. Scripts do not get to the pharmacy sometimes. What is needed is ONE UNIVERSAL IT system. Like a medical Facebook where all can access it at different levels of security. We still have a back-up paper system as the IT cannot accommodate many things and outside documents in original form. Scanning documents into the IT system is difficult and costly. We are still at a very premature stage."

Electronic Linkage Question Series

As highlighted in Table 6, the "Electronic Linkage Question Series" assesses what types of data elements are linked to respondent HIT systems. Generally, linking various data sources into HIT systems remains low for seven out of the eight sub-questions.

With the exception of linking with claims data (54%), system interoperability appears to be limited to less than one-third of the respondents for the other sources of information (i.e., pharmacy claims, laboratory/LOINC data, radiology data, information coming from a data warehouse, predictive modeling, consumer health information, and an electronic provider authorization system). However, slight gains are reported in linking when comparing the 2008 and 2010 Large Pools for four and of the six sub-questions that were asked both years. The two sub-questions asked both in the 2008 and 2010 surveys not showing an increase are linking to: 1) a data warehouse where a 1% decline was reported (28% in 2008; 27% in 2010); and 2) no change was reported for predictive modeling where 18% of the respondents reported a linkage.

In both 2008 and 2010, slightly over half of the respondents (53% in 2008; 54% in 2010) report they link to "claims payment data." For the two new sub-questions asked in 2010, 16% of the respondents indicate being linked to an "electronic provider authorization system" and 24% report being linked to "consumer health information."

While the overall increase averages 2% for the six sub-questions asked both years, the variations may represent differences that fail to reach statistical significance and are consistent with results seen in normal sampling error.

TABLE 6: ELECTRONIC LINKAGE QUESTION SERIES

Your clinical practice or medical management data are electronically linked to which of the following items?

(Respondents could select more than one option)

	2008	2010 (arranged most to least)	Change
Claims payment data	53%	54%	1%
Pharmacy claims	31%	35%	4%
Laboratory / LOINC data	29%	33%	4%
Radiology data	24%	28%	4%
Data warehouse	28%	27%	(1%)
A predictive modeling application	18%	18%	—
Consumer health information	n/a	24%	n/a
Electronic provider authorization system	n/a	16%	n/a

Generally speaking, the reported levels of linkage and interoperability with the data sources listed in Table 6 need to be improved if healthcare public policy goals are to be met over the next several years. Notably, the majority of respondents fail to connect their HIT systems with seven out of the eight sub-questions as referenced above. A key issue, both from a technology and public policy perspective, is what can be done to promote further integration of HIT systems over time in a way that will drive a more seamless healthcare delivery system, create improved transactions, and promote better outcomes?

Respondent Feedback about Electronic Linkage Issues

One respondent in 2008 presented an interesting perspective with the following description:

> "We work in several systems, which means documenting in several (systems), which takes time away from patient care. Info we do get is claims-based and not always accurate or mostly inadequate, so much time is spent looking and harvesting information. The right IT could make this much better……."

In terms of respondents' positive feedback in 2010, a respondent notes that "having the medical record attached to the claim makes it easier for me to do my job. I do not have to wait for the claim manager to get the information to me; I just access the claim and begin my job." Another individual added that HIT integration "does improve retrieval of information about past history, lab and radiology data."

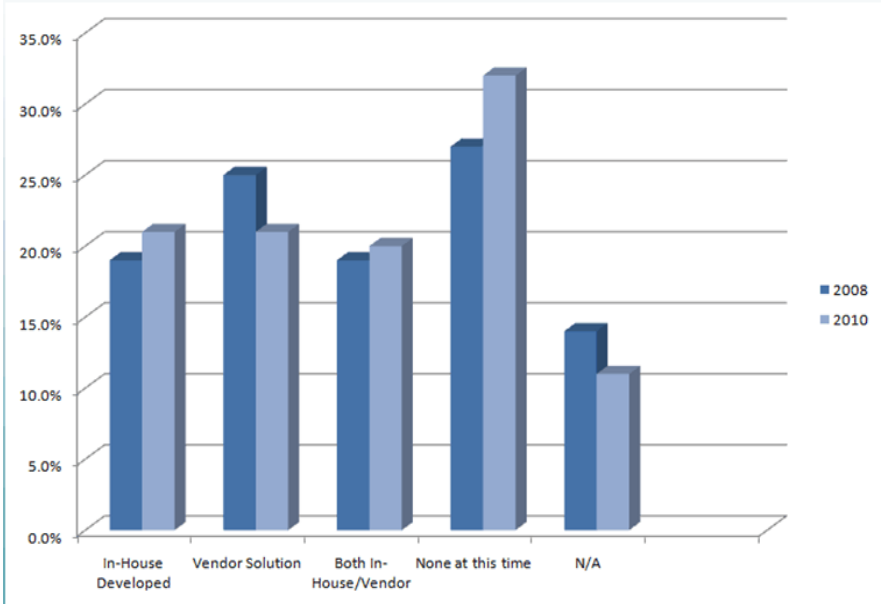
However, others expressed concerns when the process is not automated. For example, a respondent said, "At this time our system makes us less efficient. We are still doing paper documentation and data extraction for some care and reports as well as electronic. Cumbersome process and not patient-centric at all..." Another respondent expressed frustration by stating, "Our medical management data is not linked in any way to anything."

HIT System Source Overview

Medical Management System Source

The same percentage of respondents rely on vendor-based solutions, in-house developed solutions and hybrid approaches to support their respective care management software platforms as highlighted in Figure 7 and Table 7.

Figure 7: Do You Use a Medical Management Software System?



For 2010, responses are divided evenly between in-house developed systems (21%), vendor-based solutions (21%), and a hybrid approach (20%). In comparison to 2008, the 2010 results show a slight decrease of about 4% in the number of respondents who indicate using vendor-based solutions and a small increase of 2% in using in-house solutions.

TABLE 7: CARE MANAGEMENT SOFTWARE

Do you use a medical management software system?

Note: A medical management software system supports utilization management, case management, disease management, prevention/wellness and other types of medical management programs (Respondents could select more than one option)

	2008	2010	Change
In-house developed system	19%	21%	2%
Vendor solution	25%	21%	(4%)
Both in-house and vendor applications	19%	20%	1%
Sub-total	63%	62%	Combined (1%)
None at this time	27%	32%	5%
Not applicable to my work or company	14%	11%	(3%)
Sub-total	41%	43%	Combined 2%

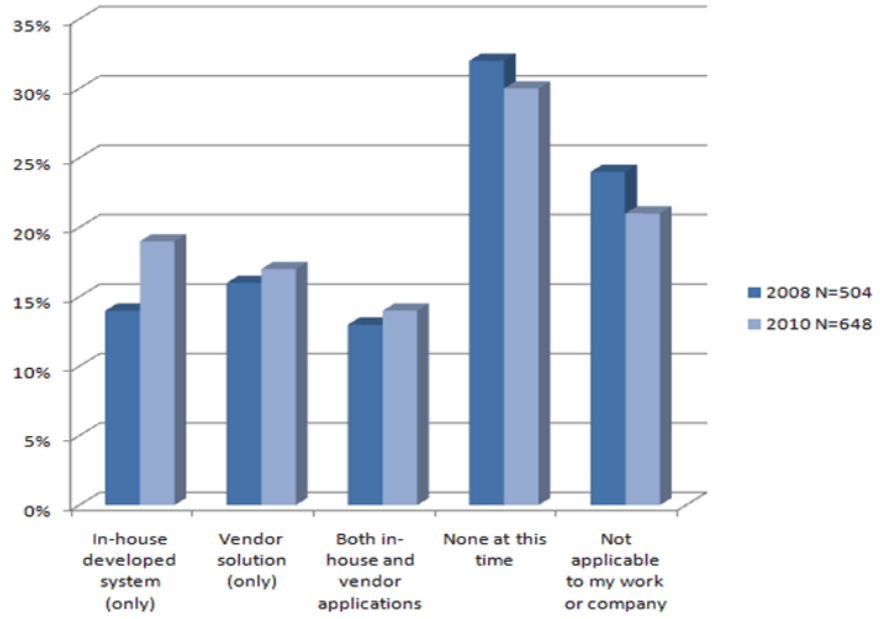
These slight differences between 2008 and 2010 results might be due to normal variations between the two respondent populations. For example, one salient factor might be the greater 2010 percentage of respondents who are: 1) case managers and are using care management software systems; 2) or working

for care management organizations -- when compared to the 2008 percentages. In addition, anecdotal evidence outside of this survey and in the HIT industry shows a shift toward the use of vendor-based solutions, as applications become more robust in supporting clinical workflows. However, these findings need to be further analyzed to document any particular trend(s).

Electronic Medical Record System Source

When looking at the source of EHR systems for the 2010 survey as highlighted in Figure 8 and Table 8 a mixture of platforms was reported. However, a slightly higher number of respondents report using in-house developed systems. Specifically, 19% of the respondents report using an in-house developed system, 17% a vendor-based solution, and 14% a hybrid approach.

Figure 8: Do You Use an EMR Software System?



In 2008, the percentages were 14%, 16% and 13%, respectively. These incremental increases totaling 7% (5% + 1% + 1%) demonstrate that, within these survey populations, a marginal rate of increase averaging 2% took place within the two-year interval with in-house developed systems appearing to remain the more popular choice.

This rate of change may be viewed as sluggish given the extent of the industry's need to automate medical records and the national imperative to do so through initiatives such as the "meaningful use" rebate program funded by the federal government. However, because of the small changes registered during the past two years, an inadequate comparison group may exist for making an informed comparison. The accuracy of this question may be further limited because respondents could select more than one answer and answers were self-reported.

In today's environment, one would expect to see a shift to vendor-based solutions for EMR applications. However, a respondent explained why that may not be the case when the individual commented, "(My) experience is the systems that are available are too expensive for my small rural practice to buy. It is cheaper to create our own in-house solutions." A big difference is the EMR systems are purchased by both small and large organizations that run or own hospitals, but are also used by small provider practices.

TABLE 8: ELECTRONIC MEDICAL RECORD SOFTWARE

Do you use an electronic medical record?

Note: An electronic medical record (EMR) is typically used by providers to collect and manage patient's health information

(Respondents could select only one option)

	2008 N=504	2010 N=648	Change
In-house developed system (only)	14%	19%	5%
Vendor solution (only)	16%	17%	1%
Both in-house and vendor applications	13%	14%	1%
Sub-total	43%	50%	7%
None at this time	32%	30%	(2%)
Not applicable to my work or company	24%	21%	(3%)
Sub-total	56%	51%	(5%)

HIT Function Question Series

Software Functionality

A primary research goal of the 2008 and 2010 HIT surveys is to assess the impact of technology on clinical workflows and the specific capabilities of EMR and care management software applications. Therefore, the survey asked the respondents about key functions associated with their care management systems.[7] In Figure 9 and Tables 9A and 9B, "Attribution Question Series" includes 15 sub-questions in 2008 and 17 in 2010 regarding the topic of software functionality. Two sub-questions (aka "Parts") were reworded from 2008 to 2010, and two new ones were added in 2010.

For the Large Pool as reported in Table 9A, 13 identical sub-questions were asked both in 2008 and 2010. Of those 13 Parts, five responses show a slight increase over the two-year period and eight responses show a slight decrease.

Care Management Functions, Global Observations

A sub-analysis of the Attribution Question Series for the Care Management Pool was run for the 17 sub-questions asked in 2010. The results are highlighted in Table 9B and discussed below.

Overall, organizations offering care management services out-performed the 2010 Large Pool. Specifically, respondents in the Care Management Pool report higher percentages in 95 of 119 responses.[8] Care management organizations appear to be ahead of the 2010 Large Respondent Pool in the majority of the attribution question's Parts, except in four Parts in which most Care Management Pool organizations lag behind the 2010 Large Pool average.

The CM software system functions in which the Care Management Pool organizations ***appear to lag slightly behind*** the 2010 Large Pool include the following 24 (24 = 119 minus 96) benchmarks as seen in Table 9B:

- Nurse Triage's use of generating online standard reports (Part G);
- CM, UM, Nurse Triage, and Behavioral Health's ability to produce standard reports (Part J);
- CM's reliance on dashboard reporting (Part K);
- Nurse Triage and Behavioral Health's ability for case managers to track and report time (Part L);
- All care management services (except CM) to allow case managers to spend more time with their patients (Part M)
- Nurse Triage, IRO, PBM and Behavioral Health to keep track of follow-up action items (Part N)
- CM's ability to calculate patient severity and acuity (Part R)
- UM, Nurse Triage, IRO, PBM and Behavioral Health's ability to calculate patient caseloads (Part S).

PBMs scored the highest adoption percentage on seven of the 17 sub-question Parts listed in Table 9B. For the remaining 10 Parts, in terms of the highest adoption rate, respondents affiliated with DM services had three of the highest relative percentage scores, and respondents associated with CM, Nurse Triage, and IRO services each scored two of the highest rankings. Companies offering UM had the highest ranking for one Part dealing with follow-up action items (Part N, Table 9B). The only care management service that did not receive a highest performance ranking among the Care Management Pool is behavioral health.

[7] Whereas the Attribution Question Series (Tables 9A and 9B) focuses more on the functions of care management software systems, the Integration Question Series (Tables 5A and 5B) is more open-ended and focuses on HIT systems in general.

[8] 17 attribute question Parts multiplied by seven types of organizations included in the Care Management Pool for a total of 119 units of measurement.

Figure 9: Attribution Question Series 2008 and 2010 Large Pool Comparison

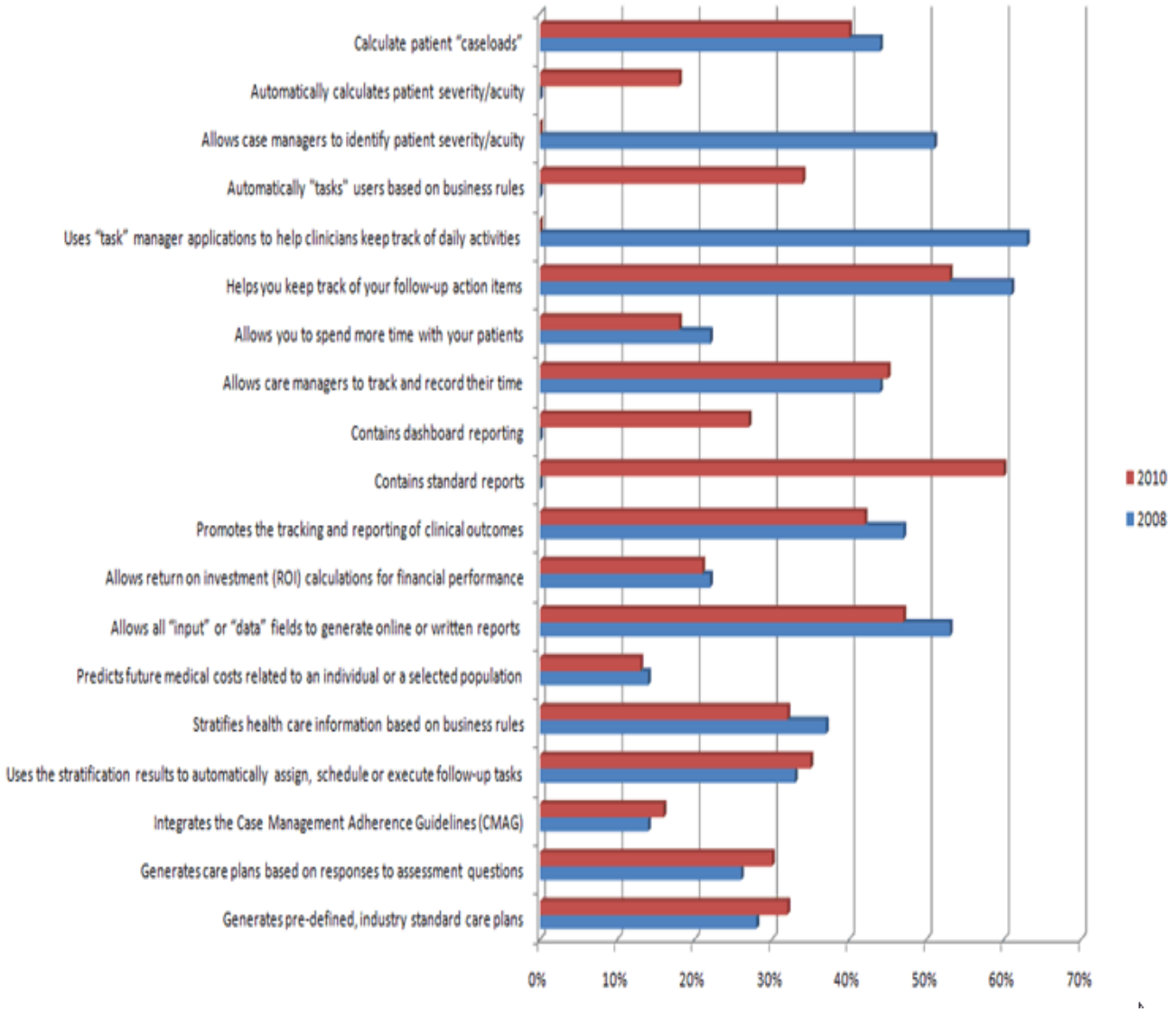


TABLE 9A: CARE MANAGEMENT SYSTEM FUNCTIONS

Please indicate the attributes of your care management software application that you use?

Large Pool Analysis

(Respondents could select more than one option)

	2008	2010	Change
Assessments and Care Plans			
A. Generates pre-defined, industry standard care plans for asthma, diabetes, and other conditions	28%	32%	4%
B. (Automatically) generates care plans based on responses to assessment questions	26%	30%	4%
C. Integrates the Case Management Adherence Guidelines (CMAG) to help case managers assess a patient's readiness to change	14%	16%	2%
Stratification and Predictive Modeling			
D. Uses the stratification results to automatically assign, schedule or execute follow-up tasks (e.g., such as sending out a letter and/or scheduling a phone call on a "to do" list)	33%	35%	2%
E. Stratifies healthcare information based on your business rules to promote population-based screening and/or identify potential candidates for case or disease management	37%	32%	(5%)
F. Predicts future medical costs related to an individual or a selected population	14%	13%	(1%)
Reports			
G. Allows all "input" or "data" fields to generate online or written reports so you can track an array of clinical and financial benchmarks	53%	47%	(5%)
H. Allows return on investment (ROI) calculations for financial performance	22%	21%	(1%)
I. Promotes the tracking and reporting of clinical outcomes	47%	42%	(5%)
J. Contains standard reports	n/a	60%	n/a
K. Contains dashboard reporting	n/a	27%	n/a
Time Management			
L. Allows care managers to track and record their time	44%	45%	1%
M. Allows you to spend more time with your patients	22%	18%	(4%)
N. Helps you keep track of your follow-up action items	61%	53%	(9%)
Scheduling			
O. Uses "task" manager applications to help clinicians keep track of daily activities and other key functions such as automated scheduling follow-up with patients	63%	n/a	n/a
P. Automatically "tasks" users based on business rules	n/a	34%	n/a
Severity & Acuity			
Q. Allows case managers to identify patient severity/acuity	51%	n/a	n/a
R. Automatically calculates patient severity/acuity	n/a	18%	n/a
S. Calculate patient "caseloads"	44%	40%	(4%)

Note: Sub-numbering of Parts was added for this analysis; it was not present in the survey.

TABLE 9B: CARE MANAGEMENT SYSTEM FUNCTIONS

Please indicate the attributes of the care management software application you use?

2010 Care Management Pool Sub-analysis

(Respondents could select more than one option)

N = Respondents	2010 CM Pool Total	The Care Management Pool's Seven Company Types Break-out						
		CM	DM	UM	Nurse Triage	IRO	PBM	Behavioral Health
	335	174	86	104	45	31	35	49
Assessments and Care Plans								
A. Generates pre-defined, industry standard care plans for asthma, diabetes, and other conditions	32.2%	34.5%	52.3%	35.6%	40.0%	35.5%	45.7%	40.8%
B. Automatically generates care plans based on responses to assessment questions	30.1%	34.5%	52.3%	39.4%	42.2%	35.5%	45.7%	40.80%
C. Integrates the Case Management Adherence Guidelines (CMAG) to help case managers assess a patient's readiness to change	16.1%	19.5%	24.4%	20.2%	22.2%	29.0%	28.6%	18.4%
Stratification and Predictive Modeling								
D. Uses the stratification results to automatically assign, schedule or execute follow-up tasks (e.g., such as sending out a letter and/or scheduling a phone call on a "to do" list)	35.2%	39.7%	53.5%	44.2%	46.7%	41.9%	60.0%	44.9%
E. Stratifies healthcare information based on your business rules to promote population-based screening and/or identify potential candidates for case or disease management	32.2%	37.9%	54.7%	46.2%	55.6%	45.2%	57.1%	55.1%
F. Predicts future medical costs related to an individual or a selected population	13.1%	17.8%	24.4%	22.1%	24.4%	29.0%	28.6%	20.4%

TABLE 9B: CARE MANAGEMENT SYSTEM FUNCTIONS (Con't.)

Please indicate the attributes of the care management software application you use?

2010 Care Management Pool Sub-analysis

(Respondents could select more than one option)

N = Respondents	2010 CM Pool Total	The Care Management Pool's Seven Company Types Break-out						
		CM	DM	UM	Nurse Triage	IRO	PBM	Behavioral Health
	335	174	86	104	45	31	35	49
Reports								
G. Allows all "input" or "data" fields to generate online or written reports so you can track an array of clinical and financial benchmarks	46.6%	48.9%	54.7%	52.9%	42.2%	51.6%	57.1%	55.0%
H. Allows return on investment (ROI) calculations for financial performance	21.2%	26.4%	32.6%	24.0%	42.2%	29.0%	37.1%	22.4%
I. Promotes the tracking and reporting of clinical outcomes	41.8%	45.4%	46.5%	48.1%	40.0%	48.4%	48.6%	44.9%
J. Contains standard reports	59.4%	55.2%	55.8%	62.5%	55.6%	61.3%	62.9%	55.1%
K. Contains dashboard reporting	26.9%	21.8%	33.7%	28.8%	35.6%	32.3%	37.1%	28.6%
Time Management								
L. Allows care managers to track and record their time	44.8%	46.6%	46.5%	45.2%	44.4%	48.4%	51.4%	36.7%
M. Allows you to spend more time with your patients	18.5%	19.5%	15.1%	15.4%	13.3%	9.7%	14.3%	16.3%
N. Helps you keep track of your follow-up action items	53.1%	56.9%	57.0%	57.7%	46.7%	45.2%	42.9%	44.9%
Scheduling (Note: Part O from Table 9A not applicable)								
P. Automatically "tasks" users based on business rules	33.7%	35.1%	53.5%	45.2%	51.1%	48.4%	57.1%	49.0%
Severity and Acuity (note: Part Q from Table 9A not applicable)								
R. Automatically calculates patient severity/acuity	18.2%	17.8%	22.1%	20.2%	20.0%	19.4%	22.9%	22.4%
S. Calculate patient "case loads"	39.7%	41.4%	40.7%	37.5%	37.8%	38.7%	37.1%	36.7%

Functionality Observations

The changes in the Attribution Question Series, whether positive or negative, are relatively small and could be the byproduct of sampling bias or the structure of the survey questions – versus the actual change in HIT functions.

However, it is more likely the positive-change percentages in Table 9A probably signal real appreciation in functionality. These functions include the following: pre-defined, industry standard care plans for asthma, diabetes, and other conditions; automatic generation of care plans based on responses to assessment questions; integrating CMAG to help case managers assess a patient's readiness to change; using stratification results to automatically assign, schedule or execute follow-up tasks; and predicting future medical costs related to an individual or a selected population.

Additional analyses are provided in the following eight subheadings for the Attribution Questions Series.

Care Plans

In terms of generating care plans, responses to Parts A and B in Table 9A appear to indicate a combined 8% increase in software systems that produce "care plans" based on either "pre-defined, industry standard" criteria or "responses to assessment questions." In both surveys, about one third of the respondents provided affirmative responses, specifically, 26% (n = 146) in 2008 and 30% (n = 210) in 2010. This combination appears to indicate a positive trend. The increased ability to generate care plans may reflect the trend of creating customized care treatment plans that are based on risk-assessments, clinical guidelines, and other resources. With the move to complex-condition management strategies that often factor in multiple co-morbidities for patients, care plans become a central strategy for identifying and managing CM and DM interventions.

For the Care Management Pool as reported in Table 9B, notably higher adoption rates are reported for the seven company types. Disease management organizations reported the highest use of generating care plans, with a 52% adoption rate both for Parts A and B. Although participants in these CM organizations report increased percentages, which implies higher rates of adoption, than the 2008 and 2010 Large Pool averages, only one in three CM company respondents report using automated care plans in contrast to one in two DM company respondents.

CMAGs

About one in seven respondents (14% in 2008 and 16% in 2010 in Table 9A) report having integrated the Case Management Adherence Guidelines (CMAG)[9] into their care management software applications (Part C, Table 9A). The CMAG provides care managers with tools to assess a patient's current level of medication adherence as reflected by adherence intention. Adherence intention is an attribute calculated on a matrix of "motivation" (such as readiness to change) and "knowledge" (such as health literacy and medication knowledge). Each CMAG then provides an algorithmic approach with evidence-based tools to improve adherence intention and ultimately medication adherence. Similar to the increasing use of care plans, CMAGs also provide an important resource to the care management process by assessing a patient's readiness for change.

Again, the Care Management Pool analysis in Table 9B shows increased percentages that imply slightly higher adoption rates ranging from 18.4% for behavioral health to 29% for IROs. In the view of the survey team, specific variances between the seven company types carry less importance given that many of these respondents probably offer medical management services that overlap the care management services. A more in-depth analysis is required to understand the results concerning IRO respondents

[9] Source: http://www.cmsa.org/CONFERENCES/CaseManagementAdherenceGuidelinesCMAG/tabid/90/Default.aspx (accessed August 2, 2008).

answering the CMAG question in the affirmative. The assumption is that some of the IRO respondents are affiliated with companies also offering medical management services such as CM, DM or UM. If not, then there may be some confusion by the respondents as to what the CMAGs are since they were not defined in detail within the online survey questionnaire.

Population Stratification

The importance of using a population stratification tool or method is important today for several reasons including the need to prioritize limited resources in most care management settings as well as the expanding anecdotal evidence that stratifying populations can lead to better clinical outcomes. Predictive modeling and other stratification applications can help identify potential candidates for CM or DM interventions or for automatically assigning, scheduling, and executing follow-up tasks (such as sending out a letter and scheduling a phone call on a "to do" list).

As seen in Parts D and E in Table 9A, a minority of respondents report using a stratification application. Specifically for the Large Pools, about one in three respondents (37% and 33% in 2008; 32% and 35% in 2010, respectively) report using a population-based screening tool. The changes as reported in the responses between the two surveys appear to cancel one another's effects. Specifically, 37% in 2008 and 32% in 2010 for Part D and 33% in 2008 and 35% in 2010 for Part E produce a net 3% decrease, which is within the range of normal study variations and probably related to the differences in the two survey populations. So the Large Pool findings are mixed.

The Care Management Pool respondents report higher percentages of using population stratification tools when compared to both the 2008 and 2010 Large Pools. Higher adoption rates are seen in Table 9B ranging from about 40-60% depending on the type of care management services. In fact, the results are positive across all 14 measures (i.e., two questions multiplied by seven types of care management services). For example, over half of the respondents associated with PBMs and DM organizations report using a stratification tool. Interestingly, respondents for CM organizations report the lowest percentages when compared to the rest of the Care Management Pool. This likely is a byproduct of the reality that a higher percentage of care management firms are smaller and are not affiliated directly with larger organizations such as health plans.

Some survey respondents may have had limited knowledge about whether or not their organizations deploy population stratification applications, which in turn may have influenced the findings. However noting the overall findings in this sub-analysis, population stratification appears to remain an under-utilized function in care management software.

Predictive Modeling

A similar trend is found in the use of predictive modeling applications, which is a form of population stratification used to predict future costs and the incidence of disease. For the Large Pools, responses about predictive modeling functions decreased by 1% from 14% in 2008 to 13% in 2010 (Part F, Table 9A). Specifically, just over one in ten respondents report in 2010 that their HIT systems predict future medical costs related to an individual or a selected population. However, for the 2010 Care Management Pool, each of the seven types of care management offerings shows a higher adoption rate when compared to the 2008 and 2010 Large Respondent Pools (Part F, Table 9B).

Although the questions are not identical in 2008 and 2010 (see Tables 10 and 11, respectively), survey participants who indicated using a predictive modeling application were asked the original source or type of source of their applications. All response percentages for 2008 are summarized in Table 10. In the simplest interpretation, at least one in four respondents (39%) for the entire survey pool in 2008 report using some type of a predictive modeling application.

TABLE 10: PREDICTIVE MODELING SOFTWARE

Do you use a predictive modeling system?

2008 Results

(Respondents could select more than one option)

	All Respondents	Only CMO Respondents
In-House	17%	27%
Vendor	11%	18%
Sub-total	28%	45%
Multiple Solutions	11%	16%
Sub-total	39%	61%
None	25%	21%
Not Sure	41%	29%
Total	105%	101%

In 2010, as seen in Table 11, modifications were made to the question about predictive modeling, which now assesses whether survey participants use a predictive modeling application or a data warehouse solution to support population stratification. Although direct comparisons between the 2010 results and the 2008 results are difficult to make, the use of predictive modeling applications appear to have remained about the same (39% in 2008 and 35% in 2010). Certainly the percentages of those who report not using predictive modeling applications remain constant (i.e., 25% in 2008 and 21% in 2010).

The findings for the standalone predictive modeling questions (as reported in Tables 10 and 11) are higher than the percentages reported in the larger Attribution Series Question Part F. This is likely due to how the questions are worded and that three separate population pools answered each question (i.e., the N value). For example, the Part F question is limited to predictive modeling applications within care management software systems, and the other predictive modeling questions (in Tables 10 and 11) are open-ended. That is why the values should be and are higher for the latter questions. Nevertheless, predictive modeling applications are reported to be used in only a minority of the respondents for all questions.

TABLE 11: PREDICTIVE MODELING SOFTWARE

Do you use a predictive modeling or data warehouse solution to support population stratification?

2010 Results

(Respondents could select more than one option)

	N = Respondents	Percentage of Respondents
Yes, we use an in-house developed application	136	21%
Yes, we use a vendor solution	94	14%
Sub-total	230	35%
No, we do not use a predictive modeling or data warehouse system	134	21%
Not applicable / Not sure	301	46%
Vendor solution – if so, what is the application?	38	6%

In terms of the Care Management Pool sub-analysis (Part F, Table 9B), respondents associated with organizations offering case management services report a higher rate of predictive modeling applications to project future medical costs than the Large Pools (17.8% compared 14%/13%). However, the 17.8% rate for case management services is the smallest percentage when compared to the six other types of care management services.

The growth of and reliance on predictive modeling as a population-based screening tool to identify potential individuals for CM and DM interventions has become an essential intervention to promote optimal client care. Risk stratification based on future clinical and financial factors is poised to play a critical role in the care management process. As a reminder of the importance of population stratification and predictive modeling tools, a respondent notes: "In my past experience we developed a Predictive Modeling triage model and I believe it assisted in getting to the right people prior to medical emergency."

Return on Investment & Clinical Outcomes

When asked about reporting functions, 47% of the survey participants in 2010 note their systems allow them to use all "input" and "data" fields to generate online or written reports (see Table 9A, Part G). The 2010 response rate represents a 5% decrease in the 53% response rate in 2008. While the lack of a significant positive change is disappointing to those expecting rapid growth, the findings may be the result in part from normal variations in sampling methods between the two surveys.

For the Care Management Pool sub-analysis reported in Table 9B, mixed results are observed when compared to the 2008 Large Pool response rate of 53%. Only respondents offering DM, PBM and behavioral health services outpace the response rates for both the 2008 and 2010 Large Pools (see Table 9B, Part G) with percentages ranging from about 55- 57%.

Only about one in five respondents (22%) noted in 2008 that they could obtain return on investment (ROI) calculations for financial performance (Part H, Table 9A). The 2010 response rate was about the same for the same sub-question (21%). Based upon these results measuring system-generated ROIs, one would assume that most ROI calculations must be done manually or in a semi-automated fashion by health plans and other healthcare organizations due to request for proposal (RFP) and on-going client requirements.

A greater percentage of respondents report their care management systems promote the tracking and reporting of clinical outcomes (Parts I, Table9B). Just over one in four respondents report the ability to track and report clinical outcomes (47% in 2008; 42% in 2010). Again, a 5% drop was reported over the past two years, which is either due to sampling variation or is otherwise inconclusive.

For the Care Management Pool in Table 9B, consistently higher results are reported for Part H when compared to the 2008 and 2010 Large Pools. For Part I, the Care Management Pool does less well when compared to the 2008 Large Pool. These seven company types out-perform the 2010 Large Pool as well, except for offering UM services.

While the need for ROI calculations and outcomes reporting are known to be critical business interests, lack of progress here may stem from the absence of a predominant definition and standardized method of tracking outcomes and calculating ROI within the healthcare industry, especially for care management interventions. Thus, as clarity around the definition and method of reporting outcomes and calculating ROI emerge, these functions can be incorporated into software applications and made available to companies and institutions alike.

Automated Reports & Dashboards

The overall ability of care management software systems to produce automated reports or rely on dashboards was also examined for the first time in 2010. As a result, two new questions were added to take a closer look at these reporting functions (Parts J and K, Tables 9A and 9B). For the Large Pool, 60% of the respondents indicate their systems are able to produce standard reports (Part J); and a smaller percentage (27%) indicated their care management software systems support the production of dashboard reports (Part K).

For the Care Management Pool, only UM, Nurse Triage, and PBMs of the seven included company types exhibit higher percentages than the 2010 Large Pool for the production of standard reports. In terms of dashboard reporting, all respondents affiliated with the care management services reported a higher implementation rate with the exception of case management. Whereas 27% of the 2010 Large Pool reported using dashboards, only about one out of five respondents (21.8%) affiliated with organizations offering case management services offers a dashboard.

The good news here is that most HIT systems appear to support the production of standard reports. This represents the highest score for the Attribution Question Series. It also is not surprising that the dashboard feature lags a little as enhanced user-interfaces have been emerging in recent years and represent new ways to view and sort data. The researchers believe that the use of dashboard will continue to expand at a brisk pace over the next several years.

Scheduling Tasks and Time Management

One of the most effective attributes of a care management software system is the ability to allow clinicians to track and bill their time for different clients, and ideally to allow case managers to spend more time with their patients. Five questions were asked in the Attribution Question Series (Parts L through P) to gain insight into the impact of HIT on actual workloads and workflows.

The first question attempted to assess the ability to track and record time. For the Large Pools, just under half of the respondents report that their respective HIT systems do support these reporting functions (Part L, Table 9A). The trend over the past two years appears to be unchanged (44% in 2008; and 45% in 2010). Similar results also were reported for the Care Management Pool sub-analysis in Table 9B.

While these findings hover just under 50% for each population pool analyzed, the hope is that the adoption rate will continue to expand over the next two years. Tracking case managers' time represents a dimension of care management software that should be incorporated widely to facilitate blending CM work with the standard suite of business metrics companies routinely monitor.

Perhaps the most disappointing response in the Attribution Question Series is the finding measuring how much direct time is spent with patients (Table 9A, Part M). While 22% of respondents in 2008 report their care management applications allowed them to spend more time with their patients, only 18% note that HIT systems support more patient interactions in 2010. For six out of the seven types of care management organizations (with the exception of CM), even lower percentages are reported (see Part M, Table 9B). A primary goal of implementing HIT applications is to increase efficiency and productivity to free case managers' time so they can work more directly on patient safety and quality issues. However, apparently this goal has not yet been achieved.

In both surveys, a related question was asked regarding whether the care management software system "helps you keep track of your follow-up action items" (Part N, Table 9A). In both years, over half of the participants (61% in 2008; 53% in 2010) responded in the affirmative. However, a sizeable 9% decrease appears to occur from 2008 to 2010.

As referenced in other anomalies above, this difference may be attributed to sampling variations in the two survey populations. Although a real diminishment in the functionality of care management software cannot be ruled out, it is unlikely. Similarly, lower percentages for the 2010 Care Management Pool are reported for all seven company types when compared to the 2008 Large Pool, and four out of seven when compared to the 2010 Large Pool (Part N, Table 9B).

In 2008, the highest response rate for the Attribution Question Series occurred in a question addressing "tasks" and "scheduling" functions (Part O, Table 9A). Specifically, in 2008, 63% of respondents indicated affirmatively that they "use 'task' manager applications to help clinicians keep track of daily activities and other key functions…for example, automated scheduling follow-up with patients." This question was changed in 2010 to assess whether care management software systems "automatically 'task' users based on business rules" (Part P, Table 9A). This phrasing was designed to focus more on automated tasking that allows more consistency and standardization of practice, while also being more efficient, since it is done automatically. A much smaller percentage (34%) of the respondents answered affirmatively in 2010 about automated tasking. Because of the question re-wording, a direct comparison is not recommended.[10]

For the Care Management Pool relating to whether their HIT system supports the automatic creation of tasks based upon business rules (Part P, Table 9B), all company types report a higher percentage when compared to the 2010 Respondent Pool. In fact, about one in two respondents associated with DM, Nurse Triage, PBM, and behavioral health report using automated tasks within their care management software applications.

Severity and Acuity

The ability of care management software systems to calculate patient acuity directly or to support patient acuity indirectly is becoming more important as workloads increase and workflows become more complex. In 2008, a question was asked about whether the care management software system "allows case managers to identify patient severity/acuity" (Part Q, Table 9A). Just over half of the participants in 2008 (51%) responded affirmatively. In 2010, the question was changed to ask if the HIT system "automatically calculates patient severity/acuity" (Part R, Table 9A). The response rate to the new question was lower with one out of five (18%) respondents answering in the affirmative. Again, the questions in 2008 and 2010 are different enough that a comparison should not be made. It also is clear that the lower response rate in 2010 is due in part to the emphasis on the automated calculation.

For the Care Management Pool, the 2010 responses are slightly higher than the Large Pool, with the exception of the CM category (Part R, Table 9B). This reinforces the trends highlighted earlier in this analysis where care management firms appear to be a few steps ahead of the 2010 Large Pool.

The final question in the Attribution Question Series addresses whether care management systems can calculate patient caseloads (Part S, Table 9A). Generally, one in four respondents answered in the affirmative, but responses to this sub-question decreased by 4% from 44% in 2008 to 40% in 2010. When looking at the Care Management Pool in terms of calculating caseloads, the results are roughly the same as the 2010 Large Pool (Part S, Table 9B).

Overall the two sub-questions asked in 2010 addressing severity and acuity highlight that more work still needs to be done to make sure that care management systems are more nimble in support of case managers and others who use these HIT systems and directly or indirectly support patients.

[10] While the new 2010 Part P received fewer affirmative responses, a direct comparison to the 2008 Part O cannot be made due to the change in wording. Yet, generating automated task lists is a function that most care management software applications should be readily designed to produce.

CM Software Attribution Summary

Overall, a slight decrease in the reported number of care management functions embedded in software over the past two years is evident. Yet, it is difficult to tell whether such a slight decrease is:

- An actual phenomenon that is tied to a real trend in the marketplace;
- The result of a better understanding by the respondents about what functions are included in their software programs;
- The byproduct of normal sampling variations between the survey populations;
- Due to methodological limitations associated with the online surveys; and/or
- Based upon some other unidentified cause.

Nevertheless, the importance of integrating care management functions is emphasized by a survey participant in 2008, who wrote this comment:

> "Currently, (we) have to do too much individual lookup to get a 'picture' of the case versus having a good/complete snapshot of the case when it is initially accessed, also (current) technology relies too much on each individual nurse having to remember too many steps for each case in trying to complete it, (there are) no prompts, no set care plans for specific diseases."

With only two of the 19 questions reported in Table 9A achieving a response rate of 50% or more (i.e., Parts J and N), an opportunity exists for most care management system vendors to upgrade the functionality of their software products. In addition, with the wide range of applications and different levels of functionality, prospective purchasers and software users must do their homework to make sure they become familiar with the functions that are really embedded and operational, versus the ones they hope are present. This is further reinforced because of the degrees of utility, and respondents' satisfaction with them, also vary widely, as discussed below.

Communication Automation Question Series

Communication Automation

A desired feature that consumers seek in HIT systems is the ability to automate key tasks, which are discussed in depth in the Attribution Question Series of Tables 9A and 9B. In addition, another set of questions asked both years examined if HIT systems can expand and automate communications (Tables 12A and 12B). The Communication Automation Question Series addresses correspondence to patients and providers generated through software systems using electronic letters, facsimiles (faxes), emails, text messaging, and telephonic communications (both outbound and inbound calls). The question was drafted exactly the same in both surveys.

Table 12A presents some of the most surprising results in the 2010 survey. There appears to be less reliance on HIT systems of all types to generate letters, faxes, emails and text messaging for both the Large and Direct Pools. The reduced-function pattern in these four communication techniques suggests these results are sizeable decreases in the respondent numbers that probably would reach statistical significance (that is, ones not created by sampling variation or random error).[11] Interestingly, the use of automated letters increased for the seven care management service categories as noted in Table 13B. Another exception to the downward trend was identified for respondents offering behavioral health services who are using electronic facilities. Interestingly, the response rates for the outbound and inbound calling systems are almost unchanged for the Large Pool and include a slight increase in the Direct Pool.

Declining trends for auto-generated letters, faxes, emails and text messaging within HIT systems appear to indicate a reversal in the expected growth in these four specific communication strategies and are somewhat of a mystery. This could be due to concerns over privacy and confidentiality regarding electronic communications, which in part is heightened by the increase of HIPAA enforcement by the federal government over the past several years. Another option to consider is that it reflects respondents' dissatisfactions with emerging software platforms that promised to perform these functions but failed to deliver them satisfactorily. If so, then vendors who successfully execute these important communication strategies have an important window of opportunity open to them.

In terms of relying on automated communications, a survey participant issued the reminder through the following quote that technology is not always the silver bullet people think it is:

> "(Our) system is organic, constantly changing. We tried an automated triage system and it was a disaster. Now we have a human answering the phone and give them scripts. We are in the process of integrating hospital and clinical EMR. They developed separately and only recently have clinic and hospital merged and the systems do not talk to each other."

[11] Because respondents could select multiple responses in both the 2008 and 2010 surveys, the selection totals exceeded the 2008 participant population (n = 561) and the 2010 population (n = 670). Specifically, the 2008 survey respondents' choices totaled 740 selections (142% of 561), and the 2010 survey choices totaled 744 selections (111% of 670). The 2008 and 2010 selection totals closely equal one another (740 and 744, respectively).

TABLE 12A: COMMUNICATION AUTOMATION QUESTION SERIES

Please indicate if your health information technology platform, care management software system or call center system automatically generates the following communications or correspondence to patients or providers?

Large and Direct Comparison Pool

(Respondents could select more than one option)

	Entire Population "Large Respondent Pool" N = 521 (2008)/N = 670 (2010)			"Direct Comparison Pool" N = 65		
	2008	**2010**	**Change**	**2008**	**2010**	**Change**
Letters	50%	42%	(8%)	50%	47%	(3%)
Electronic facsimiles (faxes)	32%	24%	(8%)	27%	23%	(4%)
Emails	29%	19%	(10%)	22%	3%	(19%)
Text messaging	9%	4%	(5%)	5%	0%	(5%)
Combined			(31%)			(31%)
Automated outbound calling system (e.g., will leave voice mail health tip or appointment reminder)	14%	14%	—	8%	11%	3%
Automated inbound calling system (e.g., automated prescription refill system	9%	8%	(1%)	2%	6%	4%

TABLE 12B: COMMUNICATION AUTOMATION QUESTION SERIES

Please indicate if your health information technology platform, care management software system or call center system automatically generates the following communications or correspondence to patients or providers?

2010 Care Management Pool Sub-Analysis

(Respondents could select more than one option)

	2008	**2010**	**The Care Management Pool Seven Company Types Break-out**						
			CM	**DM**	**UM**	**Nurse Triage**	**IRO**	**PBM**	**Beha-vioral**
N = respondents	521	639	269	107	140	56	57	43	61
Letters	50%	41.9%	50.9%	69.2%	62.1%	62.5%	56.1%	72.1%	77.0%
Electronic facsimiles (faxes)	32%	24.4%	23.4%	28.0%	26.4%	30.4%	24.6%	27.9%	32.8%
Emails	29%	18.6%	20.8%	17.8%	17.9%	23.2%	19.3%	23.3%	18.0%
Text messaging	9%	4.1%	2.6%	4.7%	2.9%	1.8%	1.8%	2.3%	4.9%
Automated outbound calling system (e.g., will leave voice mail health tip or an appointment reminder)	14%	14.6%	13.8%	26.2%	18.6%	21.4%	17.5%	30.2%	21.3%
Automated inbound calling system (e.g., automated prescription refill system	9%	8.0%	7.4%	15.0%	11.4%	16.1%	10.5%	20.9%	16.4%

Nurse Triage System Question Series

Nurse Triage Systems

As referenced in Figure 10, the 2010 survey examined telephonic nurse triage systems, which are sometimes referred to as the fourth leg of the medical management platform (see Table 13). Twenty-five percent of the survey participants indicate that they use an in-house nurse triage system, and much smaller percentages use a vendor or combined solution (9% and 4%, respectively). These findings demonstrate that this is an emerging market.

Most of these systems appear to function on a standalone basis. Specifically, a majority of participants (71%) reported that their respective telephonic nurse triage platforms are not "integrated" or "interfaced" with an HIT system (see Table 14). About three in 10 of the respondents (29%) report that their triage systems interface with a care management or electronic medical record software system.

The findings show that most respondents are not fully aware or do not understand the breadth and scope of the clinical guidelines and protocols used to support triage systems based upon the 2010 survey results as highlighted in Table 15. Only about 71 of 281 responses, or about 25%, specifically reference a clinical guideline. Perhaps, most of the respondents do not actively use their respective triage systems thereby making it difficult to report which specific clinical guidelines they use.

Figure 10: Does Your Company Offer a Telephonic Nurse Triage Service?
(Respondents could select more than one option, N = 648)

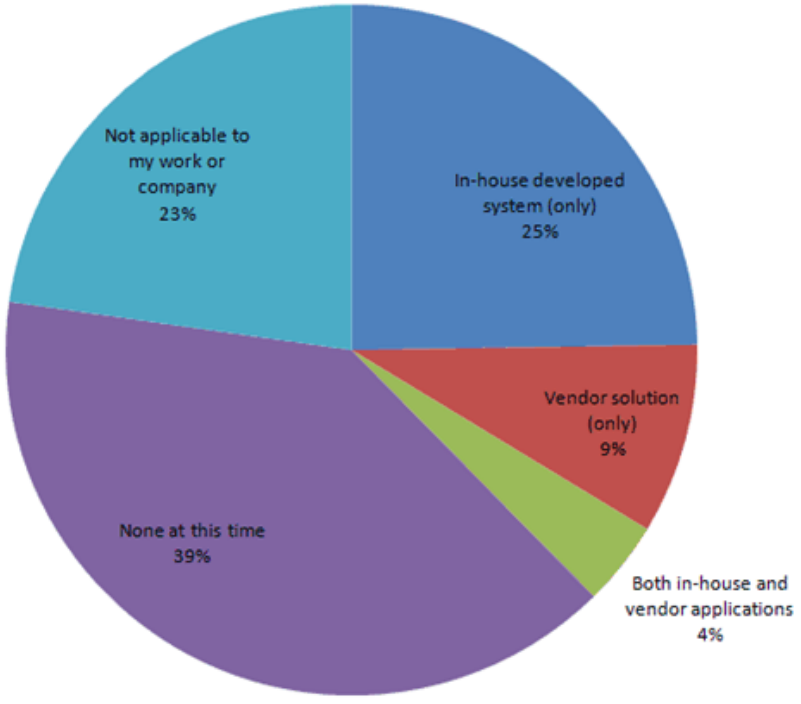


TABLE 13: NURSE TRIAGE OFFERING

Does your company offer a telephonic nurse triage service?

(Respondents could select more than one option)

	N = Respondents	Percentage of Respondents
In-house developed system (only)	163	25%
Vendor solution (only)	56	9%
Both in-house and vendor applications	24	4%
None at this time	258	40%
Not applicable to my work or company	147	23%
Total	648	

TABLE 14: NURSE TRIAGE INTEGRATION

Is your triage system integrated/interfaced with your care management or electronic medical record software system?

(Respondents could select one option)

	N = Respondents	Percentage of Respondents
Yes	65	29%
No	157	71%
Total	222	100%

TABLE 15: NURSE TRIAGE CRITERIA

What nurse triage clinical guidelines/protocols do you use in your software?

(Respondents could select more than one option)

	N = 2010 Respondents (arranged from most to least)	Change
Not applicable / Not sure	210	79%
Other, please specify	31	12%
Healthwise Knowledgebase	20	7%
CentraMax-McKesson	11	4%
Dr. Barton D Schmitt's pediatric triage protocols	5	2%
Dr. David A. Thompson's adult triage criteria	3	1%
Telephone Triage Protocols by Julie Briggs	1	—
TeleTriage Systems	0	—
Total	281	

Patient Communication Question Series

Patient Trends

In the 2010 survey, four different question sets were posed to assess the current and future use of several main communication channels with patients (Tables 16 and 17).

First, respondents were asked to report what types of communication options that most of their patients have access to as highlighted in Table 16. The majority of respondents noted that their patients have access to a cell phone (86%) and a computer at home (58%). In addition, about half reported that their patients have access to email (47%), and one in three respondents thought that most of their patients have access to a personal health record (29%). In addition, a slight majority of respondents agreed that their patients are more informed about their health status than they were more than two years ago.

TABLE 16: PATIENT COMMUNICATION OPTIONS -- OVERVIEW
Do most of your patients have access to or use the following items?
(Respondents could select more than one option)

	N = Respondents	Percentage of Respondents
Own a cell phone?	426	86%
Use a computer at home?	286	58%
Have an email account?	232	47%
Have access to a personal health record?	142	29%
Subtotal	1,086	
Are they more informed about their health status than they were two years ago?	277	56%
Additional Comment	53	11%
Total	1,416	

In the 2008 publication, researchers made the following conclusions:

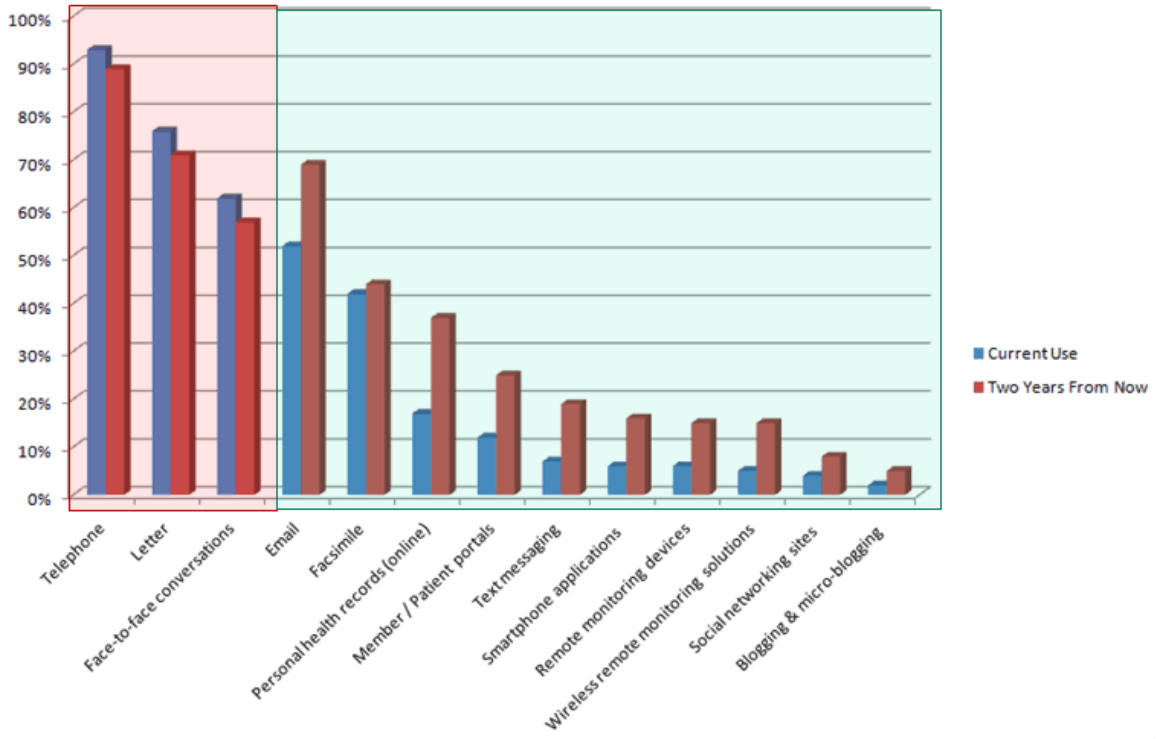
> "Automating care management communications is a complicated issue especially in terms of how technology can best be used to serve the patient, their attending provider, and the care manager. Generally speaking, it appears that most healthcare organizations are not using electronic or automated communications to optimize patient and provider engagement."

Respondents were also asked two more question sets about current and future use of communication options as detailed in Figures 11, and Tables 17A and 17B).

As summarized by Figure 11, the 2010 respondents appear to be prepared to move to a more dynamic array of communication links to support patients, including social media – as long as privacy concerns are addressed. For example, a decrease in telephone, letter and face-to-face conversations projected for 2012 for all company types is offset by ten alternative forms of communication strategies projected to reach an average 10% increase in use (positive-change percentage totals of 100% in Table 17A divided by 10). Specifically, respondents' expectations regarding uses of text messaging, 'smart phone' applications, and wireless remote monitoring approach a three-fold increase. For other communication options (specifically, personal online health records, member/patient portals, remote monitoring devices, social networking sites such as Facebook, and blogging and micro-blogging such as Twitter), respondents are predicting a two-fold or more increase in use.

Similar trends are evident for three types of care management organizations as highlighted in Table 18B covering case management, disease management and utilization management services. However, the results for face-to-face communications were mixed showing a smaller decrease when compared to all company types. Interestingly, companies offering care management services predict a higher rate of usage for the emerging communication links than the findings from the Large Pool in most cases. For example, 22.4% of respondents who are affiliated with organizations offering care managements predicted they would be using text messaging in comparison to 19.4% of the Large Pool.

Figure 11: Patient Communication Options
Currently & Two Years From Now



Interestingly, the respondents offering care management services still plan to use the telephone more than any other type of communication even though the slight decrease in usage is predicted over the next year. Letters will continue to be used by approximately eight out of ten respondents even though there is a predicted drop in Large Pool and the CM, UM and DM sub-groups. Emails will be picking up traction in all groups and approaching the 80% adoption rate by 2012.

Interestingly, the survey results suggest respondents expect a slight decrease in the future reliance on case managers to contact patients only by telephone calls, letters, and face-to-face interactions.[12] Recent negative press that Facebook received regarding its privacy policies (which often fail to optimize patient protection) should serve as a warning that, no matter what the medium, the imperative exists for case managers to remain informed communicators who are savvy about patient protections and potential breaches in privacy.

[12] Survey results to be published in June 2010, see www.tcshealthcare.com for details. Survey co-sponsored by ABQAURP, CMSA and TCS.

This trend could lead to less dependency on traditional modes of communication like telephones and letters and open up emerging modes of communications such as text messaging, blogging, and wireless monitoring solutions. One survey respondent highlights the potential benefit of using a wider array of communication options by commenting, "Using alternative forms of communication such as text messaging, can improve patient engagement levels which over time can improve clinical and financial outcomes."

Therefore, the 2010 respondents are predicting an increased versatility over the next two years regarding patients' use of emerging communication media such as email, text messaging, personal health records, 'smartphone' applications, remote monitoring connections, and other new communication options.

TABLE 17A: PATIENT COMMUNICATION OPTIONS
Currently and Two Years from Now
Please indicate the forms or types of communication that you "are currently using" or "plan on using two years from now" to communicate with your client/patients?
2010 Large Pool Analysis
(Respondents could select more than one option)

	Current Use	Two Years from Now	Negative Change	Notes
Telephone	93%	89%	(4%)	
Letter	76%	71%	(5%)	
Face-to-face conversations	62%	57%	(5%)	
			Positive Change	
Email	52%	69%	17%	
Facsimile	42%	44%	2%	
Personal health records (online)	17%	37%	20%	>2-fold increase
Member / Patient portals	12%	25%	13%	>2-fold increase
Text messaging	7%	19%	12%	Almost 3-fold increase
Smartphone applications e.g., iPhone, Blackberry	6%	16%	10%	Almost 3-fold increase
Remote monitoring devices	6%	15%	9%	>2-fold increase
Wireless remote monitoring solutions (e.g., pedometer, blood pressure device)	5%	15%	10%	>3-fold increase
Social networking sites such as Facebook	4%	8%	4%	2-fold increase
Blogging & micro-blogging such as Twitter	2%	5%	3%	2.5-fold increase
Other, please specify	3%	5%	2%	

TABLE 17B: PATIENT COMMUNICATION OPTIONS
Currently & Two Years from Now
Please indicate the forms or types of communication that you "are currently using" or "plan on using two years from now" to communicate with your clients/patients?
2010 Care Management Pool Sub-Analysis
(Respondents could select more than one option)

	Total Current	Total 2012	CM Current	CM 2012	DM Current	DM 2012	UM Current	UM 2012
N=Respondents	503	505	228	232	91	93	110	111
Telephone	92.6%	88.7%	97.8%	94.8%	96.7%	90.3%	96.4%	92.8%
Letter	75.9%	70.9%	86%	80.6%	89%	79.6%	86.4%	77.5%
Facsimile	41.7%	44%	44.7%	50.4%	46.2%	49.5%	48.2%	51.4%
Email	51.9%	69.3%	61%	79.3%	59.3%	78.5%	57.3%	77.5%
Text messaging	7%	19.4%	9.2%	22.4%	11.0%	23.7%	7.3%	18.0%
Social networking sites such as Facebook	4.2%	8.1%	4.4%	10.3%	7.7%	12.9%	7.3%	11.7%
Personal health records (online)	16.7%	37.4%	18.4%	38.8%	26.4%	48.4%	27.3%	50.5%
Smartphone applications e.g., iPhone, Blackberry	6.2%	15.8%	8.3%	19%	4.4%	12.9%	4.5%	12.6%
Blogging & micro-blogging such as Twitter	1.8%	5%	1.8%	6%	2.2%	9.7%	2.7%	9.9%
Remote monitoring devices	6. 2%	14.7%	6.1%	16.8%	11%	25.8%	6.4%	19.8%
Face-to-face conversations	62%	57.2%	49.6%	48.7%	31.9%	32.3%	35.5%	36%
Member/Patient portals	12.3%	24.8%	14.5%	28.4%	25.3%	40.9%	24.5%	43.2%
Wireless remote monitoring solutions (e.g., pedometer, blood pressure device)	4.6%	15.2%	5.3%	15.1%	9.9%	25.8%	6.4%	18.9%

For the fourth question relating to communication options, respondents provided information about their beliefs regarding their patients' sources of health information. Table 18 shows that at least one in three respondents (35% to almost 80%) reported that their patients rely on advice from primary care physicians (PCP), specialists, case managers, family and friends, and websites, as well as print and electronic media. The top three choices are PCPs (79%), specialists (65%), and case managers (64%). Since the majority of survey participants identified themselves as case managers, the act of self-selection must be taken under advisement. Only 6% of the respondents reported that they believe that their patients receive health information from online video sources such as YouTube. As YouTube and other online video search engines continue to grow, this will likely be a major source of health information in the future.

Table 18: SOURCES OF MEDICAL ADVICE
What sources of health information do most of your clients/patients typically rely on?
2010 Large Pool Results
(Respondents could select more than one option)

Type of health information	N = Respondents	Percentage of Respondents	Ranking
Advice from primary care physician (PCP)	520	79%	1
Advice from specialist	426	65%	2
Advice from case manager	422	64%	3
Advice from family or friends	369	56%	4
Health websites e.g., WebMD	298	45%	5
Print media e.g., magazines, books	266	40%	6
Electronic media e.g., television, radio	229	35%	7
Online video e.g., YouTube	40	6%	8
Not applicable / Not sure	79	12%	—
Other, please specify	22	3%	—

Consumer Health Information through Electronic Portals

It also is helpful to revisit three questions that were asked in the Integration Question Series as highlighted in Table 5A. When asking what communication links that their organization or HIT system provides in the 2010 survey:

- Less than half of the respondents (47%) offer health information to the general public via a website (Part H);
- About one in six respondents (17%) report that consumers and patients can access their case information through an online portal (Part I); and
- About one in seven (12%) note that their patients have access to web-based PHRs from a preferred vendor.

According to these respondents, organizations offering care management services score slightly higher adoption rates on all three metrics above. Although many new reports and studies have shown that consumers consult the Internet to become more knowledgeable about their health conditions, opportunities still exist for improvement.

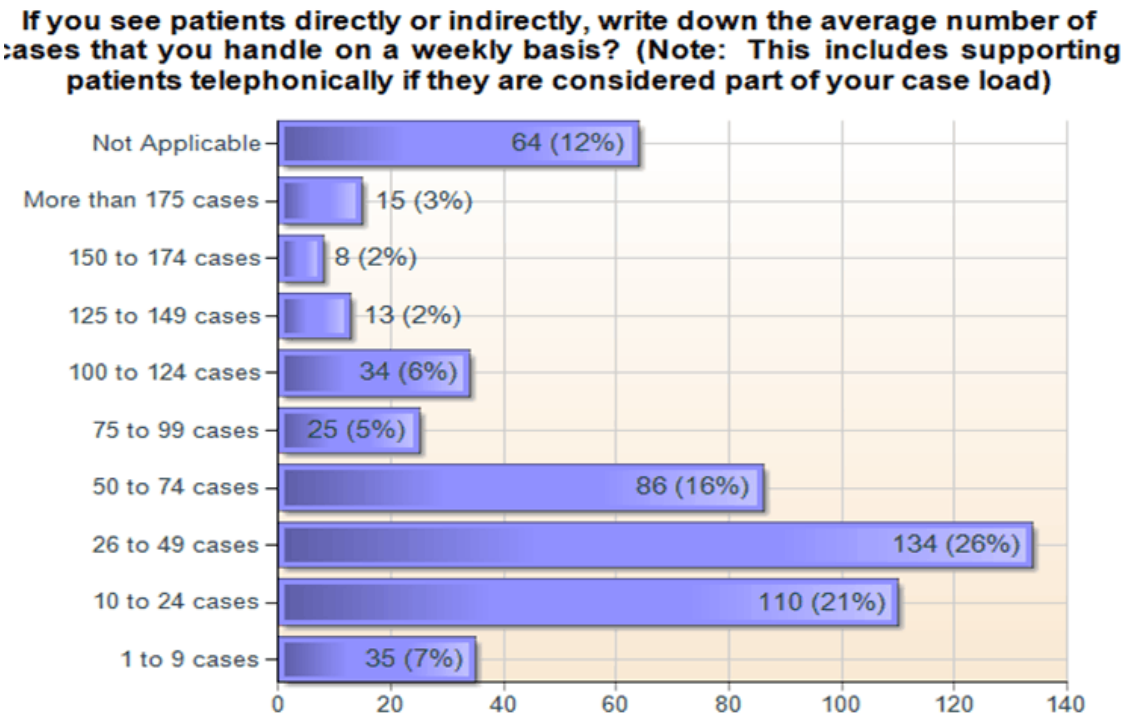
Caseload and Activity Question Series

Caseloads

For many clinical practitioners in a variety of healthcare settings, including case managers, concerns about expanding caseloads have become more prevalent. Therefore, the 2010 survey asked respondents whether their HIT systems calculate caseloads and questions about assessing the average size of patient caseloads.

Figure 12: Caseload Levels

2010 Large Pool Results



As reported in Table 9A Part S, 40% of the respondents in 2010 indicate their HIT systems "calculate caseloads." Two years earlier, this percentage was 44% — a four percent (4%) decrease appeared to occur.

On a second more direct question assessing caseloads, survey participants were asked, "If you see patients directly or indirectly, write down the average number of cases that you handle on a weekly basis." Respondents were instructed in the question to include telephonic communication as part of a caseload. Beyond this brief note, nothing more was defined for this question.

Whereas the second question was drafted to be somewhat open ended, the third caseload question was designed to delve into more detail by asking for caseload descriptions. Respondents were asked to indicate on a scale of 1 to 5 how much time they spend with patients and performing other duties on a weekly basis. The Lickert scale range was "1 = no time" on the low end and "5 = all of your time" on the high end.

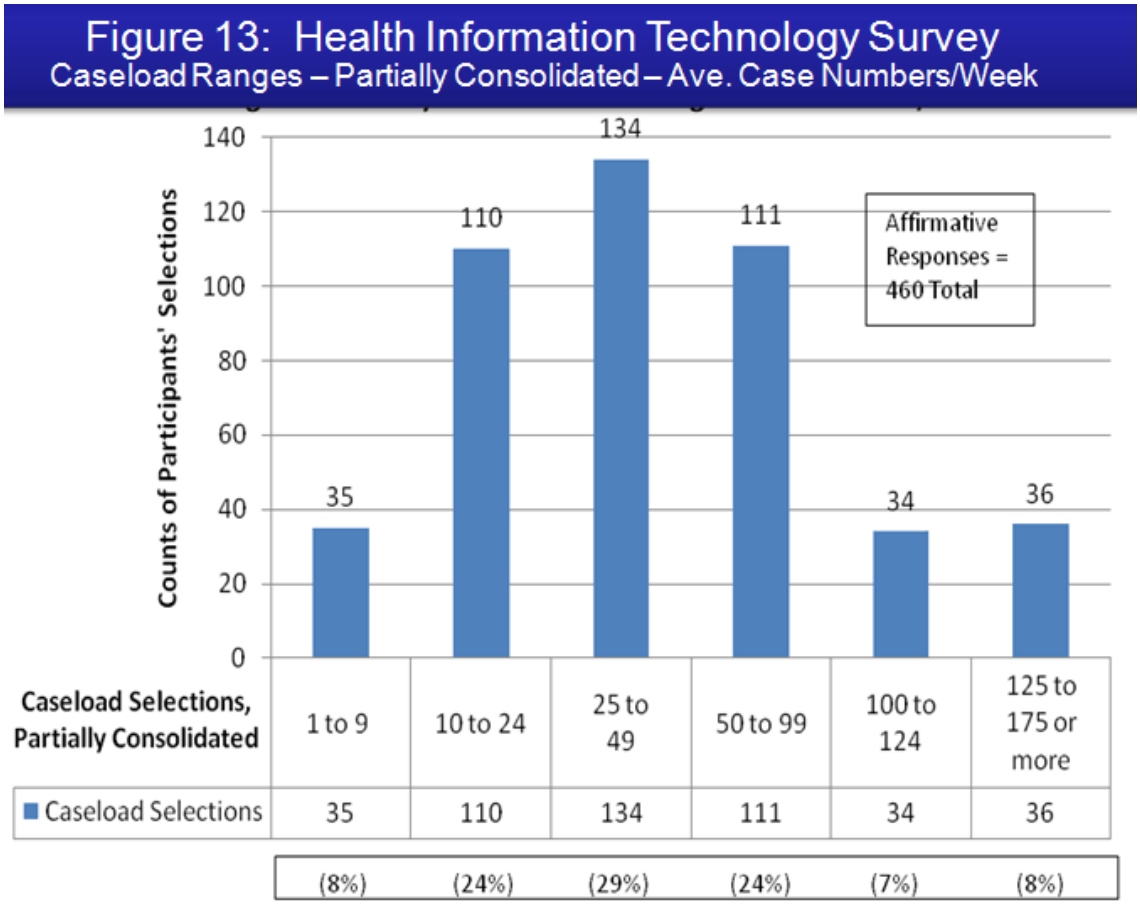
The four caseload categories that were examined include the following Parts:

- Face-to-face patient contacts (for example, meeting directly with patients in a provider setting, home visits, community settings, or clinic venues)
- Non face-to-face patient contacts (for example, includes telephonic, electronic and hardcopy correspondence)
- Administrative support (for example, paperwork, staff meetings)
- Other activities

Figure 12 shows the data obtained by asking the second open-ended question, which received 524 individual responses in 2010.[13] About one in four respondents (26%, n = 134) report carrying an average caseload of between 26 to 49 cases per week, which is the most commonly selected range of caseloads. About one in five respondents (21%, n = 110) indicate they carry an average caseload between 10 to 24 cases per week; and 16% (n = 86) report carrying an average caseload of 50 to 75 cases per week.

The survey participants select the other caseload ranges less than 10% of the time. Specifically, very few respondents selected caseload ranges above 124 cases or below nine cases per week. The majority of respondents indicate average weekly numbers of 42 cases, plus or minus 32 cases. The wide span beyond the 42 average cases per week may indicate the survey drew from many settings -- ones probably containing markedly different care management models, levels of throughputs, and business contract stipulations.

As highlighted in Figure 12, 460 respondents selected a specific caseload range (and 64 selected "not applicable"). To better visualize the distribution of caseload ranges actually selected, Figure 13 recasts the caseload range data based only on the 460 affirmative selections.



In Figure 13, a bell-curve distribution arises by partially consolidating two caseload ranges (i.e., 50 to 74 and 75 to 99) into a single range. A right-sided tail occurs, which represents (8%, n = 36) of the participants' selections through consolidating three caseload ranges (i.e., 125 to 149, 150 to 174, and 175 or more). Both the counts of caseload range selections by participants and the 460 affirmative selections' distributed percentages can be seen in the data chart included in Figure 13.

[13] This question was not asked in 2008. For 2010, of the 524 total respondents who answered this question, 460 selected a specific caseload range and 64 selected "not applicable."

The data in Figure 13 afford several insights. While range increments of 25 cases each are convenient for survey purposes, better definition of caseload ranges may be revealed by providing selections that are more narrowly circumscribed. The caseload range percentages selected dramatically decline when the cases handled per week fall below 10 and above 100.[14] The most predominant choices indicate 10 - 100 cases handled per week, which accounted for 77% of the selections in this survey.[15] In particular, by partially combining the caseload distribution options provided in the survey into those displayed in Figure 13, the three highest caseloads occur in these ranges: 25 to 49 cases/week with 134 choices (29% of 460); 10 to 24 cases/week with 110 choices (24% of 460); and 50 to 99 cases/week with 111 choices (24% of 460). The extent to which these caseload ranges reflect the entire CM field of practice or the various sub-categories of CM practice is not fully known. Further analysis should be completed.[16]

Caseload Work Activities

The third caseload question and accompanying analysis stratifies three categories of CM work activities, specifically face-to-face patient contacts, indirect patient contacts, and administrative activities, plus the other activities category (see Table 19). Because clarifications were not obtained from respondents about the activities they included in the other category, no conclusions can be drawn regarding whether these time selections are indeed separate from the three primary activity categories or if sub-groupings were present. As referenced above, respondents rated the amount of time they spent with patients on a scale of 1 to 5 (i.e., 1 = "no time" to 5 = "all of your time"). While levels 2, 3 and 4 are undefined in the survey question, a 2.0 is taken to indicate some time, a 3.0 represents a moderate amount of time, and a 4.0 indicates much time. Data in Table 19 are averages of the responses provided to each sub-category and are rounded to the nearest tenth.

Generally, industry wisdom assumes that case managers and other clinicians would spend more face-to-face time with patients if they were carrying smaller caseloads. However, that assumption is not supported in the findings presented in Table 19. According to these respondents' selections, the caseload range they report as having the most face-to-face contact time with patients is the 100 to 124 cases per week category. A high average score of 3.0 in the 100 to 124 weekly caseload range represents a moderate amount of time spent in face-to-face contact with patients, which is a surprising finding. Presenting the options of "direct" versus "indirect" contacts may have secured different choices than "face-to-face" versus "indirect." Yet, while many case managers contact their patients telephonically, the majority of respondents in this survey select face-to-face contacts, which are assumed to mean face-to-face rather than voice-to-voice.

Overall, respondents report spending the most time in performing indirect activities for patients compared to face-to-face patient contacts. The highest score for indirect activities is the 50 to 74 caseload range and the 125 to 149 caseload range, which both achieved an average score of 3.6. Another interesting response is seen in participants' selections indicating a far-below average amount of time (1.8) in face-to-face contacts when their weekly caseloads are 175 or more.

Also, the time-rating responses were sorted by several types of care management interventions, including prevention and wellness, UM, DCP, CM, DM, and nurse triage services. Once again, this survey's participants report spending more time in performing "indirect" patient activities compared to "direct" patient contacts, presumably reflecting the service coordination and facilitation duties included under the care management rubric.

[14] Specifically, 8% of the affirmative responses for 1 to 9 cases, 7% for 100 to 124 cases, and 8% for 125 and higher.
[15] Specifically, 77% = 24% of the affirmative responses for the 10 to 24 cases, 29% for 25 to 49 cases, and 24% for the 50 to 99 cases.
[16] Currently, CMSA, CMI, Inc., and Schooner Healthcare Services, LLC are collaborating on a national study that will provide more details on caseloads and should be published early in 2011.

As summary measures, these overall averages were obtained for each of the activity categories. First, face-to-face patient contacts for all caseload sizes average 2.4, with a high of 3.0 and low of 1.8. Indirect patient contacts for all caseload sizes average 3.2, with six values reaching above 3.0 and a high of 3.6 present twice and a low of 2.5. Administrative activities for all caseload sizes average 2.9, with a high of 3.4 and a low of 2.7. The "other activities" category for all caseload sizes averages 2.5, with a high of 2.8 and a low of 2.2.

Perhaps due to the absence of defined time allotments in the Lickert scale, most responses in Table 19 gravitate toward middle values (2.5). Notable exceptions are the time estimates well above 3.0 (especially 3.3 to 3.6) and below 2.0 (especially the 1.8 mentioned in the previous paragraph). One conclusion that can be drawn from this survey's data is that caseload activities lack standardization from one setting to the next. Another is that in this respondent population, more time is reported in indirect patient activities than in direct face-to-face contacts or in administrative activities.

The following comments from respondents emphasize several points in the discussion on caseloads and contacts:

- "Our system collects data for report generation that is positive, but due to my company's detailed process of billing for every CM function with a billing process that is protracted, I spend more time on activities & processes that generate billing opportunities than I do in direct patient contact."
- "Some clinical improvement, less efficient in time to see patients, more efficiency in ordering and prescribing, some improvement in finance from coding, but some lost in taking more time so see fewer patients."

TABLE 19: CASELOAD: AMOUNT OF ACTIVITY
2010 Large Pool Results
1 = no time; 5 – all of your time
(Respondents could select more than one option)

	Face-to-Face Patient Contacts	***Indirect Patient Contacts***	***Admin Activities***	***Other Activities***
1 to 9 cases	2.5	2.7	2.9	2.6
10 to 24 cases	2.7	3.3	2.9	2.4
26 to 49 cases	2.2	3.3	2.8	2.3
50 to 74 cases	2.1	3.6 high	2.7 low	2.2 low
75 to 99 cases	2.3	3.3	3.0	2.4
100 to 124 cases	3.0 high	2.9	2.7 low	2.7
125 to 149 cases	2.5	3.6 high	2.8	2.4
150 to 174 cases	2.5	2.5 low	3.4 high	2.8 high
More than 175 cases	1.8 low	3.4	3.2	2.6
Average	2.4	3.2	2.9	2.5

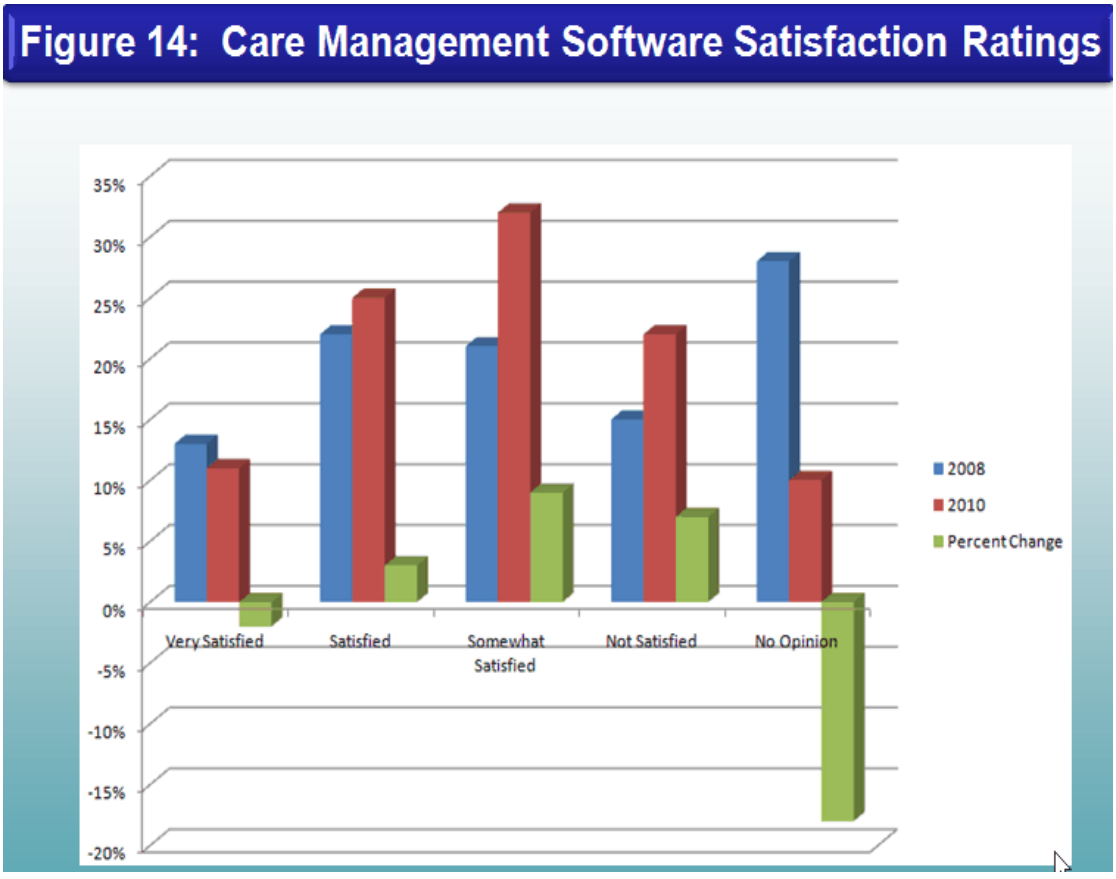
System Satisfaction Question Series

Care Management Software Satisfaction Ratings

As in 2008, the 2010 survey gauged satisfaction for both care management and EMR systems. As highlighted in Figure 14 and detailed in Table 20, almost equal percentages of respondents for the Large Survey Pool reported being very satisfied (13%) or satisfied (22%) with their care management system (35% combined) in 2008 compared to being very satisfied (11%) or satisfied (25%) in 2010 (36%, combined).

Findings in Table 21 show data from a similar analysis run for the Direct Pool of the 64 individuals who participated both in the 2008 and 2010 surveys.[17] Interestingly, the trends in the Direct Pool track the satisfaction directions in the Large Pool – with the exception that the "Not Satisfied" level decreased by 4% in the Direct Pool but increased by 7% for the Large Pool. Overall, satisfaction levels increased for both groups when including the "Somewhat Satisfied" category with "Very Satisfied" and "Satisfied"

Figure 14: Care Management Software Satisfaction Ratings



[17] In the Direct Pool, 89% responded to this question in 2008 as opposed to 56% in 2010 for unknown reasons.

(Large Pool = 10% increase; Direct Pool = 28% increase). However, when comparing the top two satisfaction categories of "Very Satisfied" and "Satisfied," the results were less positive for both samples (Large Pool = 1% increase; Direct Pool = 4% decrease).

In some of the narrative comments, respondents noted the positive attributes of care management systems that they use. For example, one respondent notes:

> "We have seen a 50% increase in the productivity of CM staff with the implementation of a medical management integrated platform. Outpatients are handed off between Wellness, DM and CM with no interruption in care or repeat services because we are all using the same patient record."

TABLE 20: CARE MANAGEMENT SOFTWARE SATISFACTION RATINGS
Large Respondent Pools
(Respondents could select one option)

	2008	2010	Change
Very Satisfied	13%	11%	(2%)
Satisfied	22%	25%	3%
Somewhat Satisfied	21%	32%	9%
Sub-totals	Combined 10% increase for Very Satisfied, Satisfied, and Somewhat Satisfied Combined 1% increase for Very Satisfied and Satisfied		
Not Satisfied	15%	22%	7%
No Opinion	28%	10%	(18%)
N = Respondents	461	392	

Between the two survey populations, the "Not Satisfied" category generated mixed results. In a downward trend for the Large Pool, the respondents who reported dissatisfaction with care management software systems increased by 7% from 2008 (15%) to 2010 (22%). In contrast, the Direct Pool respondents report more positive results with lower levels of dissatisfaction (2008 = 18%; 2010 = 14%), representing a 4% decrease.

Respondents also provided qualitative feedback why their care management systems can be frustrating. One respondent elaborates, "Most nurses and other users of [a particular software vendor] do not like it. It is too tedious and we could work with more members if we did not have to deal with all the picky demands of the system."

With only one out of three respondents noting they are "Satisfied" or "Very Satisfied" with their care management software systems in 2010 (Large Pool 36%; Direct Pool 28%), considerable room for improvement exists.

Perhaps those who purchased care management software systems in recent years were told certain functions were present or various capabilities were promised. Yet, in the ensuing two-year interval, users discovered the functions and capabilities failed to meet their expectations. However, the findings may result in part from the subjectivity of the satisfaction question.

Electronic Medical Records Satisfaction Ratings

In contrast, EMR systems (see Table 22) received a higher satisfaction rating from respondents (30% in 2008 versus 45% in 2010). Specifically, in 2008 11% of the respondents reported being very satisfied and 19% reported being satisfied. In 2010, 16% of respondents indicate being very satisfied and 29% report being satisfied. The change from 30% in 2008 to 45% in 2010 represents a 1.5-fold increase in satisfaction in this two-year interval. Furthermore, the marked decrease in the percentage of respondents (41%) who expressed having no opinions about EMRs in 2008 to 10% in 2010 may indicate a much higher exposure rate of the survey participants to EMR systems throughout the healthcare industry. Such a four-fold rate of change appears to indicate a much better market saturation for EMR systems than in 2008.

TABLE 21: CARE MANAGEMENT SOFTWARE SATISFACTION RATINGS
Direct Pools
(Respondents could select one option)

	2008 N = 57	**2008** Percentage (Based on 57 respondents)	**2010** N = 36	**2010** Percentage (Based on 36 respondents)	**Change**
Very Satisfied	6	11%	2	6%	(5%)
Satisfied	12	21%	8	22%	1%
Somewhat Satisfied	13	23%	17	47%	24%
Sub-totals	Combined 20% increase for Very Satisfied, Satisfied, and Somewhat Satisfied Combined 4% decrease for Very Satisfied and Satisfied				
Not Satisfied	10	18%	5	14%	(4%)
No Opinion	16	28%	4	11%	(17%)
No Response (This item's percentages are based on N = 64)	7	11% (of 64 respondents)	28	44% (of 64 respondents)	

Respondents gave additional feedback on EMR systems that were both positive and negative. Here is an observation that addresses both the "pros" and "cons":

> "When I worked in a hospital-based setting, I really appreciated the ease of access with the electronic system as several people could work on/in a (patient's) record without having to search for or wait for the paper chart. The downside was very cumbersome 'one size fits all' systems with many non-applicable screens and fields that had to be navigated to reach the pertinent portions of the program."

TABLE 22: ELECTRONIC MEDICAL RECORD SATISFACTION RATINGS
2010 Large Pool
(Respondents could select more than one option)

	2008	**2010**	**Change**
Very Satisfied	11%	16%	5%
Satisfied	19%	29%	10%
Somewhat Satisfied	19%	33%	14%
Sub-totals	Combined 29% increase for Very Satisfied, Satisfied, and Somewhat Satisfied Combined 15% increase for Very Satisfied and Satisfied		
Not Satisfied	11%	12%	1%
No Opinion	41%	10%	(31%)
N = Respondents	409	338	

This observation about EMRs raises several key questions:

> "In my opinion, EMR depersonalizes the physician-patient encounter. Electronic data management provides little benefit over organized paper charting. It makes physicians 'poor man's' data entry persons and magnifies the workload of compliance at the expense of listening, taking a history and EXAMINING a patient!!! The whole EMR conversion is a massive informational acquisition for governmental benefit alone. Using EMR in hospitals for over two years, I see no direct benefit to patient care, but I'm sure we're beautifully compliant with non-critical data generation. I see so many poor clinicians with perfect records that lead nowhere other than to payment capture. A disgusting, and eventually destructive, process in the decline of clinical acumen."

One message appears clear: Opportunities do exist to improve clinician happiness with care management software and EMR systems.

Nurse Triage Satisfaction Ratings

In 2010, the survey assessed for the first time the satisfaction ratings of respondents regarding nurse triage systems (see Table 23). Generally speaking, these satisfaction ratings are positive with 40% of the respondents stating they are very satisfied (12%) or satisfied (28%). In addition, the number of respondents who reported being dissatisfied is extremely low at 4%.

If the number of survey participants who indicated having no opinions (n = 100) were removed, the percentages for respondents who were very satisfied (19%) and satisfied (44%) with their nurse triage systems would reach 63%.

Through the written comments provided in the survey, respondents' frustrations are detectable. For example, respondents were asked, "What types of functions would you like added to your care management system?" Two replies in 2008 still offer revealing insights:

> "Better navigation, less cumbersome, fewer steps to process a case, better integration of written communication, more automation…"

> "We have a brand new system that was built for our company, but it is extremely faulty. There are too many flaws to begin to tell you."

TABLE 23: 2010 NURSE TRIAGE SATISFACTION RATINGS
2010 Large Pool Results
(Respondents could select more than one option)

	N = Respondents	Percentage of All Respondents	Percentage of Respondents with opinions
Very Satisfied	32	12%	19%
Satisfied	75	28%	44%
Somewhat Satisfied	52	19%	31%
Sub-totals (n=269)	Combined 59% for Very Satisfied, Satisfied, and Somewhat Satisfied Combined 40% for Very Satisfied and Satisfied		
Not Satisfied	10	4%	6%
No Opinion	100	37%	(Not included)
	All Respondents = 269		Respondents with Opinions = 169

In contrast, a respondent's comment in 2010 portrays an entirely different sentiment:

> "Could not do my job without the systems we use."

Reporting Return on Investment

Return on Investment (ROI)

The 2010 survey was designed to explore in greater depth how HIT systems promote a more transparent and accountable approach to care management. The last item in the survey asks the following question about ROI:

> "Based upon your experiences with using one or more health information technology systems, what is the 'Return on Investment' (ROI) for using these types of applications for your practice or medical management program(s)? For example, do these systems help you improve clinical or financial outcomes? Do they make you more or less efficient?"

Responses are open-ended narratives. About half of the 2010 survey respondents (49%) draft and submit responses. All responses are reviewed to determine if they answer the ROI question affirmatively, negatively, or impartially (lacking clear yes or no opinions). The results seen in Table 24 are grouped into three categories: Positive (54%); Negative (22%); and Impartial (24%).

TABLE 24: HIT ROI FEEDBACK
Narrative Response Ratings Associated with HIT Systems
2010 Large Pool Results
(Respondents could select more than one option)

Type of Response	Percentage of Respondents	Percentage of Respondents
Positive	177	54%
Negative	73	22%
Impartial (Lacking clear yes or no opinions)	81	24%
Total	331	100%

In this survey, counts of positive ROI associations with HIT systems are twice the number of impartial responses. Similarly, positive ROI statements exceed negative responses by a factor of almost 2.5. These findings help document that most HIT systems provide a net benefit for most clinicians in the respective healthcare settings.

Comments from Survey Participants about ROI

Positive Samples

Here are several examples of the positive ROI comments:

> "(HIT systems) make us more efficient, make follow up and auditing easier, improve both clinical and financial outcomes."

> "Health information technology systems have a direct effect on ROI. If a case manager can perform her job more efficiently due to an easier-to-use format, then she will have additional time to touch more members. If a health information technology system has the capability to perform automatic calculations, generate care plans, import data to reports, it would save both case managers and their management team time that could be better spent on improving our members lives."

> "I have experience both as an end user of these types of systems and also as a consultant to organizations who use these types of systems. ROI I have experienced/seen is related to: 1) existing staff becomes more efficient and so can do more work/work with more members/patients without

increasing staff; 2) brings consistency to decision making and increases adherence to policies and procedures leading to fewer errors and better member outcomes and decreased costs; 3) better reporting which has decreased the amount of manual work related to reporting saving dollars and staff time; 4) easier program evaluation and more effective targeting of activities to improve member outcomes, avoid ineffective activities and identify cost-effective processes; and 5) better adherence to evidence-based medicine/best practices by staff leading to better member/patient outcomes and dollar savings."

"It is starting to become more efficient as the physicians get more comfortable with the CPOE and documentation tools. The nursing documentation still takes too much time away from the bedside. It has definitely started to improve the safety environment as legibility of orders and plans are no longer an issue and medication alerts are automatic."

"Health Information Technology provides me more time with my injured workers, completing the checklist allows me to remember to document in all areas, typing is quicker than writing, maintains an environment for secured medical records and I would also imagine a cost-effective tool."

Middle of the Road Samples

The following are two examples of "middle of the road" responses:

"It depends on the system, how it is configured, whether it has the features and functions required training, acceptance by users, and user culture. Assuming you get most of these elements right, there will be a highly positive ROI and better efficiency. Unfortunately most organizations struggle with this."

"Electronic systems do create efficiencies; however, they are expensive to implement and constantly changing. Keeping up with technology requires ongoing commitment and annual evaluation."

Unpopular Samples

These are examples of negative responses:

"Less efficient with focus on the ROI, because we lack information with updated cost. Also you are given mix[ed] message when it comes to calculating you[r] hard or soft savings. That's why having a system that could assist in generation of these things would really help."

"ROI I think is minimal--they are nice for locating data & trends but really need people & not a program to interpret the data."

"(HIT systems) do not aid ROI. They do not aid clinical outcomes. They are cumbersome because of the template requirements and include too much information much of which is not done such as on physical exam reports."

Discussion

The field of technology is often overwhelming and challenging to fully understand by most healthcare professionals, patients, and other key stakeholders. A primary goal of this research is to raise public awareness about HIT systems, especially care management software applications.

As evidenced in the following comment from a survey respondent, the need for integration is clear:

> "At the hospitals, the return on investment has to be realized, as professionals now chart in the rooms, spending more time, I think, with the patients; there are fewer errors because you've eliminated handwriting illegibility.....I would like to see the programs expanded so that all levels of healthcare have access.....use at transition to nursing homes, etc. And I would like to see uniformity in the information given to all facilities...same location, etc. So much time is wasted looking on forms for telephone number, diagnosis, doctors, etc…..it is in a different place on every hospital form, every transfer sheet.....ridiculous!"

In addition, opportunities exist to design applications that are more user-friendly and reliable.

When the right HIT architecture is in place, good things can happen. Here are two comments by survey respondents that echo this goal. Respondents state that the right health information technology application:

> "…can help improve both clinical and financial outcomes, as well as can make me much more efficient ONLY if it is easy and fast to access all necessary information such as patient medical history, work history and physical job demands for workers' compensation claims, medical test results in chronological order or easy to access, etc. The applications for practice should fit the population(s) with whom you are dealing as much as possible."

> "….dramatically reduced staff time related to documentation, offered a better way to standardize care, since the record was typed you could read the entry, security since the system date and time stamps the entry and then does not allow entries to be altered."

Clearly, opportunities abound to improve clinical and financial outcomes by appropriately leveraging HIT applications to support provider/patient transactions.

Conclusions

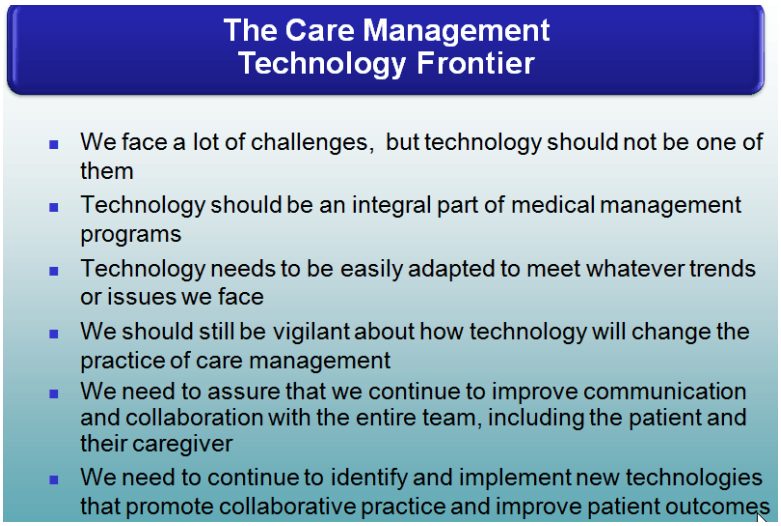
This survey examines HIT practices with a special focus on care management operations. Key findings include the following:

- The majority of respondents use two or more HIT applications supporting clinicians and care managers at some level.
- Information technology platforms supporting the care management process still are not standardized in the industry and have many different orientations and attributes.
- Organizations continue to use a myriad of in-house and vendor-based solutions as they explore ways to increase healthcare efficiency and improve clinical outcomes.
- The adoption of electronic applications may take longer than originally anticipated even in light of healthcare reform funding.
- On many measures, organizations offering care management services appear to be a few steps ahead of the Large and Direct Pool trends. For example, the Care Management Pool appears to be ahead of the curve in the following areas:
    - HIT System integration and functionality
    - More reliance on paperless processes and scanning information into medical records
    - More sharing of clinical information with providers and patients
    - The use of most emerging communication platforms over the next several years.
- Case manager caseload levels and patient acuity ratings do not appear to be standardized with specific healthcare settings.
- Satisfaction levels including "Very Satisfied" and "Satisfied" are:
    - 35% for care management software systems
    - 45% for electronic medical record applications
    - 40% for nurse triage systems.

Many opportunities exist to leverage technology to enhance the care management process through the following principles:

- ***Implementing sound platform designs*** – that support the natural workflow processes of the care management professional.
- ***Moving toward integrated and interoperable HIT systems*** – that minimize the need to identify and collate data manually across systems and platforms.
- ***Promoting automation*** – that reduces the number of actions care management professionals need to perform while conducting the basic actions affiliated with their work.
- ***Leveraging emerging communication portals*** – that include text messaging and social media as long as protected health information is properly safeguarded.
- ***Using the right information at the right time*** – that enables patients, their providers, and other stakeholders to access the patient's health information, care plans, evidence-based protocols, and other information to make meaningful decisions.
- ***Increasing workflow efficiencies*** – that should allow care managers and other professionals to spend more quality-based time interacting with and supporting their patients.
- ***Increasing transparency and accountability*** – that in turn enhance feedback loops in ways that can further improve care management interventions.

Although the practice of nursing and medicine has been transformed with the advent and adoption of HIT systems as a tool to support care management, these applications are still evolving. As a result, leveraging technology to improve medical management intervention strategies should remain a high priority in terms of both improving public health and reducing medical costs. The sidebar highlights some of the continued strategic goals moving forward for clinical professionals, especially case managers. Clearly, HIT applications are changing the practice of care management in profound ways.



Future studies are recommended to further document and explain some of the trends identified in the 2008 and 2010 studies. It is also recommend that future research collect data directly from HIT system users in addition to online surveys.

About the Survey Sponsors

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Appendix A: List of Abbreviations

BH, behavioral health	LTC, long term care
CM, case management or care management	MM, medical management
CMO, case management organization	MMO, medical management organization
DCP, discharge planning	PBR, payor-based record
DM, disease management	PHR, personal health record
DOD, Department of Defense	POS, point of service
EHR, electronic health record	PPO, preferred provider organization
EMR, electronic medical record	SNF, skilled nursing facility
EPR, electronic patient record	UM, utilization management
HIT, health information technology	VA, Veterans Association
HMO, health maintenance organization	WC, worker's compensation
IRO, independent review organization	
IT, information technology	