A Unique Approach to Business Analytics:
The Scottsdale Institute Health IT Benchmarking Program

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AMID RISING COST pressures and the move towards greater "accountability" for reducing cost and improving patient outcomes in healthcare, the importance of effective business analytics – including IT benchmarking – is at an all-time high.[1,2] With the diminishing financial incentives from meaningful use, the ability for healthcare organizations to compare areas of IT costs and staffing with known healthcare leaders or established best practice standards can allow healthcare organizations to identify significant areas of inefficiency or opportunities for financial improvement.[3-6] However, many current IT benchmarking programs and databases rely on industry-wide averages, without consideration of differences in the ways costs are actually calculated from one healthcare organization to another.[7-9] Given

genuine and very real variations in IT department structure between healthcare organizations, this approach can limit the accuracy – and ultimately the value – of the "benchmark."[10,11] This has pushed many organizations to collaborate in an attempt to more effectively leverage business intelligence and analytics to identify areas for cost reduction in their health IT spending.[12,13]

METHODS

In response to this industry need, the SI Health IT Benchmarking Program was created. This unique, collaborative program focuses on normalizing IT cost data between different organizations, thus allowing hospitals to make direct "apples-to-apples" comparisons with similar facilities.

The Benchmarking Program was initially developed in 2006, when several

health system CIOs approached SI looking for a more accurate way to compare IT spending across health systems. CIOs and CFOs from these health systems were frustrated that data sources being used for IT benchmarking at the time were inconsistent in how they reported IT cost, due in great part to how the IT function is differently organized in each health system. There was a common scenario: CFOs had data indicating their health system IT was "high cost" when compared with others, and the CIOs questioned how those numbers were specifically calculated and which data elements were included. Huge variances in reported IT costs came from the inclusion (or exclusion) of categories and functions such as depreciation, PACS, HIM, Biomedical Engineering, Informatics and Telephony, among others.

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ABSTRACT

Amid rising cost pressures and the move toward "accountability," the importance of business analytics in healthcare is at an all-time high. However, many current IT benchmarking programs rely on industry-wide averages, without consideration to differences in the ways costs are actually calculated from one healthcare organization to another.

The Scottsdale Institute (SI) Health IT Benchmarking Program represents a novel and unique way hospitals and health systems are collaborating to compare—and analyze—IT cost data. Established by the not-for-profit Scottsdale Institute in 2006, this Benchmarking Program is a departure from current approaches to business analytics, facilitating *one-on-one* comparisons of detailed IT cost data between similar healthcare organizations. The data is normalized to account for structural differences in IT departments, which allows for "apples-to-apples" correlations.

In mid-to-late 2014, 38 participants were asked to complete a survey on their experience in the program. SI received responses from 76% – or 29 organizations (representing a total of 60 health systems and 598 inpatient facilities).

A full 100% of survey respondents agreed with the statement "my organization finds value participating in this healthcare IT Benchmarking Program." Participants indicated they are using the database for a variety of purposes, including identifying areas of significant cost variance, identifying opportunities to improve financial performance and providing a clearer picture of their specific IT costs benchmarked to other similar organizations.

This article will describe how provider organizations are using the SI Benchmarking Program to support business analytics and the specific ways they are getting analytic value from their participation.

KEYWORDS

Business Analytics, IT Benchmarking, IT Costs, Cost Comparison, CIO Collaboration, Benchmarking Survey, Meaningful Use, IT Cost Reduction, Healthcare

the help of SI and its member healthcare organizations), an alternative method to current IT benchmarking was created, focused on one-to-one comparisons of normalized data to better support efforts around business analytics. The goal was to create a health system CIO-developed service that would address the shortcomings of other IT cost comparison tools, resulting in a better understanding of IT spending at senior executive and board levels and increasing collaboration among the CIOs who use the program.

Since its inception, the SI Health IT Benchmarking Program has continued to be refined by SI and its health system CIO members. Today, 38 healthcare organizations, representing a total of 62 health systems with 714 hospitals and 6,451 outpatient/ambulatory sites, participate in this program.

COMPONENTS OF THE PROGRAM

There are two components to the SI Health IT Benchmarking Program, the data collection tool and the anonymous benchmarking database.

The data collection tool consists of multiple worksheets, each capturing data regarding specific areas of the organization and the IT function (for example, financial data, staffing data, functions supported, vendors, level of IT maturity, etc.). Participants are asked to update their data once a year. The data collected serves three major purposes: helping users select comparison organizations, establishing a baseline for the actual comparison of IT costs and providing an initial source to understanding variances.

The anonymous benchmarking database (see **Figure 1**) contains completed responses to the data collection tool from each participant. The data is de-identified; organizations are only referenced by an assigned number. The database includes an automated tool that allows one-on-one comparisons with selected organizations. In this process, unique to the SI Health IT Benchmarking Program, data is standardized to include depreciation and normalized to reduce variation due to structural differences in the IT function.

HOW THE PROGRAM WORKS

The data collection tool is provided by email to any organization wishing to participate. Any hospital or health system is eligible; membership to the Scottsdale Institute is not required. When the participant completes the tool and returns it to SI, the data is reviewed for reasonableness and completeness. Once any questions or concerns about the data are resolved, the participant's responses to the data collection tool are entered into the anonymous benchmarking database. A copy of the entire database, which includes an automated comparison and normalization tool, is then sent to the participant.

One of the unique features of the SI Health IT Benchmarking Program is that users are able to self-select comparison organizations for one-on-one comparisons based on any data element in the database. Examples include: net patient revenue, number of beds, patient days, and vendor. Since the database is provided in an Excel workbook format, the ability to sort on these data elements eases identification of the desired comparison organizations.

Another unique feature is the automated comparison and normalization process. One-on-one comparisons with up to four organizations can be completed each time

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FIGURE 1: A Small Portion of Scottsdale Institute's Health IT Benchmarking Database

Organization Number	17401	48556	68584	21198	15021
Section 2. IT Information					
a. IT Operating Expense (include fringe benefit costs for direct IT labor, consulting costs and operating expense portion of IT capital projects)	174,560,000	3,629,689	402,604,465	68,115,482	134,048,420
b. IT Capital (include IT capital from other departments)	34,509,000	1,266,595	128,270,283	33,512,114	80,565,004
c. IT Depreciation	38,642,000	0	94,953,243	25,000,000	25,290,787
d. Number of employed IT FTEs in IT budget	1,012.50	16	1,568.9	423.2	590
e. Number of outsourced IT FTEs in IT budget	3	0	0.0	4	0
f. Number of contract IT FTEs in IT budget	5	0	44.8	0	0
g. Other IT-focused staff (FTEs) outside IT but not included in 2a above ("Shadow" IT people in other departments who primarily have IT-related duties or titles and who's salary, benefits, etc., are charged to their home departments.	0	4	257.0	185.8	0
h. Expense for Other IT-Focused FTEs outside IT identified in 2g above (include fringe benefits)	0	289,570	24,519,555.6	19,763,734	0
i. Any other IT expense that is included in other department's budget.	0	0	0	24,067,212	0
j. Corporate IT Expense Allocation to your IT budget, if applicable (This and the following two questions refer to any allocation to your organization by a corporate parent and may not apply to you.)	No Corporate Parent	0	4,068,778	0	0
k. Corporate IT Capital Allocation to your IT budget, if applicable	No Corporate Parent	0	0	0	0
l. Corporate IT FTEs Allocated to your IT budget, if applicable	No Corporate Parent	0	4.0	0	0
m. Total number of employees supported by IT	38,400	1,010	81,634	22,000	21,108
n. Total number of users supported by IT	38,400	1,581	190,000	30,000	33,300
o. Is the depreciation in 2c above included in the operating expense reported in 2a?	Yes	No	Yes	No	Yes

the comparison tool is used. A simple one page instruction sheet provides guidance through the automated comparison procedure. The three step process consists of 1) executing a macro to standardize how depreciation is handled; 2) inserting the data from the desired comparison organizations into as many as four comparison sheets; and 3) executing a second macro to generate the comparative statistics.

In the second macro, initial comparative statistics are generated using the standardized data provided. The automated normalization process then examines each of the functional variables identified in the "IT Variables" section of the survey for the two organizations being compared (see **Figure 2**). If the variable is included, or not included, in *both* organizations' reported data, there is no adjustment. However, if the variable function is included in one organization's IT expenses but *not* in the other's, an adjustment is made. For example, if the IT budget for one organization includes a function (such as communications or PACS maintenance), and the other organization's IT expenses do not include that function, the

operating expense and FTEs associated with that function are subtracted from the first organization. After iteratively processing all of the variables, the normalized totals are used to create an additional set of statistics.

Users are provided with comparisons based on the raw data originally provided by the site and on the "normalized" data generated from the database tool. The statistics resulting from the comparison process are size independent. Examples include: IT expense as a percentage of organization expense, IT cost per adjusted patient day, IT

FTEs as a percentage of organization FTEs and IT capital as a percentage of organizational capital.

Although the database is anonymous, participants in the program have the option to request direct contact with a site if they are interested in reviewing specific cost differences in greater detail. If the other organization agrees to be identified, SI makes the introduction. For example CIOs wanted more specifics on staffing, so a "staffing" tab was added in the data collection tool and organizations have recently begun to share their actual organization charts. Next steps for the program include a series of collaborative discussions on IT budgeting processes and an evaluation of user satisfaction metrics for potential inclusion as database elements.

Several new collaborative groups have emerged among the larger program participants. Both a large health system CIO group and a large academic medical center CIO group are now sharing specialized comparative reports across their respective peer groups in addition to making use of the one-on-one reporting capability.

SURVEY OF SI HEALTH IT BENCHMARKING PROGRAM PARTICIPANTS

Prior feedback on the Benchmarking Program from participants has been largely anecdotal. As a result, to better quantify how organizations are specifically using the Health IT Benchmarking Program to support business analytics efforts – and the value they get from participating – SI conducted an online survey in mid-to-late 2014. The benchmarking analytics lead at each of the 38 participating organizations was sent an email with a link to the web-based survey. The benchmarking analytics lead was targeted instead of the CIO due to his or her hands-on experience with the tool and unique familiarity with how the database is being used on a routine basis.

The survey consisted of 20 questions about organizational use and their perceived value of the SI Health IT Benchmarking Program. For each of the questions, respondents could select *Strongly agree, Agree, No opinion or uncertain, Disagree* or *Strongly disagree*. Partially completed surveys were not accepted; respondents were required to answer all 20 questions. (For selected questions though, respondents were offered a sixth response to indicate the statement was not applicable.)

FIGURE 2: A Sample Portion of the Automated Comparison Process that Demonstrates the Impact of Normalizing Data to Account for IT Functional Variations

NORMALIZATION IN A NUTSHELL

Raw data			
Organization Operating Expense	3,800,000,000	3,590,000,000	Similar orgaizations based on Operating Expense
Adjusted Patient Days (APD)	1,632,325.87	2,218,535.08	
Occupancy Rate	61.44%	72.87%	
FTEs per Occupied Bed	13.87	7.04	
IT Operating Expense (IT Op Exp)	80,441,357	123,747,006	Raw numbers indicate a difference of $43,305,649
IT Op Exp as % of Org Op Exp	2.12%	3.45%	Raw numbers indicate a difference of 1.33%
Org Op Exp per APD	2,327.97	1,618.18	
IT Op Exp per APD	49.28	55.78	Raw numbers indicate a difference of $6.5
IT FTEs	369.3	443.0	Raw numbers indicate a difference of 73.7
Users supported per IT FTE	134.84	135.44	Raw numbers indicate a difference of 0.6
IT FTEs as % of Org FTEs	1.31%	1.84%	Raw numbers indicate a difference of 0.53%
Org Depreciation as % of Org Op Exp	4.02%	3.16%	
IT Depreciation as % of IT Op Exp	19.08%	35.33%	
IT Capital as % of Org Capital	16.62%	6.28%	
Normalized Data			
IT Operating Expense	80,096,120	82,040,723	Normalized numbers indicate a "real" difference of$1,994,603
IT Op Exp as % of Org Op Exp	2.11%	2.29%	Normalized numbers indicate a "real" difference of 0.18%
IT Op Exp per APD	49.07	36.98	Normalized numbers indicate a "real" difference of -12.09
IT FTEs	368.3	371.0	Normalized numbers indicate a "real" difference of 2.7
Users supported per IT FTE	135.20	161.73	Normalized numbers indicate a "real" difference of 26.53
IT FTEs as % of Org FTEs	1.31%	1.54%	Normalized numbers indicate a "real" difference of 0.23%

THE IMPORTANCE OF BUSINESS ANALYTICS in healthcare is at an all-time high. However, many current IT benchmarking programs rely on industry-wide averages, without consideration to differences in the ways costs are actually calculated from one healthcare organization to another.

RESULTS

Between 8/26/14 and 10/16/14, the survey was submitted to 38 organizations and SI received a survey response from 76% of benchmarking analytics leads – or 29 organizations representing a total of 60 health systems, 598 inpatient facilities, and 4,790 outpatient/ambulatory facilities.

The results of the survey suggest that participants are using the SI Health IT Benchmarking Program for a variety of purposes related to business analytics. 97% of respondents agreed (38% strongly) with the statement "we use the SI IT Benchmarking Program database to provide a clearer picture of our costs relative to others." 93% said they use the database to identify areas of significant cost variances, while 72% report leveraging it to begin investigating the *causes* of variances. Over three-quarters of respondents agreed that their organization uses the Benchmarking Program database to examine how IT staffing resources are allocated.

Almost 80% of respondents said they use the information in the database to demonstrate to executives how their IT costs compare with other organizations; 38% use it to show IT cost comparisons to the board. 41% of respondents said their organization has even taken the step of using the database to provide information to an internal dashboard.

One unique aspect of the SI Benchmarking Program is the ability for participants to compare their IT cost information with similar organizations. Virtually all respondents make use of this feature, with 97% using the database to make compa-

risons with other participants based on organization *size* and almost 70% indicating that they use the database to compare themselves with organizations that have the same *primary vendor*.

Although this feature is available, most organizations do not request introductions to other Benchmarking Program participants. Only 45% of respondents agreed (3% strongly) with the statement "we use the SI IT Benchmarking Program database to connect with peers," while 7% disagreed (3% strongly).

Respondents overwhelmingly indicated they think the program is valuable. A full 100% agreed with the statement "my organization finds value participating in the Benchmarking Program" – with almost 60% *strongly* agreeing. 100% also agreed (55% strongly) that the normalized data, which reduces variation between how organizations report cost data, is useful. Additionally, 83% of respondents reported that they also find value in the raw ("unnormalized") data that is available, and almost 70% of respondents said they use the raw data to perform additional calculations.

Respondents' experience with the Academic Medical Center Collaborative Group and the Large Health Systems Collaborative Group was more limited, due to the fact that not every Benchmarking Program participant is an academic medical center or part of a large health system. Among those who are eligible and currently participate in either group though, a majority agreed that their organization finds sharing information in that group valuable.

DISCUSSION

The SI Health IT Benchmarking Program represents a fundamentally different approach to business analytics in healthcare. Traditionally, IT benchmarking is done by collecting IT cost data from a wide number of respondents and averaging the results. The value of that approach, though – no matter how big the "n," is limited by the fact that hospitals and health systems do not always calculate IT costs in the exact same fashion. For example, some organizations may include depreciation in the operating expense numbers they report; others may not. The CIOs who developed the SI Health IT Benchmarking Program wanted to specifically address this shortcoming by 1) "normalizing" the data reported, and 2) focusing on *one-on-one* comparisons of similar organizations instead of industry averages.

The SI Health IT Benchmarking Program is unique because it is a collaborative. The data is never resold; it is only collected so it can be shared between participants and used to make meaningful comparisons. Additionally, unlike virtually every other IT benchmarking service in healthcare, participation in the SI program is free and without any obligation. There is no charge for hospitals and health systems to use the database, and membership to SI is not required.

The results from the recent survey of SI Health IT Benchmarking Program participants clearly suggest that there is value in the program's unique approach. Virtually all respondents use the program

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to make comparisons with other organizations to get a better understanding of how and why IT costs are different. Not only did 100% of survey respondents agree that their organization finds value in participating, 100% of respondents *also* agreed that the automated comparisons of normalized data, which is what makes the SI approach different, is useful.

There is no shortage of good tools to evaluate health IT investments; many long-standing and well-known databases are used for such benchmarking.[8-13] Some are not deep enough in IT details to be helpful for a full evaluation or comparison of IT costs, but rather show IT highlights along with other operational metrics.[8,9,13] Other databases have a great deal of detail and are effective for evaluating software use since they were designed as vendor sales tools and, thus, built around vendor product use. In addition, many services firms do an excellent job at creating IT comparisons for clients but usually are one time engagements not typically maintained and updated going forward, so they can become obsolete. Still others are not specific to healthcare, and healthcare CIOs are spending the largest portion of their budgets on clinical software and support, things such as PACS and HIM, and burgeoning new population health, engagement and other healthcare and reform specific strategies.[2] A careful balance between detail and strategically important data elements, as well as an emphasis on the critical healthcare specific elements, has been carefully preserved by the healthcare CIOs who guide this program.[12]

Further, in almost no past examples were peers able to connect with each other and talk one-on-one about drivers and levers of IT cost and value. CIOs using the SI Program connect individually, meet at SI events and receive custom views of their data within a peer group category. In this way CIOs and CFOs can show their executive committees where they stand within a specific group of self-selected peers. And of course a major differentiator for this program is the unique normalization of disparate data elements between comparison organizations, so that the CIOs and CFOs finally know "what's in those numbers."

This study suffers from several limitations. The SI Health IT Benchmarking Program includes data from only a fraction (less than 25%) of the hospitals in the United States and does not include a representative sample of the various types of hospitals in the United States. It does not heavily represent pediatric hospitals, specialty hospitals, smaller or critical access hospitals and public hospitals including VA or DOD hospitals. This program does not adjust for differing severity of illness or case mix of patient cases among participating hospitals.

CONCLUSION

The SI Health IT Benchmarking Program represents a unique, collaborative approach to health IT business analytics that was created – and refined – by providers amid concerns about shortcomings of traditional methods of IT benchmarking. Current participants clearly use the database for a number of purposes related to business analytics, and survey respondents overwhelmingly believe there is value from participating in the program. **JHIM**

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