Extent of Telehealth Use in Rural and Urban Hospitals

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Key Findings

Data from 4,727 hospitals in the 2013 HIMSS Analytics database yielded these findings:

- Two-thirds (66.0% of rural defined as nonmetropolitan and 68.0% of urban) had no telehealth services or were only in the process of implementing a telehealth application. One-third (34.0% rural and 32.0% urban) had at least one telehealth application currently in use.

- Among hospitals with "live and operational" telehealth services, 61.4% indicated only a single department/program with an operational telehealth service, and 38.6% indicated two or more departments/programs with operational telehealth services. Rural hospitals were significantly less likely to have multiple services (35.2%) than were urban hospitals (42.1%)

- Hospitals that were more likely to have implemented at least one telehealth service were academic medical centers, not-for-profit institutions, hospitals belonging to integrated delivery systems, and larger institutions (in terms of FTEs but not licensed beds). Rural and urban hospitals did not differ significantly in overall telehealth implementation rates.

- Urban and rural hospitals did differ in the department where telehealth was implemented. Urban hospitals were more likely than rural hospitals to have operational telehealth implementations in cardiology/stroke/heart attack programs (7.4% vs. 6.2%), neurology (4.4% vs. 2.1%), and obstetrics/gynecology/NICU/pediatrics (3.8% vs. 2.5%). In contrast, rural hospitals were more likely than urban hospital to have operational telehealth implementations in radiology departments (17.7% vs. 13.9%) and in emergency/trauma care (8.8% vs. 6.3%).

Introduction and Background

Telehealth (aka telemedicine) is a special type of health information technology that holds considerable promise for enhancing the provision of care in rural communities. Telehealth is defined as the delivery of health care services at a distance, using information and communication technology.[1] Telehealth uses for patient care cover a spectrum of services, ranging from hospital-based to home-based applications. A systematic literature review of hospital-based telehealth applications found the strongest support for its use in pediatric cardiology, intensive care, and emergency care/trauma.[2] In terms of rural inpatient applications, systematic literature reviews have found benefits to include increased access to services, increased quality of care, and avoidance of transfers for patients.[3-5] While research has been creating the case for implementing hospital-based telehealth, the actual rate of utilization is not known. This brief contributes to that research and identifies organizational factors affecting use.

Methods and Purpose

The HIMSS (Healthcare Information and Management Systems Society) Analytics national database,[6] the most complete survey of health information technology in U.S. hospitals, includes limited data on telehealth use. We report descriptive statistics to characterize the level and type of uptake of telehealth services in U.S. hospitals and the organizational characteristics/network structure of hospitals that are using these telehealth services. Significance levels of differences by characteristic were calculated using chi-square and linear regression.

Findings

Analysis of the 2013 HIMSS Analytics data set (N = 4,727 non-specialty hospitals) indicated that two-thirds of reporting hospitals (67.1%) had no telehealth services and one-third (32.9%) had at least one telehealth application currently in use. Among hospitals with "live and operational" telehealth services, 61.4% indicated only a single department/program with an operational telehealth service, and 38.6% indicated two or more departments/programs with operational telehealth services. Rural hospitals were significantly less likely to have multiple services (35.2%) than were urban hospitals (42.1%)

Table 1 shows the characteristics of hospitals that are actively using at least one telehealth service and of those that are not actively using any telehealth services. Academic medical centers were significantly more likely to be using at least one telehealth service, as were not-for-profit institutions. Further, hospitals belonging to integrated delivery systems and larger institutions (in terms of FTEs, but not licensed beds) were more likely to be actively using a telehealth service.

Table 1. Telehealth Presence by Hospital Characteristics, 2013

Characteristic	Count	Implementer	Non-Implementer[1]	p-value
Hospital Size				
Number of licensed beds (mean)	4,727	191.5	165.4	0.116
Total number of FTEs (mean)	4,473	1,143.6	847.8	0.001
Hospital Type – 2 levels				
Prospective Payment System	3,385	32.2%	67.8%	0.090
Critical Access Hospital	1,342	34.8%	65.2%	
Hospital Type – 3 levels				
Academic	207	51.2%	48.8%	<0.0001
General Medical/Surgical	3,178	31.0%	69.0%	
Critical Access Hospital	1,342	34.8%	65.2%	
Parent Organization Type				
Integrated Delivery System	2,890	34.4%	65.6%	0.010
Single Hospital Health System	1,837	30.8%	69.2%	
Ownership Status				
Leased	131	31.3%	68.7%	0.268
Managed	222	37.8%	62.2%	
Owned	4,374	32.8%	67.2%	
Profit Status				
For Profit	772	17.6%	82.4%	<0.0001
Not-for-Profit	3,951	36.0%	64.0%	
Urban/Rural – 2 levels				
Urban	2,436	32.0%	68.0%	0.156
Rural	2,291	34.0%	66.0%	
Urban/Rural – 4 levels				
Urban	2,436	32.0%	68.0%	0.462
Large rural city/town	766	35.0%	65.0%	
Small rural town	960	33.3%	66.7%	
Isolated small rural town	565	33.6%	66.4%	

Data Source: HIMSS Analytics.

[1]Includes hospitals that did not indicate any active telehealth services, or that are only in the process of implementing a telehealth service.

Table 2 shows the departments/programs that were using at least one telehealth service (a single department/program within a hospital may have implemented more than one telehealth service). The largest percentage of operational telehealth implementations (15.7%) are in radiology departments

(including MRI, CT, EKG, EEG, and ultrasound), with a substantial number in emergency/trauma care (7.5%), and cardiology/stroke/heart attack programs (6.8%). Between 3% and 4% of hospitals had operational telehealth implementations in specific other departments, namely psychiatry, critical/intensive care, neurology, or obstetrics/gynecology/NICU/pediatrics departments. All other departments accounted for 2.5% of hospital operational telehealth implementations.

Table 2. Most Common Departments/Programs with Telehealth Services[1] in U.S. Hospitals, 2013

Department/Program	Overall		Urban		Rural		p-value
	n	%[2]	n	%[2]	n	%[2]	
Radiology (MRI, CT, EKG, EEG, Ultrasound)	744	15.7%	339	13.9%	405	17.7%	<0.0001
Emergency/Trauma Care	355	7.5%	153	6.3%	202	8.8%	<0.001
Cardiology/Stroke/Heart Attack	323	6.8%	181	7.4%	142	6.2%	0.01
Psychiatry	166	3.5%	88	3.6%	78	3.4%	0.06
Critical/Intensive Care	158	3.3%	86	3.5%	72	3.1%	0.05
Neurology	153	3.2%	106	4.4%	47	2.1%	<0.0001
Obstetrics/Gynecology/NICU/Pediatrics	151	3.2%	93	3.8%	58	2.5%	0.003

Data Source: HIMSS Analytics.

[1]Includes only institutions that indicated that they have telehealth services in place.
[2]Percent of departments/programs from implementing within all reporting institutions.

Table 3 shows the characteristics of hospitals using each of the three most commonly active telehealth services. Large hospitals, urban hospitals, and academic medical centers were more likely than rural and critical access hospitals to implement telehealth in cardiology/stroke/heart attack programs. In contrast, rural and critical access hospitals were more likely to implement telehealth in emergency departments and radiology departments.

Table 3. Most Common Departments/Programs Implementing Telehealth[1] by Hospital Characteristics, 2013

Characteristic	Count	Cardiology/ Stroke/ Heart Attack Program		Emergency Department		Radiology Department	
		Imp.	Non-imp	Imp.	Non-imp	Imp.	Non-imp
Number of licensed beds (mean)	4,727	242.3**	169.0	167.9*	174.5	174.0	174.0
Total number of FTEs (mean)	4,473	1,645.5**	894.1	979.9	941.3	964.3	940.4
*= p<.05; ** = p<.001							
Hospital Type – 2 Levels		p<0.05		p<0.0001		p<0.05	
Prospective Payment System	3,385	7.6%		6.5%		14.7%	
Critical Access Hospital	1,342	5.0%		10.0%		18.3%	
Hospital Type – 3 Levels		p<0.0001		p<0.001		p<0.05	
Academic	207	14.0%		7.7%		19.3%	
General Medical/Surgical	3,178	7.1%		6.5%		14.4%	
Critical Access Hospital	1,342	5.0%		10.0%		18.3%	
Parent Organization Type							
Integrated Delivery System	2,890	6.8%		7.7%		16.2%	
Single Hospital Health System	1,837	6.9%		7.2%		15.0%	
Ownership Status				p<0.0001			
Leased	131	3.1%		13.7%		19.8%	
Managed	222	5.4%		15.3%		16.2%	
Owned	4,374	7.0%		6.9%		15.6%	
Profit Status		p<0.0001		p<0.0001		p<0.0001	
For Profit	772	1.2%		2.8%		10.9%	
Not-for-Profit	3,951	7.9%		8.4%		16.7%	
Urban/Rural – 2 Levels		p<0.05		p<0.001		p<0.001	
Urban	2,436	7.4%		6.3%		13.9%	
Rural	2,291	6.2%		8.8%		17.7%	
Urban/Rural – 4 Levels		p<0.05		p<0.0001		p<0.05	
Urban	2,436	7.4%		6.3%		13.9%	
Large rural city/town	766	8.1%		7.7%		16.3%	
Small rural town	960	6.1%		7.6%		18.0%	
Isolated small rural town	565	3.7%		12.4%		18.9%	

Data Source: HIMSS Analytics.

[1]Implementers are those hospitals that indicated that they have telehealth services in place. Non-implementers are those that did not indicate any active telehealth services, or that are only in the process of implementing a telehealth service.

Discussion

Organizational factors are beginning to be identified that play a role in telehealth adoption,[7] and examining these helps elucidate utilization patterns. Given that telehealth is commonly used to connect remote patients and providers to urban-based care, it may be surprising that rates of overall telehealth utilization do not differ significantly between urban and rural hospitals. A likely explanation could be that urban hospitals are delivering these services to rural hospitals in a "hub and spoke" business arrangement (both would report use), and a limitation of our analysis is that HIMSS Analytics data do not clarify this pattern. However, current analyses did show differences between urban and rural hospitals in the type of telehealth services they use. In particular, urban hospitals and prospective payment system hospitals were more likely to implement telehealth in their cardiology/stroke/heart attack programs, while rural and critical access hospitals were more likely to implement telehealth in their emergency department and radiology department. By conducting a national study of telehealth use, these analyses identify applications that are used most widely in rural and critical access hospitals. We can treat these findings as baseline data to further detect spread of the "early" uses and adoption of other uses of telemedicine. Policy makers and health systems focused on expanding use could apply these findings by implementing the most common uses first, including those involving both urban and rural hospitals.

These analyses of HIMSS Analytics data indicate that telehealth adoption by hospitals is relatively low. A recent analysis[8] of the American Hospital Association (AHA) health information technology survey reported a higher adoption rate (42% in AHA versus 33% in HIMSS Analytics). While the AHA survey only includes a single question on telehealth, an advantage of the HIMSS Analytics survey is that it asks for departments where telehealth is implemented, additional data that we used in our analysis. However, our discussions with regional Telehealth Resource Centers suggest that both AHA and HIMSS Analytics estimates are too low, especially for critical access hospitals, most of which are believed to have used tele-radiology for years. The discrepancy is largely attributed to these surveys being completed by hospital respondents who may be unclear about what constitutes telehealth. Further research is needed (and underway) to understand discrepancies in reported telehealth use and hospitals' motivations for using particular telehealth applications.

Notes

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