Inexpensive solutions to enhance remote cancer care in community hospitals

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Rapidly increasing volume and complexity of information used for multidisciplinary cancer treatment requires carefully evolving communications with programmatic planning, detailed evaluation, and new methodologies and technical approaches to enhance the impact and efficacy of medical conferencing systems. We designed, implemented, and evaluated cost-effective and appropriate remote learning optimize oncology practice techniques in community hospitals. Our experience over the course of more than 7 years demonstrated simple and inexpensive communication solutions for both professional and lay education, satisfying information-dense needs of multimodality cancer care. We describe how potential complexities may be resolved with inexpensive devices and software programs. Staff teamwork and creativity are always required to implement constantly evolving technologies. We provide both quantitative and qualitative data describing activities and resulting staff responses resulting in 6,520 personnel with more than 391 aggregate credit hours of continuing medical education and continuing education credit activities with enhanced collegial participant satisfaction levels and heightened interactions/professionalism among regional oncology staff. We noted significant cost reductions for communications in all our three partnered hospitals. We demonstrated both increased satisfaction levels and heightened levels of behavioral changes (Impacts) in participants. Always, activities must be cost effective and responsive to changing medical needs. Community focused efforts with regional partners should be similar, assuring evolving successes.

Significant advances have occurred telemedicine in the last 20 years in tandem with the remarkable advances in technology in general. In a recent article, Page asserted that that telemedicine "is a must"[1] and he suggested that telemedicine improves referrals and clinical follow-up, cuts travel expenses, is low cost, advantageous for sparsely populated areas, and that it has now become a competitive requirement. Telemedicine has also become a valuable, versatile, and cost-effective resource for educating health care professionals at community hospitals; its use has expanded cancer care and has impacted the way in which care is delivered in tertiary facilities and community hospitals. The media influence physician and patient relationships and expectations about the care the deliver and receive. The "greening" of facilities and institutional pressures for cost containment have promoted the use of advanced information systems and communications patterns.[2,3] Governments and third party payers are focused on cost containment, limiting procedures and reducing reimbursements.[4,5] The need for remote learning/consultations has expanded for both staff and communities. Community cancer education now includes disease screening/prevention, diagnosis, clinical trial participation, and understanding health care system issues. Standards are increasingly focused on multi-modality treatment approaches. Ancillary sub-specialties and services are now cancer team members,[6] requiring enhanced information capabilities, remote oncology consultations, consensus planning, tumor boards and "chart rounds" for quality control.[7] Such information sharing among groups is becoming increasingly necessary.[8]

The ROCOG program

The Radiation Oncology Community Outreach Group program at the University of Pittsburgh Medical Center (UPMC) McKeesport Hospital is a multisite hospital-based program that focuses on service outreach for minority and rural underserved populations in a western Pennsylvania community. The Telesynergy program support originated from videoconferencing systems funded by the National Institutes of Health and placed at McKeesport and

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its ROCOG partners (Jameson Health Systems in New Castle, and Somerset Hospital in Somerset). These 3 Telesyngery systems are designed for communication, consultation, and conferencing.[9] We designed an outcomes-based planning and evaluation program that focused on system capabilities, versatility and regional linkage, emphasizing enhanced utility, quality assurance and continuous quality improvement, professional issues, and clinical trial participation (see p. 325).[10-12] Streaming options[13] and other simple, web-based conferencing capabilities were also included to communicate with offsite health care viewers or community groups. We ensured that all "open" communications were in compliance with the Health Insurance Portability and Accountability Act (HIPAA) for patient confidentiality.[14]

Methods and materials for inexpensive technical improvements

Evaluating the conference room participatory environment

The planning issues required special attention to: the size of the anticipated audience and the scheduling of meetings; the location – a centralized location near cancer treatment facilities and offices was preferable; room size, ventilation, lighting, and seating with table surfaces; and the video display unit(s) needed for larger audiences. The total parts and labor cost for installing cable items was $130 for Super-Video (S-Video) cables and splitters and $90 for labor. Additional purchases were a digital projector for enhanced image visibility (range, $475-$800), and a high-resolution LCD screen in the same price range.

Acquisition of secondary web-based radiology images and radiation treatment planning

Most medical specialty areas require readily available sources for medical informatics and imaging. Linking an existing videoconferencing codec or conferencing center using an inexpensive computer with S-Video and other audiovisual output ports will allow both local information access and video outstreaming for web site access purposes. Also, links to secure web-based or internal PACS [picture archiving and communication system]-based imaging systems that store and provide viewing access to radiology images (eg, Stentor iSite Radiology[15]) are necessary for optimal results. If only nondynamic images are available, then a variety of store-and-forward techniques, such e-mail attachments that can be directed to the requesting physician,[16,17] can be jointly reviewed using either the room computer or the conferencing system computer, and any telephone. Image transfer with mailed film formats for review and consultation is uncommon.

Remote access

Remote Desktop with Mac OS or Windows may provide access to such image acquisition and processing facilities within a hospital and is valuable for oncology. Such remote access provides a "slave station" that emulates the remote system's own control center and keyboard. Key for oncology is linking with a remote desktop so that specialized departmental systems can be used during meetings – for example, radiation oncologists may share treatment planning details in real-time with other physicians, much as has been suggested by Kouloulias and colleagues.[18] Such access to treatment planning computers allows physicians to offer dynamic group discussions. Almost all software products providing remote access require the Internet-provider address of both machines with the user approved as administrator for remote communication. Most software is easily installed; some are free downloads. As an example, remote desktop for Windows is built into the operating system and no installation is needed. An extensive amount of information concerning remote access for non-Windows systems may be located at the provided Google search location.[19,20]

Store-and-forward and linking techniques for alternate meeting and consultation types

The following are easy methods for getting started with telemedicine when both parties lack videoconferencing equipment. First, using email there is the cut and paste technique. When coupled with a screen saver this can be a remarkably efficient use of resources for a store-and-forward situation. Although the recipient physicians may not be present when an e-mail with image attachments arrives, they can subsequently arrange a return response. Note that large or unwieldy attachments are not always needed though many may have used the Print Screen key on the keyboard (Print Screen to copy to clipboard the entire desktop, and alt-Print Screen for only the current window). The results can be pasted directly into an e-mail, or a Word document attached to the e-mail. Alternately, the Windows Paint accessory (with or without further modifications, such as cropping sections of the captured screen) may be used to edit and/or save screens captured using the Print Screen technique. Files manipulated using the Paint accessory may result in large e-mail files that could be blocked by the sending or receiving mail server because of their unwieldy size.

There are a number of easy workarounds for smaller files to attach to one's email. A handy freeware utility (created nearly a decade ago) which will capture and compress to jpg (or other file types which are more space efficient than bmp files), various parts of the screen and store them as a graphics file, is known as SRip32.[21]

Readers with Windows 7 are also able to take advantage of a new screen capture accessory called the Snipping Tool. No matter what the method, sending a screen shot of an MRI image, a slice of a CT scan, a pathology slide, or a skin lesion photographed by a digital camera can often save volumes of typed text in an email.

Another common method for using computers is tandem use of both a computer for exchanging files, (store and forward techniques or sharing a desktop) and a telephone conversation for discussion. Many videoconferencing systems, or standalone systems have inputs for microphones, but the trusty old telephone is rapidly accessed, universally understood and has acceptable audio for many applications such as education or oncology tumor boards. It also does not slow down the CPU or hog bandwidth when used with a desktop system. This can be a major issue when a software program attempts to transmit audio while also transmitting moving images in real time.

Several of the authors have participated in telephone tumor boards, in which a remote cancer specialist will provide support to a distant tumor board needing input from that specialty when a local physician is not available at a remote location. For instance, one of the authors connected to a weekly tele-tumor board from Hawaii to Guam, and then monthly from Washington, DC, to a military hospital in Germany, ongoing for 12 years, from 1997 through 2008. These distance consults usually require prior arrangement with PowerPoint presentations or other images and clinical notes for patients to be discussed as e-mails, all of which maybe set up ahead of time to save the doctors' time. Such consulting may easily have more "presence" using 2-way videoconferencing, but is effective with simple methods using just telephone and mutually shared images or computer files as well. If a community hospital is linked to a larger facility as a satellite institution, it may be possible to use a remote viewing application, such as iSite Radiology,[15] to view the scans (eg, MRI, CT, PET) on each patient being discussed in real time. Pathology slides can be digitized and e-mailed ahead of time as well. Such remote meetings save time if a face-to-face consultation is not needed. This is particularly important when vast distances are involved. It bears reemphasizing that these solutions are scalable. The simplest system may only involve e-mail access and a telephone, with software routinely available in the office context, such as Microsoft Word and PowerPoint, and accessories built into Windows or Macintosh or even a handheld device.

Yet another inexpensive and effective method to experience live videoconferencing uses a program called PVX, a standalone application for desktop computers designed and sold by Polycom[22] for $119.95, single license. When combined with a microphone and web cam connected to one's (necessarily high-powered) computer, the user has the equivalent of a $7,000 dedicated video teleconferencing box. One can use this to connect point to point to anyone with a "talking head" box or similar software. If a video bridge is used, the connection may be distributed among several participants. A free trial of PVX is available from the Polycom web site.[22]

Physicians may also download and install Skype[23] for free. This software was acquired by Microsoft in 2011 and will satisfy many of your video teleconferencing needs. Skype is now commonly used for worldwide communication as a quick fix for commercial television networks to link with reporters and commentators at far remote locations. Any number of similar videoconferencing applications, such as Google Video and Voice Plug-in[24] are also available. Similar inexpensive applications for site-to-site communications are shown in Table 1. Simple text chats approximate conversations, with icons and thought bubbles, making it easy to see who is saying what. Multiple file types can be transmitted by simply dragging them into your chat. Images or web links display in a message window with a click. Additionally, for Mac users, the built-in iSight camera and microphone provides high-quality video and audio chats with colleagues. One may chat with just one other person or multiple sites. Mac OS X 10.6 is required.

Multiple switching and signal selection/signal distribution techniques

Often the simplest approach may be used to "fix" a problem. The rapid evolution of medicine often mandates periodic changes and modifications in telecommunication systems, considering utility, efficacy and cost effectiveness issues. At times "thinking outside of the box" can satisfy the needs of staff. Components may be added as needed by using the simple signal acquisition or distribution devices and cables as suggested in Table 1 that may provide easy methods to reroute signal paths. Working closely with your IT specialists will enhance choices and expedite solutions, as they often suggest very simple solutions for difficult situations. In particular, they may easily resolve problems such as video definition levels required and "presence" that the participants seem to require in conferencing. As an example, high-definition standards and interconnectivity using HDMI [high-definition multimedia interface] are often promoted, but unnecessary. Users should recognize that S-Video remains a standard and is common for interfacing. Most codecs provide S-Video input and output. Of note is that the

TABLE 1 Inexpensive applications for site-to-site communications

Hardware

Device type	Source	Cost	Web site
S-Video 4-to-1 Switch (manual)	svideo.com	$24	http://www.svideo.com/svideo4to4.html
S-Video Switch	Recoton	$29	http://www.amazon.com/Recoton-SVS1000-S-Video-Switch/dp/B000031WCH
VGA-Video Switch	StarTech.com	$179	http://www.startech.com/item/VS410RVGAA-4-Port-VGA-Switcher-with-Audio-and-RS-232.aspx
4-Way Audio/Video Selector Switch	Radio Shack	$30	http://www.radioshack.com/product/index.jsp?productId=3709743
S-Video Y-Cable	Cables 2 Go	$18	http://www.cablestogo.com/product.asp?cat%5Fid=2009&sku=29164

Software

Name	Purpose	Cost	Web site
PVX	Computer-to-computer conferencing	$120, free trial available	http://www.polycom.com/products/telepresence_video/video_conference_systems/personal_systems/pvx.html
Skype	Versatile video-conferencing	Free	http://www.skype.com
Google Video and Voice Plug In	Point-to-point conferencing	Free	http://www.google.com/chat/video
NetMeeting	Microsoft	Free, charges if you are meeting sponsor	http://www.microsoft.com/downloads/details.aspx?familyid=26c9da7c-f778-4422-a6f4-efb8abba021e&displaylang=en
WebEx by Cisco Systems	Conferencing for all types of computers	$50/month	http://www.webex.com/lpintl/us/sem/sem-together.html?CPM=KNC-sem&TrackID=1021381&semid=sWYmpndQV_4559991026
Gotomeeting options			http://www.gotomeetting.com/fec/
iChat 5.0.1 for MAC users (Mac OS X 10.6 is required)	Videoconferencing for Mac, OSX software included with operating system	Free	http://www.apple.com/macosx/what-is-macosx/ichat.html

Codecs

Tandberg Edge	http://www.ivci.com/videoconferencing-tandberg-edge-series.html
Tandberg Codian	http://www.tandberg.com/codian-video-conferencing-products.jsp
Tandberg Quickset	http://www.ivci.com/videoconferencing-tandberg-quick-set-c20.html
Polycom DX6000	http://response.polycom.com/forms/04-DR-PS-SEARCH-2011-HDXSweeps-v2?gclid=CKyGyPjbtq0CFc3DKgod71_NoA
Lifesize	http://www.lifesize.com/landingpages/lk_us/index.html?_kk=sony%20video%20conferencing&_kt=5c36d8e1-9322-43e0-bcab-9d9c26cbee8d&gclid=CLKwkvLctq0CFYHAKgodAGdymA
Fuze	http://www.fuzemeeting.com/

Telesynergy system still accommodates S-Video signal sourcing and distribution as central.[25]

CODEC choices as an important option to produce cost savings

A decade ago, videoconferencing was expensive and out of reach for most community hospitals mainly because of expensive ISDN or ISDN PRI line charges imposed by telephone companies. Recently, manufacturers and vendors of videoconferencing systems have devised Video OIP protocol-based codecs and software (Table 1). If the reader is presently using older ISDN or ISDN PRI-based systems with high-line installation costs and ongoing phone line charges, consider an immediate change. Monthly operating costs can be eliminated and hospital-wide usage can immediately increase. If such conversion to a newer Video OIP system is considered, we estimated that the break-even point for purchase and conversion was about 12-14 months. Recurring charges dissipate with conversion. The NIH recently required a retrofit for all such older ISDN-based systems to newer Video OIP codecs for all Telesynergy systems.[26]

TABLE 2 Initial tumor board metrics for UPMC McKeesport Hospital (2004-2007)

Year, quarter	Total attendance	Physicians with CME/CME, h	Other health care professionals	Cases discussed	Time per case, min
2004					
4	149	60/60	89	17	30
2005					
1	146	74/73.3	72	22	27
2	154	82/82	72	27	32
3	233	128/132	105	30	29.5
4	367	258/166	109	36	24.3
2006					
1	293	182/188	111	33	21.7
2	331	200/206	131	33	19.5
3	475	315/289	160	39	29
4	520	329/323	191	45	29.3
2007					
1	386	249/333	137	45	25.7
2	346	170/219	176	54	19.5
3	308	139/184	169	49	18.5
4	312	131/189	181	54	21.3

Video streaming for other alternative connections for community education

For the newer Telesynergy system and other new Video OIP codecs, signals may be routed to a secondary desktop computer with an installed OSPREY video card (Table 1) with free Windows Media Encoder software. This combination allows outgoing (one-way) capture, encoding, and transmission of audio-video meeting signals via live streaming to any Windows Streaming Media server, providing viewing capabilities to health providers or community groups worldwide. Most streaming is simple and costs very little — for example, ours costs $140 a month for 24/7 service with a bandwidth sufficient for streaming to 30 simultaneous sites worldwide.[13] Key installation steps consist of: signal acquisition and routing, selection of an input card for encoding, installation of streaming software, and pushing an encoded signal to a media web server. Signal acquisition is commonly provided by most codecs like Tandberg[26] or if needed, by a device such as the Velocity S-Video splitter cable or an audiovisual amplifier/distribution box.[27] Encoding with a Windows desktop PC is easy, with purchase of the recommended Osprey card.[28] Windows Media Encoder 9 is downloaded from the Windows site[29] to convert source AV signals to the encoded version. The encoder screens are very intuitive and easy to use, much as Skype or other point-to-point software is. The stream can be switched on and off as needed. All outgoing stream information must be HIPAA compliant and consistent with standards of good taste – remember that video streaming is to a worldwide, publicly available web site with open access. Direct e-mail announcements will alert intended recipients of program time and nature, minimizing uninvited participation by others. Also, with stream off, the URL disappears from the web!

Results

Although this communication emphasizes methodologies, utilization metrics demonstrate the efficacy of our approaches in the community hospital setting. Our conferencing experience during our initial 3 calendar years (October 13, 2004 to December 19, 2007) is summarized in Table 2. Our UMPC McKeesport hospital group including ROCOG partners at Jameson and Somerset Community Hospitals, have completed a multitude of types and applications of videoconferencing that included support for tumor boards, presentations, remote clinical consultations, many special topic joint conferences that provided many hours of continuing medical education (CME) and continuing education (CE) credit activities (Tables 2 and 3). A more specific summary for McKeesport tumor boards (Table 2) showed a rather significant and dramatic rise in staff participation and a resulting relatively high level of activity through the initial years. The data showed the initial dramatic rise in utilization during the first year and

TABLE 3 Aggregate maximum videoconferencing activities for ROCOG program, 2004-2011[a]

Type of activity	Meetings/year	Average attendees/meeting (length of meeting, h), attendees/y	CME, h	CE, h
McKeesport Hospital				
Multidisciplinary tumor boards	35	24 (1+ h), 840	Yes, 578	Yes, 233
Combined tumor boards, thoracic conferences	15	28 (1.5 h), 420	Yes, n/a	Yes
Joint site thyroid conferences	12	5 (1-1.5 h), 60	Yes, 90	Yes
Mentoring conferences	11	4, 44	No	No
Special topic conferences	6	Variable	Variable	Variable
Jameson Hospital				
Multidisciplinary tumor boards	27 (biweekly)	343	95	76.5
Remote medical store-and-forward consultations (radiation oncology)	52 (weekly; 163 patients per year)	Very variable, 250	0	0
Other special topic or admin medical conferences	Variable	Variable	0	0
Somerset Hospital				
Multidisciplinary tumor boards	12 (monthly)	204	144	60+
Remote medical consultations	493 (41/month)	1,479 discussions	0	0
Other special topic or admin medical conferences	52 (weekly chart rounds, peer review, and Q&A)	500+ 123 623 participants/year	0	0

[a] Data shows signed attendees with CME or CE credits with 5,179 total personnel events and CME accredited events of 3,844. CE or CME credit hours and types are determined by each facility.

even more subsequent increases in attendance, in part attributable to resident physicians in internal medicine and family medicine programmatically scheduled. Overall attendance to date has consistently stabilized at the 325 persons/quarter level. During our initial 6 calendar (2004-2009) years, we and our ROCOG partners at Jameson and Somerset community hospitals have collectively completed more than 1,300 hours of conferencing system use and supported 765 tumor board presentations, 1,500 remote consultations, 325 special topic joint conferences, and provided health care personnel with more than 6,000 hours of CME and CE credits. These data are partially summarized in a presentation by Rakfal[30] and in Table 3.

System improvement issues

The high activity levels noted were accomplished with an average of fewer than 8 quickly resolved technical issues a year. We successfully implemented 7 major system modifications, 5 software additions, 8 system signal distribution changes, 3 critical component repairs including a stolen video camera, and a nonrepairable codec problem. We used 6 participant evaluation approaches in survey form to provide participant feedback and to respond to specifics and requirements.

Participant satisfaction and impact assessments continually measured participant satisfaction and program impact levels have been consistently high.[11,30] Most critically, continuing participant evaluation focused on assessing degrees of satisfaction measuring 6 elements and also the effects of meetings on 10 behavioral impacts noted by participants. Participant satisfaction surveys during 2007, 2009 and 2012 included assessments of degrees of satisfaction using a scale of 1 (poor) to 10 (very high) for case mix, time per case, quality of presentations, clarity of specialist related details, adequacy or number of special presentations and acceptability of food and beverage service for the meetings. With the exception of special meeting assessments and the acceptability of food and beverage service, all satisfaction measures were consistently 8 or higher, based on a 1 (low) to 10 (high) scale.

Assessments of meeting participation on professional behavioral (impact) changes in 10 key categories based on a scale of 1 (very low) to 5 (very high) reflected positive changes attributable to meetings. Impact measures were assessed in 2009, 2010, and 2012. Areas included increased use of accepted medical websites such as NCCN, a multidisciplinary approach to cancer care, use of new diagnostic and therapeutic strategies, use of evidence-based guidelines in practice, improvements in communication, incorporation of ethical principles in clinical decision making and others. Results for all 10 impact

categories were very high, ranging from a low of 3.79 to 4.94 (on a 1-5 scale) in each of the surveys. Even more importantly, the comments offered provided very specific suggestions promoting positive and minimizing negative activities. All these assessments provided us with direction for continuous refocusing on expanding the versatility and utility of videoconferencing systems in our community hospital oncology center settings.

Discussion and conclusions

The conference room

Participatory environment and associated human factors are most important in terms of nurturing presenter and audience involvement, intensity and comfort during meetings and presentations.[31] Optimizing the environment is often a balancing act adjusting many factors, including desktop space for paperwork. Periodic participant satisfaction surveys and other technical assessments by audience members, as we reported, are appropriate to collect opinions that may not be otherwise expressed. Conclusion: Environment is important. We have found that simple, relatively cheap fixes are usually readily available and can accommodate most environmental issues, enhancing participant satisfaction and learning experiences.

Web-based radiology

Images and other associated imaging systems and their regulatory aspects have been reviewed by Pinto and colleagues.[32] The multimodality nature of cancer treatment has required wide-ranging and instant medical records retrieval. Remote access methods for other information requirements such as real time access to radiation treatment planning systems and other remotely accessed systems[33,34] are key to multimodality approaches and learning. Conclusion: Adding the ability to directly access many pre-existing types of web-based medical information systems and also remotely access many internal hospital information system sources has proven vital to simple, cost-effective conferencing.

Signal distribution

Versatility enhanced with Multiple Signal Selection/Switching and Multiple Signal Distribution, using inexpensive Y cables, distribution amplifiers, switches and other routing devices, are the easiest techniques for adding components or routing signals appropriately. These simple modifications enable shared learning at both new internal or external venues.[35] Such evaluation and change may seem perpetual and inevitable. Conclusion: Even the most sophisticated videoconferencing systems may require periodic modifications as medical needs evolve. Focusing on simplicity and versatility of communications links is always appropriate.

CODEC choices

Older systems based on ISDN or ISDN PRI connections incur costly installation charges, often with monthly fees of $1,500 for modest levels of conferencing. Werner and Anderson[36] suggested such high costs are excessive and in particular, preclude rural connections. In contrast, the newer Video OIP codec has nominal installation costs with no recurring call charges. We suggest that if one is contemplating a new venture into video conferencing, it is most appropriate to only consider Video OIP options. We conclude that detailed conversations among medical program team members and information system specialists concerning Internet access, bandwidth issues, firewall and security requirements, and HIPAA compliance are essential for conferencing.

Video streaming

To date, we have streamed more than 60 hours of Internet-based links from our system. Video-streaming is easily implemented for distance providers or community members with internet access. Streaming is cost effective, environment friendly or green in that travel to a meeting site may be minimized, thus saving time and money and reducing carbon footprints. Although streaming is unidirectional, feedback for those wishing to ask questions or make comments may be provided by phone calls. An open stream should never be used for proprietary or confidential patient information. Streaming video approaches are ubiquitous in health care industry, news organizations, commercial interests and some government sites and are proven valuable adjuncts to biomedical education. Streaming within a secure environment as described by Jeun and colleagues,[35] for multicenter radiology communications is more complex than open web streaming[37,38] by oncologists at secure sites. Streaming video has been reported in many applications; Garrison[39] has suggested it is moving into the mainstream. Schneider and associates have even suggested wireless streams as effective in medicine[40] and we have suggested its value for communication with rural physicians and disadvantaged populations.[41] Biomedical streaming with audio responses may satisfy many biomedical communication needs, particularly in oncology. We conclude that although streaming is a "one way out" type of approach to provide recipients with information, 2-way communication as detailed previously may be implemented with concurrent phone conference calls, or even more secure web-based applications such as Skype that are point-to-point applications.

HIPAA considerations and compliance

The Summary of the HIPAA Privacy Rule[42] suggests that compliance with required patient confidentiality is-

sues is straightforward, simple, and nononerous. The foremost and most overriding issue is that no patient-related identifiers are used in a public venue of any type that would (or could) be used to breach patient confidentiality. Such identifiers would include any information such as an address, telephone number, photo, social security number, name and associated initials, credit card information, e-mail addresses, family-associated information, even postal box numbers. Also inappropriate are health care providers' careless comments about patients in a public venue such as a hospital hallway or elevator. Patient-related chit-chat or lunch room gossip is not tolerated. Even careless misplacement of patient papers, computerized or digitized electronic records, or patient biomedical images could constitute a serious breach of patient confidentiality. The HIPAA summary also specifies that appropriate communications among many health care workers such as care providers physicians, nurses, technicians, laboratories, and many others involved in patient care and management are always acceptable. We also suggest these may include students or trainees who may be involved with care within the hospital or clinic environment. There is also a summary that succinctly describes acceptable information use by what are known as Health Care Clearinghouses, as well as Business Associates of the hospital. We suggest that these external communications are usually well controlled by your hospital's administration on a continuing basis. Research- or public-health–related issues are also addressed.

The reader is particularly encouraged to remember that patient confidentiality issues pertain to any and all means of communication including face to face, paper transmission or fax, mail and courier services, electronic communications, facility meetings such as tumor boards chart rounds or case reviews and consults, which would include electronic and remote consults. Of all the means of electronic medical communications we have discussed in this paper, only live videostreaming to open distribution worldwide represents an inherent need for extreme HIPAA-related caution. All other point-to-point methodologies inherently prevent interlopers. Your facilities information technology personnel can evaluate date integrity and patient confidentiality issues for your electronic communication systems. In addition to the above-mentioned HIPAA considerations, we strongly suggest one additional common sense consideration: always share communications related to patients only with those with a *need to know* the information. If the answer to the question "do they need to know?" is "no", don't give it.

General conclusions

If considering changes or improvements to the community hospital's distance communication or meeting environment requirements for any medical specialty areas, the reader is encouraged to first form a resource group to discuss issues and to formulate an initial game plan. We have presented many options and methods available to reconfigure existing meeting and distance communication options suitable to the community hospital environment. We have also presented utilization metrics documenting the growth and evolution of our own 3 hospital programs demonstrating improved professional learning experiences and enhanced community outreach or linkage. For those fortunate enough to have an existing videoconferencing unit we suggest how to become more flexible and diverse when using the system. For those without videoconferencing, we also demonstrate how many biomedical teaching and distance learning efforts can be improved using a "shoestring" budget in a primarily community setting.

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