Heath Network Clinicians Use and Need for Clinical Information Sources: Results of a Survey

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Background:

There have been numerous inquiries from The University of Vermont Health Network (UVMHN) clinicians and administrators about electronic access to UVM Dana Medical Library resources since the network was established. Dana Medical Library (a Department of UVM Libraries) licenses and provides access to information resources to clinicians and staff of the UVM Medical Center (UVMMC), but not to other network hospitals. Judging from the inquiries we have received, there are unmet information needs among the clinicians at those hospitals. Therefore, UVM Dana Medical Library and UVM Health Network representatives began discussing how to think about this problem. A first step was to collaborate on a survey of all network hospital clinicians to identify their needs for information resources relevant to their professions and patient care.

We set out to determine 1) What clinical information resources were currently being used by clinicians 2) What resources they needed but were lacking; and 3) What barriers they encountered in seeking information sources. We were especially interested in the needs of community hospital clinicians compared to clinicians who primarily practice at UVMMC.

Methods:

Representatives of the UVMMC Marketing & Communications Department, the Dana Medical Library Director, and the Dana Medical Library Collections Specialist developed the survey. The survey's purpose was to identify information resource preferences, usage, and gaps in availability for clinicians, including physicians, physician assistants, nurses and other professionals across UVMHN.

The survey instrument was designed to identify 1) how the clinicians accessed health information, 2) their reasons for seeking health information, 3) their most frequently used information resources, 4) those resources desired by clinicians that are unavailable, and 5) the barriers to using information resources. Questions were primarily multiple choice, with opportunities to add choices not listed. Several questions allowed for more than one answer. The complete survey instrument is provided in the Appendix.

The survey instrument was created using the Survey Monkey tool licensed by the Dana Medical Library. The president and CEO of the UVMHN Medical Group distributed the survey with an introductory email to the CEOs of network community hospitals and to individual UVMMC clinicians. Community hospital CEOs were asked to send the survey to all clinicians in their hospital, inviting them to participate.

The survey was also distributed to all UVMMC clinicians. The survey was open between June 21, 2017 and July 20, 2017. We analyzed the data using frequency counts and percentages. For the results reporting, we aggregated the responses of the community hospitals and compared them to the UVMMC responses since the information-seeking practices and views of those hospitals

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were of major interest. Where proportional differences appeared significant, we performed a statistical test using STATA software and Chi 2, Fisher's exact test, or rank-sum tests.

Results

A total of 464 health care clinicians participated in the study. There were 366 clinicians (79%) from UVMMC, and 98 (21%) clinicians from 5 community hospitals. One site, Alice Hyde Medical Center, had no initial responses to the online survey, but later sent 8 written responses. Those were not included in this report.

Table 1: Responses by Site

	# of Responses *n* (%)
Network Community Hospitals	98 (21)
Alice Hyde Medical Center	0 (0)
Central Vermont Medical Center	45 (10)
Champlain Valley Physicians Hospital	3 (1)
Elizabethtown Community Hospital	10 (2)
Hudson Headwaters Health Network	1 (<1)
Porter Medical Center	39 (8)
University of Vermont Medical Center	366 (79)
Total Respondents	**464 (100)**

Physicians were the largest proportion of respondents to the survey, at 40%, and when Advanced Practice and Registered Nurses were combined, they comprised the second largest group of responders, at 35%. See Table 2.

Of the 98 community respondents, 60 (62%) were MD/DOs, 14 (14%) were Advanced Practice Nurses and 14 (14%) were Registered Nurses. There were 8 Physician Assistants (8%) and 2 (2%) other professionals.

UVM Medical Center's 366 respondents included 125 (34%) MD/DOs 118 (32%) Registered

Nurses, 17 (5%) Advanced Practice Nurses, 8 (2%) Physician Assistants and 97 (27%) other

professionals. The UVMMC "Other" professional roles category included LNAs, LPNs,

Pharmacists, Psychologists, Physical Therapists, and Social Workers.

Table 2: Respondents by Professional Role

Professional Role	All *n* (%)	Community Hospitals *n* (%)	UVMMC *n* (%)	% diff
MD/DO	186 (40)	60 (62)	125 (34)	(28)
Advanced Practice Nurses	31 (7)	14 (14)	17 (5)	(9)
Registered Nurses	132 (28)	14 (14)	118 (32)	(18)
Physician Assistant	16 (3)	8 (8)	8 (2)	(6)
Other Professional	99 (22)	2(2)	97 (32)	(30)
Total Respondents	**464 (100)**	**98 (100)**	**366 (100)**	

Clinical Resource Access Method

Clinicians in both groups most frequently accessed the clinical information resources they

needed through the hospital network (See Table 3). "Hospital Intranet" was chosen by 60% of

community hospital clinicians and by 78% of UVMMC as the search engine or platform

technology through which they most often seek clinically relevant information. The General

Internet, including Google, was the next most frequently reported access technology used by all

clinicians. Fifty seven percent of community hospital clinicians and 64% of UVMMC clinicians

report searching *Google* or another Internet search engine.

Table 3: Current Access Methods

Access Methods	All *n* (%)	Community Hospitals *n* (%)	UVMMC *n* (%)	% diff
Hospital Intranet	326 (74)	56 (60)	269 (78)	(18)
Google	276 (63)	54 (57)	221 (64)	(7)
Personal Subscription	155 (35)	43 (46)	112 (32)	(14)
PubMed	208 (47)	25 (27)	182 (53)	(26)
Social Media	22 (5)	2 (2)	20 (6)	(4)
Request through Librarian	73 (17)	10 (11)	63 (18)	(7)
Other	72 (16)	22 (23)	50 (14)	(8)

Table Three- Multiple Responses Allowed

Proportionally fewer community hospital clinicians used *PubMed* as an access technology than UVMMC clinicians (27% vs. 53%). Although often considered as a content database with journal article citations and abstracts as its primary product, *PubMed* is also an access technology in that it serves as a direct link to published journal content from the identified citations. Community hospital clinicians used *PubMed* in this way significantly less often than their UVMMC counterparts. Requesting resources through a librarian was reported by both groups. While CVPH and UVMMC clinicians have other on-site library and librarian services, other community hospital clinicians may access library services through the Dana Medical Library Health Research Affiliates (HRA) program discussed in this report. Community hospital clinicians also reported greater reliance on personal subscriptions than UVMMC clinicians (46% vs. 32%).

Frequency of Information seeking

Both UVMMC and community hospital clinicians seek information regularly. When asked "In the last month, how often did you refer to a print or electronic information source in support of patient care, or for other reasons," 144 (42%) of UVMMC respondents and 49(52%) of community hospital respondents answered that they sought information ten or more times in the last month. The data show that community hospital clinicians seek clinical information more often than those at UVMMC. The median frequency of information seeking by community hospital clinicians was 5 on a scale of 1-5 where 5 equaled ten or more times per month. The

median in the UVMMC groups was (4) which equaled 7-9 times per month (Wilcoxon rank-sum

z=2.5, *P*=0.01). There were no survey questions asking how often their information seeking was

successful.

Table 4: Frequency of Information Seeking

Access Methods	All *n* (%)	Community Hospitals *n* (%)	UVMMC *n* (%)	% diff
Hospital Intranet	326 (74)	56 (60)	269 (78)	(18)
Google	276 (63)	54 (57)	221 (64)	(7)
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Table Three- Multiple Responses Allowed

Reasons for Seeking Clinical Information

Patient care was the main reason for seeking information sources among clinicians overall 390

(89%) (See Table 5.) For community hospital clinicians, a higher proportion, 92 (97%) , cited

patient care as the main reason for seeking clinical resources, followed by 66% for continuing

education and 26% teaching.

For 87% of UVMMC clinicians, patient care was the reason for seeking information sources.

Other reasons included continuing education (56%), teaching (49%), and research, (29%).

In the "Other" option, clinicians from both groups noted policy generation or updating

guidelines as reasons for information seeking. Other reasons reported by clinicians included

quality improvement projects, clinical care plans, and lab testing.

Table 5: Reasons for Seeking Clinical Resources

Results	All *n* (%)	Community Hospitals *n* (%)	UVMMC *n* (%)	% diff
Patient Care	390 (89)	92 (97)	297 (87)	(10)
Continuing Education	254 (50)	63 (66)	254 (50)	(16)
Teaching	193 (44)	25 (26)	168 (49)	(23)
Research	108 (25)	9 (9)	99 (29)	(20)
Other	20 (5)	2 (2)	18 (5)	(3)
Total Respondents	**437 (100)**	**95 (100)**	**341 (100)**	

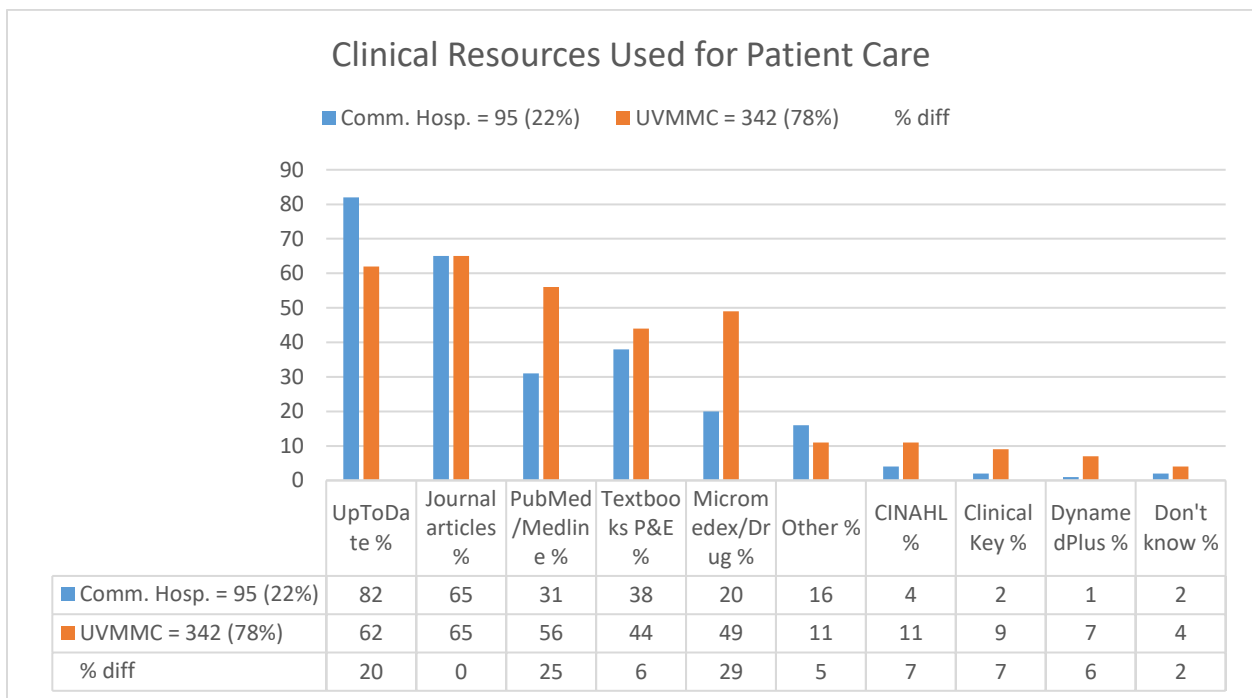*Clinical Information Resources Used by Clinicians*

Clinicians reported clinical information resources they had used for patient care in the last month. They could check all that applied and add other resources. Overall, two-thirds of clinicians reporting using *UpToDate* and journal articles. Over 50% reported using *PubMed/Medline*. The next most frequently used resources were print or electronic textbooks, and *Micromedex* or other drug databases. Clinicians responding to this question chose an average of 3 resource types each (1,346 responses from 438 clinicians).

The choice and number of resource types used varied between the provider groups. A higher proportion of community hospital clinicians used *UpToDate*, (82% v. 62%), a 20% difference. A smaller proportion of community hospital clinicians used PubMed, (31% v. 56%), a 25% difference. There was a substantial difference in the use of a drug database such as *Micromedex*, 20% of community hospital clinicians had used one in the previous month, compared to 49% of UVMMC clinicians, a 29% difference. Community hospital and UVMMC clinicians indicated they used journal articles equally (65%). There was a 6% (38% vs. 44%) difference in the use of print or electronic textbooks, and a 7% difference (4 % vs. 11%) in the use of *ClinicalKey*, an aggregated set of electronic textbooks, with UVMMC clinicians using the resource type more often.

In the "Other" resources used, 16% of community hospital clinicians reported use of the drug database *Epocrates*, and individual journals such as the *New England Journal of Medicine* and *Prescribers Letter.*

"Other" Resources used by UVMMC clinicians included *Natural Medicines* and *The Cochrane Library*. Community hospital clinicians reported using an average of 2.6 resource types in the previous month UVMMC clinicians used an average of 3.2.

Figure 1: Information Resources Used by Community Hospitals and UVMMC Clinicians

Clinical Resources Used for Patient Care

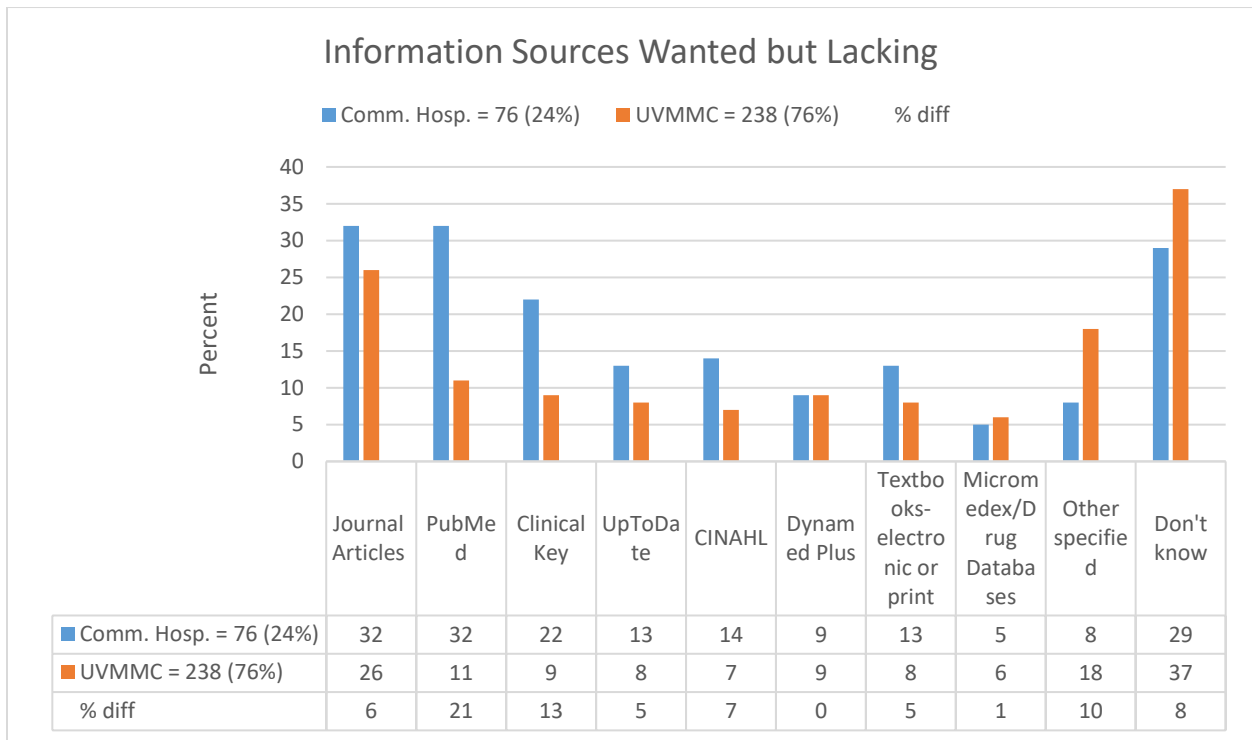|	UpToDate %	Journal articles %	PubMed/Medline %	Textbooks P&E %	Micromedex/Drug %	Other %	CINAHL %	Clinical Key %	DynamedPlus %	Don't know %
Comm. Hosp. = 95 (22%)	82	65	31	38	20	16	4	2	1	2
UVMMC = 342 (78%)	62	65	56	44	49	11	11	9	7	4
% diff	20	0	25	6	29	5	7	7	6	2

Resources Wanted but Unavailable

Clinicians were asked what clinical resources they wanted or needed for patient care but could not access. Multiple answers were accepted, and the "other" option allowed for unlimited free-text.

The type of resource found lacking by the greatest number in both groups was journal articles. Community hospital clinicians responded that they lacked access to journal articles more often than UVMMC respondents (32% v. 26%). By a percentage difference of over 20%, community hospital clinicians reported not having access to PubMed (32% vs. 11%). Some clinicians in both groups reported lack of access to *UpToDate*, for which the entire network and the UVM Dana Medical Library have a joint license.

Figure 2: Information Sources Wanted but Unavailable.

Information Sources Wanted but Lacking

	Journal Articles	PubMed	Clinical Key	UpToDate	CINAHL	Dynamed Plus	Textbooks-electronic or print	Micromedex/Drug Databases	Other specified	Don't know
Comm. Hosp. = 76 (24%)	32	32	22	13	14	9	13	5	8	29
UVMMC = 238 (76%)	26	11	9	8	7	9	8	6	18	37
% diff	6	21	13	5	7	0	5	1	10	8

ClinicalKey was reported as desired but unavailable by 22% of community hospital clinicians vs. 9% of UVMMC clinicians. *ClinicalKey* is a large aggregation of over 1000 medical textbooks, medical journals, and procedures published by Elsevier Inc. Community hospital clinicians also

reported a lack of print and electronic textbooks in proportionally greater numbers than UVMMC clinicians.

Fourteen percent of community hospital respondents reported wanting access to *CINAHL* (Cumulative Index to Nursing and Allied Health Literature) vs. 7% in UVMMC, where it is available. "Don't know" was the response by 111 (35%) of all respondents, 89 of whom were UVMMC respondents. There were 43 "Other" responses from UVMMC in response to this question. Seventeen of those "Other" responses reported having "no need for more" resources. Seven wanted specific journal titles and 11 mentioned specific resources including *Essential Evidence Plus*. From the community hospital clinicians, 22 replied "Don't know" to the question. Six "Other" respondents repeated the need for full text journals, and one reported a need for *VisualDx*. No community hospital provider reported "No need for more" resources.
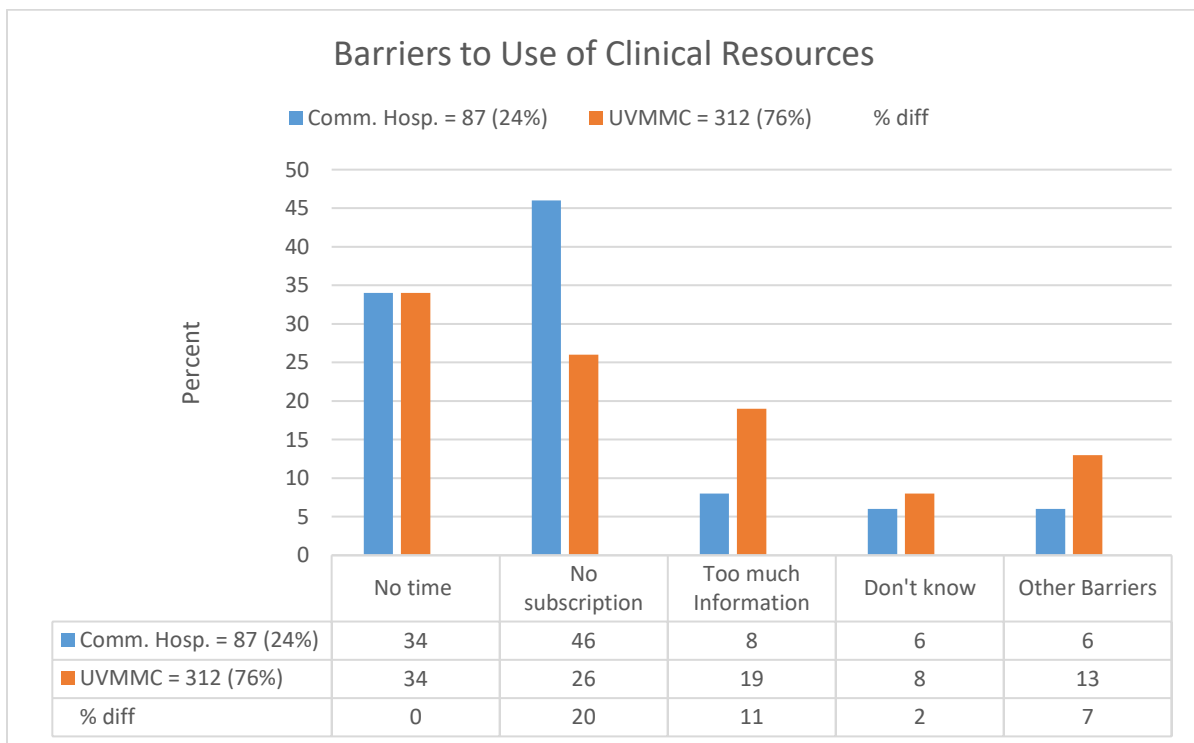
Barriers to Use of Clinical Information Resources

The last question on the survey was "which of the following represent barriers to your use of clinical information sources? "Not enough time" and "Lack subscription to needed resource" were primary barriers to the greatest numbers of clinicians for both groups. Not enough time was an equal barrier for each group. "Lack subscription to needed resource" was a barrier for a substantially greater proportion of the community hospital group, 46% compared to 26% from UVMMC. "Too much information to sift through" was a more significant barrier for the UVMMC group (community hospital 9% vs. UVMMC 19%). Overall, there was a statistically significant difference in the responses of the two groups to this question that is most apparent

in the response to the "No subscription to needed resource" and "Too much Information to sift through" choices (Chi2 = 16.9   P<0.01).

The additional "Other" barriers specified by 40 UVMMC respondents included more detailed explanation of the obstacles faced. The most-mentioned barrier was remote access, or difficulties using the Gateway to access resources, especially from a remote location. One said the information was "not presented in a manner to be reasonably integrated into a 15 minute visit". Community hospital comments repeated the "limited access to electronic resources" problem and lack of access overall as barriers. One respondent stated the barrier of not having access to PubMed at CVMC.

Figure 3: Barriers to Use of Clinical Resources

Barriers to Use of Clinical Resources

	No time	No subscription	Too much Information	Don't know	Other Barriers
Comm. Hosp. = 87 (24%)	34	46	8	6	6
UVMMC = 312 (76%)	34	26	19	8	13
% diff	0	20	11	2	7

There was a technical problem with this question, which, for the first week, did not allow respondents to "check all that apply". Many solved that problem by using "Other" as their choice and then supplying written comments naming additional barriers.

DISCUSSION AND IMPLICATIONS

These results indicate that UVM Health Network clinicians in all locations do seek information to support patient care often and most often seek information resources through their institution's intranet. Their primary reasons for seeking clinically relevant information were patient care and continuing education. However, despite similarities, the survey results demonstrated the disparity that exists between the community hospital clinicians and the UVMMC clinicians in terms of the clinical information resources available to them and the obstacles to access they face. There may also be disparities in technology infrastructure optimized to facilitate provider access to information resources.

Information Resources Used: *Most Clinicians Use UpToDate*

Clinicians in both groups report substantial use of *UpToDate*. This usage demonstrates that making evidence-based point of care research knowledge available is valued by Health Network clinicians. The higher proportional use of *UpToDate* by community hospital clinicians could be because *UpToDate* is their most available and reliable source. The *UpToDate* license is the only resource available throughout the network.

Community hospital and UVMMC clinicians reported using journal articles equally often (65%), however it was not reported which journals were most frequently accessed by community hospital clinicians compared to the UVMMC clinicians. The differences in institutionally

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subscribed journal content and reliance on personally subscribed content may negatively affect the outcome of community hospital provider information-seeking in the journal literature.

Resources Unavailable and Barriers to Information Seeking

When it came to reporting resources wanted or needed but not accessible, insufficient access to wanted journal articles was reported by all Health Network (UVMMC and community hospital) clinicians but was most greatly felt by the community hospital clinicians. Lack of subscription to resources also was disproportionately raised by community hospital clinicians in the final "Barriers" question. The statistically significant 20% difference reflects the reality that over 5,000 electronic journal subscriptions in the medical and health sciences are available to UVMMC clinicians through the University of Vermont Dana Medical Library, but they are not available to community hospital clinicians. To our knowledge, there are severely limited subscriptions or licenses to medical and nursing journals at the Health Network Hospitals.

Access Technologies as Facilitators and Barriers

Access to technology platforms that provide access to clinical knowledge content can be as problematic as the access to the content itself. The smaller proportion reporting accessing health information resources through their hospital intranet and the much smaller proportion using PubMed as an access platform are concerning. These findings may indicate a lack of facilitation of access to externally available resources within the community hospitals.

PubMed is a free medical journal citation database developed by the NIH/National Library of Medicine that is free on the open Internet.

The lack of PubMed usage and journal article access in community hospital could stem from both network technology limitations in the institutions and limited subscribed journal content. If the network technology were improved and the electronic journal licenses increased, clinicians might link successfully to the full-text of wanted articles more often.

Barriers Clinicians Face

The "No Subscription" barrier that was reported by community hospital clinicians clearly reflects the insufficiency of licensed resources in community hospitals. It also may reflect network technologies and platforms in institutions that are not optimized for information resources even if they do not require a license.

Lack of knowledge of available resources and/or education in their use was also reported as a barrier in the "Don't know" choice and "Other barrier" comments of both groups. Lack of knowledge of available resources is further validated by UVMMC clinicians who expressed lack of access to *UpToDate*, *PubMed*, and other resources that are available to them. Education in literature searching and use of free and subscribed resources on all UVM Health Network Intranets could help this problem.

Continued Evidence of Need

Since this survey closed, we have continued to hear from clinicians at Central Vermont Medical Center, Porter Medical Center, and Alice Hyde Medical Center about the need for information sources that clinicians in those locations want and need.

Other research supports these findings. Health care clinicians have reported in multiple studies that referring to clinical information sources changes their diagnosis and treatment decisions

for the better and helps to avoid adverse events. In a multi-site survey of 16,000 healthcare clinicians in 118 U.S. hospitals, 75% percent of respondents reported changing a diagnosis or treatment plan after consulting a clinical evidence source. [1] Yet, health care clinicians also report substantial barriers to answering clinical questions and the use of clinical evidence technologies, such as lack of time, limited access, insufficient skills, and belief that there is no evidence to answer questions. [2]

Limitations of the Study

This study had limitations. The low response rate from some institutions, notably CVPH, may have impacted the outcomes. Other uneven response rates were due to variations in the timing of the survey distribution and variations in the provider groups that received it. The analysis does not take into account the differences between community hospitals themselves. However, there were sufficient similarities among the community hospitals and differences with the UVMMC to support meaningful comparison.

Next Steps

This research showed that there are unmet information resource needs among all UVM Health Network clinicians but in particular among the clinicians in the Health Network hospitals outside the UVMMC. In particular, the lack of access to clinical evidence in research journal articles is greatest for them. Other barriers to the use of medical and nursing literature include lack of time, and the need for education in how to use available resources.

What steps can be taken by the UVM Health Network in collaboration with the University of Vermont Dana Medical Library to provide information resources to meet clinicians' information needs relevant to patient care and continuing education?

Possible Strategies:

1. Expand joint procurement of Information sources on the *UpToDate* model.

Currently, 5 community hospitals and the University of Vermont Dana Medical Library cooperate on licensing *UpToDate*. The UVMMC Procurement Department coordinates the license negotiation with the publisher and arranges the billing to each institution. This model could apply to important journals such as the *New England Journal of Medicine*, and *JAMA* journals, or individual titles. A multi-institutional license to aggregated resources that include full-text medical journals and textbooks such as *ClinicalKey* would also be a possible solution, as would a nursing-focused resource such as *Nursing Reference Center* or *ClinicalKey Nursing*. CEO support for a decision-making framework and understanding of budget requirements would be needed.

2. Improve networked access technologies in the Health Network hospitals.

Encourage each institution to provide easily accessible Intranet webpages that list and link to relevant available information resources such as *PubMed*, open access journal articles via *PubMed Central*, and any subscribed journals using the NLM Link Out link-resolver. IT/informatics departments can implement these in order to provide easy, seamless access to journal literature where there is no librarian.

3. Provide education in finding and use of medical evidence.

Clinicians in both community hospitals and UVMMC reported a lack of knowledge of resources available to them, and uncertainty in how to use them well. Numerous studies have shown that clinicians improve diagnosis and treatment decisions and avoid adverse events when they have used a best-evidence information source. Quality improvement officers and education coordinators could promote and teach the use of best-evidence for patient care and best practices. Dana Medical Library librarians could help with this effort. (See HRA program below and also Dana library current activity at UVMMC).

Other strategies could be explored. New York hospitals may use article delivery services through the New York State Library where possible. A directory of the information resources available at each network hospital might identify possible joint arrangements where there is overlap or need for expansion.

The Dana Medical Library currently offers a Health Research Associate (HRA) program by which employees/clinicians in HRA member hospitals request journal articles, books, and literature searches by email or phone to article delivery staff and librarians at Dana. The institution pays a small annual membership fee and per service charges that are billed monthly to cover costs. Three community hospitals are already members of this program: CVMC, CVPH, and PMC. Classes and educational workshops on using health information can be arranged at community hospital locations as part of the HRA Program. Other hospitals including Rutland Regional Medical Center, Springfield Hospital, and North Country Medical Center (Newport VT) are members of this program.

Conclusion

Expanding access to clinical information resource technologies at community hospitals would

meet clinicians' expressed needs and remove barriers to their use of information sources

relevant to patient care. Additional education for UVMMC clinicians might improve services and

remove barriers for that group.

References

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