

## **Medical Faculty's Use of Print and Electronic Journals: Changes Over Time and Comparison with Other Scientists**

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**ABSTRACT**

A survey of how medical faculty of the University of Tennessee Health Science Center (UTHSC) multi-campus system use print and electronic journals found that medical faculty read a great deal, especially in comparison to scientists in other workfields. Their principal purpose for reading scholarly articles is to support their primary research, and the majority of readings come from recently published articles. Medical faculty continue to rely on print journals (approximately 70% of readings) versus electronic journals; however, many of their readings come from personal subscriptions. Age of faculty does not appear to influence the choice of print or electronic format. Medical faculty read more articles than others on average and need information digested and verified in a way to save them time. Convenience and currency are highly valued attributes. Librarians and publishers must find ways to provide these attributes and match the portability of personal subscriptions in an electronic journal format for medical faculty.

**INTRODUCTION**

The scholarly scientific, technical, and medical journal systems are undergoing tremendous change. With steady increases in the price of print subscriptions, the number of subscriptions has declined correspondingly. Studies show that there are now many alternatives to print journals, including electronic peer-reviewed versions of the traditional journals from the same publishers; aggregated databases of separate articles; e-print servers made up of preprints, post-prints and unpublished articles; institutional open archives; and author's personal web pages [1-2]. Electronic versions of traditional journals change the publication system the least, as they may merely provide more convenient access to subscription-based journals. Options such as e-print servers or open archives are more profound, however, as they change the

publishing system from a journal title model to a separate articles model and may be

accomplished independently of publishers. Medical faculty may be an exception to change, as traditionally they use journals for much of their professional development.

Many research studies over the last decade show that the adoption rate for electronic journals, the viability of alternatives to the traditional print or electronic peer-reviewed journal system, and the pace of change vary considerably by workfield and workplace [3-5]. Meadows reports that traditionally, in the print world, medical professionals have relied heavily on scholarly journals, placing importance on specific journal titles in their sub-disciplines and reading more than most disciplines [6]. It is therefore interesting to see how much of an impact electronic alternatives have had on medical faculty and to compare their information searching and reading patterns and adoption rates to scientists in other disciplines.

The study reported here surveyed medical faculty members in the University of Tennessee system to discover how they use journals and alternatives to journals. Since the authors have also surveyed other disciplines using the same questions, the medical respondents can be compared to scientists in other workfields.

This study addresses four main research questions:

1. How do medical faculty members use scholarly journals?
2. Are print articles or electronic articles read more?
3. Is there a pattern (educational background, field of medicine) of the users of electronic resources vs. print resources?

4. What are the similarities and differences between the use of journals for medical faculty and other disciplines?

## LITERATURE REVIEW

Recent studies in other institutions suggest that health sciences faculty still rely on scholarly journals. Curtis, Weller and Hurd [7] found that health sciences faculty rely on their personal subscriptions as a source of journal articles. A total of 77.9% of medicine faculty, 68.2% of nursing faculty, and 86.7% of pharmacy faculty used personal subscriptions for copies of articles they needed. This is much higher than other workfields. For example, in a study by Hurd et al [8] University of Illinois, Chicago, faculty in the fields of biological sciences, chemistry, geological sciences, mathematics, statistics and computer science, physics, and engineering were surveyed. They found that 78% of the scientists and 54% of the engineers read journals in the library; larger percentages photocopy from the library for later reading at other locations. This data, when compared to the use by medical faculty in the Curtis, Weller, & Hurd [9] study, demonstrates that medical faculty make use of their personal journal subscriptions as much as other scientific fields make use of library subscriptions. Tenopir & King found that, on the whole, personal print or electronic subscriptions by scientists have declined from 5.8 subscriptions per scientist in 1977 to 2.1 subscriptions in 2000-2001 [10]. This decline can be mostly attributed to the rising costs of print journals. This may not be true of medical faculty.

Even though print journal use has declined, medical faculty continue to use journal articles as the preferred source of information. This is consistent with patterns reported in the past. Stinson & Mueller [11] surveyed 402 health care professionals' information habits and needs. The health care professionals surveyed included physicians (who comprised 77% of the sample), dentists,

optometrists, nurse practitioners, and physical and occupational therapists. Medical journals

were the most common medical information source, followed by consultations with professional colleagues, association meetings, continuing education courses, and pharmaceutical representatives, in that order. Ninety-nine percent of health professionals reported using medical journals; they spent an average of approximately five hours per month using medical journals.

Stinson & Mueller [12] found that personal subscriptions were the most common source for articles, followed by unsolicited medical journals. Comparatively few reported regularly using a hospital or medical school library to obtain medical articles. Lundeen, Tenopir, & Wermager [13] also found that the majority of respondents to their survey of rural health practitioners in Hawaii use journal articles obtained from a personal collection or a colleague's collection to meet their information needs.

If journals are convenient, use may be even higher among medical faculty and practitioners.

Some studies have identified problems that physicians have with using journal literature. Huth [14] identifies a number of reasons medical practitioners do not make even more frequent use of the medical literature, including papers relevant to specific clinical issues are widely scattered across journals with different subject boundaries; time involved in searching and retrieving articles; and time involved in sifting through the retrieved literature, much of which is not relevant to clinical problems.

Williamson et al [15] conducted a survey of 625 primary care physicians and 100 physician opinion leaders, who are comprised mostly of academic faculty. Two-thirds of the office-based practitioners and half of the opinion leaders said they found the volume of medical literature to

be unmanageable. The major problems identified were a lack of time to search for information and a large amount of irrelevant material that must be screened to locate the desired information. Eighty-seven percent of office-based practitioners said that most physicians have at least moderate difficulty with inadequacies of terms used in Medline (*Index Medicus*) or other journal indices.

Despite the evidence that health sciences faculty rely on personal subscriptions, De Groote & Dorsch, at the Library of the Health Sciences-Peoria, a regional site library of the University of Illinois at Chicago, found that introducing online journals negatively impacted the use of print journals [16]. There was a major decrease in the use of print journals, which corresponds with an introduction of 104 online core medical journals. This decrease in print journal use suggests that users prefer online journal access to print journal access. Conversely, Sathe, Grady, & Giuse [17] found that clinical/research faculty use print journals more than any other type of user (i.e, fellows, nurses, residents, nursing students). In this same study, patrons reported that print journals were used for reading articles and scanning contents, and that print formats contain higher quality text and figures. Electronic journals were used for printing and performing reference checks and were judged to be more easily assessable and searchable than print journals.

## **METHODS**

### *SURVEY SAMPLE AND RESPONDENTS*

The population for this survey is the medical faculty at the University of Tennessee (UT). These faculty members are based in several places in the multi-campus university system. The University of Tennessee Health Science Center (UTHSC) is headquartered in Memphis, but

includes faculty in many locations. UTHSC includes the Colleges of Allied Health Sciences, Dentistry, Graduate Health Sciences, Medicine, Nursing and Pharmacy; and the School of Biomedical Engineering, which are all located in Memphis. UTHSC also includes graduate medical education programs in Knoxville, Chattanooga, and Nashville; family medicine centers in Knoxville, Jackson, and Memphis; and public and continuing education programs across the state. UTHSC is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools. The University of Tennessee Medical Center, located in Knoxville, is the teaching hospital for the system. University Health System is a regional health system that is affiliated with the University of Tennessee Graduate School of Medicine. Currently, there are more than 1,000 faculty members total.

As part of a larger University of Tennessee survey, the survey instrument was sent to a random sample of 263 faculty members in both Memphis and Knoxville locations in the academic year 2000/2001. Seventy-nine (79) respondents returned the survey (30% response rate). The respondents included a variety of medical professionals with various educational backgrounds, including 44% with a Ph.D. only, 44% with an M.D. only, 5% with neither degree, and 1% with both degrees (5% did not answer this question).

Respondents varied in age, as demonstrated by the year in which they earned their most recent degree. The years of most recent degree ranges from 1949 to 1998, with two-thirds receiving their last degree between 1970 and 1990.

The respondents also represent a diverse range of fields of medicine, including (in order of frequency) pediatrics (10%), surgery (9%), neurological related disciplines (8%), internal

medicine (6%), family medicine (5%), pathology (5%), pharmacology (5%), radiology (5%), and all other fields of medicine (42%).

These faculty members divide their time between research, teaching, and clinical practice.

Thirty of the respondents do no clinical practice; however, only 13 do no research and only 2 do no teaching. The majority spend no more than half of their time on any one of these activities and most divide their time fairly evenly.

### *QUESTIONNAIRE*

A six-page questionnaire was mailed with a stamped, addressed envelope for return. (See Appendix 1 for a copy of the questionnaire.) The questionnaire replicated others used by Tenopir & King [18] in many previous studies. Questions covered scholarly journal reading and use, awareness and use of e-print services, and demographics. Scholarly journal reading and use was measured in two ways. First we asked each respondent how many scholarly articles they had read in the past month. Scholarly articles were defined to include “those found in journal issues, author web sites, or separate copies such as preprints, reprints and other electronic or paper copies.” Reading was defined as “going beyond the table of contents, title, and abstract to the body of the article.”

We then asked respondents to focus on the specific article read most recently to reveal more details about this reading using the critical incident technique. In using this technique, a two-stage sample is taken, where the first stage is the readers and their readings and the second stage is critical incident of one reading (assumed to be "random" in time.) The estimates are

such proportions or averages of readings of articles identified by various means, proportion of readings of articles obtained from various sources, average time spent reading, and so on. We have observed well over 25,000 survey responses since 1977, mostly scientists, and therefore have useful trends and means of comparison among fields in the kind of data asked.

For some estimates, the 79 responses were treated as simple random sample observations.

For example, the average number of readings per respondent was estimated to be 26.8

readings per person per month or 322 readings per year. (The confidence interval for this

estimate is  $322 \pm 67$  readings per person per year at the 95% level of confidence.) The critical

incident observations present another problem because each such reading has a different

probability of selection. That is, the readings of a respondent who reads a great deal has a

higher probability of entering the sample than the readings of someone who reads little. One

way to address this problem is to post stratify responses into ranges of amount of reading and

base estimates on stratified random samples where the total amount of readings in each

stratum represents the total population of readings for that stratum. In this way, one can at least

account for differences in estimates among frequent and infrequent readers and their readings.

An example is given below for this approach using the number of readings done from personal subscriptions (Table 1).

<b>Strata (Readings)</b>	<b>Sample (<math>n_i</math>)</b>	<b>Total Readings (<math>N_i</math>)</b>	<b>Proportion from Personal Subscription (%)</b>	<b>Total Personal Subscription Readings</b>
0-10	22	1,818	54.5	991
11-20	27	5,928	70.4	4,173
21-50	20	7,956	60.0	4,774

>50	9	9,420	55.6	5,238
All	78	25,122	--	15,176

**Table 1. Stratified Readings.**

The estimated proportion of readings from personal subscriptions is 60.4% (15,176 ÷ 25,122).

The estimate using the “raw” proportion of critical incident readings is 62.3%. The same small differences are true of other principal estimates as well. (The confidence interval for this estimate is 60.4% ± 9.4% at 95% level of confidence.)

## **FINDINGS**

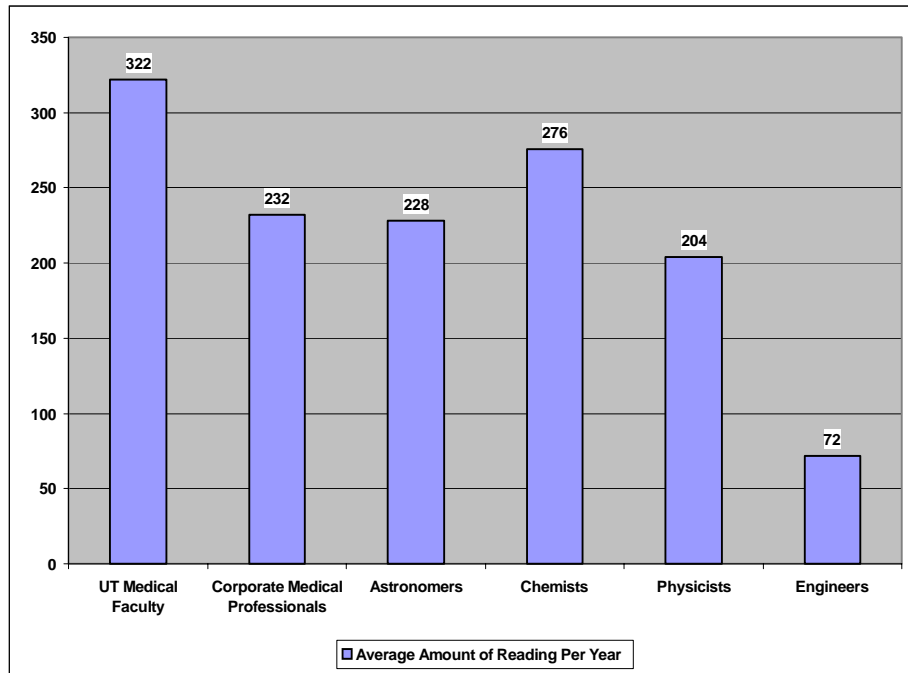
### *AMOUNT OF READING*

As shown in the methods section; the UT medical faculty read a great deal, but amount of reading varies substantially among faculty members. The highest reported amount of reading was 120 readings in the last month and the least was four readings (reported by five respondents). The average number of readings per month was 26.6 or about 322 readings per person per year (found by multiplying the monthly average by 12, assuming all months being equal).

This amount of reading by medical faculty is higher than observed in earlier surveys of non-faculty medical professionals. From 1978-1995, King Research conducted several studies of medical professionals at the National Institute of Health, cancer researchers located nationally, and in several health-related firms (i.e., Bristol-Myers Squibb, Johnson & Johnson, Baxter Healthcare, Colgate-Palmolive, and Procter & Gamble). Medical professionals in corporations averaged only 232 readings per year, but in all surveys, medical professionals tend to read more than other professionals, such as astronomers (228 readings per year), chemists (276 readings), physicists (204 readings), and engineers (72 readings) (See Figure 1). That medical

faculty read more articles than any other profession is not surprising, as it confirms similar

findings and numbers of readings from earlier articles by Tenopir & King [19].



**Figure 1. Scientist’s Reading Per Year**

### *USEFULNESS AND VALUE OF ARTICLES*

Professionals tend to read scholarly articles a great deal because of the usefulness and value of the information obtained from the articles. The principal purpose for which medical faculty read scholarly articles is to support primary research (30% of readings). We asked respondents to indicate how important the information content in the last article read is to achieving the principal purpose for which the article is read. Importance is rated from 1-not at all important to 7-absolutely essential. The average importance rating of information used for primary research is

5.09. Other principal purposes of reading and average ratings of importance are given in

Table 2 below.

<b>Principal Purpose of Reading</b>	<b>Proportion of Readings (%)</b>	<b>Average Ratings of Importance<sup>1</sup></b>
Primary Research	29.9	5.09
Background Research	6.5	4.20
Current Awareness/Keeping Up	22.1	4.58
Teaching	16.9	4.92
Writing	11.7	5.56
Consulting, Advising Others	3.9	6.00
Other Purposes	9.0	4.29
All	100.0	
<sup>1</sup> Importance Ratings: 1-not at all important to 7-absolutely essential Source: Survey of University of Tennessee Medical Faculty (n=77).		

**Table 2.**

**Proportion of Readings of Scholarly Journals by University of Tennessee Medical Faculty for Various Principal Purposes and Average Ratings of Importance of Information in Achieving the Principal Purposes: 2000-2001**

The principal purposes for reading reflect the roles of medical faculty. The four highest ratings of importance of information read in achieving the principal purpose reflect their four most basic roles; that is, primary research (5.09), teaching (4.92), writing (5.56), and consulting/advising others (6.00).

We also asked the medical faculty to indicate the ways that reading the article affected the principal purpose for which the article was read. Here, the respondents were given the opportunity to indicate multiple ways. The most frequently mentioned ways were that the reading “inspired new thinking or ideas” and “improved the result of a purpose for reading” (55% of readings for each way). Other frequently reported ways included that reading “narrowed,

broadened or changed their views” of the purpose (30% of readings), “saved time or other resources” (16% of readings) and “resolved problems” (12% of readings). Other ways mentioned were that it “resulted in collaboration or joint research” and “resulted in faster completion.” On the other hand, one respondent, who spent fifteen minutes reading an article, reported that the reading “wasted my time.”

One assessment of the usefulness of the scholarly journal information is whether or not the readers knew about the information reported or discussed in the last article read. Approximately 54% of the readings provided new information; a proportion somewhat higher (about 5 to 15% higher) than observed in other disciplines.

Another factor of value is the level of care of each reading. The medical faculty respondents report that they most frequently read with attention to the main points (54%). The survey showed that medical faculty read articles rather thoroughly. Seventy-three of the 79 respondents read articles paying attention to the main points or with great care (59% and 38%, respectively). Most of the respondents (84%) also reported that they had not read the article prior to this particular reading, which may account for the amount of detail spent reading the article.

As mentioned above, the majority of the readings came from articles published in the past year. In another study by Tenopir & King [20] 37% of scientists who read articles more than two years old were not reading them for the first time, meaning that 37% were re-reads. Of the medical faculty respondents, 16% of their corresponding readings were re-readings. Medical scientists seem to perform more first-time readings (84%) than other scientists and also seek to perform

more in-depth reading during these first time readings. One reason for this greater depth of first-time readings, again, could stem from the greater need of current awareness within the medical profession.

One indicator of the value of scholarly journal information is the amount of time a reader is willing to spend on reading the journals. Clearly, medical professionals' time is a scarce resource and any decision to use this resource demonstrates how valuable the purpose for using it is. The medical faculty at UT spends on average about 120 hours per year reading scholarly journals. This is much less time observed for other medical professionals described in other studies, who were observed to spend an average of about 305 hours per year [21]. Other professionals tend to spend more time reading scholarly articles: astronomers (144 hours per year), chemists (198 hours), physicists (153 hours) and engineers (92 hours). (More is said about the medical faculty time later.)

Another indicator of the usefulness and value of scholarly journals to medical faculty is the outcome of reading. In other studies, it has been shown that amount of reading is positively correlated with five indicators of reader productivity [22-23]. In this survey, we found that medical faculty who read more tend to have published more journal articles in the last two years. Finally, we determined whether respondents had, in the past two years, received any awards or special recognition for their research or other profession-related contributions. The 40% who had received such recognition averaged about 395 readings per year compared with 270 readings for those who had not received such recognition. Thus, award recipients tend to

read more than others. This result has been observed in nearly all of our surveys of scientists and other professionals.

#### *MEDICAL LIBRARY CONTRIBUTION TO THE USE, USEFULNESS, AND VALUE OF SCHOLARLY JOURNALS*

About 22% of the readings by medical faculty is from library-provided articles; that is, about 70 readings per year. However, these readings tend to be described as more useful and valuable than readings from other sources. While the principal purposes of reading library-provided articles are similar to those articles obtained from other sources, the importance ratings tend to be higher for library-provided articles (5.00 versus 4.88), a tendency consistently observed by Tenopir & King [24]. The average time spent reading library-provided articles is greater than those obtained from other sources (28 minutes per reading versus 20 minutes), thus indicating that the library-provided articles may be more valuable. The award recipients who last read a library-provided article averaged 502 readings per year versus 334 readings by award recipients who used non-library sources. Thus, library-provided articles appear to yield more useful and valuable articles. These results are typical of results observed by Griffiths & King [25] and Tenopir & King [26].

#### *INFORMATION-SEEKING PATTERNS OF MEDICAL FACULTY*

Medical faculty at the University of Tennessee in 2000/2001 continue to rely heavily on traditional print journals. In fact, about 70% of readings are from print subscriptions (60% personal subscriptions, 10% library subscriptions). This proportion is higher than the proportion observed with science faculty at the main campus at University of Tennessee, Knoxville (UTK)

where 65% of readings are from print subscriptions. The medical faculties' preference for print journals is tied to the fact that so many of the readings are from their personal subscriptions (i.e., subscriptions which are personally addressed to them at their home, office or lab). They average 6.3 personal subscriptions per person which is much higher than observed for other UTK science faculty (3.8 subscriptions). They also read more from their personal subscriptions (i.e., 31 readings per subscription title vs. 21 readings for UTK science faculty).

These phenomena are highly consistent with results observed earlier in our surveys of medical professionals (1978 to 1995). This result is also corroborated with research by Curtis, Weller & Hard [27] who found that 78% of medical staff rely on personal subscriptions and Stinson & Mueller [28] who observed that health professionals use their personal libraries for their source of information. Bowden, Kromer & Tobia [29] also found that most physicians prefer to use their personal journal collections when conducting research.

Ely, Levy & Harty [30] claim that physicians seek "highly digested information" and value rapid access and understandability more than quality or currency of information, and they are more likely to get this information from their personal libraries. This result is somewhat at odds with our earlier studies of medical clinicians and researchers who indicated in focus group and in-depth personal interviews that currency is extremely important to them. The importance of currency appears to be true with the UT medical faculty as well, based on their purposes for reading and the age of articles read. Over half of readings were said to be for current awareness or keeping up as a principal or other purpose (54% of readings). About 85% of readings are of articles less than one year old and only one percent of the readings are over five years old.

This proportion of reading of current articles was also found to be true in our earlier medical professional surveys; however, it is contrary to the reading patterns of other professionals. For example, 72% of readings of scientists and social scientists at UTK were of articles less than one year old and 10% involved readings over five years old. This latter pattern is consistent with distribution of age of articles read observed for scientists over the past forty years by Tenopir & King [31].

Table 3 below shows some detail concerning where medical faculty obtained the articles they read.

<b>Source of Article Read</b>	<b>Proportion of Reading (%)</b>	<b>Number of Readings per Person</b>
Library	22.1	71
Print Subscription	(10.4)	(33)
Electronic Subscription	(11.7)	(38)
Personal Subscription	62.3	200
Print	(59.7)	(192)
Electronic	(2.6)	(8)
Free Web Journal	5.2	17
Separate Copies	10.4	34
Reprint	(3.9)	(13)
From Colleagues, Author, etc.	(2.6)	(8)
Personal Photocopy	(3.9)	(13)
Total:	100.0	322
Source: Survey of University of Tennessee Medical Faculty (n=77)		

**Table 3.**  
**Proportion and Average Number of Readings by University of Tennessee Medical Faculty by Source of Article Read: 2000 to 2001.**

About 22% of the readings are from library subscriptions (with no reported readings from interlibrary loan or document delivery) and just over one-half of these are from library electronic subscriptions. Note that it is not known whether the free web journals are received personally or are library subscriptions that were not known as such by the readers. About 62% of readings are from personal subscriptions, but only 4% of these readings are from personal electronic subscriptions. About 10% of readings are from separate copies of articles such as reprints, copies sent from colleagues, or personal photocopies.

The sources used by medical faculty to obtain articles is somewhat different than observed for UTK scientists and social scientists, who used the library for 34% of readings, personal subscriptions for 44%, and separate copies for 22%. Tenopir & King [32] found that university scientists' readings from library-provided articles increased from 25% in 1977 to 55% in 1993, but for all scientists the proportions went from 13% of readings to about 56%.

As shown below in Table 4, a substantial amount of reading involves browsing library or personal collections.

<b>Means of Learning About Articles Read</b>	<b>Proportion of Reading (%)</b>	<b>Number of Readings per Person</b>
Browsing	62.3	201
Library print subscription	(1.3)	(4)
Library electronic subscription	(3.9)	(13)
Personal print subscription	(50.6)	(163)
Personal electronic subscription	(3.9)	(13)
Other digital collections	(2.6)	(8)
Online search	16.9	54
Indexing/abstracting database	(11.7)	(38)
Current awareness service	(3.9)	(12)
Online journal collection	(1.3)	(4)
Other	20.8	67
Cited in another publication	(9.1)	(29)
Another person informed reader	(6.5)	(21)
Print current awareness	(1.3)	(4)
Other method	(3.9)	(13)
Total:	100.0	322
Source: Survey of University of Tennessee Medical Faculty (n=77)		

**Table 4.**  
**Proportion and Average Amount of Reading by University of Tennessee Medical Faculty by Means of Learning About Articles That Are Read: 2000-2001.**

Again, the dominance of articles found by browsing and from current awareness sources

(67.5%) implies that much of the reading is to keep current. Also, the amount of time spent reading through browsing is somewhat less than articles identified in other ways and these readings are far less likely to be read with great care (29% of readings found while browsing vs. 53%).

Scientists and social scientists at UTK use similar means to learn about the articles they read. For example, 49% of articles are found by browsing, 22% by online search, and 29% by other means.

Other studies [33-34] have provided some evidence that it takes readers more time to browse personal electronic journals than personal print subscriptions, but much less time to browse library electronic journals than library print journals. This may account for the fact that only 4% of browsed readings of personal subscriptions involve electronic journals, whereas 53% of browsed library subscriptions are from electronic versions.

Also, our other surveys of scientists dating back to 1977 show that the readings from personal subscriptions have decreased from 68% to about 27%, due in large part to substantial increases in price [35]. Our studies show that it costs the scientists less, in their time, to go to the library to read when the use of a journal is below a breakeven amount of reading. Scientists now average about 21 readings from personal subscriptions, whereas medical faculty read an average of 31 readings. Thus, maybe most of the 6.3 personal subscriptions of medical faculty are still above breakeven points. However, that is likely to change if the cost to obtain library electronic journals continues down compared with the cost of print journals.

We asked the medical faculty about their awareness and use of the National Institutes of Health/National Library of Medicine's PubMed (<http://www.ncbi.nlm.nih.gov/PubMed>). A very high proportion of the medical faculty were aware of the service (89% of 75 respondents). Of those who indicated they were aware of the service, many used the service in the past 12 months (87% of the 67 respondents who answered this question were aware) and, those who used the service, averaged using it about 55 times in the last 12 months (or about once a week). They average reading a little over one article per use.

#### *INFORMATION-SEEKING PATTERNS BY TYPES OF MEDICAL FACULTY*

Medical faculty rely on traditional print journals for most of their readings. There are some differences in preferences for print vs. electronic, however. While there seems to be no difference in preferences by medical sub-field, there is a difference by educational degree. Faculty with M.D. degrees read more in print resources than electronic resources, while medical faculty with Ph.D. degrees are split almost evenly between print and electronic resources.

<b>Educational Degree</b>	<b>Print</b>	<b>Electronic</b>
M.D., only	33	1
Ph.D., only	18	17
Both M.D. and Ph.D.	1	0
Neither degree	4	0
<b>Total</b>	<b>56</b>	<b>18</b>

**Table 5. Format of reading.**

As shown in Table 6, there is a wide range of dates for the year the last degree was earned by the respondents, but in this study, age of the respondent does not seem to be a factor in whether they read more in print or electronic journals. However, in another survey of a different

type of scientist (astronomers) by Tenopir & King [36], age may have an influence in the use

of print and electronic journals. Over 40% (40.2%) of the scientists between the ages of 31-40

used electronic journals as the source of the article last read, while only 16.3% of scientists

between the ages of 51-60 used electronic journals as the source of the article they last read.

Conversely, 11.2% of the scientists between the ages of 31-40 used print journals for the source

of the article last read, while 30.3 percent of scientists aged 51-60 used print journals as their

source of the article last read. Even though the comparable percentages are high (40.2% to

16.3%) for younger scientists using electronic journals versus older scientists using electronic

journals, this data could support the idea that the ages of 31-40 represent the ages of when the

most amount of research is conducted. Another factor to consider between the workfields of

medicine and astronomy is that all of the major astronomy journals are published electronically.

Year of Last Degree	Frequency	Percent	Last Reading Format	
			Print	Electronic
1951-1970	23	29.1	19	3
1971-1980	28	35.4	22	5
1981-1990	22	27.8	15	7
1991-2000	5	6.3	4	1

**Table 6.**

**Year of Last Degree Earned and Format of Last Reading: University of Tennessee Medical Faculty: 2000-2001**

Source: Survey of University of Tennessee Medical Faculty (n=79)

The majority of respondents (30) spent 11-20 minutes per reading. Of these thirty respondents,

53% are MD-holding faculty; 40% are PhD-holding faculty; 7% hold neither degree. Twenty-

three of the 72 respondents (32%) who replied to the statement, "Please indicate your best

estimate of the time in minutes that you spend reading this article the most recent time," spent

30 minutes or more per reading. The respondents' degrees were almost evenly split between PhD and MD (11 PhDs, 10 MDs, and 2 neither).

## **CONCLUSIONS**

Journal reading patterns of University Medical faculty exhibit some important differences and similarities with other scientists. Medical faculty read more articles than others on average, but spend less time on average per article. They value currency, but also need information digested and verified in a way to save them time. This creates a tension for publishers and librarians, who must find ways to provide both current information and articles formatted in a way that makes them easy to identify and quick to read.

Like other scientists, medical faculty value journal articles and rely on them to do their various jobs. Convenience is an important factor in reading and medical faculty nonetheless often depend upon personal print subscriptions for convenience. Librarians and publishers must find ways to provide the convenience of a portable and readily available personal subscription in electronic journals for medical professionals.

Journal article delivery to portable, hand-held devices may match the work and reading habits of medical professionals. In all other workfields, the importance of library subscriptions has increased as prices increase and personal subscriptions decrease. This phenomenon has been slower with university medical faculty, but may occur as subscription prices continue to rise and as electronic alternatives become more widely available.

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