Comparison of fixed-fee Grateful Med database use and searching success rates given the continued availability of MEDLINE in other formats

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This study compared in-house Grateful Med database use and searching success rates for four-month periods at four sites of the Library of the Health Sciences of the University of Illinois at Chicago. Data were collected from Grateful Med workstation uselogs and analyzed. Database use patterns and searching success rates were fairly consistent across the four sites. Though MEDLINE was available in other formats and use in these other formats remained high, 65.48% of all Grateful Med searching was done by using MEDLINE, and an additional 21.34% was done by using the MEDLINE Backfiles.

In-house use patterns were similar to the overall use pattern for the University of Illinois, with the exception of MEDLINE Backfiles. Overall, 54.30% of searches were successful.

INTRODUCTION

The University of Illinois libraries began offering all faculty, students, and staff access to most MEDLARS databases via Grateful Med software in January 1994, through a fixed-fee contract with the National Library of Medicine (NLM) [1]. The contract includes users at the University of Illinois at Chicago (UIC) and its three regional sites (Peoria, Rockford, and Urbana) as well as the University of Illinois at Urbana–Champaign (UIUC).

The University of Illinois libraries are charged a fixed annual fee for unlimited access to all MEDLARS databases, with the exception of CHEMLINE and TOXLINE, for which royalties must be paid. Available databases include MEDLINE, the MEDLINE Backfiles, and more than twenty other health-related databases. Faculty, staff, and students with university computer accounts are able to search from any computer with access to the campus mainframes once the appropriate software is installed. Grateful Med computer workstations are also available at various library sites. At UIC, Grateful Med workstations are available at all four sites of the Library of the Health Sciences (LHS), as well as in the main and science libraries.

The study reported in this paper examined the Grateful Med database use and searching success rates of in-house users at the four sites of the UIC LHS, Chicago, Peoria, Rockford, and Urbana. The major health sciences library for UIC is located in Chicago. LHS–Chicago serves five professional colleges—Medicine, Nursing, Pharmacy, Dentistry, and Associated Health Professions—as well as a School of Public Health. The three other sites of LHS serve regional programs in medicine and nursing, and LHS–Rockford also supports a small pharmacy program. LHS–Chicago serves 4,617 faculty and students, LHS–Peoria 337, LHS–Rockford 334, and LHS–Urbana 456 [2].

Previous studies of database use via Grateful Med found that MEDLINE and its Backfiles accounted for much of the use by the populations studied. Dorsch and Landwirth found that 100 health professionals participating in a rural outreach program utilized MEDLINE and its Backfiles for 82% of their searching, with HEALTH accounting for an additional 14% of the searching [3]. Pifalo found a similar pattern among participants in a rural outreach program with MEDLINE and its Backfiles accounting for 91% of the searching [4]. Cahalan found that the Grateful Med users at the Welch Medical Library at the Johns Hopkins University School of Medicine overwhelmingly chose MEDLINE and its Backfiles for their searching, using the other Grateful Med databases less than 10%
of the time, although a MEDLINE subset, MEDLINE 500, was also available to patrons [5].

The present study was unusual in that MEDLINE was available to library patrons through other formats in addition to Grateful Med. At the initiation of this study, all four LHS sites offered access to the most recent five years of MEDLINE via CD-ROM subscriptions available on public workstations in the libraries. LHS–Urbana canceled its CD-ROM subscription halfway through the study, offering the researcher the opportunity to see what effect the cancellation had on Grateful Med database use rates. The other three LHS sites retained their CD-ROM subscriptions for the duration of the study. Access to MEDLINE was also available to UIC users through a subscription to Ohio College Library Catalog (OCLC) Firstsearch. A user with a UIC computer account could access OCLC Firstsearch from any computer with campus mainframe access.

In-house use at the four sites of LHS was studied to determine which databases were being used and to assess the level of demand for MEDLINE given its availability in other formats. Two possible results were hypothesized. The first hypothesis was that users would continue to use MEDLINE mainly on the familiar CD-ROM and that most Grateful Med use would involve MEDLINE Backfiles and other databases. The alternative hypothesis was that the demand for MEDLINE was so large that users would continue to use the other MEDLINE formats and also use Grateful Med primarily for MEDLINE searching.

The study also examined the success rates of in-house users in searching via Grateful Med as defined by the uselog (the definition is discussed in the next section). In a previous study, Pifalo found that rural health professionals succeeded in using Grateful Med 66% of the time [6]. Cahan found that library patrons were successful 56.2% of the time [7]. Given that some of the users in the present study had no prior training, it was anticipated that the success rate of in-house patrons might be low.

**METHOD**

Grateful Med uselogs were collected from all public Grateful Med DOS workstations at the four LHS sites for four-month periods. The time periods were November 1994 through February 1995 at LHS–Chicago, LHS–Peoria, and LHS–Urbana, and December 1994 through March 1995 at LHS–Rockford. Uselogs from the public Macintosh workstations in the main and science libraries were not available, as they are not a feature of Grateful Med for the Macintosh.

LHS–Chicago has two public Macintosh Grateful Med workstations as well as four DOS workstations. LHS–Rockford has six DOS and four Macintosh workstations in the library and an adjacent computer lab. Therefore, the data collected for LHS–Chicago and LHS–Rockford sites reflected only part of the in-house use, the use on the DOS workstations. The DOS samples were used for the study on the assumption that they represented the patterns and success rates of the total in-house use. Both LHS–Peoria and LHS–Urbana had only one DOS workstation each, so the data collected from those sites represented complete in-house use for the four months of the study.

Patrons have the ability to turn off the uselogs, and they did from time to time. In LHS–Urbana, the uselog was turned off during the last week of February, so data from the first week of March were collected to compensate for the gap. The LHS–Rockford uselogs were turned off for most of the month of November, so data from March were collected to obtain a four-month sample from that site.

For each site, the number of times each database was searched was counted. The uselogs showed that library users made significant use of the opportunity to edit their searches. For the purposes of this study, each edited search was counted as a new search because it resulted in a new line on the uselog with a new outcome and level of success.

The uselogs were analyzed to determine user success, by looking at the codes in the Reason for Failure column [8]. The uselog defines a successful search as either one in which the user retrieves between one and fifty references in response to a search statement, or one in which the user retrieves more than fifty references and the user says yes upon first being asked “Do you want more?” This operational definition does not take into account the patron’s expressed satisfaction with the results. For instance, a search that retrieves no postings is coded as a failure in the uselog but may be deemed a success by the patron if the expectation was to find nothing in the literature. With these drawbacks in mind, the Reason for Failure codes were tabulated for each site.

The UIC had also gathered statistics from NLM on overall database use for the entire university. Statistics were received for the University of Illinois as a whole, including both UIC and UIUC, for the months of April 1994 through March 1995. The NLM combined statistics for the two campuses because the fixed-fee Grateful Med contract includes both campuses. These data included the four-month time period of this study. Use was reported according to connect time per database, not the number of individual searches per database. The University of Illinois connect time data, however, were retained for comparison with the UIC in-house use data, on the assumption that connect time would correlate with number of searches so that use patterns could be compared. The connect time data included all uses of Grateful Med, both in-house and remote.
RESULTS AND DISCUSSION

Database use

During the time frame of this study, 16,983 searches were recorded on the in-house uselogs of twelve DOS workstations. LHS–Chicago recorded 12,215 uses on four public workstations, LHS–Urbana had 3,024 uses in total use. The MEDLINE Backfiles were selected as sites of the use in LHS–Chicago, 69.51% of the use in LHS–Peoria, 86.31% of the use in LHS–Rockford, and 89.52% of the use in LHS–Urbana.

During this study, other sources of MEDLINE continued to be used heavily at the UIC library. MEDLINE via OCLC was searched 914 times from November 1994 through February 1995. Overall, LHS CD-ROM use increased from 20,775 sessions in 1993/94 to 21,120 sessions in 1994/95. These figures include MEDLINE on CD-ROM as well as other databases. The fact that overall CD-ROM use increased indicated that the use of MEDLINE on CD-ROM did not decline significantly. Librarian observation also indicated that MEDLINE on CD-ROM was still being used heavily.

These observations and study results indicate that the demand for MEDLINE on campus is such that it is frequently used in all available formats. Offering access to MEDLINE via Grateful Med has met a demand for increased access and allowed campus users to access MEDLINE from outside the library as well. The availability of MEDLINE Backfiles via Grateful Med also meets a need on campus.

The lower percentage of use of MEDLINE and its Backfiles at LHS–Peoria, when compared with the other libraries, can be attributed in part to the high use of BIOETHICALSLINE during the test period. Peoria medical students were required to write an ethics paper for a College of Medicine class during this study and therefore utilized BIOETHICALSLINE more often than did users at other LHS sites.

Besides MEDLINE and its Backfiles, HEALTH was another heavily used database in the sample, accounting for 4.02% of overall use. HEALTH was the most

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heavily used non-MEDLINE database at LHS–Chicago and LHS–Urbana, AIDSLINE was the most popular at LHS–Rockford, and BIOETHICSLINE was the most used at LHS–Peoria. Library users searched thirty-one of the databases available through fixed-fee Grateful Med at least once.

The effect of MEDLINE CD-ROM cancellation at LHS–Urbana

At LHS–Urbana, MEDLINE on CD-ROM was canceled at the end of December, halfway through the study. While realizing that other factors, such as curriculum differences and the holiday period, may have affected database use, Grateful Med database use patterns for November and December were compared with those of January and February as shown in Table 2. It was expected that MEDLINE use would account for a greater percentage of the searching in the second half of the test period than in the first half. MEDLINE use as a percentage of total use actually declined during January and February, however, dropping from 79.13% to 67.25%, even though the use count rose from 948 to 1,228. This result was unexpected, although 67.25% is closer to the in-house overall average of 65.48% and the University of Illinois average of 67.08%.

When usage figures for MEDLINE and its Backfiles were combined, there was a slight increase in the second half of the test period, from 89.06% to 89.82%. Interestingly, MEDLINE Backfile use increased from 9.93% of total use to 22.57% of total use once the CD-ROM MEDLINE was canceled. One possible explanation for these results is that once users were forced to switch from the CD-ROM MEDLINE to Grateful Med, they became aware of Backfiles that had previously been unavailable to them.

Comparing in-house database use to overall University of Illinois use

Table 3 shows Grateful Med database use for the entire University of Illinois for the period from April 1994 through March 1995 as reported by connect time. MEDLINE Backfile use for the University of Illinois as a whole increased with the recency of the data: BACK66 was the least-used Backfile and BACK89/BACK90 combined (BACK90 replaced BACK89 in December 1994) were used the most. However, the in-house use at the four library sites studied did not follow this pattern. At LHS–Chicago, BACK66 alone accounted for 10.48% of the searching and was the most heavily used of the Backfiles. Interviews with
the reference librarians revealed that a noticeable number of the in-house users at LHS-Chicago are corporate members of the library engaged in historical research, and they often begin searching with BACK66. The other LHS sites also yielded unexpected patterns of Backfile use, with BACK85 used the most at LHS–Peoria and LHS–Urbana, and BACK80 used most often at LHS–Rockford.

For the University of Illinois overall, MEDLINE and its Backfiles accounted for 89.587% of the use, slightly higher than the in-house figure of 86.82%. The overall use pattern for the other databases was similar. HEALTH was the most popular non-MEDLINE database for both UIC in-house use and overall University of Illinois use, and AIDSLINE, CANCERLIT, and TOXLINE were used heavily as well. The only conspicuous difference between University of Illinois database use and UIC in-house database use involved the MEDLINE Backfiles.

**In-house user success rates**

As shown in Table 4, an analysis of the use logs showed that users’ success in searching via Grateful Med ranged from 52.11% of the time in LHS–Chicago to 64.62% of the time in LHS–Rockford, given the limited definition of success discussed earlier. LHS–Chicago was the largest of the library sites studied and had the lowest success rate. Possible reasons for this result include a greater number of in-house patrons per reference librarian, which would leave less time for one-on-one help, or a different mix of patrons, who were less likely to search successfully than those on other campuses.

The most prevalent reason for failure at all sites was coded by the use logs as "None," which meant that the search strategy resulted in no retrieved references. Of great concern was the result that many searches failed because the users were unable to connect to NLM’s computer; this happened as much as 10.23% of the time at LHS–Chicago. Cancellation of all copies of MEDLINE on CD-ROM could prove to be a disservice to users if connection to NLM for Grateful Med use is a persistent problem.

**CONCLUSION**

The second hypothesis was correct: The demand for MEDLINE at UIC was so large that MEDLINE was heavily used in all available formats and was the primary database used via fixed-fee Grateful Med. Fixed-fee Grateful Med has enabled UIC to meet the large demand for MEDLINE as well as for its Backfiles and to provide access to more than twenty other MEDLARS databases, which users may still be in the process of discovering. A smaller follow-up study will be conducted in the future to see if the use of non-MEDLINE databases increases as users become more familiar with them. Should Macintosh use logs become available, use patterns at the main and science libraries will be studied as well.

The availability of MEDLARS databases via Grateful Med has influenced library operations and services. For example, in the area of collections development, LHS–Peoria subscribed to Biomedical Ethics Reviews due in part to expectations for increased demand resulting from the availability of BIOETHICSLINE. It is expected that the availability of the other MEDLARS databases will also change users’ requests and that Grateful Med may have long-term implications for collection development.

The availability of MEDLARS databases via Grateful Med has already affected the number of requests received for mediated online searches. The number of search requests received by the LHS–Chicago Online Search Office declined from 632 in 1993/94 to 394 in 1994/95, and the total number of MEDLARS databases searched dropped from 910 to 694 in the same time period. Thus it appears that library users are taking advantage of increased opportunities to do their own searching. It will be important to see if this

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**Table 4**

Grateful Med searching success at four sites of LHS

<table>
<thead>
<tr>
<th>Reason for failure code</th>
<th>Chicago</th>
<th>Peoria</th>
<th>Rockford</th>
<th>Urbana</th>
<th>All sites</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of occurrences</td>
<td>Number of occurrences</td>
<td>Number of occurrences</td>
<td>Number of occurrences</td>
<td>Number of occurrences</td>
</tr>
<tr>
<td></td>
<td>% of total occurrences</td>
<td>% of total occurrences</td>
<td>% of total occurrences</td>
<td>% of total occurrences</td>
<td>% of total occurrences</td>
</tr>
<tr>
<td>0 = Search did not fail</td>
<td>6,365</td>
<td>52.11</td>
<td>525</td>
<td>59.52</td>
<td>557</td>
</tr>
<tr>
<td>1 = No postings</td>
<td>1,005</td>
<td>8.23</td>
<td>82</td>
<td>9.30</td>
<td>50</td>
</tr>
<tr>
<td>2 = NONE</td>
<td>2,967</td>
<td>24.29</td>
<td>175</td>
<td>19.84</td>
<td>120</td>
</tr>
<tr>
<td>3 = Overflow</td>
<td>178</td>
<td>1.46</td>
<td>15</td>
<td>1.70</td>
<td>6</td>
</tr>
<tr>
<td>4 = User out of disk space</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5 = No connection made</td>
<td>1,250</td>
<td>10.23</td>
<td>40</td>
<td>4.54</td>
<td>81</td>
</tr>
<tr>
<td>6 = More than 50 references found and user answers no to first “Do you want more” question</td>
<td>450</td>
<td>3.68</td>
<td>45</td>
<td>5.10</td>
<td>48</td>
</tr>
</tbody>
</table>
trend persists and then adjust library programs (such as instruction) and services accordingly.

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REFERENCES

6. PIFALO, op. cit., 23.
7. CAHAN, op. cit., 71.

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