Monograph use at an academic health sciences library: the first three years of shelf life

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Objective: To study the circulation of monographs during the first three years of shelf life at an academic health sciences library.

Method: A record was kept of monographs added to the circulating collection from mid-1994 to mid-1995. After three years, each monograph was located and the number of times it circulated during the first, second, and third year of shelf life determined by counting checkout stamps on the circulation slip.

Results: Of the 1,958 monographs studied, 1,674 had complete data for the first three years of shelf life. Of those 1,674 titles, 81.48% circulated at least once. A total of 7,659 circulations were recorded; 38.69% occurred in the first year of shelf life, 32.37% in the second year, and 28.95% in the third year. The data did not fit the well-known 80/20 rule. Instead, approximately 38% of monographs accounted for 80% of circulation. A small percentage, 2.21%, of monographs accounted for a substantial percentage of circulation, 21.84%.

Conclusions: A large percentage of the monographs circulated and use did not decline sharply with age within the first three years of shelf life, indicating a high demand for monographs at this academic health sciences library. These results, combined with the findings of earlier studies, suggested two possibilities. First, academic health sciences libraries might exhibit use of a higher percentage of monograph acquisitions than other types of libraries; or, second, a low monograph-to-user ratio might result in a higher percentage of monographs being used. Perhaps both factors contributed to the results found in this study. Further investigation would be needed to determine the extent to which library type and monograph-to-user ratio influenced monograph use.

INTRODUCTION

In 1954, Juran discussed the ''vital few principle,'' a phenomena in which a small percentage of elements (the vital few) in a population account for a large percentage of an effect [1]. Discussion of this principle continued through Juran's later writings, and a thorough discussion of the history and evolution of Juran's principle can be found in Eldredge's 1998 monograph use study [2].

In 1969, Trueswell introduced a derivation of Juran's vital few principle to the library literature, the well-known 80/20 rule. Trueswell used data from several studies to illustrate that often about 80% of library use would be observed from about 20% of items in a library collection [3]. Burrell also analyzed data from several libraries and found that between 43% and 58% of titles accounted for 80% of borrowing. However, in his samples, Burrell included only titles that circulated one or more times, leaving out those that circulated zero times. Burrell speculated that including the zero category would change the data; for example, from the 80/50 range to around 80/25 or close to the 80/20 rule [4]. Hardesty found that at DePauw University, during the first five years of shelf life, 80% of circulation of monographs acquired in the first half of 1973 was accounted for by 30% of the titles, close to the 80/20 rule [5]. Britten found that the 80/20 rule applied to data

collected at the University of Tennessee at Knoxville when considering the overall collection, but when the data was sorted by Library of Congress (LC) classification, the results varied, with between 1.5% and 40% of items accounting for 80% of circulations. The two medical LC classes included in Britten's analysis were among the top four of the twenty analyzed in a ranking of the percentage of monographs accounting for 80% of the circulation. The top class was RG, gynecology and obstetrics, with 40% of its monographs accounting for 80% of circulation; in RJ, pediatrics, 34.5% of monographs did the same [6].

Usually a percentage of a collection does not circulate at all. A study at the University of Pittsburgh found that during a seven-year-and-two-month period, 48.37% of the entire book collection did not circulate. The Pittsburgh study also found that 39.84% of 1969 monograph acquisitions had not circulated through 1975 [7]. Hardesty found that 44% of a sample of books did not circulate in the first three years of shelf life and that that number decreased to 37% after approximately five years of shelf life [8]. Fenske studied the use of monographs acquired by the University of Illinois at Chicago Library of the Health Sciences in Urbana from July 1987 to September 1989. She found that 41.7% of the monographs had not circulated by the fall of 1989. While the study did not control for length of shelf life so that some books had been available for two years while others only two months, it did suggest a low level of circulation [9].

Bowden studied monograph use at four health sciences libraries. She found the percentages of monographs with 1980 to 1992 imprints with zero use during 1986 to 1993 varied, with results of 14%, 18%, 21%, and 38%. The 38% figure occurred at a library that had three fewer years of circulation data than the other three libraries; circulation data did not begin until 1989. Bowden's data was not standardized in other ways: one library included inhouse use, another reserve transactions, shelf life varied due to rate of cataloging, and so on, but patterns emerged that demonstrated high use [10].

Eldredge studied monograph use in an academic health sciences library and found that of 1,306 eligible monographs added to the collection of the Health Sciences Center Library at the University of New Mexico in 1993, 84% had circulated at least once by November of 1997, a four-to-almost-five-year shelf life depending on when in 1993 the book was cataloged. Eldredge found that 19.45% of the monographs accounted for 57.8% of checkouts and that 36.29% of monographs accounted for 79.76% of checkouts, a departure from the 80/20 rule [11]. The results of Britten, Bowden, and Eldredge suggested that academic health sciences libraries might exhibit a higher percentage of use and a higher percentage of monographs contributing to 80% of use than other types of libraries.

In *Collection Development and Assessment in Health Sciences Libraries*, Richards and Eakin distinguished between textbooks and monographs in their discussion of types of literature [12]. However, ''monograph'' appeared to be the accepted term in use studies in health sciences libraries—such as the studies by Bowden, Eldredge, and Fenske—to describe all types of books in the collection, including textbooks. In keeping with precedent, the term monograph as used in this study applied to all types of book literature.

BACKGROUND

The study reported here was initiated after Fenske's study was published. The University of Illinois at Chicago (UIC) Library of the Health Sciences has three regional sites, which support regional health sciences programs, as well as a central library in Chicago. Fenske's study was conducted at the regional site library in Urbana. The results of Fenske's study suggested low use, but, as mentioned, there was no control for length of shelf life. Anecdotal evidence suggested that monograph use was high at Library of the Health Sciences in Chicago (LHS Chicago), and this study was designed to determine if that was the case. Shelf life was both controlled, so that it would not be a confounding factor, and measured to the day, so that use could be studied for the first, second, and third years of shelf life.

LHS Chicago serves faculty and students from six professional colleges: medicine, nursing, pharmacy, health and human development sciences, dentistry, and public health. The monograph collection is developed to serve the needs of the six colleges, hospital and clinic staff, and the public. The collection is also used by faculty and students from related programs at the university.

METHODOLOGY

At LHS Chicago, newly acquired monographs added to the circulating collection are displayed for one week on the new bookshelf before going to the stacks. For a one-year period, from mid-August 1994 to mid-August 1995, a record was kept of those items added to the circulating collection along with a record of the date the item was added to the new book shelf and hence the collection. Books that went to reference, reserve, and special collections were separated from the study before it started because they were handled in a different manner from circulating monographs. Only recently published monographs were included in the study, those monographs published during or after 1991. Older items are not routinely purchased, but UIC adds many older items to its collection through an active gift program. The older items are added to preserve them because LHS Chicago serves as the Re-

gional Medical Library for the Midwest Region, but the items are not expected to see much use. Those items published prior to 1991 were removed from the study population. Monographic gifts to LHS Chicago published in 1991 were later included in the study, along with purchased items. A total of 1,958 monographs was studied.

UIC changed circulation systems (to NOTIS) in the fall of 1996. Circulation data were not available online for the years before that time, therefore the data for this study were collected manually. After three years had passed, a search for the items in the bookstacks was done. If found, the number of circulations for each monograph was determined by counting the date due stamps on the circulation slip at the front of the monograph. Circulation was counted for the first, second, and third year of the monograph's shelf life in the stacks, using the date the book went on the new book shelf as the start date. Monographs that were not found on the shelf were searched in the online public access catalog (OPAC) and, if checked out, were recalled so that data could be collected.

The circulation department had been asked not to remove any circulation slips, but to paste new ones over the old ones instead. However, in several cases there was evidence that a slip had been removed. Also, some monographs were so heavily used that they had to be rebound, and, in those cases, the bindery removed the circulation slip and circulation data was lost.

A number of monographs that were not currently checked out could not be located on the shelf after four search attempts within a six-month period. Others not on the shelf had been declared missing, not returned by patron, or withdrawn. The most common reason for withdrawal was irreparable damage.

RESULTS

Data were not available for 284 titles of the 1,958 monographs studied: 7 were marked missing; 17 had been withdrawn from the collection; 14 had been rebound and the circulation slip lost; 7 others had no circulation slip; 41 had not been returned by patrons; 16 items were under investigation with a note, ''Claims returned,'' in the OPAC; 26 items were recalled but not returned; and 156 were not checked out but not found on the shelf.

In some way, each of those 284 titles appeared to have been used, whether so heavily that they had to be rebound or withdrawn, or by patrons who did not return them. The NOTIS circulation file from 1996 to 1999 revealed that 119 of 156 (76.3%) of the titles not checked out but not on the shelf had one or more recorded circulations during that time. Unfortunately, the lack of the NOTIS circulation file until 1996 prevented acquiring complete data for each title. The assumption was that the titles were either being used inhouse, misshelved (inadvertently by staff or deliberately by users), or had been stolen. In all probability, all items not checked out and not on the shelf were unavailable because they were being used in one way or another.

Including the 284 titles for which data was incomplete, 1,648 of the 1,958 titles (84.17%) were used at least once. Although there was strong evidence of circulation in many cases, such as the books that were not returned by patrons, data were not complete for the first three years of shelf life for the 284 problem titles. Therefore, these titles were removed from the study's analysis. Removing the 284 titles from the study lowered the number of titles that circulated during the first three years of shelf life to 1,364 of 1,674 titles (81.48%).

Circulation declined with the age of the monographs studied (those books with full data) but not precipitously. Of a recorded 7,659 checkouts, 2,963 (38.69%) occurred in the first year of shelf life, 2,479 (32.37%) in the second year, and 2,217 (28.95%) in the third year. Circulation analysis also found that of the 1,674 monographs, 1,012 (60.45%) circulated for the first time in the first year of shelf life, 239 (14.28%) for the first time in the second year, and 113 (6.75%) in the third year. Four hundred twenty-seven monographs (25.51%) circulated during each of the first three years of shelf life.

Table 1 shows the distribution of monographs at each level of circulation as well as the percentage of items that accounts for a percentage of the circulation. For example, 2.21% of the monographs account for 21.84% of the circulation, while 40.25% of monographs account for 83.51% of the circulation. Figure 1 illustrates the data in Table 1 in a modified Lorenz Curve [13]. The curve demonstrates how far removed data is from a one-to-one relationship in which, for example, 20% of monographs accounts for 20% of circulation. The modified Lorenz curve depicts graphically the percentage of circulation that resulted from a percentage of the monographs.

Table 2 shows the percentage of zero use for each class. Many classes outside the National Library of Medicine (NLM) classification had a small number of monographs resulting in a strong influence by one to two titles. Use was fairly consistent across the major NLM subject classifications. Three NLM classifications had all books used within the three-year period: parasitology (QX), human anatomy (QS), and otolaryngology (WV). Two classifications showed a percentage of zero use below 7%: radiology (WN) and dentistry (WU). In these classifications, the results indicated that demand might be much greater than supply and additional purchases in these areas should be considered.

History of medicine (WZ), ophthalmology (WW), and geriatrics and chronic diseases (WT) were the ma-

Table 1
Distribution of monograph use

Number of circulations	Number of monographs	Cumulative number of monographs	Cumulative percentage of total monographs	Total circulations per circulation range	Cumulative circulations	Cumulative percentage of total circulations
21+	37	37	2.21	1,673	1,673	21.84
20	4	41	2.45	80	1,753	22.89
19	3	44	2.63	57	1,810	23.63
18	6	50	2.99	108	1,918	25.04
17	7	57	3.41	119	2,037	26.59
16	7	64	3.83	112	2,149	38.05
15	7	71	4.25	105	2,254	29.42
14	11	82	4.91	154	2,408	31.43
13	20	102	6.10	260	2,668	34.83
12	16	118	7.05	192	2,860	37.34
11	29	147	8.78	319	3,179	41.51
10	36	183	10.93	360	3,539	46.21
9	38	221	13.20	342	3,881	50.68
8	54	275	16.42	432	4,313	56.32
7	68	343	20.48	476	4,789	62.53
6	90	433	25.86	540	5,329	69.58
5	103	536	32.01	515	5,844	76.30
4	138	674	40.25	552	6,396	83.51
3	164	838	50.05	492	6,888	89.93
2	245	1,083	64.69	490	7,378	96.33
1	281	1,364	81.48	281	7,659	100.0
0	310	1,674	100.0	0		

jor classes that had the highest percentages of zero-use books. The existence of a departmental ophthalmology library on campus might explain lower use in that category. In the case of history of medicine, recency would not be as important as in other areas, and the books might see use later in their shelf life. The lower use will be considered in future collection development decisions.

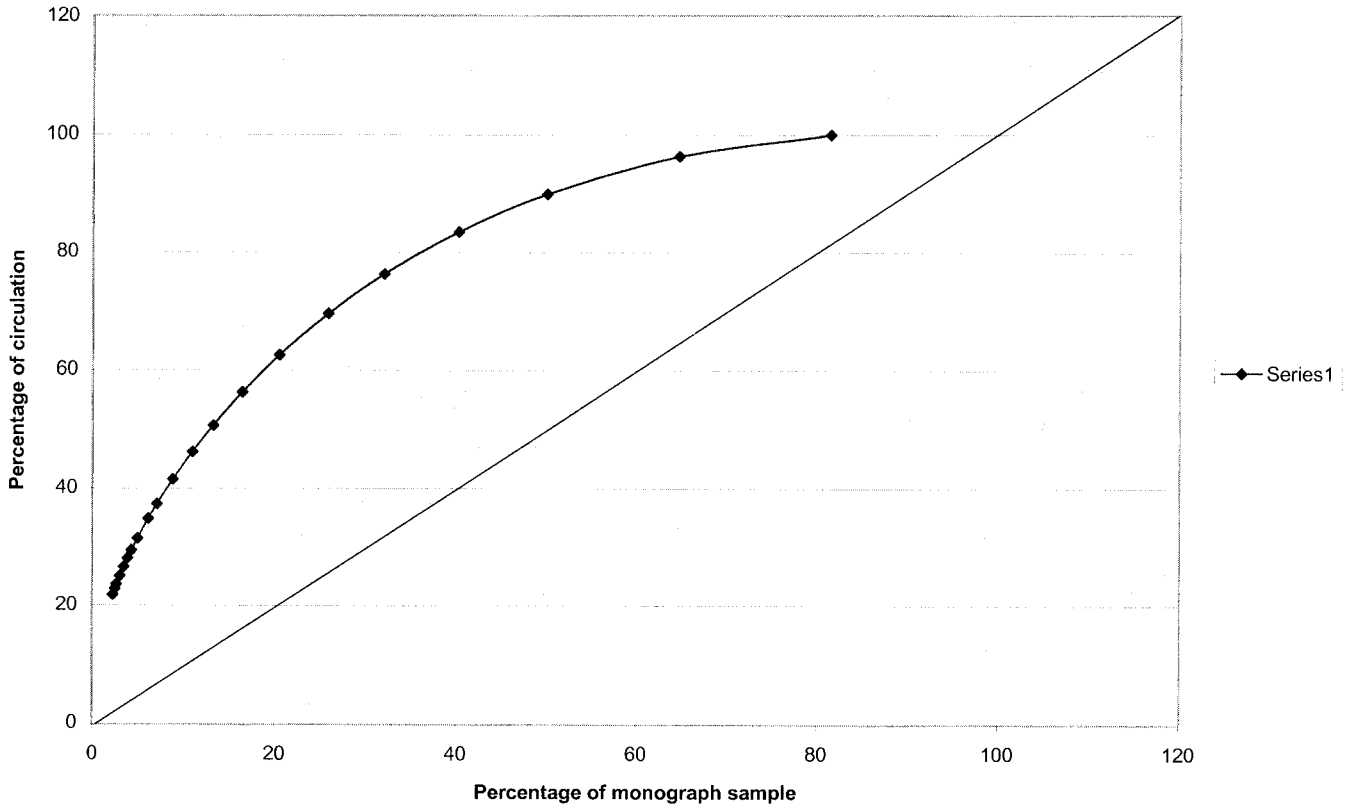
DISCUSSION

The results reported here were similar to other studies in health sciences libraries. In this study, 81.48% of monographs circulated in the first three years of shelf life. Eldredge found that 84% of monographs studied circulated over a four-to-five-year period at the University of New Mexico Health Sciences Center Library [14]. Bowden found that of four academic health sciences libraries studied, three had high percentages of the monograph sample that did circulate over seven years (between 79% and 86%) [15]. Fenske, on the other hand, reported that only 58.3% of monographs studied were used, but some of the monographs had a shelf life as short as two months, which might have contributed to the lower figure [16].

The high percentage of monographs that circulated (81.48%), might indicate that the titles purchased had a high level of relevance for library users, or a demand that was high relative to the number of resources available, or both. Eldredge discussed the issue of demand in relation to the number of resources available. He suggested that the ratio of monographs to primary users (students and faculty) might account for the results seen in monograph use studies over the years. He calculated the ratios for the Pittsburgh study, which had 60% of the monographs used in the first six years of shelf life (1.5 books per user); the Hardesty study, which had 63% use in five years (1.59 books per user; reported users included students only); the Fenske study, which had 58% use in 0.2 to 2 years (2.5 books per user); and his own study, which had 84% use in four to five years of shelf life (0.63 books per user), demonstrate that lower ratios correlated somewhat with a higher percentage of the collection circulating [17]. UIC LHS Chicago had 4,617 primary users for the 1,958 circulating books added in the year of the study. These numbers result in a book-to-user ratio of 0.42, even lower than the Eldredge study. At UIC, the percentage of books that circulated (81.48%) was similar to the Eldredge study results but in a smaller amount of time, three years instead of four to five years of shelf life. The results of this study supported the theory that the percentage of monographs used in a collection correlated negatively with the book-to-user ratio (i.e., the lower the ratio, the higher the percentage of use).

However, while Fenske's study did support the book-to-user ratio theory, the monographs in her study had a short shelf life. If her study had continued so that each monograph had a shelf life of three to four years, the percentage of the monographs used might have approached the levels found in this and the Eldredge study. Such levels would have indicated library type—in this case, academic health sciences li-

Figure 1
Monograph circulation pattern



braries—was the dominant factor over monograph-to-user ratio. Further study at several academic health sciences libraries with different monograph-to-user ratios but standardized shelf life times would be needed to determine the effect of monograph-to-user ratios.

The breakdown of circulation by shelf life year revealed that circulation did decline with the age of the monograph collection, but not precipitously. In the case of 2,217 of the recorded checkouts, the monograph was already into its third year of shelf life, with an even earlier publication date than three years before the circulation date in many cases, due to a lag between acquisition and cataloging. Perhaps, despite often rapid advances in the health sciences, many monographs have a long time span of relevance and are used for many years. The titles included in this study will be analyzed again after ten years of shelf life to further assess how circulation patterns relate to the age of a monograph in an academic health sciences library. Considering that 60.45% of monographs circulated in the first year of shelf life, but 21.08% did not circulate until the second or third year of shelf life, determining if the remaining 18.52% of monographs do eventually circulate will be interesting.

The data did not conform to the 80/20 rule. Approximately 38% of the monographs accounted for 80% of the use (Table 1). Studies in other health sciences libraries by Bowden and Eldredge have reported similar patterns; in fact, the modified Lorenz curve generated by the study data was similar to that of the Eldredge study [18, 19]. Modified Lorenz curves depicting monograph use for other types of libraries, such as libraries studied by Trueswell and Hardesty, have shown much steeper curves, depicting more concentrated use of fewer titles that were closer to the 80/20 rule [20, 21]. Britten found that while the entire library collection at the University of Tennessee at Knoxville demonstrated the 80/20 rule, between 34.5% and 40% of monographs in the medical LC subject classes sampled accounted for 80% of circulation [22]. The results of this study and studies by Eldredge, Bowden, and Britten suggested that health sciences libraries in general did not fall into an 80/20 pattern, but that a larger percentage of monographs accounted for 80% of circulation.

While not conforming to an 80/20 rule, the data of this study demonstrated that a small percentage of a population exerted a large percentage of effect, Juran's

Table 2
Zero use by classification range

Class	Description	No. of books	No. with zero uses	Percentage with zero uses
BD	Speculative philosophy	2	1	50.0
BF	Psychology	8	0	—
HF	Commerce	1	0	—
HQ	Family, marriage, woman	10	4	40.0
HV	Social pathology, etc.	9	4	44.4
KF	Law of U.S.A.	1	1	100.0
P	Philology, linguistics	1	1	100.0
QC	Physics	1	0	—
QD	Chemistry	2	0	—
QH	Natural sciences	28	3	10.7
QK	Botany	2	1	50.0
QP	Physiology-animal	3	0	—
QS	Human anatomy	17	0	—
QT	Physiology-human	27	3	11.1
QU	Biochemistry	62	11	17.7
QV	Pharmacology	78	12	15.4
QW	Microbiology and immunology	48	6	12.5
QX	Parasitology	2	0	—
QY	Clinical pathology	12	1	8.3
QZ	Pathology	74	15	20.3
SB	Plant culture	1	1	100.0
SF	Animal culture	2	0	—
T	Technology	1	0	—
TK	Electrical, nuclear engineering	4	1	25.0
TP	Chemical technology	2	1	50.0
UH	Military services	1	0	—
W	Health professions	94	19	20.2
WA	Public health	73	15	20.5
WB	Practice of medicine	69	7	10.1
WC	Communicable diseases	46	7	15.2
WD	Nutrition, metabolic diseases, etc.	34	3	8.8
WE	Musculoskeletal system	90	11	12.2
WF	Respiratory system	49	9	18.4
WG	Cardiovascular system	99	16	16.2
WH	Hemic and lymphatic systems	28	4	14.3
WI	Digestive system	63	8	12.7
WJ	Urogenital system	39	9	23.1
WK	Endocrine system	34	6	17.7
WL	Nervous system	145	30	20.7
WM	Psychiatry	130	24	18.5
WN	Radiology, diagnostic imaging	29	2	6.9
WO	Surgery	61	5	8.3
WP	Gynecology	58	10	17.2
WQ	Obstetrics	33	7	21.2
WR	Dermatology	19	2	10.5
WS	Pediatrics	68	6	8.8
WT	Geriatrics, chronic diseases	23	7	30.4
WU	Dentistry, oral surgery	48	2	4.2
WV	Otolaryngology	15	0	—
WW	Ophthalmology	35	11	31.4
WX	Hospitals and health facilities	22	4	18.2
WY	Nursing	129	10	7.8
WZ	History of medicine	23	10	43.5
Z	Bibliography and library science	3	0	—

vital few principle [23]. In this study, 2.21% of monographs accounted for 21.84% of circulation.

The large percentage of monographs that could not be found and were not checked out in this study requires discussion. Fenske reported 1.4% of books unaccounted [24]. This study found that 156 books (8%) were unaccounted for (i.e., not checked out according to the circulation system but not found on the shelf). When combined with books that were reported in the OPAC as missing, not returned by patrons, claims returned, or recalled but not yet returned, the percentage of items not able to be used rose to 246 books (12.6%). This percentage was a large part of the collection lost to library users. One possibility was that patrons are stealing, not returning, or hiding favorite books in the stacks, because getting them on demand from the library was hard. When a weeding project was carried out several years ago in an older part of the collection classed using the Dewey system instead of NLM classification, many hidden books were found and returned to their rightful spots on the shelves. In the case of LHS Chicago, the not-on-shelf problem is rather large and warrants further study.

CONCLUSION

A study of monograph circulation at the UIC LHS Chicago found that within the first three years of shelf life, 81.48% of monographs for which data was obtainable circulated one or more times. A substantial portion of the study's original population (14.5%) presented evidence of circulation but circulation data could not be obtained for a variety of reasons related to use. For the population with circulation data, the number of circulations per year declined as shelf life increased from one to three years, but not precipitously. All of these results suggested a very high demand for monographs at this academic health sciences library.

Journal collections are vital to health sciences libraries and, in times of budgetary limitations, are often maintained at the expense of monograph collections [25]. This study and others at academic health sciences libraries demonstrate that monographs are also in demand at academic health sciences libraries. Academic health sciences libraries have demonstrated a larger percentage of monograph use than other types of libraries. This use may be a consequence of the way the health sciences literature is used. One factor may be that information is often needed immediately for clinical decision making. This need may contribute to a larger percentage of circulating monographs. If a certain book on cardiology is checked out, the patron may not be able to wait for it to be recalled, but rather will consult a similar monograph. This pattern would be particularly true when basic, time-tested information is needed. On the other hand, higher levels of use may be due to an emphasis on journal purchases that reduces monographic acquisitions, resulting in a lower monograph-to-user ratio and a higher percentage of monograph circulation due to greater demand. Further study may reveal whether the monograph-to-user ratio or library type is the dominant factor in monograph use.

Web-based electronic reference services may impact the circulation of print health sciences monographs in

the future as patrons access these resources from the desktop without coming to the library building. In 1999, the UIC Library subscribed to MD Consult and Harrison's Online, which together provide Web access to electronic versions of over thirty-six leading medical monographs. Both services also allow concurrent use of resources rather than a single user checking out a monograph at a time with a traditional circulating collection. A key area for future study will be the effect of the availability of electronic health sciences monographs on traditional monographic circulation in academic health sciences libraries.

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REFERENCES

1. JURAN JM. Universals in management planning and controlling. Manage Rev 1954 Nov;43(11):748–61.
2. ELDREDGE JD. The vital few meet the trivial many: unexpected use patterns in a monographs collection. Bull Med Libr Assoc 1998 Oct;86(4):496–503.
3. TRUESWELL RL. Some behavioral patterns of library users: the 80/20 rule. Wilson Libr Bull 1969 Jan;43(5):458–61.
4. BURRELL QL. The 80/20 rule: library lore or statistical law? J Doc 1985 Mar;41(1):24–39.
5. HARDESTY L. Use of library materials at a small liberal arts college. Libr Res 1981;3:261–82.
6. BRITTEN WA. A use statistic for collection management: the 80/20 rule revisited. Libr Acquis Pract Theory 1990;14(2): 183–89.
7. BULICK S, SABOR WN, FLYNN R. Circulation and in-house use of books. In: Kent A, et al. Use of library materials: the University of Pittsburgh study. New York, NY: Marcel Dekker, 1979:9–55.
8. HARDESTY, op. cit., 266.
9. FENSKE RE. Evaluation of monograph selection in a health sciences library. Bull Med Libr Assoc 1994 Jul;82(3):265–70.
10. BOWDEN VM. Current monograph collections: patterns of ownership and use in four academic health sciences libraries. [dissertation]. Austin, TX: University of Texas, 1994.
11. ELDREDGE, op. cit., 498.
12. RICHARDS DT, EAKIN D. Collection development and assessment in health sciences libraries. Lanham, MD: Medical Library Association and Scarecrow Press, 1997. (Current Practice in Health Sciences Librarianship, v.4).
13. LORENZ MO. Methods of measuring the concentration of wealth. Publications of the American Statistical Association. New Series 1905 Jun;9(70):209–19.
14. ELDREDGE, op. cit., 498.
15. BOWDEN, op. cit., 80.
16. FENSKE, op. cit., 267.
17. ELDREDGE, op. cit., 501.
18. BOWDEN, op. cit., 130.
19. ELDREDGE, op. cit., 499.
20. TRUESWELL, op. cit., 458, 461.
21. HARDESTY, op. cit., 267.
22. BRITTEN, op. cit., 186.
23. JURAN, op. cit., 749.
24. FENSKE, op. cit., 267.
25. BLECIC DD, HOLLANDER S, LANIER D. Collection development and outsourcing in academic health sciences libraries: a survey of current practices. Bull Med Libr Assoc 1999 Apr;87(2):178–86.

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