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# CINAHL and MEDLINE: a comparison of indexing practices\*

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A random sample of fifty nursing articles indexed in both MEDLINE and CINAHL (NURSING & ALLIED HEALTH) during 1986 was used for comparing indexing practices. Indexing was analyzed by counting the number of major descriptors, the number of major and minor descriptors, the number of indexing access points, the number of common indexing access points, and the number and type of unique indexing access points.

The study results indicate: there are few differences in the number of major descriptors used, MEDLINE uses almost twice as many descriptors, MEDLINE has almost twice as many indexing access points, and MEDLINE and CINAHL provide few common access points.

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## INTRODUCTION

MEDLINE was one of the first online databases to become available; it continues to be the primary database for health sciences libraries [1]. One of its components is indexing information included in the *International Nursing Index*. NURSING & ALLIED HEALTH (CINAHL), a database designed specifically for nursing and allied health, became available in 1984 on BRS and DIALOG; its print counterpart is the *Cumulative Index to Nursing & Allied Health Literature* (CINAHL) [2].

Seventy percent of CINAHL's controlled vocabulary is identical to the National Library of Medicine's MeSH [3]. In addition, the hierarchical structure of MeSH, known as the Tree Structures, has been adopted by CINAHL. Like MEDLINE, CINAHL updates its vocabulary annually, and new subject headings are

mapped to old ones, thus automatically updating previous years.

MEDLINE and CINAHL have similar vocabularies and hierarchical structures, as well as similar content and indexing policies. Both databases index approximately 140 common nursing titles (as identified by comparison of the 1986 lists of journals indexed in both sources). Indexing policies for MEDLINE and CINAHL both dictate the use of the most specific descriptor available to represent a given concept [4-5].

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Despite the similarities, comparable search results cannot be assumed. Differences exist in scope and coverage, in indexing vocabularies, and in the as-

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signment of descriptors. A librarian or information specialist should know when to search MEDLINE, when to search CINAHL, and when to use both. This study compares the assignment of descriptors, that is, the subject indexing practices of MEDLINE and CINAHL, for a group of nursing journals. The results provide online searchers with a basis for developing more effective strategies for the retrieval of citations to the nursing literature.

## PREVIOUS STUDIES

Two studies comparing MEDLINE and CINAHL subject indexing have been reported, the first by Pings [6] and the second by Lansing and Edmondson [7]. Pings' study, investigating the need for bibliographic control of the nursing literature, compared the descriptors used by both MEDLARS and the *Cumulative Indexing to Nursing Literature* (CINL, continued as CINAHL) to index the same citation. The sample consisted of forty-eight references from eight issues of nursing journals published in 1963. The results indicated that MEDLARS had a greater depth of indexing, 2.5 descriptors per document compared to CINL's 1.6.

Lansing and Edmondson compared the indexing in MEDLINE and its print counterpart, *Index Medicus*, with the indexing in the online CINAHL and its print counterpart. The purpose of their study was to assist rehabilitation professionals in accessing the occupational therapy literature. The authors compared descriptors used by both systems to index the same references and determined the impact of non-MeSH CINAHL vocabulary. The sample consisted of 176 articles published in the *American Journal of Occupational Therapy* during a three-year period, 1983 through 1985. As in Pings' study, the results indicated that MEDLINE had greater depth of indexing, averaging 10.3 descriptors per document compared to 4.6 for CINAHL.

Neither of these studies, however, compared the ways in which indexing practices affect electronic retrieval of information on nursing topics. Pings' study was conducted before CINAHL became available for online searching. The Lansing and Edmondson study covered the occupational therapy literature, not the nursing literature.

Although indexing consistency is considered a valid measure of a system's performance [8-9], most studies in the biomedical literature have measured consistency within the same system or resource [10-13] and not between two distinct resources. Because of both the differences and similarities between MEDLINE and CINAHL vocabularies, uniqueness and commonality rather than indexing consistency were considered in this study.

## METHODOLOGY

Fifty articles were selected at random from 140 nursing journals indexed in both MEDLINE and CINAHL during the first half of 1986. The subject indexing for these fifty documents from MEDLINE and CINAHL was analyzed by counting the number of major descriptors used, the number of major and minor descriptors used, and the number of indexing access points. Category three, indexing access points, was further analyzed by determining the number of common indexing access points and the number of unique indexing access points. The unique access points were also analyzed by type of access point.

Definitions and abbreviations used in the five categories analyzed are based on those described in the Funk and Reid study of indexing consistency in MEDLINE [14]. The five categories with their definitions and abbreviations were as follows:

### Category 1 – major descriptors (MJ)

These represent the central or major concepts of an article and appear in both the print and nonprint (online) forms of the two sources. This category was analyzed by counting the total number of main headings or main heading/subheading combinations as assigned to represent central concepts.

### Category 2 – major and minor descriptors (MJ/MN)

These represent both the central and minor concepts of an article. Unlike major descriptors, minor or peripheral descriptors do not appear in the print indexes. However, a MeSH or CINAHL heading without a central concept indicator will retrieve both major and minor concepts of an article. This category was analyzed by counting the total number of main headings, main heading/subheading combinations, check tags, and geographics assigned as either major or minor descriptors.

### Category 3 – indexing access points (ACCESS)

Indexing access points include main headings, main heading/subheading combinations, check tags, geographics, topical subheadings, and CINAHL's unique tertiary subheadings. Figure 1 lists the indexing access points analyzed. All access points were counted, whether major or minor concepts of an article. Duplicate access points were counted once. For example, if the subheading THERAPY was applied to three different main headings in the same citation, it was only counted once as an unattached subheading.

MEDLINE access points included:

**Figure 1**  
Indexing access points

1. Check tags (CT)
2. Geographics (G)
3. Main headings (MH)
4. Main heading/subheadings (MH/SH)
5. Subheadings (SH)
6. CINAHL's main heading/subheading/tertiary headings (MH/SH/TH)
7. CINAHL's main heading/tertiary headings (MH/TH)
8. CINAHL's tertiary headings (TH)

**Check tags (CT).** These are headings routinely assigned or "checked" in every article indexed. Examples include CHILD, ADULT, FEMALE, and MALE.

**Geographics (G).** These are category "Z" terms of the Tree Structures and are assigned to indicate geographic aspects of documents.

**Main headings (MH).** These include all main headings (except check tags and geographics) without considering attached subheadings.

**Main heading/subheadings (MH/SH).** These include all main headings with an attached subheading.

**Subheadings (SH).** These include topical subheadings that have been attached to a main heading to denote a specific aspect of a topic. Although an indexer may not assign an unbound subheading to an article, subheadings can be searched as separate access points online.

CINAHL access points included check tags (CT), geographics (G), main headings (MH), main heading/subheadings (MH/SH), and subheadings (SH), all of which have the same definitions and abbreviations as in MEDLINE. However, because of CINAHL software constraints on both BRS and DIALOG, CINAHL single-word subheadings were excluded as indexing access points. Multi-word subheadings were included.

For instance, in MEDLINE, the subheading qualifier SH can be used to search subheadings solely as subheadings [15]. In CINAHL, no equivalent subheading qualifier is available; thus, subheadings cannot always be searched solely as subheadings. BRS software is more restrictive than DIALOG because the former's single term qualifiers retrieve only main headings and not subheadings. However, multi-word subheadings can usually be retrieved as subheadings because they are not as likely to have another counterpart in the descriptor field, and, therefore, were included in this study.

Main heading/subheading/tertiary headings (MH/

SH/TH) include any main heading with both a subheading and a tertiary heading attached to the main heading in that order. In CINAHL, subheadings represent topical concepts, and tertiary headings represent age or geographic concepts [16]. The following is an example of a main heading/subheading/tertiary heading: CHRONIC DISEASE: PSYCHOSOCIAL FACTORS—NEW YORK.

Main heading/tertiary headings (MH/TH) include all main heading/tertiary heading combinations, whether assigned in the pattern MH/TH or in the pattern MH/SH/TH.

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Tertiary subheadings (TH) differ from topical subheadings in that they can be attached or linked to a main heading or to a main heading/subheading combination [17]. These headings always denote an age or a geographic concept. However, like CINAHL's topical subheadings, tertiary subheadings cannot always be searched solely as subheadings. Therefore, tertiary headings representing age groups (like CINAHL's topical subheadings) were included only if they were multi-word headings. All geographic tertiary headings were included.

The indexing access points in category three were further analyzed by determining their common and unique access points as follows:

#### **Category 4 – common indexing access points (COMMON)**

These represent indexing access points that both CINAHL and MEDLINE have in common. In order for a heading to be selected as a common access point, the words in both had to be the same unless a SEE reference indicated that the terms were similar. For example, the MeSH heading NURSING ASSESSMENT is considered the same as the CINAHL heading DIAGNOSIS—NURSING because the latter has a SEE reference from NURSING ASSESSMENT to its heading. If both databases had the same heading, but one was singular and the other plural, or if one were inverted and the other natural language, they were considered common access points.

#### **Category 5 – unique indexing access points (UNIQUE)**

These represent indexing access points that MEDLINE and CINAHL did not have in common. That is,

**Table 1**  
Results of the subject heading analysis by category

Category	Mean		Median		Range		Std	
	Med	Cin	Med	Cin	Med	Cin	Med	Cin
MJ	2.92	2.76	3	3	1-5	1-6	1.03	1.22
MJ/MN	8.92	4.68	9	5	2-19	1-11	4.04	2.32
ACCESS	12.58	6.60	12	6	3-27	1-14	6.59	3.81
COMMON	2.96	2.96	2	2	0-10	0-10	2.37	2.37
UNIQUE	9.62	3.64	8	3	2-23	0-10	5.60	2.67

MED = MEDLINE.  
CIN = CINAHL.

any access point that failed to meet the definition of a common access point was considered a unique access point.

## RESULTS

The results of the subject heading analysis are presented by the following five categories (Table 1):

**Category 1 – major descriptors (MJ).** The results indicate that both MEDLINE and CINAHL assign an average of three major descriptors per citation. Because MEDLINE and CINAHL both assign approximately the same number of major concepts to a citation, a further analysis was made to determine how many common descriptors were used. The results indicate that there is little agreement: the average number of common major descriptors is fewer than 0.5.

**Category 2 – major and minor descriptors (MJ/MN).** The data show that MEDLINE uses almost twice as many descriptors per citation as CINAHL. That is, indexers assign an average of nine descriptors to a MEDLINE citation in contrast to an average of five assigned by CINAHL indexers. These results clearly indicate that the depth of indexing is almost two times greater for MEDLINE than CINAHL. This approximate two to one ratio of indexing depth correlates with Pings' 1966 study [18].

**Category 3 – indexing access points (ACCESS).** MEDLINE provides an average of thirteen access points per citation compared to an average of seven for CINAHL. These data parallel what was observed for the total number of descriptors used. Just as MEDLINE provides almost twice as many descriptors as CINAHL, it also provides almost twice as many indexing access points. The increase in access points compared to subject headings is approximately 40% for both MEDLINE and CINAHL.

**Table 2**  
Percentages of unique indexing access points by type

	% MEDLINE	% CINAHL
Check tags	21	7
Geographics	2	1.5
Tertiary headings	0	5
Subheadings	15	4
Main headings & main head/subheadings	62	70
Main heading/subheading/tertiary headings	0	12.5
Total	100	100

**Category 4 – common indexing access points (COMMON).** The data indicate that the number of common indexing access points shared by MEDLINE and CINAHL is low. That is, the average number of common indexing access points is three; the average number of indexing access points for CINAHL is seven, and for MEDLINE, thirteen.

*These results clearly indicate that the depth of indexing is almost two times greater for MEDLINE than CINAHL.*

**Category 5 – unique indexing access points (UNIQUE).** The data show MEDLINE has more than twice as many unique indexing access points: an average of ten, compared to an average of four for CINAHL. Since the unique indexing access points indicate the differences between MEDLINE and CINAHL indexing practices, an analysis by type was conducted:

- Check tags (21%) and geographics (2%) comprise 23% of MEDLINE's unique access points; check tags (7%), geographics (1.5%), and tertiary headings (5%) (age and geographic concepts) represent 13.5% of CINAHL's unique access points.
- Subheadings make up 15% of MEDLINE's unique access points and 4% of CINAHL's.
- Main headings and main heading/subheading combinations represent the largest category of unique access points for both databases, 62% for MEDLINE and 70% for CINAHL.
- Main heading/subheading/tertiary heading and main heading/tertiary heading combinations, which are unique to CINAHL, represent 12.5% of its unique access points.

Table 2 shows the percentage of unique access points by type for both MEDLINE and CINAHL.

## DISCUSSION

In the sample of nursing articles studied, few differences were found in the number of major descriptors used. However, MEDLINE uses almost twice as many descriptors and has almost twice as many indexing access points. The data clearly illustrate that MEDLINE's depth of indexing provides the potential for greater specificity in online searching. Thus, searchers can use more than two parameters for effective retrieval in MEDLINE; whereas, in CINAHL, searchers who use more than two parameters greatly reduce the possibilities for retrieval.

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Although few differences between the two databases occur in the number of major descriptors used, significant differences occur in the number of *common* major descriptors used. In addition, little commonality exists in the use of main headings and main heading/subheading combinations; these types of headings represent the largest category of unique indexing access points for both databases. The lack of commonality evident between MEDLINE and CINAHL indexing reinforces the general tenet that cross-database searching with the same strategy should not be performed without a thorough review of the vocabulary and structure of each database [19]. Although MEDLINE and CINAHL's common headings and common tree numbers should assist the formulation of common strategies for cross-database searching, the data in this study clearly indicate that common strategies will often be unsuccessful.

In general, a searcher should use MEDLINE when specificity available through the coordination of numerous descriptors or indexing access points is needed. However, for some topics, CINAHL's unique use of tertiary subheadings provides the opportunity to tailor a search to greater specificity. Unbound subheadings can be useful for certain searches. In this case, MEDLINE may yield more effective results because MEDLARS software always permits the identification of unbound subheadings. However, with CINAHL software on both BRS and DIALOG, it is awkward and, in some cases, impossible to identify unbound subheadings. Subheadings make up 15% of MEDLINE's unique access points, but only 4% of CINAHL's. In both databases, searchers should seldom use geographic concepts as separate parameters because indexers in both systems appear to use them sparingly.

When an exhaustive search on a nursing topic is needed, both MEDLINE and CINAHL should be used. Searching both databases is essential, as coverage differs. Although approximately 140 titles are indexed in both MEDLINE and CINAHL, many unique publications appear in each database. When using both databases, searchers must remember that 30% of CINAHL's controlled vocabulary differs from MEDLINE's and, as indicated by this study, significant differences occur in the assignment of descriptors. Therefore, different strategies should be formulated for each file.

## CONCLUSION

Although this study provides a number of guidelines for searching the nursing literature in MEDLINE and CINAHL, the results also indicate a need for additional research. This paper offers a quantitative analysis of the assigned subject headings. A qualitative or content analysis of the subject headings assigned by MEDLINE and CINAHL indexers could provide the searcher with further guidelines for effective retrieval.

A contents analysis relating to the indexing terms assigned to each article could perhaps determine the reasons for the lack of commonality in the subject headings assigned. Do CINAHL indexers always use the most specific heading available? Or do CINAHL indexers use more general headings to compensate for fewer subject headings assigned? Although 70% of CINAHL's subject headings are also in MeSH, are the headings assigned to articles in CINAHL more likely to represent a higher percentage of CINAHL's unique vocabulary? These questions can be answered only through additional research.

In the interim, this research provides online searchers with the following guidelines for developing strategies for retrieval of citations to the nursing literature:

- use different strategies based on each system's thesaurus when searching in CINAHL and MEDLINE;
- use MEDLINE when specificity is required through the coordination of more than two parameters;
- use MEDLINE when unattached subheadings are needed;
- use CINAHL for a close association between a term and an age group;
- use geographic parameters sparingly in both MEDLINE and CINAHL; and
- use both MEDLINE and CINAHL for an exhaustive search.

## REFERENCES

1. BOOKMAN JA. Online bibliographic databases. In: Roper FW, Bookman JA. Introduction to reference sources in the

- health sciences. 2d ed. Chicago: Medical Library Association, 1984.
2. Nursing & allied health (CINAHL): 1986 subject heading list with online search guide. Glendale, CA: Glendale Adventist Medical Center, 1986:3.
  3. *Ibid.*, 24-6.
  4. *Ibid.*, 25.
  5. CHAREN T. MEDLARS indexing manual (part II). Bethesda, MD: National Library of Medicine, 1983:4.
  6. PINGS VM. Comparison of indexing in *Cumulative Index to Nursing Literature* with indexing in MEDLARS. In: A plan for indexing the periodical literature of nursing: report of a study of the need for bibliographic control of the scholarly record of nursing. New York: American Nurses' Foundation, 1966:86-99.
  7. LANSING PS, EDMONDSON ME. Subject indexing of the *American Journal of Occupational Therapy* in MEDLINE and NAHL. *Med Ref Serv Q* 1987 Summer;6(2):39-49.
  8. LEONARD LE. Inter-indexer consistency and retrieval effectiveness: measurement of relationships [thesis]. Urbana, IL: University of Illinois, 1975:183.
  9. FUNK ME, REID CA. Indexing consistency in MEDLINE. *Bull Med Libr Assoc* 1983 Apr;71(2):176-83.
  10. LANCASTER FW. Evaluation of the MEDLARS demand search service. Bethesda, MD: National Library of Medicine, 1968.
  11. LEONARD, op. cit.
  12. MARCETICH J, SCHUYLER P. The use of AID to promote indexing consistency at the National Library of Medicine. Paper presented in June 1981 at the Eighty-First Annual Meeting of the Medical Library Association, Montreal, Quebec.
  13. FUNK, op. cit.
  14. *Ibid.*, 179.
  15. MEDLINE/SDILINE/BACKFILES. In: Online services reference manual. Bethesda, MD: National Library of Medicine, 1986.
  16. Nursing & allied health (CINAHL), op. cit., 31.
  17. *Ibid.*
  18. PINGS, op. cit., 88.
  19. HARTER SP. Online information retrieval: concepts, principles, and techniques. New York: Academic Press, 1986: 193.

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#### FROM THE *BULLETIN*—25 YEARS AGO

##### The coming of age of information technology

By Mortimer Taube, Ph.D., Chairman, Board of Directors and Chief Scientific Adviser, Documentation Incorporated, Bethesda, Maryland

The great flowering of American librarianship occurred around the turn of the century when the giants of our profession—Hanson, Cutter, Dewey, Billings, and others—developed the rules for standard and book catalogs. Subsequently, cataloging in libraries became for the most part a technical effort designed to carry out the cataloging of individual books or periodical articles according to established rules of dictionary, subject, and class catalogs. The advent of the computer means that the total cataloging enterprise needs rethinking. There is an opportunity now to concern ourselves not with applying set rules to the cataloging of a single item, but with evolving new rules for the organization of total collections and new bibliographical services. If librarians take advantage of this great opportunity, theirs can emerge as one of the major intellectual professions of our time.

*Bull Med Libr Assoc* 1964 Jan;52(1):127