

NATIONAL LIBRARY OF MEDICINE

Medical Subject Headings

Main headings, Subheadings, and Cross references used in the
Index Medicus and the National Library of Medicine Catalog

1st EDITION

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Public Health Service
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P R E F A C E

Here is presented the subject heading authority list of the National Library of Medicine. These subject headings are used in the compilation of the new Index Medicus, and in the National Library of Medicine Catalog, beginning 1960.

The list represents a combination, rationalization, and extensive modification of two previous authority lists. One was a list, maintained only as a card file, which was utilized in the subject cataloging of books. The other was the Subject Heading Authority List used in the old Current List of Medical Literature; this was published in 1954 (now out-of-print) and underwent several internal revisions over the course of the years.

The adoption of a single subject authority list for both books and periodical articles is a departure from traditional practice. The rationale of this position was set forth in "Applications and Limitations of Subject Headings: The Pure and Applied Sciences", a paper printed in The Subject Analysis of Library Materials, edited by Maurice F. Tauber, published by the School of Library Service, Columbia University, 1953. Much has been made of the presumed differences between headings used for cataloging and headings used for indexing; most of the difficulty lies in the ambiguity of the word "indexing". This has been ordinarily thought of in terms of indexing a book. A book index is made up on an ad hoc basis; there is a brand new conceptual scheme evolved for every book indexed. It should be clear that the construction of continuing indexes to multiple periodicals is quite a different matter. We take the view that subject cataloging and periodical indexing, as exemplified in the Index Medicus and in the NLM Catalog, are identical processes in their major dimensions. A single list can and should be used for both purposes. This has two major virtues: simplicity for users, in requiring familiarity with only a single scheme; and economy to the Library in the development and maintenance of a single scheme.

If it be objected that the subject matter of periodical articles is more specifically directed than the subject matter of books, thereby requiring more specific headings, we would counter with the notion that increasing specificity may be accommodated better by increasing the number of headings assigned to a single article.

This in turn stems from our belief that an unstated, unwritten premise of traditional library subject cataloging has been the attempt to provide a single most-specific subject heading which fits the work or the article as a whole, a single subject heading which as a word or short phrase is a compressed encapsulation of the precise subject being denoted. We reject such a premise. We conceive of subject headings not as labels which say, in effect, "This is it", but rather as pointers, which say, in effect, "There it is, right there". The intersect of two or more such pointers will define a very specific subject; in many cases the natural language, rich as it is, is not rich enough to provide a single word or phrase adequate for the purpose.

There is another departure from traditional practice represented in this list. This is the adoption of standard topical subheadings for cataloging books, as well as for indexing periodical articles.

We distinguish four types of subheadings -- topical, place, time, and form -- and we have standardized each type. The latter three types have long been standardized, to all intents and purposes, in library practice; it is the first type, the topical subheading, which in being standardized represents a change.

The topical subheading is in effect a substitute for a phrase heading, and on the whole it is a preferable substitute. The difficulty heretofore has been that in topical subdivision the relationship of the two elements -- main heading and topical subheading -- has not been clear and predictable. Often it was as logical to use the main heading as subdivision, and the subdivision as main heading, as the reverse. This difficulty is largely obviated by conventionalizing the topical subdivisions. With a short, standard list of topical subheadings available in advance, many quandaries of subject heading assignment and subsequent search are mitigated.

It will be noted that, whereas main headings are generally narrow and quite specific, topical subheadings embrace enormously broad concepts, in comparison. The main heading-topical subheading combination is a pre-coordination of terms, reducing the problem of term permutation, which looms large in most manual retrieval systems in book form.

For the present, the Index Medicus utilizes only the topical subheadings. The NLM Catalog utilizes the topical subheadings and the place, time, and form subheadings as well. In Catalog use, only one subheading of each type may be used in a given subject group (main heading plus one or more subheadings); furthermore, subheadings of the various types are always used in an invariant order in any subject group -- main heading, topical subheading, place subheading, time subheading, form subheading. Any type of subheading may be omitted in any particular subject group; the order of the remaining type subheadings remains invariant. Further description of the system and NLM rules of practice are to be found in the Introduction to this work.

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This authority list is an open-ended list; it will be added to and revised from time to time. New editions of this work will appear periodically, perhaps biennially. Interim revision sheets embodying changes will appear in mimeographed form; librarians desiring copies of the revision sheets will be placed on a mailing list on request to the Director, NLM.

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On the title page of Sabin's Dictionary there appears a quotation, "A painfull work it is I'll assure you, and more than difficult, wherein what toyle hath been taken, as no man thinketh so no man believeth, but he hath made the triall." That seems appropriate to apply to this book. The NLM staff -- and in particular a half-dozen members of that staff -- have labored long and hard to make of this work what now emerges. We hope it is useful. We will welcome comments and criticisms aimed at making it more useful still.

FRANK B. ROGERS
Director
National Library of Medicine

Washington, D. C.
1 May 1960

INTRODUCTION

Medical information "has been drawn from such a wide span of time and such a diversity of specialized fields that its doctrines belong to several different systems and its language problem is almost as bad as that of India. There is at least one major language for each major department, and each of these has several dialects. The situation is made even worse because in each language we teach a mixture of doctrines which range from Newtonian absolutism to Einsteinian relativism, including additive, reciprocal, exponential, and circular structures . . . It is tragic to contemplate the amount of effort we now waste because of our conflicting doctrines, and intriguing to wonder to what heights we might soar, each in his own way, once we manage to resolve the internal contradictions in the system by which we live and work."* There will be less frustration on the part of librarians and other users of catalogs, indexes, and bibliographies if it is realized that the complexities of the field are such that simple, unequivocal solutions to the problem of the form and substance of medical subject headings are not easy to find.

From one point of view, subject headings may be looked at as an artificial language which bears only superficial resemblances to the natural language. Subject headings are more stilted, more stereotyped. From another point of view, in subject headings conceived of as pointers, rather than as labels (see Preface), a certain amount of ambivalence is tolerable.

Suppose, for example, we find a sign reading "San Francisco" pointing west on Independence Avenue in Washington. This would not be very helpful. If, however, we see the same sign on the outskirts of Sacramento, it is likely to be very helpful, indeed. And if we see the same sign on the approaches to the bridge outside of Oakland, we know we have arrived. It does not prejudice our case at all if some wise man comes up to us and says, "Exactly what do you mean by San Francisco? Do you mean the City of San Francisco, or the metropolitan area of San Francisco? Exactly where are the corporate city limits located?" A satisfactory answer might be that, having arrived, we will consult one of the local inhabitants if such distinctions seem important to us. On the other hand, we would like to be sure that the sign on the outskirts of Sacramento refers to the city in California rather than the city of the same name in Argentina. It is likely that in most cases we will be reassured on this point from the circumstances of the locale — the context — in which the sign is found.

These headings are meant for use with biomedical literature and in biomedical libraries. They usually designate narrow and specific biomedical concepts. In peripheral

*Marjorie Swanson. Journal of the Bowman Gray School of Medicine, 17:45-9, June 1959.

fields headings used are more general in import; AUTOMOBILES appears in the list, but not Hot-Rods, or Trucks. And when VEHICLES appears, as it does, it may be assumed that in context this means pharmaceutical vehicles rather than vehicles of the four-wheeled kind. Also, since medical libraries are bibliothecal as well as medical, by definition, bibliothecal terms, such as SUBJECT HEADINGS, may also be found in this list.

FORM OF HEADINGS

General. There is a preference for headings using the direct rather than the inverted form; thus, MITRAL VALVE, rather than Valve, Mitral. In a number of instances, however, inverted forms are used. This is particularly in evidence in those cases where it is possible, in a series of inverted headings, to provide built-in annotations by virtue of the fact that surrounding headings tend to define the scope of a particular heading. Thus,

PSYCHOSES, ALCOHOLIC
PSYCHOSES, INVOLUTIONAL
PSYCHOSES, SENILE
PSYCHOSES, TOXIC

are self-annotating as a group. Similar groups appear under REFLEX, under CARCINOMA, under CHEMISTRY, and so forth. But there are always exceptions to the exceptions. Though we say CHEMISTRY, ANALYTIC, nevertheless we say BIOCHEMISTRY rather than Chemistry, Physiological. In most cases, cross-references are provided.

Spelling. American rather than British spelling is preferred. Thus, ANESTHESIA rather than Anaesthesia. Occasionally this leads to difficulties. For example, AMOEBIA is used rather than Ameba, because that form of the name is preferred in taxonomical nomenclatures. Nevertheless, when we name the disease, we say AMEBIASIS rather than Amoebiasis.

Bias. If a hundred books and articles appear on KREBIOZEN, that is what they are about, and they will be so entered in the catalog. On the other hand, we try to avoid burdening the list with hundreds of terms for special practices. Thus, instead of Grape Cure, we prefer to use GRAPES - therapy.

Englishing. There are some terms in the foreign literature which defy translation into English; they designate concepts which are unknown in the English literature. In

some cases we have found no solution except to anglicize the foreign term. Thus RADIESThESIA, and REFLEXOTHERAPY, describe concepts appearing in the French and German literature, and in terms similar to the original French and German. In other instances such a practice would be extremely misleading. For instance, German literature has material on a concept best translated as Respiratory Therapy. We do not use such a designation because of the ambiguity it would hold for the English-speaking (and no doubt the Spanish-speaking and the Italian-speaking) community. The "solutions" of such unusual cases are a good deal less than perfect, as witness our use of BREATHING EXERCISES to cover the concept of Respiratory Therapy, since this seems to be the predominant element in this type of treatment.

Eponyms. We avoid eponyms whenever and wherever possible. That so many eponymics remain in the list is merely an indication that in a great many instances satisfactory substitutes are unavailable.

Choice of terms. We have tried to use terms in the form and with the definitions set forth in standard reference works, when these can be made to agree. Thus, the names of bacterial genera are from the latest edition of Bergey's Manual, the names of neoplasms are the terms preferred in the American Cancer Society's Manual of Tumor Nomenclature; the names of enzyme groups are those promulgated by a Committee of the National Research Council; the names of drugs are the generic terms proposed by the American Medical Association's Council on Drugs; and so forth. Exceptions do occur; excepting oversights, or those cases in which it has been necessary to accept a term prior to its normalization in a standard reference work, exceptions have been made only after due deliberation.

PRACTICES IN VARIOUS AREAS

Some areas of the list deserve special comment, either because of inherent difficulties, or because of differences from past NLM practices, or because particular attention has been given to solving vexing situations.

Occupational groups. It has been found desirable to eschew the use of names of occupational groups in favor of names of occupations. Thus, we avoid Miners and use MINING, we avoid Bakers and use BAKING INDUSTRY, we avoid Aviators and use AVIATION and AVIATION MEDICINE. In some cases, however, it has been necessary to use names of occupational groups because names of the occupations themselves are unavailable or are unduly awkward: thus, MEDICAL SECRETARIES is used, and is to be interpreted as covering the occupation as well as the incumbents. The term MIDWIVES has been used to cover Midwifery, in the American sense, and to avoid confusion with

Midwifery in the British sense. The outstanding exception to this general rule is the inclusion of the term PHYSICIANS as well as the term MEDICINE. Both are used in the wider as well as the narrower sense. PHYSICIANS is used in preference to MEDICINE when attracted by the nature of the subheading; thus, PHYSICIANS - directories, PHYSICIANS - diseases. But note: CHEMISTRY - directories, for directories of chemists as well as for directories of chemical institutes and installations.

"Pre-clinical" specialties. The names of certain pre-clinical specialties are not used. Thus, we have HELMINTHS and HELMINTHIASIS but not Helminthology; PARASITES and PARASITIC DISEASES but not Parasitology; FUNGI and MYCOSES but not Mycology. We hope it will bother no one to use a heading complex such as PARASITES - congresses rather than Parasitology - congresses; after all, the form subheading congresses may be interpreted to mean "congress on" or "congresses on the subject of", as the main subject heading demands.

Clinical specialties. In the case of clinical specialties, the name of the specialty is used, and it means the specialty itself as well as the diseases it comprehends. Thus, PEDIATRICS designates the specialty as well as Pediatric Diseases in general; GYNECOLOGY designates the specialty as well as Gynecological Diseases. Take the case of ENDOCRINOLOGY and ENDOCRINE GLANDS, both of which are used. We might say ENDOCRINE GLANDS - anatomy & histology, but we prefer to use not Endocrine Glands - diseases but ENDOCRINOLOGY, to cover the concept of Endocrinological Diseases. This is a departure from previous NLM practice, wherein an attempt was made to differentiate the two concepts, further consideration having indicated that this attempt was not successful. But note just below.

Exceptional clinical specialties. There are two major exceptions to the principle cited above — the pairs DERMATOLOGY: SKIN and OPHTHALMOLOGY: EYE, in which we have a one-to-one specialty-organ relationship. Works variously titled "Diseases of the Eye" or "Textbook of Ophthalmology" would both receive the subject heading OPHTHALMOLOGY, whereas an article on a specific disease not common to the eye — "A case of vaccinia endangering the eye" — would get the heading EYE - diseases, as well as the heading VACCINIA (and an article on Glaucoma would get the heading GLAUCOMA and neither EYE - diseases nor OPHTHALMOLOGY); manuals of dermatology and manuals of skin diseases would both receive the heading DERMATOLOGY, whereas an article specifically on "Symmetric skin necrosis during the course of chickenpox" would go under SKIN - diseases, as well as under CHICKENPOX (and an article on Occupational Dermatitis would go only under OCCUPATIONAL DERMATITIS).

Drugs and chemicals. Generic names for drugs are always preferred. Group names may be based on chemical structure (ETHYLENEDIAMINES), on general physiological action (PARASYMPATHOLYTICS), on specific action on target organs (MUSCLE

RELAXANTS, CARDIAC GLYCOSIDES), or disease orientation (ANTIMALARIALS). This is a difficult area, and liberal cross-references are provided to lessen the difficulty.

Surgical procedures. In this list more liberal use has been made of names of specific surgical procedures than was the case heretofore. Now used, for example, are GASTRECTOMY and GASTROENTEROSTOMY, HYSTERECTOMY, APPENDECTOMY, and so forth. There still remain, however, instances where we cannot bring ourselves to such usage. We do not use Herniorrhaphy (or Herniotomy), for example, but prefer to say HERNIA, INGUINAL - surgery. These exceptions usually occur when a disease condition is named on an anatomical basis, but not in all cases, as witness APPENDECTOMY and many others. In any event, we should never be caught using both APPENDECTOMY and APPENDIX - surgery to describe removal of the appendix. But note: we might use TUBERCULOSIS, PULMONARY - surgery to cover general surgical measures in this disease, whereas we would use THORACOPLASTY, or PNEUMONECTOMY, or PNEUMOTHORAX, ARTIFICIAL, to describe those specific procedures.

Arteries and veins. The major vascular trunks are represented by terms given in the direct form. When articles on the lesser vasculature occur, for which no specific headings are furnished, they are either 1) headed under the name of the major trunk of which it is a branch, if this seems most appropriate, or 2) headed under the name of the organ involved, with the subheading blood supply (as STOMACH - blood supply), if grouping in this way is more appropriate.

Muscles. Only major muscle groups are named, as OCULOMOTOR MUSCLES. When other muscles are involved, the material is headed under the name of the part, with the subheading anatomy & histology, as FOREARM - anatomy & histology (or FOREARM - surgery, if this is more appropriate for the particular article).

Neoplasms. Neoplasms are always listed under both histological name (CARCINOMA, DUCTAL) and anatomical site (BREAST NEOPLASMS) when the context of the work makes it possible to give both. This is done even though the particular histological type may be site specific. In some cases, pre-eminently BRAIN NEOPLASMS, two site listings will be given whenever possible. For example, an article on "A case of astrocytoma of the temporal lobe responsive to radiotherapy" would be headed ASTROCYTOMA - radiotherapy, BRAIN NEOPLASMS - radiotherapy, and TEMPORAL LOBE - neoplasms. (Note: the term "neoplasms" is incorporated into the main heading in several prominent instances; otherwise it appears as a topical subheading.)

Radiology. A considerable amount of revision has been done in this area. Formerly cluttered with the roots Radio- and Roentgen- used indiscriminately, the terms are now restricted to roots beginning Radio-, to good effect. Care must be used, however, in assigning these terms and in using them in search. RADIOACTIVE WASTE and RADIATION INJURY may be merely aspects of the same thing, dependent on point of view.

Mental processes. A large attempt has been made to rationalize this whole difficult area. Recognizing that it is not easy to deal with essentially elusive terms such as THINKING, GUILT, PREJUDICE, and the like, we have provided an elaborate cross-reference structure.

CROSS-REFERENCE STRUCTURE

In the main body of this list, the symbol x stands for "see from", and the symbol xx stands for "see also from". In other words, both ends of the cross-references are noted.

Cross-references are at once the bane and pitfall, and the strength and glory, of a subject heading list. A good list needs a good and adequate cross-reference structure; only the matter of defining these adjectives operationally is in doubt.

We have provided a much more extensive cross-reference structure than was heretofore used by us. Nevertheless we are firmly of the opinion that cross-references are not, cannot, and should not be considered a substitute for dictionaries and encyclopedias. We have eliminated all "historical" cross-references ("Jail Fever see Typhus") and all "gratuitous" cross-references ("Leukemia see also Anemia"). The cross-reference structure in its present form seems to be both too voluminous and not voluminous enough.

The difficulty of analysis may lie in the fact that the two cross-reference directions — see and see also — may be concealing at least four different kinds of things. The see also (SA) reference may mean see also laterally (SAL), to a nearly co-equal, or overlapping related subject, as in PERCEPTION see also SENSATION, or as in LUMBOSACRAL REGION see also SACROCOCCYGEAL REGION. It may also mean see also down (SAD), to a subordinate subject, as AMINO ACIDS see also GLYCINE, or as in DAIRY PRODUCTS see also BUTTER. Too frequently these see also down references belabor the obvious, as in GENITALIA, FEMALE see also OVARY, or as in ANTIBIOTICS see also PENICILLIN. The see (S) reference is also a double variety; it may mean see synonymous (SS), as in ASPIRIN see ACETYLSALICYLIC ACID, or it may mean see under (SU), as Marcumar see COUMARINS, or as in Banana see FRUIT. This last type, the SU, impresses us as being particularly dangerous, because for one thing our machine system of editing will put in the cross-reference Banana see FRUIT whenever anything appears under FRUIT, even though all that appears there may deal with Raspberries and not Bananas.

SUBHEADINGS

Four types of subheadings are distinguished: topical subheadings, place subheadings, time subheadings, and form subheadings. In the Index Medicus, only topical subheadings are used. In the NLM Catalog, all four types may be used, and their order is invariant, as given.

TOPICAL SUBHEADINGS

The following topical subheadings* may be used in combination with any main heading:

abnormalities	in pregnancy
addiction	infection
anatomy & histology	innervation
anesthesia & analgesia	jurisprudence
antagonists	legislation
blood	metabolism
blood supply	microbiology
case reports	neoplasms
cerebrospinal fluid	nursing
chemistry	nutrition & diet
complications	parasitology
culture	pathology
deficiency	pharmacology
diagnosis	physiology
diseases	prevention & control
economics	psychology
education	radiation effects
embryology	radioactive
epidemiology	radiography
equipment & supplies	radiotherapy
etiology	rehabilitation
experimental	related compounds
extracts	sociology
foreign bodies	statistics
fracture & dislocation	surgery
genetics	therapy
history	toxicology
hormones	transmission
hospitals & clinics	transplantation
immunology	urine
in adolescence	veterinary
in infancy & childhood	virology
in old age	wounds & injuries

*bibliography may be used as a topical subheading only in Index Medicus; for Catalog use it is considered a form subheading.

The general principles for the application of topical subheadings are as follows:

1. The subheadings as given are to be understood as shorthand for large concepts. The grammatical form of the subheading — noun or adjective — has no significance. The subheadings may be interpolated as adjectival phrases by the addition of prepositions before or after the heading. Thus, - blood may mean "in blood," "blood in," or simply "hematological aspects." Similarly, - therapy may mean "therapy of," "therapeutic use of," or "therapeutic aspects"; - diagnosis means "diagnosis," "differential diagnosis," "prognosis," "examination," "diagnostic aspects," etc.

2. The use of any particular subheading is inappropriate:

a. When the combination of heading and subheading is patently absurd and impossible, as LIVER - related compounds, or MILITARY MEDICINE - blood supply, or RICKETSIA - addiction.

b. When the combination of heading and subheading is clearly tautological, as LACTATION - in pregnancy, or GERIATRICS - in old age, or SARCOMA - neoplasms.

c. When the combination of heading and subheading defines a concept for which a single more appropriate main heading is available within the system. Thus, APPENDIX - surgery would be interdicted, in favor of APPENDECTOMY; BRAIN - neoplasms would be interdicted, in favor of BRAIN NEOPLASMS; MEDICINE - history would be interdicted, in favor of HISTORY OF MEDICINE.

3. When a particular subheading is used to delimit a main concept, the material subject-headed should not appear also under the main heading counterpart of the subheading. For example, an item on nursing care of malaria should appear under MALARIA - nursing, but not also under NURSING; an item on surgery of the liver should appear under LIVER - surgery, but not also under SURGERY.

The scope and definition of many of the subheadings are obvious. The age-group subheadings are straightforward enough, as are the radiological-group subheadings. The subheading education embraces material on teaching, study programs, curricula, and so forth; it is desirable to remember that education is a topical, not a form, subheading, and therefore should not be confused with form subheadings such as "laboratory manuals" and "outlines." The pair of subheadings jurisprudence and legislation must be distinguished; legislation covers texts of laws, proposed legislative acts and discussion thereof, and includes state and municipal regulations, but not litigation. The subheading jurisprudence covers litigation as well as investigations, claims, expert testimony, avoidance of suits, and so forth.

It is instructive to divide the large body of topical subheadings into three groups, merely for purposes of definition and explanation.

(1)	(2)	(3)
abnormalities	antagonists	complications
anatomy & histology	blood	diagnosis
blood supply	cerebrospinal fluid	diseases
culture	chemistry	fracture & dislocation
embryology	deficiency	nursing
epidemiology	experimental	nutrition & diet
immunology	extracts	psychology
infection	metabolism	surgery
innervation	pharmacology	transplantation
microbiology	physiology	veterinary
parasitology	related compounds	wounds & injuries
prevention & control	therapy	
transmission	toxicology	
virology	urine	

Group (1)

a. The subheading abnormalities is intended to cover the field of teratology. It is limited to anatomical defects, abnormal development, and congenital malformation. We would expect that this subheading might be found under names of organs and anatomic regions; it may also be used under names of domestic animals. Its use in other senses (e.g., VISUAL PERCEPTION - abnormalities) is to be avoided. The subheading embryology is used under names of organs and regions to cover aspects of embryonic and fetal development and function.

b. The subheading anatomy & histology covers morphology, gross and microscopic, of any biologic system. We may expect to find this subheading under names of organs, tissues, and regions, as well as under names of animals (FROGS - anatomy & histology; CATS - anatomy & histology) and names of cells and microorganisms (BACTERIA - anatomy & histology; MITOCHONDRIA - anatomy & histology).

c. The subheading blood supply is used under anatomic parts to indicate blood supply, circulation, pressure, or vascular anatomy of the part. The subheading innervation is used under organs and regions to cover the broad aspect of nerve supply.

d. The subheading culture refers to the process of propagation and cultivation of living cells. The subheading immunology is used under names of microorganisms for indicating immunological concepts such as antigenic structure, serotypes, and the like, and under names of diseases to indicate preparation of vaccines, antitoxins, and antisera, and other immunologic and serologic aspects, except for serodiagnosis, serotherapy,

and vaccine therapy. The subheading infection is used under names of microorganisms or parasites for infection by that organism only when the more specific main heading is non-existent in this scheme; it is used under anatomic parts for unspecified infections, but not for specific infections or parasitic diseases; it is used under wounds, injuries, and surgical procedures in the sense of infection as a complication. The subheading microbiology covers both bacterial and mycological aspects, whereas the subheading parasitology covers parasitological and helminthological aspects, and the subheading virology covers strictly virological aspects.

e. The subheading epidemiology indicates the relationship of factors bearing on frequency and distribution of disease; the subheading prevention & control covers preventive and public health measures, except immunization and hospitalization; the subheading transmission covers transfer and modes of transfer of infectious disease.

Group (2)

a. The subheading chemistry covers chemical or biochemical aspects such as production, determination, measurement, analysis, composition, and synthesis. The subheading pharmacology covers aspects such as mode of action, type of activity, effect on biological systems, drug compounding, bioassay, and pharmacognosy. The subheading metabolism covers the energy transformation of food substances, and it may also be used to cover aspects of absorption, assimilation, and excretion of drugs. The subheading physiology may be used under name of organs and regions for normal function and also under physiological states, such as pregnancy or labor.

b. The subheading therapy means either "therapy of" or "therapeutic use of." It is used under the names of drugs, chemicals, medicinal plants, physical agents, and so forth; it is used under names of pathological conditions for any type of therapy other than dietotherapy, radiotherapy, or surgery.

c. The subheading toxicology is used under names of drugs, chemicals, plants, and animals to indicate toxicity, toxic effects, forensic toxicology, and poisoning in any biological system.

d. The subheading antagonists is used only in the pharmacological sense; it is used under names of drugs and chemicals for inhibition or prevention of action, and under specific enzymes for specific antimetabolite.

e. The subheading related compounds is used under single compound drugs and chemicals, but not under drug groups or elements, for compounds derived from, or chemically or functionally related to them; includes derivatives and simulants.

f. The subheading blood means "in blood" or "blood in." It covers examination of, or changes in, the blood, or other hematological aspects, except for serology and serodiagnosis; this subheading is used under names of drugs and chemicals for presence of, or determination of, the chemical in the blood. The subheading cerebrospinal fluid means "in cerebrospinal fluid" or "cerebrospinal fluid in." The subheading urine means "in urine" or "urine in."

g. The subheading deficiency is used under nutritional requirements for deficiency of intake, and under hormones for deficiency of secretion.

h. The subheading extracts is used under organs and tissues for pharmaceutical extracts and dried powdered preparations of the organ or tissue.

i. The subheading experimental is used under pathological conditions, procedures, and diets for experimental work of a specific nature; it is used under specialties and subject fields for general material on experimental research in that field. Its use as a mere form subheading is to be avoided, as for instance where other subheadings, such as physiology or surgery, would be more informative.

Group (3)

a. The subheading complications is used under pathologic conditions, physiologic states, and procedures to indicate departure from the normally expected course of the disease, state, or procedure; includes sequelae, unexpected death, or intercurrent disease; does not include symptoms and signs of the disease or diseases which merely happen to be associated.

b. The subheading diagnosis is to be interpreted in its broadest sense, as "diagnostic aspects," or "diagnosis and examination," or "differential diagnosis," or "prognosis."

c. The subheading diseases is to be interpreted in its broadest sense, as "diseases and disorders."

d. The subheading fracture & dislocation should not include anomalies of location or displacement of parts other than bones and joints.

e. The subheading nursing is used to mean nursing care, and it also means "nursing aspect," as in training in special techniques.

f. The subheading nutrition & diet is used under population groups, physiological states, and pathologic conditions for nutritional aspects, including diet therapy.

g. The subheading psychology is used under non-psychiatric diseases, and elsewhere for psychologic, psychiatric, psychosomatic, and emotional aspects; may be used under psychiatric diseases for material on clinical psychology.

h. The subheading transplantation is used under organs and tissues for material on grafting; it refers to the organ or tissue grafted, and not to the site of transplant; for surgical anastomoses the subheading surgery is preferred; for implants for organo-therapy the subheading therapy is preferred.

i. The subheading veterinary is used under specialties, pathologic conditions, and procedures for material of veterinary interest; it is not used for experimental work or for material on transmission or epidemiology of disease.

j. The subheading wounds & injuries is used for physical trauma and traumatic sequelae such as wounds, burns, birth injury, traumatic rupture, and so forth; it does not include radiation injury, which goes under radiation effects; it is to be distinguished from fracture & dislocation.

PLACE SUBHEADINGS

Place subheadings consist of the names of countries (Canada, India, Netherlands), states and territories of the United States and provinces of Canada (Alabama, Alberta), names of capitals and other major cities (Leningrad, London, Los Angeles), geographical regions and names of natural features such as continents, islands, and peninsulas (Africa, Asia, Mediterranean region).

At NLM, direct place subdivision is always used, e.g., PUBLIC HEALTH - London (not: PUBLIC HEALTH - England - London).

Whether compound geographic names are used in the direct or inverted form is largely a matter of taste. At NLM, we say Africa, Central and Africa, West, but on the other hand we say Central America and South America.

Language subheadings. In special circumstances, the names of languages (French, German, Yiddish) may be used in the place position. When used, these forms must always have the language connotation, and not the connotation of race or nationality. Thus a heading such as ART - French is impossible in this system; but the heading DICTIONARIES - French is acceptable.

Dictionaries. In heading dictionaries, the English language is disregarded. Dorland's work would therefore take the heading DICTIONARIES, MEDICAL. Veillon's work would take the headings DICTIONARIES, MEDICAL - French, and DICTIONARIES, MEDICAL - German.

TIME SUBHEADINGS

The following time subheadings are used:

- Antiquity [to ca. 500 A.D.]
- Middle Ages [ca. 500 A.D. to ca. 1400 A.D.]
- 15th Century
- 16th Century
- 17th Century
- 18th Century
- 19th Century
- World War I
- World War II

At NLM, time subheadings are filed in reverse chronological arrangement, without regard to alphabetization.

FORM SUBHEADINGS

The following form subheadings are used:

abstracts	indexes
atlases	juvenile literature
bibliography	laboratory manuals
biobibliography	nomenclature
biography	outlines
catalogs	periodicals
congresses	popular works
dictionaries	portraits
directories	societies
encyclopedias	tables
essays	yearbooks

PROPER NAMES AS MAIN HEADINGS

Names both personal and corporate which are used as main entries or would be proper as main entries may be used as subject headings. Such subject entries are filed following the appropriate author entries. No subheadings are used, with the following exceptions:

- a. In the case of personal names, the subheading bibliography may be used when appropriate.
- b. In the case of corporate names beginning "United States . . .", the subheading history may be used when appropriate.

Proper names are not used as main headings in the Index Medicus; here two special main headings are used — BIOGRAPHIES, and OBITUARIES — and these are differentiated in the main list by the prefixed asterisks.

The public catalog at NLM is a divided catalog: name catalog, and subject catalog. Proper names used as subject entries are filed behind guide cards in the name catalog.

It is well to remember, also, that the NLM subject catalog is a 25-year catalog; that is, only imprints of the last 25-year period are entered in the subject catalog, and older materials are weeded from the subject catalog in five-year chunks. Certain exceptions are made in the case of bibliographies and other reference works, which are allowed to remain in the subject catalog without a time limit.

FILING PATTERNS

In the NLM subject catalog, cards are filed behind guide-cards bearing the main heading and subheading designations.

Cards are filed in the following order:

- Main heading alone
- Main heading plus form subheading
- Main heading plus time subheading (plus form)
- Main heading plus place (plus time plus form)
- Main heading plus topical (plus place plus time plus form)

This yields the following sort of pattern:

- TUBERCULOSIS
- TUBERCULOSIS - congresses
- TUBERCULOSIS - U. S. - periodicals
- TUBERCULOSIS - epidemiology - Russia
- TUBERCULOSIS - history - Gt. Brit. - 18th Century - bibliography
- TUBERCULOSIS - legislation - 19th Century

At NLM, this kind of "position" filing is carried out literally, although it is not a necessary part of the system. Main headings are typed on white, center, half-cut guide-cards. Topical subheadings are printed on white, left, half-cut guide-cards. Place (or language) subheadings are typed on buff, center, third-cut guide-cards. Time subheadings are printed on salmon, right-of-center, third-cut guide-cards. Form subheadings are printed on blue, right, third-cut guide-cards.

The main headings are typed, and most of the place subheadings are typed as needed. The topical subheadings, the time subheadings, and the form subheadings are printed in advance, in quantity, and inserted as needed.

In installing the system, a price is paid as itemized below:

- a. The system is experimental.
- b. It is economically installed only as a whole. This means typing up the main heading cards and the cross-references in toto, inserting subheading cards as needed.
- c. This means, in turn, that blind headings and cross-references will exist, and that a certain quantity of material has to be filed before the system becomes intelligible.

THE QUESTION OF SPECIFICITY

The traditional rule for subject heading practice, dating from the days of Cutter, is "Enter under the most specific term." The unfortunate fact is that this rule is often mouthed, seldom followed.

The NLM modifies the rule as follows: "Enter under the most specific term or terms available within this system."

We believe that the emphasis on the importance and desirability of specificity is sound policy, because failures in practice have lain and largely continue to lie in this area. At the same time, however, because degree of specificity can be almost endlessly extended, there is a point beyond which it serves no useful purpose, or where the purpose which might be served is insufficient to justify the expenditures required to develop and maintain consistently such extra specificity. Again, the difficulty is that this breaking point is hard to determine.

But for some examples. We have the term PENICILLIN. Should we add Penicillin Sodium and Penicillin Calcium and Penicillin G and all the other variants? We have MORPHINE; should we distinguish Morphine Sulphate from Morphine Phosphate? We have HERNIA, INGUINAL; should we distinguish Indirect Inguinal Hernia from Direct Inguinal Hernia? To this we can add the subheading surgery to cover the topic of Herniorrhaphy, but should we have Ferguson Operation, Bassini Operation, and Halsted Operation? Or should it be, instead, Bassini-type Operations? We have TRICHOMONAS INFECTIONS; should we differentiate infections in the male and in the female? We have HALLUX; should we have Extensor Hallucis Longus? Flexor Hallucis Brevis?

We have asked ourselves these questions, and many more, and we have answered them all in the negative. We believe that with careful original selection of terms, with the concept of the coordination of multiple terms, and with the provision of standard topical subheadings and their liberal use, the spectre of specificity is laid to rest.

TOPICAL SUBHEADINGS

abnormalities	in pregnancy
addiction	infection
anatomy & histology	innervation
anesthesia & analgesia	jurisprudence
antagonists	legislation
blood	metabolism
blood supply	microbiology
case reports	neoplasms
cerebrospinal fluid	nursing
chemistry	nutrition & diet
complications	parasitology
culture	pathology
deficiency	pharmacology
diagnosis	physiology
diseases	prevention & control
economics	psychology
education	radiation effects
embryology	radioactive
epidemiology	radiography
equipment & supplies	radiotherapy
etiology	rehabilitation
experimental	related compounds
extracts	sociology
foreign bodies	statistics
fracture & dislocation	surgery
genetics	therapy
history	toxicology
hormones	transmission
hospitals & clinics	transplantation
immunology	urine
in adolescence	veterinary
in infancy & childhood	virology
in old age	wounds & injuries

TIME SUBHEADINGS

Antiquity [to ca. 500 A.D.]

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15th Century

16th Century

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19th Century

World War I

World War II

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abstracts

indexes

atlases

juvenile literature

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laboratory manuals

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