An Introduction to MESH

(Medical Subject Headings)

Prerequisite:

You should be familiar with the material on controlled vocabulary systems

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A. What is MeSH?

The Medical Subject Headings (MeSH) are standardized vocabulary of approximately 20,000 terms that describe the biomedical concepts covered in the Medline database. MeSH consists of a set of terms or subject headings that are arranged in both an alphabetic and a hierarchical structure. The MeSH thesaurus is produced by the National Library of Medicine (NLM). When each article is indexed, an indexer at NLM assigns from 5 to 20 headings describing the concepts covered in the article. *(see the sample Medline record below)*

MeSH headings are powerful searching tools. They locate documents by assigned controlled vocabulary, not free text words, and are independent of the occurrence of specific words in any other field. MeSH headings allow you to retrieve all references to a particular topic, even if different terminology was used in the records.

MeSH includes several special features. Four of the most important are:

1. Subheadings *(qualifiers)*

   These are used to qualify MeSH subject headings to pinpoint the specific aspect of the concept represented by the subject heading. For example, the heading *Liver* may be qualified with the subheading *drug-effects* (*"Liver-drug-effects"*) to indicate that the article is not about the liver in general, but about the effect of drugs on the liver. *(see appendix 1)*

2. Check Tags

   These are special use descriptors that do not represent subject matter per se but that reflect parameters or aspects of subject content. Special efforts in indexing assures that these will be included or "checked" each time they appear as aspects in an item being indexed. The following list of descriptors must be entered by an indexer for every journal article citation to which they apply.

ANIMALS	MALE
HUMANS	FEMALE

3. Publication Types

These provide an additional means for classifying the material indexed. Rather than representing the subject content of an article, they characterize the nature of the information or the manner in which it is conveyed, e.g., letter, historical article, retracted publication, clinical conference, etc.

BIOGRAPHY
CASE REPORTS
CLINICAL CONFERENCE
CLINICAL TRIAL
CLINICAL TRIAL, PHASE I
CLINICAL TRIAL, PHASE II
CLINICAL TRIAL, PHASE III
CLINICAL TRIAL, PHASE IV
COMPARATIVE STUDY
CONGRESSES
CONSENSUS DEVELOPMENT CONFERENCE
CONSENSUS DEVELOPMENT CONFERENCE, NIH
CONTROLLED CLINICAL TRIAL 75941
EDITORIAL
ENGLISH ABSTRACT
EVALUATION STUDIES
GUIDELINE
HISTORICAL ARTICLE
IN VITRO
JOURNAL ARTICLE
LETTER
META-ANALYSIS
MULTICENTER STUDY
NEWS 115627
PRACTICE GUIDELINE
RANDOMIZED CONTROLLED TRIAL
RESEARCH SUPPORT, N.I.H., EXTRAMURAL
RESEARCH SUPPORT, N.I.H., INTRAMURAL
RESEARCH SUPPORT, NON-U.S. GOV'T
RESEARCH SUPPORT, U.S. GOV'T, NON-P.H.S.
RESEARCH SUPPORT, U.S. GOV'T, P.H.S.
RETRACTED PUBLICATION
REVIEW
TWIN STUDY

4. Age Group Headings

There is a collection of age group heading in MeSH which are assigned whenever someone in that age group is noted in the paper. All age groups listed in the paper are indexed. Thus a clinical trial involving 50 patients, the youngest of whom was 18 y.o. will be assigned the age heading "Adolescent" as well as all the applicable adult headings. Age groups are very rarely assigned to the major MeSH field.

Age Groups

- Adolescent (age 13-18)
- Adult (age 19-44)
  - Aged (age 65-79)
    - Aged, 80 and over
    - Frail Elderly
  - Middle Aged (age 45-64)
- Child (age 6-12)
  - Child, Preschool (age 2-5)
- Infant (age 1-23 months)
  - Infant, Newborn (birth to 1 month)

B. Special Features of MeSH

Here is part of a Medline Record from the EBSCOhost system:

Title: **Diagnosis of ventilator-associated pneumonia.**
Author(s): Kollef MH
Source: The New England Journal Of Medicine [N Engl J Med] 2006 Dec 21; Vol. 355 (25), pp. 2691-3.
Publication Type: Comment; Editorial; Research Support, Non-U.S. Gov't
Language: English

MeSH Terms:

Bronchoalveolar Lavage*
Anti-Bacterial Agents/***therapeutic use**
Pneumonia, Ventilator-Associated/***diagnosis**

Bronchoalveolar Lavage Fluid/**microbiology**; Drug Resistance, Bacterial; Humans; Pneumonia, Ventilator-Associated/**drug therapy**; Trachea/**microbiology**

Note that there are two groups of MeSH terms.

1. In the upper group the MeSH headings are flagged with an asterisk, *, which indicates that the term represents a major or central focus of the paper.
2. The headings in the lower group, which are not flagged, represent secondary or minor aspects of the paper. These are subjects or concepts which are worth noting, but which are not the paper's primary focus.

Some of the MeSH headings are qualified with subheadings, which are shown in green.

The following three citations are all about the drug Azithromycin; however, they all discuss the drug in a different context. Note how the subheading is used to indicate the context:

Azithromycin-induced QT prolongation in elderly patient.
Acta Bio-Medica: Atenei Parmensis, 2006 Apr; 77(1):30-2
- **Azithromycin/*adverse effects**

Determination of azithromycin in human plasma by LC-MS-MS and its pharmacokinetics.
Die Pharmazie, 2007 Apr; 62(4):255-7
- **Azithromycin/*blood**

Cutaneous leishmaniasis treated with azithromycin in a child.
The Pediatric Infectious Disease Journal, 2008 Jan; 27(1):80-1
- **Azithromycin/*therapeutic use**

Appendix 1: MeSH Subheadings:

Subheading	Scope Note
abnormalities	Used with organs for congenital defects producing changes in the morphology of the organ. It is used also for abnormalities in animals.
administration & dosage	Used with drugs for dosage forms, routes of administration, frequency and duration of administration, quantity of medication, and the effects of these factors.
adverse effects	Used with drugs, chemicals, or biological agents in accepted dosage - or with physical agents or manufactured products in normal usage - when intended for diagnostic, therapeutic, prophylactic, or anesthetic purposes. It is used also for adverse effects or complications of diagnostic, therapeutic, prophylactic, anesthetic, surgical, or other procedures, but excludes contraindications for which "contraindications" is used.
agonists	Used with chemicals, drugs, and endogenous substances to indicate substances or agents that have affinity for a receptor and intrinsic activity at that receptor.
analogs & derivatives	Used with drugs and chemicals for substances that share the same parent molecule or have similar electronic structure but differ by the addition or substitution of other atoms or molecules. It is used when the specific chemical heading is not available and no appropriate group heading exists.
analysis	Used for the identification or quantitative determination of a substance or its constituents and metabolites; includes the analysis of air, water, or other environmental carrier. It excludes the chemical analysis of tissues, tumors, body fluids, organisms, and plants for which "chemistry" is used. The concept applies to both methodology and results. For analysis of substances in blood, cerebrospinal fluid, and urine the specific subheading designating the fluid is used.
anatomy & histology	Used with organs, regions, and tissues for normal descriptive anatomy and histology, and for the normal anatomy and structure of animals and plants.
antagonists & inhibitors	Used with chemicals, drugs, and endogenous substances to indicate substances or agents which counteract their biological effects by any mechanism.
biosynthesis	Used for the anabolic formation of chemical substances in organisms, in living cells, or by subcellular fractions.
blood supply	Used for arterial, capillary, and venous systems of an organ or region whenever the specific heading for the vessel does not exist. It includes blood flow through the organ.
blood	Used for the presence or analysis of substances in the blood; also for examination of, or changes in, the blood in disease states. It excludes serodiagnosis, for which the subheading "diagnosis" is used, and serology, for which "immunology" is used.
cerebrospinal fluid	Used for the presence or analysis of substances in the cerebrospinal fluid; also for examination of or changes in cerebrospinal fluid in disease states.
chemical synthesis	Used for the chemical preparation of molecules in vitro. For the formation of chemical substances in organisms, living cells, or subcellular fractions, "biosynthesis" is used.
chemically induced	Used for diseases, syndromes, congenital abnormalities, or symptoms

	caused by chemical compounds in man or animals.
chemistry	Used with chemicals, biological, and non-biological substances for their composition, structure, characterization, and properties; also used for the chemical composition or content of organs, tissue, tumors, body fluids, organisms, and plants. Excludes chemical analysis and determination of substances for which "analysis" is used; excludes synthesis for which "chemical synthesis" is used; excludes isolation and purification of substances for which "isolation & purification" is used
classification	Used for taxonomic or other systematic or hierarchical classification systems.
complications	Used with diseases to indicate conditions that co-exist or follow, i.e., co-existing diseases, complications, or sequelae.
congenital	Used with disease headings to indicate those conditions existing at, and usually before, birth. It excludes morphologic abnormalities and birth injuries, for which "abnormalities" and "injuries" are used.
contraindications	Used with drugs, chemicals, and biological and physical agents in any disease or physical state that might render their use improper, undesirable, or inadvisable. Used also with contraindicated diagnostic, therapeutic, prophylactic, anesthetic, surgical or other procedures.
cytology	Used for normal cellular morphology of unicellular and multicellular organisms.
deficiency	Used with endogenous and exogenous substances which are absent or in diminished amount relative to the normal requirement of an organism or a biologic system.
diagnosis	Used with diseases for all aspects of diagnosis, including examination, differential diagnosis and prognosis; excludes mass screening for which "prevention & control" is used. Excludes radiographic diagnosis for which "radiography" is used; excludes scintigraphic diagnosis for which "radionuclide imaging" is used; excludes ultrasonic diagnosis for which "ultrasonography" is used.
diagnostic use	Used with chemical compounds, drugs, and physical agents when these substances are used for studies of clinical function of an organ, or for the diagnosis of human or animal diseases.
diet therapy	Used with disease headings for dietary and nutritional management of the disease. The concept does not include vitamin or mineral supplements, for which "drug therapy" may be used.
drug effects	Used with organs, regions, tissues, or organisms and physiological and psychological processes for the effects of drugs and chemicals.
drug therapy	Used with disease headings for the treatment of disease by the administration of drugs, chemicals, and antibiotics. For diet therapy and radiotherapy, use specific subheadings. Excludes immunotherapy and treatment with biologicals for which "therapy" is used.
economics	Used for the economic aspects of any subject, as well as for all aspects of financial management. It includes the raising or providing of funds.
education	Used for education, training programs, and courses in various fields and disciplines, and for training groups of persons.
embryology	Used with organs, regions, and animal headings for embryologic and fetal development. It is used also with diseases for embryologic factors contributing to postnatal disorders.
enzymology	Used with organisms, except vertebrates, and with organs and tissues. It is

	also used with diseases for enzymes during the course of the disease, but excludes diagnostic enzyme tests, for which "diagnosis" is used.
epidemiology	Used with human and veterinary diseases for the distribution of disease, factors which cause disease, and the attributes of disease in defined populations; includes incidence, frequency, prevalence, endemic and epidemic outbreaks; also surveys and estimates of morbidity in geographic areas and in specified populations. Used also with geographical headings for the location of epidemiologic aspects of a disease. Excludes mortality for which "mortality" is used.
ethnology	Used with diseases and selected terms for ethnic, cultural, anthropological, or racial aspects, and with geographic headings to indicate the place of origin of a group of people.
etiology	Used with diseases for causative agents including microorganisms and includes environmental and social factors and personal habits as contributing factors. It includes pathogenesis.
genetics	Used for mechanisms of heredity and the genetics of organisms, for the genetic basis of normal and pathologic states, and for the genetic aspects of endogenous chemicals. It includes biochemical and molecular influence on genetic material.
growth & development	Used with microorganisms, plants, and the postnatal period of animals for growth and development. It includes also the postnatal growth or development of organs or anatomical parts.
history	Used for the historical aspects of any subject. It includes brief historical notes but excludes case histories.
immunology	Used for immunologic studies of tissues, organs, microorganisms, fungi, viruses, and animals. It includes immunologic aspects of diseases but not immunologic procedures used for diagnostic, preventive, or therapeutic purposes, for which "diagnosis", "prevention & control", or "therapy" are used. The concept is also used for chemicals as antigens or haptens.
injuries	Used with anatomic headings, animals, and sports for wounds and injuries. Excludes cell damage, for which "pathology" is used.
innervation	Used with organs, regions, or tissues for their nerve supply.
instrumentation	Used with diagnostic or therapeutic procedures, analytic techniques, and specialties or disciplines, for the development or modification of apparatus, instruments, or equipment.
isolation & purification	Used with bacteria, viruses, fungi, protozoa, and helminths for the obtaining of pure strains or for the demonstration of the presence of or identification of organisms by DNA analyses, immunologic, or other methods, including culture techniques. It is used also with biological substances and chemicals for the isolation and purification of the constituents.
legislation & jurisprudence	Used for laws, statutes, ordinances, or government regulations, as well as for legal controversy and court decisions.
manpower	Used with disciplines and programs for the demand, supply, distribution, recruitment, and use of personnel.
metabolism	Used with organs, cells and subcellular fractions, organisms, and diseases for biochemical changes and metabolism. It is used also with drugs and chemicals for catabolic changes (breakdown of complex molecules into simpler ones). For anabolic processes (conversion of small molecules into large), biosynthesis is used. For enzymology, pharmacokinetics, and

	secretion use the specific subheadings.
methods	Used with techniques, procedures, and programs for methods.
microbiology	Used with organs, animals, and higher plants and with diseases for microbiologic studies. For parasites, "parasitology" is used; for viruses, "virology" is used.
mortality	Used with human and veterinary diseases for mortality statistics. For deaths resulting from various procedures statistically but for a death resulting in a specific case, use FATAL OUTCOME, not /mortality.
nursing	Used with diseases for nursing care and techniques in their management. It includes the nursing role in diagnostic, therapeutic, and preventive procedures.
organization & administration	Used for administrative structure and management.
parasitology	Used with animals, higher plants, organs, and diseases for parasitic factors. In diseases, it is not used if the parasitic involvement is implicit in the diagnosis.
pathogenicity	Used with microorganisms, viruses, and parasites for studies of their ability to cause disease in man, animals, or plants.
pathology	Used for organ, tissue, or cell structure in disease states.
pharmacokinetics	Used for the mechanism, dynamics and kinetics of exogenous chemical and drug absorption, biotransformation, distribution, release, transport, uptake and elimination as a function of dosage, extent and rate of metabolic processes.
pharmacology	Used with drugs and exogenously administered chemical substances for their effects on living tissues and organisms. It includes acceleration and inhibition of physiological and biochemical processes and other pharmacologic mechanisms of action.
physiology	Used with organs, tissues, and cells of unicellular and multicellular organisms for normal function. It is used also with biochemical substances, endogenously produced, for their physiologic role.
physiopathology	Used with organs and diseases for disordered function in disease states.
poisoning	Used with drugs, chemicals, and industrial materials for human or animal poisoning, acute or chronic, whether the poisoning is accidental, occupational, suicidal, by medication error, or by environmental exposure.
prevention & control	Used with disease headings for increasing human or animal resistance against disease (e.g. immunization), for control of transmission agents, for prevention and control of environmental hazards, or for prevention and control of social factors leading to disease. It includes preventive measures in individual cases.
psychology	Used with non-psychiatric diseases, techniques, and named groups for psychologic, psychiatric, psychosomatic, psychosocial, behavioral, and emotional aspects, and with psychiatric disease for psychologic aspects; used also with animal terms for animal behavior and psychology.
radiation effects	Used for effects of ionizing and nonionizing radiation upon living organisms, organs and tissues, and their constituents, and upon physiologic processes. It includes the effect of irradiation on drugs and chemicals.
radiography	Used with organs, regions, and diseases for x-ray examinations. It does not include radionuclide imaging for which "radionuclide imaging" is

	used.
radionuclide imaging	Used for radionuclide imaging of any anatomical structure, or for the diagnosis of disease.
radiotherapy	Used with disease headings for the therapeutic use of ionizing and nonionizing radiation. It includes the use of radioisotope therapy.
rehabilitation	Used with diseases and surgical procedures for restoration of function of the individual.
secondary	Used with neoplasms to indicate the secondary location to which the neoplastic process has metastasized.
secretion	Used for the discharge across the cell membrane, into the intracellular space or ducts, of endogenous substances resulting from the activity of intact cells of glands, tissues, or organs.
standards	Used with facilities, personnel, and program headings for the development, testing, and application of standards of adequacy or acceptable performance and with chemicals and drugs for standards of identification, quality, and potency. It includes health or safety standards in industries and occupations.
statistics & numerical data	Used with non-disease headings for the expression of numerical values which describe particular sets or groups of data. It excludes manpower distribution for which "manpower" is used and excludes supply or demand for which "supply & distribution" is used.
supply & distribution	Used for the quantitative availability and distribution of material, equipment, health services, personnel, and facilities. It excludes food supply and water supply in industries and occupations.
surgery	Used for operative procedures on organs, regions, or tissues in the treatment of diseases, including tissue section by lasers. It excludes transplantation, for which "transplantation" is used.
therapeutic use	Used with drugs, biological preparations, and physical agents for their use in the prophylaxis and treatment of disease. It includes veterinary use.
therapy	Used with diseases for therapeutic interventions except drug therapy, diet therapy, radiotherapy, and surgery, for which specific subheadings exist. The concept is also used for articles and books dealing with multiple therapies.
toxicity	Used with drugs and chemicals for experimental human and animal studies of their ill effects. It includes studies to determine the margin of safety or the reactions accompanying administration at various dose levels. It is used also for experimental studies of exposure to environmental agents.
transmission	Used with diseases for studies of the modes of transmission.
transplantation	Used with organs, tissues, or cells for transplantation from one site to another within the same subject, or from one subject to another of the same species or different species.
trends	Used for the manner in which a subject changes, qualitatively or quantitatively, with time, whether past, present, or future. It excludes discussions of the course of disease in particular patients.
ultrasonography	Used with organs and regions for ultrasonic imaging and with diseases for ultrasonic diagnosis. Does not include ultrasonic therapy.
ultrastructure	Used with tissues and cells (including neoplasms) and microorganisms for microanatomic structures, generally below the size visible by light microscopy.

urine	Used for the presence or analysis of substances in the urine, and also for the examination of, or changes in, the urine in disease.
utilization	Used with equipment, facilities, programs, services, and health personnel for discussions, usually with data, of how much they are used. It includes discussions of overuse and underuse.
veterinary	Used for naturally occurring diseases in animals, or for diagnostic, preventive, or therapeutic procedures used in veterinary medicine.
virology	Used with organs, animals, and higher plants and with diseases for virologic studies. For bacteria, rickettsia, and fungi, "microbiology" is used; for parasites, "parasitology" is used.