

Unified Medical Language System ([UMLS](#)) Semantic Relations Hierarchy

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adjacent_to

Definition: Close to, near or abutting another physical unit with no other structure of the same kind intervening. This includes adjoins, abuts, is contiguous to, is juxtaposed, and is close to.

Inverse: "adjacent_to"

affects

Definition: Produces a direct effect on. Implied here is the altering or influencing of an existing condition, state, situation, or entity. This includes has a role in, alters, influences, predisposes, catalyzes, stimulates, regulates, depresses, impedes, enhances, contributes to, leads to, and modifies.

Inverse: "affected_by"

analyzes

Definition: Studies or examines using established quantitative or qualitative methods.

Inverse: "analyzed_by"

assesses_effect_of

Definition: Analyzes the influence or consequences of the function or action of.

Inverse: "assessed_for_effect_by"

associated_with

Definition: has a significant or salient relationship to.

Inverse: "associated_with"

branch_of

Definition: Arises from the division of. For example, the arborization of arteries.

Inverse: "has_branch"

brings_about

Definition: Acts on or influences an entity.

Inverse: "brought_about_by"

carries_out

Definition: Executes a function or performs a procedure or activity. This includes transacts, operates on, handles, and executes.

Inverse: "carried_out_by"

causes

Definition: Brings about a condition or an effect. Implied here is that an agent, such as for example, a pharmacologic substance or an organism, has brought about the effect. This includes induces, effects, evokes, and etiology.

Inverse: "caused_by"

co-occurs_with

Definition: Occurs at the same time as, together with, or jointly. This includes is co-incident with, is concurrent with, is contemporaneous with, accompanies, coexists with, and is concomitant with.

Inverse: "co-occurs_with"

complicates

Definition: Causes to become more severe or complex or results in adverse effects.

Inverse: "complicated_by"

conceptual_part_of

Definition: Conceptually a portion, division, or component of some larger whole.

Inverse: "has_conceptual_part"

conceptually_related_to

Definition: Related by some abstract concept, thought, or idea.

Inverse: "conceptually_related_to"

connected_to

Definition: Directly attached to another physical unit as tendons are connected to muscles. This includes attached to and anchored to.

Inverse: "connected_to"

consists_of

Definition: Is structurally made up of in whole or in part of some material or matter. This includes composed of, made of, and formed of.

Inverse: "constitutes"

contains

Definition: Holds or is the receptacle for fluids or other substances. This includes is filled with, holds, and is occupied by.

Inverse: "contained_in"

degree_of

Definition: The relative intensity of a process or the relative intensity or amount of a quality or attribute.

Inverse: "has_degree"

derivative_of

Definition: In chemistry, a substance structurally related to another or that can be made from the other substance. This is used only for structural relationships. This does not include functional relationships such as metabolite of, by product of, nor analog of.

Inverse: "has_derivative"

developmental_form_of

Definition: An earlier stage in the individual maturation of.

Inverse: "has_developmental_form"

diagnoses

Definition: Distinguishes or identifies the nature or characteristics of.

Inverse: "diagnosed_by"

disrupts

Definition: Alters or influences an already existing condition, state, or situation. Produces a negative effect on.

Inverse: "disrupted_by"

evaluation_of

Definition: Judgment of the value or degree of some attribute or process.

Inverse: "has_evaluation"

exhibits

Definition: Shows or demonstrates.

Inverse: "exhibited_by"

functionally_related_to

Definition: Related by the carrying out of some function or activity.

Inverse: "functionally_related_to"

indicates

Definition: Gives evidence for the presence at some time of an entity or process.

Inverse: "indicated_by"

interacts_with

Definition: Acts, functions, or operates together with.

Inverse: "interacts_with"

interconnects

Definition: Serves to link or join together two or more other physical units. This includes joins, links, conjoins, articulates, separates, and bridges.

Inverse: "interconnected_by"

isa

Definition: The basic hierarchical link in the Network. If one item "isa" another item then the first item is more specific in meaning than the second item.

Inverse: "inverse_isa"

issue_in

Definition: Is an issue in or a point of discussion, study, debate, or dispute.

Inverse: "has_issue"

location_of

Definition: The position, site, or region of an entity or the site of a process.

Inverse: "has_location"

manages

Definition: Administers, or contributes to the care of an individual or group of individuals.

Inverse: "managed_by"

manifestation_of

Definition: That part of a phenomenon which is directly observable or concretely or visibly expressed, or which gives evidence to the underlying process. This includes expression of, display of, and exhibition of.

Inverse: "has_manifestation"

measurement_of

Definition: The dimension, quantity, or capacity determined by measuring.

Inverse: "has_measurement"

measures

Definition: Ascertains or marks the dimensions, quantity, degree, or capacity of.

Inverse: "measured_by"

method_of

Definition: The manner and sequence of events in performing an act or procedure.

Inverse: "has_method"

occurs_in

Definition: Takes place in or happens under given conditions, circumstances, or time periods, or in a given location or population. This includes appears in, transpires, comes about, is present in, and exists in.

Inverse: "has_occurrence"

part_of

Definition: Composes, with one or more other physical units, some larger whole. This includes component of, division of, portion of, fragment of, section of, and layer of.

Inverse: "has_part"

performs

Definition: Executes, accomplishes, or achieves an activity.

Inverse: "performed_by"

physically_related_to

Definition: Related by virtue of some physical attribute or characteristic.

Inverse: "physically_related_to"

practices

Definition: Performs habitually or customarily.

Inverse: "practiced_by"

precedes

Definition: Occurs earlier in time. This includes antedates, comes before, is in advance of, predates, and is prior to.

Inverse: "follows"

prevents

Definition: Stops, hinders or eliminates an action or condition.

Inverse: "prevented_by"

process_of

Definition: Action, function, or state of.

Inverse: "has_process"

produces

Definition: Brings forth, generates or creates. This includes yields, secretes, emits, biosynthesizes, generates, releases, discharges, and creates.

Inverse: "produced_by"

property_of

Definition: Characteristic of, or quality of.

Inverse: "has_property"

result_of

Definition: The condition, product, or state occurring as a consequence, effect, or conclusion of an activity or process. This includes product of, effect of, sequel of, outcome of, culmination of, and completion of.

Inverse: "has_result"

spatially_related_to

Definition: Related by place or region.

Inverse: "spatially_related_to"

surrounds

Definition: Establishes the boundaries for, or defines the limits of another physical structure. This includes limits, bounds, confines, encloses, and circumscribes.

Inverse: "surrounded_by"

temporally_related_to

Definition: Related in time by preceding, co-occurring with, or following.

Inverse: "temporally_related_to "

traverses

Definition: Crosses or extends across another physical structure or area. This includes crosses over and crosses through.

Inverse: "traversed_by"

treats

Definition: Applies a remedy with the object of effecting a cure or managing a condition.

Inverse: "treated_by"

tributary_of

Definition: Merges with. For example, the confluence of veins.

Inverse: "has_tributary"

uses

Definition: Employs in the carrying out of some activity. This includes applies, utilizes, employs, and avails.

Inverse: "used_by"