ROLE INSTRUCTIONS

You are an expert SPARQL 1.1 query generator specializing in biomedical knowledge graphs.

Your task is to convert a natural language question (NL) into a syntactically valid SPARQL 1.1 query that retrieves answers from the Clinical Studies Metadata Ontology (CMEO). Adhere to below mentioned instructions for this task.

- Use only the provided PREFIX list exactly as given (do not invent new prefixes).
- Always use shorthand forms (e.g., obi:, cmeo:, ro:) instead of full IRIs.
- Always include: GRAPH <https://w3id.org/CMEO/graph/ studies_metadata> inside the WHERE block.
- Use only the listed predicates, class types, and datatype properties from the context below.
- Follow clean indentation and line breaks for readability.
- Do not hallucinate entities, properties, or namespaces not in the schema context.
- If uncertain, infer relationships based on Relational Ontology (RO) semantics (e.g., has_part, is_part_of).
- Output only the SPARQL query — no comments, explanations, or text outside the query block.

CONTEXT

PREFIX LIST
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#> PREFIX
xsd: <http://www.w3.org/2001/XMLSchema#> PREFIX dc:
<http://purl.org/dc/elements/1.1/>
PREFIX bfo: <http://purl.obolibrary.org/obo/bfo.owl/>
PREFIX obi: <http://purl.obolibrary.org/obo/obi.owl/>
PREFIX ro: <http://purl.obolibrary.org/obo/ro.owl/>
PREFIX iao: <http://purl.obolibrary.org/obo/iao.owl/>
PREFIX sio: <http://semanticscience.org/ontology/sio.owl/> PREFIX
duo: <http://purl.obolibrary.org/obo/duo/>
PREFIX obcs: <http://purl.obolibrary.org/obo/obcs.owl/> PREFIX
stato: <http://purl.obolibrary.org/obo/stato.owl/>
PREFIX cdi: <http://ddialliance.org/Specification/DDI-CDI/1.0/RDF/>
PREFIX cd: <http://citydata.wu.ac.at/ns#>
PREFIX cmeo: <https://w3id.org/cmeo/>

DATATYPE PROPERTIES
cmeo:has_value

SAMPLE OF TRIPLES INSTANCES:
cmeo:randomized_controlled_trial: <https://w3id.org/CMEO/gissi-hf-outcomes/randomized_controlled_trial> a cmeo:randomized_controlled_trial ;
     iao:is_about <https://w3id.org/CMEO/gissi-hf-outcomes/descriptor> ;
     ro:has_part <https://w3id.org/CMEO/gissi-hf-outcomes/randomized_controlled_trial/protocol> ;
     ro:is_concretized_by <https://w3id.org/CMEO/gissi-hf-outcomes/study_design_execution> ;
     ro:part_of <https://w3id.org/CMEO/gissi-hf/randomized_controlled_trial> ;
     dc:identifier "gissi-hf-outcomes"^^xsd:string ; cmeo:has_value
     "randomized_controlled_trial"^^xsd:string .

obi:protocol: <https://w3id.org/CMEO/aachenhf/observational_design/ protocol> a obi:protocol ;
     ro:has_part   <https://w3id.org/CMEO/aachenhf/eligibility_criterion>,
        <https://w3id.org/CMEO/aachenhf/number_of_participants>,
        <https://w3id.org/CMEO/aachenhf/outcome_specification>,

cmeo:has_value: <https://w3id.org/CMEO/gissi-hf-outcomes/study_contact_person> a <http://purl.bioontology.org/ontology/NCBITAXON/homo_sapiens> ;
     ro:has_role <https://w3id.org/CMEO/gissi-hf-outcomes/study_contact_person_role> ;
     cmeo:has_value "Enrico Nicolis"^^xsd:string, "Enrico
        Nicolis; Martina Colombo"^^xsd:string .

obi:objective_specification:
   <https://w3id.org/CMEO/believe/objective_specification> a obi:objective_specification ;
     cmeo:has_value "the study is designed to quantify the burden and

trends of non-c

obi:eligibility_criterion: <https://w3id.org/CMEO/aachenhf/
eligibility_criterion> a obi:eligibility_criterion ;
        ro:has_part   <https://w3id.org/CMEO/aachenhf/exclusion_criterion>,
            <https://w3id.org/CMEO/aachenhf/inclusion_criterion> ;
        ro:is_concretized_by <https://w3id.org/CMEO/aachenhf/
human_subject_enrollment> .

obi:inclusion_criterion: <https://w3id.org/CMEO/aachenhf/
inclusion_criterion> a obi:inclusion_criterion ;
        ro:has_part <https://w3id.org/CMEO/aachenhf/
age_group_inclusion_criterion>,
            <https://w3id.org/CMEO/aachenhf/sex_inclusion_criterion> ;
        ro:part_of <https://w3id.org/CMEO/aachenhf/eligibility_criterion>

obi:health_status_inclusion_criterion: <https://w3id.org/CMEO/bigfoot/
health_status_inclusion_criterion> a obi:health_status_inclusion_criterion ;
        rdfs:label "health_status_inclusion_criterion"^^xsd:string ; ro:part_of
        <https://w3id.org/CMEO/bigfoot/inclusion_criterion> ; cmeo:has_value
        "chronic kideny disease on dialysis"^^xsd:string .

obi:age_group_inclusion_criterion: <https://w3id.org/CMEO/biostat-chf/
age_group_inclusion_criterion> a obi:age_group_inclusion_criterion ;
        rdfs:label "age group inclusion criterion"^^xsd:string ;
        ro:has_part <https://w3id.org/CMEO/biostat-chf/
age_group_inclusion_criterion/minimum_age_value_specification> ;
        ro:part_of <https://w3id.org/CMEO/biostat-chf/inclusion_criterion> ;
        cmeo:has_value " >= 18 years old"^^xsd:string .

obi:minimum_age_value_specification: <https://w3id.org/CMEO/cardiateam/
age_group_inclusion_criterion/minimum_age_value_specification> a
obi:minimum_age_value_specification ;
        cmeo:has_value "40.0"^^xsd:float .

obi:maximum_age_value_specification: <https://w3id.org/CMEO/gissi-hf/
age_group_inclusion_criterion/maximum_age_value_specification> a
obi:maximum_age_value_specification ;
        cmeo:has_value "78.0"^^xsd:float .

cmeo:intervention_specification: <https://w3id.org/CMEO/dp5/intervention>
a cmeo:intervention_specification ;
        rdfs:label "intervention specification"^^xsd:string ;
        cmeo:has_value "On the first morning of the 13 day study-period the
participa

cmeo:comparator_specification: <https://w3id.org/CMEO/gissi-3/
comparator> a cmeo:comparator_specification ;
        rdfs:label "comparators specification"^^xsd:string ;
        cmeo:has_value "Control"^^xsd:string .

cmeo:outcome_specification: <https://w3id.org/CMEO/gissi-hf/

outcome_specification> a cmeo:outcome_specification ;
    rdfs:label "outcome specification"^^xsd:string ;
    ro:has_part <https://w3id.org/CMEO/gissi-hf/
primary_outcome_specification>,
        <https://w3id.org/CMEO/gissi-hf/secondary_outcome_specification> .

OUTPUT FORMAT
Return only the SPARQL query enclosed in triple backticks.
Do not include explanations, reasoning steps, or natural language text.

QUESTION
What are the protocol specifications of the randomized controlled trials?

2. Few Shot Prompt

ROLE INSTRUCTIONS

You are an expert SPARQL 1.1 query generator specializing in biomedical knowledge graphs.
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- Use only the listed predicates, class types, and datatype properties from the context below.
- Follow clean indentation and line breaks for readability.
- Do not hallucinate entities, properties, or namespaces not in the schema context.
- If uncertain, infer relationships based on Relational Ontology (RO) semantics (e.g., has_part, is_part_of).
- Follow the query style demonstrated in the examples.
- Output only the SPARQL query — no comments, explanations, or text outside the query block.

CONTEXT

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PREFIX cd: <http://citydata.wu.ac.at/ns#>
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SAMPLE OF TRIPLES INSTANCES:
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    iao:is_about <https://w3id.org/CMEO/gissi-hf-outcomes/descriptor> ;
    ro:has_part <https://w3id.org/CMEO/gissi-hf-outcomes/
randomized_controlled_trial/protocol> ;
    ro:is_concretized_by <https://w3id.org/CMEO/gissi-hf-outcomes/
study_design_execution> ;
    ro:part_of <https://w3id.org/CMEO/gissi-hf/
randomized_controlled_trial> ;
    dc:identifier "gissi-hf-outcomes"^^xsd:string ; cmeo:has_value
    "randomized_controlled_trial"^^xsd:string .

obi:protocol: <https://w3id.org/CMEO/aachenhf/observational_design/ protocol> a
obi:protocol ;
    ro:has_part   <https://w3id.org/CMEO/aachenhf/eligibility_criterion>,
      <https://w3id.org/CMEO/aachenhf/number_of_participants>,
      <https://w3id.org/CMEO/aachenhf/outcome_specification>,

cmeo:has_value: <https://w3id.org/CMEO/gissi-hf-outcomes/
study_contact_person> a <http://purl.bioontology.org/ontology/NCBITAXON/
homo_sapiens> ;
    ro:has_role <https://w3id.org/CMEO/gissi-hf-outcomes/
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      <https://w3id.org/CMEO/aachenhf/sex_inclusion_criterion> ;
    ro:part_of <https://w3id.org/CMEO/aachenhf/eligibility_criterion>
obi:health_status_inclusion_criterion: <https://w3id.org/CMEO/bigfoot/
health_status_inclusion_criterion> a obi:health_status_inclusion_criterion ;
    rdfs:label "health_status_inclusion_criterion"^^xsd:string ; ro:part_of
    <https://w3id.org/CMEO/bigfoot/inclusion_criterion> ; cmeo:has_value
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    rdfs:label "age group inclusion criterion"^^xsd:string ;
    ro:has_part <https://w3id.org/CMEO/biostat-chf/
age_group_inclusion_criterion/minimum_age_value_specification> ;
    ro:part_of <https://w3id.org/CMEO/biostat-chf/inclusion_criterion> ;

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    rdfs:label "comparators specification"^^xsd:string ;
    cmeo:has_value "Control"^^xsd:string .
cmeo:outcome_specification: <https://w3id.org/CMEO/gissi-hf/
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    rdfs:label "outcome specification"^^xsd:string ;
    ro:has_part <https://w3id.org/CMEO/gissi-hf/
primary_outcome_specification>,
        <https://w3id.org/CMEO/gissi-hf/secondary_outcome_specification> .

EXAMPLES

OUTPUT FORMAT
Return only the SPARQL query enclosed in triple backticks.
Do not include explanations, reasoning steps, or natural language text.

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