Competency Questions for the Hypertension Ontology v1

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Competency question	Query	Query results	Status
What are all of the BP measures in the data set that are above the threshold for normal?	'elevated blood pressure measurement datum'	Basil's elevated systolic BP measure	Validated for adult systolic and diastolic BPs
		Basil's third systolic BP measure	
		Clara's first elevated systolic BP	
		Clara's second elevated systolic BP	
		Clara's third elevated systolic BP	
		Desmond's first diastolic BP measurement datum	
		Desmond's second diastolic BP measurement datum	
		Ernest's diastolic BP measurement data item	
		Ernest's systolic BP measurement data item	
Which data items in the data set are about elevated BP phenotypes?	'data item' and 'is about' some 'elevated blood pressure phenotype'	Amy's diagnosis	Validated for adult systolic and diastolic BPs and diagnoses of hypertension
		Basil's elevated systolic BP measurement datum	
		Clara's first elevated systolic BP measurement datum	
		Clara's second elevated systolic BP measurement datum	
		Clara's third elevated systolic BP measurement datum	
		Desmond's first diastolic BP measurement datum	

Question	Query	Results	Status
		Desmond's second diastolic BP measurement datum	
		Ernest's diastolic BP measurement data item	
		Ernest's systolic BP measurement data item	
What are all of BP values in the data set >= 126.0 mm Hg?	'blood pressure measurement datum' and 'has measurement value' some xsd:double[>= "126.0"^^xsd:double]	Basil's elevated systolic BP measurement datum	Validated
		Basil's third systolic blood pressure datum	
		Clara's first elevated systolic BP measurement datum	
		Ernest's systolic BP measurement datum	
What are all of the health care encounters with elevated BP values?	'health care encounter' and has_specified_output some 'elevated blood pressure measurement datum'	Basil's first health care encounter	Validated for adults, systolic and diastolic BP measurement data items
		Basil's third health care encounter	
		Clara's first health care encounter	
		Clara's second health care encounter	
		Clara's third health care encounter	
		Desmond's first health care encounter	
		Desmond's second health care encounter	

		Ernest's only health care encounter	
Who are the patients with elevated BP values at 2 more health care encounters?	'Homo sapiens' and 'bearer of' some ('blood pressure' and inverse('is about') min 2 ('elevated blood pressure measurement datum' and is_specified_output_of some 'health care encounter'))	Basil Clara Desmond	Validated for adults, systolic and diastolic BP Importantly, Ernest was not included in this search since he has two elevated BP measures but they are at the same health care encounter.
Who has a hypertensive phenotype?	'has phenotype' some Hypertension	Basil Clara Desmond	
Who has a phenotype that gives rise to hypertension?	'has phenotype' some ('feature gives rise to disease' some hypertension)	Basil Clara Desmond	
Which patients have been diagnosed with hypertension?	organism and inverse('is about') some 'diagnosis of hypertension'	Amy	Validated for adults, systolic and diastolic

Who has either a diagnosis of hypertension or a hypertensive phenotype?	(organism and inverse('is about') some 'diagnosis of hypertension') or ('has phenotype' some Hypertension)	Amy Basil Clara Desmond	Validated for adults, systolic and diastolic

What are the pairs of health care encounters for an individual patient such that one immediately precedes the other?	Statement C3
	
	PREFIX obo: <http://purl.obolibrary.org/obo/>
	select * where {
	    ?hce1 a obo:OGMS_0000097 .
	    ?hce2 a obo:OGMS_0000097 .
	    ?hce1 obo:RO_0002090 ?hce2 .
	}
		\<Basil's first health care encounter,Basil's second health care encounter>
		\<Basil's second health care encounter,Basil's third health care encounter>
		\<Clara's first health care encounter,Clara's second health care encounter>
		\<Clara's second health care encounter,Clara's third health care encounter>
		\<Clara's third health care encounter,Clara's fourth health care encounter>
		\<Desmond's first health care encounter, Desmond's second health care encounter>	

What are the pairs of health care encounters for an individual patient such that one precedes the other?	Statement C4
	
	PREFIX obo: <http://purl.obolibrary.org/obo/>
	select * where {
	    ?hce1 a obo:OGMS_0000097 .
	    ?hce2 a obo:OGMS_0000097 .
	    ?hce1 obo:RO_0000063?hce2 .
	}
		\<Basil's first health care encounter,Basil's second health care encounter>
		\<Basil's first health care encounter,Basil's third health care encounter>
		\<Basil's second health care encounter,Basil's third health care encounter>
		\<Clara's first health care encounter,Clara's fourth health care encounter>
		\<Clara's first health care encounter,Clara's second health care encounter>	

		<Clara's first health care encounter, Clara's third health care encounter>
		<Clara's second health care encounter,Clara's fourth health care encounter>
		<Clara's second health care encounter,Clara's third care encounter>
		<Clara's third health care encounter,Clara's fourth health care encounter>
		<Desmond's first health care encounter,Desmond's second health care encounter>

For which people is the most recent systolic blood pressure value higher than the immediately preceding value?	Statement Q5
	
	PREFIX obo: <http://purl.obolibrary.org/obo/>
	PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
	select ?patlab ?sbpmdVal1 ?sbpmdVal2
	where {
	  ?patient rdfs:label ?patlab.
	  ?pr2 a obo:OMRSE_00000011 ;
	    obo:RO_0000052 ?patient .
	  ?hce1 a obo:OGMS_0000097 ;
	    obo:BFO_0000055 ?patrole ;
	    obo:OBI_0000299 ?sbpmd1 .
	  ?es1 obo:RO_0002223 ?hce1 .
	  ?esd1 obo:IAO_0000136 ?es1 ;
	    obo:IAO_0000004 ?esdv1 .
		<Desmond,81.0,80.0>
		<Basil,126.0,117.0>

```
    filter(?esdv1=?maxEncDateVal)
    ?sbpmd1        obo:IAO_0000004
?sbpmdVal1 .
    ?hce2 a obo:OGMS_0000097 ;
        obo:BFO_0000055 ?patrole ;
        obo:OBI_0000299 ?sbpmd2 .
    ?sbpmd2        obo:IAO_0000004
?sbpmdVal2 .
    ?hce2 obo:RO_0002090 ?hce1 .
    filter(?sbpmdVal1>?sbpmdVal2)
    {
        select  ?patient  (max(?esdval)
as ?maxEncDateVal)  where {
            ?patrole                    a
obo:OMRSE_00000011 ;
                obo:RO_0000052
?patient .
            ?patient                    a
obo:NCBITaxon_9606 .
            ?hce a obo:OGMS_0000097
;
                obo:BFO_0000055
?patrole .
            ?encstart  obo:RO_0002223
?hce .
            ?encstartdate
obo:IAO_0000136 ?encstart ;
                    obo:IAO_0000004
?esdval .
```

```
        }
        group by ?patient
    }
}
```