Clinical Coreference Annotation Guidelines (with excerpts from ODIE guidelines and modified for SHARPn/THYME)

Arrick Lanfranchi, Kevin Crooks, and Mariah Hamang
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The following is a summary of medical coreference annotation guidelines designed for the medical annotation projects. We acknowledge the ODIE project and OntoNotes coreference annotation guidelines in the creation of these guidelines. Our goals are:

- o to make the coreference annotation task and guidelines as transparent as possible for non-domain annotators
- o to narrow the scope of the ODIE guidelines to coreference annotation only, with automatic extraction from other annotation layers of extra-informative features included in the ODIE coreference annotation task.
- o to develop a schema for coreference annotation specifically as it applies to the medical-domain texts.

The University of Colorado coreference annotation team has adapted both the OntoNotes v. 7.0 (2007) and ODIE (2010) guidelines as needed to accommodate coreference annotation in the clinical domain.

1. WHAT IS COREFERENCE ANNOTATION?

The purpose of coreference annotation is to link all the specific mentions in a text that refer to the same entities and events, and to distinguish between types of coreference. Entities eligible for coreference includes nouns, noun phrases, pronouns, and nominalized verbs, and the relations identified are identity relations, apposition, and bridging relations. (See OntoNotes guidelines, revised 10/11/07, pg. 2; also, Poesio et al., 2004, and Poesio et al., 1997)

2. MARKABLES:

2.1 What is a markable?

All nouns, noun phrases (including relative clauses), nominal modifiers, pronouns, and nominalized verbs are considered markables eligible for coreference relation annotation. The data we are using will come pre-annotated with markables[1]. We are not restricted to these markables only. We can create our own markables. Note, however, that if the span of a pre-annotated markable is not complete, rather than creating a new markable, we should edit the span of the pre-annotations (this will occur frequently with articles "the" and "a", and the possessive 's). When expanding a markable select the pre-existing markable whose span contains the head of the phrase, and as much of the modifying information as possible.

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[1] These pre-marked annotations are not automatically generated. Prior to coreference, the data undergoes UMLS entity annotation (These guidelines are available at http://informatics.mayo.edu/sharp/index.php/Annotation), and following adjudication at the Mayo clinic, these entities are then converted into coreference markables.

Annotate the longest and the most specific span that you think belongs to the markable linguistic expression, which includes determiners as well as all modifying information to the head noun such as prepositions and relative clauses.

Example (ODIE data set m1, document 112831390_2):

    (1)   "HHHHHHH was seen by [Dr. DDDDDD in neurology]… I have spoken to [Dr. DDDDDD who is now at SSSS Clinic-SSSSSSSSSS][3]"

"Dr. DDDDDD in neurology" and "Dr. DDDDDD who is now at SSSS Clinic-SSSSSSSSSS" are taken as the "longest and the most specific span(s)," as they are treated as a noun phrase constituents according to Penn Treebank policy[4].

    Here a few more examples of largest logical spans:

    (2)   a markedly dilated esophagus with some distal thickening raising the question of achalasia versus pseudoachalasia.

    (3)   transfemoral distal abdominal aortography

    (4)   CT of the lower extremities with 3D angiogram reconstructions

2.2 Nominalized verbs

Nominalized verbs can be annotated as markables; in these cases, the markable should include only the matrix verb(s)[5]. This is the only case in which we violate the largest logical span rule.

Example:

    (5)   The patient will need a CBC as long as he is on azathioprine to (M1 monitor) for leukopenia. The patient wants to have his physician arrange for (M2 this monitoring).

    (6)   She is encouraged to (M1 walk or climb) stairs but should avoid physical activity more extensive than (M2 this).

    (7)   The glucose does not directly affect potassium levels but should be (M1 given) to prevent hypoglycemia. (M2 This) is also a temporary measure.

    In all 3 examples, M1 and M2 are coreferrential.

    Try to only annotate verbs if replacing the coreferring markable (usually a demonstrative, *this* or *that*) with the nominalized form of the verb does not change the meaning, and have a clear coreference. In (3), it is obvious that "this" corefers to both walking and climbing, and we can replace it with "This walking or climbing" without losing the coreference, and thus we select both verbs in the span of annotation.

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[2] In the case that the source data comes without pre-annotations. Otherwise, there will be many pre-annotated markables that will not participate in any coreference relationships. However, we will not delete these annotations.

[3] The de-identification used for ODIE's source notes converts proper names and patient information into strings of capital letters. We will see various other forms of de-identification throughout these guidelines; however, all are to be treated the same.

[4] http://repository.upenn.edu/cgi/viewcontent.cgi?article=1603&context=cis_reports

[5] The matrix verb can best be thought of as the verb (or relation) that conveys the action independent of tense, aspect, and mode. Therefore, we opt only to take the relating verb and not any auxiliaries. In modal constructions, including paraphrastics, this means the infinitive verb, e.g. "go" in "could not go". In light verb constructions, we can usually find a noun that serve as the relation more accurately than the verb, e.g. "walk" in "take a walk". In VPC's, this means the main verb only, e.g. "throw" in "throw up".

2.3 Atomicity

Dates and locations are considered to be atomic, and nested dates and locations cannot be extracted. For example, in "November 7, 2000", there can be no coreference relations for "November" or "2000". However, while specific date mentions are not eligible for coreference, other temporal expressions are.

Example:
> (8)   (M1 11 May 2006) 10:11AM Exam: CTA Lower Ext. ORIGINAL REPORT: (M2 11 May 2006). At (M3 that time), patient was admitted for lower leg pain.

> M2 and M3 are coreferrential, but not with M1.

Dosages are also considered to be atomic.

Example:
> (9)   She was started on a course of (M1 prednisone 40-mg).

> The entire phrase "prednisone 40-mg" would be one markable, and is eligible for coreference if there are other mentions of that specific course of medication.

Example:
> (10)   Patient receives (M1 (M3 Lasix 40-mg p.o. q.d.) and (M4 propranolol 50-mg p.o. q.d.)) We will continue him on (M2 these doses of antihypertensives), provided he tolerates (M5 the beta blocker) as well as (M6 the diuretic).

> M1 corefers to M2, M3 corefers to M6, and M4 corefers to M5. However, "Lasix" and "propranolol" cannnot be extracted as markables and thus will not corefer.

2.4 Stative adjectives

Since we are treating stative adjectives as markables, occasionally, you will encounter one that corefers.

Example:
> (11)   Heart rate was (M1 normal). (M2 This) is acceptable.

2.5 Nested NPs and Premodifiers

Overlapping annotations of markables are allowed if they are a part of a relation. Adjectives, determiners and other modifiers are to be included in the span if relevant.

Example (ODIE Coreference guidelines, Jan. 5, 2009):
> (12)   The patient was transferred to IIIIIIIIII for (M1 explantation of (M2 a pacemaker system)). The patient underwent (M3 the procedure) without any complications. On **DATE[], (M4 the pacemaker) was (M5 explanted) from the left shoulder.

In the above example, M1 and M2 have overlapping text spans, however each participate in identical relations – M1 and M3; M4 and M2. Both M1 and M3 (along with M5) are to be annotated as well as M4 and M6.

Premodifiers may be annotated as a markable without their head nouns, but only if they participate in identity relations. For example:

(13)   I think that the patient is metabolically indeterminate in terms of (M1 stone) formation and growth. Magnesium is elevated which is protective against (M2 kidney stones).

M1 and M2 corefer, as both are general mentions of kidney stones. However, they cannot be linked to the mention of "stone" in the following passage from the same note:

(14)   I compared it to a stone protocol CT-scan of Btac, 3881.

This is because we can only extract one level; that is, only the largest premodifiying span is extracted. In this above example, "stone" modifies "protocol", which in turn modifies "CT-scan", and thus we can only annotate "stone protocol" as a markable. We also would only annotate "stone protocol" as a markable if there are other individual, non-premodifying mentions of "stone protocol" in the same note.

One way to determine if a group of premodifiers is atomic, rearrange the phrase as in the following example: "right breast needle core biopsy" → "needle core biopsy of right breast". Thus, we can use "right breast" in relationships, as well as "needle core", but not "needle", as the phrase "needle core biopsy" cannot be rephrased as "biopsy of needle core".

2.6 Names and possessives

Names are markables.

Example:
(15)   I discussed my clinical expression at length with (M1 Mr. SSSSS) and (M2 his) wife. I have recommended (M3 he) apply DesOwen lotion b.i.d. prn.

"Mr. SSSSS" (M1), "his" (M2) and "he" (M3) are coreferrential.

Possessives are included in markables.

Example:
(16)   (M1 MM. EEEEE'x) diet for many years was relatively low in calcium. (M2 He) tended to go easy on meat and moderate if not easy on salt.

M1 and M2 are coreferrential – we extract the possessive 's with the markable. In medical data, personal information has been de-identified, but in this case it is clear that EEEEE'x is a possessive, and thus we include the 'x in the span.

See section 4.3. of the MUC-7 guidelines for more examples.

2.7 "Pre-" terms

Occasionally there are mentions that are adjectival in nature but clearly corefer with a nominal mention within the text. *Pre-* and *Post-* terms that corefer are also annotated. Other examples are *peri-* and *intra-*. These terms are eligible as members in a relation only if there is a coreferring noun with which to form a relation. There may be other such prefixes that behave similarly so this is not limited to these terms. These occur in constructions like "preoperative", "post-surgical", and "peripartum".

Example:

(17)   Thus, Patient is ok for (M1 anesthesia) with the proviso that he be seen by cardiology pre- and postoperatively....Patient seen at the request of DD. DDDDD for (M2 pre-anesthetic) medical evaluation...

(18)   Stable (M1 postoperative) course. She has only noted minimal change in her hand function following (M2 the procedure).

M1 and M2 are coreferring in both examples.

2.8 De-identification

De-identified mentions are to be annotated as markables and subsequently as members of a coreference pair/relation if it is clear that they are truly coreferring. There are multiple schema used for de-identification, but all should be treated in the same way when it is obvious they corefer.

Example:

(19)   She certainly could try aspirin which in a study conducted by (M1 Sx. Yxgwx Gqxlmwzwi) seemed to be effective at least partially. (M2 Sx. Yxgwx Gqxlmwzwi) has presented this data.

M1 and M2 are coreferring.

2.9 Interesting cases

2.9.1   Disjoint spans

Example:

(20)   Two dimensional echocardiology: (M1 Segmental left ventricular function). Final Impression: (M2 Normal left ventricular) size and (M2 function).

In this example, we would want to corefer "segmental left ventricular function" with "normal left ventricular… function" (M1 corefers with M2). The latter is a disjoint span. Our annotation software allows for the disjoint span annotations.

2.9.2   Age

Example:

(21)   Mr. Smith, 60, presents today…

We would here create an appositive with "Mr. Smith" as the head, and "60" as the attribute. Although these two markables are not technically equatives, this is considered to be an elliptical construction of "Mr. Smith, who is age 60", and we need to capture that information.

2.9.3   Post-modifiers

Example:
>   (22)   (M1 (M2 Kidney, left), nephrectomy)

M1 illustrates the full span of "nephrectomy" which can be translated as "left kidney nephrectomy". As such, M2 is the full premodifying span which is linked to other coreferring equivalents of *left kindey*. Therefore, "kidney" would not be eligible for coreference, nor would "nephrectomy".

2.9.4   Section headings & numbering

In pathology notes, sub-sections are frequently headed by a numbering system. We will ignore these numbers. We will also ignore named section headings.

Example:
>   (23)   #1 Skin rash
>   (24)   (M1 Medications): The patient has no active medications.
>   (25)   (M1 Cardiac): Normal rate and rhythm.

In 23, "#1" is not eligible for coreference, and neither is M1 in 24 as a generic section heading. However, M1 is 25 is eligible. Section headings that contain relevant medical information applying to the patient should be annotated, provided it participates in some relationship.

2.9.5   Attributes and Syntactic Equatives[6]

In the case of Syntactic Equatives, also referred to as copular constructions, we only annotate the left-most markable (adopted from OntoNotes).

Examples:
>   (26)   (M1 Mr. Callahan) is (M2 the president of IBM).
>   (27)   (M1 Mr. Smith) is (M2 a 89-year gentleman).

Only M1 in each case is annotated as a member of the relation.

3.   RELATIONS

The RELATION TYPE attribute indicates the relation between annotated markables. MUC-7 task annotated for the IDENTITY relations only. The relations we are annotating for are:
- Identity
- Appositive

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[6] The SHARP team is performing several layers of annotation (POS tagging/Treebanking, UMLS, Propbank) as well as coreference annotation. The output of these layers can be used to automatically extract most Attributes when not already inherent in the data (such as definite and indefinite noun phrases). SHARP proposes that the coreference task focus only on the annotation of coreferential relationships with the Attributes being extracted automatically. SYNTACTIC EQUATIVES: This category is similar to appositives except that the two coreferring items are separated by an equative. In addition to NER, the amount of processing required for this class is the ability to identify equatives like "of", "is", etc. This information is easily extractable based on Propbank frames for "be" and/or tree structure (for small clauses and secondary predicates) and easily distinguishable from appositives.

- Set/subset
- Part/whole

3.1 Identity

Two markables have an **IDENTITY** relation, or corefer, if they refer to one and the same discourse referent. Following the MUC-7 specifications, the IDENTITY relation has several important semantic characteristics. The Identity relation is symmetrical, i.e., non-directional: (if A is IDENT to B, then B is IDENT to A). It is also transitive: (if A is IDENT to B and B is IDENT to C, then A is IDENT to C, and C is IDENT to A). The Identity relationship is not directional to set it apart from Part/Whole and Set/Subset relations.

Example:
(28)   (M1 Mr. Smith) complained of a headache. (M2 He) also had a sore throat.
(29)   Mr. Smith (M1 ran). I saw (M2 it).

The relation between M1 and M2 in both examples is Identity. This is the type of coreference we saw in most of the examples in section 2.

Example:
(30)   (M1 Aortic root): (M2 2.9 cm) (2.0-3.7cm) (M3 The (M4 aortic root) size) is normal.

M1-M4 and M2-M3 are the Identity relationships in this example.

3.2 Appositive

Two markables have an **APPOSITIVE** relation if two NPs having the same semantic meaning occur adjacent to one another, separated only by punctuation – almost always a comma, colon, dash, or parenthesis. Appositives are treated as a separate relationship, despite strictly being an Identical relationship. In an appositive, the most specific markable, determined with a specificity hierarchy, is the head and the less specific is the attribute. Markables in an appositive can then be included in other relationships; however, all appositives are annotated regardless of whether they corefer elsewise.

Examples:
(31)   (M1 ZZZZZZ, MD, FFF), (M2 Pathologist).

M1 would be the head, M2 would be the attribute, which constitute one Appositive relationship. The markable serving as the head of the Appositive, "ZZZZZZ, MD, FFF", can then be added to Identical relations or other relations; however, the attributes, "Pathologist", will not be eligible.

(32)   (M1 37.00C) ((M2 98.60F))

M1 is the head, M2 is the attribute. Measurements are frequent in this data, and unit conversions like this are considered appositives.

(33)   (M1 Consulting Surgeon): (M2 CCCCCCC, CCCCCCC H. Z.Q.)

M2 is the head, and M1 is the attribute, following the **SPECIFICITY HEIRARCHY:**

Proper noun　　>　　pronoun　　>　　definite NP　　>　　indefinite specific NP　　>　　non-specific NP

　　　　If both nominals have the same level of specificity, select the left-most as the head. In some cases, appositives may include multiple markables. Select the most specific as the head, and the other markables as the attributes (See OntoNotes guidelines, revised 10-11-07, sect. 3.1).

Examples:
　　　　(34)　　(M1 AUTHOR) (M2 Contributing Author) (M3 AAAAAAAAAAAAA. M.D.)

　　　　AAAAAAAAAAAAA. M.D. would be the head, and both "AUTHOR" and "Contributing Author" would be the attributes.

3.3 Part/Whole

　　　　Two markables exist in a **PART/WHOLE** relationship if one can be thought of as part of the other. These can be simple anatomical sites, such as
　　　　(35)　　(M1 The SFA) has severe stenotic disease. (M2 The popliteal segment) has moderate disease without stenosis.

in which M2 is a Part of M1. This relationship can also be more abstract, as in
　　　　(36)　　(M1 CT abd/pel) – use (M2 iv contrast)

again, where M2 is a part of M1.

　　　　It is important to note that negated Parts are still included in a Whole. I.e., if it is explicitly stated that X is NOT part of Y, and the negation occurs in the span of the markable, we will still annotate that relationship.

　　　　(37)　　(M1 Infiltrating Ductal Carcinoma). (M2 No microcalfications) present.

　　　　Here, M1 serves as the Whole for M2.

3.4 Set/Subset

　　A **SET/SUBSET** relationship exists when one markable can be thought of as one or several members of a larger group.
　　　　(38)　　(M1 Laboratory studies). (M2 Mammogram). (M3 CT Angiogram).

　　　　Here, M1 serves as the Set, of which M2 and M3 are subsets (technically speaking, they are elements of the larger Set, but we are treating these the same way). To create a Set/Subset annotation, select the span of the markable that will serve as the Set, and create a new Set/Subset annotation. Then select the markables and fill the Set slot and the Subset slot.

3.5 Bridges

　　　　A bridge is a type of coreference relationship in which the reader must "bridge" a gap in knowledge to associate one entity with a previously-mentioned entity. For our annotation, this includes Part/Whole and Set/Subset annotations.

To make a Part/Whole or Set/Subset relation, select the span of the markable that will serve as the Whole or the Set attribute, and create the new annotation. Then, select the markables to fill the slots as normal. There can only be one markable in the Whole slot or Set slot; however, there can be multiple markables in the Part slots or Subset slots.

Set/Subset and Part/Whole relationships are not eligible for coreference in an Identical relation. However, the markables that participate in a Part/Whole are certainly eligible as any normal markable would be.

There can be some confusion regarding whether or not two markables are in a Part/Whole relationship or a Set/Subset relationship. The difference can be described as that of has-a versus is-a. In a Part/Whole relation, the Whole "has-a" Part, but not vice-versa. In (31) above, the SFA has a popliteal artery, as do all normal SFA's, but a popliteal artery does not have an SFA. In a Set/Subset, the Subset "is-a" Set, but not vice-versa. In (33) above, a mammogram is a laboratory study, but a laboratory study is not a mammogram.

A new annotation should be made for each new mention of a Whole or a Set in an article, so that Parts and Subsets are added to the most recently preceding relation. For example:

(39)   CT angiogram of (M1 both lower extremities). (M2 LOWER EXTREMITIES):
        Three-vessel runoff to (M3 both ankles).

In this example, although M3 is in a part/whole relation with M1, we would take M2 as the Whole (with M3 as the Part), since it is the most recently preceding mention of the Whole. In cases where the Part or the Subset is mentioned in an article before its corresponding Whole or Set, we would add it to a relation made with the first mention of the head.

(40)   Indications: (M1 r thigh) r/o graft infection. Exam: u/s (M2 le)

Here, M1 is the Part, and M2 would be taken as the Whole. (A note on abbreviations: The SHARP data will often look like this. Here, "r/o" stands for "rule out", "u/s" for "ultrasound", and "le" for "lower extremities") It may be the case that the Part or the Subset are never mentioned first; however, if a case is found in which it does occur, this is how we would deal with them.

Spans for these two relations are treated similarly to those for Identical or Appositive relations. We will always take the largest logical span that describes the bridged entities, and we can annotate NP's that serve as pre- or post-modifiers, but we cannot take an NP without its modifiers. Note that there will be several cases which appear to have a part listed before the whole, such as "the mid calf of the right foot". We would still make a relation linking "the mid calf of the right foot" as a Part of "the right foot", despite the fact that the Whole is explicitly mentioned within this span. This is because we cannot remove modifiers from NPs, and must take this entire span as one markable for the Part.

<u>Spans</u>
--Disjoint Spans:

"[a stream of thick and yellow mucous from the right meatus]" → This is not a disjoint span. The content between brackets is the entire span, not [a stream of thick…mucous from the right meatus] and [a stream of…yellow mucous from the right meatus]". It's the same stream of mucous, just with modifiers.
--All premodifying and postmodifying determiners, possessive pronouns, prepositional phrases, adjectives, and relative clauses (with or without the actual relative pronoun) are included in the span.

Ex: -[A pleasant, alert, oriented, female] is ONE SPAN. [A pleasant…female] ;
[A…alert…female]; [A…oriented female] is wrong; they are all modifiers of the same female.

--Similarly, [55 year old male with Myeloma here for fu for first cycle Velcade] is the entire span   with "male" as the referential head noun.
PRONOUN EXAMPLE: [I'll] is all one span; [she'd] all one span, [it's] all one span, etc.
<u>How To Mark It?—Markables</u>
-Adjective spans like "LEFT" and "RIGHT, standing in for e.g. "LEFT SIDE," can be markable entities if you have good reason to assume that it's referring to RIGHT LEG or LEFT SIDE or LEFT ILIAC ARTERY, as the case may be. If you can't determine that, leave it alone.
-Hedged entities are not used in coreferential relationships with actual entities:
e.g. "Several luminal outpouchings in the left aspect of the descending thoracic aorta *probably* represent   areas of focal atheromatous ulcerative plaques."
    "Low attenuation and calcified regions in both thyroid lobes *may* represent multinodular goiter"
Although, [a probable multinodular goiter in the thyroid lobes] would be Part of [the thyroid lobes].

-Special case: Whole/Part "23.2 cm of the cecum and ascending colon"
 In this case, the Part ("23.2 cm of the cecum and ascending colon") isn't 100% a part of the cecum nor the ascending colon, BUT it is 100% a part of both of those elements. So, we can make a Whole that includes two entities. We can only do this in cases when the two conjoined entities that serve as the Whole are separated by a conjunction, and then we include the conjunction in the span of the Whole ("the cecum and the ascending colon"). If it had said "23.2 cm of the cecum and of the ascending colon", we could not include them in the same markable span because the two Wholes, although separated by a conjunction, are also separated by being in individual PP's.
-- In cases where the relative pronoun is separated from its head noun, use a disjoint span. Consider:

"Dr. Johnson has collaborated on this note, who has guided my plan"
Here, we would make one markable "Dr. Johnson ... who has guided my plan", as if the   intervening clause(s) weren't there. Thus, there should not be an Identical relation between the   head noun and the relative pronoun, if we include them both in the same markable this way.

How To Mark It?—Relations

-A premodifier cannot be in an Identical relationship unless there is a bare mention of the markable elsewhere in the document, nor can it serve as the head of a Whole/Part to the element that contains it, e.g. "Right eye" cannot be the head of "Right eye proliferative retinopathy". Using this same example to illustrate the first point, if two mentions of "Right eye proliferative retinopathy" are the only times you see a reference to "right eye" in the entire document, "right eye" cannot be in an Identical relation (although "Right eye proliferative retinopathy" could). If "right eye" occurs as a bare markable elsewhere, then all the premodifiers would be Identically coreferential with this bare mention ("irritation in [right eye]")

-A body part and a disease should not be in a Whole/Part relation unless the disease is a physical manifestation - a tumor, or a rash (e.g. "a tumor in her colon" vs. "heart disease" not in a Whole/Part with "heart").

    -Special case: Even if the disease is a physical manifestation (e.g. "dermatitis"), if the note states "Patient had dermatitis on the arms years ago" and it is not indicated that the patient is currently afflicted with disease X on body part Y, there should not be a Whole/Part with body part Y/disease X.

-- "we" should be Set/Subset - not Part/Whole. The subsets would be mentions of the individuals in the group. Make sure it's the correct "we"! Sometimes it's for "myself and the patient", sometimes it's for "myself and my colleagues".

NOTE: If e.g. "the patient" occurs as Subset in a Set with "We", <u>every mention of "the patient" as you have it marked in your Identical chain also needs to be included as a Subset</u>, until you get to another mention of "we". Then you start the Set chain over. This is true with Whole/Parts, too, and for all markables; if you have [the stomach] as a Whole and [the fundus of the stomach] as a Part, <u>every mention of [the fundus] needs to be included as a Part in that W/P relation</u>.

-- Dates are only to be included in Identical chains if there is a relative (non-absolute) temporal mention like "today" or "next Friday". If the only mentions of a date are "Oct. 15, 1991", then don't corefer those.

Appositives

-- Things like "multiple (8) lymph nodes" aren't Appositives.

-- Things like "multiple (8 of 15) lymph nodes" are Set/Subset, but here's how to annotate them:

    Ex. "Multiple (8 of 15) lymph nodes" - Set: "15", Subset: "8 of 15". The entire span "Multiple (8 of 15) lymph nodes" would then be the markable used in Identical chains. Nothing else can be extracted here.

    Ex. "8 of 15 lymph nodes" (without the parentheses) - Set: "15 lymph nodes", Subset: "8 of 15 lymph nodes"

--The specificity hierarchy puts the full span of a disorder higher than an abbreviation of that disorder. So "Lower back pain" would be the head of the appositive with "LBP" as an attribute, regardless of their order of appearance on the screen.

--Remember that in "HEARING LOSS (BILATERAL)" there is no appositive relationship, as "bilateral" is simply giving more information about the hearing loss, not referring to the hearing loss as an identical appositive.

Medications & Med Sections

--The generic name of a medication (usually in parentheses within the dosage) is not appositive to the whole name of the medication. "EZETIMIBE (ZETIA) 10 MG ORAL TAB" is one span; [ZETIA] is not an extractable appositive attribute of the whole span.

--This medication name span (e.g. [EZETIMIBE (ZETIA) 10 MG ORAL TAB]) is Set to every specific mention of the medication as a Subset, INCLUDING "[two tablets] in the morning", "[one tablet] qid 1 week", "[her Zetia]", "[the patient's ezetimibe]", etc.

--Every mention of e.g. [BEDTIME] is Identical to other mentions. This is true for all of the temporal expressions: [every evening], [the morning], etc.

Cancer Notes

-Cancer and carcinoma aren't coreferential. We assume that cancer refers to the disease event and the carcinoma refers to the physical manifestation thereof. This is a Whole/Part relation, not Identical.

-- In examples like "Liver negative for tumor", the 'tumor' is a generic mention and can be linked to other generic mentions (usually found also other sentences like "kidney negative for tumor"). Any actual tumors will be Subset to the generic "tumor" as Set.

-- Doctors usually use the term "right colon" and "left colon" to refer to a larger grouping of organs than simply the right side and the left side of the colon.
 "Right colon" could include: the cecum, the ascending colon, and the hepatic flexure.
 "Left colon" could include: the splenic flexure, the descending colon, and the sigmoid colon.