Cough model in EON

Guideline 1 (Based on the Chronic Cough management guideline. Contains 3 recommendations)

1) Chronic cough is cough that lasts for at least 3 weeks. Chest radiographs should be ordered before any treatment is prescribed in nearly all patients with chronic cough (Grade II-2). Chest radiographs do not have to be routinely obtained before beginning treatment, for presumed PNDS (post nasal drip syndrome) in young nonsmokers, in pregnant women, or before observing the result of discontinuation of an ACE-I (ACE Inhibitor) for 4 weeks for patients who developed cough shortly after beginning to take an ACE-I.

(Note: In this recommendation, please pay attention to the following points:
   a) Please model chronic cough, ordering a chest radiograph, treatment (dimensions 2, 6, 9)
   b) Please model the grade of evidence (dimension 8)
   c) Please model the fact that Chest radiographs do not have to be routinely obtained before beginning treatment. That is, they may or may not be obtained, and both options are valid. (dimension 4)
   d) Please model the criteria: (a) presumed PNDS (post nasal drip syndrome) in young nonsmokers, (b) pregnant women, (c) before observing the result of discontinuation of an ACE-I (Angiotensin-converting Enzyme Inhibitor) for 4 weeks for patients who developed cough shortly after beginning to take an ACE-I. (dimensions 1, 2, 9, 10)

The first scenario, “Unevaluated chronic cough” has the following criterion:

![Image of the first scenario](image-url)
Outside scope of case study
Domain term added to the medical domain class hierarchy.
The case step “cough after ACEI” has the following expression:

If cough started after ACEI, then the sub-guideline “evaluate ACE I as cause” is executed. It has the following algorithm:
The scenario “taking ACEI” has the following precondition:
The action step “stop ACEI” has the following action:

The scenario “4 weeks after discontinuing ACE I” has the following precondition:
“Stop” is the name of an *End* instance. The End class is a specialized step in management guidelines that signals the end of a management algorithm.

The action “Not done evaluating cough after discontinuing ACE I” has a task that schedules the next encounter. That task is not formally modeled. It just has a name. It is outside the scope of this case study to model this task.

The *case* step (In GLIF it was a choice step) “presumed PNDS in young non-smoker, pregnant women?” has the following criterion:
“Presumed” is taken to be the value of the domain term PNDS in a note entry.
“Treatment for presumed PNDS” is not specified further. In fact, treatment for PNDS is done by evaluating PNDS, but this was not clear from the case study description.

In the EON model, Samson modeled the fact that X-Ray can be executed at any time if there are reasons to withhold it, by using a branch step that branches to X-Ray, and the two case steps that check for reasons to withhold X-Ray. The GLIF language can be used to do the same flow of control. This flow of control is not possible with PROforma and
Asbru; they have to have two plans: one of sequential execution (X-Ray -> Treatment) and the other for execution in parallel.

The “Chest radiograph” action step is shown below.

Evidence rating is modeled just like in GLIF.

Next we proceed to the branch step at the bottom of the algorithm.

The “evaluate for PNDS” is a sub-guideline that has the following algorithm:
“test for sinusitis” has two tasks, as shown below.

Domain term added to the medical domain class hierarchy.
Not ordering a sinus CT scan is modeled as a message to the user:

The “Evaluate for GERD” action step is shown below. It has a task for ordering the pH monitoring test.
The interpretation of the results is done in the scenario “evaluate for GERD”, shown below.
The Cough gone? Case step has the following expression:
<table>
<thead>
<tr>
<th>Label</th>
<th>When</th>
</tr>
</thead>
<tbody>
<tr>
<td>no current cough</td>
<td>AFTER(END_OF(Condition), NOW)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>From</th>
<th>Where</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition</td>
<td>domain_name = &quot;Cough&quot;</td>
</tr>
</tbody>
</table>