How do we represent the belief?

We're representing the belief as if it were a doctor talking to a patient for the first time with their basic information in their hand. So we have a set of facts about each patient's basic information such as their name, age, sex, and ethnicity/race. We'll also have a "personal_history" rule which takes in any personal/family medical history such as past illnesses, or family history of illnesses. We'll also have the "lifestyle" rule which takes in each person's eating habits, smoking habits, and activity/exercise. Then we're going to have a "symptom" rule that takes in each patient's account of their symptoms. This would include any chest pains/breathing difficulties, as well as their severity. Finally, we're going to take in tests for each patient, which measures their blood pressure, cholesterol level, blood sugar level, BMI, and ratio of waist/hips. The test rule will take in the test method (blood tests, EKGs, and CT scans), result, and reliability.

How do we reason with the belief?

The guidelines for diagnosing CAD can be pretty broad. As such, we're just going to focus on certain tests. Each person's basic facts, history, symptoms, and test results would be given a point based on the below table. Each "yes" would amount to 1 point.

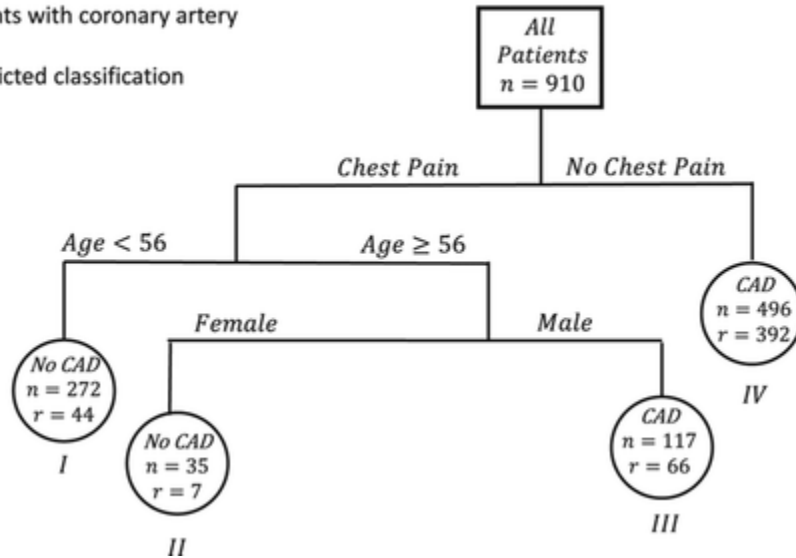|		
1. Age:	**no** <50g.	**yes** 50g.>
2. smoking:	**no**	**yes**
3. family history of coronary artery disease:	no	**yes**
4. blood pressure	**no** < 139/40mmHg	**yes** >140/40mmHg
5. cholesterol:	**no** < 5,5 mmol/l	**yes** > 5,6 mmol/l
6. blood sugar:	**no** < 6,0 mmol/l	**yes** > 6,1 mmol/l
7. BMI :	**no** < 25 kg/m^2	**yes** >25 kg/m^2
8. the ratio of waist / hips:	m. **yes** >1,0 **no** < 0,9	w **yes** > 0,9 , **no** < 8, 9
9. physical activity:	**no** < 30 min. per day	**yes** > 30 min. per day

These points would be tallied up and be interpreted based on the following assessment:

Risk present	Expressed risk	highly expressed risk
1 – 3 points	4 –6 points	7–9 points

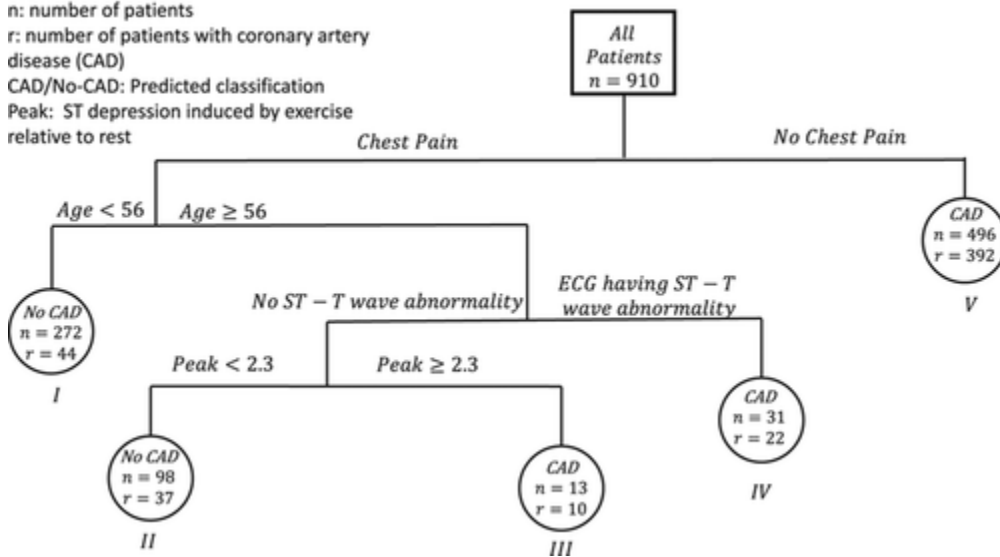Highly expressed risk patients would be further put into examination under the following decision trees:

Legend
n: number of patients
r: number of patients with coronary artery disease (CAD)
CAD/No-CAD: Predicted classification

All Patients
$n = 910$

Chest Pain / No Chest Pain

Age < 56 / Age ≥ 56

Female / Male

No CAD
$n = 272$
$r = 44$
I

No CAD
$n = 35$
$r = 7$
II

CAD
$n = 117$
$r = 66$
III

CAD
$n = 496$
$r = 392$
IV

Legend
n: number of patients
r: number of patients with coronary artery disease (CAD)
CAD/No-CAD: Predicted classification
Peak: ST depression induced by exercise relative to rest

All Patients
$n = 910$

Chest Pain / No Chest Pain

Age < 56 / Age ≥ 56

No ST − T wave abnormality / ECG having ST − T wave abnormality

Peak < 2.3 / Peak ≥ 2.3

No CAD
$n = 272$
$r = 44$
I

No CAD
$n = 98$
$r = 37$
II

CAD
$n = 13$
$r = 10$
III

CAD
$n = 31$
$r = 22$
IV

CAD
$n = 496$
$r = 392$
V

In order to make use of these decision trees, we would create a rule called "symptom_assessment", which would assess a patient's chest pain symptoms against some of their basic information (such as age and sex), as well as EGC test results like so:

symptom_assessment(Patient, cad) :- !symptom(Patient, chestPain).
symptom_assessment(Patient, cad) :- symptom(Patient, chestPain), age(Patient, Age), Age > 56, sex(Patient, Sex), Sex = male.
symptom_assessment(Patient, cad) :- symptom(Patient, chestPain), age(Patient, Age), Age > 56, testResult(ecg, Result), Result = waveAbnormality.

symptom_assessment(Patient, cad) :- symptom(Patient, chestPain), age(Patient, Age), Age > 56, testResult(ecg, Result), Peak >= 2.3.

Patients who are of highly expressed risk and pass the symptom_assessment would be classified as CAD patients.

What are the conditions under which we will revise our beliefs?

When given another set of test results with better reliability, then that result would take precedence over any other test result (of the same test method), and thus might change the outcome slightly. Any new tests or any new symptoms that may arise might also be subject to belief revision.

What are the techniques for revising such beliefs?

As aforementioned, the final assessment for CAD is based on whether a patient scores with highly expressed risk and test positive on the symptom_assessment. As such, if a condition where belief revision is necessary arise (such as more reliable test results and new symptoms), then their points would be tallied up again and the "symptom_assessment" would be recalculated.