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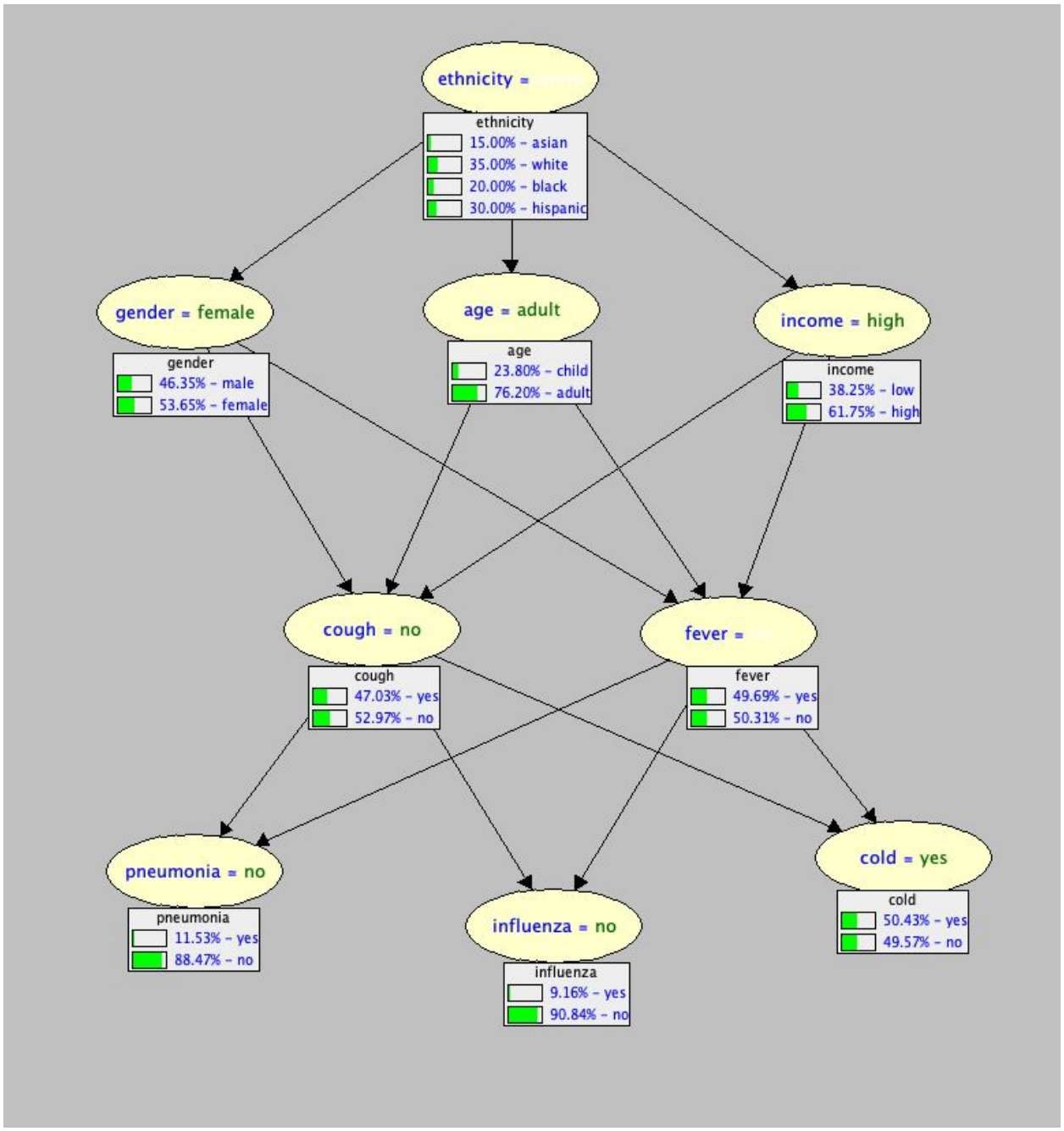
BAYESIAN NETWORK OF DEMOGRAPHIC ANALYSIS OF DISEASES

Domain:

DIAGNOSIS FOR PNEUMONIA, INFLUENZA AND COLD



Network Explanation:
This network explains the Bayesian relationship between a person's ethnicity, his/her demographic features and the probability that the person has pneumonia, influenza or cold.

Evidences:

- Having ***cough*** increases the possibility of a person having ***pneumonia***
- Having ***fever*** also increases the possibility of a person having ***pneumonia***

- While being a male decreases the possibility of a person having ***pneumonia***, being a female decreases the possibility of a person having ***pneumonia***.

- Having ***fever*** highly increases the possibility of a person having ***influenza***

- Having ***fever*** and ***cough*** increases the possibility of a person having ***cold***.

- Other demographic features do not significantly affect the diseases.

Evidence Variables : Cough, Fever, Gender, Ethnicity, Age, Income.

Diseases:

We have 3 diseases : Pneumonia, Influenza, Cold

Network model is built to predict those diseases probabilities on certain evidences.

Hence, query variables are : ***Pneumonia, Influenza, Cold***

Conditional Probability Tables

Ethnicity

asian	0.15
white	0.35
black	0.2
hispanic	0.3

Gender

ethnicity	asian	white	black	hispanic
male	0.45	0.44	0.4	0.54
female	0.55	0.56	0.6	0.46

Age

ethnicity	asian	white	black	hispanic
child	0.25	0.23	0.15	0.3
adult	0.75	0.77	0.85	0.7

Income

ethnicity	asian	white	black	hispanic
low	0.4	0.35	0.55	0.3
high	0.6	0.65	0.45	0.7

Cough

gender	male				
age	child		adult		
income	low	high	low	high	
yes	0.15	0.85	0.54	0.64	(
no	0.85	0.15	0.46	0.36	(

female			
child		adult	
low	high	low	high
0.35	0.25	0.88	0.05
0.65	0.75	0.12	0.95

Fever

gender	male			
age	child		adult	
income	low	high	low	high
yes	0.54	0.64	0.27	0.2
no	0.46	0.36	0.73	0.8

female			
child		adult	
low	high	low	high
0.75	0.4	0.44	0.85
0.25	0.6	0.56	0.15

Pneumonia

cough	yes		no	
fever	yes	no	yes	no
yes	0.3	0.1	0.1	0.001
no	0.7	0.9	0.9	0.999

Influenza

cough	yes		no	
fever	yes	no	yes	no
yes	0.25	0.05	0.1	0.0
no	0.75	0.95	0.9	1.0

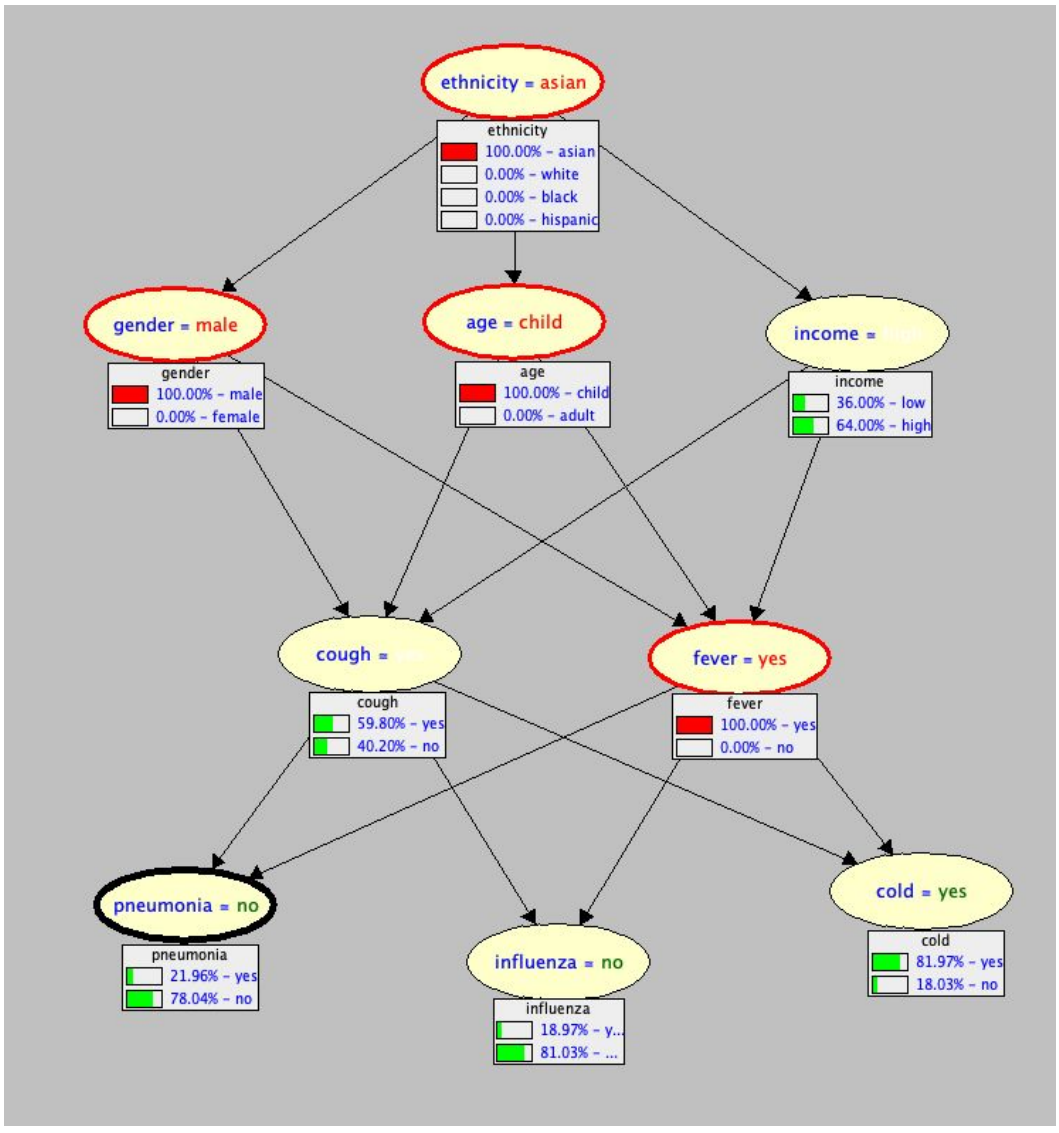
Cold

fever	yes		no	
cough	yes	no	yes	no
yes	0.88	0.73	0.36	0.05
no	0.12	0.27	0.64	0.95

TEST CASES

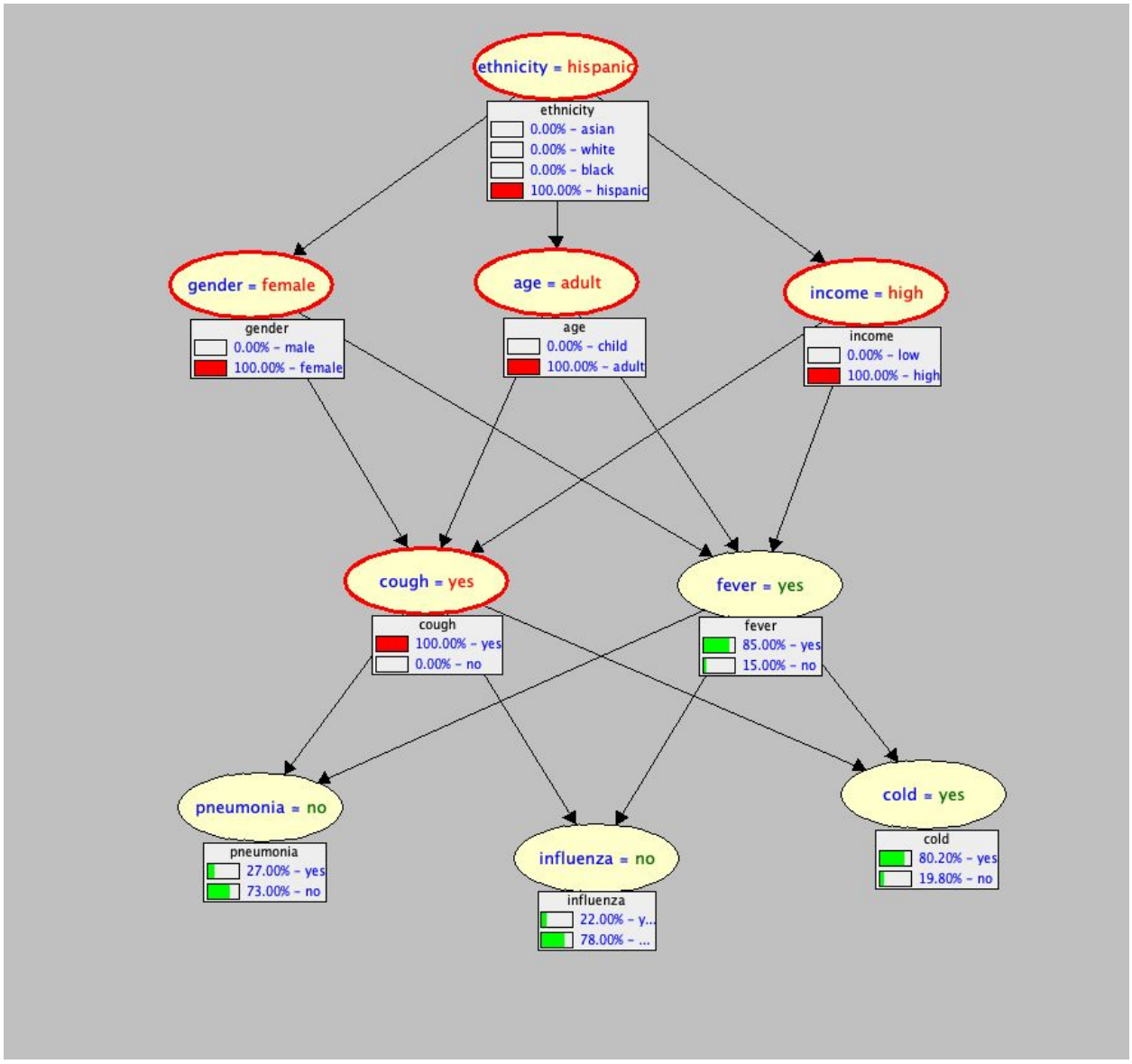
Case 1

An asian male child who has fever.

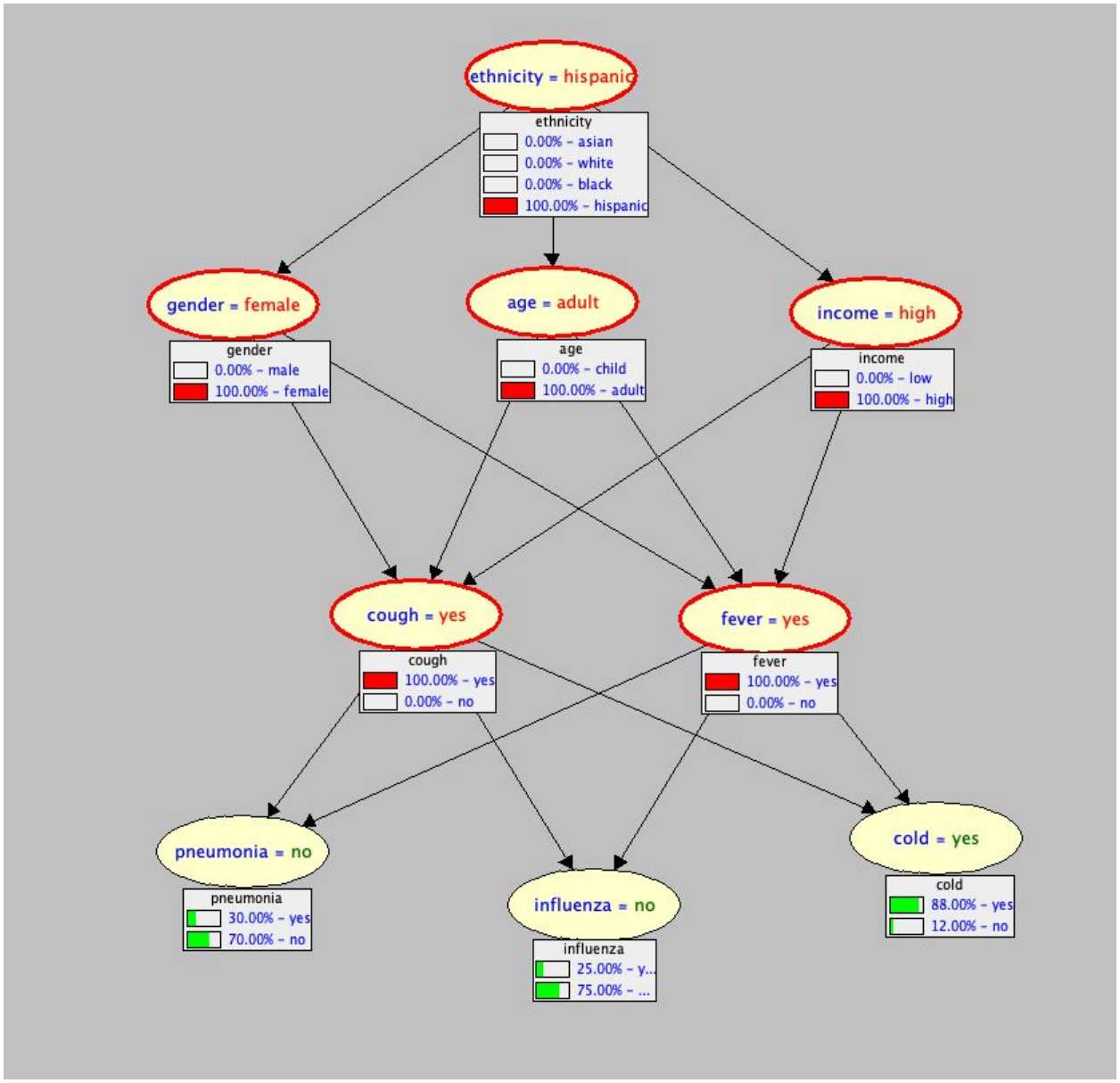


Case 2

A female adult with high income who has a cough.

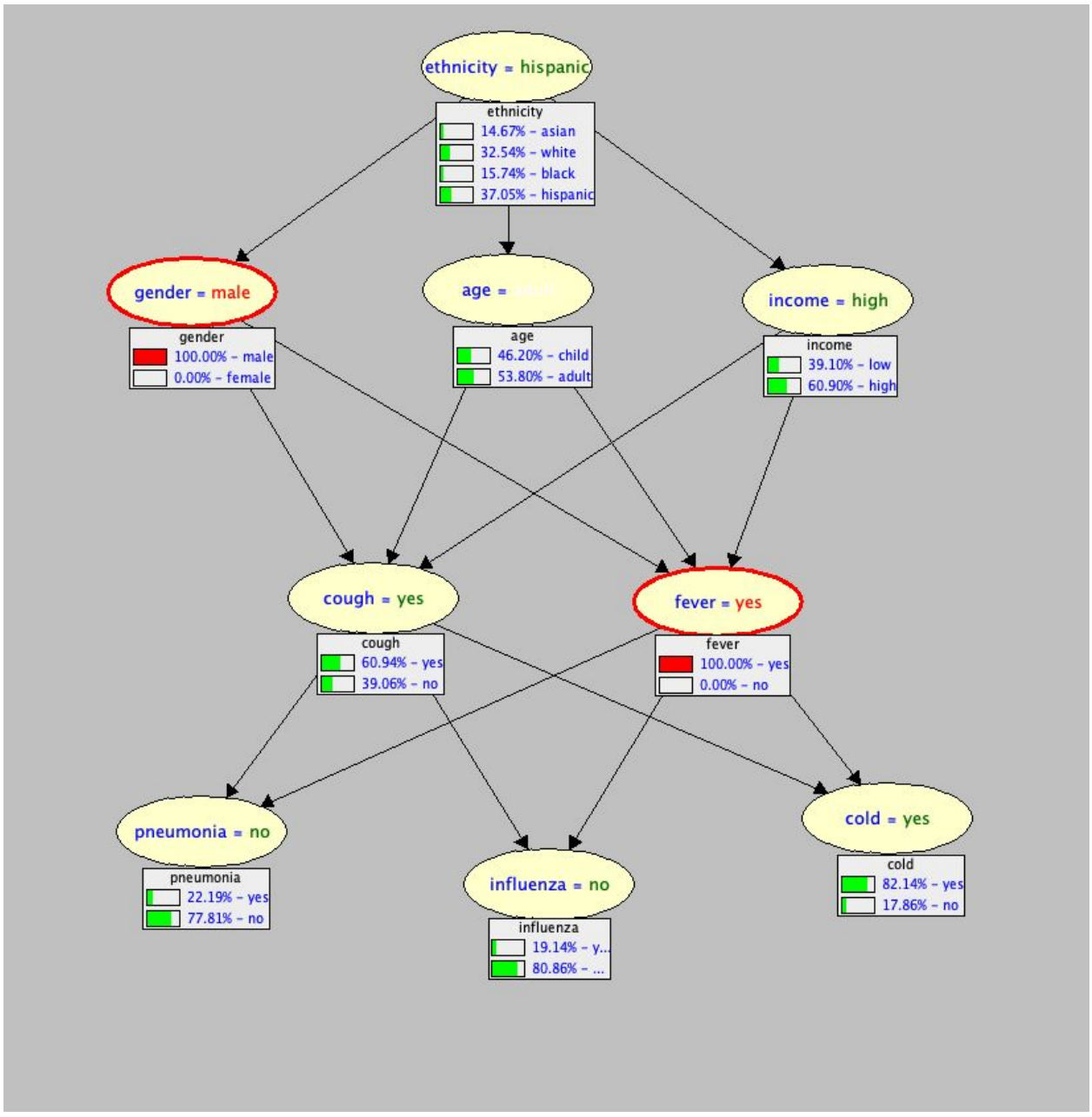


After, we asked if she had a fever and she answered yes.

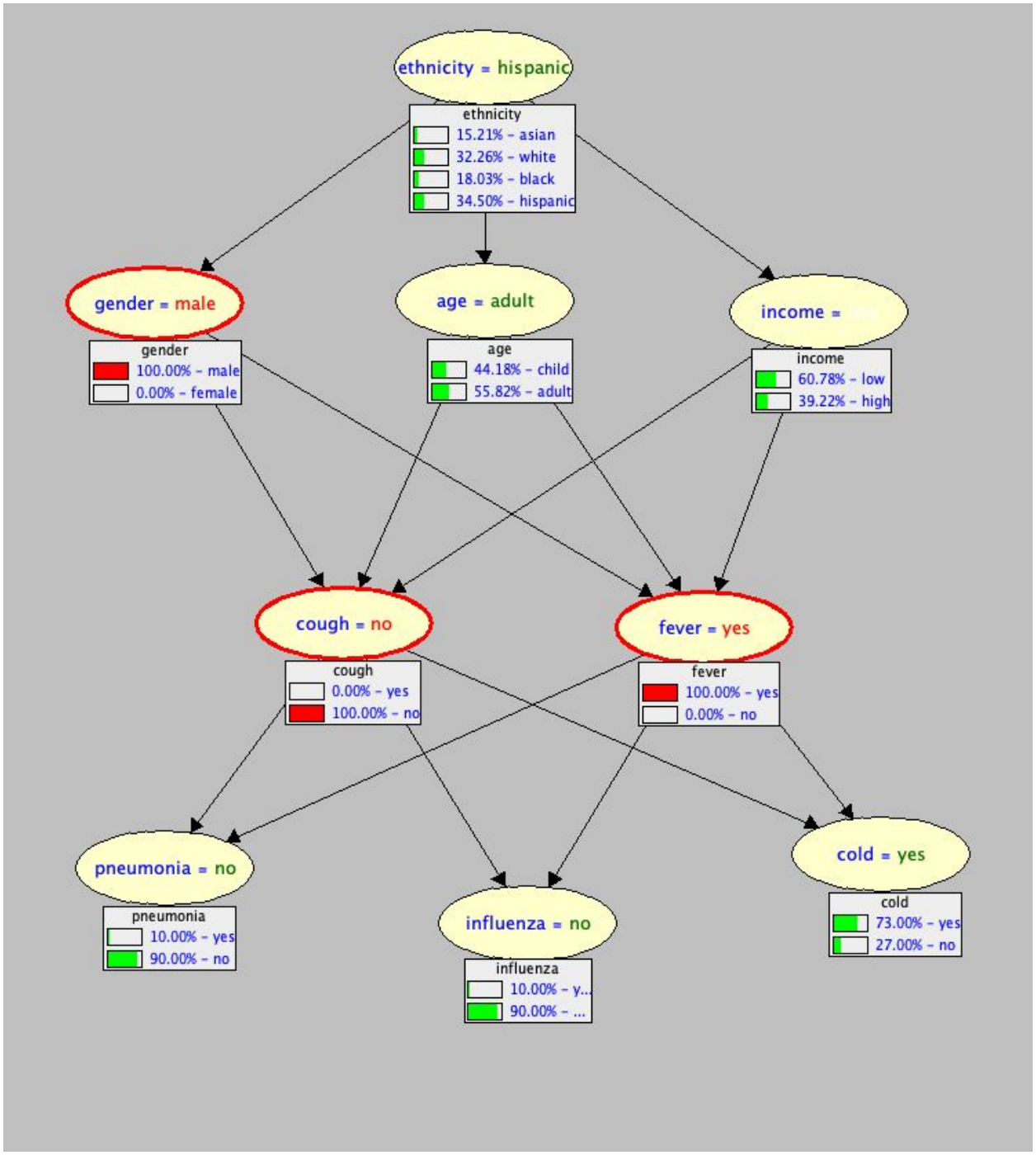


Case 3

A male who has fever.



Later, we asked if he had a cough and he answered no.



References:

https://www.researchgate.net/figure/Bayesian-Network-for-demographic-analysis-of-diseases_fig2_228819348