Q2:

a)

Let V1 = Hyperlipidemia, V2 = bmi, V3 = Vegetables.

When given just hyperlipidemia, the probability of vegetables consumption looks like

P(Activity = Insufficient)	57.9
P(Activity = Normal)	28.4
P(Activity = Sufficient)	13.7

When given hyperlipidemia and bmi = ~24.0, the expected vegetables

P(Activity = Insufficient)	57.9
P(Activity = Normal)	28.4
P(Activity = Sufficient)	13.7

When given hyperlipidemia and bmi = <18.5, the expected vegetables

P(Activity = Insufficient)	57.9
P(Activity = Normal)	28.4
P(Activity = Sufficient)	13.7

So we can see if given Hyperlipidemia we do not need bmi.

b)

V1 = hypertension, V2 = age, V3 = diabetes, Target = activity

When given hypertension and age, find activity

P(Activity = Insufficient)	43.5
P(Activity = Normal)	29.7
P(Activity = Sufficient)	26.9

When given no hypertension and age, find activity

P(Activity = Insufficient)	43.5
P(Activity = Normal)	29.7
P(Activity = Sufficient)	26.9

When given hypertension, age, and diabetes, find activity

P(Activity = Insufficient)	43.7
P(Activity = Normal)	29.6
P(Activity = Sufficient)	26.6

When given no hypertension, age, and diabetes, find activity

P(Activity = Insufficient)	45.0
P(Activity = Normal)	29.6
P(Activity = Sufficient)	25.4

c)

Want P(Age = ~60) to increase. Let's choose to add evidence in the following order.

[BMI = ~18.5, CO = YES, HT = YES, HL = YES, AC = Insufficient]

With BMI

P(Age = ~60) = 30.6

With BMI CO

P(Age = ~60) = 31.1

With BMI CO HT

P(Age = ~60) = 39.9

With BMI CO HT HL

P(Age = ~60) = 41.2

With BMI CO HT HL AC

P(Age = ~60) = 44.4

The Probability of all the variables being as in the evidence is

P(ac = Ins, hl = y, ht = y, co = y, bmi ~18.5) =

P(ac = Ins | hl = y, bmi, gd) * P(hl = y | co = y, bmi = ~18.5) * P(ht = y | co = y, bmi = ~18.5) *

P(co = y | bmi = ~18.5) * P(bmi = ~18.5)

= 0.435 * 0.248 * 0.373 * 0.411 * 0.373 = 0.00617 = 0.617%

d)

Searching for exercise is Insufficient decreases. Let's choose to add evidence in the following order.

[CO = No, HT = No, HL = No, GD = Male, AG = <40]

With CO

P(Activity = Insufficient) = 38.0

With CO HT

P(Activity = Insufficient) = 37.3

With CO HT HL

P(Activity = Insufficient) = 35.4

With CO HT HL GD

P(Activity = Insufficient) = 34.2

With CO HT HL GD AG

P(Activity = Insufficient) = 29.1

Probability of evidence happening is P(ag < 40, gd = M, hl = N, ht = N, co = N) =

P(ag < 40 | hl = N, ht = N) * P(gd = N | hl = n) * P(hl = N | co = n, bmi) * P(ht = N | co = n, bmi) *

P(co = N | bmi)

= 0.465 * 0.494 * 0.742 * 0.645 * 0.334 = 0.0367 = 3.67%