Article

Cardiovascular disease and lipid-regulating drugs

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Calculation skills: Cardiovascular Disease

Cardiovascular disease (CVD) accounts for approximately one third of deaths in England and Wales, with the associated morbidity costing the NHS in England alone almost 8 million pounds in 2010 (NICE, 2014). Modifiable risk factors include hypertension, smoking and raised cholesterol levels. As such, the Joint Formulary Committee (2016) identify that preventative measures, through the use of lipid-regulating drugs, should be taken where there is a high risk of developing CVD and to prevent recurrence in those with recognised CVD.

Question 1

Sanjay is 54 years old and works as an administrator. He has diabetes and although adherent to his management plan, he is unable to exercise due to joint pain. He has been assessed using the QRISK2 risk assessment tool and has been identified at 19% risk of having a heart attack or stroke in the next 10 years.

(i) Out of a crowd of 1000 people with the same risk factors as Sanjay, how many are likely to have a heart attack or stroke in the next 10 years?

(ii) Sanjay is prescribed atorvastatin 20mg daily. Atorvastatin 20mg tablets are available in packs of 28 (£24.64) and 90 (£79.20). What would be the most cost effective way (without splitting packs) to prescribe the treatment from 1st June to 30th November?

Question 2

In 2010, 180,000 deaths in England and Wales were as a result of cardiovascular disease, with a quarter occurring before the age of 75, of which 70% were men (NICE, 2014).

How many of the deaths in under 75 year olds, from CVD in England and Wales in 2010, were men?

Question 3

The estimated cost of CVD to the NHS was estimated to be 6,940 million in 2003, increasing to 7880 million in 2010. If the cost continues to increase at the same rate, was is the likely cost in 2017? Round percentages up or down to nearest whole number

Question 4

Karen, a 49 year old receptionist, has a non-HDL cholesterol concentration of 7.0 mmol/litre and has been taking high-intensity statins for 12 weeks. NICE (2014) recommend that a greater than 40% reduction in non-HDL cholesterol should be aimed for at 3 months of treatment with high-intensity statin treatment.

What would the maximum non-HDL cholesterol concentration be for Karen's treatment to be deemed successful?

Question 5

Brian, a 50 year old builder, has a confirmed diagnosis of CVD and is commenced on Atorvastatin 80mg once daily. The treatment is available as a 28 tablet pack (£28.21) or 90 tablet pack (£90.67). If treatment is prescribed to cover the period from 1st January to June 30th (assume it is not a leap year), what is the price difference between the most expensive and least expensive of the prescribing options below? Do not split packs.

Option 1: 2 x 90 tabs + 1 x 28 tabs

Option 2: 1 x 90 tabs + 4 x 28 tabs

Option 3: 7 x 28 tabs

Answers

Question 1

(i) 19% = 19 in 100

19 x 10 = 190 in 1000

(ii) No of days 1st June to 30th Nov = 183

Options 1: 1 x 90 tabs + 4 x 28 tabs = 1 x £79.20 + 4 x £ 24.64 (£98.56) = £177.76

Option 2: 2 x 90 tabs + 1 x 28tabs = 2 x 79.20 (£158.40) + 1 x £24.64 = £183.04

Option 3: 7 x 28tabs = 7 x £24.64 = £172.48

Option 3 is the most cost effective

Question 2

(i) Total deaths = 180,000.

One quarter = 180,000 ÷ 4 + 45,000

1% of 45,000 = 450

70% = 450 x 70 = 31,500 men

Question 3

Rate of increase between 2003 and 2010 = 940 million

As a percentage of initial cost = 6940 million ÷ 940 million = 7% increase

7% of 7880 million = 552 million

7880 million + 552 million = 8,432 million

Question 4

100% = 7.0

1% = 7 ÷ 100 = 0.07

40% = 40 x 0.07 = 2.8

7 – 2.8 = 4.2 mmol/litre

Question 5

(i) Total days = 181

Option 1: 2 x 90 tabs + 1 x 28 tabs = 2 x 90.67 (181.34) + 28.21 = £209.55

Option 2: 1 x 90 tabs + 4 x 28 tabs = 90.67 + 4 x 28.21 (112.84) = £203.51

Option 3: 7 x 28 = 7 x 28.21 = £197.47

Difference: 209.55 – 197.47 = £12.08

References

NICE (2014) *Cardiovascular disease: risk assessment and reduction, including lipid modification: Clinical Guideline 181.* London: NICE

Joint Formulary Committee (2016) *BNF 71.* Available at: *http://www.bnf.org/products/bnf-online/*