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Approximately 550 000 people in the United Kingdom (UK) die each year, and mortality rates are set to rise. It is anticipated that the annual number of deaths per year in the UK will have increased by 17% by the year 2030. This rise is attributed largely to an aging population. The three main causes of death within the UK are circulatory disease, respiratory disease and cancer (Office for National Statistics, 2017).

The NHS plays a large part in the care of people who are dying, this care includes enabling people to choose where they would like to be in their last days of life. Place of death is particularly important to many people who receive a diagnosis of a terminal condition and research suggests that most people want to die at home, around 63%. Just 28% of people wish to die in hospice, 8% in hospitals and just 1% in nursing or residential care (Help the Hospices, Sue Ryder and Marie Curie, 2013).

The cost of caring for people in the end of life is financially expensive to the NHS but is indisputably a vital part of the patient and family's journey and the human cost when this is not achieved may be immeasurable. The financial cost to the NHS in the last 90 days of life can vary dependant on the care setting, however on average £4500 is spent on hospital stays per person, hospice care is estimated at around £550 per day and the average cost of community nurse visits is estimated at £278 per day (NHS Confederation, 2017).

Question 1

- I. Based on the information in this paragraph how many people will die in the year 2030?
644 350 people
- II. If in the year 2015 when the approximate death rate is estimated to be 550 000 people what is the number of people who wanted to die in hospital?
44 000 people
- III. Figures from 2015 suggest that 55% of people who died that year died in hospital, how many more people died in hospital than those who wished to?
258 500 people
- IV. In total over the last 90 days of a person's life if they were to have once weekly community nurse visits for the first 70 days, twice weekly community nurse visits for the next 14 days after that and then daily community nurse visits until the end of life after that fortnight, but did not access any hospice care how much would their total care costs be?
£5560.00

Question 2

John attends the hospital for a CT scan of his abdomen following a referral from his GP, on returning to outpatient's post scan he is diagnosed with a malignant bowel obstruction and he is given a palliative diagnosis. Within a few months of diagnosis John's health is declining and the multi-disciplinary team in partnership with John and his family decide to prescribe and supply anticipatory medications. The rationale for anticipatory prescribing is to ensure symptoms are managed in a timely manner in order to prevent any pain or suffering to the person and their family or support network in the last days of life. Anticipatory prescribing equipment and medications are frequently called 'just in

case boxes' and normally contain medication and administration equipment, as well as the correct documentation, written specifically for the patient but normally written in accordance with local policy or guidance (Health Improvement Scotland, 2017). See table one for the list of medications that are prescribed and supplied to John's home in his 'just in case' box, and then answer the questions below:

- I. Based on table 1 what is the total cost of the medications supplied to John in his 'just in case' box? **£41.52**
- II. In total how many milligrams of Diamorphine hydrochloride (a schedule 2 controlled drug) is supplied to John? **25**
- III. John's family contact the out of hour's service on Sunday night at approximately 7.30 pm as John has been reporting considerable pain for around 24 hours and it is getting worse. The decision is taken to administer analgesia from the 'just in case' box. John is opioid naïve and so is given a bolus subcutaneous injection of 2.5mg of Diamorphine hydrochloride in a diluent of water for injection. Over the next 12 hours John is administered two more doses of the same, how much Diamorphine hydrochloride has John required over the 12-hour period in total to manage his pain? **7.5 mg**
- IV. In addition John is given one dose of Levomepromazine for nausea 2.5mg, if Levomepromazine is supplied in 25mg in 1 ml ampoules how much of the ampoule is John given and how much is wasted? **Given= 0.1 ml Wasted= 0.9 ml**

Table 1

Diamorphine hydrochloride injection (powder for solution for injection)	5 mg ampoules	Supply five (5) 5mg ampoules	£11.36
Midazolam injection	10 mg/ 2ml ampoules	Supply ten (10) 2ml ampoules	£7.11
Hyoscine butylbromide injection	20 mg / 1 ml ampoules	Supply ten (10) 1ml ampoules	£2.92
Levomepromazine injection	25 mg / 1 ml ampoules	Supply ten (10) 1ml ampoules	£20.13

Question 3

Mary is an 83 year old lady diagnosed with breast cancer, her pain is successfully managed with oral opioid analgesia but due to her analgesia, increased immobility and decreased appetite for diet or fluids Mary is suffering from established constipation. Following a full examination it is ascertained that Mary is impacted rectally with hard faeces and is at risk of continuing constipation due to the risk factors associated with opioid analgesia, immobility and constipation. Bisacodyl 10mg suppository plus a 4g Glycerol suppository is prescribed to relieve the rectal constipation. Also prescribed is Docusate sodium 100mg to be taken twice daily for 3 days with a plan to review Mary in 72 hours.

Using table 2 below:

- I. What is the total cost of the suppositories prescribed to Mary? **£5.07**
- II. How many Docusate sodium tablets in total should Mary be prescribed for the 3 day period?
- III. In total how many Milligrams per day of docusate sodium will Mary be taking?
- IV. How many milligrams over the 72 hour period in total will Mary take?
- V. What is the total cost of the Docusate sodium prescribed to Mary?

Table 2

Drug	Dose	Duration of treatment	Cost
Bisacodyl suppository	10mg	once	12 suppository pack costs £3.53
Glycerol suppository	4g	once	12 suppository pack costs £1.54
Docusate sodium	100mg tablet	3 days until review then regularly.	30 capsule pack costs £2.09 100 capsule pack costs £6.98
Moviocal oral powder	Maintenance dose 1-2c sachets daily 13.7 g sachet	On going	30 sachets £7.72

Three days later as planned Mary is reviewed and it is found that the suppositires for Marys impacted hard faeces have been successful and she is no longer rectally impacted. However, the stools she has passed since the initial suppository have been hard and it has been quite painful for Mary. Health promotion advice is important in managing constipation and so advice regarding nutrition, hydration and mobility are necessary. However, within palliative care the success of such interventions may be limited due to other factors associated with the patient's condition. For example; factors such as opioid analgesic's for pain, use of diuretics (commonly prescribed in older people) chemotherapy treatment, lack of appetite for food and fluids and lethargy caused by the condition all of which often limit the success of health promotion advice and frequently longer term pharmacological interventions are necessary. According to NICE (2015) a plan for care and pharmacological interventions in the last days of life should be written individually for the person and reviewed regularly as the persons health changes. Within this framework Mary is placed on a treatment plan to prevent constipation and pain on passing faeces. She is prescribed regular Docusate sodium 100mg three times daily which mainly acts as a faecal softener in addition she is prescribed an osmotic laxative Macrogol PRN and a plan for regular review using the Bristol stool chart is made.

- I. If Mary is supplied with enough Docusate sodium to take one tablet three times per day for 28 days how many tablets in total is that? **84**
- II. Over a period of 7 days how many milligrams of Docusate sodium in total will Mary have taken? **2100 mg**
- III. Convert this total number of milligrams into grams. **2.1 grams**
- IV. If Mary also needs to take a Movicol sachet in addition to the Docusate sodium twice a week for the first two weeks and then three times a week over the 28 day period how many sachets in total will marry have needed? **10 sachets in total**

Question 4

Joe is a 54 year-old man who has entered his last days of life. NICE (2015) offers guidance on how to recognise that a person may be in the last days of life, they may be displaying signs such as increasing fatigue, loss of appetite, deteriorating levels of consciousness or mottled skin to name just a few. NICE (2015) also recognise that professional judgement and experience also play a role in recognising when a person is entering the last days or hours of life. Joe is bed bound and despite repositioning he is unable to clear secretions in his respiratory tract this is causing the secretions to move as he breathes, this is creating significant noise when he breathes. This may be causing Joe some discomfort and he is beginning to display agitated behaviour. Joe's wife and son who are caring for him are finding the noise and agitation distressing.

In line with NICE guidance (2017) Glycopyrronium 200micrograms is prescribed for Joe to relieve the secretions and associated noise, at a dose of 200 micrograms subcutaneously every 4 hours as required (PRN). Joe requires 5 doses of the Glycopyrronium over the next 24 hours.

- I. How many micrograms in total over 24 hours is Joe given? **1000mcg**
- II. Convert this to milligrams. **1 mg**
- III. If Glycopyrronium is supplied in 200 micrograms / 1ml solution for injection how many of these vials will need to be prescribed to ensure Joe has enough medication for 72 hours based on his needs over the past 24 hours? **15 vials**

For restlessness and agitation in end of life care Midazolam at a dose of 2.5 – 5 milligrams subcutaneously up to 2 hourly as required (PRN) is recommended (North West Coast Strategic Clinical Network, 2017). Joe is prescribed 2.5 milligrams to begin with and he requires 4 doses over the next 24 hours.

- I. In total over the 24 hour period how many milligrams has Joe required? **10 milligrams**
- II. Convert this to grams. **0.01 grams**
- III. If the Midazolam is supplied in 5mg / 1 ml solution vials how many of these vials will need to be prescribed to ensure Joe has enough medication for 72 hours? **12 vials**

It is worthy of note that if a patient is requiring multiple administration of medication via a subcutaneous injection in end of life care it is good practice to save discomfort by commencing a subcutaneous infusion via syringe driver to minimise pain and discomfort however these conversions go beyond the scope of this exercise.

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