Understanding and using data in your ESP

T Level Technical Qualification in Health

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Contents

Introduction

Health professionals use maths and statistical data daily, often without being aware of the application of maths in their everyday practice.

Examples of applying mathematical data to health include looking at risk for certain diseases, and likeliness of developing complications based on age, sex, or other factors. Another example is the analysis of statistics on the uptake of vaccinations; this information can then be used to explore the reasons for any significant differences within these areas. Mathematical data and conclusions from them are used to inform patient care, determine campaigns or public information, and even steer policy.

Graphs that show data on the rates of pregnancy within a locality could be used to assess if the contraception service provision is effective. The information is then analysed and used to assess if further funding and staff recruitment or resources would need to be implemented.

Data tables can provide evidence on how reducing cigarette smoking can positively impact life expectancy. This type of information could be used in health promotion and education for patients.

Understanding how to interpret and draw conclusions from mathematical data can help you become a more confident and effective healthcare practitioner. The aim of this booklet is to help improve your confidence and to enable you to recognise the importance of understanding and applying maths to health.

For students considering progression into higher education, it is important to note that universities value mathematical skills in health. Some universities have a maths assessment entry test for health degrees, while others conduct continuous maths assessments during the course.

Maths is an important component of your assessment outcomes (AOs): AO4 Use English, maths, and digital skills as appropriate. The table below can be used to guide your focus when it comes to considering how you would demonstrate the General Mathematical Competencies (GMC) in your employer set project (ESP). For each competency, the core skill is linked.

General competency	Linked core skills in Health	Linked ESP tasks
GMC5. Processing data	CS5.1: Apply research skills	Task 1
	CS5.2: Apply principles for evidence-based practice to contribute to research and innovation within a specific area	Task 1
GMC6. Understanding data and risk	CS5.1: Apply research skills	Task 1
GMC8. Communicating using maths	CS2.2: Communicate effectively with a variety of stakeholders within the health setting	Task 2(a) Task 2(b) Task 3(a) Task 3(b)
	CS5.1: Apply research skills	Task 1

Strength and limitations of data

Reliability of data

In healthcare, it is important to adhere to evidence-based practice. However, not all data is suitable, as not all data is reliable. As we have a patient's care resting on our decisions, it is important that we are careful when choosing data to base our recommendations on. There are several factors you can consider to determine whether a data source is reliable:

Authority: It should be possible to state who is responsible for the data you select, NHS data may not give an actual author, however data published on an NHS site is the responsibility of the NHS and undergoes extensive peer review, and therefore can be relied upon.

Currency: This relates to how current (recent) the data is. You may wish to use data that is as recent as possible, but you may also wish to compare current data with older sources to see the change over time.

Relevance: It is important that any data you interpret is related to your topic and that the content is in a format that you can understand.

Accuracy: Ideally, the source should include a statement on how the data was collected. If you find data from a research paper, it should have been peer reviewed. You may be able to verify the data from an alternative source, if two different sources draw the same conclusions, this suggests accurate data.

Bias: Bias can affect the collection of data, or make it more likely that the data supports conclusions that benefit a particular individual or organisation. Be sure to check the source of your data; is the data from a source that is trying to sell something or is it sponsored by a profit-making organisation? Can you find other data from a different source that verifies the data?

Sample size: Sample size impacts on the validity of research findings; a larger sample provides more reliable results. Take care when viewing data on few people or from a small area; this may limit how you can extrapolate the conclusions.

Reliable sources of data include:

Organisation	Link
NHS Digital	https://digital.nhs.uk/data
GOV.UK	https://www.gov.uk/government/organisations/office-for-health-improvement-and-disparities
	https://www.gov.uk/government/organisations/uk-health-security-agency
Care Quality Commission (CQC)	https://www.cqc.org.uk/

Data formats

Data can come in a variety of formats. This section details how to interpret data in formats you are likely to encounter with healthcare data.

You don't need to show that you can interpret data from every format, however, being able to interpret data in different formats gives you more choice over what data you decide to select and interpret.

When using data to support writing an individual's healthcare plan, the most important factor in deciding what data to use is that you, as an individual, understand that data.

If your research leads you to data that you do not understand, do not use it.

When interpreting data in your ESP, consider how the data will link to a patient's healthcare plan, and how using the data will improve the outcome for the patient.

Tables

Here we have an example of data presented in a table taken from [Childhood Vaccination Statistics - Main Tables - 2020-21 V2.xlsx (live.com)](#):

Table 1: Completed primary courses: percentage of children vaccinated by their first birthday, England, 2009-10 to 2020-21

percentages

Year of 1st birthday	Diphtheria Tetanus Polio Pertussis Hib HepB (DTaP/IPV/Hib/HepB) *primary*	Diphtheria Tetanus Polio Pertussis Hib (DTaP/IPV/Hib) *primary*	MenC *primary*	Pneumococcal Disease (PCV) *primary*	Rotavirus *primary*	MenB *primary*
2009-10[(1)]	:	93.6	92.7	92.9	:	:
2010-11[(2)]	:	94.2	93.4	93.6	:	:
2011-12[(3)]	:	94.7	93.9	94.2	:	:
2012-13[(4)]	:	94.7	93.9	94.4	:	:
2013-14[(5)]	:	94.3	:	94.1	:	:
2014-15[(6)]	:	94.2	:	93.9	:	:
2015-16[(7)]	:	93.6	:	93.5	:	:
2016-17[(8)]	:	93.4	:	93.5	89.6	:
2017-18	:	93.1	:	93.3	90.1	92.5
2018-19[(9)]	:	92.1	:	92.8	89.7	92.0
2019-20[(10)]	92.6	:	:	93.2	90.1	92.5
2020-21[(11)]	92.0	:	:	:	90.2	92.1

Source: COVER, Public Health England

The title tells us what the chart shows: completed primary vaccination courses as a percentage for children by their first birthday.

The first column is the year of the children's first birthday.

The subsequent columns show the percentages of children who had received various vaccinations by their first birthday.

We can read along the rows to state the percentage of vaccinations for any given year.

We can also read down the columns to state the percentage of vaccinations for a particular type of vaccination.

We can identify specific information from the table, for example, in 2021, 92% of children had their Diphtheria, tetanus, polio, pertussis, Hib and HepB vaccinations while only 90.2% had their Rotavirus vaccination.

Table practice

Consider the table below taken from Action on smoking and health (https://ash.org.uk/resources/view/smoking-statistics):

Table 2: Prevalence of cigarette smoking by sex (GLS/OPN/APS), 1974 to 2019, Great Britain & UK [2 3 4]

%	1974	1978	1982	1986	1990	1994	1998	2002	2006	2010	2014	2015	2016	2017	2018	2019
Men	51	45	38	35	31	28	28	27	23	21	20	19.3	17.7	17.0	16.5	15.19
Women	41	37	33	31	29	26	26	25	25	20	17	15.3	14.1	13.3	13.0	12.5
All	45	40	35	33	30	27	27	26	26	20	18.1	17.2	15.8	15.1	14.7	14.1

NB: Since 2000 data have been weighted. 1974-2010 figures are from the GLS/OPN surveys and are for Great Britain. Data from 2014 onwards is from the Annual Population Survey and is for the UK. [2 3 4]

1. What does this table show?

2. What percentage of women smoked in 2019?

3. How does this compare with the percentage of women who smoked in 1974?

4. What percentage of men smoked in 1990?

5. Which year was the percentage of women smoking higher for women than for men?

6. Are you able to say how many men smoked in 2019? Why/why not?

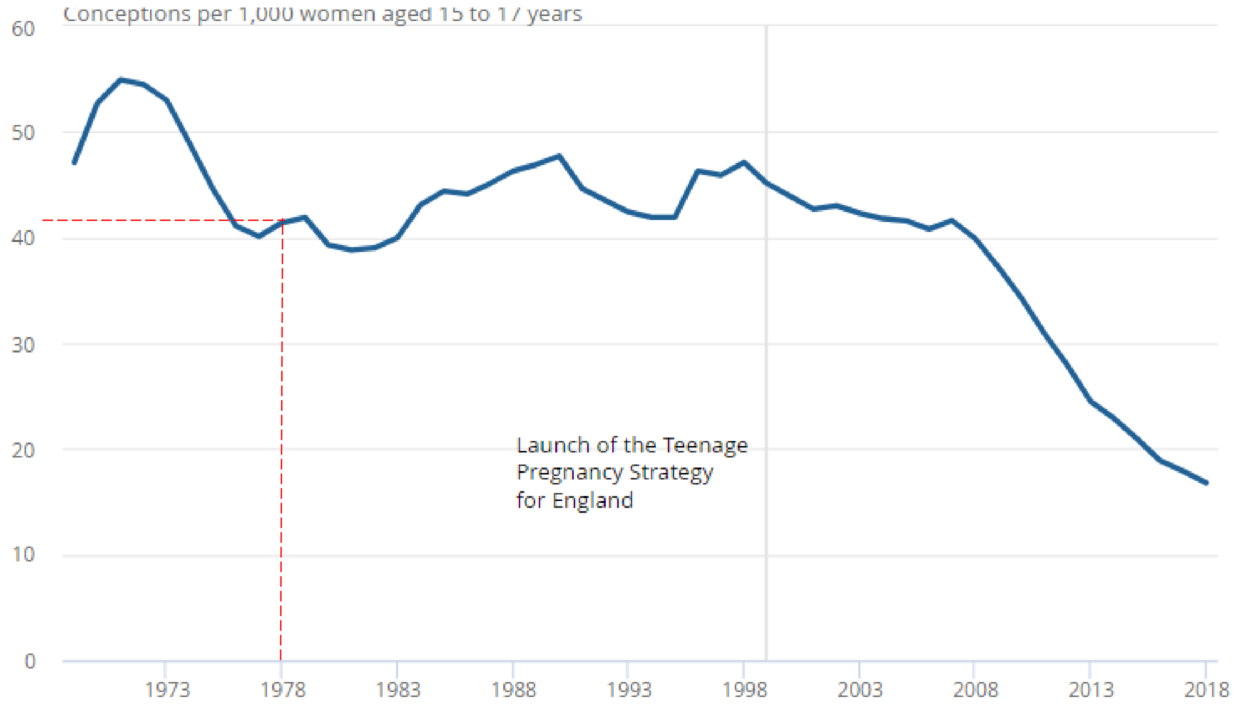
Answers are in the Table practice part of the answers section at the end.

Line graphs

Line graphs are very common ways to show data, as they can show trends much easier than a table. Line graphs are used when the x and y axes are continuous.

Below is a line graph showing conceptions of women aged 15-17 years from 1969 to 2018 in England and Wales taken from [Conceptions in England and Wales - Office for National Statistics]

Conceptions per 1,000 women aged 15 to 17 years, 1969 to 2018, England and Wales



Just like with tables, we can see what the graph shows by reading its title.

The x axis shows the years, and the y axis shows the conceptions per 1000 women aged 15-17 years. This graph also has an additional piece of information; it shows when the Launch of the Teenage Pregnancy Strategy for England, which we can see from the vertical grey line was the year 2000.

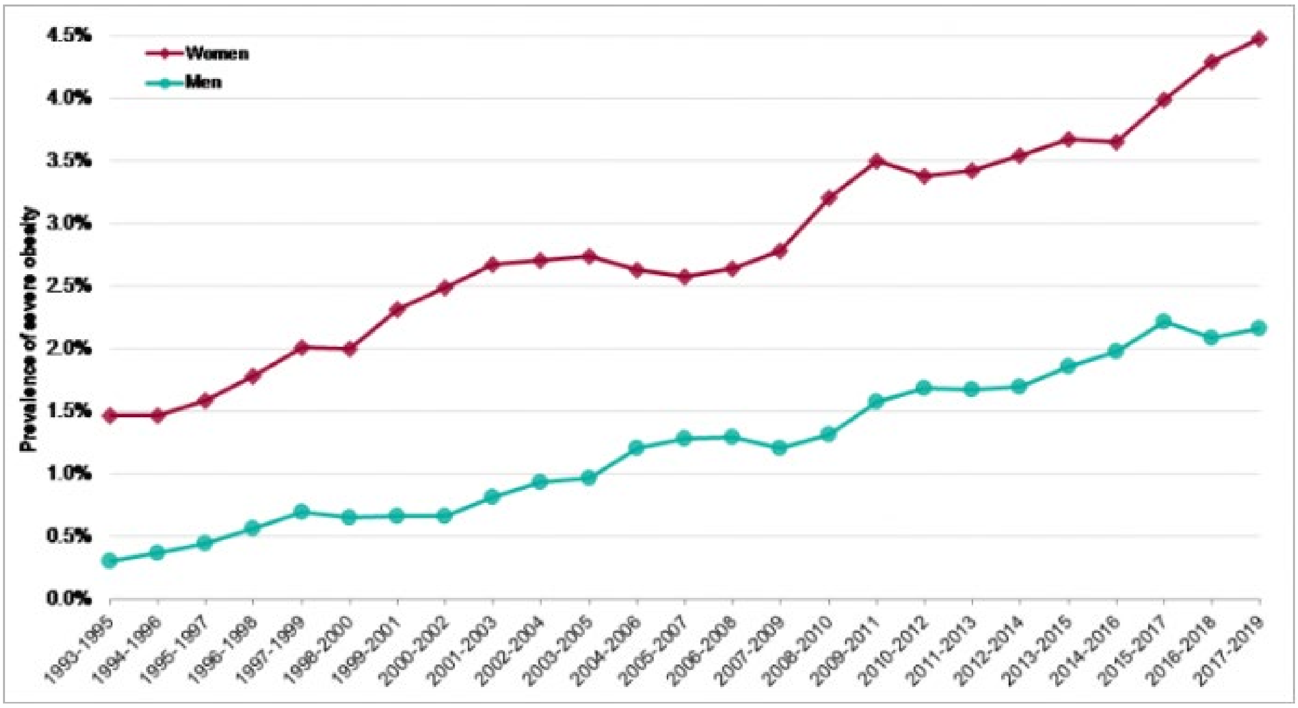
We can choose a year, for example, 1978, and trace along from the line to see how many teenage pregnancies there were per 1000 women. This is shown as the dashed red line on the graph. So, we can say that in 1978 there were around 41 conceptions per 1000 women.

While it may be useful to read a graph to find values in this way, the real benefit of line graphs is in looking at trends. Looking at the line, we can see the largest proportion of teenage pregnancies around 1973, then there is little change from 1983 onwards until 2000, when the teenage pregnancy strategy for England was launched, there we see a gradual and sustained fall in teenage pregnancy. Overall, we can say that the trend for teenage pregnancies was variable until 2000 and has steadily decreased since then.

Line graph practice

Now is your opportunity to practice analysing line graphs. Consider the graph below from GOV.UK [Patterns and trends in excess weight among adults in England - UK Health Security Agency (blog.gov.uk)]

Trend in the prevalence of severe obesity among adults (aged 16 and over) in England 1993-2019



Source: Health Survey for England 1993 to 2019 (three-year averages), NHS Digital

1. What does the graph show?

2. Why are there two different coloured lines?

3. In 1993-1995 what percentage of males were severely obese?

4. How does this compare with the percentage of males who were severely obese in 2017-2019?

5. What can you say about the trends in the data?

6. What might this graph be useful for in healthcare?

7. Would this graph be useful in making a healthcare plan for a patient who is severely obese? Explain why/why not.

Answers are in the Line graph practice part of the answers section.

Pie charts

Pie charts are used to show proportions – that is how the size of a section compares to the size of the whole.

Below is a pie chart taken from https://www.dementiastatistics.org/statistics/impact-on-carers/.

There is no title for this pie chart, and no key, however, the description implies that a suitable title could be:

'Pie chart to show the occupations of carers for people with dementia'

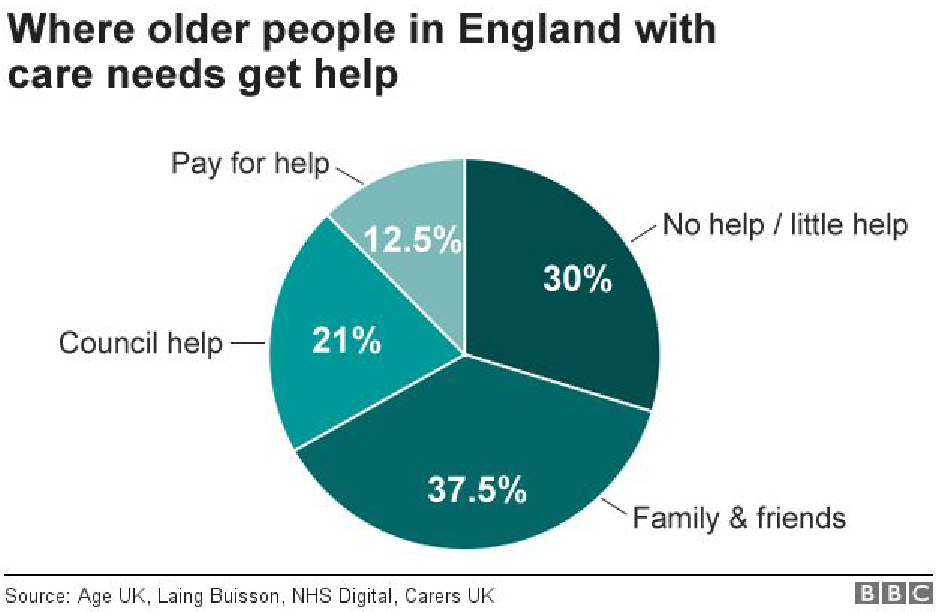
The description tells us that the white section of the pie chart represents 63% of carers for people with dementia who are retired.

The orange section represents 18% of carers for people with dementia who are in paid work.

The blue section represents 15% of carers for people with dementia who are not in work because of their caring responsibilities.

Pie chart practice

Have a go at interpreting pie chart data yourself using the example below from BBC (using data from other sources listed below the chart)



1. What does the chart show?

2. Which is the most prevalent category?

3. What percentage of older people with care needs in England get their help from the council?

4. What is the order of where these people get their help from most prevalent to least?

Answers are in the Pie chart practice part of the answers section at the end.

Bar charts

You may already be familiar with bar charts. They are used to represent groups of data; the x axis is discrete data, and the y axis is continuous. Bar charts can either be horizontal or vertical, for either the case is the same: the x axis is the base of the bars, and the y axis indicates their height. Consider the bar chart below taken from https://www.hse.gov.uk/statistics/causdis/stress.pdf

Figure 3: Prevalence rate for work-related stress, depression or anxiety in Great Britain, by occupational category, per 100,000 workers 2018/19-2020/21

Source: LFS estimated annual average 2018/19-2020/21
95% confidence intervals are shown on the chart

This chart is different to bar charts you may have come across in maths classes, as the bars are horizontal, rather than vertical.

The title tells us that the chart shows the prevalence rate for work-related stress, depression, or anxiety in the UK by occupational category from 2018/19 – 2020/21.

The bars split up the workforce depending on the type of job they do, and we can read the rate per 100,000 workers across the bottom and handily at the top of each bar we have the exact rate.

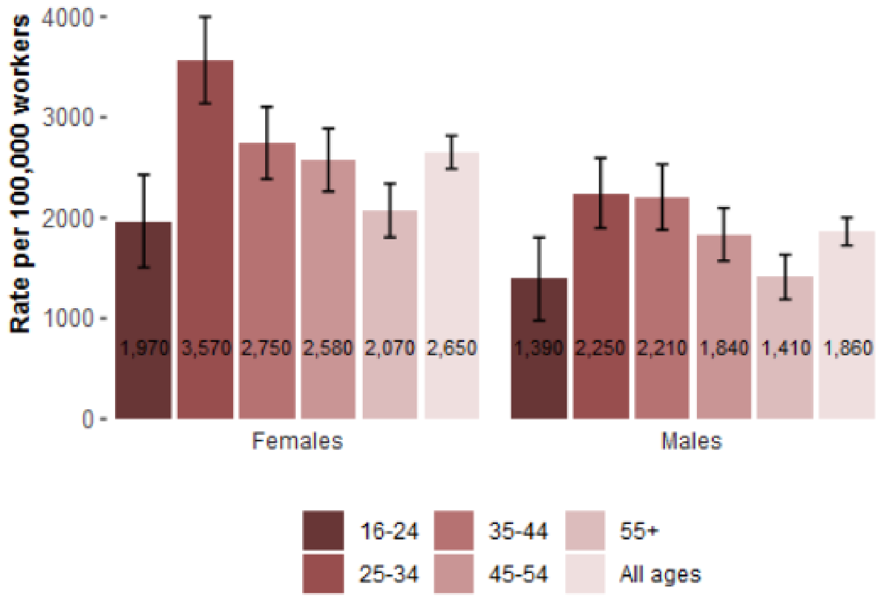
As an example of interpreting this data, we can say that the highest prevalence rate of work-related stress, depression or anxiety is in professional occupations, with a rate of 2,530 per 100,000 workers, compared with a prevalence of just 1,780 per 100,000 of the entire workforce.

Bar chart practice

Answers are in the [Bar chart practice](#) part of the answers section at the end.

Consider the bar chart below taken from the same source from the Health and Safety executive https://www.hse.gov.uk/statistics/causdis/stress.pdf

Figure 4: Prevalence rate of self-reported work-related stress, depression or anxiety in Great Britain, by age and gender per 100,000 workers averaged over the period 2018/19-2020/21



Source: LFS estimated annual average 2018/19-2020/21
95% confidence intervals are shown on the chart

1. What does this bar chart show?

2. What is the significance of the different coloured bars?

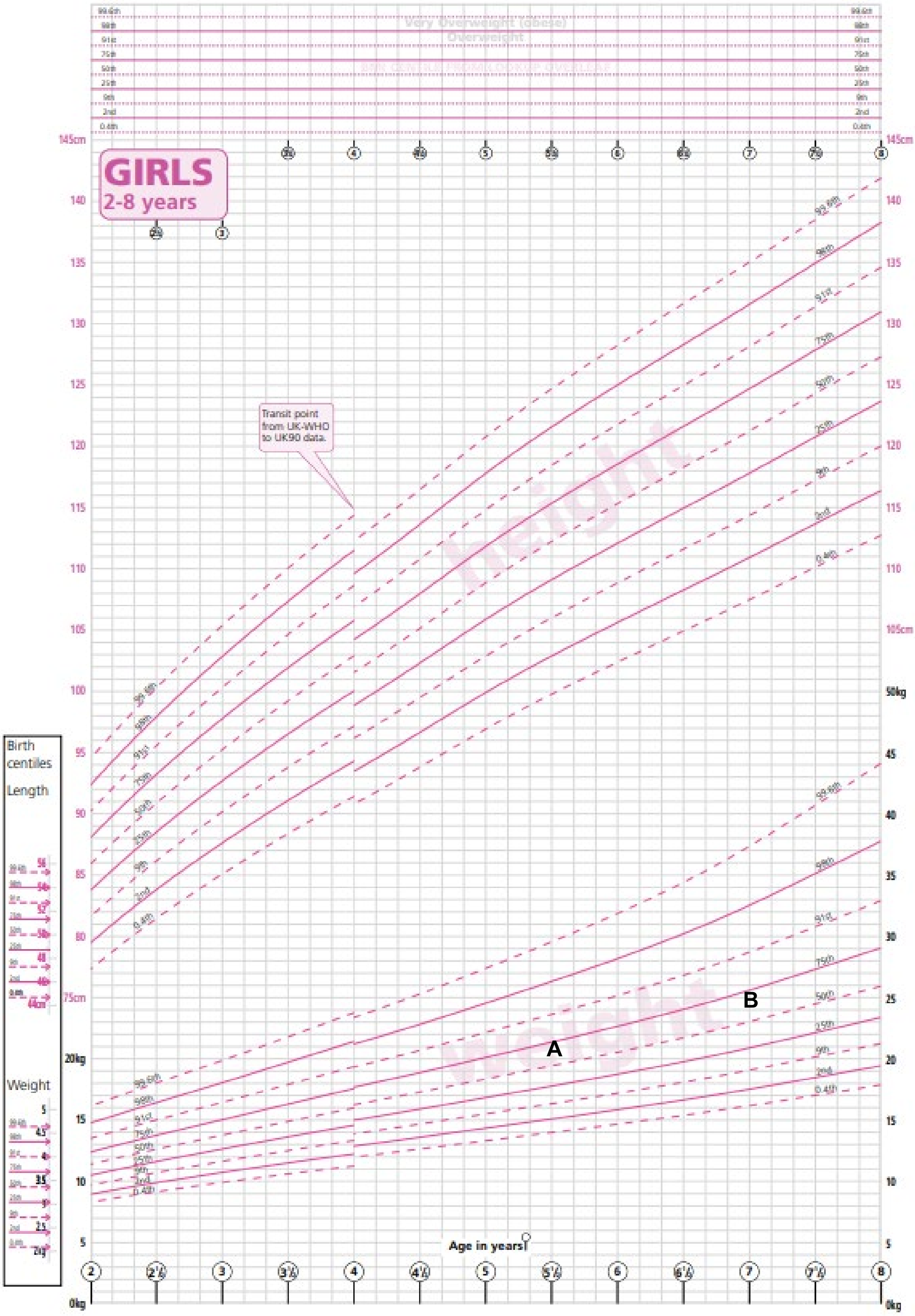
3. Which age range has the highest prevalence of self-reported stress, depression, or anxiety for females?

4. How does this compare with the highest prevalence of self-reported stress, depression, or anxiety for males?

5. How might this graph be useful when treating a patient who is suffering with work related stress?

Percentile charts

You may want to look at percentile charts – for example, to make comparisons with what is deemed to be a normal rate of growth for children. Consider the percentile chart below:



Reference: The royal college of paediatrics and child health https://www.rcpch.ac.uk/sites/default/files/Girls_2-18_years_growth_chart.pdf

This graph is referred to as a percentile chart for height (top) and weight (bottom) for girls between the ages of 2 and 8 years.

As individuals are all different, there are range of weights for each category. Therefore, we consider a girl's growth in relation to their percentile - as shown by the different centiles (the lines on the graph).

As an example, a girl weighs 21 kg at the age of 5 ½ years. We can plot this on the graph above, shown as point A on the above graph. From this single measurement, we can determine that their weight is in the 75th percentile for all girls.

Whilst this graph is useful for comparing a single point, it has extra use when looking at a several timepoints for a single individual – we can look at the growth curve for an individual and see if they are growing at the expected rate. The expected growth rate has the same shape as the percentile lines.

If this same girl is assessed at the age of 7 and found to be 25 kg - as shown as point B on the graph, we can say that they are growing at a consistent rate. If you were to draw a curve between these two points, it would be parallel with the percentiles.

Statistics

Sometimes, data may not be in a graph or table, but is simply a statistic or set of statistics; as shown below, taken from the Health and Safety Executive website https://www.hse.gov.uk/statistics/:

Key figures for Great Britain (2020/21)

- **1.7 million** working people suffering from a work-related illness, of which
  - **822,000** workers suffering work-related stress, depression or anxiety
  - **470,000** workers suffering from a work-related musculoskeletal disorder
  - **93,000** workers suffering from COVID-19 which they believe may have been from exposure to coronavirus at work
- **2,544** mesothelioma deaths due to past asbestos exposures (2020)
- **123** workers killed at work (2021/22)
- **441,000** working people sustained an injury at work according to the Labour Force Survey
- **51,211** injuries to employees reported under RIDDOR

To interpret this data and relate it to a patient's care plan, you may need to seek out additional data - such as the working population of the UK in that time.

This could be used to calculate the percentage of workers out of the total working population who have experienced any of the work-related illnesses or injuries.

Converting data for comparisons

Often, if you choose data to back up your decisions from a reliable source, you may only use one data source. However, there may be times when you wish to use data from several sources and make comparisons. If the data from these different sources is in the same format and has the same units, this is straightforward, however, there may be times when you wish to use data that needs a conversion before being able to make a direct comparison. In the ESP, it is not a requirement to be able to convert data from different sources, but may lead to higher marks by showing your ability to use maths - if you are able to make a conversion.

Data being in different forms is particularly common in population data (for example, when reporting how common an illness is in a population). You could find data presented as a percentage of the population, but if what if you find another statistic given as numbers per 100,000? How could you compare these?

Example

Consider the statistics below on the prevalence of different diseases in the UK:

Statistic	Organisation	Link
A. 7.6 million people in the UK are living with cardiovascular disease (out of 66.8 million population)	British Heart Foundation	https://www.bhf.org.uk/what-we-do/our-research/heart-statistics
B. In 2019, 0.059% of the UK population were diagnosed with diabetes	Diabetes UK	https://www.diabetes.org.uk/professionals/position-statements-reports/statistics/diabetes-prevalence-2019
C. Around 1 in 6200 people in the UK have cystic fibrosis.	Cystic Fibrosis Trust	https://www.cysticfibrosis.org.uk/what-is-cystic-fibrosis/faqs

Which of the three diseases (cardiovascular disease, diabetes, or cystic fibrosis) is more common?

This comparison isn't possible immediately, as the data is in different forms. To compare these, we need to convert them all to the same form.

Converting into a percentage

A. To calculate 7.6million out of 66.8 million as a percentage we divide first and then convert the decimal answer into a percentage
   7.6 ÷ 66.8 = 0.1138
   0.1138 x 100 = **11.38%**
B. **0.059%** of the population were diagnosed with diabetes
C. 1 in 6200 people have cystic fibrosis. To turn this into a percentage we need to first calculate how many people have cystic fibrosis, and then follow the same steps as 'A'
   66,800,000 ÷ 6200 = 10,774.19
   10,774.19 ÷ 66,800,000 = 0.000161
   0.000161 x 100 = **0.0161%**

Therefore, we can say that cardiovascular disease is more common and cystic fibrosis is the least common.

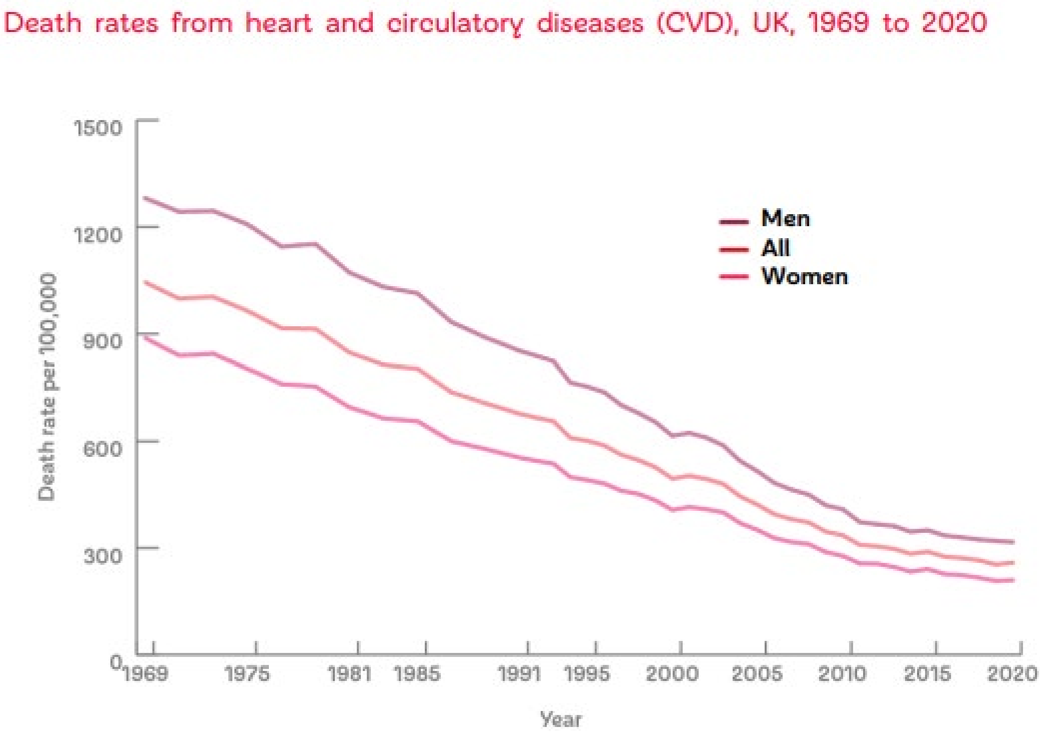
Converting into numbers

A. **7.6 million** people are living with cardiovascular disease.
B. To calculate 0.059% of the population of 66.8 million, we can divide by 100 as percent means out of 100 and then multiply by the percentage we want to find.
   66,800,000 ÷ 100 = 668,000
   668,000 x 0.059 = **39,412**
C. 1 in 6200 people have cystic fibrosis, to convert this into an actual number of people, we must divide the total population by 6200 as in the first step of the conversion to a percentage:
   66,800,000 ÷ 6200 = **10,774.19**

As before, the numbers show that cardiovascular disease is the most common disease.

It wouldn't be necessary to do both types of conversion, however an example of how to calculate both is given, to show you the methods.

These conversions aren't just useful for stand-alone statistics, we can use them on a graph axis if we wish to view the data in a different form. For example, consider the graph below on death rates from cardiovascular disease in the UK:



https://www.bhf.org.uk/-/media/files/research/heart-statistics/bhf-cvd-statistics---uk-factsheet.pdf

We may have a circumstance where we wish to change the units from death per 100,000 to a percentage of the population.

Converting rate per multiple of 100 into a percentage

Percent simply means, out of 100 if we are given a rate that is out of a multiple of 100, we can convert this into a percentage very easily:

Example

Rate per 100,000

100,000 is a multiple of 100.

100,000 = 100 x 1000

So, to convert a rate per 100,000 into a percentage all we need to do is divide by 1000

For example, in 1969 there were 900 deaths out of 100,000 for women. To convert this into a percentage we can divide 900 by 1000:

900 ÷ 1000 = 0.9%

Top tips for understanding and using data

When interpreting reliable data, that you have decided is relevant to your topic, there are some general rules that apply no matter what format the data is in.

- Title – There should be a title that tells you exactly what the chart, table or graph is presenting. **Remember to use the title in what you write or say about the data.**
- Columns in tables and axes on graphs should always have labels that convey what they are and the units. **Remember to include the units when communicating about the data.**
- Reading charts, graphs and statistics accurately can help support your decisions about a patient's care. **Remember to use actual values from the data you use and state how they support or lead you to conclusions.**
- Consider the trends shown by the data. Are rates decreasing as with the teenage pregnancy example, or increasing as with the severe obesity example? **How does this guide your decisions?**

Using data in your ESP

How to use data in your task 1

As an example of how to use data task 1, we shall use the case studies of Jo and Terry from the sample ESP materials. hlth-0001-03-tq-health-esp-core-skills-project-brief-insert.pdf (qualhub.co.uk).

Jo

Jo takes medication for high blood pressure and uses a hearing aid; his wife Sheila is concerned about his mobility and memory loss. Sheila is worried about leaving Jo in the house on his own as he previously left a gas ring on and has forgotten to take medication at the right time or altogether.

Jo appears to be having cognitive difficulties specifically around memory loss. Research has shown hypertension can be linked to diagnosis of 'mild cognitive impairment or dementia' (Vest, 2021); therefore, a review of his medication may be needed to ensure that this is not having an impact on his memory loss. Additionally, this memory loss could be onset of age-related dementia.

In task 1 and to prepare for your healthcare plan, it could be useful to collect data related to the prevalence of dementia and the impact of early detection on the effectiveness of treatment.

Example sentence starters:

Data from ***source*** shows ***title.*** Jo is a male aged 73, the ***number/percentage*** of men with dementia at the age of 73 is **x.** This compares with ***x*** at ***different age*** and/or ***x*** of ***different gender***

This shows…

Data from ***source*** shows ***title.*** The trend shows that earlier detection of dementia improves chances of successful treatment by ***x.***

This evidence supports my decision to…

Terry

Another example from the sample materials is Terry's case study.

Terry has recently taken an overdose. He appears to suffer with work related stress, depression and anxiety and has had the added stresses of his daughter's pregnancy and concern for his parents.

To support your healthcare plan for Terry, you could research the incidence of work-related stress as well as the efficacy of treatment using medication, therapy or a combination of medication and therapy.

Example sentence starters:

Data from ***source*** shows ***title***. Terry is in a senior management role. The incidence of work-related stress in his occupation/at his management level is ***x.*** This shows…

Data from ***source*** shows ***title.*** The efficacy of treatment for stress and depression with medication only/therapy only/combination is ***x.***

This evidence supports my decision to…

How to use data in your supportive patient discussions

As an example of how to use data in your supportive patient discussion we shall use the same case studies as the previous section.

Jo

Jo is a proud and independent man and may be resistant to the course of action you recommend. Letting him know that you have carefully researched his symptoms and the data for men of his age could help him to understand why the concerns need to be investigated further.

Providing hope for any treatment that may be necessary using data could also help with encouraging him to support and follow the healthcare plan.

Terry

It could help Terry to know that he is not alone feeling the impact of the strain he is under by referring to data that relates to men in a similar position.

Referring to the data you have used to support your decisions relating to his care could give him reassurance about the effectiveness of treatment and encourage him to engage fully with his healthcare plan.

Answers

Table practice

Consider the table below taken from https://ash.org.uk/resources/view/smoking-statistics:

Table 2: Prevalence of cigarette smoking by sex (GLS/OPN/APS), 1974 to 2019, Great Britain & UK [2,3,4]

%	1974	1978	1982	1986	1990	1994	1998	2002	2006	2010	2014	2015	2016	2017	2018	2019
Men	51	45	38	35	31	28	28	27	23	21	20	19.3	17.7	17.0	16.5	15.19
Women	41	37	33	31	29	26	26	25	25	20	17	15.3	14.1	13.3	13.0	12.5
All	45	40	35	33	30	27	27	26	26	20	18.1	17.2	15.8	15.1	14.7	14.1

NB: Since 2000 data have been weighted. 1974-2010 figures are from the GLS/OPN surveys and are for Great Britain. Data from 2014 onwards is from the Annual Population Survey and is for the UK. [2,3,4]

1. What does this chart show?

The chart shows the prevalence of cigarette smoking by sex as a percentage from 1974 to 2019 in Great Britain and UK

2. What percentage of women smoked in 2019?

In 2019, 12.5% of women smoked

3. How does this compare with the percentage of women who smoked in 1974?

In 1974 the percentage of women who smoked was 41%. The percentage of women smoking in 2019 is under a third of that in 1974.

(You could calculate the exact percentage of the decrease as below)

41 – 12.5 = 28.5

28.5 ÷ 41 = 0.695

0.695 x 100 = 69.5%

The percentage of women smoking in 2019 was 69.5% less than in 1974

4. What percentage of men smoked in 1990?

In 1990, 31% of men smoked

5. Which year was the percentage of women smoking higher for women than for men?

2006 is the only year shown where the percentage of women smoking was greater than the percentage of men who smoked.

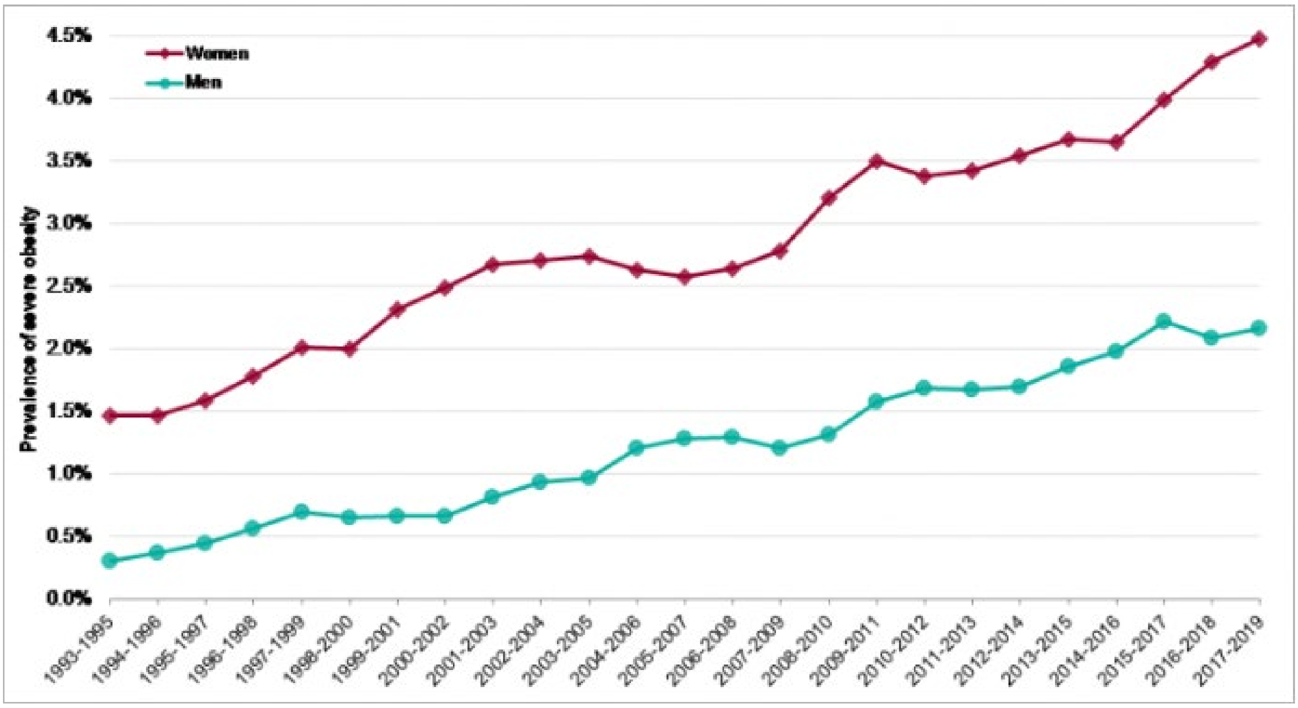
6. Can you say how many men smoked in 2019? Why/why not?

15.19% of men smoked in 2019. To find out the number of men that smoked in 2019 I would need to find out the male population in the UK, so from this data alone I could not say how *many* men smoked. It would be possible to calculate the number by multiplying the male population by 0.1519

Line graph practice

Consider the graph below taken from [Patterns and trends in excess weight among adults in England - UK Health Security Agency (blog.gov.uk)]

Trend in the prevalence of severe obesity among adults (aged 16 and over) in England 1993-2019



Source: Health Survey for England 1993 to 2019 (three-year averages), NHS Digital

1. What does the graph show?

The graph shows the trend in the prevalence of severe obesity among adults aged 16 and over in England between 1993 and 2019.

(You could also say the conclusion:)

The trend shows that the prevalence of obesity is increasing over time.

2. Why are there two different coloured lines?

The different coloured lines show the trends for men and women separated out. The different coloured lines show the trends for men and women separately. The key shows that men are represented by the green line, while the red line represents the trend for women. The key shows that men are represented by the green line, while the red line represents the data for women.

3. In 1993-1995 what percentage of males were severely obese?

In 1993-95 0.3% of men were severely obese.

4. How does this compare with the percentage of males who were severely obese in 2017-2019?

In 2017-19 2.1% of men were severely obese. This shows that the percentage of men who were severely obese increased by seven times. (You could work out the exact increase in percentage as below) 2.1 ÷ 0.3 = 7 7 x 100 = 700% The percentage of severely obese men increased by 700% between 1993-95 and 2017-19. Note: Using the data we have, we can say how the **percentage** of men who are severely obese has changed, but we cannot say the **number** of men who are severely obese has changed. This is because **if** the population also declined, then the percentage as a number of men could actually be less.

5. What can you say about the trends in the data?

Overall, since 1993, women have experienced a greater proportion of severe obesity than men. The prevalence for male obesity has been steadily rising since 1993. The trend in the women's prevalence for severe obesity is also showing a steady increase over time with this increase steeper than that for men.

6. What might this graph be useful for in healthcare?

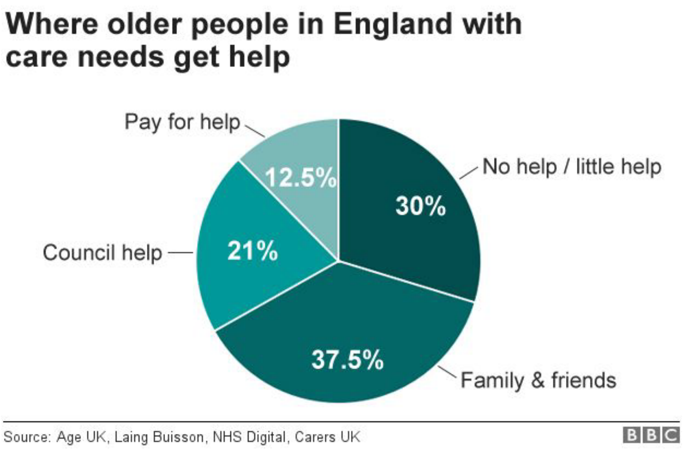
By showing the increasing risk for obesity, this data could be used to support an intervention for public awareness about obesity – such as an information campaign or initiatives to reduce obesity. The data also suggests that specific campaigns targeted at women may be beneficial.

7. Would this graph be useful in making a healthcare plan for a patient who is severely obese? Explain why/why not.

Although this line graph is important for us to use and understand as practitioners, so we are aware of what is impacting national and patient health, this does not give the reasons behind why obesity is rising. Therefore, in creating a healthcare plan this graph or data would not be useful to suggest how obesity is impacting the health of your patient or what interventions may be needed to improve the patient wellbeing.

Pie chart answers

Have a go at interpreting pie chart data yourself using the example below from BBC (using data from other sources listed below the chart)



1. What does the chart show?

Where older people in England with care needs get help.

2. Which is the most prevalent category?

Family & friends – with 37.5%

3. What percentage of older people with care needs in England get their help from the council?

21%

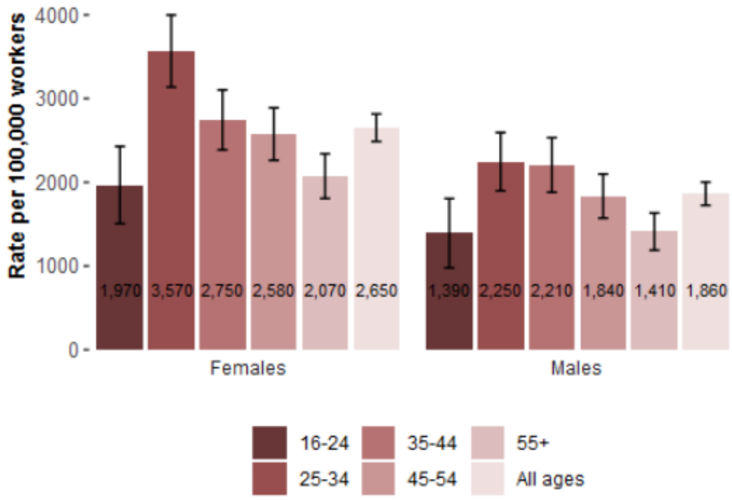
4. What is the order of where these people get their help from most prevalent to least?

Pay for help, council help, no help/little help, and family & friends

Bar chart practice

Consider the bar chart below taken from the same source https://www.hse.gov.uk/statistics/causdis/stress.pdf

Figure 4: Prevalence rate of self-reported work-related stress, depression or anxiety in Great Britain, by age and gender per 100,000 workers averaged over the period 2018/19-2020/21



Source: LFS estimated annual average 2018/19-2020/21
95% confidence intervals are shown on the chart

1. What does this bar chart show?

The bar chart shows the prevalence rate of self-reported work-related stress, depression, or anxiety in Great Britain by age and gender per 100,000 workers averaged over the period 2018/19 to 2020/21.

2. What is the significance of the different coloured bars?

The different coloured bars show how the data is split into different age groups. The key is given and shows that the darkest colour represents the 16-24 age range, and the lightest colour represents the data for all ages.

The bar chart is split into the data for females on the left and data for males on the right.

3. Which age range has the highest prevalence of self-reported stress, depression, or anxiety for females?

The age range with the highest prevalence of self-reported stress, depression, or anxiety for females is the 25 – 34 age range. The rate is 3,570 per 100,000 workers.

(The question doesn't ask for this, but you could turn that number into a percentage by dividing by 1000 as percent means out of 100 and we are given the rate out of 100,000)

3570 ÷ 1000 = 3.57%

4. How does this compare with the highest prevalence of self-reported stress, depression, or anxiety for males?

The age range for males with the highest prevalence of self-reported stress, depression, or anxiety is also the 25-34 age range. The rate for this age range is 2250 per 100,000 workers or 2.25%.

This is significantly lower than the highest prevalence in females.

(You could calculate this difference exactly, an example of one method to do this is below)

3.57 ÷ 2.25 = 1.5867

The highest rate of prevalence of self-reported stress, depression, or anxiety is 58.67% higher in the female working population than in the male working population.

5. How might this graph be useful when treating a patient who is suffering with work related stress?

Sharing the data with the patient that is related to their age range may help to reassure the patient that they are not alone in how their work is impacting upon them.

Referring to the data may also help you to determine if the symptoms that the patient is experiencing could be related to their work given the likelihood for their age range and gender.