Non-communicable diseases

learning outcomes

- Define health and describe factors that can affect improve it
- Define a non-communicable disease (NCD) and give examples
- Describe the effect of named NCDs
- Describe risk factors of NCDs
- Discuss the human & financial costs of NCDs

Non-communicable diseases

LI: ***How does our lifestyle affect our health?***

Some
- Be able to use data to explain correlation and cause

Most
- Be able to describe risk factors for NCDs and use data to link them to specific NCDs

All
- Be able to give a definition for a NCD, give examples and describe their effects

12/04/2018

Keywords

Risk factor, lifestyle, correlation, cause/causal mechanism

VIDEOS

- **Non-communicable Diseases and their Risk Factors**
  https://youtu.be/fK1_SH3X2ek
- WHO highlights need for countries to scale up action on non-communicable diseases
  https://youtu.be/uGZbbC0Smi4

Which kills the most people?

Which one is the biggest killer? Put them in order of the most deaths per year

Respiratory infections

Coronary heart disease

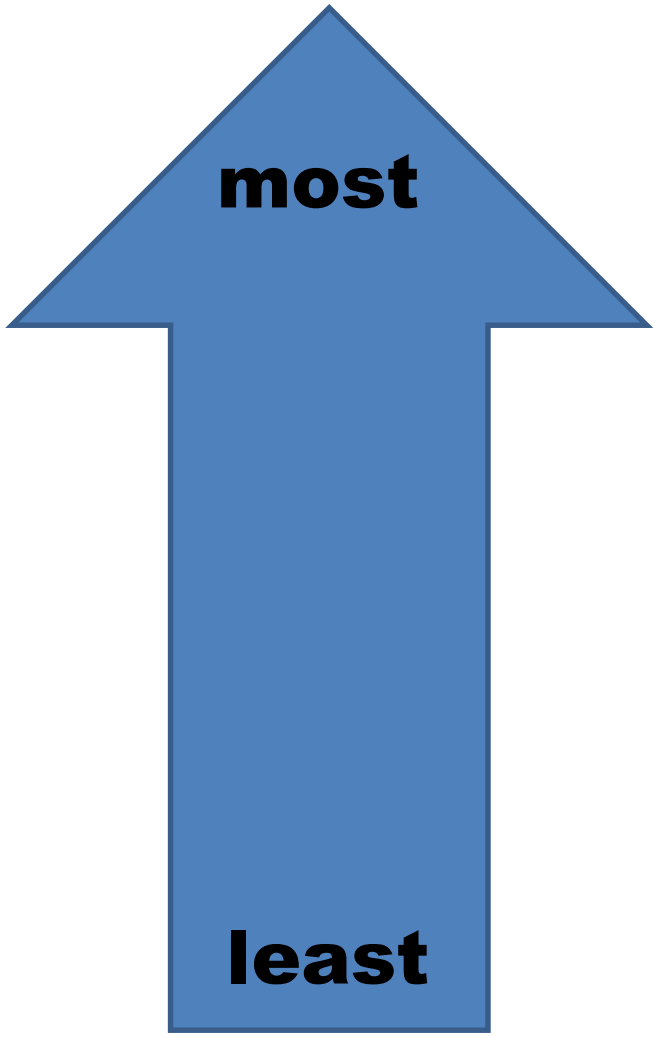
Lung cancer

Diabetes

Stroke

HIV/AIDS

Were you right?



Coronary heart disease

Stroke

Respiratory infections

Lung cancer

HIV/AIDS

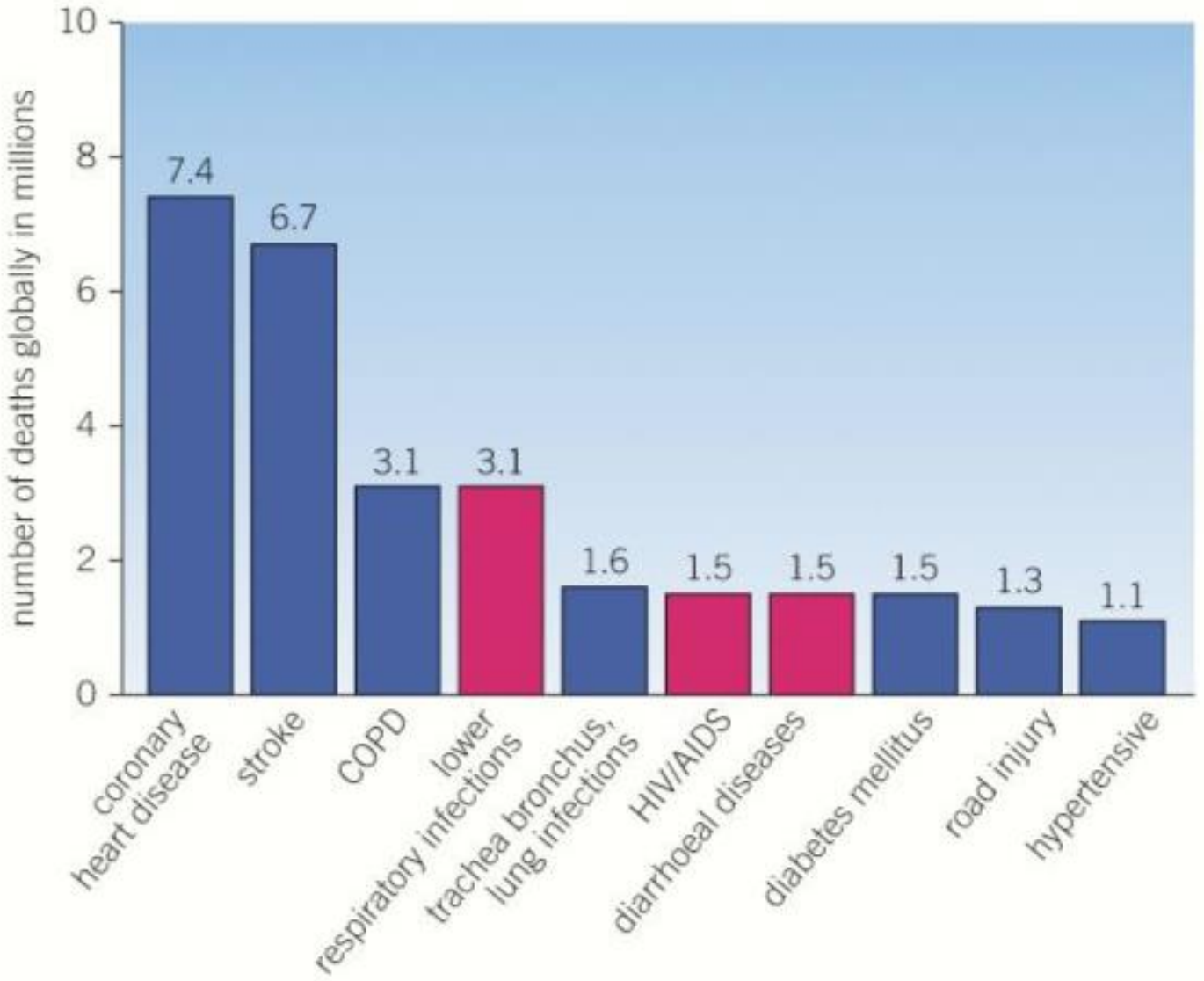
Diabetes

Which are non-communicable diseases?

- ✓ **Coronary heart disease**
- ✓ **Stroke**
- ✗ **Respiratory infections**
- ✓ **Lung cancer**
- ✗ **HIV/AIDS**
- ✓ **Diabetes**

2012
Blue – non infectious
Pink – infectious

The biggest killers

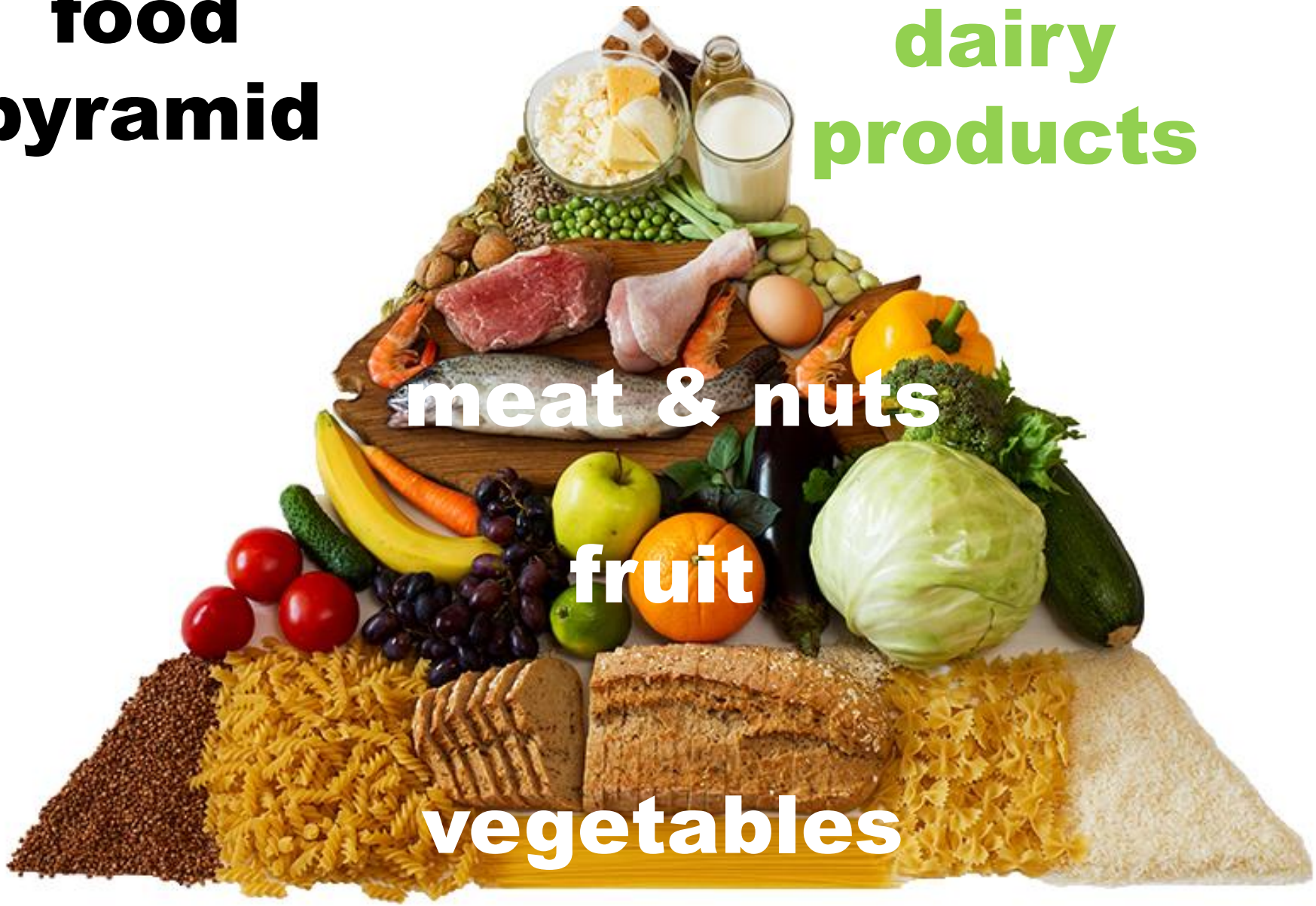


Non-communicable diseases

- cannot be passed from one person to another

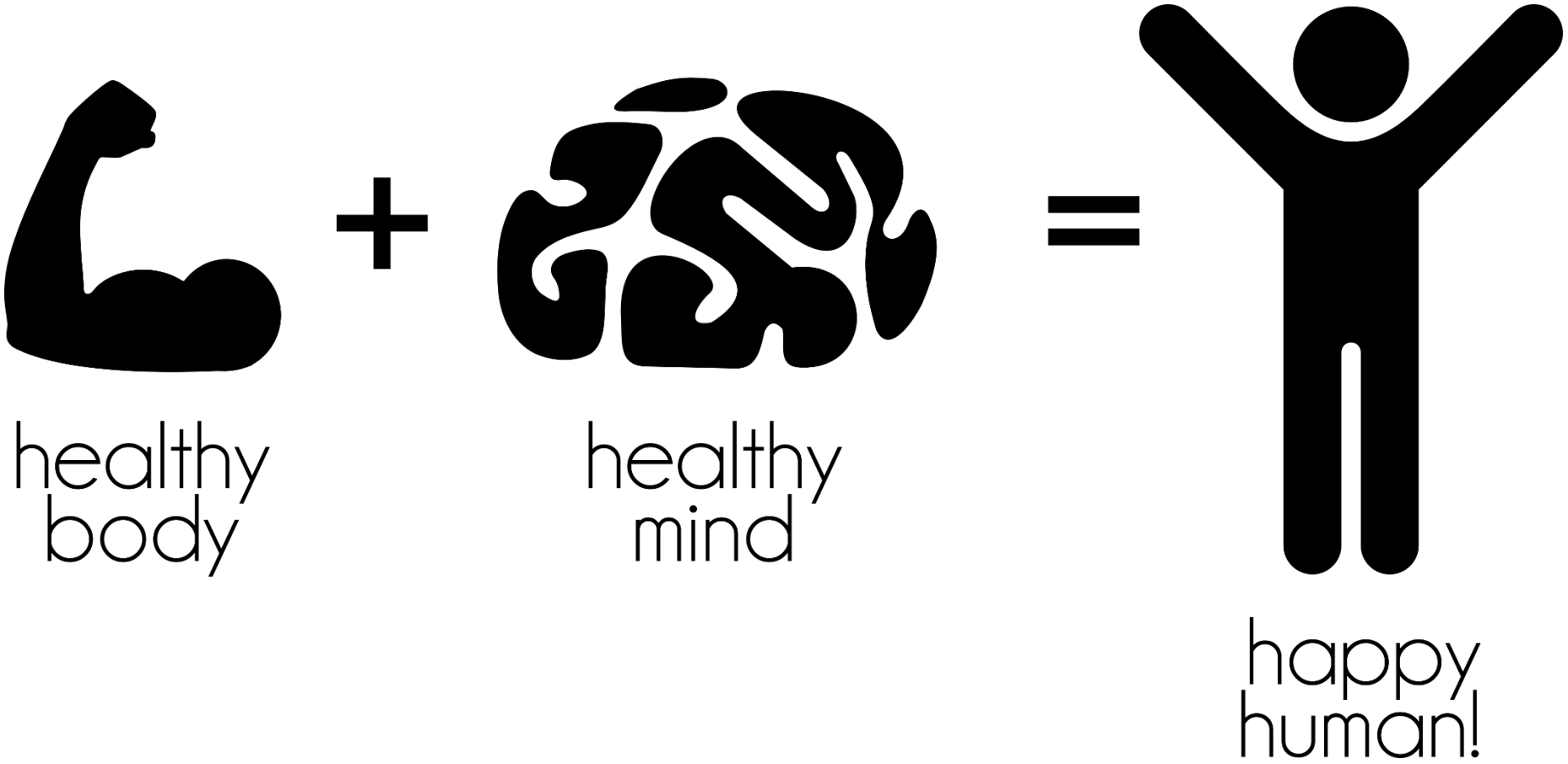
- Well balanced diet
- Regular exercise
- Reducing stress
- Seeking medical help for mental and physical difficulties

the food pyramid

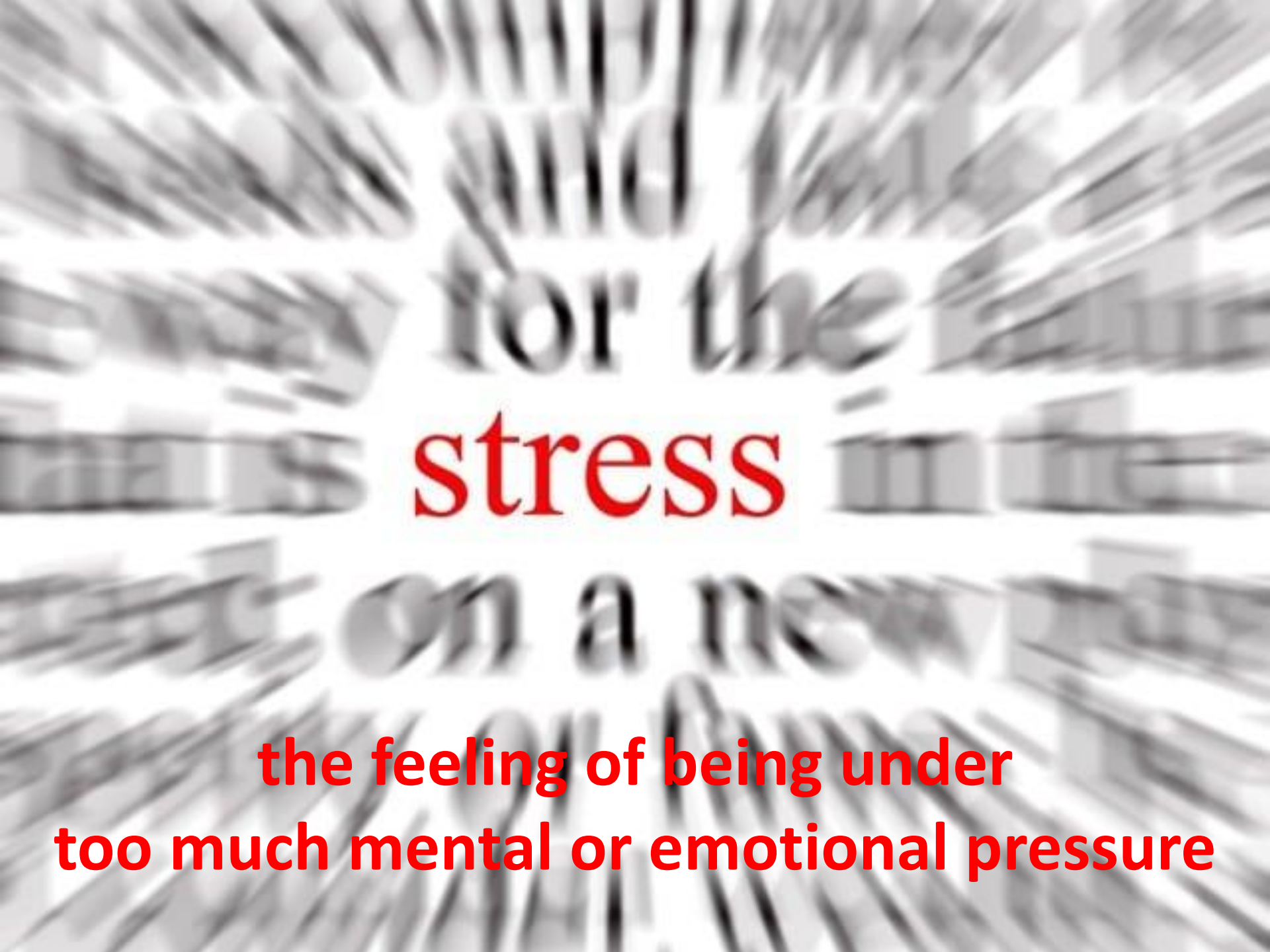


EXERCISE

- video
- 15-18 yo: 1 hour physical activity each day
- Mix it up:
  aerobic, muscle strengthening, bone strengthening



Physical & mental health video

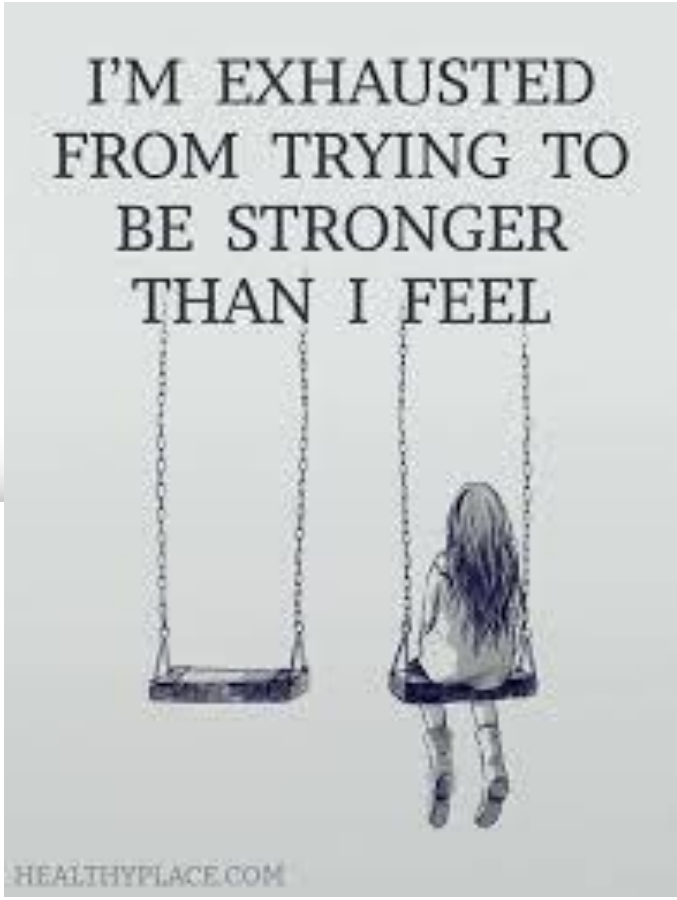


the feeling of being under too much mental or emotional pressure

a feeling of unease such as worry or fear

affects different people in many different ways


DEPRESSION


I'M EXHAUSTED FROM TRYING TO BE STRONGER THAN I FEEL
HEALTHYPLACE.COM


"I'm fine."
Feeling
I'm
Nothing
to Everyone

Long term Effects

Body cells do not respond to the hormone insulin, which helps control the glucose level in the blood. → LEADS TO NERVE DAMAGE + COMA IF UNTREATED.

Long-term alcohol use causes liver cirrhosis. The cells in the liver stop working and are replaced by scar tissue. This stops the liver from removing toxins, storing glucose as glycogen and making bile.

Excessive use of alcohol can alter the chemicals in the brain (neurotransmitters), which pass impulses between nerve cells. This can cause anxiety and depression and reduced brain function.

Smoking can cause cancer in many parts of the body, including the lung, mouth, nose, throat, liver and blood. It also increases the chances of having asthma, bronchitis and emphysema.

Alcohol and chemicals from cigarettes in the mother's blood pass through the placenta to her baby. Without a fully developed liver the baby cannot detoxify these as well as the mother can. This can lead to miscarriage, premature birth, low birth weight and reduced brain function.

chemicals & radiation that can cause cancer are called carcinogens e.g. tar in cigarettes, asbestos, ultraviolet energy from sunlight and X-rays.

learning outcomes

- Define the terms cancer and tumour
- Explain the difference between a benign and malignant tumour
- Describe some risk factors of cancer
- Describe and expalin the role of screening in detecting cancer
- Describe and explain the treatments for cancer

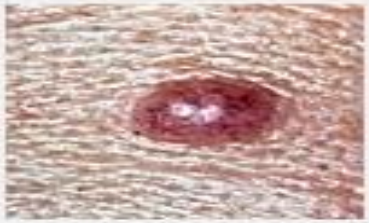
Cancer

Cancer is produced by **uncontrolled cell division.**

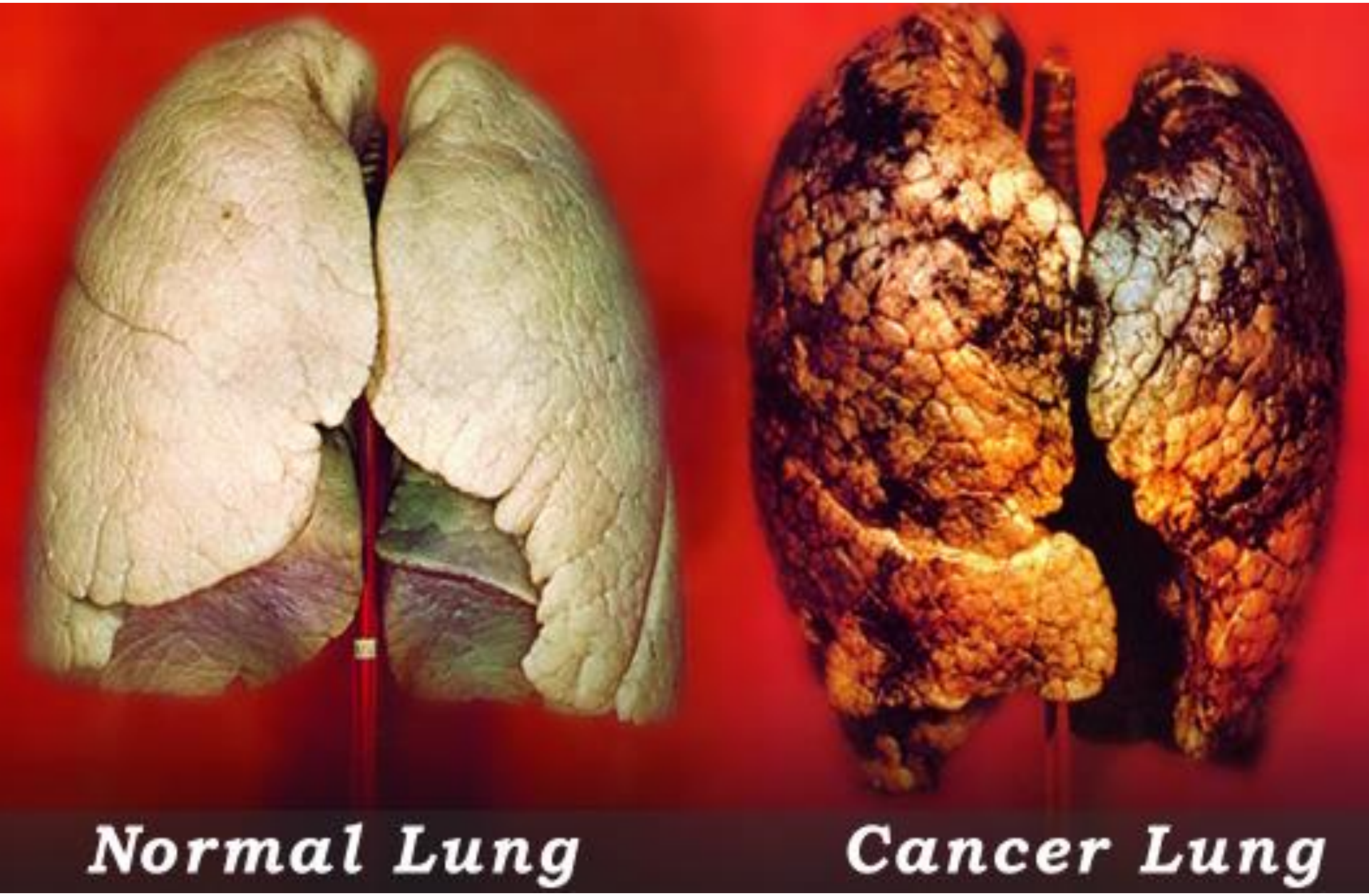
Some causes of cancer

- **UV radiation-** this is produced from the Sun or sunbeds and causes **skin cancer**.
- Chemicals in cigarette smoke namely **TAR** can cause **lung cancer**.
- **Viruses** eg human papilloma virus (**HPV**) which can cause **cervical cancer**.

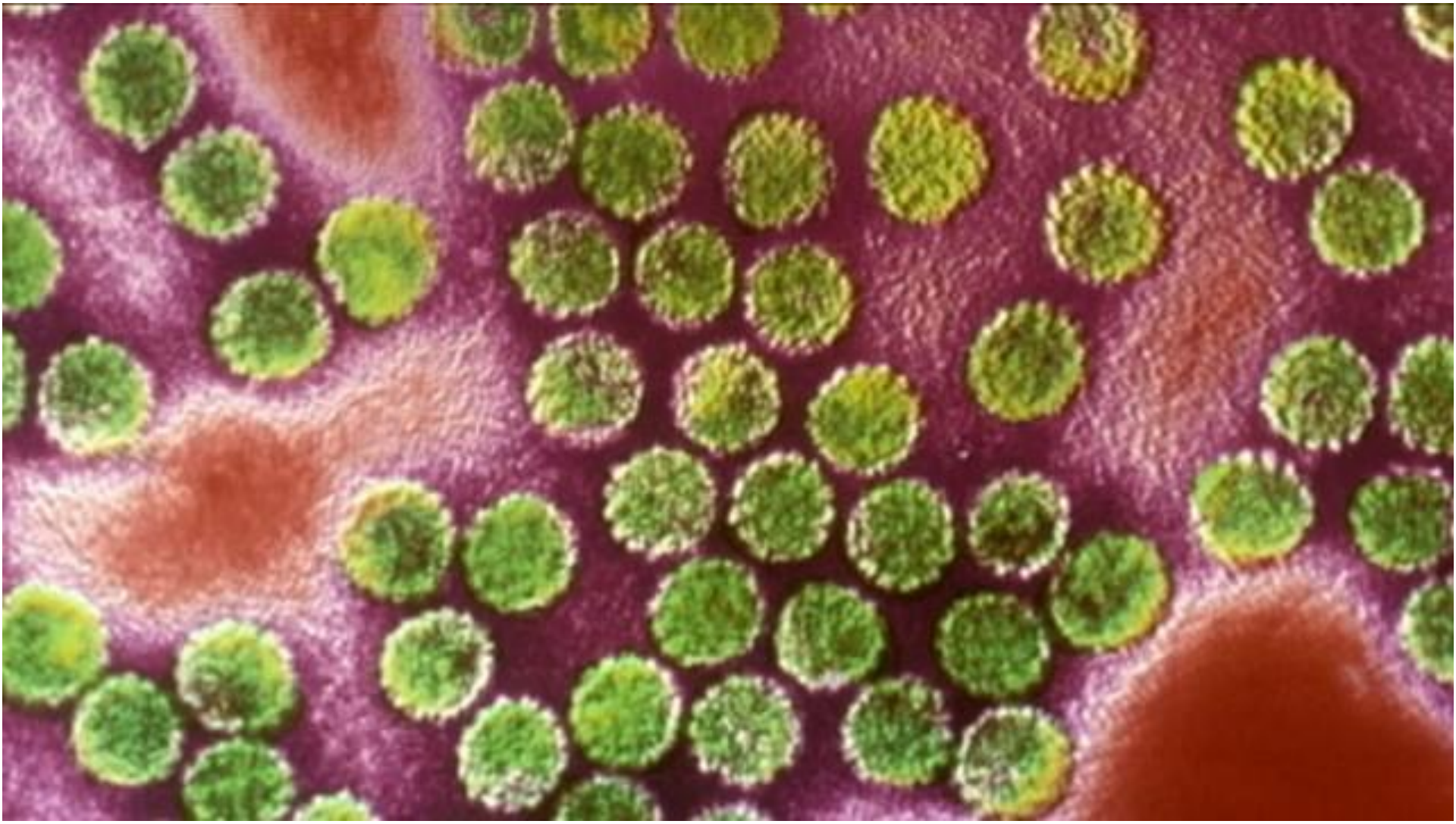
Skin Cancer

Normal Mole	Melanoma	Sign	Characteristic
		Asymmetry	when half of the mole does not match the other half
		Border	when the border (edges) of the mole are ragged or irregular
		Color	when the color of the mole varies throughout
		Diameter	if the mole's diameter is larger than a pencil's eraser

Photographs Used By Permission: National Cancer Institute


Normal Lung
Cancer Lung

HPV



Cancer cells

grow in clumps called

TUMOURS

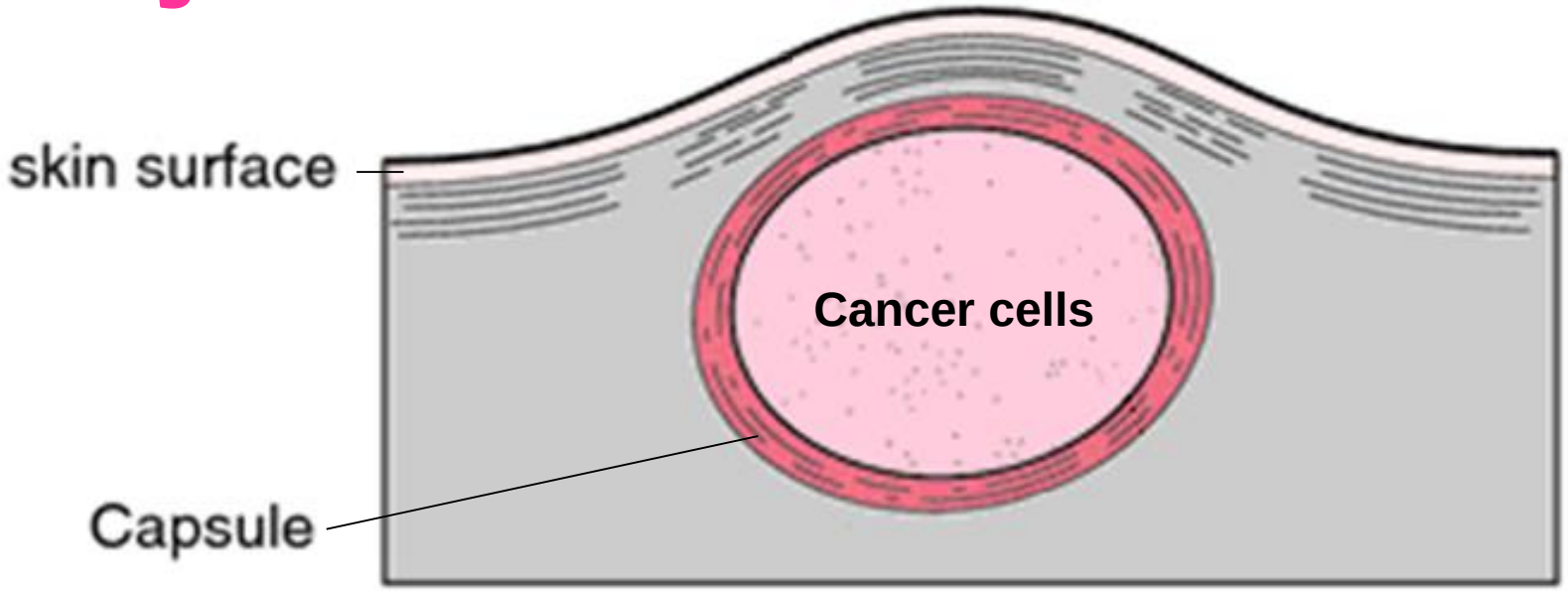
There are two types of tumour:

Benign tumours

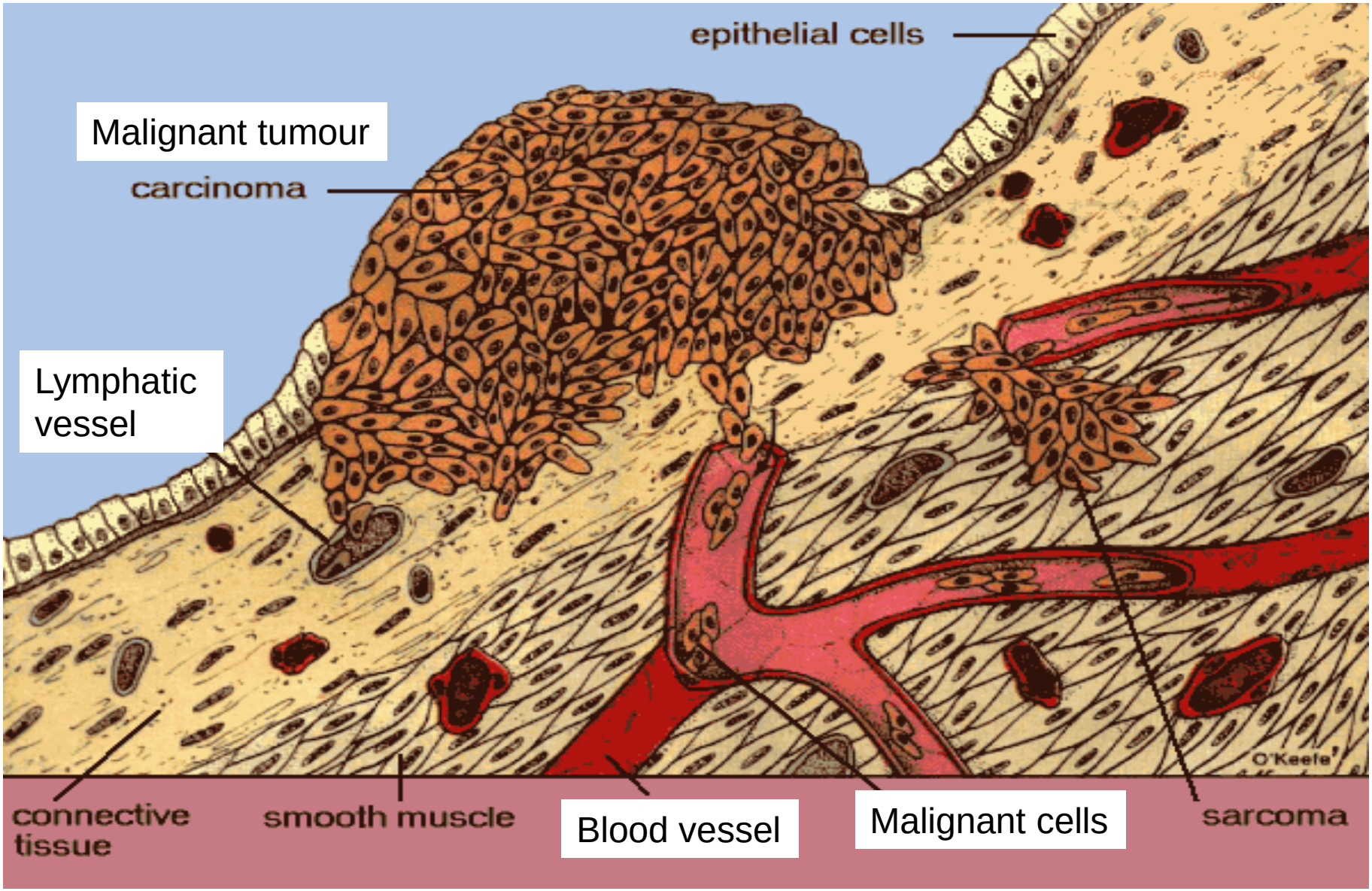
The cancer cells are **enclosed in a capsule**.

This means they **remain in one place**

and they **do not spread throughout the body**



Malignant Cancer



Malignant tumours

Usually **do not have a capsule**.

Groups of cancer cells may **break off the main tumour** and **spread** around the body in the blood or lymph, forming **secondary tumours**.

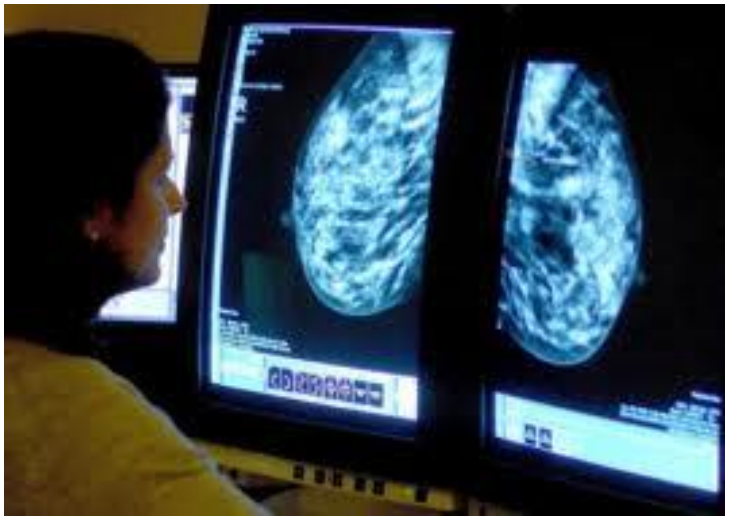
Malignant tumours are normally more dangerous.

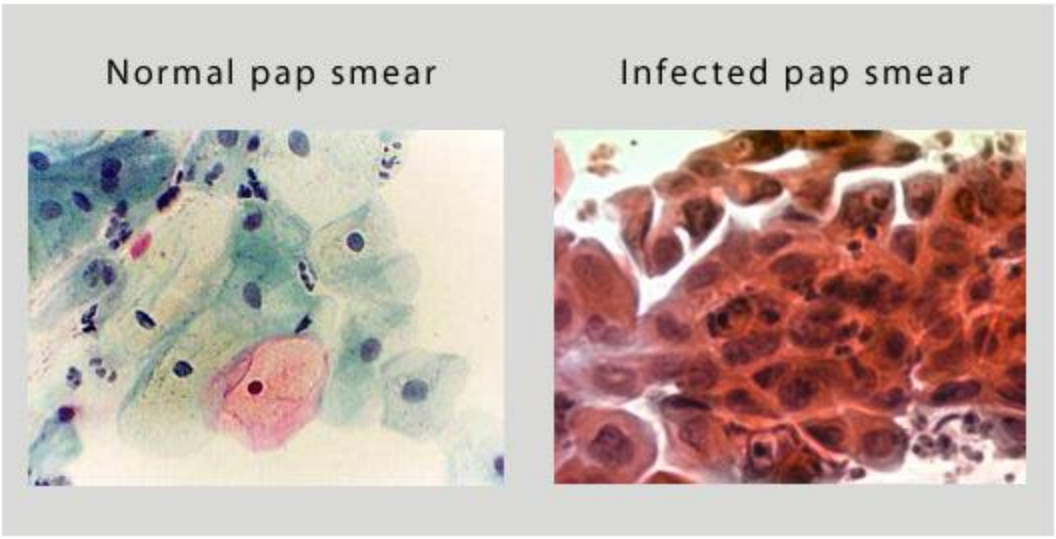
The importance of detecting cancer early

- If a cancer is detected early the tumour **will be smaller and will have caused less damage to the body.**
- It is also important to detect a malignant tumour **before it spreads to other parts of the body.**
- Therefore early detection **improves survival rates.**

Screening programmes

- These programmes aim to identify the cancer **before it spreads too far**.
- These are available to detect **breast and cervical cancer in women.**
- **Men are advised to check regularly** for signs of **testicular cancer.**





Screening for skin cancer helps to detect its presence before it spreads too far.

Treating Cancer

Once cancer has been identified there are a number of treatment options:

TREATMENT	INVOLVES	PROBLEMS
SURGERY	Cancer cells removed from the body.	Less effective if cancer has spread. Tumour may be inaccessible.
RADIOTHERAPY	X-rays kill the cancer cells.	Other normal cells may be affected
CHEMOTHERAPY	Drug/s kill the cancer cells by preventing cell division.	Side-effects include hair loss and other normal cells being affected.

1. Describe the main differences between a communicable disease and a non-communicable disease. [2 marks]

Answer.
Communicable disease can pass from one individual to other by contact ✓ or other means while non-communicable disease can spread Communicable disease have some factors and agents of spreading.

Non-communicable diseases cannot be passed from person to person.

2. Explain the difference between risk factors, correlations, and causal mechanisms. [6 marks]

Answer.

Correlation -Similarity between lifestyle factors and non-communicable disease is called correlation. For example ~~Cancer with~~ lifestyle factors such as lack of exercise or smoking can be linked to Coronary heart disease. These similarities may suggest a link or relationship between the two, known as a **correlation.**

Risk factors -Most non-communicable diseases are the result of four particular behaviours (tobacco use, physical inactivity, unhealthy diet, and the harmful use of alcohol) that lead to four key metabolic/physiological changes (raised blood pressure, overweight/obesity, raised blood glucose and raised cholesterol).

Casual mechanism- It is the mechanism by which the disease is caused. First we have to find the correlation between the disease and the risk factors and then find the actual or particular biological cause of the disease.

3. Describe the differences between the two types of cancer. [4 marks]

Answer.

Cancer can interrupt the functioning ✓½ of various body parts and cause them to dysfunction. A benign tumour can be life threatening and occurs in the brain ✗. A malignant tumour has several other implications such as fatigue in body. Pain in the body is caused by the tumours. Appetite patterns also get changed.

lot elaborate

Any 4

- tumour ⇒ group of cells formed by uncontrolled cell divisi
- benign tumours are surrounded by a capsule & don't spread
- malignant tumours are not surrounded by a capsule
- & spread to other parts of the body

4. One of the most common methods of treating cancers is chemotherapy. Chemotherapy drugs often affect other parts of the body, particularly hair follicles, skin cells, cells lining the stomach, and blood cells as well as the cancer cells.

a. Explain how the drugs used in chemotherapy might work. [2 marks]

Any 2

Answer.

Cancer cells tend to form new cells by mitosis / divide more quickly than normal cells and this makes them a better target for chemotherapy drugs. However, chemotherapy drugs can't tell the difference between healthy cells and cancer cells. This means normal cells are damaged along with the cancer cells, and this causes side effects. Each time chemotherapy is given, it means trying to find a balance between killing the cancer cells (in order to cure or control the disease) and sparing the normal cells.

Chemotherapy drugs target cells that divide rapidly by mitosis

b. Suggest reasons why healthy hair, skin, blood, and stomach lining cells are particularly badly affected by the drugs used to treat cancer. [4 marks]

Answer.

Drugs are used in chemotherapy. Hair loss occurs because chemotherapy targets all rapidly dividing cells; healthy cells as well as cancer cells. Hair follicles, the structures in the skin filled with tiny blood vessels that make hair, are some of the fastest-growing cells in the body. If you're not in cancer treatment, your hair follicles divide every 23 to 72 hours. But as the chemotherapy does its work against cancer cells, it also destroys hair cells. Within a few weeks of starting chemo therapy, you may lose some or all of your hair. They have the same affect in the same way to skin and follicles ~~also~~.

3. Describe and explain the different treatments that are used to treat cancer. [4 marks]

Answer.

Cancer cells are destroyed

1. **Radiotherapy**- (Destruction of cancer cells) by targeted doses of radiation. It stops mitosis in the cancer cells .It can also damage healthy cells. Very targeted ways for ionizing radiations are improving cure rates.

Chemicals are used

2. **Chemotherapy**- (Use of chemicals) to ~~either~~ stop the cancer cells dividing . There are many different types of chemotherapy and scientists are working to make them as specific pacific to cancer cells as possible, to avoid damaging healthy cells.

1. Describe the main differences between a communicable disease and a non-communicable disease. [2 marks]

Answer.

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Answer.

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  2. Chemotherapy– Use of chemicals to either stop the cancer cells dividing . There are many different types of chemotherapy and scientists are working to make them as pacific to cancer cells as possible.

learning outcomes

- Explain the difference between correlation and causation.
- Use tables & graphs to interpret data relating to NCDs

Lifestyle choices

- Our **lifestyle choices** affect our health
- But they don't all have the same impact
- Decide which has the most impact on our health.

Line of impact

Eating lots of sugary drinks

Smoking cigarettes

Drinking excess alcohol

Not carrying out regular exercise

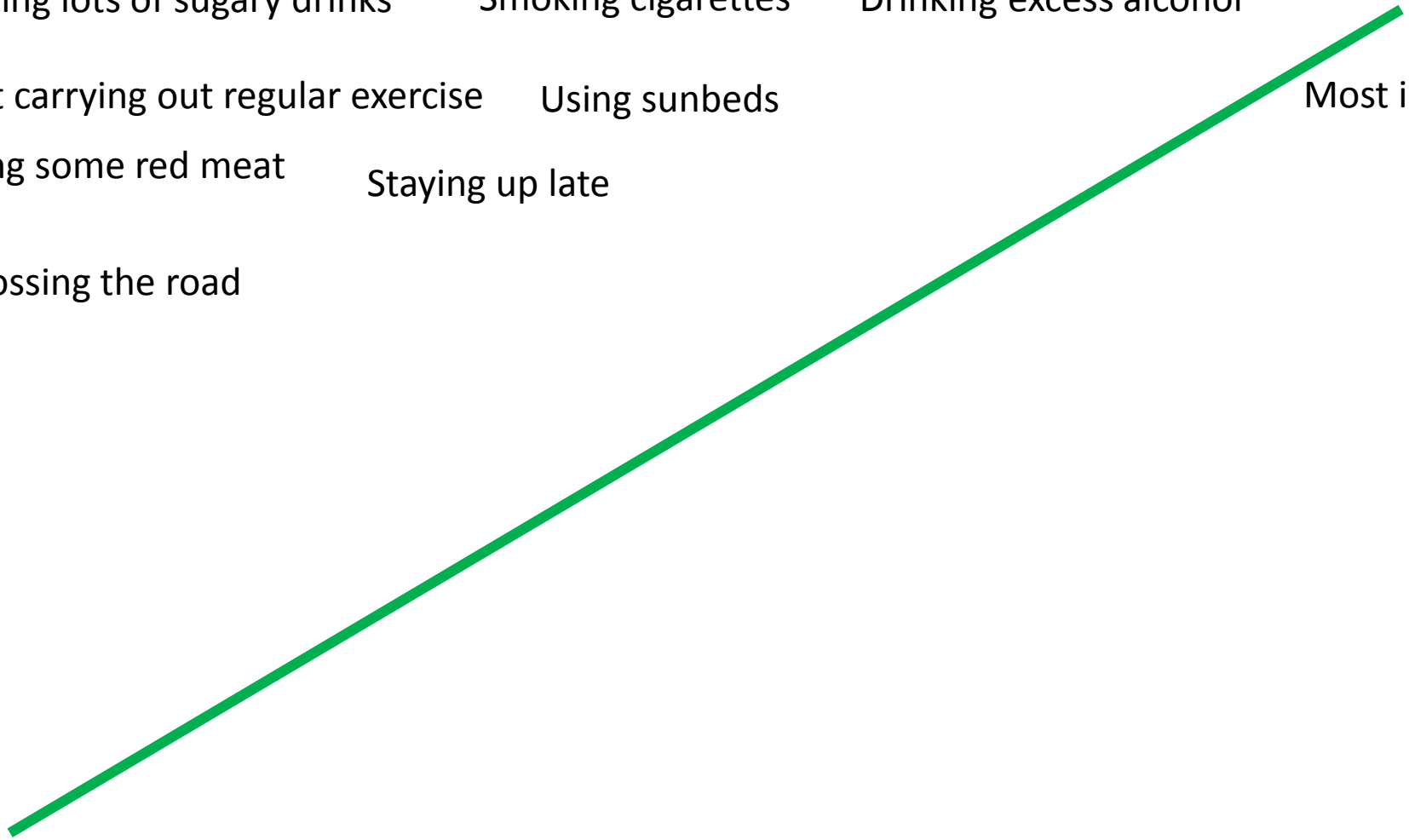
Using sunbeds

Most impact

Eating some red meat

Staying up late

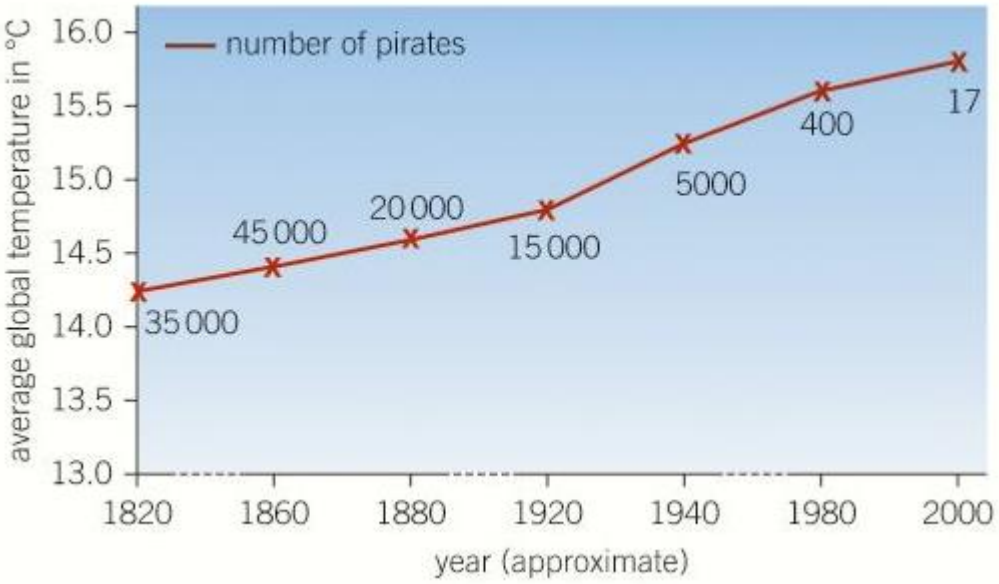
Crossing the road



Least impact

Correlation

- Scientists see similarities in the patterns between non-communicable diseases and lifestyle factors.
- This link is called a **correlation**.
- A correlation **does not prove one thing is the cause of another**



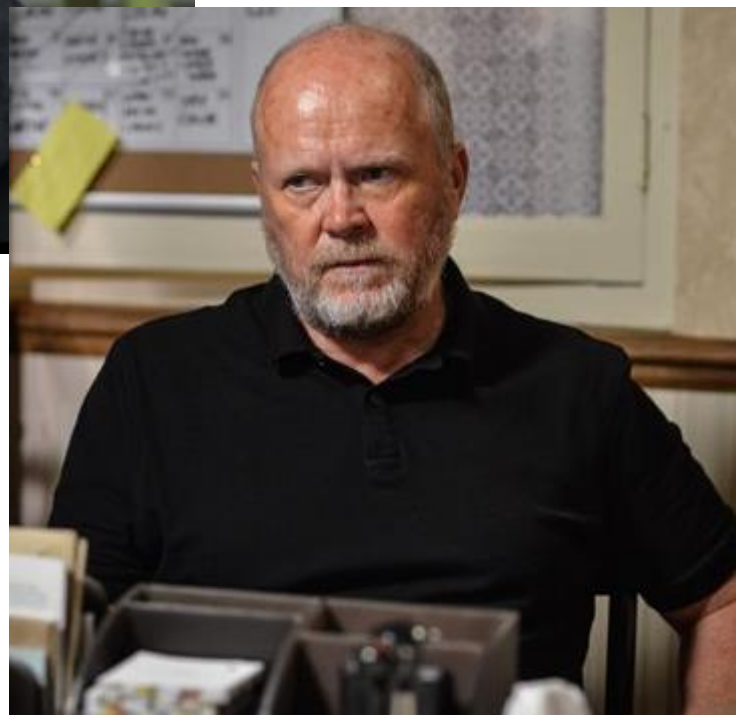
As the temperature increases, the number of pirates increases.

What needs to be done to prove a correlation?

Causal mechanism

- Scientists research to discover if one factor does affect another.
- A causal mechanism explains how **one factor influences another through a biological process**.
- If a causal mechanism can be demonstrated, there is a link between the two.
- There is a clear causal link between smoking tobacco and lung cancer… anyone can get lung cancer – but smoking increases your risk

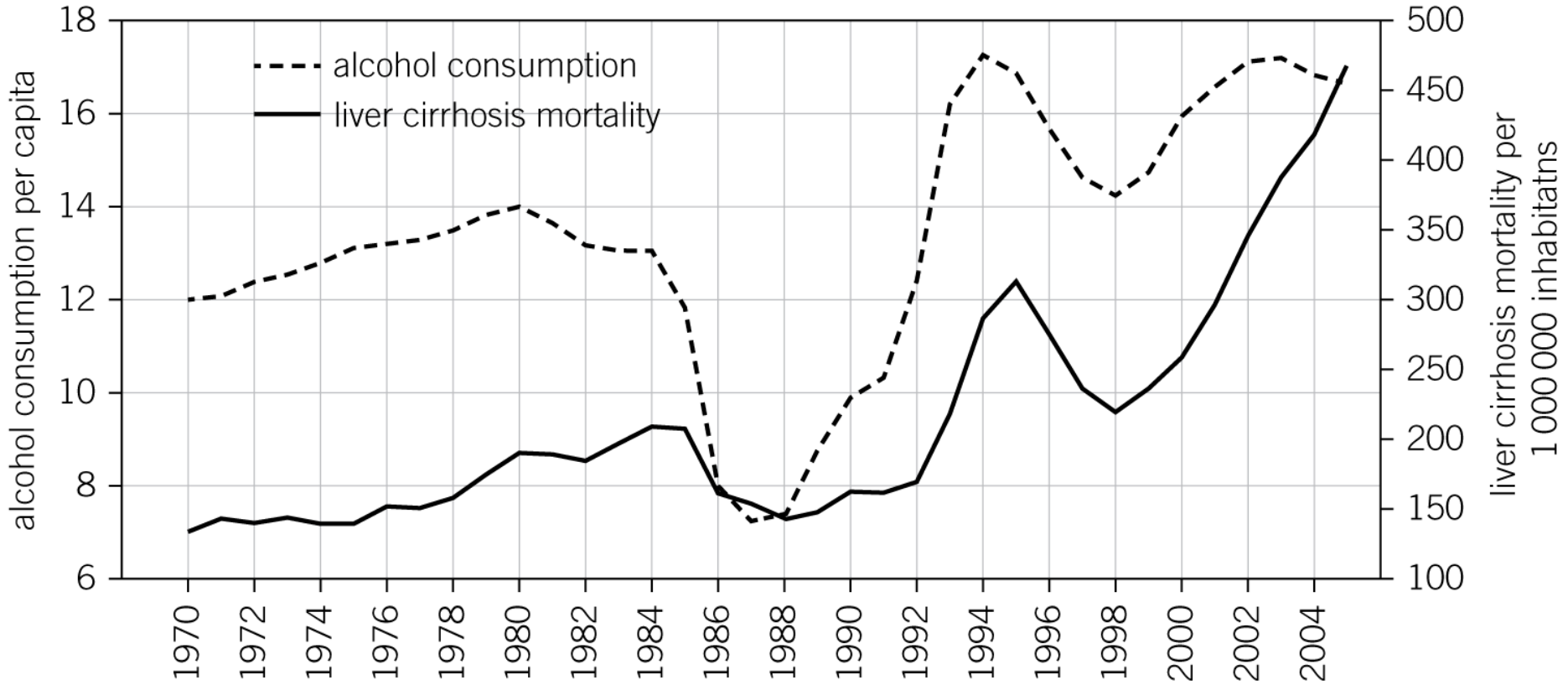
Causal mechanisms



Use Phil Mitchell to describe causal mechanisms

Anyone can get liver damage but…….

Describe the data – alcohol and liver disease



1. State the year of the highest alcohol consumption 1994

2. State what you notice about the liver cirrhosis mortality rate in that year

   Also peaks

3. Alcohol consumption fell sharply in 1984. Describe the trend in deaths from liver cirrhosis during this year levelled off to 1985 then fell

4. Describe the relationship between alcohol consumption and deaths from liver cirrhosis

   As alcohol consumption ↑ the number of deaths from liver cirrhosis ↑

5. Explain whether the data show any correlation between alcohol as a risk factor and deaths from liver cirrhosis.

   Yes, alcohol is shown to be a risk factor for liver cirrhosis.

6. Explain why you cannot be certain that this shows a causal link

- # deaths from liver cirrhosis is 150 per 1million inhabitants in 1976 & 1986 even though alcohol consumption is 13 in 1976 & 7 in 1986.

  This suggests there must be something else causing liver cirrhosis as well as alcohol consumption

Describe the data – smoking and lung cancer

Year	Percentage of men who smoke	Percentage of smoking-related deaths in middle-aged men
1950	77	15
1955	74	18
1960	74	19
1965	68	20
1970	68	20
1975	62	17
1980	55	16
1985	46	14
1990	39	11
1995	37	8
2000	32	6

1. Name a major smoking-related disease.

lung cancer, bronchitis, emphysema

2. Describe the trend in the numbers of men smoking in the UK.

fallen from 1950 to 1960 levels off to 1970, falls again

3. Describe the trend in smoking related deaths in men in the UK. USE DATA

increase from 1950-1965, levels off to 1970, falls again to 2000

4. In the 1950s professor Richard Doll first suggested that smoking affected our health.

a. State the impact on male smoking habits after that date.

% of men smoking decreased by 45% | more than halved

b. Describe the relationship between the smoking habits and the number of smoking-relating deaths in men

they are correlated, as % men smoke increases & decreases, the % smoking related deaths also increases & decreases.

c. Suggest a reason for your answer to part b

Smoking affects the lungs & is linked to bronchitis, emphysema & lung cancer which can cause death.

5. Explain how this data can be used to:

a. Support the idea that smoking is bad for our health

* After 1965 each fall in smoking % resulted in a fall in smoking related deaths.

b. Argue that smoking might not be causing the deaths

* • 1950 77% men smoked & 15% deaths.
• 1955 dropped to 74% men smoked but deaths rose to 18%
or 1960 " " " " " 19%

Describe the data – risk factors and diabetes

Year	Number of cases of type 2 diabetes in 55–64 year olds	% of population aged over 18 taking no physical exercise	% of population aged over 55 classed as obese	Average sugar intake per person (kg/year)
1990	4	37	38.5	41
1995	5	35	43	41
2000	10	30	49.5	44
2005	8.5	32	54	44
2010	11	34	55	42

a) Which lifestyle factors show a correlation with the number of cases of type II diabetes?

obesity, As ↑ in obesity there is ↑ in type 2 diabetes

b) Can any of the factors have a causal link?

There is a causal link between obesity & type 2 diabetes.

Anyone can get 2 diabetes but being obese increases your risk

c) Can you explain why some of the other factors might have no relevance?

- Ave sugar intake does not vary significantly (much over the 10 years
- % pop taking no physical ex & whilst # type 2 diabetes ↑

d) What further work would be needed to produce a more convincing solution?

- Survey of a larger number of people
- over a longer period of time (only 10 years here)
- looking at other possible risk factors