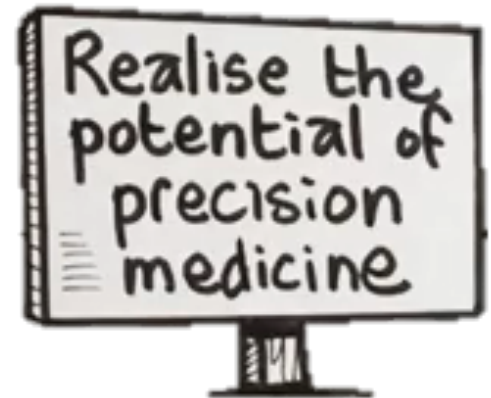
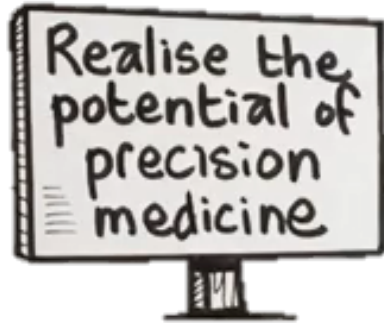


# Precision Medicine:

# What's it all about?





Precision medicine sounds great, but what exactly is it?



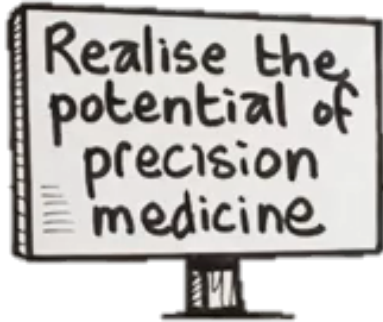
**Precision Medicine** is a field that uses information about people to choose better treatments for them.

This could be genetic information from your DNA, from the proteins in your blood, from scans of your body or information about your lifestyle choices. From this information we can look for different characteristics to group people who are more likely to respond to drug A over drug B.

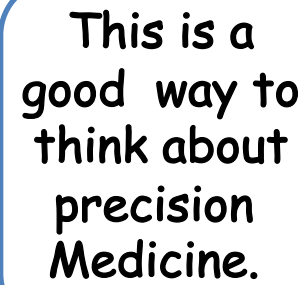
Moving precision medicine from research to practice requires industry, academics and clinicians to work together and bring new tests from bench to bedside, which is still a massive challenge.

The Living Laboratory will work to bring these groups together and overcome these challenges!





Realise the  
potential of  
precision  
medicine

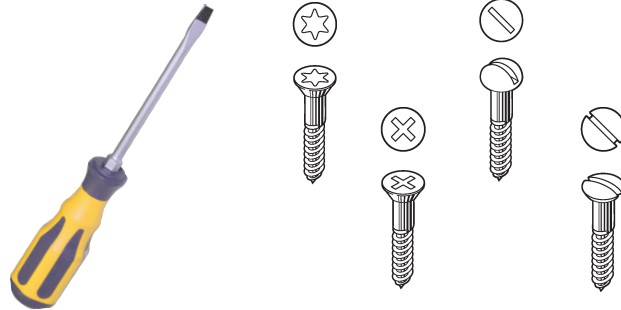


This is a  
good way to  
think about  
precision  
Medicine.



### Choosing the right tool for the job.

Could you use one type of  
screwdriver with all these  
screws?

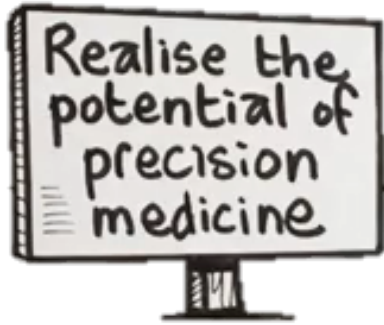


You could, but it wouldn't be the best tool for the job.

Even though all screwdrivers have the same end job, we can make them more efficient by looking at important characteristics, such as  
**the shape of the screw head,**



and using this information make an informed decision about which screwdriver would be best for that specific screw.

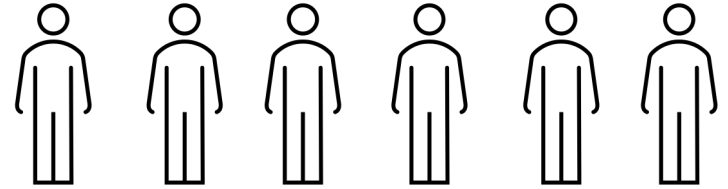


When it comes to precision medicine there is a similar principal to choosing the right screwdriver for the screw.

However, instead of the shape of the screw head determining what screwdriver we need, **biological characteristics, such as DNA or proteins in the blood, can be used to help to determine what drug is best for a person.**

Even though all the drugs for a certain condition might have the same end goal (for example, lowering blood pressure) you may possess certain characteristic that make you more likely to respond to one drug over another.

Many people all diagnosed with the same condition



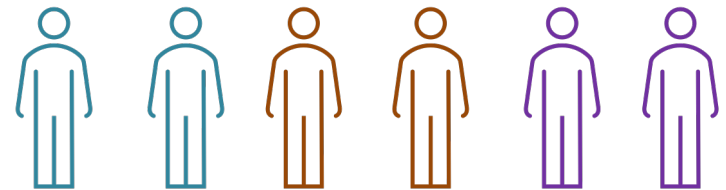
When they visit their doctor there might be several different drugs that can be used to treat their condition



By looking for characteristics in their DNA, the doctor can make a more informed choice about what drug is right for them – using DNA for this purpose is known as pharmacogenetics.



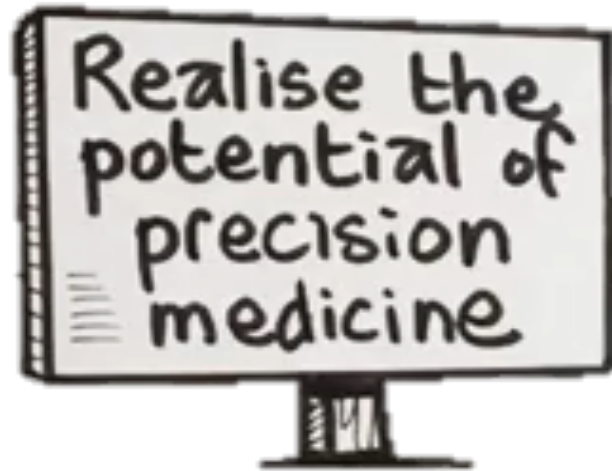
This will help more people to respond to their treatment, bringing patient benefits, as well as cost savings for the NHS



Drug A

Drug B

Drug C



Let's use some basic genetic information to demonstrate how we can be put into different groups based on our own unique characteristics - this is the essence of precision medicine.

Realise the potential of precision medicine

Let's start with one genetic feature that we can use to split people into 2 groups

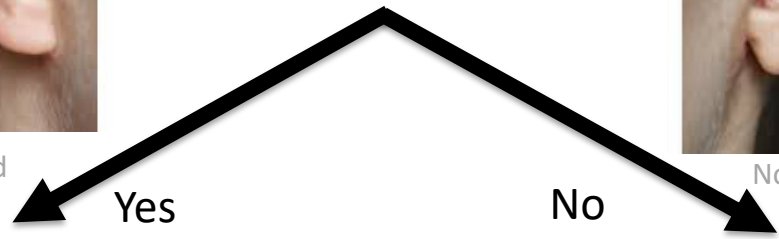


Attached



Not Attached

Are your ear lobes attached?



**Group 1**

**Group 2**

Realise the potential of precision medicine

Now lets add another genetic feature and we can split people into 4 groups.

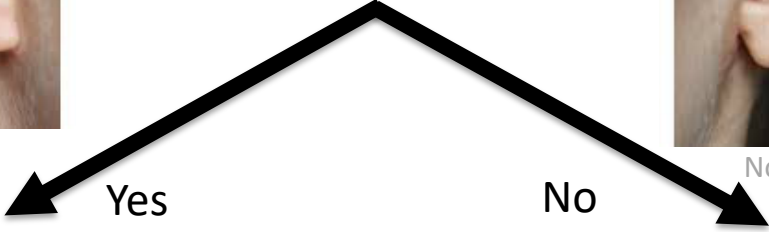


Attached



Not Attached

Are your ear lobes attached?



Yes

No

Can you roll your tongue?

Yes

No



Can Roll Tongue



Can't Roll Tongue

Can you roll your tongue?

Yes

No

Group 1

Group 2

Group 3

Group 4

Realise the potential of precision medicine

By adding in a third feature, we can split people into 8 different groups



Attached



Not Attached

Are your ear lobes attached?

Yes

No

Can you roll your tongue?

Can you roll your tongue?

Yes

No

Yes

No

Do you have a peaked or straight hairline?

Do you have a peaked or straight hairline?



Can Roll Tongue



Can't Roll Tongue



Peaked



Straight

Peaked

Straight

Peaked

Straight

Peaked

Straight

Peaked

Straight

Group 1

Group 2

Group 3

Group 4

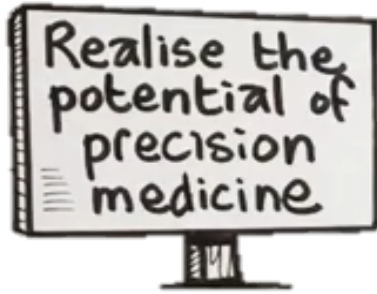
Group 5

Group 6

Group 7

Group 8





Looking for certain characteristics in your DNA is one way of making decisions about what drug you are more likely to respond to – and this type of precision medicine is called **pharmacogenetics**

You can see that as we add in more genetic features we can split people into more groups as we have more information.

Here we only used three genetic features to split people into groups. For precision medicine we can take a sample (for example saliva or blood) and sequence all of your DNA to look for characteristics.

To deal with the amount of information we can get from DNA (which is a lot!) we often rely on something called a computer algorithm (Algorithm - a process or set of rules to be followed in calculations)

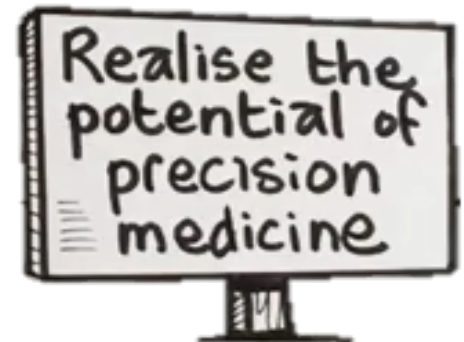
This algorithm searches the DNA and looks for the characteristics that tell us if you are more likely to respond to a certain drug.

Health benefits from the use of Precision Medicine will include:

### **Improved health care outcomes for patients**

- Finding the drug that works best
- Finding the safest drug

### **Significant cost savings for the NHS**



To allow hospitals to practice precision medicine we need three partners, known as the triple helix, to come together:

- Clinical partners
- Academic partners
- Industry partners



By working together, the triple helix can take good ideas and make sure they are right for the NHS, implementing them quickly into standard care.

The Living Laboratory will provide space for the triple helix partners to come together and grow within Govan, creating new jobs and training opportunities within the area, as well as a world leading precision medicine campus.

