The Official Magazine of Medical Mavericks. Putting the **Inspiration In** to get the **Aspirations Out**

Medical Mavericks World

Helping students discover amazing opportunities in the world of health, medicine & STEM.

Autumn 2018 #BeMoreMaverick

Pass Your Exams in 90 minutes

I am serious! You can pass all your exams by studying for 90 minutes!

OK, OK... I'm not talking about one single round revision for 90 minutes, but what about 226 sets of 90 minutes spread over a year.

Why 226?...Let us do some maths...

- There are 365 days in the year.
- Let's ditch the weekends and lose 104 days. That leaves 261 days.
- Next, lets ditch 6 weeks for the summer holidays, as well as 5 days for Christmas and New Year. That is a total of 35 days. ➜

Feature

- 35 from 261 leaves us with 226.
- That's 226 days, studying for 90 minutes each day.

Could you master or at least get a far better understanding of your subjects if you did 226 sessions studying them.

I bet you could.

It is such a simple concept. But it requires some discipline. 90 minutes every day for at least 5 days a week, including all the school holidays (except the 6 weeks and 5 days over Christmas and New Year of course.).

What's that I hear you say…. You don't have time? I'm going to be blunt here…. But I smell B.S!

Any one that says they don't have time is a total liar, liar pants on fire! Just think about your day at the moment. Where could you fit 90 minutes in?

Let's say you get home at 4:30pm and go to bed around 10pm, you've got 5 ½ hours to kill! Doing 90 minutes of work still leaves you 4 hours to do what you want. Go to your sports club, play computer games, go on social media, Netflix and chill….

I also heard you say "Tom, you forgot about taking off the other school holidays!"

Errrrrr, no I didn't

Listen, if you want to be successful and get the results you need to get your dream job there are some sacrifices you have to make.

And to be honest it is not a big sacrifice.

Let's do the maths…. again….

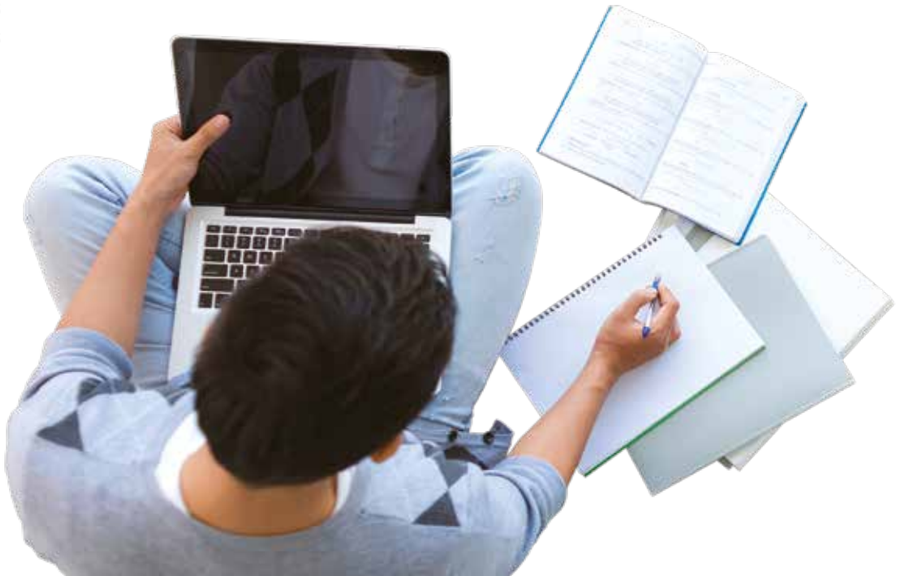
We ditched the summer hols and 5 days out of 10 at Christmas so that leaves:

- October half term - 5 days
- Christmas – 5 days
- Feb half term – 5 days
- Easter – 10 days
- May half term – 5 days
- So, that is 30 days in total.
- Let's say you were awake for 16 hours of each day (getting your 8 hours sleep!)
- 16 hours x 30 days = 480 hours
- 480 hours x 60minutes = 28,800 minutes that you're awake.
- If we look at our 90 minutes as a percentage of this….
- 90 minutes x 30 days = 2,700 minutes
- 2,700 / 28,800 = 0.093
- 0.093 x 100 = 9.3%

9.3% of your holidays on studying.

9.3% of your time awake in the holidays taking small but significant steps towards your dream job.

It's not much to ask, is it?



Now, would you like an extra 15 days in the year?

I'm not talking 15 normal days. I'm talking about 15 solid days of extra work & revision, 24/7, no breaks.

You can do it! Honestly you can.

Do ya wanna know how?

Get up one hour early every day for 365 days of the year. This totals 365 hours or 15 days (365 / 24 if you want to do the maths) of extra time to do what you want.

Revise, do your 90 minutes, play sport, play video games… whatever it is… it is making room in your day to do your 90 minutes either straight away or in the evening.

Admittedly, this is a bit hard-core, so let's say you did this for half of the year. That's 182.5 days, which is just shy of a school year… funny that, eh?

You could look at this the other way around and get up 1 hour early in the… dare I say it…. School holidays!!!!

Imagine that… getting up at 6am every day of the school holidays, doing your 90 minutes of school work done and dusted by 8am each day.

Trust me… you will feel so satisfied (and a little bit smug!).

Plus, you've got the rest of the day to do what you want! Go back to bed, hang out, Netflix and chill… again.

Plus, by doing it first thing you have a better chance of not being distracted by friends on social media or family barging in. It is surprisingly quiet at 6 in the morning. Plus, your brain is in the most optimal state for learning first thing in the morning.

I know what you're also thinking… Why 90 minutes, Tom?

Good question. It is the perfect amount of time where your brain can cope with prolonged concentration before it starts to drift and nothing else goes in.

You need it to be undisturbed time too.

Did you know that when you're deep in concentration on a piece of work and you're disturbed, it takes a full 15 minutes for you to get back to the same state of mind as you were in before.

Not good.

So, here are my Golden Rules for your perfect 90 minute study session.

1. **Tell your family what you're doing.**
2. **Plan it out.**
3. **Get into a routine.**
4. **No phones.**
5. **No Music or TV.**

When you are planning your sessions, it could just be as simple as looking at a different subject each day. Mondays is Chemistry, Tuesdays – Biology etc. etc.

Or be more specific on a particular area you're struggling with.

The important thing is plan what you're doing and when you're doing it. Do this last thing on Friday, Saturday morning or Sunday night. It doesn't matter when, just as long as it is **before the start of the next week.**

You can download our weekly planning template here: **www.medicalmavericks.co.uk/book**

After about a couple of weeks of doing this I can guarantee you'll be a different person and you'll crave those short periods of time.

You can thank me when you pass your exams.

Even though doing your 90-minute study sessions is a small ask each day, you probably will need a bit of motivation and reward.

So, each week pick something as a reward… it might be a film on Netflix (I like Netflix, can you tell?), that chocolate bar in the cupboard that has been calling to you, spending a tenner on yourself at Pri-marni….

It doesn't have to be big. But when you do 5 out of 5 sessions give yourself a reward.

Anything less…. No reward. Nothing… Nada…. Zilch.

Obviously, there are the little rewards you can give yourself in your head for each 90 minute session.

I can guarantee you will feel a little smug each time you complete a session, as you know some, if not all of your friends won't have done it.

((That is unless you pass this on or tell your friends to get one and tell them to read this article, then you'll all be doing it!… Thanks in advance!))

And when times get tough and you really don't want to do it just remember you are taking tiny steps towards your dream job.

Small concentrated periods of effort each day will result in massive progress.

Try it… I dare you!

- **Plan it out on a Sunday.**
- **Get into a routine.**
- **Get up early.**
- **Get it done.**
- **Reward yourself.**
- **Pass your exams.**
- **Get a great job!**

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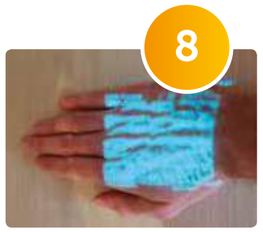
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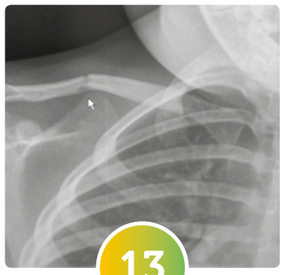
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What's in this Issue?

Win a Medical Mavericks Mug!

Share a picture of you with the magazine and tag us and a friend to win a mug!

@MedicalMavericks

@MedicMavericks

@Medical_Mavericks

What are you looking at?!

Check out these ultrasound scans. Can you recognise which parts of the body they are from and name the anatomy you are looking at?
Answers on page 6

Image 1

Image 2

Image 3

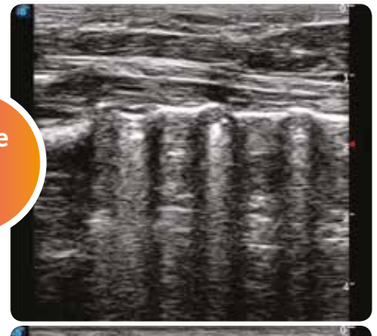


Image 4

Tips:

1. The numbers on the right hand side of the image is the depth into the body in cm. Some are only a few CM where as others are much deeper.
2. Look really carefully for changes in structure and texture of the image. This usually represents a change in tissue or a boundary between two areas, tissues or organs.
3. Black is a fluid. It could be blood, wee, puss.
4. Thick bright white lines are more solid tissue such as bone, tendon, ligaments.... or metal!

How did you get on?

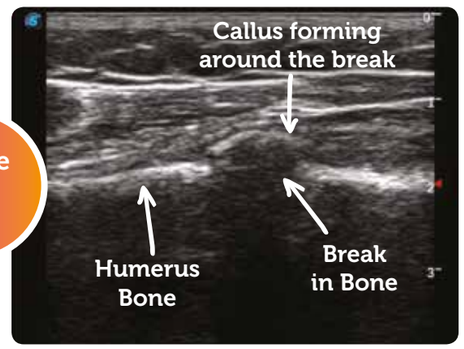
Check out page 6 for the answers!

You can see more ultrasound images in the student zone of our website: **www.medicalmavericks.co.uk/for-students** or check out our instragram stores for even more! **@Medical_mavericks**.

What are you looking at? - THE ANSWERS

Did you get them right? Check out what structures and organs you were looking at!

Image 1

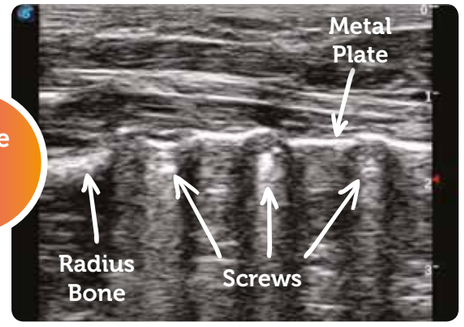


This is the humerus of a 10 year old girl that jumped off her trampoline and broke the bone! The big lump in the middle is the boney callus that had grown around the break, helping strengthen and repair the bone. This scan was taken about 4 weeks after the original break. The lumpy callus will disappear over the following months.

Image 2

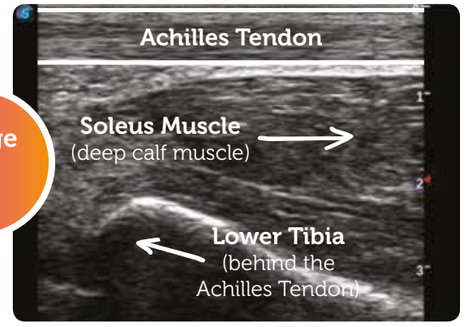
This is a cross section through the liver. Imagine standing in front of your best friend and chopping someone them in half horizontally so the top half falls off. You could then get a birds eye view of their insides at that particular slice. That is what we have done here with the ultrasound. We have sliced through the liver to see the major blood vessels, bile ducts and the grainy texture of the liver!

Image 3



This is a scan of someone's radius bone. That is one of the long bones in your arm, in particularly the one that runs down to your thumb. This person had a serious bike accident and had to have a metal plate screwed into the bone to fix it back together. You can clearly see the screw heads, the thread and the metal plate! We love it when we see these!

Image 4



The final one is a tough one. The scan was taken at the lower part of the leg along the achilles tendon, just before it attached onto the heel bone. You can see the achilles tendon as tendons have a stripy kind of appearance. You can see the end of the tibia near the middle of the image, this is the bright white lump! And then between the tendon and the bone we have muscle!

3 Episodes of MMTV You Need to See!

Each week we release a new episode of Medical Mavericks TV. We cover all sorts from medical procedures, diseases, careers info, guides to HE and much more. Some times we even dress up! (Check out episode 22 of MMTV below).

You can watch all our episodes in our student zone. Head over to **www.medicalmavericks.co.uk/for-students** and click MMTV.

Here are three of our favourite episodes.

Episode 21 - How to find a medical career and decide what to study

This is a quick guide on how to use the NHS careers website BEFORE using the University application website UCAS, to find the right degree for the right job! A must watch if you want to work in the NHS and want to go down the University route!

Episode 22 - Tom's weird vein physiology

In this episode Tom and his daughter Beatrice dress up as Gomez and Wednesday Addams from the Addams family! You get to see how an ultrasound machine is used to view veins and arteries in the body and how Tom has very special jugular veins in his neck! Apparently he has a genetic abnormality that causes it, almost making him part of the X-Men! Check out the video to see what it is.

Episode 18 - You wouldn't pick these screws up in B&Q

Tom is at a careers event and bumps into a surgeon that specialises in fixing metal plates to broken bones. In the video you can see how the the plate and screws are engineered to fix the bone in place properly. They really are very special and the engineering is so simple but so effective!

See these episodes and more on our YouTube channel. Just Search for Medical Mavericks TV

YouTube **Medical Mavericks TV**

#BeMoreMaverick

How does it work?

How does it work? - Vein Scanner

One of our most popular pieces of kit is our **near infrared vein scanner**. You've probably never seen one of these at your local GP or hospital as they tend to be used by a specialist called a Vascular Scientist.

The vein scanner is a really cool piece of kit as it projects a video image of your blood vessels onto your skin in real time! It helps Vascular Scientists see where your veins run as well as where there are junctions and valves they should avoid in procedures.

The technology to make this kit work is quite simple. In fact it is quite similar to how a pulse oximeter works as they both use near infrared light.

If you didn't know, near infrared light (NIrL) is in the infrared light spectrum, but it is at the far end. It has a wavelength of 700nm to 2500nm, where as infrared has a wavelength of 700nm to 1mm.

One of the reasons it is used in this kit is that it can penetrate your skin far more readily than normal light. In fact it can be detected 8cm into tissues. That makes it perfect for reaching our veins as we can normally see them just under your skin. You arteries are always much deeper in the body and only come to the surface where you can feel your pulse.

The second reason NIrL is used is that some of it is absorbed by haemoglobin. The remaining light is reflected back, making the wavelength of NIrL the important part here.

Here's how it works:

- The device shines the near infrared light onto the skin
- The haemoglobin in the blood in your veins absorbs some of the infrared light differently to the surrounding tissues.
- The remaining light is bounced back to a sensor in the device.
- This information is then converted into a video image, which is projected onto your skin.

Careers Spotlight

Used By:
Vascular Scientist
Role:
Image & assess blood vessels & blood flow
Entry Requirements:
A degree in a related subject (Biology, Physiology, Sports Science)
Salary: £28,000 to £102,000

Pretty cool, huh?

Just by using the way haemoglobin absorbs light differently to your other tissues, we can 'see' the blood vessels under your skin.

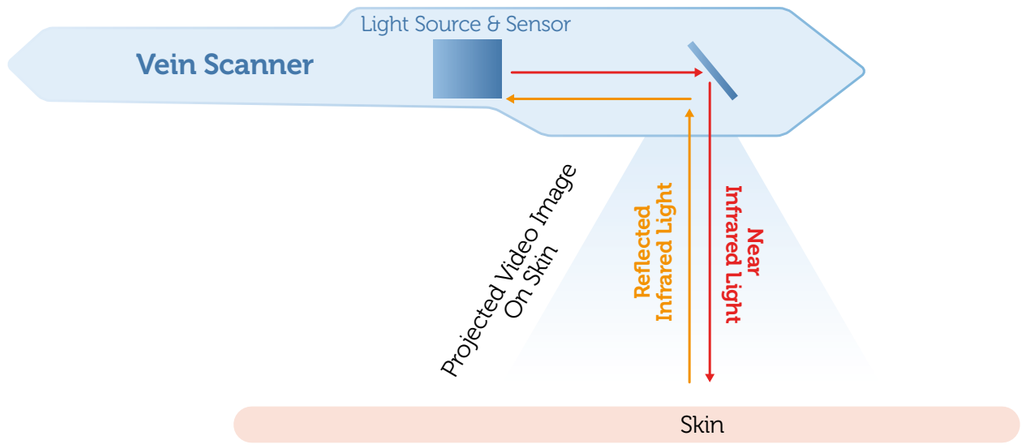
You can compare this to how we see colour. Visible light hits an object, that object absorbs a certain wavelength and the remaining wavelength of light that bounces off and hits your eye is the colour you see.

A pulse oximter works by using a similar principle, except these devices are calibrated to understand the different amounts of near infrared light that are absorbed when your blood has different levels of oxygen and carbon dioxide attached to it.

The pulse oximeter is calibrated to understand arterial oxygen saturation levels by the way arterial blood absorbs different wavelengths of NIrL depending on how much oxygen or carbon dioxide is attached to haemoglobin.

Blood with a 99% oxygen level absorbs a different amount of NIrL compared to blood with 75% oxygen saturation.

A pulse oximter costs between £15 and £200, a NiR vein scanner costs around £5000, but if you want to see a £20,000 pulse oximeter, Check out episode 20 of MMTV in our student zone on www.medicalmavericks.co.uk where you can see how they use this technology to monitor blood flow in your brain by shining NiRL through your skull!!!



#BeMoreMaverick

Novichok

Why is Novichok so Deadly?

Here's everything you need to know!

Over the past few months, you've probably heard about the incidents in Salisbury and Amesbury where several people were poisoned with a chemical called Novichok. This is very serious as Novichok is a nerve agent designed to be used in chemical warfare. If you've read about these stories, you may have noticed it took a while for experts to identify what the chemical was. This was because it is a rarely used or seen warfare agent.

Novichok was designed to be chemically different and more sophisticated than Sarin and VX, basically to get around rules banning certain chemicals and make it more difficult to detect from chemical warfare inspectors.

One of the ways they could 'hide' the chemical from inspectors, was in the way it was made. Novichok could be made from two different non toxic chemicals, but when mixed together, Novichok was formed.

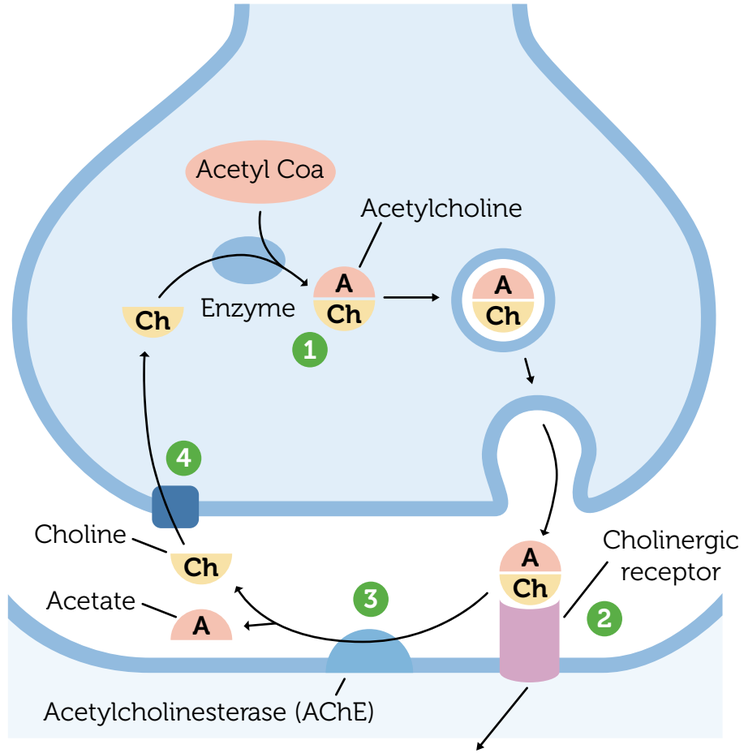
Very sneaky.

So how does kill you?

Well... it's a bit grim to be honest. It works in the same way many chemical weapons work, by working on your nervous system. In fact it can be 5 to 8 times more toxic than Sarin and VX.

To understand the mechanism of action we have to look at the normal workings of a specific part of your nervous system. Primarily the parasympathetic part of your Autonomic Nervous System (ANS).

The ANS basically controls all your automatic functions. There are three parts to it, but the two we want to look at are the parasympathetic and the sympathetic. They pretty much oppose each other. They are the Yin and Yang of the nervous system.



RESULTING ACTION: Pupil Constriction

They help control physiology such as the diameter of your pupils in different levels of light, your breathing & heart rate, when you sweat, your digestive system, mucus secretion, airway diameter.... The ANS does A LOT!

When you brain sends signals along the ANS nerves, they release a neurotransmitter (special chemical) from the nerve onto or into the tissue being controlled (1&2). The NT we want to look at, is from your parasympathetic nervous system called Acetyl Choline. (Sympathetic uses adrenalin & noradrenalin).

For example if you walk out of dark room into a bright room, you want your pupils to go from dilated (wide) to constricted (narrow) to reduce the amount of light going into your eye.

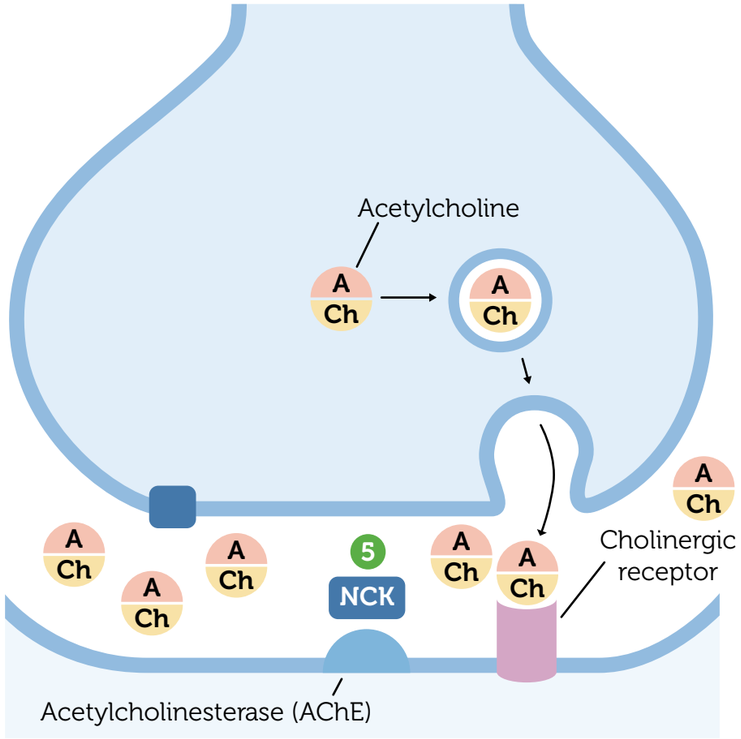
Your eye detects the light and the ANS jumps into action sending signals to the muscles that control your pupil diameter. At the end of the nerve the neurotransmitter Acetyl Choline (ACh) is released onto the muscle, it binds to a receptor and the muscle contracts to constrict the pupils (Sympathetic release noradrenaline to dilate pupils). (2)

Now, if ACh is not removed from the nerve / muscle space it will just keep on working and its action is continued. If you walked into a dark room from a light room, your pupils would stay constricted and small!!

So, we need a way to get rid of it once its action has taken place.

The main way this happens is through an enzyme called Acetyl Cholinesterase. We know it is an enzyme as it ends in 'ase'!

This enzyme breaks up ACh and recycles the parts back into the nerve so they can be used again to make more ACh. (3&4) ➜



Clever, eh?!

And it is this enzyme, where Novichok works!!

Novichok blocks the enzyme so it can not work and ACh does not get broken down. Once it is released from the nerve, it just sticks around in the nerve – tissue space, continuing to have same action. (5)

This can be devastating. Lets look at what prolonged ACh exposure does to each organ and tissue in turn.

So, effectively what happens is you loose consciousness and suffocate to death by drowning in your own mucus secretions.

Not a very nice way to go.

Is there an antidote?

Yes and no. There is a drug called Atropine.

This chemical blocks the action of ACh, by binding to its site of action. By blocking the receptor that ACh sits in to cause its action, it stops its action.

However, you are not eliminating the Novichok from the system... just opposing some of the effects of too much ACh, so the treatment has to be continuous until the patient recovers.

Because so few people have been exposed to Novichok and it's development was done under secrecy, we know very little about the way the body processes and eliminated the chemical from the body.

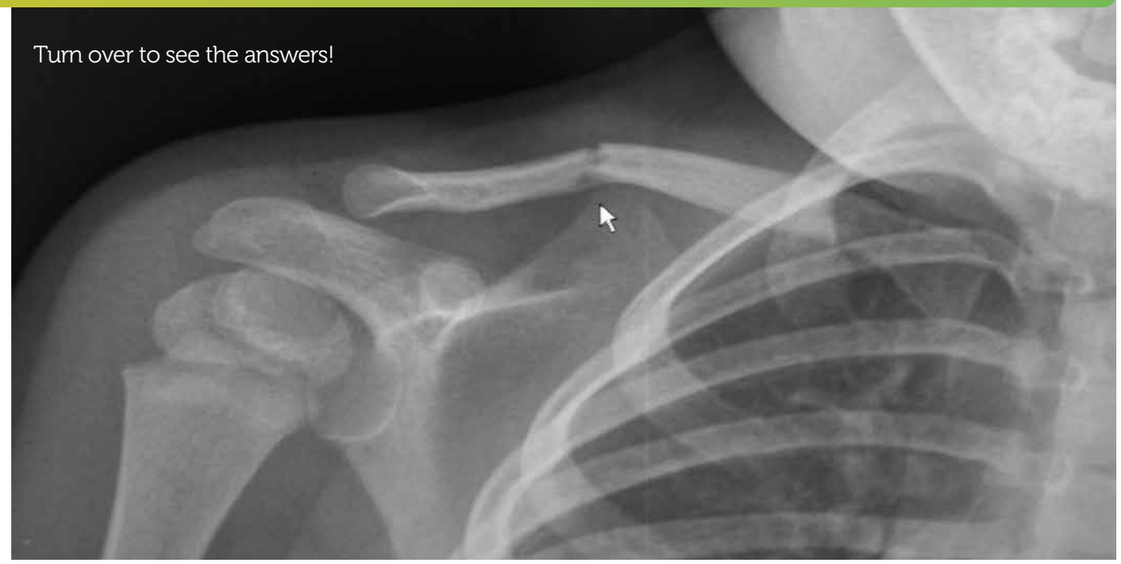
The reason why the first couple survived was because of the use of Atropine. This slowed the effects of prolonged ACh activity and allowed the body to manufacture more of the important enzyme, Acetyl Cholinesterase. Once the levels of Novichok had fallen and enzyme levels increase the patients start to recover.

The key to surviving poisoning like this is rapid intervention with Atropine and sedation to let the body recover. The patient also needs to be stripped of contaminated clothing and washed thoroughly to remove any poison from their skin.

Organ	Effects	Result
Lungs	Breathing rate falls, airways contract, airways produce lots of mucus	Suffocation!
Heart & Blood Vessels	Heart Rate falls, blood vessels at peripheries (arms, legs) dilate (get wider!)	Low blood pressure, unconsciousness due to poor blood flow to brain
Digestive System	Increased activity	Diarrhea, vomiting – choke, dehydrate – compounds low blood pressure
Skin	Profuse sweating	Dehydration – compounds low blood pressure

CAREER FOCUS

Career: Medical & Analytics Toxicologist
Role: Identify symptoms relating to poisons and analysing samples in labs to identify toxins.
Entry Requirements: Medical Toxicology requires you to be a doctor! Analytical Toxicology is a lab based career and can accessed with a related science degree (EG: Chemistry, Physiology, Pharmacology)
Salary: £28,000 to £102,000



Walt Disney broke my daughters collar bone...

but can you spot the amazing physiology on her X-ray?

'This is true! Walt Disney broke my daughters collar bone. Not Walt himself... he's been dead a while now. But it was one of his princesses dresses that contributed to my daughter, who was 3 at the time, breaking her collar bone that you can see on the X-ray above.

You see, she was coming down the stairs wearing one of her favourite princess dresses. The dress in question was Belle's yellow ball gown. Very long and very shiny slippy fabric.

I think you can guess where I am going with this.

She was walking down the stairs and the dress was a little long for her. She was very good at lifting it up to navigate her way down, but on this occasion, let go a little too soon.

The result was a slip on the fabric of the dress about 3 stairs from the bottom and she went flying into the hall, landing awkwardly and pretty much leaving her collar bone with a clean break.

My wife was in tears at the hospital when we were shown the X-ray. Her little baby had her first broken bone.

Me.... I was asking if I could take a picture of her X-ray because I could see THREE amazing bits of physiology.

The first was obvious... the break! It is quite clear and almost clean through!

BUT!!! Can you spot the two other amazing bits of physiology.

Here's a clue:
Remember my daughter was three at the time. She has lots of growing to do! ➜

Awesome Physiology

Amazing Physiology X-Ray - THE ANSWERS!

AMAZING PHYSIOLOGY 1 - The Growth Plate

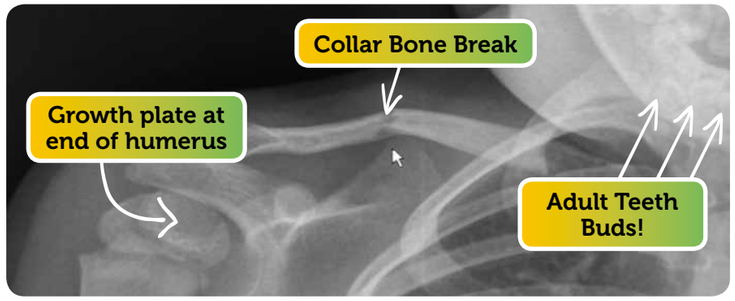
You can clearly see a line at the top the radius bone that makes it look like the bone is in two parts.

This line is actually the growth plate and this is where bone growth actually occurs.

They are found at BOTH ends of all long bones such as your humerus, radius, ulna, tibia, femur... I could go on.

They are there when you are born and will be, all the way through until your mid teens and in some cases your early 20s.

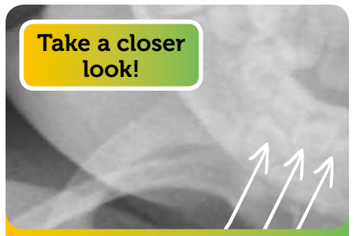
They are different to the actual bone as they contain fewer minerals. In fact they are very cartilage like. Chondrocyte cells lay down the cartilage matrix ready for it to be calcified and hardened.



Two other cells; Osteoclasts and Osteoblasts, help dissolve, remodel and lay down new bone matrix in the region too.

The growth plates disappear at some point in your teens, with girls finishing their growth a few years earlier that boys. Your hormones control this!

If you want to be posh and use the right anatomical name for growth plates, they are called Epiphyseal Plate.



Did you know: In our school workshops you can search for a growth plate in your radius bone (that's the bone in your arm that goes down to your thumb!). We can tell you if you are going to grow taller or not!

AMAZING PHYSIOLOGY 2 - Teeth Buds!

If you look around the jaw area you can see Bea's normal baby 'milk' teeth, but just underneath you can see a 2nd row of teeth!

These are her adult teeth that will grow and push the baby teeth out through her early childhood.

You are born with both your baby teeth 'waiting' under the gums and your adult teeth buds are under these. They are not full teeth as they develop over the first few years of life.

You had 20 baby teeth, with 10 on the top and bottom. However you have 32 adult teeth with the last set, your wisdom teeth, not coming through until you are 17-21!

Did you know: that Tom, the Head Honcho of Inspiration at Medical Mavericks still has one of his milk teeth! Apparently he didn't have an adult tooth bud develop above his right lateral incisor - that's the one to the right of his top two front teeth.

Search YouTube

5 Things we on the YouTube

1. Back Cracking Fun!

Ever had your back or neck clicked or cracked by a Chiropractor? It is soooo nice, but looks a little brutal.

Just search YouTube for Dr Ian Chiropractor.

Our fave vid is the one where he adjusts a young boy that had been hunched over for 4 months after gardening... or the one where he puts a kid's head back on the top of his spine properly... or the one which helps a man breath properly again. They are all TOTES AMAZE! Go check them out!

2. Science Experiments at Home

If you love science and want to do some experiments at home, check out this chap called Steve Spangler on YouTube. He has a regular slot on numerous TV shows but also produces some cool experiments you can try at home!

Just search YouTube for Steve Spangler or Sick Science and you'll find his vids.

3. Why we DON'T succeed & Millennials (That's you by the way!)

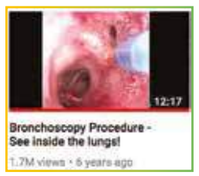
This is a great video with a chap called Simon Sinek. You've probably never heard of him, but he is an author and motivational speak (don't roll your eyes!...)

Check out his YouTube Channel and watch the video called The Millennial Question. It will change how you use your phone and how you think about your success.

Just search Simon Sinek on YouTube

4. Want to see inside Tom's lungs?

Yep, you read that correctly. There is a video on YouTube where you can see inside Tom's lungs. He had a procedure called a Bronchoscopy, which is where a camera is put up his nose and down his throat into his lungs. It is a pretty special video.



Check it out on our YouTube Channel: Medical Mavericks TV

5. Want to get Smarter Every Day?

This channel started after Destin Sandlin (cool name, huh!) did a video on why a chicken's head stays still, even when you move its body around. Sounds weird, but check it out.

Destin is an Engineer and he loves to figure out how stuff works and look at the science and engineering involved. Some of his videos include splitting a playing card in half by firing a bullet from a gun, slo-mo & close up on tattooing, rockets, explosions, animals.... loads of stuff!!

Search YouTube: Smarter Every Day.

Don't forget to

SUBSCRIBE

to our YouTube channel

YouTube

7 Steps

7 Steps to finding your dream job & course!

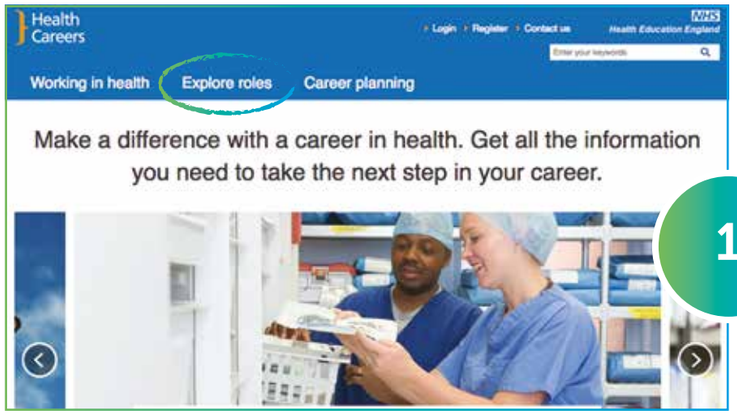
Choosing the right route into a career in the NHS could be a little tricky. There are so many jobs and possible routes in, you need to know where to look.

This guide will help you explore the different roles in the NHS before showing you how to find right the right University degree for different medical careers as not all degrees are the same!

You need to find NHS accredited degrees that train you up to work in these jobs and give you the quickest access into the career.

You need to go to this website **nhscareers.nhs.uk** to find your career!

It looks something like this!



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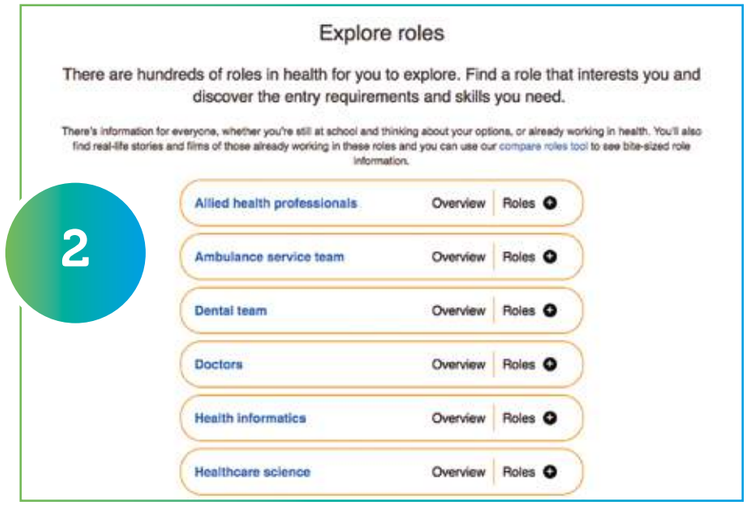
Click EXPLORE ROLES at the top of the page... this take you to a page like this!

This page lists a 14 different sectors in the NHS, all of which have lots of different specific jobs careers within them.

They include both medical & health based jobs as well as all the supporting careers from I.T, receptionists, office staff, caretakers, porters.

Every single career is in here somewhere.!

Click the **ROLES** button on each one to show the jobs in that specific section.



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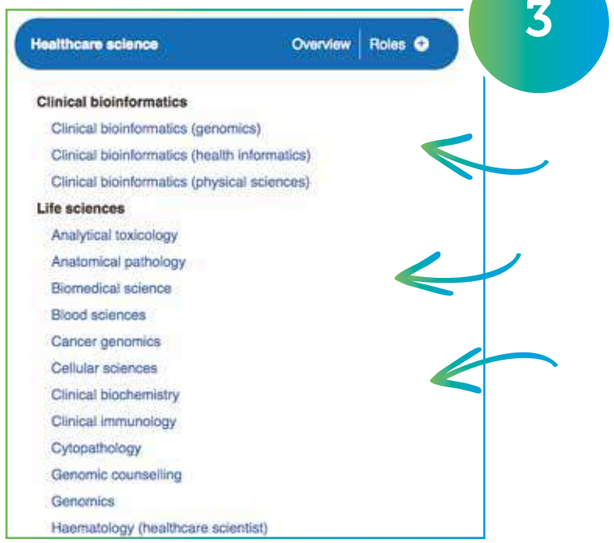

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Once you've clicked on the ROLES button, you get a list of the different job titles in that sector.

Some have a hand full of careers, where as some have dozens and dozens of them!

It is worth taking some time and looking through them.

If you click a specific job title, you get take an to a more detailed page on that specific job.

4

These pages tell you what you do in the job, as well as how much you get paid, typical entry routes and qualifications needed along with links to other useful sites such as regulatory bodies that help train scientists to the correct level.

Did You Know The NHS Needs:

- Art & Drama Therapists
- Architects
- Accountants
- Marketers
- Drivers
- Personal Assistants
- Secretaries
- Gardeners & Landscapers
- Mechanics

TURN OVER TO SEE HOW YOU CAN FIND THE RIGHT DEGREE!

#BeMoreMaverick

7 Steps

Not all careers in the NHS require a degree, but those that do, typically require a specific degree that is accredited by the NHS.

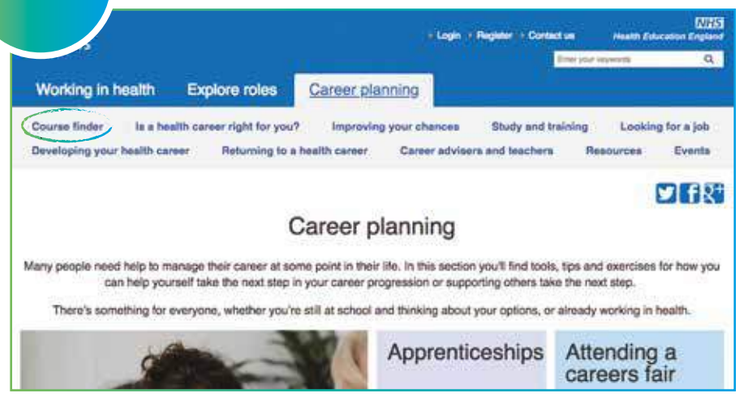
All degrees are listed on the University course website UCAS, but it is difficult to figure out which degrees are accredited and which are not, on this site alone.

How do you know if a degree in Physiology will get you into a job as a Clinical Physiologist??

To make this even more confusing/ frustrating not all medical careers require an accredited degree!

Aaaaarrrghh... I think my head is going to explode just reading that again! So where do we start?

5

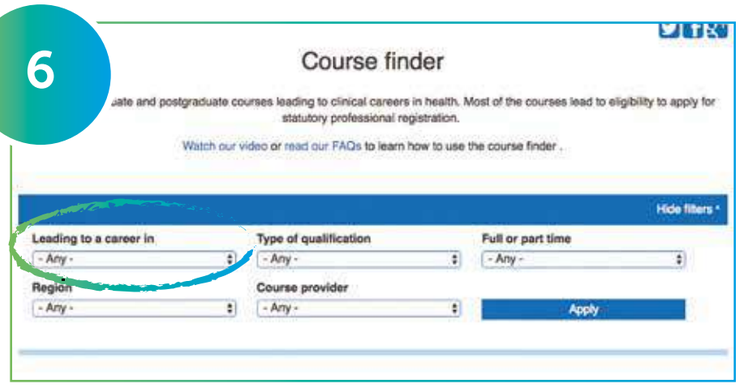


Go to the NHS careers site again: nhscareers.nhs.uk and click **CAREER PLANNING**

You then need to click: **COURSE FINDER**

You can see this at the top of the sub header or scroll to bottom of the page to see another link down there.

6



Click: 'Leading to a Career in' to reveal a list of careers that have an NHS Accredited Degree. Click the Career you want to look at and change any of the other settings as you see fit. We'd advise leaving them alone for your first search just to see what is out there.

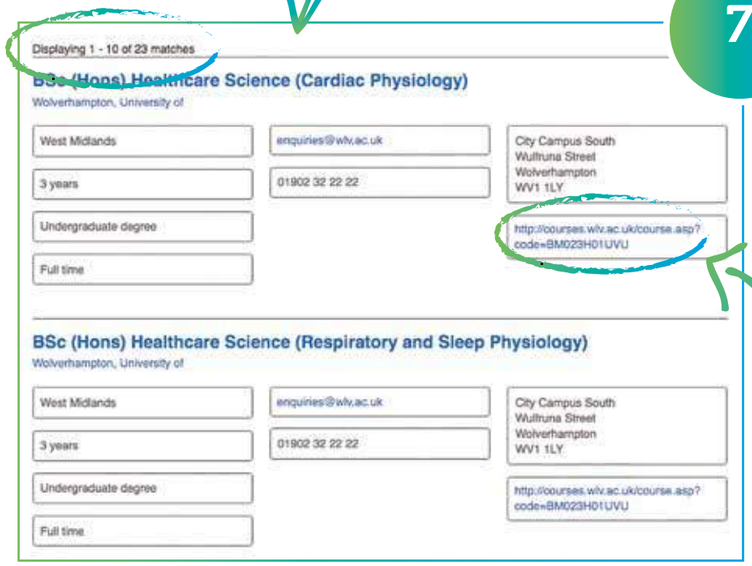
Click Apply to see the courses!

Top Tips

To make sure you choose the right course, make sure you contact the universities that teach these courses. You'll be able to speak to lecturers and tutors who can tell you all about the course. Check out when Open Days are and go and visit their labs and talk to their students to get an idea of what the courses are like! The UCAS website has a full list of Open Days at all the universities in the UK! You'll find it with a quick google search.

You then get a list of all the degree courses that link to that career. Our choice of Healthcare Science in Physiology resulted in 23 matches!!

7



Each match links directly to the University website and the course information where you can find out UCAS course codes, entry requirements at GCSE, A-Level, BTEC, IBAC etc, open days and more!

What to do next?

Head over to UCAS.ac.uk and you can then search for the courses using the course name or code. The course code from the University website allows you to double check you are selecting the right course when applying! Easy as 1, 2, 3... 4, 5, 6, & 7!

Watch a walk through online!
Check out episode 21 of MMTV. Visit www.medicalmavericks.co.uk/for-students/ to watch it!

Don't want to do Uni? Want to try an Apprenticeship?

All Apprenticeships are listed on the NHS Jobs website. There are different numbers of apprenticeships available for different jobs. Some have loads, some have very few. Plus apprenticeships numbers differ between different NHS trusts. To find them you have to do a bit of digging around. Visit **jobs.nhs.uk** to find them.

Interview

Interview with a Scientist

Microbiology

Name: Henna Bootwala

Age: 26

Place of work:
Blackpool Victoria Hospital

Area of NHS/Specialism:
Biomedical Science

Biomedical Science is a generic name for collection of really important lab based careers. Biomedical Scientist usually have a specialism, just like Henna here.

The specialisms are based within three areas of Biomedical Science, which are all pretty self explanatory. These are:

- Infection Sciences
- Blood Sciences
- Cellular Sciences

To find out more about the specific jobs in these areas, search Biomedical Science on the NHS Careers website:

www.healthcareers.nhs.uk

Why did you choose Microbiology?

Knowing what happened to specimens given to doctors e.g. urine, swab etc. I like the testing process to reach end result.

What was your route into your job?

IBMS (Institute of Biomedical Science) accredited BSc Hons Biomedical Science degree. I then got a Medical Laboratory Assistant job (3 and a half years), then I applied for an Assistant Practitioner job (1 year). During my time as an Assistant Practitioner I carried out training on my registration portfolio whilst in full-time employment as a Medical Laboratory Assistant. I completed and passed on 19th February 2018. I did a lot of the work in my own time as I was not in a specific training post. I then got a job as a band 5 Biomedical Scientist to start in 2018 at Lancaster Infirmary.

What's the most interesting thing you have discovered or seen working in the laboratory?

How gram staining works and a faecal transplant study. A woman was in pain as she could not digest her food, so stool from a donor was collected in a bag to transplant back into her.

What's challenging about your work?

Working under pressure with certain seasonal outbreaks as it creates an influx of specimens.

What does a routine day as a Microbiologist involve?

Receiving specimens to process and identify the cause of infection (organisms, bacteria) and doing antibiotic sensitivity testing. Then giving results to doctors and contacting environmental health if we need to.

Do you have any advice for someone who wants to get into Microbiology?

Definitely do a IBMS accredited degree in Biomedical Science!

Super easy to check if your degree is accredited, the IBMS generate a MASSIVE list each year:

https://careers.ibms.org/students/accredited-degree-courses/undergraduate-uk-courses

What are your top tips for students?

During your degree try and so a sandwich year to add to your portfolio. Get a MLA job as soon as you can, you need a portfolio of work to apply for Biomedical Scientist status. Have patience as getting to the BMS role takes time and patience and hard work. But keep at it and **DO NOT** GIVE UP.

What do you get up to when you aren't working?

I have a family (husband and a 2 year old) so I spend time with them and my extended family.

Other Biomedical Science Jobs to Consider

- Biochemistry
- Analytical Toxicology
- Haematology
- Immunology
- Geneticist
- Virologist
- Histopathology
- Cytopathology
- Molecular Pathology

Top Tips

If you want to look for other lab based careers you can find dozens of them in the Life Science section of Healthcare Science. Go to **www.nhscareers.nhs.uk** - click explore roles at the top - scroll down to Healthcare Science - Click Roles - Look for the list of Life Science careers, there 18 of them!

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Tom's Tales

Wanted for Murder by Tesco!

Many years ago, we had a life size medical manikin that was part of our workshops. When I say life size, I mean life size. He lay on an ambulance stretcher and weighed 70+kg!!!

His name was Stan and he was ace! You could plug him in and he would effectively come alive!

Yep, he had pulses in all the places you have pulse, you could hear his heart beat, his chest moved as he breathed, he blinked, his pupils reacted to light, he could bleed, sweat, wee, cough and talk. He even had removable and interchangeable genitalia so he could switch genders! (we soon stopped leaving those bits in our bags in the classroom – what happened there is for another story!).

One of the coolest things you could do with Stan is give him different diseases or drugs and his physiology changed in real time. You could give him a shot of adrenaline on his computer and his pulse would start to go faster! You could give him pretty much any medication and see the effects!

Stan was designed as a patient simulator and you would usually find him in a University or hospital training department... not in the back of a car, which is where my story really begins.

When we first got Stan, he had to 'live' in my house. A 6 foot, 70kg life like manikin living in the hallway on an ambulance stretcher. My wife was not impressed. Especially as we lived in a small terraced house on a 16 house walk way. Basically everyone could see my comings and goings.

My neighbours thought it was hilarious every time I had to take him somewhere. They'd see me wheel him out of the front door, down the path to my car. It didn't help that I always moved him around covered in a white sheet, just for added effect.

Within a few days of Stan's arrival our neighbours had dubbed me and my wife, Mr and Mrs Sweeney Todd. Nice.

However one morning, I had an afternoon session booked at a local school. My wife, who is a nurse, was at work at the local hospital, so I was on my own getting Stan ready.

Moving him around was a bit tricky so I always wore my 'dossing' clothes so it didn't matter if I got a bit dirty. That morning though, I had taken my dog for a walk so I was in my oldest trackie bottoms, big walking boots and a massive duffle coat with a huge hood. Basically, I could be described as a bit dodgy.

That day I had to take Stan in my car which at the time was a green Honda Accord Estate. Stan would slide straight into boot perfectly with a few CM to spare. That car was amaze balls.

As I was loading Stan in to my car, on his stretcher, covered in a white sheet, in my dodgy outfit, a Tesco delivery driver went past. The look on his face was a picture. I could see he was a bit freaked out and when he stopped I explained his was a life size first aid dummy.

He seemed to accept what I had said, and I went back home to change and leave for the school.

About 3 hours later I had just finished my session at the school and checked my mobile phone. TEN missed calls from my wife.

I called her back... she was not impressed.

The police had been to see her at work to ask about the 'dead body' that had been seen being loaded into a green Honda Accord. Oooooops!!

Apparently the Tesco delivery driver phoned the police soon after seeing me load Stan into my car. In their training, they are told not to ignore anything and always contact the police if they see anything suspicious.

The police had rucked up to my street and ended up speaking to my neighbours who all explained what our nick name was, which didn't help.

They found out that my wife worked at the hospital and headed there. The police had no problem finding my wife and went to her department. Once there, they pulled her out of her clinic into a side room which isn't a good sign.

Once in the room, the started asking questions... in this order....

"Mrs Warrender, is your husband called Tom Warrender?"

"Does he drive a green Honda Accord?"

Now, if you were asked these questions, what would you think? You'd think I was dead wouldn't you? Or at least seriously injured in a car accident.

This is EXACTLY what my wife thought.

The police had to quickly explain and asked if I had a 'dead body' that he takes around in his car.

Straight away, my wife knew what had happened. Someone had seen me with Stan and put 2 + 2 together and got 5.

On the phone she was in a bit of a state. Going from thinking your husband is dead to being asked if he has a body in his car is not good for marital relations.

She explained on the phone that I had to call the police just to explain.

So, next thing I was on the phone to local station. I called and asked for the Sargent in charge. I heard the Officer on the phone shout across his office:

"Sarg! It's the guy with the dead body in his car, on the phone! Shall I put him through!"

Got to love the police. They do have a sense of humour.

After a quick explanation of what Stan was all about the Police were fine and thought the whole thing was quite hilarious!

The Tesco delivery driver on the other hand... I think he needed a few days off to get over the shock!

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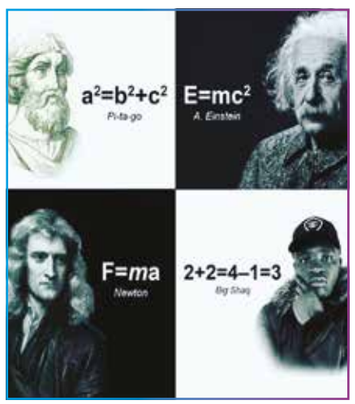
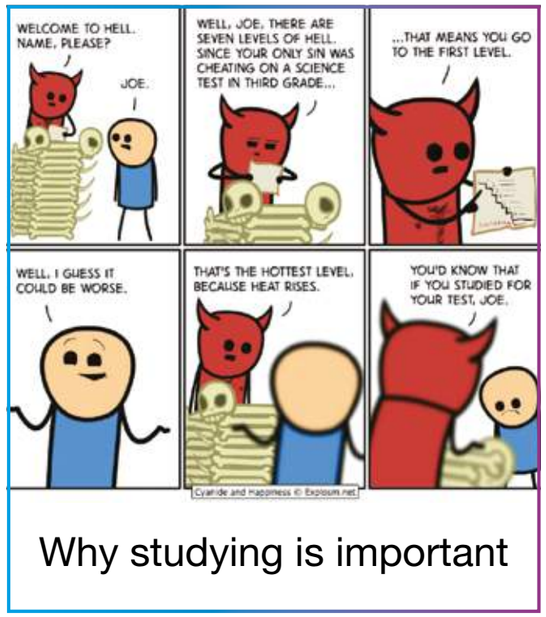
Memes

We Memes

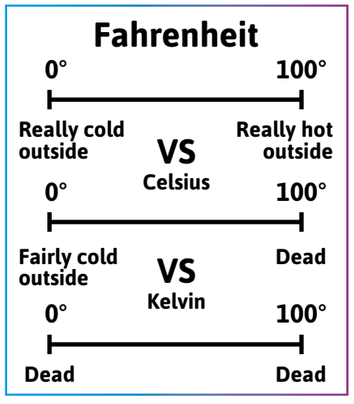


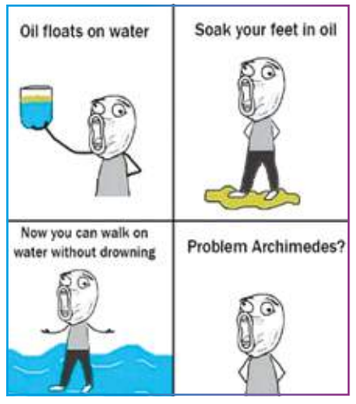
> what kind of fish is made of only two sodium atoms
>
> 2 Na

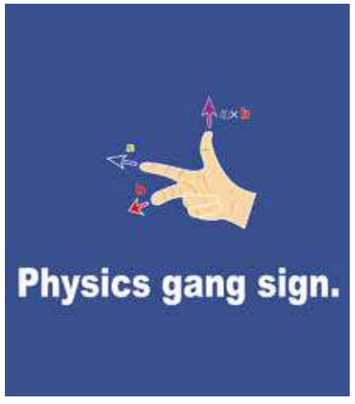
I actually want to cry

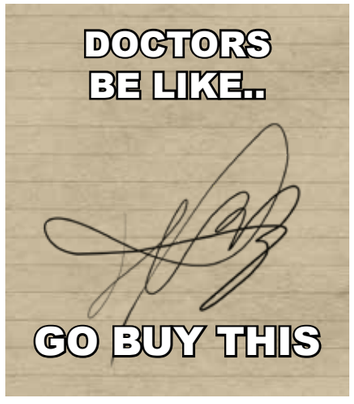


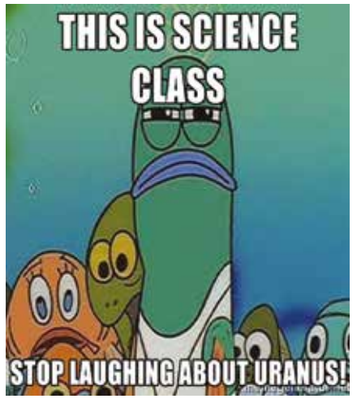
Why studying is important

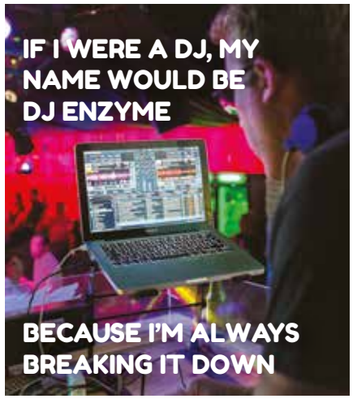


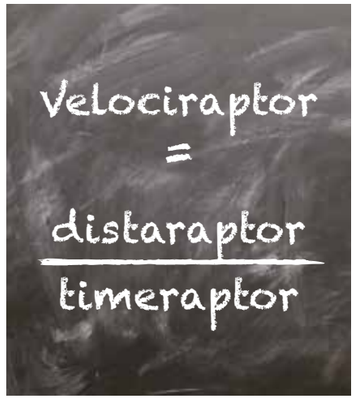












#BeMoreMaverick

Pushy Parents

What to do if you have pushy parents

Before we get started on this chapter, let's make one thing clear. Your parents love you and only want what they see is best for you.

And this is the problem. It is what THEY see is best and not **WHAT IS BEST** for you.

I see this time and time again in my visits to careers fairs, talks and visits across the UK. We'll have a stand which is promoting careers in the NHS and a parent will come to the stand with their child and proudly say, "My son/daughter here wants to be a doctor."

And usually that is it.

All they have told me is that their child wants to be a doctor with a big beaming proud smile on their face (the parent's face that is!).

The reaction in my head is "yeah… and…."

It is as if they want us to do a dance around and shout from the roof tops: "we've got another one… this kid wants to be a doctor!!"

And this is the 1st problem.

It is more than likely a status thing for the parent. Yes, being a doctor is an amazing achievement in society and for some cultures especially. Saying your child is a doctor is a very proud moment. The parent feels elevated, almost.

But this is wrong IF the child hasn't really had their say.

You may have experienced this conversation with your parents whilst talking about your future career. It might go something like this…

Parent: Have you thought about what you want to do for a job?

You: Not really, I quite like trying out my lessons for a bit.

Parent: Really? No idea at all?

You (in your head): I'm 15 FFS… I can't decide which socks to wear in the morning sometimes and you want me to make a decision now on what to do with the next 30-40 years of my life.

You (out loud): Hmmm, I do quite like music, art, drama & English.

Parent: I think you'd make a good doctor. Why don't you become a doctor? A doctor would be good!

You (in your head): WTAF… there is no way I want to be a doctor. I like science, but not that much.

You (Out loud): Really? I'm not sure about that. You need top top grades. Literally A*s / level 9's across all subjects.

Parent: I'm sure you can do it if you knuckle down a bit more.

You: Maybe…

Parent: OK, then… we'll get you sorted as a doctor. Wait till the ladies / lads down the pub / club / church / synagogue / mosque / office hear that my little **insert your name here** is going to be a doctor.

And that's it…. Your future decided.

You can't blame your parents. They probably know very little about the careers in the NHS.

Do a little test on them. Ask them to write down all the careers they know about in the NHS… and I mean exact job titles. I bet they can't get more than 10.

Once they've done this you've got some ammunition to go back to them with and say:

"Being a doctor is right for me, I like these careers in here (use our resources) and this one and this one".

Or, you can say:

"I've had a look through this magazine and the NHS careers website and I really don't fancy any of the medical careers. Being a doctor is not for me, neither are any of the careers in here. I want to explore my options some more."

It is OK to disagree with your parents and it is OK to not want to be a doctor. Just go to them with some evidence that you've done your research.

I know it could be difficult to disagree with what your parents say. It takes a lot of courage to 'stand up' to them and speak your own mind. You may be frightened to do so because it turns into an argument or you don't want to disappoint them, or even worse they use emotional blackmail by telling you you've brought shame on the family and they threaten to outcast you.

But in any situation like this I have one thought… and it is a bit grim.

One day your folks won't be here and you'll be on your own (metaphorically… you'll probably have a partner and kids of your own by now, but you get my point…)

Yep – they'll be gone and they won't be able to judge your decisions, they won't be able to judge you.

Let's say you do become a doctor (or any other careers your parents chose for you… a lawyer, engineer, architect…) and you are 37 years old. Both your parents pass away. You now have half your working life and over half of your actual life ahead of you.

Another 30-50 years of time to do stuff. Work, play, rest and enjoy.

And you are going to spend all this time… and it is a looooooong time, doing something that you didn't want to do in the first place and that you don't want to do now but did it to please someone else that now isn't here and won't care one bit because they are not here.

How messed up is that? Not that we're talking about your parents not being here, but the fact is you will more than likely spend over half your life doing something you don't want to in order to please someone that is now dead.

It is properly messed up and so wrong.

There's none of this, "but they're looking over me…"

What do you think is going to happen? They're going to haunt you and shame you from 'the other side'?

Absolute codswallop.

If that actually happens… how many times has someone experienced this. I'll tell you.

NON… NADA… ZILCH… no one has ever said I was haunted by my folks because I chose a different career.

It is a societal thing for both you and your parents.

Promise me if you are in this situation, you'll sit down quietly and just think about this situation as I have laid it out here. I am sure you'll think differently about your career decision.

It is OK to change your mind about what you want to do at any point in your life. Whether it be a doctor or an artist, a designer, musician, actor, lawyer or whatever. The important thing is that YOU make the decision as it is your life and you need to have the courage to follow what you want to do.

Where can I work in the AWESOME NHS?! Includes Top Tips!

1. Healthcare Science

GCSE: 5 x Levels 9-4. Eng, Maths & Sci are important.

University? University Degree.

40+ careers to choose from.

Some have patient contact, some don't.

Specialisms include:
- Physiology
- Lab Science
- Medical Engineering
- Medical Physics

Consider this if you like all the sciences or engineering, IT, Technology, Electronics.

2. Nursing

GCSE: 5 x Levels 9-4. Eng, Maths & Sci are important.

University? University Degree.

Lots of Unis have two course intakes each year – Sept & April.

Work with patients & pretty much every other career in a hospital.

See loads of different things! Surgery, medicines, treatments, death, babies, kids, adults.

Lots of areas to choose from:
- Adult
- Child
- Learning Disability
- Mental Health

More specialisms later on after qualifying.

3. Midwifery

GCSE: 5 x Levels 9-4. Eng, Maths & Sci are important.

University? Degree in Midwifery.

Work in hospital & Community.

Main role is to monitor unborn baby and Mom!

Alternate Route In
If you don't get in 1st time. Go away, get some healthcare work experience and re-apply when you are a little older / more mature!

You can become and Nurse and then do a 78 week training course to become a Midwife!

4. Management

GCSE: 5 x A-C / 9-4

University? Various degrees – Business, Management, IT.

Virtually no patient contact.

More office based.

Work behind the scenes to make sure hospital runs as smoothly as possible.

Specialisms include:
- Finance,
- Human Resources
- Sterilisation & decontamination
- General Management

Consider this if you don't fancy blood and science!

5. Physician Associate

GCSE: 5 x A-C / 9-5

University? You need a science degree 1st, then study a postgraduate top up.

Relatively new career in the NHS.

Good option if you don't get into medicine.

Work closely with patients.

Support Doctors in diagnosing & managing patients.

Consider this if you like medical careers but want to keep your options open at Uni.

6. Medicine

GCSE: A & A* / 7-9 levels
You need Chemistry @ A-Level!

University? Basic – 5 years of uni med school, 2 years as Junior Doctor.

About 1/3 get an interview

50% get an offer after interview

Get lots of life experience! Join clubs, get a part time job, meet people!

Work Experience Tip:
Think outside the box. Go to other medical industries like biomedical engineering, pharmacy, prosthetics, lab based careers. The Unis will love it!

7. Dentistry

GCSE: A & B / 6-9 level
A-levels are more important!

University? You need Chemistry 5 year University course.

Work with patients.

You have to complete an Aptitude Test to gain entry too.

You can do a pre-dental year if you don't have science qualifications!

Other Dental careers include:
- Dental Hygenist
- Dental Nurse
- Dental Technician
- Dental Therapist

These have lower entry standard and multiple entry routes.

8 . Health Informatics

GCSE: A-C / 9-4 Maths, English and IT are important.

University? Various routes. Some University some Apprentice & on the job training.

Uni courses to consider: IT, Technology, Maths & Stats.

This area allows the NHS to get information as efficiently as possible.

Some work with paper based records, some involve getting electronic records and others are involved in the developing systems & programs to store and distribute information.

Specialisms include:
- Coders
- Librarians
- ICT technicians
- IT Trainers
- Health Records
- Clerks

9. Ambulance Service

GCSE: A-C / 9-4 levels
Maths, English & Science.

University? 3 year Paramedic Science Degree.

As well as University routes you can become a student paramedic. It takes longer but you get paid to train. Places are limited too.

Driving is a key skill.

There are other roles too that support the paramedics on the road:
- Call Handler (answering 999)
- Emergency Dispatch
- Ambulance Care Assistant
- Patient Transport

Consider this if you want to work in a close knit team and be at the forefront of the action!

10. Allied Health Professions

GCSE: Some A-C / 9-4, some A-B / 9-6.

University? Various courses depending on career path.

One of THE most varied parts of the NHS and mainly work directly with patients.

Career choices include:
- Physiotherapy
- Occupational Therapist
- Podiatrist (feet!)
- Dietician
- Arts, Drama & Music Therapist
- Psychologist
- Radiographer
- Speech & Language Therapist
- Operating Department Practitioner

There is something for everyone here!

11. Wider Healthcare Team

GCSE: Varied, typically A-C incl Maths & English.

University? Varied: Some do, some don't.

Just like the Allied Professions, this a real mix of different careers.

These help the NHS run like clock work.

Careers include:
- Architect
- Catering
- Drivers
- Health Promotion Staff
- Maintenance
- Porters
- Receptionists
- Personal Assistants
- Medical Secretary
- And many more!

MEDICAL MAVERICKS
INSPIRATION IN, ASPIRATIONS OUT

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