Vol. 1

The Medicine Society Journals

Edited By

The Beths Medicine Society

Wherever the art of Medicine is loved, there is also a love of Humanity - Hippocrates

Beths Grammar School

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Vol. 1

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An Investigation Into Pacemakers

By Charles 12A1

What Are Pacemakers?

Pacemakers, also known as artificial cardiac pacemakers, are small devices which deliver electrical pulses to chambers of the heart via electrodes and pacing leads. They are made from a pulse generator and 1 to 3 pacing leads, weighing around 20 grams in total. The pacemaker is surgically implanted under the skin (close to the heart) and the pacing leads are connected to the necessary heart chambers. Each pulse generated by the pacemaker can target one specific chamber, forcing it to contract. The contractions fulfil the pacemaker's primary function – maintaining a steady heart rate. For this reason, pacemakers are typically used to treat conditions that result in the heart beating at an incorrect rhythm or too slow (Arrhythmias). Incorrect contractions of the heart can often be identified by symptoms, such as dizziness, and fatigue. In addition to providing these electrical pulses, Pacemakers also monitor the heart's activity, so it can activate as soon as it identifies any abnormal rhythms. Modern Pacemakers are also fitted with settings that adjust the pacing rates based on physical activity, ensuring it is only activated when completely necessary.

Who Invented Pacemakers

The first official pacemaker was an external pacemaker made by Canadian electrical engineer John Hopps in 1950. This design, although functioning, was incredibly dangerous to the patient as it had to be plugged into an AC wall socket. This carried the risk of electrocuting the patient, and inducing ventricular fibrillation (an abnormal heart rhythm). Over time this model was developed, leading to the creation of the wearable pacemaker, by Earl Bakken in 1958. This saw the pacemaker being moved into a small plastic box containing a battery, and controls to adjust both the output voltage and pacing rate.

An Investigation Into Pacemakers

By Charles 12A1

The first implantable pacemaker was created in 1958 by Rune Elmqvist, a Swedish engineer and Ake Skenning, a heart surgeon. It was designed to solve the impossible, to increase the lifespan of those with fatal heart conditions. In 1958, Arne Larsson became the first patient to receive an implantable pacemaker in order to help him survive Stokes Aadms attacks, which required daily resuscitation. By implanting the pacemaker into him, his heart could be regulated, and he was no longer at risk of sudden death. After the initial implantation, Larsson received 26 other pacemakers before dying from melanoma in 2001, outliving both Elmqvist and Skenning.

The Future of Pacemakers

Recent developments in pacemaker technology has seen the creation of leadless Pacemakers. As the name suggests these do not have the pacing leads that previous pacemakers had, and instead of being placed under the skin, the pacemaker is placed directly onto the right ventricle. Before implantation, a healthcare professional customises the Pacemaker, so that it only sends electrical signals to the patients' heart when necessary. Furthermore, the leadless pacemaker can sense the patients heart and provide additional electrical impulses when the natural ones are not occurring frequently enough. As this pacemaker requires no additional power source, or pacing leads, the most common complications (infections or broken leads) are no longer a problem.

An Investigation Into Pacemakers

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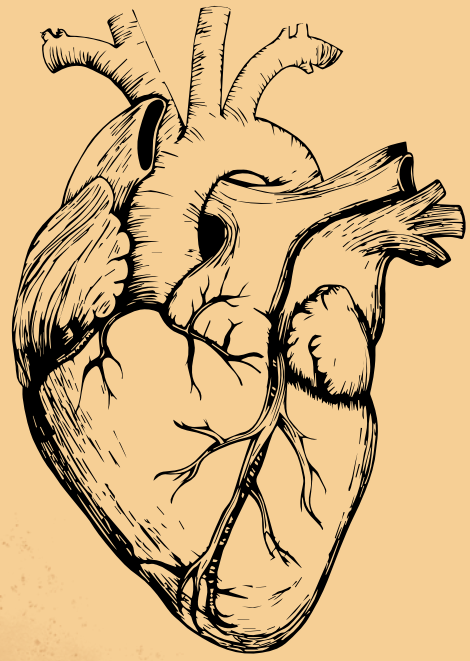
In addition to leadless pacemakers, a new temporary pacemaker has been created. This pacemaker is smaller than a grain of rice, and dissolves once it's Job is done (this can occur after a few days or few weeks, depending on what is required). This holds a significant advantage to the previous temporary pacemakers, which had to be implanted into the body. Removal of the older pacemakers could lead to complications, as removing the leads could cause damage to the surface of the heart. This occurred in 2012 when, during the removal of Neil Armstrong's temporary pacemaker, the wires tore a part of the heart tissue, resulting in bleeding. This would not normally result in death, but due to several incorrect decisions, by the time they started to stop the bleeding, he had experienced severe brain damage, due to a lack of blood supply. By using the new dissolvable pacemakers, this rare complication will never be experienced again.



Your Brain vs. The School System

By Ayo 12H2

If you constantly feel tired or worn out, it might not be because you're lazy; the underlying issue is your brain is trying to work against the clock.

During adolescence, a shift occurs in your body's natural clock (or Circadian Rhythm) causing you to feel sleepy later at night than normal and wake up later in the morning. But school expects you to be fully functioning and ready between 8:30 and 8:45, when your brain is barely online, completely disregarding the changes in the body.

A 2018 study in Nature Communications confirmed that teenage Circadian Rhythms are delayed by about two hours, making early starts biologically difficult.

Contrary to 8-10 hours of sleep recommended, research shows that most teens get only 6-7 hours of sleep, and this could potentially affect your mood, memory, focus, skin and even your immune system.

Unfortunately, our phones make this issue even worse. The blue light from the screen blocks melatonin, which is a hormone responsible for regulating Circadian Rhythms (sleep cycle). Melatonin is essentially produced in response to darkness, and this then signals to your brain that it is time to sleep. Although this affects our sleep patterns, this is just one of the many factors that play into reducing sleep time (the main one being the change in our Circadian Rhythm).

Your Brain vs. The School System

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Some tips to help with manage your sleep schedules are:

- Limiting screen time before bed (it could even be once or twice a week)
- Sticking to regular sleep patterns
- Avoid doing homework in bed to ensure your brain separates “rest space” and “work space”

Your brain wasn’t built for 8AM, it is still developing and unfortunately, the school system doesn't care: your brain is trying to survive in a system built for adults. So, no you're not lazy, just stuck in a system that ignores how your brain actually works. Until that changes, remember your body isn't the problem, the schedule is.

Mental Health Act Reform (2025)

By Oscar 12C2

Since it was first implemented in 1983, the original Mental Health Act has come under sizeable scrutiny; this stems from its lack of understanding patient autonomy and rights, and being generally outdated for a modern society. An independent study by Professor Sir Simon Wessely (2018) sought to find the true issues, and came back with vital calls for reform:

-Why are so many patients kept in detention without genuine reason?
-Why is the racial disparity between patients so large when it comes to treatment?

So, the government listened. They did extensive research, and eventually (this year), they combined their ideas into a legislative movement. This article will explore what exactly has been changed, and what implications it has on those affected.

Advance Choice Documents

Advance Choice Documents (ACDs) allow for patient autonomy to be fully exercised; in circumstances where capacity to consent is lost or diminished, this document can be referred to when receiving medical treatment. It serves as a legally binding statement in order to record a patient's preferences and refusals if detained in the future.

Advocacy Rights

In tandem with ACDs, the reforms significantly bolster advocacy and tribunal rights. Every detained patient now has a statutory entitlement to independent advocacy, and automatic referral to a Mental Health Tribunal occurs within two months of detention. Tightened timelines or hearings guarantee that reviews happen promptly, providing an essential check on clinicians' authority to detain.

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Stricter Detention Criteria

Only in cases where there is an elevated likelihood of serious injury to the patient or others, and no less prohibitive option exists to mitigate that risk, may the patient be placed in detention. This means that in order to face detention, a person would have to genuinely pose a large threat of harm towards themselves or others, otherwise not qualifying for said method of treatment.

Racial Disparity

According to the most recent NHS data, Black people are still more than three times as likely as white people to be sectioned under the Act and roughly seven times as likely to be placed on a Community Treatment Order. Although the reform has not been specifically enacted into law, it has strongly urged action to reduce the disproportionate number of Black, Asian, and minority ethnic patients in detention.

Statutory Care and Treatment Plans

Every patient held beneath the Act will have a care and treatment plan that is enforceable by law. These plans must outline a precise, individualised approach to therapeutic advancement, outlining objectives, roles, and deadlines to direct rehabilitation and release. By putting these plans into law, they are elevated above the level of guidance. Clinicians and commissioners are now required to work with patients, record agreed-upon interventions, and evaluate progress at predetermined intervals. This ensures that mandatory detention is accompanied by a strong plan for freedom and well-being.

Overall, these elements being reformed signifies a vital change in understanding how patients should be able to make their own decisions, and not be discriminated against; a genuine goal to strive for.

Club Trip: The Wellcome Collection

By Etinosa 12H2

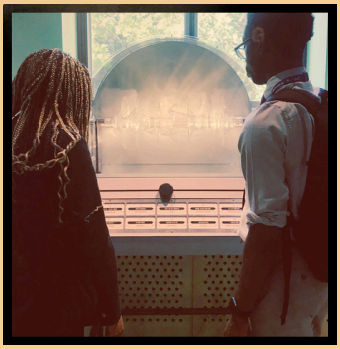
Part of what makes this club so great are the oh-so-exciting super curricular trips!

On the 16th of July we visited the 'Wellcome Collection' on Euston road. We were able to see a variety of intriguing exhibitions on the ground and first floor.

Permanent Exhibition: Being Human

Starting with the awesome 'Being Human' exhibition that greeted us just after climbing the stairs. This exhibition was insanely immersive with things such as; a light up human body and a majestic jukebox (by Kin and Bethan Laura Wood) that played songs relating to illnesses and epidemics.

It was throughout this exhibition that I realised the link between medicine and art. The place was filled with work of protest, awareness and retribution. Pieces made to remind us of how we are human in more than just a physical, biological sense. Depictions of disability awareness, the fragility of human emotions, and on issues like drought, flood and pollution.



Instalment: Finger Talk (Cathy Mager)

Next, we had an enlightening experience in 'Finger Talk'. This instalment was to educate on British Sign Language (BSL) utilising vibration vests to further induce us into a more sensory world. This coupled with the curved screen and looping emphatic video enveloped us, drawing our attention to the struggles of the non-hearing community.

Club Trip: The Wellcome Collection

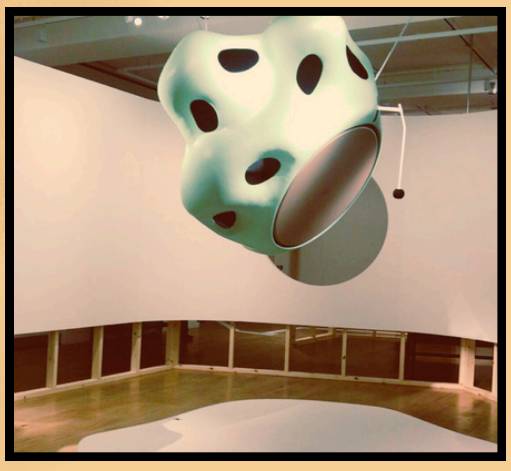
By Etinosa 12H2

Display: Zines Forever! DIY Publishing and Disability Justice (Dr Lea Cooper, and Adam Rose)

We then entered the realm of 'Zines'; a form of expression, protest and relaxation. Through tablets and paintings we could see various thoughts presented through 6-page-long booklets called 'Zines'. We were even able to make our own; that now sit comfortably as part of the display itself!

Exhibition: 1880 THAT (Christine Sun Kim and Thomas Mader)

The final destination of our voyage, also centred around deafness. The title of the exhibition in itself refers to a conference held in Milan 1880 which ruled that oral education - teaching Deaf people to communicate through lip reading and speech - should replace sign language in Deaf schools. This outlook inspired a repeated theme in the exhibition centering around noses and condescending snorts. Best seen in the piece 'Running gag' featuring over 200 huffed noses representing all the hearing people at the conference. It epitomises society's lack of respect for deaf people, their snorts getting greener and greener reflecting the colour of healthcare and how deafness was seen as something that needed to be cured. Only one nose had no cloud as only one man at that conference was deaf.

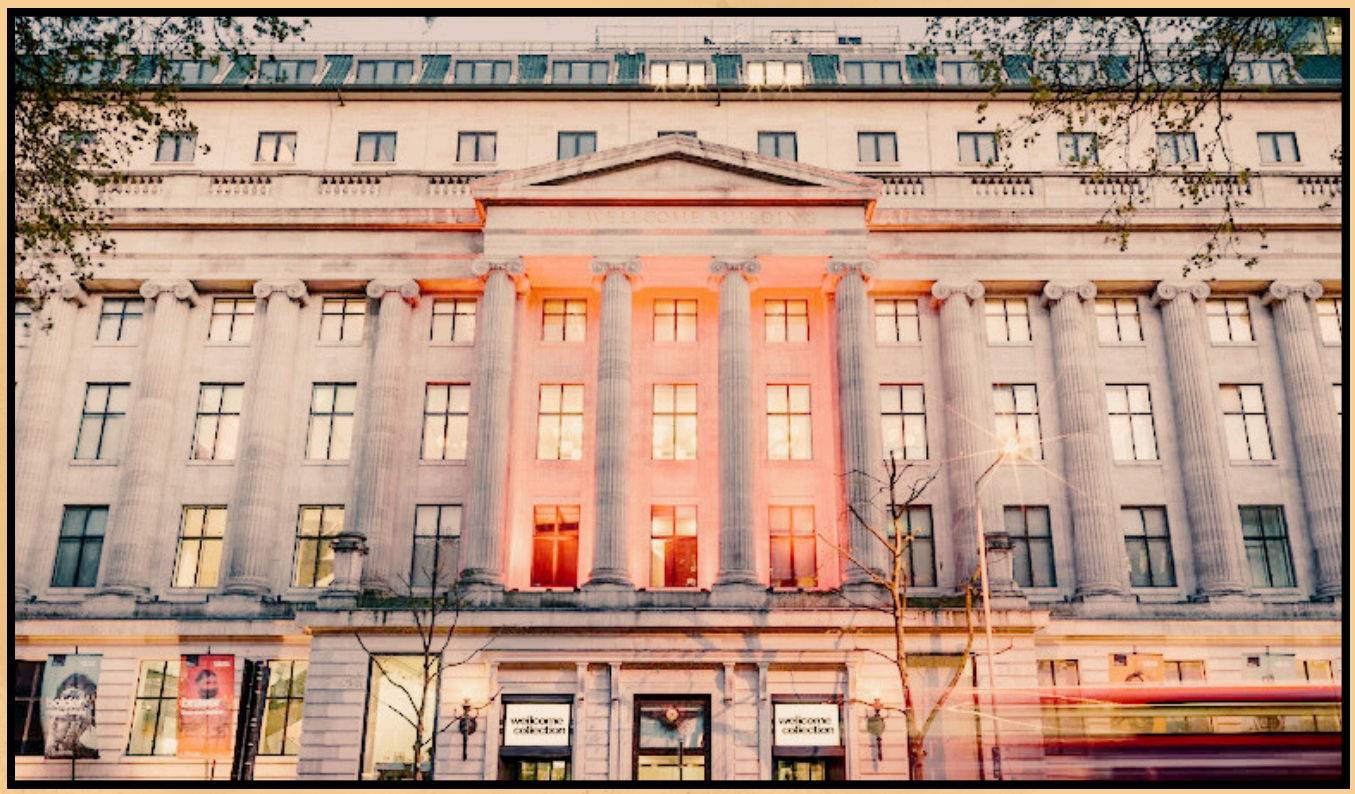


Club Trip: The Wellcome Collection

By Etinosa 12H2

This exhibition had me awestruck again and again. I particularly enjoyed 'Look Up My Nose' that took the huffing one step further with a drum that blows air down the nostrils, as well as 'Not Cross' that illuminates the disconnect between hearing and deaf people using the proverbial 'Brick Wall'

I'm grateful to the MedSoc leaders for organising this trip as well as all the artists that made these exhibitions so delightful to view and interact with. Everything I saw was simultaneously mesmerising and educational and I'm glad to have gone. One last thanks to the Wellcome Collection themselves for making a free-to-visit and highly immersive museum!



An Interview with a Year 2 Medical Student

By Edwin 12C1

For our first edition of the MedSoc Journals, I was lucky enough to reach out to a medical student in her 2nd Year of University, Chelsea Izuchukwu. She attends Kent and Medway Medical School, and yet still had the time to provide the answers to this interview – tell-tale traits of a compassionate doctor! Here's what we spoke about:

How big is the overlap between A-Level and University?

A level subjects like Biology and Chemistry lay a good foundation for some aspects of medicine. For example, it allowed me to have a general understanding of concepts such as the Krebs cycle, sarcomeres, general chemistry - which is very useful as they reappear in Medicine. In terms of learning styles, A-levels require students to study a lot more independently. This is an extremely important skill for medics, so I'd say the overlap is a fair amount, but there is a lot more detail of course.

What is your favourite thing about studying Medicine?

My favourite thing about studying medicine is the fact that it allows you to delve into the intricacies of certain body systems or conditions. As a result, I am genuinely learning something new every day that I can use to help the people I know.

What do you like best about your university?

My university is a relatively new medical school, which I really like because the approach to our learning is a lot more patient-centred. Because of my university, I had the privilege to have some 1 on 1 patient interactions as early as my second month of my first year of university.

An Interview with a Year 2 Medical Student

By Edwin 12C1

What is the most difficult part of being a medical student?

The most difficult part of being a medical student is that you have to juggle a lot all by yourself. For example, placement, 9-5 lectures, assignments, assessments etc. So it's important to learn to find balance and time to rest

If you could restart, would you still go into Medicine?

If I could restart, I would still go into Medicine. The further I get as a medical student, the more I realise how crucial it is for me to study this course. You get to see different inequalities and niches in medical practice where your impact could be highly influential and beneficial.

Any Advice?

My advice for A-Level Aspiring Medics is to keep pushing and keep being interested! It's easy to be discouraged along many paths of medical school application and during the actual course, but just remind yourself of why you wanted to study medicine. And learn to rest :)

And that wraps up my interview with Chelsea, a 2nd Year Medical Student. Massive thank you to her for giving me her time, and I hope you all enjoyed this amazing insight into the life of a current medical student, future doctor, and previous aspiring medic – just like us. Thanks for reading, and we hope to see you again in the next edition!

Notes from Presidents

Applying for medicine (or other healthcare fields such as dentistry) is a task no one should have to take on their own. It requires intense focus and determination, often sacrificing mental health in the process. As the President of Medicine Society, I hope to help others make their dreams of securing a spot at a medical university a reality, whilst ensuring their mental wellbeing does not crumble.

- Charles, President

Since I joined Medicine Society, I have been part of a supporting and caring community, where we help and motivate and support each other through the daunting journey of medicine. The Society is also very inclusive as anyone is welcome, even those not particularly interested in medicine. Being the vice president of this society has allowed me out of my comfort zone and has encouraged me to read, research, and grow so I can better support our members. I truly believe this society is already headed in a great direction, and I believe with the right leadership, this society will continue to thrive and flourish.

- Ayo, Vice President

Medicine Society means a myriad of things to me. It's a place to meet new people and make new friends. It's a place to knuckle down and focus on preparing to apply to medicine. It's a vessel for us to be altruistic and charitable. Overall, it's one of my favourite places to be in Beths. I'm so proud of the work my co-presidents, the previous iterations of Medicine Society, and all of our members have done this year, and I hope for Medicine Society to hit the ground running in the next academic year. Thank you to everyone who had a hand in the flourishing of Medicine Society.

- Edwin, Vice President

Special Thanks

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In Loving Memory

Dedicated to a prominent Medicine Society Member, and our friend,

Alexander Cardoza