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What can I do? How can I help? Who can I help? Can I help?

This idealistic mind-set which seems to be a trademark of our generation, young, motivated, inspired — naive? —, sometimes leaves us feeling powerless when confronted with the realities of today.

We are increasingly aware of the global issues which humanity faces; our responsibility to pay attention to actions as simple as what we eat (as Emma will tell you p31) cannot be denied in the face of the information available to us. We have a duty to be informed consumers — Carrie encourages us to combat the plague that is disposable fashion p33 — and conscientious citizens — George makes us question our ethical standards p19.

Yet this increasing awareness comes at a cost. The burden of responsibility is heavy. We are, as the 1%, educated and resource-rich, the most equipped to take action against All the Problems of the World.

People seem to react in different ways to this challenge— you can definitely choose to ignore any problem that doesn’t seem to directly affect your happiness. But for those of us who can’t quite shake that nagging feeling of guilt, the good news is that we can act upon it. (In the face of such bleak prospects, how tragic would it be if I didn’t even attempt to conjure in you a feeling of hope?)

Don’t wallow in despair. Don’t give up on victims of climate change. (p21 & p11). Do what you can to change the world (Kate and Vanessa can help p25)! And you thought you were in it for a light read...

We are also at the dawn of a new Age of Technology, with changes we can’t imagine around the corner. And although this comes with its share of challenges, some of which Esther writes about p23, there is hope that we can come full circle and use technology to solve some of technology’s problems (p9).

North Wing has come a long way since last year, and now publishes bi-weekly articles, artwork, and reviews online on www.northwingmagazine.com. I hope that this yearly print edition is thought-provoking, and perhaps even inspiring — at the very least, I hope that you pass some time pleasantly by reading a few pages.

With my most sincere thanks to our fantastic editorial team, and all our writers,

Mary
Editor-in-chief
Across from my workplace in the US stood a beautiful building that once served as a funeral home. During my first week on the job a coworker looked out the window and said, “In the 80s and 90s, I went to about 70 funerals there.” I knew without hesitation that this coworker was talking about friends who had died of HIV/AIDS.

Since its devastating epidemic in the 1980s, HIV has loomed like a shadow over many parts of the world. For demographic groups in the US deemed to be at high-risk for HIV, “just use condoms,” has been the #1 prevention message, and it’s still prevalent in parts of the country today. This is especially true for gay and bisexual men, a population who for decades has been warned that sex could kill them. While it’s true that condoms prevent HIV, this do-or-die approach is riddled with fear and stigma.

Enter PrEP, a tool that despite its controversy has been redefining HIV prevention in certain parts of the world. PrEP involves taking a daily medication called Truvada (Emtricitabine/Tenofovir), which can help block HIV if it gets in the body. The medication builds a shield around a person’s CD4 T-Cells, so HIV can’t get into the cells and start multiplying. Clinical trials have demonstrated that when taken consistently and correctly, PrEP can reduce a person’s chances of getting HIV by up to 99%.1,2

As a PrEP Navigator in the US my job was to help prospective patients find a culturally sensitive and affirming PrEP provider (doctor, nurse practitioner, physician assistant, or naturopathic doctor), and to help the patient get PrEP at low cost or for free through a combination of insurance and/or patient assistance programs. I witnessed a range of benefits and challenges to PrEP implementation in the US, but at the core I found that patients who take PrEP feel empowered and in charge of their sexual health. Contrary to what the anti-PrEP movement says, people don’t take PrEP because they hate condoms. People take PrEP because they want to prevent HIV, and in turn take all the opportunities they can to minimise transmission risks.

PrEP can be used in a multitude of situations: a woman can take PrEP to conceive with an HIV-positive partner; a person engaging in survival/transactional sex can take PrEP to prevent infection when partners don’t want to use condoms; a sero-discordant couple who has been together for 20 years can now include PrEP in their prevention toolkit. Patients on PrEP commit to HIV and STI testing every three months, medication adherence checks, and additional lab work. And while we know that some patients may stop using condoms when taking PrEP, we also know that some patients have never used condoms in the first place.

When I arrived in Sheffield in September to start my postgraduate program I was immediately curious about PrEP provision in England. Scotland was the first of the UK nations to get full NHS provision for PrEP, and through the PrEPared Trial Wales has since made PrEP available at certain Genitourinary Medicine (GUM) clinics.3 England is making similar headway. In October of this year NHS England launched the PrEP Impact Trial, which will be the largest PrEP implementation trial of its kind.4 Over the next three years, PrEP will be made available to 10,000 individuals at high-risk for HIV, including at Sheffield’s Royal Hallamshire Hospital. All trial clinics are expected to be up and running by April 2018.4

Despite this forward movement, some are concerned that the trial is ultimately delaying PrEP provision. The Impact Trial website states: ‘Whilst the efficacy of PrEP has been established in multiple trials across the world, including the PROUD trial that was conducted in England, the relatively small
The negative comments I’ve read on NHS England press releases about PrEP are similar to those shared in the US—full of subtle and not-so-subtle homophobia: “the NHS shouldn’t cover PrEP because it’s a ‘lifestyle choice’.” If we let that argument guide public health programming, we’d have to eliminate virtually any programming that addresses a ‘lifestyle choice.’ We’d have to get rid of tobacco cessation services, nicotine patches, blood pressure medication, treatment for substance use, weight loss programming... the list goes on.

The topic of PrEP has come up a lot here with friends when we talk about our background and interests. Most of them are enthusiastic about PrEP, though occasionally some express concern. “Has the US thought about focusing more on lifestyle education and choices?” I always cringe when I hear this because it rings of body and sex-shaming. We’ve got to stop telling people that they are making “bad choices”, especially when they are committing to an intervention like PrEP. PrEP is not for everybody, but it’s an option that works. Of the 79,000+ individuals on PrEP in the US, there have been three documented cases of HIV.

At the first annual PrEP Summit in San Francisco in December 2016, I remember one gentleman saying “With PrEP I’ve been able to have sex without crippling anxiety for the first time...
in my life’. Imagine what it would be like to be told that your sex life was dangerous and unsafe. Why do we say these things to people? These messages don’t take into account a human being’s basic and natural desire for intimacy and human connection. They also give the impression that we know what is best for others, when in reality each person is the expert of their own life. I think PrEP is helping to change this rhetoric.

I want PrEP for England like I want PrEP for my patients and friends back home in the US. I want to offer it to an individual so that they stay HIV-negative; I want it for the patient who will drive across England to get PrEP at a clinic where nobody recognizes him; for the undocumented patients who work in migrant camps; the HIV-negative women who take PrEP to be able to conceive with HIV-positive partners; and the patients who will cry with relief when they no longer have debilitating anxiety about HIV. These are human beings who are self-actualizing and taking care of their health, as anyone else could hope to do. While PrEP isn’t for everybody, it’s a critical tool for prevention and patient-led care. Patients know their risks, and they know what works for them. When people have information and tools available, they have choice. While much work remains regarding access and stigma reduction, I am grateful for England’s recognition of PrEP and its forward movement toward this critical prevention tool.

References


Book Reviews
Compiled by Esther Lawrence

**Gut**
The inside story of our body’s most underrated organ. By Giulia Enders

"Even if you have written off gastrointestinal medicine as dull, this book will leave you highly intrigued by the digestive tract."

Esther Lawrence

**The Other Side of Silence**
A psychiatrist’s memoir of depression. By Linda Gask

"Like listening to a confession - raw, honest, personal and at times almost uncomfortable."

Alexandra Bucko

**Mountains Beyond Mountains**
From Harvard to Haiti: the remarkable story of one man’s mission to save the world. By Tracy Kidder

"A ‘poor people’s doctor’… A fascinating character who has had an outsized impact on medicine and public health across the globe… I would thoroughly recommend this book to anyone interested in global health, poverty, and development."

Toby Bonvoisin

**Challenging Concepts in Respiratory Medicine**
Cases with expert commentary. Edited by Lucy Shomberg, Elizabeth Sage & Nicholas Hart

"A good textbook to challenge those on the path towards a career in respiratory medicine."

Callum Leng
Visual, auditory, kinaesthetic: which way do you learn best? It may not matter anymore. Forget all you think you know about the process of learning... or don't. Elon Musk’s latest venture is set to change the very concept of knowledge, identity and how we interact with each other.

Making his billions through the founding of PayPal, you may have heard of Elon from his electric car and solar power company Tesla, his re-usable rocket company Space-X, the zero air-resistance bullet trains of the Hyperloop or even the high-speed transport tunnels he is digging hundreds of feet below Los Angeles (by the so-called ‘Boring company’). The man is polymath and visionary, reputedly spending 80% of his work time on actual engineering and design; he seems to have humanity’s best interests at heart.

When he’s not making our species interplanetary or combating the world’s dependence on fossil fuels, Elon also has a thing or two to say about Artificial Intelligence (AI). Infamously telling Mark Zuckerberg that he doesn’t know what he’s talking about regarding the matter, Musk is backed by Steven Hawking and many other prominent scientists who are equally as worried about the threat of malicious AI. Imagine a self-improving computer programme able to increase in both knowledge and computing power exponentially; within minutes of its creation it would be infinitely more knowledgeable than any human and able to carry out tasks beyond our comprehension.

If this kind of power was under the control of one individual – or some shadowy organisation –, it could wreak havoc on global financial markets, having serious consequences for the global distribution of power.

Going one step further than this brings us to ‘the singularity’, where AI becomes self-aware and independent. This super-smart programme, once acquainted with all of human history, could decide that we humans are not worthy of life given, say, the destruction of the ozone layer, our many atrocities of war or our maltreatment of animals.

The solution, as Elon sees it, is to mitigate these threats by becoming super-smart ourselves. In his latest, most ambitious project yet, Neuralink, Musk plans to meld man and machine by creating an implantable device that seamlessly interfaces with our consciousness. It would directly provide knowledge to the forefront of our thought and allow communication between users via the cloud. Musk hopes that when true AI comes along it will become an indistinguishable part of us. In this way, if someone decides to use AI for some evil scheme, a group of other people equally enhanced by their own AIs could combat the threat. This decentralised and equitable approach to the introduction of AI will be key to our own safety.

While this may start to sound very sci-fi and a little far-from-reality, Brain-Machine Interfaces (BMI) have been around for a while and are becoming more common every day. Cochlear and retinal implants, while reasonably crude at the moment, directly stimulate their respective nerves and act as input devices straight to our consciousness. Paraplegics can have a 100-pin multi-electrode array implanted into their motor cortex that allows them, after some training, to control a robotic arm. Interestingly, problems arise here as there is
no feedback from the system, and, without this proprioception the arm won't feel like their own. Until BMI technology develops enough that it can stimulate the right neurons to synthetically recreate touch, we can use the brain's neuroplasticity as a shortcut. By stimulating another area of the brain while simultaneously using the bionic arm, the brain can learn and slowly adapt to treat the new signal as the sense of touch. It would seem odd at first for the patient but this 'sensory substitution' is a promising way to allow the brain to become a collaborator in BMI efforts. Deep brain stimulation is another common BMI, however, this only interacts with the unconscious brain helping to reduce tremors, in Parkinson’s disease, or the severity of epileptic seizures.

So are we all going to be cyborgs? The answer is that we already are. If you’re lucky enough to not need one of the implantable devices already mentioned, you might need a pacemaker or defibrillator in the future. Even if you don’t, you already have a smartphone. That small device in your pocket contains the sum total of all human knowledge – and ignorance – and it allows you to complete tasks that would be impossible without it. Want to speak face-to-face with your friend in Australia? No problem. Want to read Homer’s Odyssey? Sure. All a BMI promises to do is take away the pointless and clunky steps of getting the machine out of your pocket, typing, sifting through irrelevant information, to finally reach your goal. Knowledge will be seamlessly available to your consciousness. All you hold dear about reading, writing, in fact, language altogether, is just another invention we humans came up with to transmit information from our brain to someone else’s brain. BMIs will do away with this altogether leaving language as something we look back on with nostalgia. There will be no need to articulate, no difficulty with comprehension as ideas are directly transferred. As Elon puts it: it will mean a type of conceptual interaction on a level that’s difficult to comprehend.

We’re getting ahead of ourselves… how would this thing even work? We already have a number of ways of reading the output of the brain: functional magnetic resonance imaging (fMRI) tracks blood flow to show the activity in different parts of the brain; however, its resolution is far too low for use in BMIs. Each pixel, or voxel as they are known, covers about a cubic millimetre – leaving tens of thousands of neurons within this mm3. EEGs have a similar problem of low resolution, as their reading averages millions of neurons. More invasive procedures such as Local Field Potentials and the Multi-Electrode Arrays, as used in the bionic arm example, give much higher resolution but cannot cover the whole brain. These are physically implanted microelectrodes made of silicon which pick up average potentials from a number of neurons.

The best method we have so far is called Single Unit Recording. Equally invasive, it uses a very high resistance, super sharp needle electrode that can detect the firing of single neurons. A similar method uses a tiny glass pipette to form a ‘patch clamp’ where some of the neuron’s cell membrane is suction cupped allowing direct contact. Using this method, single neurons can be stimulated as well as read.

The problem that arises is one of scale. If you were to unfold the cortex of a human brain it would cover roughly a 480x480mm square, 2mm thick. With there being around 40,000 neurons per cubic mm of brain, that’s a lot of neurons. With today’s technology, it’s only possible to record around 500 neurons at once.
The problem that results is one of bandwidth: we simply can't yet collect all the information we need from the brain. If Moore's law is applicable to BMI's the hope is that our maximum connections will double every 18 months, just as the number of transistors we can fit onto a computer chip has since 1965. Let's hope for some paradigm shifts in technology in the meantime to speed that up.

The Human Connectome Project is currently undertaking the mammoth task of creating a complete detailed map of the entire human brain. It's taking 30-nanometre-thick slices to help visualise the connections throughout the brain and has shown over different 9 cell types, creating some lovely images in the process. However even with such a detailed map, the problem of bandwidth persists. We need to connect to every one of the brain's neurons for a seamless whole brain-machine interface.

Elon has assembled a pretty big-dog team for his Neuralink task; they range from IBM microchip designers to biocompatibility experts, neurosurgeons to microfabric engineers. DJ Seo, one team member, is a pioneer in microsensors. His invention 'Neural Dust' could prove useful for Musk. The tiny 100 micrometre silicon chips that he creates can be dispersed through the vascular system and allow diffuse ultrasound recording of the brain. Other future possibilities for recording the brain include a Neural Mesh that unfolds like a net sub-durally, Transcranial Magnetic Stimulation inducing electrical pulses with a magnet outside the brain, or the use of Optogenetics, where genes are implanted into the DNA of a brain cell allowing it to be stimulated by light.

There are a few more hurdles before rollout can begin. Biocompatibility is one, and it is assumed that the technology must become both compact and wireless before people will want these things in their heads – unless we also figure out a way to do this non-invasively. Yet, if our consciousness is accessible wirelessly, we could have a Ghost in The Shell (1995 not 2017) style situation where people’s very soul can be hacked, memories changed and motivations altered. Security is therefore another must. The hope is that one-day these operations will become something comparable to a laser eye surgery. For now, Elon is aiming to bring out a product for those suffering from severe brain injuries within 4 years.

Of course, you're welcome to your own opinion on whether this is likely to happen in your lifetime, or even at all. However, it certainly seems possible that BMIs will become a reality, which brings on more existential ramifications of what a truly whole brain-machine interface will mean. As mentioned previously, you would be able to have the entire Internet on tap. You would be able to recall anything at will and not know whether the information has come from your memory banks or through the cloud. It will herald an end for many diseases such as dementia and cause the boundary between man and machine to disintegrate. An other aspect we have already talked about is direct brain-to-brain communication where ideas are transferred without need for articulation. Feelings will also be transferable, meaning an evolution in emotional intelligence and empathy. In fact, you will be able to allow anyone to see what you’re seeing or hear what you’re hearing as sensory communication becomes possible. This all raises issues of privacy of course, but more importantly what happens to individuality under such circumstances? Isaac Asimov’s sci-fi short The Last Question describes a similar scenario: each physical body losing its mental identity in a manner that was somehow not a loss but a gain.

Information adapted from 'Neuralink and the Brain's Magical Future' https://waitbutwhy.com/2017/04/neuralink.html accessed 2/9/2017 and Sapiens' By Yuval Noah Harari
MALARIA: Coming soon to a country near you!

From rising sea levels to melting polar ice caps, there is no question that climate change is having an effect on the world. Writing as a future doctor, it is important to consider the implications of climate change on health, and healthcare. One of the scariest potential effects on human health are the changes in the pattern of infectious diseases, particularly tropical infectious diseases.

**HOW WILL CLIMATE CHANGE AFFECT INFECTIOUS DISEASES?**

Perhaps the most obvious answer to this is temperature. Global warming will lead to a rise in global temperatures – clue’s in the name. According to the National Geographic there has been an 0.8°C increase in temperature since 1880. Warmer environments encourage growth of bacteria and other pathogens by increasing their rate of division and replication. Tropical diseases, defined by WHO as a disease that ‘occurs solely, or principally, in the tropics’, occur in these climates because of the arthropod vectors which thrive there.

Mosquitos, for example, are fussy about the temperature and climates they like to live in, so this determines the epidemiology of mosquito spread infections. Many mosquitos prefer warmer temperatures, hence rising global temperatures will increase the number of areas these disease spreading creatures can live in. In addition to this, longer summers will lengthen the time in which people are at risk of mosquito bites. The most well renown example of a mosquito spread disease is malaria, with other notable examples including Yellow Fever and West Nile, not forgetting the currently popular Zika virus.

Higher temperatures can also decrease the extrinsic incubation period- the time between the vector becoming infected to the time it is able to pass the disease on to human hosts. This is true of the development of the Malaria parasite in mosquitos: the warmer it is, the more quickly the mosquitos become infective.

But it’s not just mosquitos. Ticks are responsible for spreading a number of different infectious diseases, including Lyme disease, typhus, relapsing fever, Rocky Mountain Fever, tick borne meningoencephalitis... Like mosquitos, ticks have preferences about the temperature and climates they enjoy living in, with many preferring warmer temperatures.

Changes in rainfall will also affect vector distribution by altering humidity levels (another environmental factor these bugs like to be fussy about), and excess rainfall producing still bodies of water creates the perfect breeding ground for our little friends. There has been an increase in Rift Valley fever outbreaks in sub-Saharan Africa, which are associated with still standing water around areas of
forest and bushes following large volumes of rainfall. This infection has the potential to spread beyond the continent.

Ocean warming causes Red Tides, a phenomenon where excess proliferation of algae around the coast causes a red discolouration to the water. These algal blooms can cause disease in humans by producing toxins, which accumulate in fish and are ingested by us. The Alexandrium genus of algae produces saxitoxin which causes Paralytic Shellfish Poisoning; paralysis due to the effects of the toxin on nerve function. The Dinophysis species produce okadaic acid causing Diarrhetic Shellfish poisoning, with profuse diarrhoea and severe abdominal pain.

The complexity of the lifecycles and transmission of vectors, and of oceanic ecosystems, makes it difficult to predict the repercussion of climate change on human health. But it is undeniable that some of these nasty bugs will profit from the warmth – to our detriment.

**Which diseases will be affected?**

At present malaria causes more than three million infections worldwide each year. Analysis of the infection trends in South America and Africa have found that rising global temperatures are enabling the disease to occur at higher altitudes, putting previously unaffected populations at risk of the disease. These areas can often be highly populated. Whilst those living in malaria endemic regions often have natural resistance against the infection, there is little immunity in new areas, which could put large percentages of the population at risk.

The viral infection which causes dengue fever, and the severe and potentially life threatening dengue haemorrhagic fever, is spread by the Aedes aegypti and Aedes albopictus mosquitoes who prefer warm, humid climates. At present dengue is endemic in one hundred countries and causes 22,000 deaths a year. A study published in the Lancet estimated that by 2085, 50-60% of the Earth’s population will be at risk of dengue, and without climate change this would be as low as 35%.1

Lyme disease develops when the Deer tick, also known as the black legged tick infects a human host with the bacterium Borrelia burgdorferi. After inoculation, a rash known as erythema migrans develops with a classical ‘target’ appearance as well as fever and malaise. Without prompt treatment patients develop chronic Lyme disease, an incurable infection causing numerous complications including arthritis, polyneuropathy and encephalomyelitis. Rising global temperatures have expanded the geographical areas that the disease occurs over. Cases are now being reported further and further north in America and there have been cases reported in Canada. Longer summers also increase the period of time in which infections can develop.

West Nile virus, of the Flaviviridae family, causes an infection which is usually asymptomatic – but it can cause encephalitis in a few people. It is spread by a variety of species of mosquitos and the main reservoir is in birds. West Nile virus spreads to new areas following summers with above average temperatures, causing recent spread to new areas of Europe and West Asia. Warmer temperatures have also led to an increase in the incidence of the virus in North America.

**How will all this affect doctors in the UK?**

Sub-Saharan Africa is most vulnerable to climate change so many of the impacts of climate change will be seen there first. However, an increase in the global incidence of these tropical diseases will ultimately lead to more and more cases ending up here, in the UK, as infectious diseases are predicted to spread to areas where British tourists commonly visit. The Po Valley in Italy, Southern Spain and the Spanish Mediterranean have been identified as areas where dengue is likely to spread to. Increased incidences of these diseases in other countries will also mean we will need to better protect our own travellers against these diseases, as well as being up to date on which diseases they are at risk of.

But are we at risk of these weird and wonderful exotic tropical diseases occurring in the UK? One could argue if we don’t do anything to stop global warming perhaps it is only a matter of time. Malaria was once endemic in the UK but has now been eradicated, and at present cases in the UK are imported from travellers. However, global warming will favour transmission of malaria, putting us at risk. The disease has already re-emerged in areas of Europe including Greece and some studies predict that could become re-established in Britain in a number of decades.

**Summary**

The epidemiology of infectious diseases is affected by multiple different factors including global travel, infrastructure and vaccination programmes. Global warming will have multiple effects of the temperature, rainfall
and climate. Changes in the ecosystems of both pathogen and vectors will alter the prevalence, geographical extent and timing of multiple different diseases in unpredictable ways. Warming global temperatures will increase the geographical extent and timings that many tropical diseases occur over, largely due to making more favourable conditions for the vectors that spread them.

As global temperatures continue to climb it may become possible to acquire certain infectious diseases in the UK, which would now have been the case previously. At present, doctors have the clue of recent foreign travel in a patient’s history to alert them to the possibility of a tropical disease as a differential. However, the physicians of tomorrow – that’s us – may well have to be alert to the possibility of diseases previously not seen in the UK. We will need greater knowledge of infections than past generations of doctors. We will need to be on our feet. We will need to be prepared to constantly adapt our practice to our ever changing planet.

Night, night, don’t let the bedbugs bite!

1)http://www.cmdr.ubc.ca/trainingprogram/papers/journalpaper_June18b_04.pdf

“\text{They’re just here to take my blood and sell it, they’re vampires}”

Mistrust of research facilities is a common sentiment among rural villages in the North Bank West region of The Gambia. But what does it stem from?

When conducting health research in low-income countries, there is no clear line between research trials and healthcare treatment. Government facilities are often undersupplied and understaffed leaving populations dependent on transient research projects as a form of healthcare.

Researchers who come and go after their research is complete often lead these research projects. “You people never stay long” was how I was greeted by one of the guards at the facility, instantly feeling guilty for my personal participation in this cycle of discontinuity. The lack of information, the fleeting nature, and the abrupt end of these projects can foster a culture of mistrust.

Essentially all these research projects intend to do good for the community they operate in. Some may build toilets and houses for participants, improving hygiene and sanitation. Others may collect data from participants, like blood samples, to understand the diseases in the area. Many will provide medication and treatment.

What of the unintended consequences?

Projects that involve building facilities for community use may neglect to ask what that community needs and prefers. Even if the intervention builds mosquito proof houses, they might not be near friends and family, taking away a large part of what constitutes to their civil society. This inevitably leads to disuse of these facilities by the community they were built for. Thorough anthropological research regarding how compounds are structured and simply asking study participants what they look for in a house would avoid these issues. Interventions need to be integrated into a society and its culture for them to work.

Projects that focus on epidemiological research and data collection are the biggest cause of mistrust of research organisations working in rural areas. Their work may vary from taking names and information, to taking blood or urine samples. Because it is hard to differentiate between research projects and healthcare aid, people consent to projects with misguided expectations, assuming they will receive free healthcare. Projects that take information and do not give anything tangible back to their study participants, coupled with a lack of transparency regarding what the information collected will be used for, cause an accumulation of beliefs of blood “stealing”. Going further, the misunderstanding and
consequential mistrust of these research projects poses the question of whether consent of the participants is well and truly informed.

The issue of the “desperate volunteer” is also a universal theme as to why people take part in research projects. In countries like the UK, trials provide cutting edge treatment that may give people a better chance of survival when there aren’t many other options. On the other hand, countries like Gambia offer fewer options in the first place, and the options that exist are often too expensive for individuals to be able to afford. Patients chose to participate in trials as a way to meet a health need that should instead be met by accessible healthcare provision. Are we then exploiting peoples’ vulnerability, in their lack of ability to access healthcare?

On a more positive note, projects that provide medication are greatly valued by rural communities. Just by consenting to take part in a study one can receive free treatment and rely on regular follow ups, whilst the research project lasts. This type of trial, along with vigorous sensitisation sessions with study villages, has helped to change perceptions of research organisations for the better.

However, research projects must eventually end. The goal is for them to become policies integrated into governmental guidelines, but this is not the case for many projects – instead, they sometimes lead to the creation of two parallel healthcare systems. Previous study participants become reliant on an unsustainable provision of healthcare supplied by an external research organisation. The government health facilities may have also become reliant on the project to supply medication and manpower. Following the evacuation of a project, along with its resources, the government’s health system is left weaker than it was.

There are luckily projects that aim to sustainably build and strengthen a foreign health system. Larger emphasis on systems strengthening in accordance with the WHO’s (World Health Organisation) International Health Regulations has become evident in global health research, and it is seen in the rise of horizontal and diagonal interventions replacing the traditional vertical interventions previously carried by NGO’s (non-governmental organisations). In order to create sustainable, strong health systems in lower income countries, local government and community involvement in decision-making is crucial. The people you aim to help will know what they need, if you just ask. If all interventions can be coordinated through central and local governmental bodies, then health systems can truly self sufficient and resilient.

It’s an all too familiar situation to find yourself in when carrying out research. After weeks of arduous lab work, you test your hypotheses using the statistical tools that underpin all modern science. Alas, it comes to naught – no significance. Theoretically, you should write up the report anyway, showing the ways in which your grand theory was proved wrong. But who is going to do that? Whatever the reasons for your research, the same truths hold: significance is king. If your research doesn’t demonstrate statistical significance then I don’t rate your chances.

The next step is all too common: randomly testing different variables together until you find something with the magic p-value. It’s poor science, but everyone does it. It doesn’t matter whether you have done all the background work for this set of variables or not. A few hours later and your entire project is now fundamentally changed, you’ve come up with some half-plausible theory to
underpin your idea, and so you begin to write a report.

Science is in the middle of a crisis in confidence. It is commonly known that the scientific method relies on core concepts, but perhaps the most important of these is that all good science should be replicable. When research is published, it’s a reasonable assumption that if someone else were to re-do that work, they would get the same or similar results. Evidence is mounting that this simply isn’t the case and that the majority of studies aren’t repeatable; reviews of this in the pharmaceutical oncology studies cannot be quarters of the most-cited studies aren’t repeatable; reviews of this in the pharmaceutical oncology studies cannot be successfully replicated. And as a result, we’re finding it harder than ever to develop new drugs.

So, what’s going wrong? I personally think it’s our attitude towards statistics: they are being treated as the sacred markers of research quality. They are not. Statistics are just a statement, telling us how likely it is that the correlation we see is a result of random chance. Without strong theory backing up the data, statistics are meaningless. And when you start to randomly compare variables there is a high chance that you will find something ‘significant’. If you do 20 tests, you would expect one of them to be significant just by chance, which is precisely the definition of a p-value of 0.05.

And yet, to get research published it is absolutely essential to show significance. A paper that can show a statistically significant result is over three times more likely to be published than one which cannot, even if the negative result has a better theoretical basis and method. This puts incredible pressure on scientists, whose entire careers depend on regular publications, to ensure that their research always turns out significant results. There are numerous kinds of scientific fraud, and randomly testing for significance, whilst the most widespread, is perhaps the least insidious kind. It is also very common to structure an experiment in such a way as to guarantee significance, and these methodological flaws often go unscrutinised. In the lab the pressure to publish can put students and assistants in an uncomfortable position. One study found that a third had been pressurised to support their mentor’s hypothesis even when they felt the data didn’t support it, and around a fifth felt that they had been forced to produce sub-par data themselves.

So, it’s clear that data is often handled poorly in the lab and that the drive to publish leads to widespread dubious practice. The last safety net against poor science is the peer review. Papers are sent out to experts in the field, who are then supposed to read them with a highly critical eye and weed out the errors. And yet, when a spoof paper riddled with blatant errors was sent out to 304 journals in 2013, it was accepted for publication by over half of the peer reviewers. Science is competitive, but the number of papers published every year has skyrocketed thanks to the growing success of open-access journals and online publishing. This means that peer reviewers are given more and more papers to review whilst facing increasing demands on their time to do their own research. Consequently, papers are being given increasingly cursory reviews or even sent to a non-expert in the field. It’s not surprising to me then that papers with major flaws can slip through the net because they tick the ‘statistics box’ irrespective of the quality of these statistics.

There seem to be few real solutions to this issue. The Journal of Basic and Applied Social Psychology has moved to an outright ban of the use of p-values in their publications, on the basis that such values can be used as a ‘crutch’ for scientists with weak data. Whilst this might go some of the way to addressing the issue in my view it still fundamentally misunderstands the problem. Statistics have a valid place in science. They are exceptionally useful tools in determining whether your data is likely to be consistent with the null hypothesis. Removing those tools doesn’t solve the fundamental problem – that many scientists are statistically illiterate.

Another better solution that has been proposed, is pre-registering hypotheses and methods with the journal before the experiment is done. This then guarantees publication even if the data is negative and removes the incentive to p-hack or alter the hypothesis to fit the conclusions. In addition, directing funding towards replication efforts would go a long way to identifying irreproducible results that do get published. And finally, official paid peer review positions would encourage more stringent reviews before the studies are accepted for publication, thereby weeding out the poor science. However, by far the most important solution is to reform the way that statistics are taught to prospective scientists. Until statistics are taught to an appropriate way across the board we cannot possibly hope to fix this problem.

The reproducibility crisis is deeply complex, with far more underlying causes than can
possibly be addressed in one article. However, when we cannot rely on even the plurality of published papers to be reproducible, it becomes infinitely harder to refute the “anti-vaxxers” of the world, infinitely harder to convince sceptics that anthropogenic climate change is occurring, and infinitely harder to fight the message that “alternative healing” is somehow better than evidence based medicine. Our over-reliance on statistics, and the way that this pushes us to corrupt research, is a fundamental problem that undermines the trustworthiness of science and has far reaching consequences.


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THE HEALING TOUCH

Emma Hambrechth

A study published in the Proceedings of the National Academy of Sciences PNAS found that human touch, synchronised brain waves and empathy of a partner can have significant analgesic effects. The researchers of the University of Colorado Boulder and the University of Haifa conducted experiments to explore a phenomenon known as interpersonal synchronisation in which brain waves synchronise to mirror other people. The study included 22 heterosexual couples, hooked up to EEG caps to measure their brain activity, exposed to different scenarios involving pain. The results showed brain wave synchronicity when the couples were with each other which increased even further when they were holding hands and exposed to pain. The synchronicity was interrupted when one was exposed to pain and could not touch their partner. While this synchronisation is interesting on its own, the higher the level of synchronisation, the less pain was felt. So the next time you stub your toe, find someone who is close to you and have a hand-holding session.

Study:
Pavel Goldstein, Irit Weissman-Fogel, Guillaume Dumas, Simone G.Shamay-Tsoory. Brain-to-brain coupling during handholding is associated with pain reduction. Proceedings of the National Academy of Sciences, 2018; 201703643 DOI: 10.1073/pnas.1703643115

Article:

BEAUTY DOES MATTER

Mary Goble

A team of researchers from the U.S. seem to have found a simple yet seemingly effective way to tackle people’s neighbourhood safety concerns, vandalism and even gun violence and burglary - by making the place look nicer. The results were collected by looking at police-reported crime and nuisance outcomes, as well as data from 445 randomly selected residents. Locals reported their safety concerns about leaving the house reduced by 57.8%, and all crime in the vacant lots treated were reduced by 4.2% - results which were statistically significant. The study concludes that this cheap and scalable intervention is a way to encourage ‘people-focused urban connectivity’ - which we could all do with a bit more of.

Study:
For this next exercise I would like you to imagine yourself being in the end stages of a terminal illness. It could be severe multiple sclerosis, motor neurone disease or diffuse and aggressive cancer. Every day is wracked with a painful struggle with the only thing to look ahead to being your inevitable death. I want you to imagine knowing that when it does come, it will be slow and protracted. Perhaps your respiratory muscles will fail and your lungs shall slowly fill with fluid. Perhaps it will come peacefully in your sleep. You can hope.

This may not describe the experience of every person going through a terminal illness, but it will describe some and it is for these people that I write this article. Contrary to some traditional views on morality and ethics I do think that there are some states of living which are worse than death. Death is not painful, it is the big zero, an absence. We are not conscious for the period before we were alive and have no reason to suppose we will be afterwards. The process of dying can be incredibly painful. It is monstrous that people can be forced to live in this pain; it is tantamount to torture. If this comes to my door, I want to be free to make the decision to have my suffering ended by a qualified physician and not have some politicians with no knowledge of me or my pain make the decision for me. A doctor is not allowed to impose their personal beliefs on a patient, so why can Westminster?

Euthanasia, defined as ‘a deliberate intervention undertaken with the express intention of ending a life to relieve intractable suffering’. Currently it is illegal in the UK, voluntary or involuntary. I believe that this is a gross mis-imposition by the State. Obviously, if someone doesn’t want to die, then leave them well enough alone, why are we even discussing this? However, if they are of sound mind but not body, why shouldn’t they be able to ask for that kind of help? This is termed physician-assisted suicide. There is a delicious Catch-22 here. You need to in a rational frame of mind to make this most important of decisions. However, should I want my life to be ended, I must be depressed. Suicidally depressed people are not in a rational frame of mind, thus I cannot make this decision. It is an infrequent situation, but thanks to modern medical advances and the increasing ability of doctors to keep people alive (read: alive, not well) it is cropping up more and more.

As of writing there are nine countries (and a handful of US states) where euthanasia is legal. Basing our law on the Canadian bill which was recently passed, I would like us to become the tenth. It’s not through lack of...
trying; in the 21st century there have been five attempts to pass assisted suicide bills through Parliament, who rejected them. The last Assisted Dying Bill ran out of time in the Committee stage because we were too focused on the upcoming election. Currently only one doctor has ever been convicted in the UK, Nigel Cox. He was given a 12-month suspended sentence.

The General Medical Council took no further action and Cox returned to work the following year.

The wording of the law is so poorly written that Debbie Purdy made the tabloids after her legal battle to protect her husband if he helped her travel abroad to seek assisted suicide to escape her primary progressive multiple sclerosis. The court could not determine that her husband wouldn’t be prosecuted. She died in a care home in 2014. As of writing, 92 Britons have gone to Dignitas in Switzerland (publicised by the late Sir Terry Pratchett) for an assisted suicide. But what about those for whom this is not an option, for expense or ease access if nothing else?

We are able to make advance directives refusing treatment, such as the DNACPRs. The infamous Liverpool Care Pathway and other end of life care allow for withholding a treatment, such as food or fluids. So I can slowly starve to death, great. The difference between withholding treatment and administering treatment leading to death is like the classic ethical conundrum with changing the train tracks to save five people from the oncoming train at the expense of one. One option allows you to push one person in the path of the train. The other allows you to push a button and switch the tracks, thus hitting the one person instead of the many. Either way, the outcome is the same.

The above in ethics is termed ‘The Trolley Problem’ and it explores the Principle of Double-Effect. In medicine, this refers to the circumstance where an act resulting from a legitimate motive also has a consequence which is normally avoided. With assisting dying, the desire to alleviate terrific pain via a morphine injection may lead to a shortened life. For some, this is ethically indefensible and the debate stops there.

Opposition to well-regulated system of assisted suicide for grave circumstances is borne of our infantile moralities. God says that suicide is a grave sin you say? That’s all well and good, but what if I don’t believe in the Catholic God? Hippocratic Oath? Sorry, no removing bladder stones for you then. If its respect for human life you want I suggest that you consider whether the positions of some people can truly be termed an expression of human life and not merely existing. I’m not even going to dignify the ‘slippery slope’ fallacy with a response.

The concept of ‘The Sanctity of Life’ is the ultimate expression of paternalism. I do not want to overreach and say the life of every tetraplegic person is of miserable torment. However, the reverse is currently true. It is said that just because your life options are limited, doesn’t mean that it is over and one can still go on to fulfilling things. That may be the case, but it is not the decision of the Church, the State or anybody else. I want it to be my decision. I write this from a personal perspective because circumstances change. Currently I am fortunate in my good health, however, tomorrow I could be hit by a truck or start to notice a unilateral foot drop (MND for those of you who didn’t see The Theory of Everything). Circumstances change and if they do I want the option to be there to change them permanently. The Right to Die provides a certain security. To be able to say, ‘no, I have had enough’ and quietly retire, just a large dose of morphine. It would be cheap, it would be painless. Of the ways to go, it would seem the most favourable.

1) by the House of Lords Select Committee on Medical Ethics
Water is a basic human necessity - without it we cannot go about our daily lives. Not just water, but water that is clean, easy to access and safe – meaning that it will not be harmful if it is used for drinking, cooking and basic sanitation.

Around 2.1 billion people lack access to safe, readily available water at home according to the WHO and UNICEF. This is largely a problem in developing countries, but rural areas of developed countries also experience the same deficit. We sometimes forget that polluted water not only causes sickness but it can have fatal consequences. The main victims of lack of clean water are children, since 361,000 children under the age of 5 die every year due to diarrhoea caused by contaminated water.

Poor sanitation and contaminated water is further linked to transmission of diseases such as cholera, dysentery, hepatitis A and typhoid. It is important to understand the effects of these diseases. The majority of those who contract them, may not have access to basic health care amenities such as oral replacement therapy and intravenous fluids. If they do not have access to clean water in the first place, then how are they supposed to return to good health? Furthermore, there are socio-economic effects such as children missing school due to being sick. Consequently, their education, an alternative to farming suffers and they lose out on their only opportunity of a decent job.

Personal economic opportunities are also lost due to the impacts of illnesses acquired from unclean water. It is a time-consuming process, acquiring water when it is not readily available. These factors lead to increased time off work or missed job opportunities, keeping people trapped in the cycle of poverty. The economies of the USA and UK depend on clean water for manufacture, farming and tourism. Moreover, water is the habitat for fish and wildlife. So, the impacts of polluted water on the ecosystem must be considered. The increased dumping of plastics into our oceans, the leaking of oil and pesticides into water leads to its pollution. These pollutants come in many forms – organic, inorganic and even radioactive – making it almost impossible for animals and plants to survive.

Clean water is appealing for recreational activities such as paddling, surfing and swimming. However, polluted water can be a threat to our health as it may transmit harmful microorganisms whilst we are doing these activities in the water. Picnics around the lake or fishing in streams do not seem very appealing when the water is murky and dirty. Clean water is aesthetically appealing and can provide an important place of rest and quiet in rural rehabilitation or hospice centres.

What causes water contamination? The most popular cause is open defecation due an inadequate sanitation infrastructure. 12% of the global population practice open defecation. The overall number of people practising it has declined in the past few years but is still increasing in Sub-Saharan Africa and Oceania due to high population growth.
growth. It is one of the Sustainable Development Goal (SDG) global targets to achieve access to adequate and equitable hygiene for all and to end open defecation by 2030. Even though access to toilets will increase, behavioural changes will still need to be encouraged to promote the use of toilets, since open defecation seems to be the norm in many communities.

Additionally, even if communities have a water source, it needs to be protected. Water sources are often soiled by human or animal waste, agricultural waste, industrial chemicals and even natural pollutants. When water is in the distribution system the pipes have to be protected from contaminants, otherwise the quality of water suffers. Inappropriate storage can also result in unsafe drinking water. Once the water source is polluted, it is a difficult process to clean it again.

Although there has been considerable improvement since 2000, with billions of people gaining access to cleaner water, these services may not necessarily provide safe water and sanitation. The state of drinking water supplies is characterised by quality, quantity, reliability and cost. Only a minority of the world’s population has access to water that fulfils all four criteria. Many homes, schools and healthcare facilities still lack soap and water for handwashing. There is an increase in risk of transmission of bacterial diseases, leading to the most common symptom – diarrhoea. This seems to be a consistent problem in young children.

The UN estimates that each person requires 20–50 litres of water per day for drinking, food preparation and personal hygiene. We are privileged that we can access water indefinitely. Partly due to the fact that we experience a lot of wet weather, which largely aids the farming industry. Water reliability varies by season, year and location. With worldwide climate change, El Nino and La Nina variation can cause one year to be wet whilst the next year is dry in coast countries around the Pacific Ocean.

The majority of water sources are groundwater, but if these sources are depleted too rapidly or are not successfully recharged then the quantity of drinking water is negatively affected. Lack of water also affects agriculture as crop production and cattle quality may decrease, which many people in third world countries rely on as a major source of food. This results in malnutrition, a weakened immune system and is why the ecosystems surrounding unclean water sources are so prone to being affected by infection and disease.

There is always a cost for having water distributed to a house or a community. These costs are usually monetary but for some there is the added cost of time. The time it takes to travel to and from a safe drinking water source. The costs of a water supply may be subsidized by governmental institutions which is of great benefit in poor communities. However, in some instances, it can lead to inefficient or wasteful use of the resource by those who may not fully appreciate its value. This is why education is important when providing a new water source. Local people should be taught the most effective way to use their water supply as well as how to work and fix it when things go wrong.

What can you do?

You have probably seen the melodramatic WaterAid adverts on TV but this is actually the harsh reality of what people have to face. The truth is that supporting non-profit organisations like WaterAid is one of the best things we can do whilst living in the UK. As well as appreciating that we are so lucky to have access to clean water, a luxury that we take for granted at times. We may hold to the ideology that water is an inexhaustible resource but the truth is that water security may not be so stable in the future, especially with the threat of climate change. I leave you with this advice: Don’t waste your precious water!

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3) https://www.worldwildlife.org/threats/pollution Accessed on 17/01/2018
Over the last two decades social media has rapidly permeated every aspect of our society. Everyone knows this. But do we recognise the effects of social media once it gets under our own skin? Could it be possible that social media is invading every aspect of our minds too?

We now spend an average of 2 hours a day on social media liking, tweeting, snapping, posting, commenting, swiping and engaging with a vast world of photos, opinions, ideas and people that would have previously have been beyond our reach.

Alongside this, there has been an explosive increase in mental health issues with rates of anxiety and depression increasing by 70% in the last 25 years. Is this a coincidence? Mental health issues are a growing problem in our children and young people, with three quarters of chronic mental health issues originating before the age of 24. We need to be aware that young people are the ones who are extremely vulnerable when it comes to mental ill health. What effect will social media have upon the generation who have never known a world without it? The statistics are shocking: in an average classroom of 30 there will be 3 children with a diagnosable mental health disorder. Suicide is the most common cause of death for boys aged between 5-19 years, and the second most common for girls of this age.

Surely this is a drastic leap from our innocuous Instagram feeds? Surely the worst it can do is give you a bit of FOMO?

We are all familiar with FOMO: We all have one friend who jets off to the Maldives when BBC weather is predicting the bleakest week in 120 years. We all have a friend in Machu Picchu who runs a marathon a month and another with a perfect Pinterest wedding. We all have lots of friends all of whom have ridiculously interesting lives giving us ample reason to kid ourselves into believing that we are missing out. We joke about it but do we underestimate the power of social media to stir up discontentment and envy?

Subconscious and powerful, social media is adjusting our expectations of life. We are exposed daily to the lives of hundreds of people that would have previously been off our radar. Social media is cultivating a ‘compare and despair’ culture that is difficult to disentangle from the mental health epidemic.

Many of the studies linking depression and use of social media admit that it is difficult to know whether social media is a direct cause of depression or whether depressed people are more vulnerable to its effects. It’s a chicken and egg situation. FOMO may seem miles away from a diagnosis of depression, but social media plays an undeniable role in lowering mood and worsening anxiety in vulnerable people. Perhaps this is unsurprising considering the amount of time we spend scrolling through our news feeds, which are endless streams of stressful stimuli. Opinions run higher now than ever before because it is all too easy to vent pent up emotion to the Facebook world. A team of researchers at Facebook in California have shown that emotions can spread like viruses with negative posts causing a contagion of more negative posts. This results in an online environment that is a breeding ground for depressive and anxious thoughts.

One of Facebook’s early pioneers Sean Parker has spoken about the way in which social media is programming us. He describes the way in which we are being programmed by a ‘social validation feedback loop’. Social media exploits a vulnerability in human psychology: more than anything else, we strive for recognition and acceptance. We are so easily tricked into an ego boost from a like, a thumbs up, a retweet. Short term, fake popularity that for many equates to a hit. A popularity high which, when it has deflated, leads people to seek another hit.
Social networking sites are structured to be egocentric. We like to talk about ourselves anyway but social media communication is twice as likely to be self-involved than face to face communication.

Social media allows us to present ourselves in a positive light, ignoring the mundane and the messy and highlighting the things we like about ourselves.

It doesn’t take much to curate an image to make yourself prettier, thinner, blemish free. Now anyone can enter the beauty pageant but the relentless exposure to these images creates a world of comparison and insecurity. This filters down to Images not just of celebrities and models, but of friends. Modified and therefore false images of friends.

The stats show that 9 in 10 teenage girls are unhappy with their body image. This plays a significant role in the entangling web of mental health issues, including eating disorders which are faced by in teenagers and young adults.

Social media addiction is also a growing problem. Twitter has been shown to be more difficult to resist than cigarettes and alcohol. We find it difficult to resist the urge to open a social media app because it doesn’t feel like it costs much. However, when our days are littered with hundreds of interactions on social media it begins to cost.

For most of us it is simply a case of being too easily distracted by our phones, but for many social media addiction is a life controlling issue. People who are particularly vulnerable to social media addiction include those who compensate for scarce ties in real life, those who are vulnerable to alcohol and substance abuse and those with overly extroverted and introverted personality types. In these cases excessive usage is linked to poor academic achievement, social isolation and relationship issues.

A social media addiction shares many of the characteristics of substance addiction.

The addicts experience a short term elevation of mood but over time they develop a saliency towards social networking sites and they experience conflict and withdrawal symptoms similar to a drug user. Is this to going to be the addiction of the future?

On the surface, social media seems harmless enough. Certainly many people can easily brush off the negative effects of social media and remain seemingly unaffected. However, evidence shows that many of us are being subjected to a harmful infiltration of our minds by the social networks we are part of. For some this is taken to the extreme causing a powerful addiction. For many vulnerable people it serves to aggravate an existing mental health problem and young people are being exposed to new pressures as a direct consequence of social media. Who can predict the subtle power that social media has over our minds? Only time will tell.

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Vanessa Kam & Kate Bernard

What you can do to CHANGE THE WORLD

VANESSA

My first response when invited to write an article for North Wing was,

“Hold on… I’m not a medic.”

Then I was presented with the ambitious, Herculean title: ‘What you can do to change the world’.

Changing the world is not something which regularly crosses my mind. Choosing biomedical science I managed to dodge the struggle of providing a noble, emotive rationale for wanting to do medicine. You know: wanting to do good, help people, save lives – the whole spiel.

Yet I do want to do good, help people and save lives.

Until coming across Giving What We Can (GWWC), a community of individuals committed to donating 10% of their income to effective charities, like many youths, I did not think about concrete ways I can make positive contributions to the world. GWWC’s affiliate group 80,000 Hours, an organisation which provides career advice based on in-depth research on occupations and social impact, offers a great, lasting approach outside of donations alone - fitting for us students.

Their logic is simple: Considering things go (relatively) swimmingly, we will spend 80,000 hours at work.

That’s 40 hours a week, for 50 weeks a year, for a solid 40 years of our lives.

So career choice is critical in shaping our contributions to the world.

Just as some charities are thousands of times more effective than others (as Kate mentions), some career paths offer much larger prospects for ‘making a difference’. 80,000 Hours provides such career advice, bolstering people towards fulfilling and meaningful high-impact jobs.

BUT WHICH JOBS ARE HIGH-IMPACT AND WORLD-CHANGING?

Unsurprisingly, medicine springs to mind.

While doctors may be the paragon of do-gooders in the eyes of the public, the beau idéal of contributing to society – according to 80,000 Hours? Biomedics and Medics? We’re in the same boat.

Amongst the 30-odd career paths 80,000 Hours has reviewed, biomedical research and medicine rank below data science, economics PhDs, policy-oriented civil service and more, only ‘sometimes recommended’ for maximising social impact. However the reasoning differs, so for the bioscience students out there keen on having a social impact, I tackle the question:

HOW DOES BIOMEDICAL RESEARCH FARE, AS A CAREER TO DO GOOD?

Biomedical research has high historical and potential returns.

Historically, biomedical research has generated huge yields.

80,000 Hours cites economic analyses on the costs and returns of past research, including the classic, mind-blowing example of cardiovascular research in the US from 1970 to 1990.

Economists calculated that reductions in mortality from cardiovascular disease in this period amounted to $1.5 trillion per year. Suppose just a third of this stemmed from advances in medical research – you still get a $500 million return, more than 20 times the annual spending on all fields of medical research, not just cardiovascular diseases alone.

But these are big, iffy numbers and I can’t quite link this to personal contributions.
Let's look at the example of Nobel Laureate Karl Landsteiner instead. (also courtesy of 80,000 Hours). Landsteiner discovered and classified the blood groups at the turn of the twentieth century, endowing us with the ABO system we all know today.

A trained physician, Landsteiner’s pursuit of biomedical research and not clinical practice enabled safe blood transfusions without the often disastrous immune responses, indirectly saving millions of lives. As a practising doctor alone, he would never have achieved this level of impact.

It’s all fine and dandy to bang out a list of past breakthroughs in medicine, but what about future work?

How will the opportunities for maximising good in biomedical research look in coming decades?

In short: promising.

The immense contribution of scientific research towards improving wellbeing in the past and present is recognised by global priorities research, including the Open Philanthropy Project, which is currently in the exploratory phase of identifying focus areas for life science research.

A simple browse of science, 2017 year-in-review articles jogs our memory on budding therapies, including artificial wombs, human embryo gene editing and gene therapy, all with large scopes for further investigation.

Furthermore, accepted standard of care therapies can be questioned. A recent randomised control trial challenged the use of stents in stable angina, for example, with patients receiving no stent at all in a dummy procedure experiencing no difference in exercise-induced angina as those who did receive a stent. It is thus clear to see that biomedical research is constantly evolving and constantly posing more questions to answer.

Great!

Wait, but why is biomedical research only sometimes recommended by 80,000 Hours?

A career in biomedical research is not all sunshine and rainbows.

Long duration of training

One key caveat is the sheer length of training. A minimum of 7 years spans the progression
from bachelor’s to PhD completion, at which point you invest more years working your way up to autonomy in the lab. The Wellcome Trust’s Director of Science voiced his concerns, citing that at age 37 on average, biomedical scientists gain independence in investigation too late.

High drop-out rates

The drop-out rate is even scarier. Whereas in medicine, fearsome competition rages in the entry stage, in biomedical research, it strikes after attainment of the almighty PhD. In the UK, a meagre 3.5% of science PhDs get on track towards permanent research positions in academia. Most settle for careers outside science.

That’s not to say that these people cannot go on to better the world in other jobs, but beyond a certain stage in a biomedical researcher’s career, moving into other, high-impact career paths is... Well, tricky.

Fairly restricted career capital

80,000 Hours lists ‘relatively narrow exit options’ as a key limitation of biomedical research careers, bringing in a key concept in the pursuit of high-impact jobs:

Career capital.

This is defined as ‘the skills, connections, and credentials that allow a person to have impact in their job’. For biomedical PhDs, 80,000 Hours states career capital is chiefly applicable to medicine and biology. Leaving research would limit roles to scientific writing, research management and administration, teaching, science policy-advising...

I am undecided on this point. Yes, a couple more doors may be shut, but supporting roles in research can be as vital to world-changing scientific progress, provided you don’t want to avoid biomedicine at all costs after your PhD. It may sound less glamorous, less exciting, less prestigious, but as 80,000 Hours recognises, ‘What ultimately matters is not who does the research, but that it gets done.’

Of note too is the distinction between academia and industry. Adding to the 35% of science PhDs on tenure-track (mentioned above) is an additional 17% in non-University research roles, still conducting research, just in industry, government agencies etc. 80,000 Hour’s review focuses on academia, but can industry biomedical research do equal or even more good? This draws in some ‘big names’ in biomedicine – fundamental research versus translational research, the funding ‘valley of death’ and more – all which broadly point to a major setback to the potential and ability of biomedical research to make big changes: A lack of money. But that’s a whole different discussion...

“Supporting roles in research can be vital to world-changing scientific progress”

To be in that top margin, pumping out far-reaching contributions, you’ve got to have the personal fit. Do you have, or could you develop, a blazing intellectual curiosity, considerable intelligence, indefatigable grit? As malaria vaccine researcher Katie Ewer put it, would you ‘be motivated enough to go and answer [your research question when your] last 10 experiments haven’t worked and [you] don’t know why.” Perhaps do a summer lab placement and test the waters.

Importantly, while some desired qualities in biomedical researchers may be inherent, desired skills can certainly be sculpted and polished.

Programming and data-handling is up there on the list.4 Professor of Medical Genetics John Todd argues the case: “All the kids need to learn to program and understand statistics. The data sets are getting bigger and bigger, and better. You need to learn to move data around.”

Admittedly, herein lies a gaping hole in my own skill set. But fear not, resources are everywhere. Dabble in online learning, consider taking a bioinformatics module.

Finally, read around pressing but promising research areas within biomedicine. Take Professor Alan Fenwick, who founded the Schistosomiasis Control Initiative (SCI). He embarked on his biomedical research career with a master’s and PhD in parasitology, spent 35 years in Africa working on both research and public health control of neglected tropical diseases, then returned to England to establish the highly-effective charity SCI, helping governments implement deworming programmes to tackle the easily-treated, but prevalent and overlooked...
infections in the world’s poorest. Sounds easy right?

In summary,

biomedical research is what 80,000 Hours calls a high-potential, long shot career. You have a small but realistic chance of making a difference, and a potentially gargantuan impact in reach. Will you take your informed chances?

Notes

1 Here, I apply a loose view of ‘making a difference’, nicking the 80,000 Hours definition of the number of people whose lives you improve, and how much you improve them by. ‘Improving lives’ here is synonymous with the general notion of increased wellbeing, broadly encompassing health and happiness.

2 Practising medicine in developed countries does not have the massive impact it’s cut out to have.

3 Diagram showing the flow of science PhDs through the stages of a typical academic research career or out to different sectors (figure 1.6, pg 14).

4 Also see figure 13 (pg 32) in this report by the Association of British Pharmaceutical Industry, highlighting core skill gaps in the pharmaceutical industry.

PARTIAL SOLUTIONS SAVE WHOLE LIVES

We live in a world where around 15,000 children die every day, mainly from preventable diseases. A world where nearly half of the population live on less than $2.50 a day.

I’m sure you’ve heard these sorts of statistics before. But the sheer number of humans they relate to can be difficult to process. When we see one person’s life, we can imagine their hopes and pain. But millions? You can’t – that’s just an abstraction. Psychology research shows that as the numbers of victims in a tragedy increases, our empathy and willingness to help reliably decreases - a phenomenon called ‘psychic numbing’. (This happens even when the number of victims increases from one to two!) The human mind isn’t very good at thinking about millions or billions of individuals. The world often ignores mass suffering.

Perhaps this is because the problems out there are so large, diverse, complicated, that it can feel impossible to make any kind of significant change. However much we try, individual actions are so small that whatever we can do is just a drop in the ocean. In this article I will use giving to charity as an example of one such individual action.

People may or may not choose to give to overseas charities for lots of different reasons. A major one is uncertainty about whether the money is doing any good. On top of this is concern about corrupt governments, perpetuation of dependency, and the ex-colonial culture of some aid organisations. That’s not to mention the recent scandals involving Oxfam and other big names, and the further damage to public opinion of charity that has resulted.

It’s true. Some forms of charitable aid have a minimal positive impact, and some are even downright harmful.

But there are two pieces of good news here:

1. The existence of independent charity evaluators. The main one is called ‘GiveWell’, an organisation which carries out and collate systematic research to identify charities which are evidence-based, cost-effective, and currently underfunded.

2. We know from this research that a minority of charities are incredibly effective. The best ones are excellent: open, transparent, self-sceptical, data-driven. And these charities can significantly change people’s lives for the better.

Almost all of GiveWell’s top-recommended charities work in global health. This because it’s an outstandingly ‘tractable’ area. There are diseases which (still) kill and disable millions of people worldwide, but which can be

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prevented and treated with cheap, straightforward interventions. I’ll give an example:

Malaria kills half a million people every year, 75% of whom are under the age of five.

In endemic areas, such as sub-Saharan Africa, malaria is a leading cause of disease burden and a major hindrance to socio-economic development. Medications, when available, can provide effective prophylaxis - but their cost prohibits widespread use and drug
resistance is a major problem. There is, as yet, no vaccine for malaria. Two Cochrane systematic reviews have concluded that insecticide-treated mosquito nets are highly effective and recommend the use of long-lasting insecticide-treated nets (LLINs).

The Against Malaria Foundation (AMF) purchases and distributes LLINs and monitors their use and impact. The most frequently distributed nets are large, family-sized nets which cost about $2.50 each. Two hundred and fifty nets typically protect an entire village and the aim is to achieve ‘universal coverage’ so as to reduce local transmission. Post-distribution net surveys are carried out every six months to assess net use and condition, and monthly malaria case-rate data is gathered from all health centres in a distribution zone. Survey results inform community-led malaria education activities and ‘net hang-up’ campaigns. To date, AMF has distributed more than 51 million nets to villages in high risk areas, mainly in Africa, but major unmet need remains because of lack of funds.

The Against Malaria Foundation is the highest ranked charity by the aforementioned ‘GiveWell’, and has been for 6 of the last 7 years. Their cost-effectiveness is estimated at £19 per QALY. (QALY = quality adjusted life year: a measure of disease burden used in health economics. 1 QALY is equivalent to 1 year of perfect health.)

This is the bit that gets me: £19 for a YEAR of healthy life. That’s incredible. To put this in perspective, many treatments recommended by NICE for use in the NHS cost around £20,000 - £30,000 per QALY.

Now let’s go back to the idea at the start: ‘There’s only one of me so how can I possibly make a difference?’ The majority of people reading this probably live in the UK, are being university-educated, and will go on to take a place in the wealthiest slice of the world’s population. The average UK wage earner (£26,500 a year in 2017), is in the richest 5% of the world’s population. The average UK doctor is in the top 1%.

Whether you like it or not, these circumstances mean that you DO have the power to ‘make a difference’.

This can be big or small. Personally, I have taken a ‘pledge’ to donate 10% of my future income to effective charities (pledging alongside thousands of other people, as part of an international community called ‘Giving What We Can’). As a student, I give 1% of my spending money (10p for every tenner is pretty do-able right now). But let’s say I work from the age of 25 to 68, earning the doctor wage averaged across my career, and each year give 10% to the Against Malaria Foundation. I’ve done the rough sums - through the course of my working life I could fund 15, 842 years of healthy life. Health economics would equate this number of QALYs to 528 lives.

Whether it’s 10% or 1%, or even the odd one-off donation to a well-chosen organisation, the evidence shows that effective charities change lives.

So - does this still represent a ‘drop in the ocean’ in the context of huge world problems? Yes.

An individual donating to effective charities isn’t going to sort out crazy global issues. But that does not alter the fact that it can and does improve things for a considerable number of REAL people - with real lives, families, sufferings and joys. People just like you and me.

We can break through the ‘psychic numbing’ to realise that actually, even partial solutions save whole lives.

If this stuff makes sense to you, check out the society ‘Giving What We Can: Sheffield’. We are a group interested in making a difference to global problems in the most effective ways possible, and run regular events on all sorts of topics. Find us on Facebook or email gwwc@sheffield.ac.uk.

Footnote: For the purposes of this article I’ve talked about charities which impact human lives, in the area of global health. There is also a lot of research available which relates to effective interventions in other causes areas - including animal suffering, climate change, and existential risks.
In the UK in 2007, the Department of Health made a decision to tackle infection rates in hospitals. Ban the coats, ban the ties, ban the watches – and everyone roll their sleeves up to the elbows. Not only has the impact of this practice on infection control been negligible, if existent, but banning the white coat has had a wide array of detrimental impacts on hospital culture and patient safety.

The decision to restrict the use of doctors’ traditional white coats in the NHS was made in the wider context of implementing a ‘bare below the elbows’ policy, which compelled professionals to wear short sleeves. Doctors must also avoid wearing ties and watches in a clinical setting, as well as jewellery, with the absurd exception of a plain wedding band, which is perhaps the best illustration of the irrational nature of these rules.

As a fresh-eyed medical student arriving on the wards for my first clinical placement, I was struck by the stark contrast between doctors, and the rest of the entire hospital staff. Sisters, wearing dark blue uniforms; phlebotomists, in their white garb; receptionists, dressed in light purple. Only doctors stood out in personal shirts or blouses. In an environment where teamwork is of primordial importance, why is it we have to create an added layer of difference between the professions?

Allowing doctors to have choice in what they wear to work, when the rest of the hospital is assigned a uniform, creates a heightened sense of hierarchy. Only they can exercise their judgement on which items of clothing are appropriate, and only they are allowed to express their taste in fashion and personal choice. While these considerations may seem trivial, it is rather symbolic of liberties granted by the status of ‘doctor’. All I ask is that these liberties are restricted to fields where they are pertinent to specific medical and surgical knowledge, and don’t cross the line. Hospital teams as a whole would benefit from the confirmation that each professional has their own area of expertise, each valuable in their own right, and doctors don’t have a special ‘Heightened Fashion Judgement (Bsc)’ to distinguish them from everyone else.

From the perspective of the patient, too, it is hard to justify the abolition of the white coat. Initially used in laboratories, they became widespread in medicine the 19th century to associate the image of scientific reliability with doctors. Their evolution has made them a symbol of professionalism and expertise deeply ingrained in our culture. This may explain why patients prefer doctors to be dressed in their traditional uniforms, as found in a 2013 study in England. Interestingly, the ‘bare below the elbow’ attire came last on the list of preferences. As underlined by Dr Dancer in her article the same year, there are very real dangers associated to scruffiness in doctor-wear. Patients struggle to recognise doctors on the wards, who are tempted to let standards slip and resort to casual attire.

Finally, the simple white coat has a practical appeal far beyond what could be expected of it. Not only is it easy to comply to standard hospital instructions to wash the uniform at 60°C, which could not be easily said of fragile polyester blouses, but the stress of having to display aforementioned fashion tastes would be immensely reduced. In the context of a struggling NHS, aren’t doctors over-worked and burnt-out enough without having to worry about the pattern of their shirt every single day?
We have evolved into a meat-loving, dairy-addicted, protein-obsessed population, disconnected from our food and the sources of our food. We eat steaks and fish, drink milk and consume eggs without even questioning where this ‘food’ comes from and what processing it has undergone before it ended up in its neat plastic packaging in the supermarket or on our plates. This habit of ignorance and lack of enquiry has many more consequences than we might first think. Through the food we buy in the supermarkets and consume every day, we have a profound impact on the industrial food system, the planet’s ecosystems that have given us life and the very future of our own species. A plant based diet is not only beneficial to our health, it also has a clear impact on sustainability, the ecosystems of the world and the inhabitants we share this planet with.

While the current world population has enough habitable land to survive, it may not seem concerning that 45% of land on Earth is used to feed and raise the animals that have become a major source of our food¹. However, it does become concerning when we consider that this isn’t just any land; it is the land that is vital for the survival of humankind, millions of animal and plant species and the planet itself. 91% of Amazon rainforest destruction is due to clearance for animal agriculture.¹

The rainforests are not only home to many animal and plant species, but this large area is responsible for eliminating the carbon dioxide from our atmosphere.¹ Just like a human cannot survive without lungs, the planet is unlikely to survive for long once its rainforests have been completely cleared – let alone be a habitat fit for humans to thrive.

The Earth’s land is not the only part of the planet that is threatened by our current animal product consumption: the Earth’s waters and their inhabitants are also at risk. Pesticides and chemical fertilizers needed to produce food for farm animals are poisoning natural waters. Excessive algae growth, in response to the chemicals, deplete oxygen, which creates areas where marine life can simply not be supported.¹ In addition to the death by poisoning of marine life, ¾ of the fisheries in the world are depleted and at this rate we will probably have oceans without fish by 2048¹. As if contaminating the ocean wasn’t enough, animal agriculture consumes more than 1/5 of the world’s fresh water¹ as well. This is not a surprising when you consider that the production of 1 pound of beef requires over almost 10,000 litres of water.¹

With global warming and melting polar ice caps of fresh water, it seems like a bad idea to poison and inappropriately use our existing fresh water stores for animal agriculture.

Speaking of global warming and climate change, animal agriculture, fueled by our meat and dairy consumption, doesn’t really help here. When we think of pollution and greenhouse gas emission, we think of large factories, transportation and industry - not animal agriculture. However, studies suggest that at least 18% of greenhouse gas emission comes from animal agriculture - this is more than that of all transportation combined.² By 2050, this number is expected to increase to 80%.³ Methane and nitrous oxide emission from livestock are more destructive than carbon dioxide, which only adds to the existing problem.³ It’s hard to ignore the impact of our actions, including our dietary choices, when we see the effects on our planet.

In terms of the environmental imprint, a person with a plant based diet produces ½ of carbon dioxide, uses 1/11th of oil, 1/13th of water, and 1/18th land compared to a person with the standard meat and dairy diet.² And you thought you couldn’t make a difference.

In addition to the environmental issues we are creating, future generations will have to tackle additional problems created by our current habits. The world population is expected to rise to 9-10 billion by 2050,⁴ which also means there will be more mouths to feed. Climate change will continue to reduce the world’s viable agricultural land and food security will become a major concern. Inefficient, wasteful and land destroying animal agriculture to feed meat eating populations will not be sustainable with the limited resources. We simply cannot feed this growing population with an animal based diet while continuing to destroy and deplete natural land and resources. Our planet has allowed our species to survive by providing us with the resources necessary and meeting our needs, but with our present actions, it will not be able to meet the needs of future generations.

If the environmental benefits of a plant based diet aren’t convincing enough to consider...
changing your diet, maybe the health benefits can sway your opinions. Just like any diet, a plant-based diet can be healthy or unhealthy. However, research has shown that a balanced, whole food, plant-based diet has several health benefits that should not be overlooked just because bacon tastes nice. A vegan diet is linked to lower cholesterol, lower blood pressure, lower risk of stroke and ischaemic heart disease and protection from several types of cancers. However, when eating this type of diet it is important to be aware of common nutrient deficiencies. These can easily be avoided by being mindful of your diet, and possibly using plant-based substitutes. It is also important to consider future health problems we will encounter as probable food shortages will lead to more susceptible, malnourished populations and increased diet related diseases like cardiovascular disease and diabetes linked to unhealthy diets and obesity will affect greater proportions of populations all over the globe. Once we understand what our food contains and how to obtain nutrients from healthier sources, eating a plant based diet is not difficult, nor does it deprive people of necessary nutrients. Plants can provide us with everything we need (except vitamin B12), and contain protective properties for our health.

Our own health problems and the difficulties future generations will encounter as a result of our current diets are not the only health crises our current practices contribute to. Agricultural antibiotics contribute to antibiotic resistance, a public health crisis that is only growing with the increased use of antimicrobials. The animals we consume are pumped full of antibiotics needed to fight the diseases that these animals encounter in their overcrowded and unsanitary living environments. Medications are used to help the animals grow faster, to fight infections and prevent death. Frequently antibiotics are used as a preventative measure rather than a treatment, thus are administered unnecessarily. These antibiotics not only get passed onto us through our food supply, but also contribute to the not-so-small colony of antibiotic resistant bacteria. Studies have found that 11,000 tonnes of antimicrobials are used for nontherapeutic agricultural purposes in comparison to the 1400 tonnes used in human medicine. Another study suggests there will be an increase of 67% in worldwide antimicrobial consumption between 2010 and 2030. This increase will be supported by the rise in factory farms using antimicrobials for the animals raised to feed us. Limited consumption of an individual may not have a massive impact of the use of antibiotics in agriculture, but a population level decrease in meat and dairy consumption, decreased demand for these products and a protest against the inappropriate use of these antibiotics would be a start to addressing this public health crises looming over our heads.

Apart from the animal cruelty we are taught to ignore and accept as normal, the massive environmental destruction and climate change contribution, the ever growing antibiotic resistance crisis and the countless health problems associated with the consumption of animal products, your meat, fish, dairy and egg rich diet is great. I would still recommend considering switching to a more sustainable and Earth friendly plant based or at least vegetarian diet. We need to make better decisions about what food we consume and realize that with every item of food we have a direct impact on much more than just our taste buds. We do not have the right to destroy the Earth we inherited from previous generations, as we are simply borrowing it from future generations and sharing it with all the other inhabitants of this planet.

Sources:

Chances are, you have probably shopped at, or at least heard of these clothing companies. They dominate the fashion market by providing cheap as chips clothing with a rapid turnover of styles and allowing the fashion conscious millennial to keep up with the latest trends, even on our tiny minimum wages. Sounds pretty good? In theory, yes. In practice? We have got things massively, terribly wrong.

Over the last few years, these ‘fast fashion’ giants have emerged, thriving on our insatiable consumerist culture which has successfully conditioned us to believe we can be happier if we have more stuff. And do not get me wrong. I totally support the ‘more stuff = happiness’ argument when we are talking about cake, or popcorn, or adopting dogs.

But the fast fashion industry has a dark and dirty side that is not included in any of their adverts depicting white skinny happy people who you just know must be intelligent, kind, thoughtful and ambitious, because they’re wearing the latest trend (but that’s another angry rant for another day...).

This dark and dirty side is an environmental crisis that WE, the consumers, are perpetuating as we fall hook, line and sinker for the ‘more stuff = happiness’ narrative. And we need to stop it RIGHT NOW.

So, what exactly is this crisis, and how was it triggered? As usual, it all comes down to money. In the past, there used to be spring, summer, autumn and winter ‘collections’ for fashion lovers. But the fast fashion industries are purely and simply businesses – and businesses like our money. And to get more of it, they needed us to buy more often than four times a year. Enter the 52 micro-season concept. Yep, that’s right there is now a new ‘season’ of fashion EVERY SINGLE WEEK. To generate this huge turnover, clothes are being made faster, cheaper and of poorer quality to keep up with the demand. As these cheap, poor quality clothes fall apart and outdate so easily, we discard quicker and quicker, forming literal mountains of clothing that nobody wants and nobody knows what to do with.

And the result? The fashion industry is now the second largest generator of pollution on Earth after oil with 300,000 tonnes of used clothing going to landfill in 2016 in the UK alone. Additionally, when clothing made of natural fibres like cotton ends up in landfill, it behaves much like food waste; producing the greenhouse gas methane as it degrades in the abnormal, anaerobic environment. Synthetic fibres like polyester and nylon are essentially made of plastic – and don’t biodegrade at all. Both types of clothing will have been bleached, dyed and printed with chemicals during the production process and once in landfill, these chemicals leach into the soil and groundwater. Thus, the cast-offs of our hunger for cheap fashion are poisoning the earth.

“But don’t panic!” I hear you say, “I give all my old clothes to charity shops”. And that’s a lovely sentiment. However, while donating old clothes to charity might ease one’s conscience, in reality it makes a pretty small dent in reducing textile waste. According to the Council for Textile Recycling, just 20% of donated clothes are sold on by charity shops. The clothing that isn’t bought ends up going to textile recyclers. These recyclers either sell it in bulk as shredded rags for industrial use (which again, will ultimately go to landfill), or ship it off to developing countries such as Uganda and Kenya. There the donation of second hand clothes from developed countries has caused the collapse of their textile industry. Not such a charitable gesture after all...

How these clothes are made does not hold up to scrutiny either. No matter how hard brands try to distance themselves from it, low cost clothing companies make their money by exploiting resources – including human beings – from countries such as Bangladesh, China, Cambodia and India. There,

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cotton is grown by farmers who are paid pitifully, and exposed to the toxic pesticides they need to use to protect their only source of income. The fabric generated from this cotton is then sewn by 'slave labour' – adults and children alike who typically work 14 hours a day, 6 days a week in unsafe conditions, to earn as little as $21 a month. Remember the Rana Plaza factory in Bangladesh that collapsed in 2013, killing 1100 people who were stitching clothes for Primark? It is easy to forget when caught up in the thrill of purchasing the most recent bargain. Textile workers are also exposed to carcinogenic chemical dyes used on the fabrics – which in themselves are causing their own environmental disaster.

Let us look at The Citarum river in Indonesia as a case study. The river has been used as a chemical dump for years by textile factories that line its shores. Recently, Greenpeace analysed its water and found it to be polluted with lead, mercury, arsenic and nonylphenol1 (an endocrine disrupting dye which has been banned from the EU due to its environmental implications). The alkalinity of the water was equivocal to that of lye-based drain unblockers1 (picture yourself taking a dip in a river of Mr Muscle – you know the one with all the warnings of ‘can cause severe skin burns and eye damage’ …). And this is by no means an isolated event. Annually, over half a trillion gallons of fresh water are contaminated in textile dyeing and are then dumped, untreated, into rivers where the water will eventually go on to pollute the sea.

Half a trillion gallons. A year. On clothing. When people across the globe are dying every minute from drinking unclean water.

Unfortunately, this water pollution does not stop once the clothes are nestled safely in your wardrobe. Every time a polyester or nylon garment is washed, tiny plastic microfibres are shed into our drains, taking with them yet more chemicals and microplastics.2 This is all getting a bit morbid, isn’t it? Human exploitation, thousands of tonnes of unbiodegradable waste, pollution of waterways, death of aquatic life, collapse of budding textile industries and depletion of natural resources for the sake of a £10 t-shirt.? It’s time to re-prioritise.

The good news is that there is a powerful opponent to fight this problem. This superhero/heroine is called: The Mindful Consumer (that is you). Us consumers wield a great deal more power than many of us realise – and every time we buy this fast fashion, we are creating the demand for it. We are condoning these practices: we are saying that this is ok by us. But you can choose to say something else instead.

You can choose to watch the documentary True Cost, or read Elizabeth Cline’s ‘Overdressed: The Shockingly High Cost of Cheap Fashion’. No, it is not light entertainment, but we cannot limit our education to the niceties. It is time to start living thoughtfully.

- Buy second hand (check out ‘Thred Up’ and the wonderful Scandinavian baby clothing initiative, ‘Vigga’).
- Buy good quality clothing that is ethically produced (such as Patagonia, Prana, People Tree). – Buy what you NEED rather than what you WANT.
- Stop mindlessly supporting cheap brands that are made to not last.
- Repair what you can (some shops such as Patagonia offer free repair on all their clothes).
- Repurpose your worn out clothes into something you will use, like cleaning cloths. Not only will you increase the lifespan of your textiles but you’ll also be avoiding paying out for household items that you can make out of what you have. Most importantly, you can choose to shift your attainment of self-validation away from buying things you don’t need, and instead invest your time and energy in experiences that enrich yourself; reading, walks in the great outdoors, catching up with friends, supporting small local bakeries, stargazing, cycling across the peaks, working out, falling in love – there are so many more amazing things in the world than tramping around Meadowhall or scrolling on Asos.com.

We need to end our culture of materialism, ignorance and convenience. It is time to start living thoughtfully.

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