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THE GREY MATTER

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15

QUARTERLY NEWSLETTER FOR MEDICAL STUDENTS



MAN v/s CLIME

A Global Warning

Since time immemorial, climate and humans have always had a complicated relationship, but arguably they still went hand in hand. Remember the days when our parents forbade us from frolicking outside in the rain with the fear of catching a cold? Well today, monsoons aren't the only occasions where we have to face similar symptoms. The myriad of pathogens out there empowered by pollution and the unstable climate have created a situation far more grim.

Every minute that glaciers melt and snow clad peaks get chipped off, so does the foundation of our healthcare system. Mutating viruses and rebellious bacteria are giving immunosuppressants a run for their money.

In Volume 15 of The Grey Matter 'Man v/s Clime', we highlight how the unstable environment has paved way for a stronger generation of pathogens and how healthcare workers are striving to provide countermeasures to tackle this abominable threat.

Earlier our immediate response to signs of sore throat and cough was drinking warm water and giving it a rest. Now the 'masks and hand sanitiser' era after the pandemic diverts us to the lane of Vitamin C tablets and antibiotics. Everyone has become aware that even a bout of cough can lead to uncontrollable propagation of the pathogen. As our climate moves towards further entropy, it is but obvious that pathogens will evolve. It is imperative that we evolve too.

Hop in and catch hold of a paddle as we comprehend the handbook of how to row to the other side.

- Gauri Hirekerur & Neel Waghu, Co-Editors

Happy Reading!

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THE MESS CALLED ANTIBIOTIC RESISTANCE

by Pankaj Gayki, II M.B.B.S., Dr. V.M. Govt. Medical College, Solapur

When you get a recurring cold or persistent sore throat, you go to a doctor and they prescribe some medications. Ever wondered what they are? They're Antibiotics! Antibiotics have become such a common affair in our daily lives that we use them right from treating sneezes to curing TB and leprosy. Can you imagine what would happen if antibiotics stopped working? Is that possible? Let's see.

Antibiotics weren't always in the limelight. In truth, they existed; we were just oblivious to them. So in the past, people would pass away from the flu, from being gored by an ox, or from a gangrene from a basic axe injury. They rarely witnessed cancer or diabetes because most of them didn't live long enough. But one fine day, a miracle occurred.

On the third of September, way back in 1928, renowned Scottish physician and microbiologist Sir Alexander Fleming while working on colonies of Staphylococci bacteria noticed that these bacteria had formed a touch-me-not ring near an accidental fungal growth in the bacterial culture. This particular fungus—the Penicillium, was secreting a molecule which stunted bacterial growth. Any clues as to which molecule is in question? You're right! It was Penicillin, the first antibiotic that was ever discovered. This could be perceived as 'the discovery that changed mankind' and Dr. Fleming received a well-deserved Nobel prize for this astounding discovery.

Since this historic discovery of penicillin, we haven't glanced back and antibiotics have now become an immensely important part of modern medicine. From the 1940s to the 1980s, loads and loads of funding paved way for research and production of newer, better antibiotics. From able penicillins to tetracyclines to cephalosporins, antibiotics did to medicine what Rousseau did to French Revolution.

Isn't it always scary when things proceed flawlessly with zero trace of counter effects? This is when 'Antibiotic Resistance' comes into picture. What's that? Antibiotic resistance describes a bacterium's ability to survive while it is still being exposed to antibiotics. Yes, it is possible that a certain bacterium may not at all be affected by an antibiotic!

How do bacteria develop antibiotic resistance? It's a part of their evolutionary process. Life today as it is, has evolved over millions of years through countless mutations. Unlike us however, this is simply a matter of a few minutes or days for a strain of bacteria.

Therefore, developing new characteristics like antibiotic resistance through mutations isn't a big deal for them. Mutations are chance events; every other mutation doesn't result in conferring resistance. So how do different strains of bacteria become resistant to similar antibiotics? The answer is, transfer of genetic material. A curious habit of bacteria is that they love to share information whenever they meet, like two old friends at a park. This also occurs between different species of bacteria. Once a bacterium gets an antibiotic resistance gene, it gets passed on to another bacterium, like a juicy bit of gossip. Talking in scientific terms, they share genes by conjugation, transformation or transduction. In conjugation, DNA is transferred between bacteria through a tube between cells, while in transduction, DNA is accidentally transferred from one bacterium to another via a bacteriophage (a virus which infects bacteria). Transformation is a bizarre method wherein a bacterium will take up a piece of DNA floating in its surroundings. If the shared DNA in any one of these scenarios happens to have an antibiotic resistance gene, then congratulations to the bacteria!

Antibiotic resistance is a boon for the bacterium, but a bane for us blokes. The heavy use of antibiotics since their discovery has led to scores of bacterial strains developing resistance against broad spectrum antibiotics like Penicillin. Before reaching the age of 2, an average child in the U.S. takes at least 3 rounds of antibiotics! Antibiotics are even prescribed for viral infections! By the way, antibiotics are of no use at all against viruses, parasites, or fungi. 80% of antibiotics used in the U.S. are used in agriculture for rearing animals for meat. This leads to large-scale exposure of bacteria to antimicrobials and their development into 'Superbugs' which eventually strengthens them against us.



Sir Alexander Fleming in his Nobel acceptance speech in 1945 warned us about antibiotic resistance saying, "The time may come when Penicillin can be bought by anyone in the shops. Then there is the danger that the ignorant man may easily underdose himself and by exposing his microbes to non-lethal quantities of the drug make them resistant." But why concern ourselves with resistance when newer antibiotics can simply be developed? Because the last antibiotic class discovered was back in the 1980s. The rapidly developing resistance against antibiotics has led pharmaceutical companies to divert funding to other classes of drugs. In 2004, only 4 antibiotics were in development across the world!

The NCBI (National Centre for Biotechnology Information) states that, "India ranks first amongst all countries of the world in total consumption of antibiotics for human use. More than 7,00,000 people lose the battle to antimicrobial resistance every year and another 10 million are projected to die from it by 2050. Antimicrobial Resistance alone is killing more people than cancer and road traffic accidents combined together."

Increasing ineffectivity of antibiotics has led to concerns regarding the treatment of patients with weakened immune systems like in AIDS, cancer, transplant patients and premature babies. In India each year, around 11 million adults develop sepsis, 17% of all pregnant women undergo a C-section, 77 million people have diabetes, 175,000 get dialysis, 12,746 receive transplants, 670,000 people receive cancer chemotherapy and much, much more. How are we going to treat microbial infections in these people if antibiotics are rendered useless chemicals?

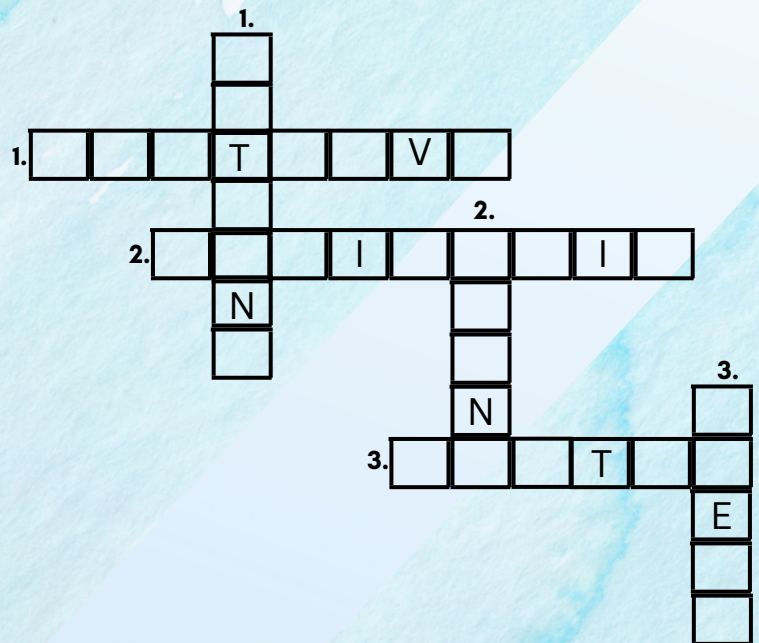
As we reach the threshold of a post-antibiotic era, research is being carried out to combat resistance. One of the few solutions is addition of resistance inhibitors. When clavulanic acid is added to penicillin group the antibiotic overcomes resistance. Bacteriophages are also being seen as a beacon of hope in the fight against superbugs. Fecal Microbiota Transplantation or Live Biotherapeutics is another solution under research.

Research requires funding and funding takes place where profits are apparent, leading to globally important projects like these being backed solely by the World Health Organisation or national organisations like CDC and NCDC and not pharmaceutical companies. Judicious prescriptions from physicians, vaccination, reduction of the massive antibiotic usage in the agricultural sector may be some ways in which we can help prevent creation of superbugs. We have always had accidental discoveries which later turned into miracles. Maybe we'll develop a new generation of antibiotics which will help us overcome this dreadful issue of antimicrobial resistance/superbugs. In any case, as a species we are resilient and we will thrive!

C RTEX

Crossword

by Gauri Hirekerur, II M.B.B.S.
M.I.M.E.R. Medical College, Pune

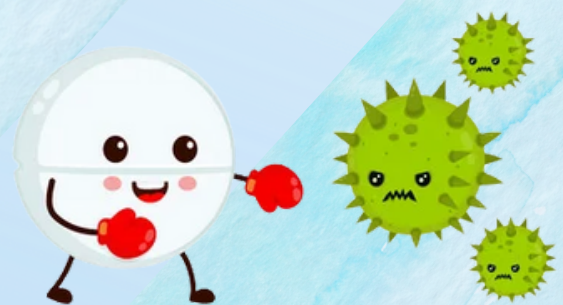


Down

1. Third strongest hurricane recorded in the USA.
2. Stratospheric shield for life on earth.
3. A greenhouse gas.

Across

1. Abnormally hot weather coupled with high humidity.
2. Occupational disease caused by particulate matter
3. Infection carriers.



Answers
Down: 1. Katrina, 2. Ozone, 3. Freon
Across: 1. Heatwave, 2. Silicosis, 3. Vector

Breathtaking Talk

**Dr. Mahavir Modi, MD Tuberculosis and Respiratory Diseases, Pulmonologist
at Ruby Hall Hospital, Pune**

In conversation with Neel Wagh and Soba Inamdar, II M.B.B.S., M.I.M.E.R. Medical College, Pune

GUEST
INTERVIEW



Dr. Mahavir Modi

Dr. Mahavir Modi is a renowned Pulmonologist based in Pune with excellence in Chest and ENT. He has completed his post graduation in MD Tuberculosis and Respiratory Diseases from BJ Medical College. He holds a fellowship in Therapeutic Endoscopy and Endoscopic Ultrasound from Ancona, Italy. He currently runs his own Clinic and also conducts regular consultations at the esteemed 'Ruby Hall' Hospital in Pune, India.

Q) Can you tell us a bit about how you ended up choosing this profession and this line of masters?

I'm from a generation where intelligent students were only given 2 choices to decide what career path to pursue - medicine or engineering. Luckily I would always become fascinated with medicine whenever I visited my family physician, especially when I witnessed the unparalleled amount of respect doctors got in the community as against other professions. During my college days, I realised there is no physiological system in our body where the respiratory system isn't involved. Isn't it fascinating that even during resuscitation the respiratory system comes first? This sparked up my interest in Pulmonology.

Q) We used to come across a number of headlines which correlated the increase in cases during the COVID-19 outbreak with the harsh and ever-changing climate. What is your take on it?

I was directly involved in providing COVID care right from the first day of the virus outbreak. We had an

assumption that Indians won't be among the mass affected as our population is already immune to a substantial quantity of pathogens. There were doctors and epidemiologists who thought that because of the warm temperatures we face here, corona virus won't thrive here. However, with drastic seasonal changes where a heavy downpour is immediately followed by scorching heat, it turned out that unstable conditions have helped the virus survive. During the lockdown, the decrease in vehicular pollution, reduced sulphur levels as a result of lowered human activities coupled with social distancing norms helped in containing the further spread of the virus.

Q) In your opinion, how significant is the relation of climate change with the healthcare system? What are the positive and negative impacts it has had on today's gene pool?

We see a large number of deaths due to cancer, diabetes and other chronic long term diseases and there has to be something more than just genetics affecting the death rate. We may not know the exact cause and aetiology for the increase in this rate, and that may lead us to blame lifestyle patterns, but suffice to say, the climate does play a role.

Several climatic hazards like the recent heat wave in Southern Europe, cyclones, uric acid rains all have a significant impact on health either locally on the affected area or a potential outbreak having global influence. Because of the variation in the weather we are unsure of the quality of crops that are grown and consumed. The water may even contain harmful contaminants despite getting purified. Air pollutants which have increased due to urbanisation and increase in the number of industries are a predisposition to rise in respiratory disorders like COPD, Interstitial lung disease, Lung fibrosis etc. Getting infected by greenhouse gases released as a consequence of burning fuels causes a person to experience lethargy, drowsiness and compromises their immune system.

Q) As a pulmonologist, have you encountered any specific paediatric case which required special care relating to this same issue?

Respiratory infections are very common in the paediatric age group. I see many cases where mothers state that pre-COVID, the child had no history of any infection but post-COVID, the child displayed signs of

recurring respiratory infections and allergies which eventually led to asthma. I then thought of an entity called 'Post-COVID bronchitis' or 'Post-COVID asthma' but medical experience shows that somehow the paediatric age group was the least affected by the virus and remained completely asymptomatic. If any, the symptoms were very mild and the children were the ones who used to act as carriers, eventually infecting the entire family. This undetected exposure to the virus lowered their immunity and resulted in their increased susceptibility to respiratory infections and allergies. Diseases like COPD have a chronic onset and hence evidently seem to affect adults, but the disease starts from a younger age. There may be a person who has never smoked in their life but still might develop COPD. This is due to the recurring respiratory infections they have faced as a child.

Q) We see an increase in number of children prone to asthma and respiratory infections. People believe it is due to weakening immunity. What is your advice to the public about this?

There's a lot of misbelief regarding asthma being a result of weakened immunity but we must remember that allergies are a form of hyper immune response. Most of the time when a person is experiencing a respiratory disorder the underlying cause is a man made phenomenon itself.

The Dutch hypothesis says that when a child gets infected and recovers in the growing years, it helps to strengthen their immune system, but if they are brought up in an over protected environment where they never encounter an infection, their bodies will not be able to develop immunity against a similar potent allergen. Thus, we should be able to protect our children by strengthening their immune system. Another thing to keep in mind is that our immune system is modulated by our sleep cycle and diurnal variation in hormone levels. A child who needs 10-11 hours of sleep, if only gets 6-7 hours is bound to have compromised immunity. Growing children although fed correctly, also need a stable sleep cycle with proper sleep hygiene. Sleep makes up for 1/3rd of our lifestyle hence, must be well regulated.

Q) As pollution rises, breathing clean air has become all the more challenging. What are some methods to maintain respiratory hygiene?

It is a very difficult question to which no one has a definitive answer. Our respiratory system is continuously being invaded by particulate matter and pollutants. I generally advise patients to take a walk early in the morning when the atmosphere is relatively at its purest. I believe we should have a techno-savvy village system where all amenities are available and we are also away from pollution.

Another way is to drink water and stay hydrated. Our goblet cells secrete sufficient mucus if we keep our body hydrated. Along with water, antioxidants are also used in people suffering from COPD to provide relief. Citrus fruits like amla are rich in antioxidants that are enough to maintain the required amount. India is blessed with Ayurveda. Pranayama and deep breathing exercises help to clean the respiratory tract. We have to modify our lives to coexist in these climatic conditions. Taking measures to decrease our contributions to pollution and deforestation is a step forward and well worth the efforts. All of these man made changes will definitely help us improve our health over the course of time.

Q) The bizarre climate changes we face call for better respiratory care. How do you think this will shape the field of pulmonology in the future? Have there been any advancements due to the same?


Pulmonology is a vast field and it is only growing with the on going and continuous advancements in the healthcare system. We have people specialising in only allergens and allergy related respiratory disorders. Those who practice only lung fibrosis and interstitial diseases. Some directed primarily towards sleep medicine and sleep apnoea, whereas some may practice only pulmonary vasculitis and pulmonary hypertension. There are professionals concerned with only lung transplants and some with long term palliative care of ventilation. This shows how far respiratory care sector in the healthcare system has evolved especially after covid, since lungs were the primary organs involved during the pandemic. The novel techniques are leaning into AI, like the CT scans that were strictly done by AI during covid. Our country has also progressed successfully in lung transplants and robotic surgeries even post covid. Diagnostic aspect of respiratory care has sky rocketed with procedures like electromagnetic navigation system. The smallest of infective nodules can now be studied through a biopsy because of precision brought along by robotics, which was only a dream a few years ago. These minute procedures were impossible because lungs are like balloons and can get punctured with any wrong move, resulting in pneumothorax, but now there is an electromagnetic navigation bronchoscopy that allows fine handling of the periphery of the lungs. We have patients getting procedures like ECMO (extracorporeal membrane oxygenation) for months together, while being on a waiting list for lung transplant.

Q) Do you have any advice for students who wish to pursue pulmonology?

Pulmonology is a dynamic field. It requires you to be on your toes at all times. You should always be ready for emergencies because your intervention will be the difference between life and death.

One must be ready to sacrifice a few things to have a successful career. If the subject creates an interest in you, you will definitely excel because then your dedication will shine. And 'Dedication' is the name of the game, not just for a fulfilling career but a happy life.

Lights, Camera, ✨ Prescription ✨



•Don't look up:

Tune into this apocalyptic satire of political and media indifference to the climate crisis, as two underestimated astronomers attempt to warn humanity about the mass destructive repercussions of an approaching comet.

•Kadvi Hawa :

Based on true stories from the drought prone Bundelkhand region and the vanishing villages from coastal Odisha, this haunting tale of farmer's suicides and the struggles of living in such drastic situations is sure to give you goosebumps.

•The inconvenient truth:

As the sirens of "planetary emergency" alert the public to global warming, this documentary brings to light various climatic disasters, forcing people to think and rethink their actions and instill in them the urge to salvage our planet.

•Irada:

In the hopes of a comfortable tomorrow, watering thermal power plants and industrialising explosive carcinogens have ripped off families and loved ones. Will this motivate a journalist to seek justice for the hearts broken and the lives lost?

•Bhopal Express:

Set against the gas tragedy in Bhopal, in 1984, which killed over thousands of people and left behind the survivors to suffer and pass the chromosomal damage caused by the leak, this movie highlights human irresponsibilities and carelessness that caused such a massive disaster. The story is a depiction of the aftermath of our actions that contributed to this catastrophe.

•Geostorm:

This sci-fi classic quite literally took the world by storm when it came out. Have you ever wondered what the repercussions of toying with nature's laws would be? Witness how a desperate effort to control the climate spells doom for its conspirators.

•The day after tomorrow:

Don't let the documental genre mislead your interests. This two-time Oscar winning masterpiece is the critic's choice for a fresh perspective from an ex-Vice President on international awareness of global warming.



Viruses: The Acellular Abominations

by Disha Nikam, II M.B.B.S., M.I.M.E.R. Medical College, Pune

Runny nose, body ache, throat pain, fever and chills. Do these symptoms ring a bell? They are associated with the ever-so-notorious being, the virus. Ranging from the regular occurrence of a common cold to a socially stigmatized infection of HIV, everyone has been traumatized by viruses. Being acellular, this simple microorganism is just made up of a strand or two of DNA or RNA as its genetic material. In a pronounced contrast to its simple structure, the havoc created by viruses is magnificently atrocious.

Invading viruses pounce upon our healthy cells and destroy them, lowering our immunity. On the other hand, we have an inherently established virome amassing 380 trillion viruses. When our immune system weakens due to other bacterial or parasitic infections, these indwelling viruses take over and worsen our body's capacity to fight. In sickness and health – a vow taken too seriously by this entity has unequivocally induced an abominable feeling for itself.

Viruses are hijackers, loitering at the brink of life. They enter the cells by endocytosis or by fusing with the membrane and replicate inside the living cell by using the cells' own replicating machinery. With no inherent mechanism of their own for survival, these viruses have a distinguished power vested in themselves as a virtue of their ability to persevere, recreate, and mutate over the course of evolution.

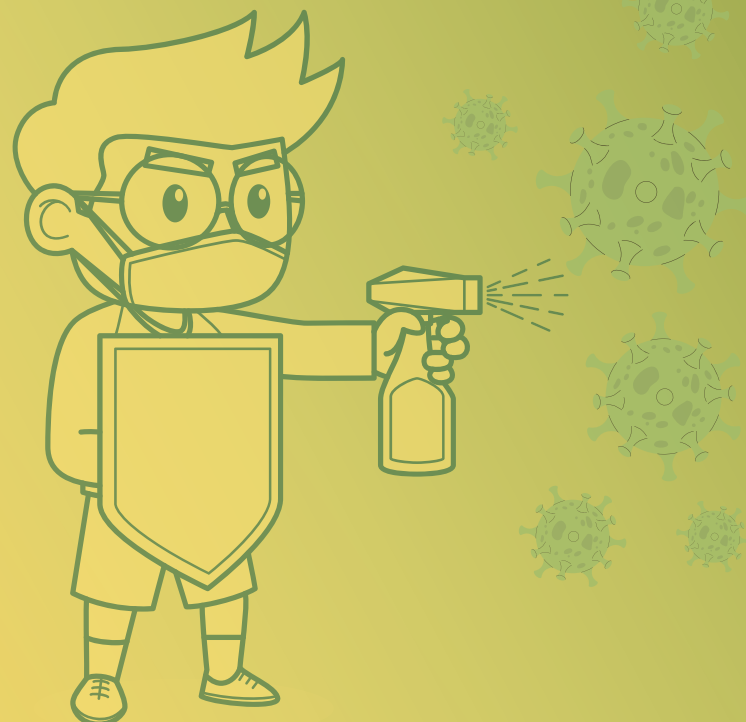
New research coming to light takes us down a black hole of harrowing information. According to a study done at the University of Chicago, the commensal bacteria of the gut suppress the antitumor immune response against the murine leukaemia virus under influence of the virus. It effectuates leukaemia in the host, thus proving that viruses can take on anything and everything for their existence.

An eminent contradiction that one might ponder upon is that even with no survival mechanism of their own; viruses are known to be established 'self-servers'. Under unfavourable conditions, bacteriophages seem to take refuge in the host bacterium. Instead of attacking and destroying the bacterium, it replicates along with the replication of the bacterium. It remains protected inside the host cell. Once the adverse conditions wither, the new virus infects and kills the bacterium. For the burgeoning of viruses, the bacteria succumb to their death.

Viruses are guilty of contributing to the already unfortunate advent of antibiotic resistance brought on by improper and excessive use of antibiotics. Bacteriophages, known to attack bacteria, under certain circumstances manifest antibiotic resistance in them by releasing specific enzymes. This is prominently observed in the Enterobacteriaceae family, Shiga toxin-producing Escherichia coli, and non-typhoidal Salmonella.

Viruses gone rogue is the new normal today. Novel viruses and their strains are emerging at an alarming rate with climate change conferring to this rise. At higher altitudes where cold persists, global warming and its delirious effects have caused an increase in temperature, creating conducive conditions for pathogens like Dengue and Zika viruses to flourish and help aggravate outbreaks. Heat waves, precipitation, storms, droughts, and floods disrupt our natural habitat. Animals all around come grazing over large fields of land, and the endemic areas get intermixed, resulting in bringing the pathogens closer to humans. The spread of the Ebola virus is the perfect example.

An entity is labelled as an abomination only when there is a strong and universal feeling of hatred towards it. And hate is quite a strong word. For anything to elicit such retaliation, it must have an insidious potential. Now is the time when we realize its potential and act accordingly. We are still at the tip of the iceberg, waiting to unravel more. The challenge of the hour is to navigate this intricate network of humans, viruses and their interactions.



Responsibilities Galore!

by Jainil Devani, III/I M.B.B.S., GMERS Gotri Hospital, Vadodara, Gujarat



Mrs. Abha Saxena

Mrs Abha Saxena has been working for eleven years at GMERS Gotri Hospital, Vadodara, Gujarat, and is now serving as the Head Nurse of the Surgery Department. She works diligently to make sure the entire ward operates smoothly, and tries to ensure the best patient care possible, even with limited resources.

Q) What is your job profile, on a day-to-day basis?

As the Head Nurse of a busy department, I have to oversee everything my team is doing; from allocating and assigning duties to all the nurses, to making sure the Crash Cart and Betadine solutions are in the right places at the right time. Because at the end of the day, the responsibility is mine. I have to keep an eye on all the nurses, ward boys, staff and make sure all the orders and schedules are being followed, bedsheets cleaned and doses delivered to name a few.

Q) That sounds hectic! What was a particular challenge that you had to overcome?

There were lots, especially during the pandemic. One that comes to mind was consent forms. Slowly over my tenure, the role of consent forms has increased, and they introduced them in more places. A lot of the times, there would be a lapse: they wouldn't be signed, they would go missing or the names wouldn't match. I had to slowly and carefully teach the entire staff the importance of these forms. Now they're all maintained in tip-top condition!

Q) When do you feel satisfied with your job, a "well-done" feeling?

As a government hospital, we see a lot of poor patients who come here as a last resort. Coming together as a team, all

the way from the surgeon and the on-round resident, to the nurses and ward-boys, providing them with the best possible care with our limited resources and seeing them get treated and discharged, that's a really special feeling. These are the incidences when all the arguments and the hard work pays off.

Q) Do you see more cases during the Monsoon in our hospital?

I mean, from a surgery wards perspective, the patient flow more or less remains the same all year round. But Medicine wards are chock-full of patients with dengue and such diseases, in the after-monsoon period.

Q) What do you think of the students coming here? Do you have any advice for them?

Oh, I love seeing students in the wards! Taking histories, figuring out examinations, and trying to read drugs written in the files! As a Head Nurse, I don't have much time to interact with them, but whenever I can, I try to help. One advice I do have is to observe and ask questions. I have learnt so much after nursing school from just observing the doctors, my senior nurses, etc. And don't be afraid to ask questions. You will always remember something you've asked about in wards. If you're afraid to ask your teachers, ask a nurse. We're usually very busy, but if you ask something, we'll always try to help!



Comic by Anuja Argade

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Shutterbug



Wardhan Kulkarni

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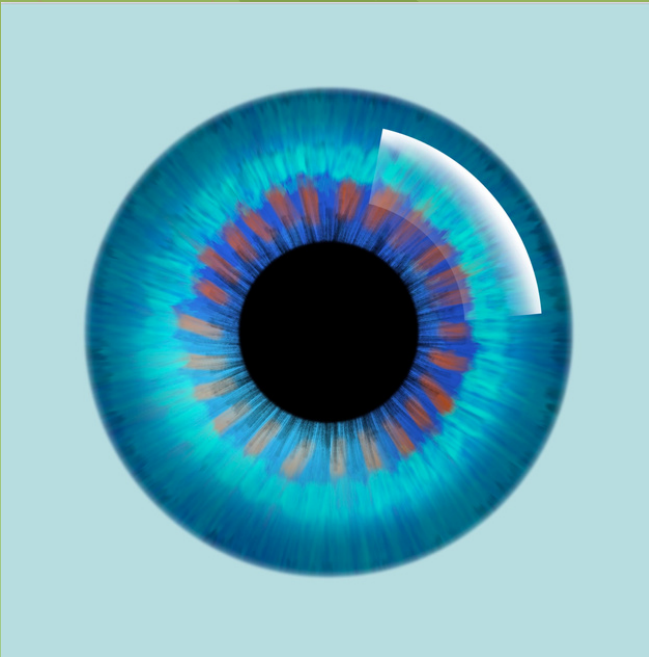


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Pigment



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DIALOGUE

Dr. Surendra Kulkarni, Department of Community Medicine, M.I.M.E.R. Medical College, Pune
In conversation with Anushka Gupta & Aaditya Kiratkar, I M.B.B.S., M.I.M.E.R. Medical College, Pune

Dr. Surendra Kulkarni is an epidemiologist. He completed his M.B.B.S. from Dr. VM Medical College, Solapur. He received his Diploma in Public Health and completed his post graduation in Preventative and Social Medicine from his undergraduate alma mater. Beginning in 1988, he served in the department of public health as a medical officer and slowly advanced to teaching. Dr. Kulkarni has numerous research publications to his credit in National and International Journals. Currently, he is a professor at Maharashtra Institute of Medical Education and Research, Talegaon (D), Pune.

Q) What does an epidemiologist's role entail?

Theoretically, an epidemiologist studies disease patterns, interprets data and suggests preventive measures. The family visits and data analysis lectures during your Community Medicine postings. Well, that's a precursor towards studying epidemiology. Being a teacher in a medical institute, my role expands to igniting a spark of interest in the raw inquisitive minds of our future doctors.

Q) What changes have you observed in epidemiological trends now versus back in your time?

My journey in the public health department began way back in 1988 as a medical officer. Over the course of time, as our healthcare system and government policies evolved, so did the pattern of communicable and non communicable diseases. Previously malaria, hepatitis, gastroenteritis and water borne diseases were famous as causes for outbreaks. But now they are replaced by Dengue and Chikungunya, all being sets of vector borne diseases arising from lack of hygiene in any locality.

Q) What is the link between global warming and rapid emergence of novel pathogens & diseases?

Global warming and disease spread are like 'Vikram and Betaal'. Where one goes, the other follows. The dawn of climate change as a result of urbanisation, global warming and rising sea levels have lead to an alarming increase in illnesses caused by extreme weather conditions like, heat waves, tsunamis and drought. Certain infective agents like viruses have been introduced to humans through other species, being the outcome of close unmoderated interactions between them. These viruses like the strains of corona viruses found in animals seem to have 'spilled over', now affecting mankind on a larger scale.



Dr. Surendra Kulkarni

Q) The Europe Union recently issued an article which read 'Future pandemics are inevitable. Coronavirus will not be the last pandemic in our lifetime.' How do you think has human intervention accelerated the onset of pandemics?

In my opinion, pandemics aren't about nature exacting its revenge or siphoning off the mess we have made. They are the consequence of our ignorance and lack of awareness towards realizing we are way overdue doing our part. The fragile equilibrium our planet apprehensively balances over is about to, or dare I say, has already tipped over. We humans who claim to have an empathetic heart, have inconsiderately throttled nature at its core. We are so persistent to be the last ones standing, our overpopulation is stretching the planet's resources thin. Compelled by the thirst to be powerful boasters, we have unknowingly driven dozens of species to extinction. So it is but natural that pathogens will feed off the most thriving population, that being us humans.

Q) Can changing climate cause a global pandemic like Covid-19? What measures can we take at the grassroots level to slow down the permanent effects of climate change?

Although no current evidence points towards climate change as a causative factor of COVID-19, it certainly did exacerbate the outbreak where overcrowding and poor personal hygiene added to the chaos of the pandemic. Any action towards inviting change no matter the concerning issue, begins at an individual level. Investing in alternative non polluting sources of energy, carpooling or using public transport to reduce air pollution, eliminating plastic from daily life can pace the damaging speedometer and allow the environment to heal.

Q) How does climate change affect the healthcare sector?

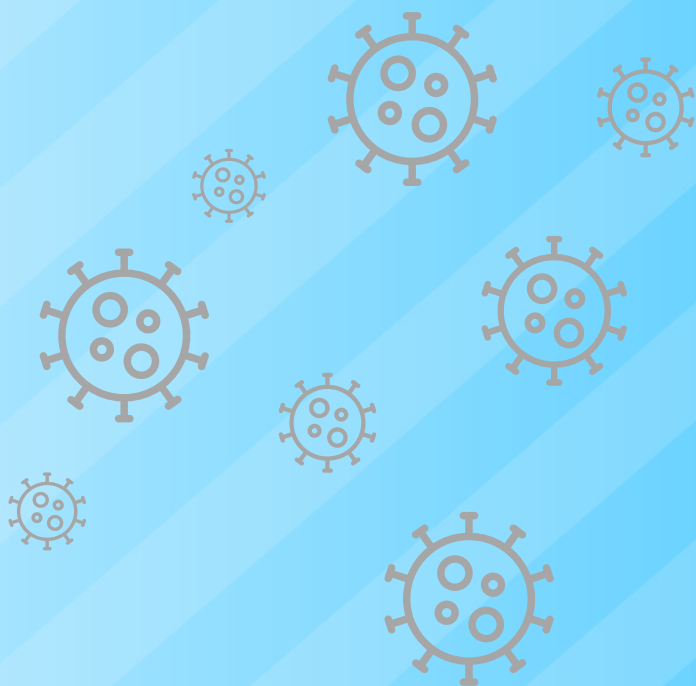
If humans get to have a direct effect on the environment, why can't it be the other way round? A well known example is a surge in skin cancers from exposure to dangerous sun rays. As you may already be aware, our gene expression is not only altered by pollutants and free radicals, but it can also be passed down to future generations. However, genetic changes in humans are quite rare. Pathogenic genetic material is more vulnerable to mutation by unfiltered UV radiation. Even after the thinning of the ozone layer we have continued to pollute the stratosphere with green house gases. These germs are being fashioned into newer and more dangerous versions, which evidently are strong enough to wreak havoc if not tended to in time.

Q) How is the human body coping with the changing global environment?

The suffocating amount of pathogens in the air is causing humans to fall prey to disease. Pollution is a weakening factor that opens up our body to cardiovascular diseases, asthma, heat syncope and strokes. Our collective immunity is dwindling due to poor nutritional choices, food shortages and chemical laden produce. Add lifestyle diseases like hypertension, obesity, carpal tunnel, cataract, backaches to the mix, and you've got an invitation with open arms for pathogens to come attack us.

Q) Is there anything you would like to emphasize on to sensitize more people to the devastating effects of climate change?

As an epidemiologist, I believe every citizen should know certain principles of epidemiology. The climate emergency is a pressing issue that cannot be postponed any longer. It is happening now. The ball has already begun rolling and we cannot reverse the permanent damage done to our planet. The time for prevention is gone, we must now focus on treatment. The treatment is in the form of action, at all levels—personal, community, national, and international. However, public awareness is key to solving the climate crisis. There are people who don't know about it or refuse to acknowledge or those simply too lazy to act upon it. It is imperative to awaken these people. Awareness can fuel a conscious change in our mindset and subsequently, our habits. If Greta Thunberg, a mere 19 year old can do it, so can we.



Environment - Friendly practices in Healthcare Delivery Systems

by **Madhav Bansal, III/I M.B.B.S., Institute of Medical Sciences, Bhubaneswar**

From making posters and writing essays on seemingly easy topics like 'Go Green' in primary school competitions to understanding the ethos of the grim issue climate change actually is, I personally have never felt more awakened as I feel today after having read various reports and literature on the issue of climate change and its connection with healthcare.

Alliance for Natural Health first defined sustainable healthcare in the journal 'Nutrition Practitioner' in 2006 as "A complex system of interacting approaches to the restoration, management and optimisation of human health that has an ecological base, that is environmentally, economically and socially viable indefinitely, that functions harmoniously both with the human body and the non-human environment, and which does not result in unfair or disproportionate impacts on any significant contributory element of the healthcare system"

Traditional healthcare is patient-centered and focuses on internal characteristics, which may incorporate community, but is very often seen to exclude environmental components from the notion of 'community'. Healthcare organisations are involved in disease management and generally view themselves as part of the solution rather than part of the problem.

Healthcare, though one of the most essential industries in countering climate change's rising health implications, it has also been highlighted as a key contributor to the climate issue, accounting for 46% of worldwide greenhouse gas emissions in 2017. Greenhouse gas emissions and particulate matter emissions from health-care systems increased by 29% and 9%, respectively, between 2000 and 2015.

Because over-investigation and over-treatment run the danger of harming patients, incurring needless medical costs, and causing pollution, appropriateness of care is a factor in determining the quality and value of healthcare. A sustainable healthcare system should be in line with the kind and level of care to be delivered for the condition.

Due to the fact that health-related activities bring in money, many private healthcare systems have little motivation to encourage healthier populations and lower the burden of diseases. In contrast, the constraints of set budgets in systems that are sponsored by the government encourage resource stewardship.

The same goes for physician compensation plans, which should eliminate conflicts of interest between the patient, provider, and the system by replacing fee-for-service models with alternative payment methods that reward optimal practices.

The majority of published research on health care sustainability and institutional efforts to achieve this aim has been on decarbonizing health system operations.

Manufacturing accounts for up to 90% of product emissions, but even enhanced recycling programmes can't possibly make up for it. Nothing short of a systematic shift to a circular economy, in which for example medical equipment, are built for reuse and kept in circulation for as long as feasible, will result in net zero emissions.

A significant distinction must be made between the 'road to sustainability' and 'becoming sustainable', which is the intrinsic culture shift that occurs inside the corporation, which involves all employees and personnel, and radiates out into everyday work, organizational choices, and activities. These sustainable habits have an impact on the local community as well as all those who are directly or indirectly involved in the organization's broad area of influence.

The goal of net zero health-care emissions is the apex of a societal movement toward universal health and well-being and goes beyond a mere strategy for coping with climate change. Existing emission targets are insufficient to prevent devastating climate change, and they will aggravate inequities and also lower the standard of living for future generations.

Value-based health care reforms offer a framework for lowering the financial and environmental cost of healthcare provision while enhancing clinical effectiveness. Instead of consulting multiple physicians with unstructured referral patterns, restructuring healthcare to integrated disease therapies is the way to go. Clinical pathways are used to expedite treatment and cut down on shortfalls, replacing the need for frequent provider visits with multiprofessional teams that incorporate general, specialised, and allied health care. A powerful virtual care system, upheld by the COVID-19 pandemic, may reduce travel requirements, improve patient comfort and cost-effectiveness, and expand access to healthcare for those living in remote and rural areas.

We lack an accurate understanding of the level at which we should be conserving since the notion of 'conservation' is relatively new. However, the idea of sustainability looks up to human action to address these problems, giving us the chance to go back in time and maybe even reach a point where things are somewhat how they were previously. We do have the chance to reverse or reduce the detrimental effects healthcare causes on people and the environment if we comprehend the life cycle of our actions.



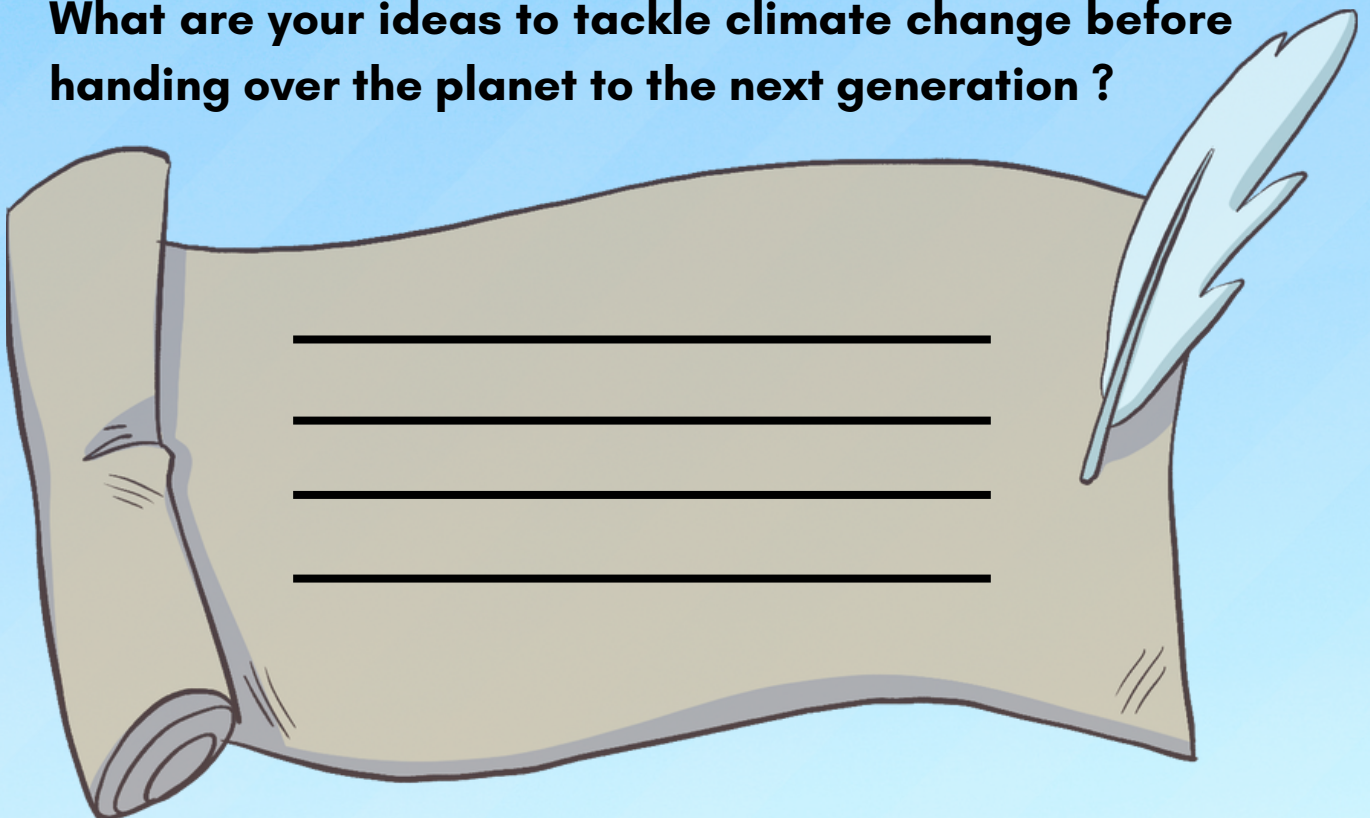
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We are living on this planet as if we had another one to go to.

-Terri Swearingen

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What are your ideas to tackle climate change before handing over the planet to the next generation ?



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