



## BEING ENVIRONMENTALLY CONSCIOUS IN UROLOGY. THE WAY FORWARD.

### Urology

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### ABSTRACT

The healthcare industry accounts for 4.4% of global emissions. GHG emissions are a major threat to the environment. India is the third-largest emitter of GHGs worldwide. The energy sector contributes 70-90% due to burning coal for electricity. Urologists have a high carbon footprint, and hospitals generate tremendous amounts of waste. To reduce emissions, we can switch to a central/digital platform for patient records, use telemedicine, motivate industry partners to utilize less plastic, use biodegradable/recycled packaging materials, and reuse materials. In addition, it encourages hospitals to use solar energy, reusable drapes, use safe reuse of guide wires and puncture needles, foot-operated/automatic spray water faucets, and avoid opening windows in the OTs during winter. The goal is to decrease the carbon footprint and waste generation while delivering quality healthcare. Sensitization about climate issues should begin early so that the next generation is aware of the enormous challenge that climate change poses to our planet. If we start acting today we can change the course of our future.

### KEYWORDS

Greenhouse gases (GHGs), High-Efficiency Particulate Air (HEPA), Shockwave lithotripsy (SWL), Ayushman Bharat Digital Mission (ABDM), Unified Health Interface (UHI)

#### The problem

"The greatest threat to our planet is the belief that someone else will save it."

For over three lakh years now, Mother Earth has been home to humans. She provided us with nourishment to sustain ourselves, an optimal environment that helped nurture our species and propelled us to advance to what we are today. This fact is remarkable when we consider that we are yet to find another planet across galaxies with conditions suitable for life, even after all these years of exploration. Over the last few centuries, our population has ballooned, resources have stretched, and we have set ourselves on the path to industrialization and modernization. We moved away from Mother Nature into a custom-made cocoon of comfort. However, all this has come at a price and has upset the delicate balance between different species and nature itself. This reckless exploitation of nature has destroyed vast forest lands and water bodies, polluting the air we breathe, increasing the emission of greenhouse gases (GHGs), and increasing Earth's temperature (global warming). Loss of sea ice, melting ice sheets and glaciers, rising sea levels, and intense frequent climate changes, such as heat waves, cyclones, droughts, wildfires, and vector-borne diseases, are some of the consequences. It is believed that climate change could lead to an increase in Acute and Chronic Kidney diseases, urolithiasis, and urinary infections.[1]

GHG emissions were among the top three environmental threats. Worldwide, the healthcare industry accounts for 4.4% of all emissions. There are wide variations in the contribution of the healthcare industry to GHG emissions, with 10% in the United States and 20% in the United Kingdom. India is the third largest emitter of GHGs worldwide. A closer analysis of India's GHG contributors revealed that the following sectors are top contributors: energy, agriculture, construction, and transportation. In the energy sector, 70%-90% is due to the burning of coal for electricity production. Healthcare directly is a minor contributor, but it makes indirect contributions to the above. Hospitals and medical colleges require electricity around the clock. Being a technology-driven specialty in which high-energy devices are frequently used, urologists leave a high carbon footprint. The construction of large, poorly planned, and energy-inefficient buildings; High-Efficiency Particulate Air (HEPA) filters in Operation Theatres (OTs); pressure, air, and humidity needs in OTs and laboratories; and unequal distribution of healthcare facilities that require patients to travel large distances would all add indirectly to our carbon footprint. Healthcare institutions generate tremendous amounts of biomedical and plastic wastes. We shall examine each of these aspects in detail and try to come up with remedial actions.[2]

#### The solution:

"Those who have the privilege to know have the duty to act"

#### Changing Practice

#### The practice of Urology:

Using paper records for outpatient/in-patient case records consumes a large amount of paper, and a switch over to a central/digital platform could help mitigate this problem. The adaptation of telemedicine for consultation and follow-up is described below. Motivating industry partners to utilize less plastic and use biodegradable/recycled packaging material, judicious reuse of materials such as uro-bags (for the same patient post-procedure), clean intermittent self-catheterization (CISC), protocols for IV line and Foley care to prevent contamination and premature replacement, and using metal knife handles/reusable Teflon rather than disposable balloon dilators could help reduce the waste generated. In the future, biodegradable stents could be developed to prevent extra admissions and procedures to reduce waste generation. All hospitals should be encouraged to have solar energy generation plants that can aid in some energy generation and offset the high greenhouse emissions due to high energy usage. Decreasing hospital stays also reduces per capita emissions.[3]

OTs use the highest number of resources in hospitals. They also contribute to almost 30% of the hospital waste generation. Per square meter, the OT consumes three to six times more energy than other sections of the hospital. Steps to decrease emissions in the OT include reducing waste generation, judicious reuse of materials, correct segregation of waste, and efficient energy use. Reusable drapes with relative waterproofing (attaching an extra layer of muslin/nylon) to enhance their life can reduce the waste generated from single-use plastic drapes. Safe reuse of guidewires and puncture needles is advocated considering the resource-constrained situations we are forced to work in. Foot-operated/automatic spraying of water faucets instead of conventional taps with handles in the scrub area could prevent water wastage. Not opening disposables unless there is a need in a particular case could help in the judicious use of resources and prevent waste. The use of desflurane instead of isoflurane or sevoflurane results in ten times higher GHG emissions and is hence the primary contributor to global anaesthetic GHGs.[15]

A group of urologists have recently studied operating theater practices and advised measures to reduce the carbon footprint of OT. They recommended segregation-driven waste reduction, reprocessing, reuse, and recycling to reduce waste; proper and efficient sterilization; anaesthesia gas management; and improvement of energy usage. Improving education and awareness has a positive effect on waste segregation and reduction. It was here that healthcare workers had a great impact. In OT, reducing energy consumption is the primary way to reduce the carbon footprint.[4]

An industrial multi-institutional study on energy usage in hospitals has revealed interesting findings and suggested ways to improve efficiency. Fifty percent of the hospital's energy consumption was for the AC system, followed by the medical equipment and lighting. The

energy consumption of hospitals in Mumbai was higher than that of hospitals outside the city and the national average. They suggested automation of lighting, AC, and power based on occupancy. Advanced control techniques in medical devices with an automatic power-saving mode, behavioral change among patients and staff, energy audits, data analysis, and a dedicated 24/7 specialist energy service team to examine energy use and optimization were suggested. The maximum energy usage during solar energy generation and the use of natural light during the day are encouraged. Displaying energy usage and savings in public spaces within hospitals would motivate hospitals and the public to take note of this issue and act together to reduce consumption and help save energy. It is important to ensure regular maintenance of devices and HVAC systems to ensure energy efficiency. Small measures such as installation of low energy lighting and labeling the light switches in the hospital, using "switching in parallel" where lights closer to windows are kept on separate controls so that during the day, those can be kept off and only areas further away from windows can be used could go a long way in reducing energy consumption.[14]

The debate on the environmental effect of reusable versus single-use cystoscopes has been ongoing for quite some time. A recent notable article by Hogan et al. showed that single-use flexible cystoscopes have a lower carbon footprint than reusable flexible cystoscopes. The higher footprint of the reusable scope was due to the re-sterilization process.[18] Packaging and manufacturing processes contribute to emissions in the case of reusable flexible scopes. Although the findings seem erroneous, the authors have answered their critics that the estimation of energy consumption depends on the location of scope use (areas with increased energy generation from renewable sources had a lower consumption), and the results cannot be extended to flexible ureteroscopes. In the case of flexible ureteroscopes, the carbon footprints of single-use and reusable scopes were similar.[5]

A study that examined the environmental impact of prostate MRI and transrectal ultrasound-guided biopsy found that a more focused image-guided approach to biopsies, avoiding template/systematic biopsies, could significantly reduce waste and GHG emissions. The use of shockwave lithotripsy (SWL) instead of ureteroscopy, and hence the avoidance of emissions, including that of disposables in carefully selected patients, could also help. The use of metals instead of disposable laparoscopic instruments would help to reduce the carbon footprint. Robot-assisted laparoscopic prostatectomy has a lower carbon footprint than laparoscopic radical prostatectomy due to increased reuse of surgical materials, shorter hospital stay, and shorter operative time according to one paper.[13]

Ophthalmologists have established a network, EyeSustain, to look into their practices, such as sterilization and reuse of materials, among others, in an energy-conscious way. Similar initiatives in our specialty could go a long way to reducing wasteful practices and GHG emissions. Indians have already created low-cost innovations for many applications, and this field should hopefully inspire urologists, both young and old alike, to don their thinking caps and come up with new ideas.[6]

### Telemedicine:

An indirect benefit of the Covid pandemic was the wider acceptance and use of teleconsultation by both urologists and patients alike. The proliferation of cheap Internet services (for video consults) and online payment systems has aided this change. It helps save time and cost for patients and improves accessibility to healthcare, in addition to providing convenience. It is useful to maintain patients with calculus disease, genitourinary cancers and cysts, and benign prostatic enlargement on follow-up with teleconsultation. A reduction in travel and its corresponding emissions would benefit the environment. However, post-COVID-19 covid teleconsultation use has markedly reduced in our country, although no objective study has examined this aspect. This is in contrast to the Western experience, where teleconsults are utilized at higher rates. In addition to follow-up cases of malignancies, patients seeking a second opinion also opted for teleconsultation. Using a common national healthcare database facilitated easy access to patient records, both old and new. It should be noted that India has taken concrete steps by implementation of the Ayushman Bharat Digital Mission (ABDM), and the Unified Health Interface (UHI). The environmental costs of establishing and maintaining the Internet, phone connections, and computer systems to run such consultations would be small compared to their benefits. It could also help busy urologists be more productive by utilizing their

otherwise unproductive time, such as between OT cases, travel time, and other waiting times for consultations, which would be difficult with physical consultations.[7]

While one may argue that good internet access is still a dream in the remote villages of our country, phone connectivity has vastly improved and can be used to sustain such consultations. Another option is to establish peripheral centers with Internet and phone connections in well-planned rural spaces that can cater to a large population. People without access to the Internet and telephone could travel to centers that are closer to them than tertiary centers to avail the benefits. Monthly visits by urology faculty to such centers would further improve care for such patients while adding to the benefits already explained.[16] The USI Cares initiative can include such methods in the future. In addition to being a good cause, it is unique to provide environmental benefits. Today health startups have entered the rural healthcare space and are utilizing teleconsultations to satisfy the needs of the rural population. There is an urgent need to reinforce the benefits of teleconsultation among patients and urologists so that they can be utilized to the fullest extent.[12]

A study conducted by Filfilan et al. on the effect of teleconsults in urology practice in a busy urban setting in Europe found a 99% reduction in GHG emissions. This underscores the tremendous potential of telemedicine in reducing GHGs. However, this study did not estimate the emissions caused by the use of telemedicine technology. With the introduction of 5G technology in our country, the implementation of telemonitoring and telesurgery in minimally invasive procedures could result in fillips. This could indirectly benefit a large number of people because it would help create local expertise in procedures while also improving patient care. Helping develop expertise in enucleation surgeries for the prostate, robotic prostatectomies, monitoring patients for pre-operative optimization, post-operative pelvic floor exercises, and close follow-up for post-transplant patients are some of the applications possible in the Indian scenario. However, strict adherence to the ethical and legal principles is important.[8]

### Conferences/Workshops:

Sadly today, organizing conferences and workshops has become a matter of prestige, with each one trying to host a larger event than their predecessor. While such events are welcome once in a while, too many conferences lead to wastage of resources, among others. Switching to a virtual or hybrid mode with physical attendance reserved for members from nearby areas could avoid the environmental effects of travel-related GHGs for delegates. Group travel and the use of public transport at such conferences should be encouraged and pre-planned by organizers and delegates alike. Staying in shared accommodations closer to hotels could be an environmentally friendly option.[17] The same holds true for solo luxury hotel rooms with attendant environmental costs of high maintenance. Meticulous housekeepers and absent-minded guests result in wasted toiletries, washing linen after a single use, keeping electricity on while visiting out, and other wasteful practices. Reducing printed materials for the conference, using digital or e-conference badges, digital instead of flex banners, providing virtual and live e-guide maps to delegates instead of multiple sign boards at venues, using water cans with reusable glasses for drinking water instead of plastic mineral water bottles, replacing plastic carry bags from industry partners with jute or other biodegradable materials, and using reusable or biodegradable crockery would help reduce the vast amount of plastic waste generated in the dining area. Plant-based foods are better for the environment and human health than meat and meat products. A prior RSVP/optional service for meals and reduction of the spread would also prevent food waste during such events. Providing E-certificates would again reduce paper use.[9]

Social media groups that coordinate and help share travel resources can be implemented. Utilizing sunlit spaces for trade and food areas, and smart lighting systems to prevent energy wastage in areas with no activity within the conference area, as well as during audio-visual presentations in large halls, could limit electricity use. Hotels and venues should also use taps that spray water instead of free-flowing water, taps with sensors instead of metered-use ones, and utilize hand blowers, doing away with tissue paper. The proposed daylight saving and differential electricity billing (less charges during sunlight times because solar energy can be used directly but cannot be stored) could encourage energy-efficient spending. Considering the number of such

events and the large number of people attending them, the reduction in the carbon footprint could be significant.[11]

### General/Lifestyle

Simple lifestyle choices can bring about positive changes. Decreasing the use of paper and paper products in clinics, reducing printed material, and switching off computers, printers, and other devices overnight are the starting steps. Using public transport for routine travel, keeping hospitals accessible by public infrastructure, arranging in-campus accommodation for hospital staff, promoting carpooling, cycling to work, and using solar energy in homes and offices must be encouraged. Reuse of resources, smart energy use, "green initiatives" by societies, and forming climate activist groups can help pool talent to promote education and action on this important problem.[10]

### CONCLUSION

While the above measures would seem too broad and uninteresting to urologists, we need to understand that our routine practice utilizes many disposables, generates significant waste, and requires high electricity consumption. This, coupled with the fact that small changes in our practices could lead to an overall positive impact on climate, is sufficient to work towards being more climate-conscious. Ours is a growing specialty with almost 6000 urologists, many of whom work in teams or are in administrative posts and can readily bring about a change in the large number of people with whom they come in contact. Looking at the literature and numerical values of the carbon footprint or emissions of GHGs from various interventions could be confusing, and it is for this reason that this article avoids them. We need to understand that any method to reduce GHG emissions and prevent climate change is worthy of emulation if we are serious about our intent to save the planet. As healthcare professionals, we can educate the public on climate change and lead by bringing about changes in energy usage and waste management in our hospitals and daily practice.

Sensitization about climate issues should begin early so that the next generation is aware of the enormous challenge that climate change poses to our planet. Our attitude of being the most superior species on the planet and its rightful inheritor has harmed us more than good. We ought to realize that we are as susceptible to climate change as our fellow living beings are. We depend on nature and other species on this planet, and our actions have consequences for everything around us. Global warming, GHG emissions, and climate change are burning issues that need to be taken seriously by every human being. If we tread lightly today, we might just be able to give our children a better tomorrow. The time to act is now!"

"We are the first generation to feel the impact of climate change and the last generation that can do something about it."

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