Tenth Krishna Raj Memorial Lecture on Contemporary Issues in Health and Social Sciences Instituted by Ansandhan Trust

Hospitals as Factories of Medical Garbage

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Hosted by



Centre for Enquiry Into Health and Allied Themes, Mumbai With Department of Medical Humanities, Seth GSMC and KEM, Hospital, and eSocial Science



Anusandhan Trust has instituted the Krishna Raj Memorial Lecture Annual Series on Contemporary Issues in Health and Social Sciences to honour the intellectual and academic traditions that Krishna Raj set in place, and in his memory. This is a humble tribute to the memory of the visionary editor of the *Economic and Political Weekly (EPW)*.

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Abstract

Over the course of the twentieth century, as hospitals cleaned up, they came to produce more and more rubbish. Beginning in the 1970s and gaining pace in the 1980s and 1990s, single-use plastic items (syringes, blood bags, tubing) saturated everyday medical practice across the globe. This essay brings the question of plastic to bear upon the longer history of twentieth century sanitary science. The widespread adoption of single-use disposable medical plastics consolidated a century's worth of changes in medical hygiene. As strange as it may seem today, the initial uptake of medical plastics was not driven primarily by concerns about hygiene. Plastic began as a mid-century technology of convenience and durability. It was not until the end of the twentieth century that it morphed into a powerful symbol and instrument of medical hygiene. Today, both patients and practitioners have embraced plastic as an indispensable technology of clean medicine. The procession of single-use medical plastics through everyday medicine now comprises a constant, if disposable, infrastructure of medical hygiene. This new processional infrastructure of disposable hygiene has produced another, albeit unintended, consequence. This new regime has exponentially increased hospitals' material outputs. In so doing, plastic has refigured the ecologies of everyday medicine.

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She works on the social and cultural history of modern South Asia, specifically the politics of health in colonial and postcolonial India. Her interests lie at the intersection of a number of fields: modern South Asian history (particularly of the Tamil south), development, anthropology, and the history of science, technology and medicine. Her current work 'What's at stake in the fake? Indian pharmaceuticals, African markets and global health' critically re-examines our collective common sense about fake drugs and global health. Her past work addresses the politics of reproduction and sexuality in colonial and postcolonial India, particularly in relation to questions of how and why the relationship between India and the West was mediated by a scientific modernity during the first half of the twentieth century.

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Hospitals as Factories of Medical Garbage

Hospitals are factories of medical garbage. This is meant as a provocation, to make you read and sit up and think about it, that it cannot possibly be. But it is also the outcome. Since 1988 I have been coming up and down, and doing research almost entirely in Tamil Nadu. So the sort of overview that I am going to give you comes out as a pounding the pavement, or as my Native Americans would say, dumpster-diving – running around Chennai's hospitals and nursing homes, and just figuring out "where stuff goes". Because when we think about hospitals, we might think of them as workplaces, we might think of them as places of learning. We might think of them as places to go for treatment. But we do not often think of them as places that have effects, not places that are completely unconnected to questions of health care, that they are *producing* things. So, I invite you to listen to this talk in the spirit of which is delivered – as a provocation and an invitation. And what I would say is Critical Humanities. And so it is meant to disturb everyday clinical medical practice or public health practice.

The global history of plastic

Over the course of the twentieth century, as hospitals cleaned up, they came to produce more and more rubbish. Now how can this be? Beginning in the 1970s and gaining pace in the 1980s and 90s, single-use plastic items, by which I mean syringes, blood bags, tubing, any number of things, came to saturate everyday medical practice across the globe. So in other words, hospitals become factories of medical garbage. The marriage as we can say, between the idea of the possibility of hygienic spaces, hygienic clinical spaces, moving from scrubbing and washing and steaming, to actually the idea that hygiene and single-use disposability become one. But of course, for the doctor or the patient, of course that moment happens when whatever procedure that is, is performed. But my question is, what happens next?

Because if we see hospitals not just as treating outcomes of environmental health, but as producing environmental conditions, then we need to see the hospital as a factory in much the same way, if I may say so. As some people wrote several hundred years ago about the mills of Manchester. Industrialisation, or the figures of the institutions of the modern, does not always do only what they say they do. They actually often produce excess. And the excess that is fundamental, the external that is actually internal, is what I would say, allows us to imagine hospitals as many things, including hospitals as factories of medical garbage. And again, I am not talking about India. No, this is everywhere. The idea of good practices, of hygienic practices as single-use disposable is not an Indian

speciality. It is not English speciality. It is not a New York speciality. Something that healthcare does it everywhere that possibly. So this is a kind of all-world clinical practice.

So now, another vignette, the arrival of plastic as an everyday medical practice. How did this happen? It was in a sense, a revolution of the 20th century. So, the extraordinary amount of plastic to be found in hospital bins today and indeed plastic is in volume, the greatest amount of waste that any clinical place produces, modern medicine, that is. The extraordinary amount of plastic to be found in hospital bins today is but one of the infusion of all units of everyday life plastic over the course of the second half of the 20th century. So, what is the history of plastic? Did you even know plastic had a history? But it does. Here is a quick one.

The advent of plastic in India

Around 1940 or thereabouts, after the Second World War, did plastic items start to be manufactured with any regularity. So, I have done a quick survey about when plastic came to India. And there is this reference in the Times of India, and also in The Hindu, just a little overview. The advertisements really do not start coming up in any main way until the 70s. Plastic is still a special, special thing. Plastic is a treat. When you have missing person advertisement, what the person is advertised as wearing, what is distinctive about him is that he is wearing plastic chappals. That is an identifying feature. Or the idea that in the 1980s, early 80s when MGR was the Chief Minister of Tamil Nadu, there was a major water problem, and he gives out plastic *kudams* (pots). So the idea that plastic would be a special, super-modern, extraordinary thing. Not a problem, but a solution.

The 1950s and 60s saw great expansion and innovation within chemical engineering—including for plastic. By the 60s, new methods of manufacture meant that new kinds of plastics entered many areas of everyday life, including of course, medicine, medical practice. The spread of plastics picked up speed and, by the 1990s, plastic had achieved a near ubiquitous status in most places across the globe. Today, it would be unusual, if not impossible, to even imagine being able to spend an entire day in which we did not interact with plastic.

Plastic-use in everyday medical practice

The uptake of plastics within medical practice across the second half of the twentieth century follows a very similar trajectory to this broader uptake of plastics across all areas of daily life. From pens, to specs. By the 1950s, and particularly during the 60s, innovations in medical practice saw a corollary emergence and marketing of new plastic medical devices. The paradigmatic example of this is the plastic syringe and its symbiotic relationship, which comes up largely in relation with new vaccines. For example, the Salk polio vaccine was only available through injections, the polio drops were not introduced until the 1960s. In 1955, the same year that the Salk injectable polio vaccine was launched,

a plastic single-use disposable syringe came into the market. Its manufacturers emphasised durability. Manufacturers promoted plastic syringes over glass as the best way to tackle the challenge of delivering huge numbers of doses of polio vaccine across widespread areas. So they are talking about convenience and durability. What are they not talking about? Hygiene.

Other plastic manufacturers soon followed suit in developing their own single-use plastic syringes. The use of plastics was also scaled up during war time, that is, battlefield medicine, particularly the Korean War which was in the early 50s. For example, plastic bags replaced glass bottles for transporting and administering blood. These blood bags, they do not break, they are lightweight, you can transport them easily on the battlefield. These new blood bags were used by US forces throughout the War. And then, as with so many technological innovations, it is developing something as military technology during wartime which then becomes widespread for us, for common, daily usage.

Plastics as "ambassadors of modern hygiene"

As with mass vaccination drives, the appeal of plastics in battlefield medicine was not related to hygiene, but was largely due to their relative durability compared to glass. By the 1980s, disposable plastics were found in most areas of medical practice, particularly in rich countries. Over the past few years, my query to all clinician friends within earshot trained mainly in Australia, US, UK was 'When do you first recall using disposables?' And they shoot back at me, 'How old do you think I am? I have always used disposables!' So there is this sense since the 80s that it is durable. Counter-intuitively, the uptake of plastics was neither uniform nor inevitable for medical practice. As with the history of vaccine delivery and battlefield medicine, medical practitioners did not chase after medical plastics for their hygienic properties. Instead, medical plastics were initially marketed by manufacturers and praised by practitioners through word of mouth on the basis of their relative durability, ease of use and patient comfort. And here again, the syringe is a great example. So talking to doctors from training and practice in Edinburgh, it is all about, if you are drawing blood, it is much easier to do that with plastics. Patients are much more comfortable. So it is for many reasons that plastic might have been an attraction, but none of these were actually about creating hygienic conditions.

During the second half of the twentieth century, innovations in chemical sterilisation replaced steamed sterilisation in industrial manufacture and packaging of medical items. Now this may be a trivial point, but actually it meant that heat sensitive items like plastic, which earlier might have melted under steam treatment, could now be sterilised by the application of chemicals. Other kinds of plastics were produced that could withstand high temperatures. And alongside these developments, disposable plastics and many other everyday products marketed as a disposable were part of a larger trend. This 1980s trend saw manufacturers promote their newly-disposable products as possessing

the linked virtues of hygiene and single-use as a modern technology of hygiene rather than simply convenient. So the marketing meant that these disposable plastic items were not simply messengers of convenience. They were ambassadors of modern hygiene.

But it is not entirely a surprise because what we see again, just briefly, what we see also happening during the 1980s across the West is a cash-crunch. We see coming together the expand of patient demand, and new diagnostic technologies like MRI – that is being able to see inside the body – technologies that are very costly. So the cost of being able to keep up with the tech makes the cost of medical running hospital, the expense, massive. This is at the same time 70s and 80s as many economies in the West were feeling the crunch. So what did the hospital administrators do They begin to say, 'What is our audit? Not in terms of our health outcomes, but also in terms of where can we cut corners? Meaning how can we spend less and get the same results?' And one of the main places they look at, is in terms of infection control.

So what do they say? They say we cannot hire the nurses to scrub the wards anymore. Up until then, for infectious transmission, all of the research that has come out of it shows that hand-washing and scrubbing are still the best. But it is costly and it is a never-ending process. Why? Infective agents are always entering clinical spaces in the form of patients, people! People are beacons of infection. Beacons of potential pathogens. So the work of cleaning a hospital is never done. That is too costly. We have got plastic. We can identify hotspots of infectious control problem, and do them away way through plastic single use disposables, which then actually obviate, in this logic, the need for scrubbing. But that logic only holds if you only stay within the four walls of the hospital buildings themselves. But when you leave, it is another story.

The Indian disease landscape, international aid approaches, and uptake of single-use plastics

So looking at where does this medical detritus go? It goes outside. Or in all of my interviews with doctors about medical garbage, where does the garbage go when it leaves the wards? There is one word that everybody said. "Away." So there is a sense of "it is not my problem". And indeed, the problem of the physician is the patient. But nevertheless, it is quite a possibility. In India, I think there is a little bit of a common-sensical idea that plastics really came here with the AIDS. Now it is certainly the case that in the 90s, we have one more account of patient demand. There are wonderful, fascinating snippets in the Times of India. For example, some lady needs to get her certificate to go abroad. She is in Bombay. She sees a consultant physician to get the certificate — to draw some blood. And he is not using a disposable needle, and she throws a fit, such that it gets into Times of India. So patient demand, in this idea that there is imminent danger of infectivity, that feeling of danger is heightened. But actually, history suggests that it is 10-15 years before that, that disposables actually

come to. So, it is useful to think about our assumptions of how things come together. And certainly after AIDS, or in the wake of AIDS, disposability becomes a part and parcel of maintaining a healthy hospital. So, the AIDS story now dominates the popular imagination and the sort of imperfect popular memory, and it is certainly part of the story.

The uptake of single use disposable medical plastic items initially revolved around convenience rather than urgency. So, there are some interesting implications we can think about, for high resource settings and low resource settings, rich countries and poor countries. In many places in India have a healthcare setting without necessarily robust infrastructure, by which I mean absence of regular 24 hour power supply, absence of clean running water, absence of appropriate sewage and drainage lines. But basic sanitary infrastructure that was initially promoted here by the international health community was packaged sterility, which allowed the international medical community to deliver innovation to India without having to invest in all their sanitary infrastructure. It is the same logic as preloaded syringes. You do not have to count on somebody to fill it properly. It is already there. And in a context where I think we can confidently say that the structures of money and race assume that the Indian community healthcare workers is not a competent person – which is literally there in a policy document – and we have to make things simple. Single use disposable syringe fits in that nicely because the nurse need not know how to make a pressure cooker into an autoclave. She can just use it. But it is also part of giving up the possibility of developing robust sanitary infrastructure. So just as mobile phones – anybody ever have a landline? They were great until you realised how much better mobile phones are. So, there are any number of reasons. I am not saying that disposable syringes are mobile phones. But there is something about being able to leapfrog in infrastructural developments and still feel like the outcomes are comparable. So, I would say in rich countries, it has to do with auditability and spending less on health, and in poor countries, it is basically spending nothing on health! And lending countries money to buy consumables. So nevertheless, medical plastic came to be popularly recognised as both symbol and instrument of medical hygiene. Although this meaning to ambassador of hygiene has today become "common-sensical", as I am constantly trying to point out, it was neither natural nor inevitable. Nor necessary for that matter.

The extent of the problem: the universality of plastics

Popular and professional common sense continue to frame the uptake of medical plastics as part of a longer history of a clinical march towards medical hygiene. And bear in mind that all plastic really gets a bad press now. No more plastic bags. Very bad. Say no to plastic. Any number of things that were constantly being exhorted to do. But what kind of plastic is never mentioned? Medical plastic. But you know, the estimate is, in India a place where waste still is relatively less compared to, say, the figures for Germany or US per bed, the estimate of waste is two kilos of waste per day. So, it is

massive. In light of this, perhaps the popular and professional embrace of single-use medical plastic objects as necessary ambassadors of hygiene is simply a benign misrecognition. Surely the upshot is still the production of clean medicine, which can only be a good thing? Of course, it makes waste, but people are getting a decent standard. Now in this section I want to revisit the question of what everyday medicine's embrace of plastic hygiene has produced. That is, has it produced fundamentally clean medicine? Or additional things that may like us to reconsider that.

I claimed that as medicine cleaned up, it created more and more rubbish. This story turns on medicine's adoption of the single use disposable plastic items. In this sense, the material impact of the large-scale uptake of plastics within medical practice has been nothing short of transformational. This uptake plastics did two things. First, it transformed the infrastructure of hygiene for everyday medical practice. This new disposable regime of medical hygiene produced a plastic infrastructure, by which I mean, comprised of single-use disposable plastic items. This new infrastructure was temporarily and materially distinct from what had come before. Rather than cleaning and reusing durable items, plastic hygiene could only succeed through a maintaining a discipline of constant renewal, and healthcare providers finding the finds to keep buying. Plastic hygiene also demanded a rigid adherence to the ephemerality of the items through which hygiene itself was delivered. In short, within everyday medical practice, the uptake of plastic came to constitute a new infrastructure not of bricks and mortar, but a permanent flow of temporary objects. So just close your eyes for a second and imagine in the hospital, there are no people, you just imagine the plastics around. It is serious. And I am not saying it is a good thing or a bad thing, but it is a thing that demands our attention because it has serious implications.

Are single-use disposables necessary for hygiene?

You may feel rage boil inside you for adopting plastics, for creating wastes, a new public health problem. But in my personal work, in the time I did my dumpster-diving and I actually walked around, I figured out how non-infective material stays infective – except for Hepatitis C – but most pathogens like our warm, moist bodies. In fact, most infective agents die after 8 hours or so. Which is generally how long medical garbage is lying around before anybody organises it. So we might not like the idea of their being a roaring trade in the recovery and reprocessing of used discarded medical plastics. But does it constitute an immediate public health threat? I would say medical garbage is most dangerous to clinical staff. Needle-stick injury is a major problem, but it is more of a problem inside than outside! I also want to reiterate the point that the large-scale adoption of single use disposable plastics within contemporary healthcare across the globe effected a technological standardisation of medical hygiene. In health care settings with uneven or lacking infrastructure, this standardisation meant a kind of levelling-up. The use of single use disposable plastics allowed targeted health care

interventions such as vaccination drives to go ahead. This was despite a lack of uniform infrastructure itself considered a precondition for broader gains in public health outcomes. Looking back, it now appears that plastic facilitated global healthcare's bypassing of wider infrastructural developments in low resource settings, including those that had earlier been considered essential building blocks for good health.

The economics of plastics

If the new infrastructure of plastic hygiene produced a constant flow of temporary objects, off the wards and out of hospitals and clinics, what happens next? Where is "away"? These objects may have dwelled temporarily in medical settings, but plastic is hardly a temporary material as it moves across the planet. Plastic sticks around. So where have single-use disposable plastic items gone, once they have finished their roles within medical practice? This question matters because it points to how the distribution of the consequences of plastic hygiene is both uneven and are to be found only beyond the walls of the hospital and clinic.

What I found in Chennai is the solution, as it were to the so-called problem of garbage regulation. So there are medical waste regulations, and there is a sorting regime. Special sorters have been identified by specialist processing facilities that state governments have taken tenders for. But if you think about the alongside that kind of parallel, if not much larger growing industry, but is dying now because the hospitals are required to keep the medical garbage. It is much easier for someone to come and buy. So if you think about maybe you grew up in a house where you still keep your newspapers, and sell to the *kabadiwallah*? How does that work? When the *kabadiwallah* comes, do you pay him? He pays you! The same way, the hospital administrators – when the biomedical waste rules came in – lost a revenue stream! We used to be able to sell but now we pay! And so there is a way in which this really works *against*. I am supposed to give you money for this. And we also see that it is the biggest guys who are benefiting. The bigger your lorry is the bigger your profit margin will be!

What we also see is that the plastics scrap processing industry is the most lucrative market. And within that, medical plastics are the most profitable. Because people earn. If you are not a picker, but a sorter, people earn a name, when you can sell these gunny sacks of sorted waste on the reputation that you can do a "clean sort". Now, all medical plastics are pretty much made of the same thing. All medical plastics are very recognisable. So you do not have to train somebody very much before she can put that syringe vial or the blood bag or the tubing. So the street level economy, the street value of used biomedical plastics when they recover is very high. Also because they are called conversion plastic, many people melt them, wash them and knock them down, and then wash them grind them,

and then melt them into new objects like microphones or other things. So you can reuse medical chips a lot of times. It is a great commodity for the scrap market.

All of this is to say again that in my experience, which was really comprehensive, and hanging out with people working with medical garbage in Chennai at least – there is no small army of little boys and workshops with little pipe cleaners reprocessing plastic syringes. Not because people are not so scrupulous that they would not do that. In my experience, that is a bit of an urban myth. It captures *our* fear that is not in the world of data, there is no data for it. But what I have seen is, the reason that there is no small armies of little boys with pipe cleaners and used syringes, is because the profit margins are so much higher in scrap. So there is actually no kind of market. It is expensive to repackage something. It is cheap to grind it down and remake it into something else.

The point that I want you to consider in terms of the question of infrastructure, is this: While the widespread embrace of single-use disposable plastics standardised medical hygiene at the close of the twentieth century, it did nothing to address already-existing decay and failure of conventional infrastructures; except perhaps to accelerate it. And again, I am not only talking about India. Anybody been to the UK recently? Our infrastructure crumbles every day. And the US as well!

Conclusion

So to wind up: Changes in the material lives of clinical practices now bind together health and the environment in new and unanticipated ways. In closing, I want to reflect on the material products of this new hygienic infrastructure has itself, and what, if any, the broader impacts this has had for the way we might want to think about the broader relations between health, health care and the environment, across the globe. To consider hospitals as factories of medical garbage – within the context of critical Humanities – is to situate healthcare within its own ecologies. To think of hospitals as factories of medical garbage refocuses question of the relationship between health and the environment such that we might consider how, rather than being outside of the calculus of health and the environment, healthcare itself is productive of environments, even as it is called on to treat the outcomes of these environments. The emergence and uptake of disposable medical plastics from the middle, and particularly the final quarter of the 20th century: surgical gloves, plastic syringes, plastic blood and urine bags, plastic tubing – this emergence of these articles have rendered earlier regimes of sterility more exact, but created massive detritus in its wake. Thus, plastic came to be seen, and ultimately to serve, as an ambassador of clinical hygiene. It did so seemingly independent of the absence of broader infrastructure. Plastic disposability became an infrastructure of hygiene. And in doing so, hospitals became factories of medical garbage.

Now, if that is the case, then what is next? What does one do about it? What is the solution? And what I would say to you and what the real, subversive nature of critical medical humanities offers is that we are not that interested in solutions, to be perfectly honest. That is not because we are just vexatious people who want to frustrate your attempts to fix problems. But rather, what I think the critical medical humanities, is not to be an aid to clinical medical practice or to public health. Actually, if anything, our relationship is hostile. We stand outside of these practises and ask what is going on? What allows a problem to approach as a problem? And so it is in that spirit that I want to just end saying a few words about Krishnaraj and EPW.

Mr Krishnaraj, for many of us, is larger than life. For someone like me, he is not a memory, but in the former EPW, he infuses the spirit of difficult political dialogue. And that is how I think of the man. As I entered into academia, a kind of Santa Claus for EPW, Father Christmas that came not once a year, but every week! So when I reached the point in my own career as a scholar to send my work out into the world, I knew where I wanted it to appear. And that was, of course EPW. And I can barely contain, you must imagine, my excitement when I received the acceptance, and then the hard copy of the real thing in my department mailbox. Nevertheless, although I knew of its importance, I also had to explain to my colleagues why this was such a big deal. And I was very lucky to have such a senior colleague also — So we have to present our publications to our department to be considered for XY evaluation exercise. And I said, 'What is this Indian publication? They have got all this.' So he says, 'There's nothing else there's nothing else like it in the world. If we had something like that, intellectual life in Britain, would it be what it is today?' So it is the kind of thing that gives you an imagination of who you want to become. Which is: direct, awkward, engaged.

And so it is in that spirit that I stand in front of you today. The idea of critical enquiry and debate, curiosity about our world, and our place within it, that was so exemplified by the late Mr Krishnaraj, in whose honour I am simply thrilled to stand before you. To connect the world's disciplinary communities, even if uncomfortably at times, talking to each other about a common cause of what can be called the politics of health.

ANUSANDHAN TRUST

Anusandhan Trust (AT) was established in 1991 under the Bombay Public Trusts Act, 1950 (Registration No. E-13480) to establish and run democratically managed institutions to undertake research on health and allied themes; provide education and training, and intimate and participate in advocacy efforts on relevant issues concerned with the well being of the disadvantaged and the poor in collaboration with organisations and individuals working with and for such people.

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CEHAT (Centre for Enquiry into Health and Allied Themes), which was set up in 1994, concentrates or focuses on its core area of strength – social and public health research and policy advocacy. This also included work on strengthening education and training in public health in the country, linking up with social science institutions and university departments in order to promote and undertake health research and training, and demonstrating intervention models to strengthen public health systems. CEHAT has its headquarters in Mumbai.

SATHI (Support for Advocacy and Training in Health Initiatives) is the Punebased centre of CEHAT has been undertaking work at the community level in Maharashtra and Madhya Pradesh; and also facilitating a national campaign on Right to Health and other related issues. From 1st April 2005 SATHI has developed into full-fledged institution primarily involved in health action and campaigns.