



# DAILY NEWS BULLETIN

LEADING HEALTH, POPULATION AND FAMILY WELFARE STORIES OF THE DAY  
Tuesday 20190723

## **National Medical Commission Bill**

### **National Medical Commission Bill introduced in Lok Sabha (The Indian Express: 20190723)**

<https://www.thehindu.com/news/national/national-medical-commission-bill-introduced-in-lok-sabha/article28644142.ece>

The National Medical Commission (NMC) Bill, which seeks to replace the 63-year-old Medical Council of India (MCI) to reform the medical sector in India, was introduced in Lok Sabha on Monday.

The Bill, introduced by Health Minister Harsh Vardhan, also seeks to repeal the Indian Medical Council Act 1956, stating that the Council set up under it was corrupt. It has been alleged that the process by which the MCI regulated medical colleges was flawed.

The new Bill has the provision for making national standards in medical education uniform by proposing that the final year MBBS exam be treated as an entrance test for post graduation and a screening test for students who graduated in medicine from foreign countries. This exam will be called the National Exit Test (NEXT).

At present, different medical colleges have different MBBS exam patterns. The NMC's proposal is to ensure a uniform national pattern for final year MBBS exam so that all medical graduates who get the licence to practise conform to uniform national standards and quality.

The Bill also puts a cap on fees on 50 per cent of seats in MBBS and PG colleges.

The NMC will be 29-member body which would comprise of 20 members selected through nomination, and nine through election.

The medical colleges will have to conform to standards the NMC will lay down. Once they conform and are permitted to operate, there would be no need for annual renewals.

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## Smoking e-cigarettes

### Smoking e-cigarettes is more injurious to health (The Hindu: 20190723)

<https://www.thehindu.com/opinion/op-ed/smoking-e-cigarettes-is-more-injurious-to-health/article28658584.ece>

A misconception among students, parents and teachers that these cigarettes are free of nicotine also contributed to their appeal. | File

A misconception among students, parents and teachers that these cigarettes are free of nicotine also contributed to their appeal. | File

The government's ban proposal needs to be welcomed

The Narendra Modi government's proposal to ban e-cigarettes and other electronic nicotine delivery systems (ENDS) needs to be welcomed as such a move will ensure that Indians, especially, children, are kept away from these pernicious products. Such a ban has also been recommended by the Indian Council of Medical Research (ICMR), which called for a "complete prohibition on ENDS and e-cigarettes in India in the greater interest of protecting public health, in accordance with the precautionary principle preventing public harm from a noxious agent."

The Health Ministry last year issued an advisory asking the States to ensure that products like e-cigarettes and e-nicotine-flavoured hookahs are not manufactured, distributed advertised or sold. Following this, 15 States, including Karnataka, Kerala, Tamil Nadu, Jammu and Kashmir and Mizoram, banned them. Several of the bans were under the Drugs and Cosmetics Act or the Poisons Act, under which nicotine was included as a 'poison'. Further, the Central Board of Indirect Taxes and Customs (Anti-Smuggling Unit) and the Drug Controller General of India directed all their officials to ensure compliance with the advisory.

#### Popularity among youth

Introduced about 10 years ago in India, e-cigarettes rapidly gained popularity, especially among the youth. A misconception among students, parents and teachers that these cigarettes are free of nicotine also contributed to their appeal. The reality is that the tobacco industry, hit by the success of the state's efforts to reduce tobacco use, had developed such products to hold on to customers who would have otherwise quit. Research suggests that many youngsters, who would otherwise have never started using nicotine, took up conventional smoking after being introduced to e-cigarettes.

While the tobacco companies promote e-cigarettes as a 'less risky' smoking option, some industry documents show that their real goal is to introduce ENDS products as an alternative to quitting. One company started selling its e-cigarette brand in 2014, promising that it will give the consumers the 'pleasure of smoking any time anywhere' (suggesting that they could use the product even at public places, where smoking is banned).

Further, even though warnings on many ENDS products clearly indicate that they are not a ‘smoking cessation product’, e-cigarettes are often promoted that way. Dozens of studies show that smokers who use e-cigarettes are less, not more, likely to quit smoking. In fact, most of them become ‘dual users’, continuing to smoke cigarettes while also taking to e-cigarettes. This makes them vulnerable to added health risks.

The tobacco industry plans to expand by achieving these twin objectives — attracting more youngsters and reducing quitting by adults. After all, the industry’s end goal is profit and not improvement in health indicators. The fact that the industry continues to produce and sell conventional cigarettes, its flagship product that brings it the greatest amount of profit, despite marketing e-cigarettes as an alternative is evidence enough of its sinister design.

### Myths and reality

A recent white paper by the ICMR and several other research studies have contradicted several claims of the industry. First, the industry says that ENDS products provide a safer alternative to conventional cigarettes. However, the reality is that ENDS users are almost at the same risk of contracting lung diseases and cancer as conventional cigarette users. In fact, ‘dual users’ are at greater risk of heart attacks.

Further, the industry claims that the sale of ENDS products does not violate any regulations despite the fact that the companies are in clear violation of WHO’s Framework Convention on Tobacco Control, which prohibits the sale of any product that appeals to minors. The marketing of ENDS products, targeted at youth, also impacts minors and schoolchildren. The industry’s assertion that e-cigarettes are safe is contradicted by the many fires and explosions caused by devices, resulting in injuries, loss of lives and property. Further, their accidental ingestion by children has also caused some deaths.

All these points make it clear that the Central government has shown great foresight in bringing out the ban proposal, a move that is likely to avoid causing another epidemic of nicotine addiction in the country. The ban needs to apply to all forms of ENDS products, including all ‘heat-not-burn’ devices that profess to be an alternative to the existing tobacco products.

Amit Yadav is a postdoctoral scholar at the Center for Tobacco Control Research and Education, University of California, San Francisco

SINJINI MUKHERJEE Sinjini Mukherjee has a PhD in anthropology from the South Asia Institute, Heidelberg University and her research focuses on science, technology, and medicine  
The views expressed are personal

## **Medical negligence**

**Protect the poor against medical negligence (Hindustan Times: 20190723}**

<http://paper.hindustantimes.com/epaper/viewer.aspx>

Violence is wrong, but the system is more geared to protect medical practitioners than patients.  
Overhaul it

The government is toying with the idea of a 10-year jail term, and a fine of ~5 lakh, for persons found guilty of physically or mentally abusing doctors, whether inside a clinic, or in close proximity of the clinic, or on home visits. The government and the Indian Medical Association (IMA), responsible for the draft act, are advocating a central law specifically addressing the issue of violence against doctors to send out a strong message to the public. But what exactly is the message?

AFP■ While justice for doctors is being pursued with great gusto, the claims of medical negligence and assault by doctors got no traction

In a recent interview to the Hindustan

Times, Harsh Vardhan, the Union health minister, condemned the violence at NRS hospital in Kolkata which sparked off a nationwide doctors' strike in June. He said that a 10-member committee had been constituted, representing diverse stakeholders, to look into the issue of the spurt in violent outbreaks in hospitals. In a meeting, the involved ministries agreed on the need for a central legislation, leading to renewed discussions on a draft act submitted by the IMA in 2017. This has now been shared with the states for their response.

The proposed Protection of Medical Service Persons and Medical Service Institutions Act, 2017, recommends a 10-year imprisonment term and a penalty of ~5 lakhs for physically assaulting doctors and healthcare professionals. It also wants to categorise such violence as an offence that is cognisable, non-bailable, non-compoundable, and fit for trial by a court of the Judicial Magistrate of First Class. It has provisions which address damage to property, and make an offender pay twice the price of the damaged property as compensation.

While it is imperative to provide a safe professional environment for doctors to work, and violence in no form can be condoned, the implications of this draft are troubling. The provisions seem especially harsh given that medical negligence, even when resulting in death, carries a jail term of only two years, with or without a fine. A recent Harvard University study, according to news reports, has claimed that up to 5 million people in India suffer due to medical negligence annually. If this is true, and the processes currently in place for redressal squarely put the burden of proof

on the complainant, it becomes clear that the system is far more geared to protect practitioners than patients. Patient families have to fight long and difficult battles in order to receive any compensation for medical oversight, most of which involve private hospitals and the privileged classess it caters to.

For the poor, who are mostly dependent on public healthcare, navigating through the system is an even more arduous challenge. In cases of malpractice, their only recourse is to quietly accept their fate, which is what the draft act of the IMA will end up institutionalising. An eye for eye is unacceptable, but one also has to abandon quick-fix, knee-jerk reactions to resolve the problem of violence against doctors. The need of the hour is a systemic change. The abysmal condition of primary healthcare, both in terms of infrastructure and personnel, requires urgent attention. Rather than providing security at public hospitals, addressing the problem of staff shortage, for instance, could go a long way in assuaging public grievance. This is, of course, a far tougher battle for the IMA to fight. Instead, it chooses to see it as a law and order issue. The Indian Penal Code (IPC) has plenty of laws which deal with violence. A stringent new law,

specifically to protect doctors, as recommended by the IMA, will primarily victimise those who are already battling the structural violence unleashed on them by the State.

Media accounts of the death of Mohammad Sayeed, the 75-year-old who died in Kolkata's NRS Hospital, quote family members saying that there was a 40-minute delay in administering a lifesaving injection. Frustrated that no one was paying heed to their repeated requests, one of them pulled a doctor by his hand and asked him to attend to the ailing patient, for which they even later tendered an apology. The relatives allege that the doctors attacked them with hockey stick and bamboo poles, while the police looked on, when they asked for the body to be released. The family lodged FIRs against three NRS doctors. While justice for doctors is being pursued with great gusto, the claims of medical negligence and assault by doctors got no traction.

The key question is what recourse do the poor of this country have in cases when doctors do not prioritise patient needs? If indeed there was negligence in Sayeed's case, who bears responsibility for it? It is time to think not merely of doctors, but also patients.

## **Delhi: Dispensaries**

### **Delhi: Dispensaries may give way to mohalla clinics (The Indian Express: 20190723}**

<https://indianexpress.com/article/delhi/dispensaries-may-give-way-to-mohalla-clinics-5843032/>

According to officials, even the sites identified for the construction of dispensaries will now first have a mohalla clinic set up there. A total of 48 such sites have been identified by the health department, said officials.

The Delhi government is planning to convert rented dispensaries in the city into mohalla clinics and is conducting a study to gauge the financial viability of the project. Based on the number of patients visiting the OPDs at these rented dispensaries, and the salary of the staff employed there, the government is planning to replace the project with Aam Aadmi Mohalla Clinics (AAMCs), said officials.

According to officials, the move is being considered as running mohalla clinics is more economically viable. There are 89 dispensaries being run on rented accommodations in the city, of which 52 are owned by private agencies. At present, the Delhi government is paying a monthly rent to the owner of the dispensary. The final report will be submitted to Delhi Chief Minister Arvind Kejriwal by August 15, said a senior Delhi government official.

“We are analysing the money spent on the functioning of these dispensaries on a monthly basis. As per initial estimates, mohalla clinics are a better option as they do not require much financial support. Doctors are paid depending on the number of patients they attend and the set-up does not require much spending,” said the official.

On an average, around 300 patients visit the OPDs at dispensaries, while a mohalla clinic witnesses around 150-200 patients on a daily basis. At present, 195 mohalla clinics are operational in Delhi. The Delhi government has planned to open 530 clinics by the end of 2019.

A total of 1,040 sites were identified by the government for setting up the mohalla clinics, of which 740 were found unfeasible. The department of health, meanwhile, has identified 234 feasible sites to construct mohalla clinics. However, no progress has been made at the sites so far.

While the Public Works Department (PWD), Delhi Development Authority (DDA) and the three municipal bodies continue to spar over land to construct more mohalla clinics, the Delhi government has reached out to public to rent space. Last month, in a public appeal through an advertisement, Kejriwal requested the public

to send applications to the Department of Health by August 6.

“We have received 150 applications so far. It took us almost two-and-a-half years to get the locations approved from several municipal bodies. While 150 mohalla clinics are under-construction, we are struggling to start work on the remaining ones,” said a senior health official.

Behind Army’s WhatsApp order: Secret map, other faux pas

New offshore records reveal several Indian firms tapped Mauritius route to save on taxes

Delhi denies Trump claim PM Modi asked him to mediate on Kashmir

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According to officials, staff at these rented dispensaries will be deputed to government hospitals, particularly the ones reeling under shortage of doctors and medical staff.

“All these doctors and nurses are working under the Delhi government, so they will be transferred to any of the government hospitals. For running a mohalla clinic, we don’t need separate doctors,” added the official.

## **Men migrating for marriage**

**No. of men migrating for marriage doubles in a decade (The Times of India: 20190723}**

<https://timesofindia.indiatimes.com/india/no-of-men-migrating-for-marriage-doubles-in-a-decade/articleshow/70337947.cms>

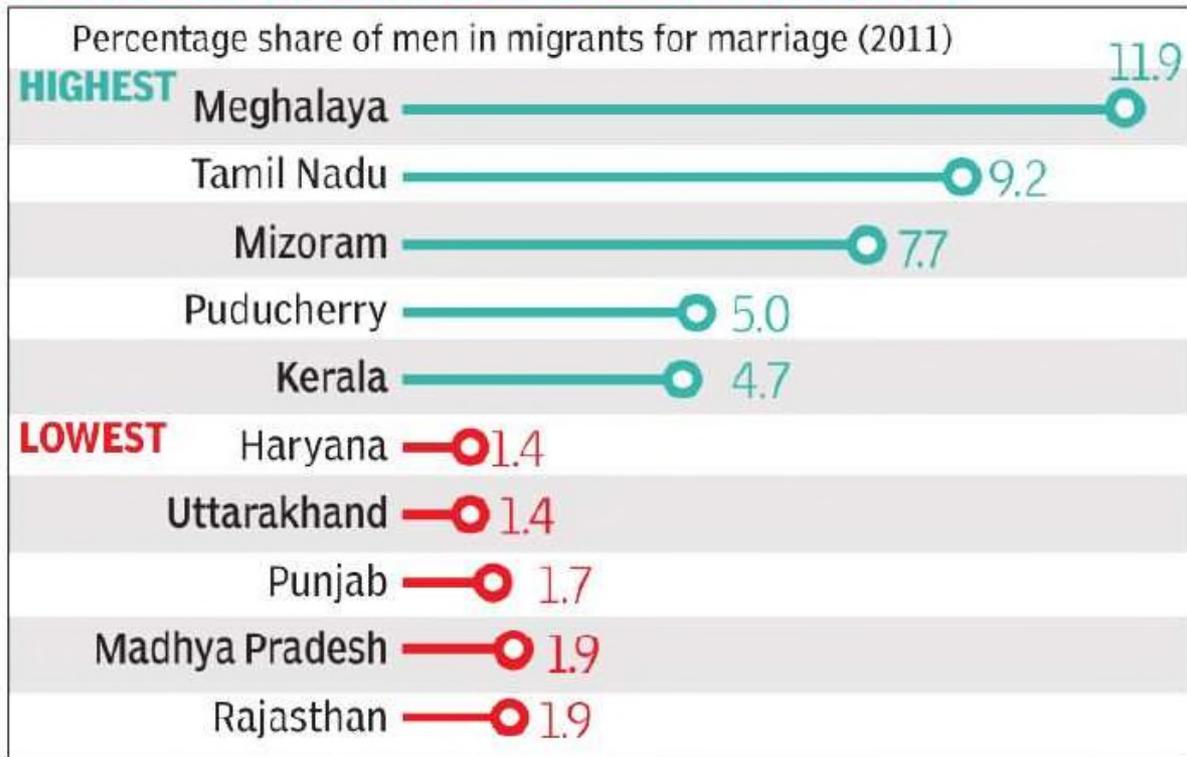
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## FEWER MEN MOVE IN NORTH



Brain mapping machine

Delhi's first brain mapping machine by September (The Times of India: 20190723}

Read more at:

[http://timesofindia.indiatimes.com/articleshow/70336521.cms?utm\\_source=contentofinterest&utm\\_medium=text&utm\\_campaign=cppst](http://timesofindia.indiatimes.com/articleshow/70336521.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst)

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## **Ebola,**

### **Ebola, 9 other viral diseases pose a big threat to India (The Times of India: 20190723}**

<https://timesofindia.indiatimes.com/india/ebola-9-other-viral-diseases-pose-a-big-threat-to-india/articleshow/70337906.cms>

Read more at:

[http://timesofindia.indiatimes.com/articleshow/70337906.cms?utm\\_source=contentofinterest&utm\\_medium=text&utm\\_campaign=cppst](http://timesofindia.indiatimes.com/articleshow/70337906.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst)

## **Cell therapies**

### **Cell therapies create personalised treatment for people with advanced cancer (New Kerala: 20190723}**

<https://www.newkerala.com/news/read/179264/cell-therapies-create-personalised-treatment-for-people-with-advanced-cancer.html>

In a recent study it has been found that cell therapies is one of the first steps in developing personalised treatments for cancer in people.

The study was discussed in the meeting the American Association of Cancer Research (AACR).

In the study, the researchers were able to characterise and identify the neoantigens driving the antitumor responses in a patient treated with an anti-PD-1 blockade and isolate the T cell receptors responsible for such effect.

Using immune checkpoint inhibitors to treat people with metastatic melanoma has helped transform the way people with the most deadly skin cancer are treated. Despite its success, there are still many people who do not benefit from the treatment.

Up until now, adoptive cell therapy, which involves extracting and harvesting T cells from a patient and engineering them in the laboratory, have targeted shared antigens. That restricts many of the people that can potentially be treated with the therapy because not every cancer

has the same antigen that needs to be targeted. Researchers are working to improve methods to identify new targets for these therapies in hopes to develop more effective and personalized therapies.

Researchers conducted the study using samples collected before and during treatment, the team isolated the T cells specifically recognizing the mutations on the tumour by using the imPACT Isolation Technology developed by PACT Pharma. The technology allows researchers to identify the T cells, and their T cell receptors, that have the ability to detect mutations. After identifying the T cell receptors, they were re-introduced in T cells from peripheral blood using a non-viral genome engineering method to generate new neoantigen-specific T cells that were used to kill melanoma cells from the same patient.

Cristina Puig-Sau, lead author of the study said, "In the setting of patients treated with anti-PD-1, we identified for the first time, in a high-throughput manner, which neoantigen mutations in the tumour are being targeted by T cells. More importantly, we were able to identify their T cell receptors and demonstrate that they can actually specifically kill the tumour cells."

"We hope that a better understanding of the T cell responses that occur after immune checkpoint blockade will guide the design of personalized adoptive T cell therapies."

## **Diabetes**

### **Study discovers how diabetes leads to vascular disease cancer (New Kerala: 20190723}**

<https://www.newkerala.com/news/read/178903/study-discovers-how-diabetes-leads-to-vascular-disease.html>

A team of scientists and physicians identified a cellular connection between diabetes and one of its major complications - narrowing of the blood vessel - which increases risks of several serious health conditions, including heart disease and stroke.

The same team previously found that high blood glucose, the hallmark symptom of diabetes, activates an enzyme known as protein kinase A (PKA), which increases calcium channel activity and constricts blood vessels.

"This was a surprise since PKA is typically associated with blood vessel widening and wasn't really on our radar. We wanted to understand the molecular processes that created this opposite reaction," said senior author Manuel Navedo.

For the new study, published in the journal of Clinical Investigation, the team conducted a series of experiments on the effects of high glucose on cerebral blood vessels and arterial cells that control blood flow. The tests were conducted on a unique genetically modified mouse and two mouse models of diabetes that were developed for studies of cardiovascular health.

The researchers focused on the relationship between PKA and adenylyl cyclase (AC), an enzyme involved in cyclic AMP (cAMP) production, a cellular messenger with a critical role in vascular cell function.

Their results showed that one AC in particular, AC5 mediated cAMP and PKA activation, triggering increased calcium channel activity and blood vessel narrowing. They also found that AC5 was essential for blood-vessel constriction during diabetes.

The team now hopes to test the effects of the AC5 chain reaction in high-glucose conditions in human cells. This step could confirm it as a treatment target for reducing the vascular complications of diabetes, which can include eye, kidney, and cerebral, gastrointestinal and cardiovascular disease.

"We see every day in our clinics the devastating impact of diabetes on the health and lives of our patients. Our work brings into much clearer focus on how high glucose can damage the vascular system and gives us a new target for blocking its effects," said co-author Nipavan Chiamvimonvat.

## **Mortality**

### **AI predicts long-term mortality from chest X-ray data (New Kerala: 20190723)**

<https://www.newkerala.com/news/read/178781/ai-predicts-long-term-mortality-from-chest-x-ray-data.html>

Researchers have developed an Artificial Intelligence (AI)-powered tool that can harvest information in chest X-rays to predict long-term mortality.

The findings of this study, published in the journal JAMA Network Open, could help to identify patients most likely to benefit from screening and preventive medicine for heart disease, lung cancer and other conditions.

"This is a new way to extract prognostic information from everyday diagnostic tests," said one of the researchers, Michael Lu, from Massachusetts General Hospital (MGH) of Harvard Medical School.

"It's information that's already there that we're not using, that could improve people's health," Lu said.

Lu and his colleagues developed a convolutional neural network - an AI tool for analysing visual information - called CXR-risk.

It was trained by having the network analyse more than 85,000 chest X-rays from 42,000 participants who took part in an earlier clinical trial.

Each image was paired with a key piece of data Did the person die over a 12-year period?

The goal was for CXR-risk to learn the features or combinations of features on a chest X-ray image that best predict health and mortality.

Next, Lu and colleagues tested CXR-risk using chest X-rays for 16,000 patients from two earlier clinical trials.

They found that 53 per cent of people the neural network identified as "very high risk" died over 12 years, compared to fewer than four per cent of those that CXR-risk labeled as "very low risk."

The study found that CXR-risk provided information that predicts long-term mortality, independent of radiologists' readings of the x-rays and other factors, such as age and smoking status.

Lu believes this new tool will be even more accurate when combined with other risk factors, such as genetics and smoking status.

**Suger (Hindustan: 20190723}**

[http://epaper.livehindustan.com/imageview\\_149949\\_60548738\\_4\\_1\\_23-07-2019\\_i\\_20.pagezoomsinwindows.php](http://epaper.livehindustan.com/imageview_149949_60548738_4_1_23-07-2019_i_20.pagezoomsinwindows.php)

# मीठा छोड़ने से कार्य करने की क्षमता बढ़ेगी



सेहत

नई दिल्ली | हिन्दुस्तान टीम

चीनी से बनी मीठी चीजों का सेवन छोड़ने से आपका स्वास्थ्य अच्छा रहेगा, जिम में प्रदर्शन बेहतर होगा और कार्यस्थल पर क्षमता बढ़ेगी।

एक हालिया शोध में शोधकर्ताओं ने कहा कि मीठी चीजें या चीनी मादक पदार्थों जैसा ही नशा देती हैं। इसलिए इसे छोड़ना बेहद मुश्किल होता है। नेवाडा

एकेडमी ऑफ न्यूट्रिशन एंड डाइटेटिक्स की निदेशक और नेवाडा यूनिवर्सिटी की शोधकर्ता सामंथा कोगन ने कहा कि जब आप चीनी छोड़ते हैं तो परेशानियों का सामना करना पड़ता है।

सिर व पेट दर्द जैसी कई परेशानियां कुछ दिनों से लेकर कुछ हफ्तों तक झेलनी पड़ सकती है। डॉक्टर कोगन ने कहा कि जब चीनी छोड़ने के बाद शरीर उसके अनुसार व्यवस्थित हो जाता है तो कार्यस्थल पर इंसान की कार्यक्षमता बढ़ती है, मानसिक मजबूती आती है और शारीरिक प्रदर्शन भी बेहतर होता है।

**Xray Technies (Hindustan: 20190723}**

[http://epaper.livehindustan.com/imageview\\_149949\\_60550288\\_4\\_1\\_23-07-2019\\_i\\_20.pagezoomsinwindows.php](http://epaper.livehindustan.com/imageview_149949_60550288_4_1_23-07-2019_i_20.pagezoomsinwindows.php)

# एक्सरे तकनीक मौत का अनुमान लगाएगी

शोध

नई दिल्ली | हिन्दुस्तान टीम

न्यूयॉर्क के शोधकर्ताओं ने एक आर्टिफिशियल इंटेलिजेंस आधारित उपकरण विकसित किया है, जो चेस्ट एक्स-रे में मौजूद जानकारी का इस्तेमाल कर दीर्घकालिक मृत्यु का पूर्वानुमान लगा सकता है।

पत्रिका जामा नेटवर्क ओपन में इस शोध के बारे में जानकारी को प्रकाशित किया गया है, जिसमें उन मरीजों के बारे में पता लगाया गया है जो स्क्रीनिंग या एक्स-रे का सबसे ज्यादा स्वास्थ्य लाभ उठा सकते हैं।

दिल की बीमारी, लंग कैंसर और अन्य बीमारियों के स्क्रीनिंग में लक्षण दिखाई देने पर शुरुआती स्टेज में ही दवाएं लेने पर व्यक्ति की स्थिति को गंभीर होने से रोका जा सकता है। हार्वर्ड मेडिकल स्कूल के मैसेचुसेट्स जनरल



**53** फीसदी लोगों की मौत हो गई 12 सालों में जिन्हें अति गंभीर खतरे के स्तर पर रखा गया था

हॉस्पिटल में कार्यरत माइकल लू जो इस शोध के शोधकर्ताओं में से एक हैं और उनके मुताबिक, यह हर दिन होने वाले जांच व टेस्ट के आधार पर पूर्वाभासी जानकारी निकालने का नया तरीका है।

एक्स-रे पर अध्ययन

शोधकर्ता लू और उनके सहयोगियों ने सीएक्सआर-रिस्क का इस्तेमाल पहले दो क्लिनिकल ट्रायल का हिस्सा रह चुके करीब 16,000 मरीजों के चेस्ट एक्स-रे पर किया। इसमें उन्हें पता चला कि ऐसे व्यक्ति जिनके लक्षणों को पढ़ न्यूरल नेटवर्क ने उनकी स्थिति को 'अति गंभीर' बताया था उनमें से 53 प्रतिशत की मौत 12 साल में हो गई, वहीं जिन्हें सीएक्सआर-रिस्क ने 'बहुत कम खतरे' का स्तर दिया था उनमें यह प्रतिशत सिर्फ चार रहा। इस अनुमान की मदद से पीड़ित व्यक्तियों का सही समय पर इलाज किया जा सकता है।

उन्होंने कहा, यह ऐसी जानकारी है जो पहले से सबके सामने मौजूद है, जिसके आधार पर व्यक्ति की सेहत को सुधारा जा सकता है, लेकिन इस जानकारी का इस्तेमाल नहीं किया जाता।

**Surgery ((Hindustan: 20190723}}**

[http://epaper.livehindustan.com/imageview\\_149949\\_60545900\\_4\\_1\\_23-07-2019\\_i\\_20.pagezoomsinwindows.php](http://epaper.livehindustan.com/imageview_149949_60545900_4_1_23-07-2019_i_20.pagezoomsinwindows.php)

# सर्जरी में मदद करेगा सूक्ष्म रोबोट



तकनीक

नई दिल्ली | हिन्दुस्तान टीम

अमेरिका की जार्जिया इंस्टीट्यूट ऑफ टेक्नोलॉजी के वैज्ञानिकों ने दुनिया का सबसे छोटा रोबोट बनाया है। दो मिलीमीटर लंबाई वाले ये 3 डी रोबोट को इंसान के शरीर के अंदर डालकर इलाज किया जाएगा। मेडिकल के विशेषज्ञ, रोबोट का इस्तेमाल सर्जरी में कर सकेंगे। हर रोबोट खुद से 4 गुना ज्यादा स्पेस को एक सेकेंड में कवर करता है।

पत्रिका माइक्रोमैकेनिक्स और माइक्रोइंजीनियरिंग में प्रकाशित अध्ययन के मुताबिक, रोबोट चोटों को ठीक

## खोज

- दो मिलीमीटर वाला एक रोबोट करेगा सर्जरी में मदद
- 3डी रोबोट में पेजोइलेक्ट्रिक एक्ट्यूटर लगाया गया है

करने में महत्वपूर्ण साबित हो सकता है। इन्हें अल्ट्रासाउंड वेब और वाइब्रेशन से नियंत्रित किया जा सकता है।

जार्जिया इंस्टीट्यूट ऑफ टेक्नोलॉजी के असिस्टेंट प्रोफेसर आजाद अंसारी ने मीडिया को बताया कि हम इंजीनियरिंग, इलेक्ट्रॉनिक्स, बायोलॉजी और फिजिक्स को मिलाकर कुछ नया बनाने का प्रयास कर रहे थे।

यह क्षेत्र बहुत बड़ा है। इसमें अनेक तरह की खोज होने की संभावनाएं हैं।

मिनी 3डी रोबोट में पेजोइलेक्ट्रिक एक्ट्यूटर लगाया गया है, जो वाइब्रेशन करता है। इससे रोबोट सक्रिय होता है। रोबोट को किसी तरह के बैटरी पॉवर की जरूरत नहीं होती है। दरअसल, रोबोट इतना छोटा है कि इसमें बैटरी लगाने के लिए स्पेस ही नहीं है।

**पिजोइलेक्ट्रॉनिक रोबोट में तरंग पैदा करता है :** 3डी रोबोट की बाँडी में लगा पिजोइलेक्ट्रॉनिक (बैटरी के बिना मशीन को चार्ज और नियंत्रित करने वाला) इसमें तरंग पैदा करता है। यह एक्ट्यूटर (मशीन को आगे-पीछे का संकेत देने वाला) के सेंसर द्वारा नियंत्रित किया जाता।