

THE MAN BEHIND MAGNETIC RESONANCE IMAGING

Peter Mansfield, the man who developed the science of medical resonance (MR) imaging, died recently. He was an extraordinary person born in the most ordinary circumstances. His father was a gas-fitter and mother was a waitress. He was born in London, and schooling stopped abruptly when World War broke out. Part-time classes led him inexorably through a degree in Physics, and finally a PhD. As a PhD student, he discovered that in some solids, excitation after NMR radio pulses led to a solid echo. The complex math behind this discovery caught the interest of NMR pioneer Charles Slichter, who invited Mansfield for a postdoc at the University of Illinois. It was later while working in the University of Nottingham, he realized that NMR could be used as an alternative to X-rays to image biological tissues.

In 1977, the first human tissue was imaged using NMR – a student's finger. This helped to get grants for a whole body imaging magnet. In 1978, when the new MR imager was built, people were worried whether the strong magnetic fields would cause a heart attack. Mansfield volunteered to be the first human to get his abdomen imaged. The rest is history. The first MR imager for clinical use was built in 1980 in the University of Aberdeen, and it was in the markets by 1984. He was knighted in 1993, and received the Nobel Prize for Medicine in 2003. MR imaging has transformed medicine, and scientist behind this will not be easily forgotten. (*Nature 8 March 2017*)

FIGHTING FOR BEDAQUILINE

An 18-year-old girl from Patna suffers from extensively drug-resistant (XDR) tuberculosis (TB). As access to Bedaquiline is restricted and available from only six government run health facilities in India, she applied to the The National Institute of Tuberculosis and Respiratory Diseases in New Delhi. However, she was refused because of lack of domicile. Her father launched legal action, and was also supported by XDR-TB expert Jennifer Furin from Harvard Medical School. The courts voted in the girl's favor and revoked the Ministry of Health's decision on January 19, 2017. The New Delhi high court has ordered that bedaquiline and other drugs that complete her regimen must be immediately provided to the girl. It has also smoothed the way for other patients in her position by removing the clause of domicile for access to the drug. Encouraged by the court's intervention, health advocates are also seeking inclusion of delamanid, another new drug

for treatment of multi- and extensively-drug-resistant TB in the Revised National Tuberculosis Control Program (RNTCP). A careful balance between access and close regulation of new drugs to prevent resistance and monitor for adverse effects is needed.

Another recent development has been the Supreme Court's injunction to the government to introduce a daily fixed-dose regimen, replacing the current intermittent therapy for all patients of tuberculosis. The health ministry says that it needs nine months to roll out the new plan. (*The Lancet 3 February 2017, The Lancet 18 February 2017*)

THE STATE OF THE GLOBAL AIR 2017

India and China contribute to 52% of global deaths due to air pollution. Exposure to ambient fine particulate matter PM_{2.5} is the fifth leading cause of death after hypertension, smoking, diabetes and hypercholesterolemia. The State of Global Air 2017 report has been published in February 2017 by the Health Effects Institute in collaboration with the Institute of Health Metrics and Evaluation. It provides a global, regional and country level look at air pollution.

WHO air quality guidelines suggest a level of 10 µg/m³ of PM_{2.5} as unsafe, and 92% of the world's population is exposed to levels above this cut-off level. New Delhi and Patna are considered the worst cities in the world for PM_{2.5} levels. It is reported that air pollution contributed to the death of 1.1 million people in India in 2015. Coal fired power plants are considered to contribute to 50% of this pollution.

The effect of air pollution on children's lungs is especially deadly. According to the WHO, more than 1 in 4 deaths of children under five years of age are attributable to unhealthy environments. About 11–14% of children aged 5 years currently report asthma symptoms, and an estimated 44% of these are related to environmental exposures.

So far the focus has been only on big metros like Delhi. However, in the list of 20 most polluted cities of the world, 10 were from India and included Allahabad, Kanpur, Firozabad and Lucknow. We need a nationwide, concerted strategic plan to combat this invisible menace. (*The Hindu 22 February 2017, The Lancet 25 February 2017, https://www.stateofglobalair.org/sites/default/files/SOGA2017_report.pdf*).

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