



EDITORIAL ▶▶

This month public health issues became policy for once. The Supreme Court in its judgement on moving public vehicles to compressed natural gas (CNG) in Delhi made it clear that the concern of the court in passing various orders on combating air pollution has been only one, "namely to protect the health of the people."

Unusual also was that scientific research was considered to decide policy. I call this unusual because a key failure in our country is that government decision-making and policy setting is never based on recent scientific evidence. But this time the court looked at studies from the US to Kolkata to understand the impact of air toxins on human health.

A key consideration was the recent study published in the Journal of American Medical Association (JAMA) on tiny particles. The JAMA study – an amazing epidemiological journey – taking 16 years, covering 116 cities and research on 500,000 people presents stunning evidence that exposure to fine particles leads to lung cancer and other related diseases and deaths. According to the study a mere increase of 10 microgramme per cubic metre (µg/cum) of fine particles – smaller than 2.5 microns or PM 2.5 – can increase the risk of lung cancer by 8 per cent, cardiopulmonary deaths by 6 per cent

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LEAD STORY ▶▶



PREETI SINGH / CSE

CHILDREN OF A LESSER GOD

Future was yesterday

According to the World Health Organisation, globally environmental hazards kill three million children under five every year

Environmental health threats include inadequate drinking water and sanitation, air pollution, accidents, injuries and poisonings

In India, child mortality rates due to environmental hazards and toxins are on the rise

55 per cent of child mortality originates in the perinatal period

Our children's future depends on our past. Grim, but true.

Environmental degradation of the past impacts the very air that the children breathe, the water that they drink and the food that they eat.

Children are humankind's most treasured investment. In fact, sustain-

ability (and future) of any species depends on the quality of progeny it produces. However, the quality of progeny is affected by the environment that they are born into and the environment in which their parents lived in. Children, especially the unborn, are most vulnerable to any form of pollu-

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and all deaths by 4 per cent.

Co-author Arden Pope, who has been working on particulates and pollution for many years now, says that the findings of this study provide the strongest evidence to date that long-term exposure to air pollution is an important risk factor for cardiovascular and lung cancer mortality. Consider also that the US annual average standard for fine particulates is 15 µg/cum while in India the annual average standard for PM 10 is 60 µg/cum and most cities, where this pollutant is monitored, record anywhere between 100-200 µg/cum on an average in a year. What then would be the risk of breathing air in our cities?

In the JAMA study, analysis was based on data collected by the American Cancer Society, which is working on a massive study involving over 1.2 million adults to look at cancer prevention. I believe this is all about what we should be doing in our country – working with medical professionals to study exposure and impact studies on vulnerable populations – children, women and people living in polluted areas. Such studies give us confidence in knowing what needs to be done and then policy prescription can follow. This is good research and good politics.

The judges also discussed studies, however limited, done by Indian medical professionals – by H Paramesh of the Bangalore based Lakeside Medical Centre on 20,000 children under the age of 18 years which shows that asthma incidence increased from 9 per cent in 1979, to 29.5 per cent in 1999. By JN Pande of the All India Institute of Medical Sciences, by S K Chhabra of the Vallabhai Patel Chest Institute and by the Chittaranjan National Cancer Institute and Environmental Biology Laboratory of the Department of Zoology of Kolkata University. All showing similar trends of growing risk.

The court then concluded that the increase in respiratory diseases, especially in children should normally be a cause of concern for any responsible government. But, the wise judges say, "children do not agitate or hold rallies and, therefore, their sound is not heard and the only concern of government appears to be to protect the financial health of polluters, including oil companies, at the cost of public health."

Need I say anymore?

— Sunita Narain
Director

tion. Even minor impact on health of the parent particularly the mother threatens the health of the child, which manifests later as poor health in adulthood. The recently concluded World Health Organisation (WHO) conference on children's health in Bangkok estimated that globally, environmental hazards kill three million children under five every year. And this is a very conservative estimate.

More vulnerable

There is increasing evidence that foetal growth is the most important aspect of life for any child. Foetal lung growth studies indicate that abuses such as smoking and hazards such as ambient air pollution can result in reduced lung function. But most exposures that occur in a mother and young children are accidental. Plastics and plasticisers, dioxins, pesticides, and other chemicals invade the body through every possible portal of entry. The growing evidence of invasive chemicals that impair or retard growth of children is overwhelming. Often these substances work in bewildering new combinations that are difficult to analyse. Consequently, there is an upsurge of pediatric cancers, neurological impairments, mental retardation, low birth weight and chronic anaemia and still births (see table: *Dangerous pollutants*). Children are particularly susceptible to environmental hazards because they consume more food and fluids (volume by volume), inhale more air and constantly explore their environment. This means that more pollutants accumulate in their bodies, which may

Children are particularly susceptible to environmental hazards because they consume more food and fluids and inhale more air

immediately begin to impair normal development or cause unexplained syndromes as children grow.

In India, children have to bear the double burden of diseases that have persisted for generations as well as of new diseases caused by various environmental factors. In rural India, a mother is most likely to be anaemic or malnourished. She works for long hours in smoke-filled kitchens and in the field. The constant assaults of both traditional diseases such as diarrhoea, malaria and other infectious diseases etc., and modern diseases caused by poisoning and contamination by pesticides and fertilisers in dusts, air, water and food, plastic wastes, agricultural or industrial effluents etc., make her specially vulnerable to a range of infections. This affects the unborn foetus as well. In urban India, another emerging challenge are the lifestyle-related diseases such as diabetes, attention-deficient disorders and obesity that are also on the rise, as urban children are getting addicted to "junk" food with little or no nutritive value and are leading an increasingly sedentary life.

The Health Information of India reports show that environmental reasons are increasingly responsible for increased mortality in women and children (see graphs: *What kills India's child*

Dangerous pollutants

| Pollutant | Source | Health effect |
|--|--|---|
| Endocrine disruptors (chemicals like dioxins, polychlorinated biphenyls-PCBs, pesticides — dichlorodiphenyl trichloroethane-DDT, dieldrin, lindane, etc) | Food, human milk, water | Cancer, immune system dysfunction, delayed neurological development, low birth weight babies, abnormalities of the reproductive tract |
| Benzene, polyaromatic hydrocarbons | Vehicle exhaust, indoor pollutants like biomass burning, cigarette smoke | Asthma, bronchitis, reduced lung function, other respiratory illnesses |
| Heavy metals (lead, mercury, chromium etc) | Soil, air, water | Neurological impairments, mental retardation |
| Asbestos | Air and water | Lung cancer and respiratory illnesses |

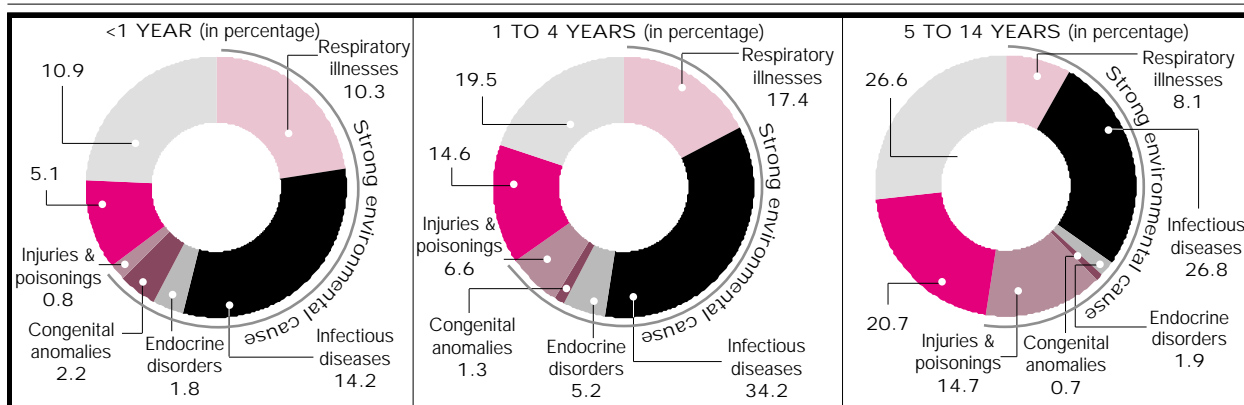
ren...). According to the report, 55 per cent of child mortality in India is due to conditions originating in the perinatal period. A significant proportion of the other 45 per cent, as shown in the table, are strongly related to environmental causes. But this data is only that of recorded deaths. The World Health Report (1999) of the WHO shows that 429,000 children in India die every year due to childhood diseases (pertussis, polio, diphtheria, measles and tetanus) alone. This estimate is about three times the figure given in the Health Information of India report.

merce worldwide; of these, 75,000 are registered in the United States. Worldwide, more than one new chemical (including industrial chemicals, pesticides, pharmaceuticals and food additives) is introduced into the environment every day. Only a fraction of the new compounds are completely tested for their safety. Little is known about carcinogenicity or other, often fatal, health effects for the majority of chemicals in use today. In developed countries, chemical substances are loosely regulated by technical and enforcement agencies. For example, as of 1984, 10

Even when evidences of toxicity exist, the costs of producing and developing viable, safer, non-toxic alternatives are prohibitive. Large and wealthy companies from developed countries therefore build manufacturing units in developing nations, to exploit the weak and corrupt regulation or enforcement regimes of those nations. This ensures the continued production of hazardous chemicals and pollutants outside the home country and puts people in developing nations at risk. Toxic products that have been phased out, restricted in use or banned

What kills India's children...

Environmental reasons are increasingly responsible for increased mortality in children (excluding 55 per cent of perinatal conditions)



Strong environmental cause: respiratory illnesses, infectious diseases, endocrine disorders, congenital anomalies and injuries & poisonings

Moderate environmental cause: neoplasms, nervous system and circulatory system

Somewhat moderate environmental cause: digestive system, genito-urinary system, blood diseases and ill-defined symptoms

Source: Anon 2000, Health Information of India 1997 and 1998, Central Bureau of Health Intelligence, Ministry of Health and Family Welfare, Government of India.

Price of development

There is little doubt that modern development has occurred due to rapid growth in the discovery and use of new chemicals. But many of these chemicals are neurotoxic in nature, affect the brain and interfere with the workings of the nervous system. These substances have the ability to affect intelligence, language ability, and attention span. Children are especially vulnerable to the effects of these neurotoxic substances. They may cause behavioural and social adjustment problems as well as affect mood. At very high doses, neurotoxins may produce such effects as coma, convulsions, respiratory paralysis, and death.

While definitive numbers do not exist, estimates are that in the order of 100,000 chemicals are used in com-

per cent of the pesticides in common use in the United States had been assessed for hazards, while for 38 per cent virtually nothing was known. As of 1997, between 1.5 and 3.0 per cent of the approximately 75,000 industrial chemicals in US commerce had been tested for carcinogenicity. The problem in assessing chemical toxicity is that different age groups and sexes respond differently to the varying levels of chemicals, and most of these outcomes manifest several years later. Often, combinations of chemicals act overtly and insidiously to produce confounding results. Despite being a serious threat, chemical and toxins are least studied by the medical fraternity. Even basic investigation protocols and therapeutic interventions are not developed.

for production or import to developed countries are then liberally marketed in developing and poor countries.

Ignoring the future

There is substantial resistance among the medical community and policy makers with regard to accepting the increasing evidence of the impact of these toxics on human health. Some people believe that NO chemicals in the environment could possibly cause cancer because humans are exposed to very small quantities. A review by the National Toxicology Program of the United States Environmental Protection Agency (EPA), found that just 6 per cent of 216 chemicals tested, increased cancer risk and that too only at high doses.¹ Others believe that EVERY chemical can cause cancer. Of

course, this is also false. In a later study by the National Toxicology Program, of the 253 chemicals chosen for testing because of their suspected carcinogenicity, about 70 per cent caused cancer in high-dose animal studies and more importantly, about 20 per cent of the chemicals were found to be carcinogenic even at low doses.² The truth, therefore, is somewhere in between the two arguments. A significant fraction of chemicals in the environment, about 10 to 20 per cent, may have the potential to cause cancer in humans at low doses. Exposure to chemicals is just one environmental factor that combines with children's genetic predispositions to cause cancer; others include diet, smoking habits, alcohol consumption, and exposure to sunlight, radiation, and viruses.

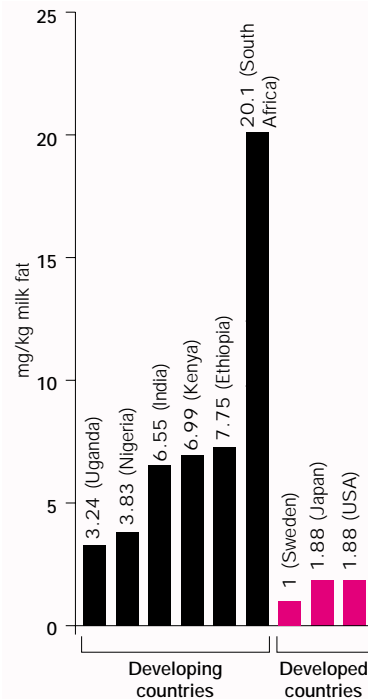
Evidence of absence

Diseases, ailments and syndromes that have commonly been attributed to chemicals are cancers (to dioxins, pesticides and metals), neurological disorders like Alzheimer's disease (to aluminium), eczema (to hardness of water) and diabetes mellitus (to increased nitrates in water). Cancers like bladder cancer and non-Hodgkin's lymphoma are strongly associated with the high presence of nitrates in water.³ A study of children in five villages in Rajasthan found that high nitrate ingestion in drinking water together with methemoglobinemia, causes and aggravates recurrent acute respiratory tract infections and may be the reason for high mortality in children.⁴ Even "safer" pesticides used in homes have been incriminated to cause Parkinson's disease,⁵ breast cancer⁶ and cognitive dysfunction.⁷ Risks are often widespread and across borders. In Turkmenistan, for example, dust is richly laden with hazardous pesticides, carried from neighbouring countries and regions. This dust contains anywhere between 1.8 to 126 milligrams

Some people believe that NO chemicals in the environment could possibly cause cancer because humans are exposed to very small quantities

DDT levels

Developed countries have low levels of DDT in human milk in comparison to developing countries



Adapted from: F Ejobi et al 1996, Organochlorine pesticide residue in mother's milk in Uganda, *Bulletin of Environmental Contamination and Toxicology*, 56:875, New York.

of particulate matter per kilogram of dust deposited per hectare of land. Evidence suggests that there is an increase in interstitial lung disease in children in the region⁸. Parental occupation also poses risks to children⁹⁻¹¹.

Reproductive disorders from endocrine disruptors, hormonally-related cancers, and infertility also appear to be on the rise. During the past 50 years, the rate of testicular cancer in industrialised countries has increased by a factor of two to four. Breast cancer mortality in the United States has been rising by about one per cent per year since the 1940s. There is some evidence that sperm counts and semen volume may have declined substantially.¹² There are also signs that abnormal sexual development in infants may be increasing. A doubling of the incidence of undescended testes in male infants since 1960 has been reported in the United Kingdom.¹³ Today's increased prevalence of these reproductive problems is puzzling. Some increases

in cancer rates have occurred in the elderly but more disturbingly, these symptoms have also been observed in younger populations. Most studies on these phenomena conclude that long-term exposure, initiated in childhood was responsible for these conditions. However, so far no studies on these issues have been done in India.

...or absence of evidence?

The sudden rise of modern disease epidemics has taken the Indian medical fraternity by surprise. Physicians in Mumbai, for example, found they were under-diagnosing asthma. The prevalence was actually 17 per cent, compared with 3.5 per cent by physician diagnosis.¹⁴ Similarly, unexplained rise in the number of cancer patients from areas not considered "hotspots" for cancers is alarming doctors in India. In Delhi alone, six new cancer treatment hospitals have sprung up in the past five years. Even the many Government of India registries show that cancers are on the rise in children (though, shockingly, the government has not produced a comprehensive report for about a decade!). What is even more alarming is that the numbers of unexplained causes of child deaths have increased dramatically.

Pesticides that have long been phased out in developed countries, and banned/restricted food additives and preservatives are liberally marketed in India. Enforcement agencies like the Bureau of India Standards, pollution control boards and more importantly the Ministry of Health and Family Welfare have no synergy or cooperation to deal with these challenges. Clearly, enforcement and regulatory agencies are keen to adopt best prevailing standards but are at least a generation behind in implementing them.

The concept of environmental health has emerged only in the past 30 years or so and is yet to receive recognition from medical fraternity. The warning given in Rachel Carson's *Silent Spring* (1962) that pesticides were creating greater problems than they were intended to solve started off a controversy still raging today between environmentalists and the pesticide industry. More evident and large-scale disasters like Bhopal, Soveso dioxin

poisoning, the Minamata mercury poisoning have moved governments to create effective policy measures and regulatory bodies, but it does not seem to have deterred industries from producing chemicals or at least conduct studies on their safety and long term implications. Therefore educating people on the impact of chemicals and toxics in their daily life is more important and more effective in bringing about this change. Modern diseases are the driving force of environmental health as a discipline in the developed countries. But India suffers from a double burden of diseases which pose more questions and reveals few answers on how they will interact and impact children. The needs to approach is of integrating health and environment, both in the research agenda, policy domain and in clinical diagnosis and treatment by medical practitioners. So far, environmental causes to diseases are not considered in the "radar" of diagnosis. But there is hope that with increase in awareness, this mindset will change and there will be more holistic approach to diseases.

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Killer air...

At last there now comes conclusive evidence that tiny particles in the air increase the risk of human death. A recent study published in the *Journal of American Medical Association*, co-authored by C Arden Pope, professor of economics at the Brigham Young University finds that a mere increase of 10 microgrammes per cubic metre ($\mu\text{g}/\text{cu.m}$) of fine particles (size less than 2.5 microns or $\text{PM}_{2.5}$) increases the risk of lung cancer by 8 per cent, that of cardiopulmonary deaths by 6 per cent and all deaths by 4 per cent. To really understand how air pollution results in increased risk for lung cancer, the effect of smoking on lung cancer risk was taken into account. The study thus help provide new insights into lung cancer risk.

The research took place over a period of sixteen years, covering 116 metropolitan areas of United States and covered about 500,000 people. The study is a part of the ongoing prospective mortality study of approximately 1.2 million adults, the analysis of which is based on the data collected by the American Cancer Society. "The findings of this study provide the

strongest evidence to date that long-term exposure to air pollution, common to many metropolitan areas in the US, is an important risk factor for cardiopulmonary and lung cancer mortality," according to Pope.

The study shows that despite improvements in the falling rates of fine particulate levels, the levels are still high enough to be associated with a significantly increased risk of cancer and cardiopulmonary deaths. In 1999-2000, the annual average particulate air pollution level recorded in New York was $16 \mu\text{g}/\text{cu.m}$, with Los Angeles, Chicago and Washington, DC reporting $20 \mu\text{g}/\text{cu.m}$, $18 \mu\text{g}/\text{cu.m}$ and $15 \mu\text{g}/\text{cu.m}$ respectively. Compare this to the levels recorded during 1979-1983: New York City $24 \mu\text{g}/\text{cu.m}$, Los Angeles $27 \mu\text{g}/\text{cu.m}$, Chicago $23 \mu\text{g}/\text{cu.m}$ and Washington DC $15 \mu\text{g}/\text{cu.m}$. Yet, the risks to human health remain high.

With air quality levels in most of the Indian cities higher than expected, it is not a surprise to come across more incidences of respiratory illnesses, breathlessness and reduced lung function. In Delhi alone, about 7.5-10 per cent of males suffer from various respiratory diseases.

Clearly, the time has come to ask for our right to clean air.



Review of recent studies on Children's Health

Asthma subgroups

To provide national estimates of asthma prevalence in various populations among children and adolescents, to evaluate environmental risk factors that are independently associated with current asthma in children; and to identify subgroups at particular risk for current asthma, Michael A. Rodriguez and colleagues, from the Department of Family Medicine, University of California and Los Angeles School of Medicine, USA, did a cross-sectional study of asthmatic patients. Twelve thousand three hundred eighty-eight African American, Mexican American, and white (non-Latino) children and adolescents, aged 2 months through 16 years, were selected from a systematic random, population-based, nationally representative sample.

The study concluded that there existed a strong independent association between obesity and current asthma in children and adolescents, and confirmed previous reports of a parental history of asthma or hay fever and African American ethnicity as additional important risk factors.

Archives of Pediatrics and Adolescent Medicine 2002, Vol 156, pp 269-275.

Persistent asthma

Fernando D. Martinez, from the University of Arizona, Tucson, Arizona, conducted a longitudinal study in Melbourne, Australia, to follow childhood asthma into adulthood. The study followed 401 children who were enrolled at age 7 and was based on their parents' responses to a questionnaire concerning their child's history of asthma, wheezing episodes, and bronchitis. The study found that patterns of wheezing and asthma expressed early in life generally persisted into adulthood. Conversely, persistent airway obstruction in adulthood was associated with more troublesome asthma during childhood.

Pediatrics 2002, Vol. 109 No. 2 February, pp. 362-367

Fossil fuel threat

Though it has been known for long that particles generated by combustion of fossil fuels adversely affect health, it is only recently that pediatricians are beginning to question the health effects of these fossil fuel particles on children. J Grigg, Senior Lecturer in Pediatric Respiratory Medicine, Leicester Children's Asthma Centre, Institute for Lung Health, University of Leicester, Leicester, UK, reviewed various studies carried out on children and health effects due to fossil fuel pollution and found very strong evidence between the two. Particles stimulate lung cells to produce proinflammatory responses, which give rise to respiratory diseases.

Archives of Disease in Childhood 2002, Vol 86, pp 79-83.

Placebo cough syrups

Over the counter (OTC) cough medicines may not really be effective in relieving symptoms of acute cough. K Schroeder and T Fahey of the Division of Primary Health Care, University of Bristol, UK, did a systematic review of 15 randomised controlled trials involving 2166 children. Combinations of anti-histamine-decongestant and other drug

combinations were found to be no more effective than placebo in relieving symptoms of acute cough. The study cautions on the recommendation of OTC cough medicines as a first line of treatment for children with acute cough.

British Medical Journal 2002, Vol 324, February, p 329.

Malnourished children

An association has been found between chronic malnutrition during infancy, marked by stunting and poor cognitive function. D S Berkman et al of the Department of Epidemiology, The Johns Hopkins School of Public Health, Baltimore, USA carried out a cohort of 239 Peruvian children to assess the effect of stunting, diarrhoeal disease, and parasitic infections during infancy on cognitive function in late childhood. Malnutrition in early childhood was found to be closely related with poor cognitive function at age 9 years; suggesting that intervention programmes aimed to prevent malnutrition early in life could lead to significant improvement in cognitive function of children throughout the less-developed world.

The Lancet 2002, Vol 359, No 9306, February 16, pp 564-571.

Coughing Kids

Screening of 225 children in the age group of 1-15 years, belonging to rural Punjab was done to determine the prevalence, age distribution and common causes of chronic or recurrent cough in them. Twenty four children were diagnosed with chronic or recurrent cough, and the most common cause amongst 66.7 per cent of them was bronchial asthma. A significant association was found with family history of allergy/asthma and smoking. Daljeet Singh and colleagues from the department of Pediatrics, Dayanand Medical College and Hospital, Ludhiana, Punjab, carried out the study.

Indian Pediatrics 2002, Vol 39, January, pp 23-29.

New viral infections

A Daley and D Dwyer of the Royal Alexandra Hospital for Children in New South Wales, Australia, have called for vigilance to ensure early recognition of emerging viral infections in children. These new emerging viruses include known viruses that have increased in incidence or geographic range (such as enteroviruses and Japanese encephalitis virus) and new viruses such as Australian bat lyssavirus which are associated with known diseases. The study also talks about new viruses associated with previously unrecognised diseases like Hendra and Nipah viruses and says that some of these viruses may have a predilection for children.

Journal of Paediatric Child Health 2002, Vol 38, No 1, February, pp 1-3.

Antisocial lead

Exposure to lead in early childhood could be the reason behind the rising levels of crime and other antisocial behaviour. A comprehensive study carried out by Kim Dietrich, Associate Director at the Children's Environmental Health Centre at Cincinnati Children's Hospital Medical Centre, US, followed 195 adolescents between 1997 and 1999 to assess the links between lead exposure and antisocial behaviour. Blood lead levels were taken from mothers during pregnancy and from children every three months between birth and age 6, thus covering the time when maximum developmental growth takes place. The study found that exposure to lead was associated with antisocial behaviour, even after adjusting for other factors (home environment, low birth weight, parental intelligence and social class) that could lead to similar behaviour.

<http://www.sciencedaily.com/releases/2002/03/020301.html>

Adolescents and lead

To investigate the association between lead levels and renal tubular damage among adolescents, F Sonmez et al of the department of pediatrics, Adnan Menderes University Faculty of Medicine, Aydin, Turkey conducted a study among 39 adolescent workers engaged in auto repair workshops. Taking a control group of 13 adolescents working in battery production workshops and 29 healthy rural adolescents, blood lead levels and urinary N-acetyl beta D glucosaminidase (NAG) activity was tested. Blood lead levels and urinary NAG in auto repair workers were significantly higher than the rural control group but lower than the battery workers. Amongst those adolescents working in auto repair shops, 8 were painters and they had higher levels of lead exposure and urinary NAG activity than the other workers; suggesting that chronic low dose lead exposure was found to cause renal tubular injury in children workers of auto repair workshops.

Journal of Adolescent Health 2002, Vol 30, No 3, March, pp 213-216.

Childhood cancer

Peggy Reynolds and her colleagues at the California Department of Health Services, California, US, investigated at total of 7,143 children under 15 years of age for exploring linkages between childhood cancer and agricultural pesticide. Though childhood leukemia rates were found to be significantly elevated in groups with the highest use of the pesticide propargite, no specific dose-response trend was noticed with increasing exposure categories.

Environmental Health Perspectives 2002, Vol 110, No 3, March, pp 319-324.

Pesticides in diets

Diet samples from preschool children aged 2 to 5 years of Washington State, US, were collected and studied to assess the level of organophosphorous pesticide exposure patterns. A total of 88 individual food category samples were collected and analysed for 15 organophosphorous (OP) pesticides. Sixteen individual food category samples were found to contain detectable levels of at least one OP pesticide, and two of these samples had two OP pesticides. Of the 15 targeted pesticides, 6 were detected and fresh fruit and vegetable category had the most frequent pesticide determinations followed by beverages.

Journal of Exposure Analysis and Environmental Epidemiology 2002, Vol 1, January 12, pp 21-28.

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<http://www.inchesnetwork.org/about.html>
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www.cehi.org
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<http://www.epa.gov/children/>
- World Health Organisation site for children's environmental health
<http://www.who.int/peh/ceh/topics.htm>
- Children's Health Environmental Coalition
<http://www.chechnet.org>

Premature links

New research points towards examining the associations between environmental exposures of mothers and developing fetuses and subsequent premature birth. Disruptive at any point during pregnancy, environmental toxicants are known to bring about genetic, cellular and molecular changes. Mathew Longnecker an epidemiologist with the National Institute of Environmental Health Sciences, US, says there is some suggestive, though not conclusive, evidence for environmental toxicants triggering preterm birth. Studies on community-level air pollution suggest a modest association with preterm birth. In an earlier study done to determine the associations between exposure to DDE and preterm birth Longnecker and colleagues found a statistically significant though Longnecker cautions that more research is needed. In line with that need, Longnecker's current research focuses on the effects of DDT/DDE in a highly exposed Mexican population of pregnant women and their offspring. Another area, which needs to be explored with caution, is the gene-environment interactions so that conclusive evidence can be drawn on the linkages between environment and premature deliveries.

Environmental Health Perspectives 2002, Vol 110, No 2, February, pp A78-79.

Organochlorine chemicals

In their editorial in The Journal of Pediatrics, Mary S Wolff and P J Landrigan speak of the harmful effects of organochlorine chemicals (OCs) on children's health. Organochlorine chemicals include dichlorodiphenyl-trichloroethane (DDT) and polychlorinated biphenyls (PCBs), as well as halogenated dioxons and furans. In utero exposure to OCs have been linked to reduction in intelligence and behaviour. Elevated levels of dichlorodiphenyldichloroethylene (DDE)—a major metabolite of DDT and PCB have been associated with preterm birth and smaller size newborns.

The Journal of Pediatrics 2002, Vol 140, No 1, January, editorial.

PRODUCT WATCH



Wrong signals

A recent television advertisement for BPL India, the mobile phone service provider, caused some concern among the Indian health fraternity. It shows a pregnant woman, sitting on a chair, with a cell-phone pressed to her stomach.

The impact of cellphones on health is a hotly debated topic in the West. There are allegations that cellphones could cause cancer, tumours, cardiac arrests, migraines, adversely affect pregnancy, interfere with implants like pacemakers, and expedite the onset of neurological diseases like Alzheimer's. Although industry-sponsored research shows little evidence of a causal relationship between cancer and radio frequency radiations from cellphones, independent studies suggest that the link is profound. A research published by Madeleine Bastide at the University of Montpellier in the *Journal of Bio-Electro Magnetism* suggests that pregnant women who use cellphones could cause serious harm to their unborn babies, and that the risks from cellphone radiation could be far greater than previously imagined. Her research on 6,000 chicken embryos showed that those moderately to heavily exposed to emissions during their 21-day incubation period were five times less likely to survive than those not exposed.

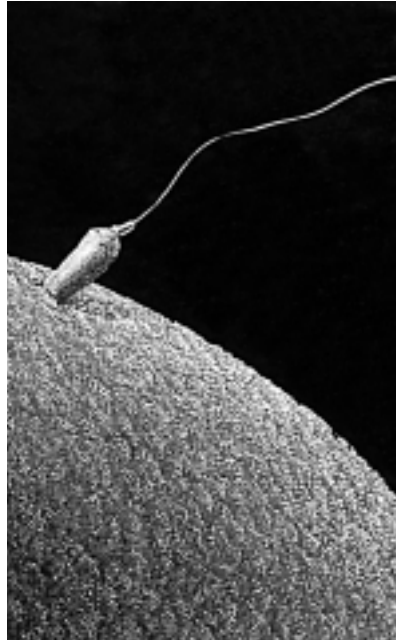
The Advertising Standards Council of India (ASCI), a Mumbai-based non-profit organisation, is the advertising media's self-regulatory body. It deals however only with complaints on advertisements that are false, misleading, indecent, illegal, lead to unsafe practices or unfair competition. Regulatory organisations, like the Bureau of Indian Standards, which ought to be at the forefront of such debates, have neither the required scientific capacity nor political will. Clearly, in the prevailing situation, the initiative has to come voluntarily from companies rather than civil action.

BRIEFS

Impaired fertility

Falling sperm counts across Britain and in the rest of the industrialised world is making scientists put the blame on pollution. Over the past 50 years, the average sperm counts in men have dropped from about 160 million per millilitre of semen to 66 million. Sperm count of Scottish men born after 1970 has been found to be falling by two per cent each year. The presence of hormone-disrupting chemicals like phenylchlorinated biphenyls (PCBs) and DDT is known to cause cancer and damage the immune system, as well as impair fertility. These chemicals are being now used in

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countless products, right from plastics and paint to electrical equipments. Recent research shows that artificial oestrogens, used in contraceptive pills and emitted through sewage works may get into drinking water and affect human fertility. The main culprit here has been identified as ethanol oestradiol, the removal of which is ineffective by conventional sewage treatment. Effects of exposure to these cocktail of chemicals may take as long as 20 years before they are manifested.

Parental trap

Indoor allergens and irritants are known to contribute to childhood asthma. To assess the prevalence of

potential environmental triggers, to identify risk factors for such exposures, and to determine whether prior parental education about trigger avoidance is associated with fewer such exposures, J A Finkelstein and colleagues from the Department of Ambulatory Care and Prevention, Harvard Medical School and Harvard Pilgrim Health Care, Boston, USA, interviewed parents of 638 children who were between the ages of 3 to 15 years. Parents were told to report recent asthma symptoms and exposures to potential environmental triggers.

Though exposures to environmental triggers was common (30 per cent of households had a smoker, 18 per cent had household pests, and 59 per cent had furry pets), very few parents adopted the recommended trigger avoidance measures suggested by the clinicians. This despite the fact, that 45 per cent of the parents had received written instructions regarding trigger avoidance. However only 11 per cent reported having given them in the past year. Discussion with doctors on home triggers for asthma was done by 42 per cent of the parents in the past 6 months. The study highlights the important role that parents may play in helping reduce asthma attacks in children, which are specially triggered by indoor allergens and irritants.

Poisoned metal

Contamination of soil or water by high levels of depleted uranium (DU) may cause kidney damage in soldiers exposed to it. Favoured by the power nations as the best and cheapest ammunition available to smash enemy armour, some 40,000 rounds of depleted uranium shells were fired in the Balkans by the US ground attack aircraft during the Kosovo conflict and in 1995 in Bosnia.

The soldiers most prone to these exposures may be the one who have survived within struck tank or those who have worked for long durations, cleaning up contaminated vehicles after a battle. A few hundred US servicemen and an unknown number of Iraqi soldiers would have been exposed to the most dangerous levels of DU. Particles of DU in the ground near attack sites could contaminate the

soil. This could pose a danger to civilians who can get affected through water in the pipeline, and is a risk for children accidentally swallowing the topsoil, given their unique nature of playing on the ground. However, since contamination could take decades, it is too early to say what effect the contaminated soil or water would have on human population. Fear of developing cancer on exposure to the armour-piercing depleted uranium shells used in the Gulf War and the Balkans arose after some soldiers developed leukaemia.

A similar link has been found in Iraq, raising further doubts about the role that this heavy metal may have to play in causing cancer. The non-availability of any accurate test to measure very small levels of the element in the human body calls for more research to be done into the effects of DU and long-term studies of soldiers exposed to high levels to determine any link to kidney disease and lung cancer need to be done.

Bad air, bad heart

A path breaking study finally proof that breathing ozone and fine particulate matter constricts arteries, leading to heart attacks and other cardiovascular problems. Vascular biologist Robert Brook of the University of Michigan, Ann Arbor, USA, along with his brother—Jeffrey Brook, an atmospheric scientist from the University of Toronto, Canada, exposed 25 healthy volunteers with an average age of 35, to levels of ozone and fine particulate matter compared to peak levels in some smoggy cities. Alternatively, clean air was also pumped in. On measuring

changes in the diameter of the arteries of the upper arm after each exposure ended, the scientists found that after two hours of breathing polluted air, the blood vessels of the volunteers constricted between 2-4 per cent on average. Though so small a change can do no damage to a healthy individual, it can trigger heart trouble in someone with cardiovascular disease. When the same group breathed filtered air, no change was observed in the arteries.

According to Brook, the body's immune system may mistake these particles for bacterial or viral invaders, and attack. With the moving in of the white blood cells, inflammatory chemicals called cytokines are released, that cause the blood vessels to constrict. The study is a preliminary study, pointing to the mechanism that occurs which puts heart patients more at risk during smoggy days.

After effects

Six months after the World Trade Center attacks, thousands have been found to be ailing from respiratory disorders, headaches and other serious illnesses. When the buildings collapsed after being hit by the two jetliners, it released in the environment a spew of toxic gases and chemicals which included 300 to 400 tonnes of asbestos, dioxins and heavy metals, like lead from computers and electrical equipment, mercury from thousand of fluorescent lights and nearly 130,000 gallons of transformer oil contaminated with polychlorinated biphenols (PCBs). The worst affected have been the firefighters and people living near the area. More than two thousand firefighters complained of respiratory ail-

ments due to toxic exposures; and nearly 6,000 people living near Ground Zero suffered short-term health problems associated with attack-related air pollution. The unusual mix of chemicals and their synergistic effects makes it difficult for even environmental medicine specialists to predict how long some illnesses may last. According to Clifford Bassett, an allergist affiliated with Long Island College Hospital, New York, people already suffering from pre-existing allergies, asthma and respiratory problems are the most affected. Suhail Rahoof, chief of pulmonary and critical care medicine at Nassau University Medical Center in East Meadow, New York, reports that the worst afflicted have been those working directly at Ground Zero — firefighters, police officers, rescue workers and volunteers.



B O O K R E V I E W

HANDBOOK OF PEDIATRIC ENVIRONMENTAL HEALTH-American Academy of Pediatrics-1999-pp 420-US \$44.95



The Handbook of Pediatric Environmental Health is the only comprehensive guide to the identification, prevention and treatment of pediatric environmental health problems. The handbook speaks of how though environmental hazards are among parents' top health concerns for their children, very little time is spent training physicians to recognize and treat ailments resulting from exposure to harmful substances and environments. The book aims to cover this very gap by providing insights and training to physicians in the field of pediatric environmental health. The topics reviewed in the handbook cover more than 30 chapters and include prevention and treatment of hazards, including asbestos, radiation, UV rays, pesticides, pollution, lead, mercury, tobacco, electric and magnetic fields, noise, food contaminants, and more. Pediatricians are also given guidelines on how to recognise acute pulmonary hemorrhage in infants exposed to toxigenic moulds. The handbook is a must for pediatricians who want to examine the various environmental health issues concerning children.

Children Act Fast...So Do Poisons!



Consider this. About 40 to 65 per cent of all poisonings occur in children. Out of these, nearly 90 per cent are preventable. Pesticide residues, lead, asbestos, chemical contaminants found in water, air and food and in products found in the home—all produce adverse effects on the health and development of children.

The most common chemicals are found in commercial products, pharmaceuticals and natural toxins (plants) available in the home and surroundings. Among the most dangerous

household products are bleaches, strong detergents and oven cleaners containing sodium hydroxide. These when ingested, produce corrosion of the digestive tract. Inadvertent ingestion of a drain cleaner or crystallised caustic soda commonly found in the kitchen requires repeated surgery and years of rehabilitation. Kerosene is the most commonly ingested (and inhaled) product worldwide. Its inhalation may produce chemical pneumonitis, secondary infection and eventually, respiratory failure in children. The less toxic commonly ingested household products are window cleaners, stain removers, shampoo and cosmetic products. Children also get exposed to various pesticides, which are present in the home environment. In most of the houses, at least one pesticide product is stored in containers, which are well within the reach of young children. Exposure to pesticides can lead to

headaches, dizziness, muscle twitching, weakness, tingling sensations, and nausea.

Poison Control Centres play a critical role in the identification, management and prevention of these types of exposure. Educating parents about preventive aspects and common precautions that ought to be taken is a very important role of the Poison Control Centre. These centers are thus in a position to play a potential "sentinel" role in children's environmental health.

A Poison Control Centre is to be initiated soon at the Sir Ganga Ram Hospital, New Delhi. Suresh Gupta, Consultant at the Department of Pediatric Emergency Medicine and Toxicology is also working on poison prevention, knowledge and practices among pediatricians.

Those wanting to join hands with him, can contact Suresh Gupta at: Sir Ganga Ram Hospital, New Delhi 11 060. Ph: 5762672/73/74 Mobile: 09810124391 e-mail: drguptasuresh@yahoo.co.in

LEADing problem



SANJAY ACHARYA / EARTHSCAN

Amongst the most serious environmental toxins, lead ranks as number one. The sources of exposure to lead include automobile exhaust, leaded pipes, lead solders in water supply systems, and lead based paint, cosmetics (surma), medicines, etc. Young children and developing fetuses are known to absorb lead more readily than adults. It stays in our bodies, in blood, bones, and soft tissues, and can hurt kidneys, liver and the nervous system. Exposure to low levels of lead

can permanently affect children. In low levels, lead can cause nervous system and kidney damage. Learning disabilities, attention deficit disorder, and decreased intelligence. High levels of lead can have devastating effects on children, including seizures, unconsciousness, and, in some cases, death.

Between 1997-1999, a major screening program called "Project Lead Free" was carried out by The George Foundation (TGF), a non-governmental organization, to determine the blood lead levels among the population in seven major Indian cities (Bangalore, Kolkatta, Chennai, Vellore, Hyderabad, Delhi and Mumbai). This study of over 15,000 children and 5,000 adults clearly indicated an environmental health crisis; it concluded that over 50 per cent of the children below the age of 12 years living in urban environments had unacceptable blood lead levels of 10 µg/dl or more. Further 14 per cent of the children in these cities have seriously elevated levels of lead of 20 µg/dl or more.

To inform, educate and communicate to the general public about this preventable environmental health hazard, The National Referral Center for Lead Poisoning in India (NRCLPI) was established as a joint project of St. John's National Academy of Health Sciences (SJNAHS) and The George Foundation, both from Bangalore. Besides providing updated information on all aspects of lead poisoning, it offers blood lead testing facilities for samples received at the Centre from anywhere in India. NRCLPI also undertakes training of doctors and paramedics with regards to assessment and evaluation of lead poisoning, provides consultancy services and makes policy recommendations to the government for reduction and prevention of lead poisoning.

For more information, contact: The George Foundation, No. 1155, 6th Main Road, IV Block, 1st Stage, HBR Layout Bangalore 560 084 Phone: 080-2065058 Fax: 080-5520777 e-mail: nrclpi@leadpoison.net Website: www.leadpoison.net

Readers write in

It gives me profound pleasure to receive and read your newsletter. The publication is quite informative as well as educative, especially for those who are directly concerned with health and environment. It is also a unique effort to bring like-minded people together for a noble cause.

Avinash Kumar Verma
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Congratulations to CSE for coming out with the bi-monthly health and environment newsletter. It is a platform where in people can share and interact with others having similar interests.

Er. Satish Chandra M Scindia
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The health and environment newsletter is a long awaited necessity to awaken the medical fraternity on environment and health. Keep up the good work.

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Congratulations for this innovative effort in bringing out Health & Environment newsletter. The contents are extremely useful for a healthy society. The newsletter will be a tool in initiating and strengthening a movement.

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A colleague from the WHO Office in New Delhi, passed on your Health and Environment Newsletter to me that I read with great interest. We welcome your effort to place particular emphasis on the link between environment and health and to stress the special vulnerability of women, children and the poor.

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I find the health and environment newsletter to be a very interesting publication, which may be the first of its kind in our country. You have rightly said in your editorial that we have to do something to bridge the information gap that exists in the field of health and environment. In trying to bridge that gap, CSE is doing a laudable service to the nation.

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**JOIN
OUR NETWORK!**

**Are you in the medical profession?
Do you have news to share with us?
A campaign to talk about?**

CSE's Health and Environment Newsletter invites comments, suggestions and views.

If you are interested in receiving the copy of the newsletter, do write to us. Join our network.

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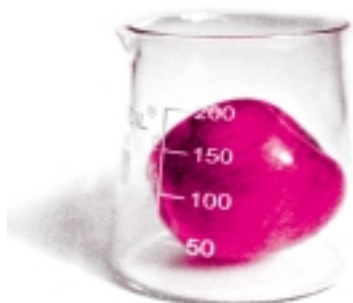
Working on various projects like the Urban Malaria Project (DFID), Urban Tuberculosis Project (WHO) and the Sexual Health Project of NACO. Also member of the Environment Committee of Southern Gujarat Chamber of Commerce.



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Making a coalition of NGO's in Hyderabad on waste management issues.

An apple a day may not keep the doctor away



How fresh is a red apple? Don't trust your eyes. It is lined with harmful pesticide residue and heavy metals. And it is not only the apple. Most of our foodstuff and the water we drink are suspect materials for our health.

But we cannot complain or build up any meaningful and informed opinion against it. We are helpless as we lack scientific data.

Centre for Science and Environment, as part of its commitment towards a clean and safe society, has started a state of the art laboratory dedicated to detect deadly pesticide residue and heavy metals in our foodstuff, beverages, water and bloodstream. It also undertakes testing of water for a complete profile of pollutants, even for individuals. We encourage civil society organisations around the country who are into mass movements against pollution to come forward and use this facility to test any "suspect" material.

CSE POLLUTION MONITORING LABORATORY

For details, contact:
Dr N K Satija
Head, Pollution Monitoring Laboratory
satija@cseindia.org



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SUPPORT US!

CSE's Health and Environment Newsletter is a bi-monthly bulletin, with the objective of bringing into focus the various issues of environmental health. A free publication, the newsletter is targeted at doctors, environmentalists, NGOs and policy makers concerned with the state of our environment.

To enable us to forge closer ties with our readers and to enrich our association, we look forward to your support. Cheques or Demand drafts may be remitted in favour of:

"Centre for Science and Environment" and sent along with the form duly filled in with the following details.



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CSE's Health and Environment Newsletter is a bi-monthly publication and is available online and downloadable at www.cseindia.org/html/eyou/health/publications/missing_link.htm

Other stories related to environment and health are available at our website: <http://www.cseindia.org>

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10 May, 2002

Dear Friend,

We are enclosing a copy of the third issue of our newsletter "**Health and Environment.**" In this issue we have focused on children's health and environment. The vulnerability and easy susceptibility of children to health implications due to environmental degradation require special attention. The newsletter addresses these concerns and we hope you shall find it of interest.

The overwhelming response to our newsletter is very encouraging and we look forward to continued support from our readers. Our effort is to create a platform to bring together people with a common voice in this sector of environmental health. The bi-monthly newsletter is a tool for networking and sharing within the community of medical professionals and environmentalists.

We look forward to receiving your feedback and ideas. This helps us make our newsletter more interactive. Please do share with us news that you would like to be reported. Our effort is to identify researchers.

We are also in the process of updating our database for which we are sending you the form. We would appreciate if you could fill it and send it back to us.

We would also like to take this opportunity to invite you to join an important fraternity, the readers and subscribers of **Down To Earth** (DTE). Given your interest in environment issues, we hope you will find our fortnightly of interest and will subscribe.

With best wishes,

Yours cordially,

Sunita Narain
Director

Encl: Database form
DTE order form

LEAVES
OF
IMPORTANT
SURVIVAL
TREES
IN
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KHEJDI,
ALDER,
PALMYRA
AND
OAK

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