EPIDEMIOLOGY OF TUBERCULOSIS

- India is classified along with the sub-Saharan African countries to be among those with a high burden.

- Incidence of infection as studied in younger age groups is the appropriate index to measure the tuberculosis situation in a community.

- Mathematical estimation, using the figures on the prevalence of infection in younger children (0-14 yr) is termed the annual risk of infection (ARI).

- Prevalence of real smear-positive cases is likely to be a good epidemiological index, when the intervention measure is either very effective or when there is no treatment at all.

- The incidence : prevalence ratio in India is about 1:3. In case an efficient tuberculosis programme, targeting a sufficient number of sputum-positive prevalence cases in the community, is run for a sufficiently long period of time, it could bring down the prevalence, till probably the point when incidence and prevalence become equal in the community (1:1).

- A series of tuberculosis infection surveys, carried out at intervals of 7-10 years, depending on and related to the intervention efficiency in a given area, could give a trend, following intervention.

- It is suggested that for developing countries, the natural decline of 0-2 per cent may have to be augmented to be between 5-10 per cent following an intervention, for it to be cost-effective.

- The sustained maintenance of ≥85% cure rate and case detection of ≥70% among NSPs is likely to bring down incidence by 7-12% per year in the absence of HIV.

- People infected with tubercle bacilli and HIV are 10 times more likely to develop active tuberculosis in a given year, than those infected with tuberculosis alone.

References:
KEY FACTS ABOUT XDR TB

- It is vital that clinicians caring for TB patients are aware of the possibility of drug resistance and have access to laboratories that can provide early and accurate diagnosis.
- Effective treatment requires that all six classes of second-line drugs are available to clinicians who have special expertise in treating such cases.
- XDR-TB (extensively drug-resistant tuberculosis) can develop when second-line drugs are also misused or mismanaged and therefore also become ineffective.
- MDR-TB occurs when the TB bacteria are resistant to at least isoniazid and rifampicin, the two most powerful anti-TB drugs.
- XDR-TB is TB that is resistant to any fluoroquinolone, and at least one of three injectable second-line drugs (capreomycin, kanamycin, and amikacin), in addition to MDR-TB\(^1\).
- The most important thing is for a patient to continue taking all their drugs exactly as prescribed in right dose, duration and combination.
- Countries can prevent XDR-TB by ensuring that the work of their national TB control programmes, and all practitioners dealing with patients of TB, is carried out according to the International Standards for TB Care\(^2\).
- XDR-TB & HIV co-infection is likely to be a deadliest combination. Highest mortality reported from Kwa-zulu Natal province in S. Africa\(^2\).
- Good TB control prevents the emergence of drug resistance in the first place, and proper treatment of MDR-TB prevents the emergence of XDR-TB, in line with the new Stop TB Strategy launched in 2006\(^4\).

References:
2. International Standards For Tuberculosis Care (ISTC) January 2006
4. WHO Geneva: Stop TB strategy, March 2006,
KEY FACTS ABOUT SMOKING

- India has the world's second largest tobacco growing industry and consumer of tobacco. Tobacco is the most important preventable cause of death and disease among adults.

- There are 1.3 billion smokers worldwide and 70% of them live in the developing world. The prevalence of tobacco use among men has been reported to be high (exceeding 50%) from almost all parts of India. Women from most parts of India report smokeless tobacco use and the prevalence varies between 15% and 60%.

- Among 13-15 year old school-going children, the current use of any tobacco product varies from 3.3% in Goa to 62.8% in Nagaland.

- The major smoking problem in India is beedi smoking, and a large part of the overall tobacco problem is the oral use of smokeless tobacco products.

- The World Health Organization (WHO) estimates that worldwide 5 million deaths are caused prematurely by smoking every year.

- WHO predicts that India will have the fastest rate of rise in deaths attributable to tobacco in the first two decades of the twenty first century. In India, over 600,000 men in the age group 25-69 years die due to smoking every year.

- Second-hand smoke, also known as “passive smoking” or “environmental tobacco smoke” (ETS), causes serious diseases, including lung cancer and heart disease, in non-smokers, as well as other conditions in children such as asthma, respiratory infections, cough, wheeze and middle ear infection.

- Recent research results from India have demonstrated that smoking increases the risk of death among TB patients and causes 200,000 extra TB deaths.

- Tobacco control requires a comprehensive multi-component strategy which is implemented through coordinated multi-sectoral measures. Interventions at the community level involve programmes for empowering people, especially vulnerable sections, with the knowledge, motivation and skills required to abstain from or abandon the use of tobacco habit.

References:
KEY FACTS ABOUT ACSM

- **Advocacy**: Coordinated interventions, designed to place TB high on the political and development agenda, foster political will, and increase financial and other resources.

- **Communication**: Create and improve knowledge among the general public about TB (e.g., its symptoms and curability), TB control services (e.g., diagnosis and treatment) and improve interpersonal communication between patients and program providers.

- **Social Mobilization**: Securing broad consensus and social commitment within civil society to fight stigma and eliminate TB as a public health threat.

- The goal of ACSM is to improve case detection and treatment adherence, to combat stigma and discrimination, to empower people affected by TB and to mobilize political commitment and resources for TB.

- **ACSM for TB control** should help to maintain current case detection and case cure rates in situations where DOTS services are assured, (as in India), ACSM could increase these rates by as much as 510%*.

- **ACSM goals** can be achieved through five key strategic components: building ACSM capacity, inclusion of patients and affected communities, ensuring political commitment and accountability, building ACSM partnerships, adapting and building on good ACSM practice.

- **ACSM strategies** are most effective when ACSM programming fully and broadly engages governments, NGOs, patients and communities, and other sectors of society such as private enterprises and the media.

- Six fundamental principles for action: knowledge is critical, knowledge is not enough, ACSM should be integral to RNTCP, should be nondiscriminatory and rights-based and requires capacity building.

- Monitoring and evaluation indicators should be designed and selected in the context of the two main RNTCP goals: 70% TB case detection and 85% TB case cure.

**Reference:**

INFECTION CONTROL MEASURES IN TUBERCULOSIS

- Tuberculosis has long been recognised as an occupational hazard for health care workers. Despite the high prevalence of TB in India and the expected high probability of nosocomial transmission, little is known about the risk of nosocomial tuberculosis and the infection control measures.

- Several factors, especially the overwhelming number of TB patients and repeated exposures to smear positive TB patients facilitate nosocomial transmission in healthcare settings in India.

- Delays in diagnosis and initiation of treatment and failure to separate or isolate patients with smear positive TB from other patients also contribute to transmission. Under utilisation of sputum smear microscopy and over-reliance on X-rays increase the possibility of missing infections.

- Poor adherence to treatment, use of sub optimal regimens, insufficient treatment supervision, all factors prolong the infectiousness of patients, hence, the transmission.

- Effective TB infection control depends on early identification, isolating and segregation of smear positive patients in rooms or wards with good ventilation, rapid and effective treatment of persons with TB especially in centres managing MDR patients.

- Personal respiratory protection measures such as N95 respirators, which filter out infectious TB particles such as N95 respirators are effective but are expensive and least effective of above Infection Control measures. May have a role in hospitals managing MDR TB patients.

- Periodic testing of healthcare staff for latent TB and treating those with latent infections, particularly among trainees and junior staff should be done routinely.

- Efforts should be made to improve quality of TB diagnostics and treatment practices in the private sector through better coordination with RNTCP. This would result in reducing the overall transmission of TB in community and nosocomial settings.
COPD IN SEAR

- COPD is estimated to be 6.2 percent in eleven Asian countries surveyed by the Asian Pacific Society of Respiratory Diseases.
- The prevalence of COPD reported in different population-based studies from India is highly variable. The prevalence rates in male subjects in studies reported from North are generally higher than reported from South India.
- The rounded-off median prevalence rates from India were assessed as 5% for male and 2.7% for female subjects of over 30 years of age.
- Inhaled noxious particles and gases result in lung inflammation, induce tissue destruction, and impair defense mechanisms that serve to limit or repair this damage.
- The peripheral airways are the major sites of airways obstruction in patients of COPD. The structural changes in the airway wall, airway edema and mucus hyper secretion contribute to airway narrowing.
- Chronic exposure to polluted air is an important cause of chronic respiratory diseases such as the COPD. Tobacco smoking is responsible for more than 80% of male patients.
- Both cigarette and bidi smoking are equally responsible. Pipe and hookah smoking are also important in causing COPD. Only 10-15% of long-term smokers develop clinically significant COPD.
- Passive smoking, better termed as environmental tobacco smoke (ETS) exposure, may also play a contributory role especially in non-smoker individuals including women.
- Exhastus from vehicles and industrial units; dusts, fumes and smoke from burning of crop residues in the fields constitute important sources of air pollution.
- The use of biomass fuels, especially in the rural areas in resource limited countries, contributes towards a higher prevalence of COPD in some of these countries and suggests that COPD may be significantly greater in this region of the world than previously estimated.
- Spirometry remains the gold standard for confirmation and staging of COPD.
- The presence of a post-bronchodilator FEV1 < 80% of the predicted value in combination with a FEV1/FVC < 70% confirms the presence of airflow limitation that is not fully reversible.

References:
HIV AND TB

- HIV/AIDS and tuberculosis (TB) are commonly called the “deadly duo”. HIV weakens the immune system and so people are more susceptible to catching TB if they are exposed. People with HIV/AIDS are up to 50 times more likely to develop active TB in a given year than HIV-negative people.
- At the end of 2007, approximately 33.2 million persons were living with HIV infection.
- In 2007, approximately 2 billion persons (one third of the world's population) were infected with Mycobacterium tuberculosis.
- Escalating tuberculosis case rates over the past decade in many countries in sub-Saharan Africa and in parts of SE Asia (e.g. northern Thailand) are largely attributable to the HIV epidemic. Since 1990, TB infection rates have increased 4-fold in countries that are heavily affected by HIV.
- During 2003, an estimated 11 million people worldwide were infected with both HIV and TB. TB is the leading cause of death among people who are HIV positive, accounting for 13% of AIDS deaths worldwide.
- Without proper treatment, 90 percent of people living with HIV die within months of contracting TB.
- The most important factor in the treatment of HIV-related tuberculosis is adherence to the treatment regimen. At least one study decreased mortality in HIV-infected patients who received DOT versus self-administered therapy.
- Treatment of TB in HIV-infected individuals is most likely to be successful when it is begun early. TB bacteria accelerate the progression of HIV to AIDS.
- Various models of integration and collaboration between HIV and TB program activities have been adopted in Malawi, South Africa and Zimbabwe, among other countries.
- A recent outbreak of extensive drug resistant (XDR) TB cases, reported on South Africa has caused concern among health officials around the world. The cases have been found almost exclusively among those infected with HIV and are characterized by extremely high mortality.
- The World Health Organization's Global Plan to Stop TB 2006-2015 identifies responding to the HIV/TB co-epidemic as a key activity, and calls for funding of $7 billion over 10 years to do so, of the total $56 billion needed to fight TB.

References:
ASTHMA IN SEAR

- Asthma is one of the most common chronic diseases, with an estimated 300 million individuals affected worldwide¹.

- Even though genetic predisposition is one of the factors in children for the increased prevalence - urbanisation, air pollution and environmental tobacco smoke contribute more significantly.

- Common risk factors for asthma symptoms include exposure to allergens (house dust mites, cockroaches, pollens, and molds), tobacco smoke, chemical irritants, respiratory (viral) infections, exercise, strong emotional expressions and drugs¹.

- Many recent reports have suggested a rise in the prevalence of asthma and allergic disease in Western countries. Prevalence of asthma and allergic disease in south-east Asia is low compared with Western countries, but considerable differences exist between the south-east Asian populations. The prevalence of asthma amongst secondary school students was found to be 11.6% in Hong Kong, 8.2% in Malaysia, and 1.9% in China⁷.

- The lifetime (ever) and 12-month period (recent) prevalence of wheezing in school children of Dhaka, Bangladesh¹ were reported as 13.8% and 7.6% respectively.

- No significant changes were observed in the prevalence rates among senior secondary children between 1995 and 2001, over a period of six years in Malaysia¹. However a study on 20,000 children under the age of 18 years from 1979, 1984, 1989, 1994 and 1999 in the city of Bangalore, India showed a rising prevalence of 9%, 10.5%, 18.5%, 24.5% and 29.5% respectively⁷.

- A clinical diagnosis of asthma is often prompted by symptoms such as episodic breathlessness, wheezing, cough, and chest tightness. Measurements of lung function (spirometry or peak expiratory flow) provide an assessment of the severity of airflow limitation, its reversibility, and its variability, and provide confirmation of the diagnosis of asthma.

- Asthma attacks (or exacerbations) are episodic, but airway inflammation is chronically present.

- Medications for asthma are either controllers or relievers. Controller or anti-inflammatory medication must be taken every day to control symptoms, improve lung function, and prevent attacks. Reliever medication may also be required on an SOS basis to relieve acute symptoms¹.

- Inhaled glucocorticosteroids are the most effective controller medications currently available. Rapid-acting inhaled beta₂ agonists are the medications of choice for relief of bronchoconstriction.

References:
MDR & XDR TB

- Global TB incidence is still growing at 1% a year because of the rapid increase in Africa; intense control efforts are helping incidence fall or stabilize in other regions.
- Multidrug-resistant TB (MDR-TB) is a form of TB that does not respond to the standard drug treatment. MDR-TB is present in virtually all 109 countries recently surveyed by WHO and partners.
- MDR-TB has emerged as a possible threat to global tuberculosis control efforts in recent years. It is a challenge not only from a public health point of view but also in the context of global economy, especially in the absence of treatment for MDR-TB at national-level programs in developing countries.
- A second WHO-IUATLD global project on drug resistance surveillance carried out in 1996-1999 in 58 countries, found that the median prevalence of primary and acquired multi-drug resistance was 1% (0-14%) and 9% (0-48%) respectively.
- 450 000 new MDR-TB cases are estimated to occur every year. The highest rates of MDR-TB are in countries of the former Soviet Union and China. The global plan to stop TB 2006-2015 will Treat 800 000 people for MDR-TB.
- Extensively drug-resistant TB (XDR-TB) occurs when resistance to second-line drugs develops. XDR-TB is due to bacteria that are resistant to any fluoroquinolone, and at least one of three injectable second-line drugs (capreomycin, kanamycin and amikacin), in addition to isoniazid and rifampicin. This is a revised definition of XDR-TB, on which the WHO Global Task Force on XDR-TB agreed in October 2006.
- A person ill with TB develops XDR-TB when first- and second-line anti-TB drugs are misused or mismanaged during the course of treatment and become ineffective.
- Drug resistant tuberculosis usually results from inadequate drug therapy in multibacillary cases of tuberculosis, addition of single drug in cases of failure, difficulty in obtaining drugs by the poor patients due to lack of financial resources or social insurance, frequent shortage of second line anti-tuberculous drugs by poor management and/or financial constraints, use of drugs or combination of drugs (FDC) with unproven bioavailability, lack of motivation at the beginning of treatment and inadequate self-administration of drugs without direct observation in the intensive phase of therapy.
- Efforts must be focused on the effective use of first line drugs in every new patient so as to prevent the ultimate emergence of multidrug resistance. The use of reserve drugs to cure multi-drug resistant tuberculosis and to reduce further transmission should be considered, but only as part of well structured programmes of tuberculosis control.
- WHO has been emphasizing that good TB control prevents the emergence of drug resistance in the first place, and that the proper treatment of MDR-TB prevents the emergence of XDR-TB. This is completely in line with the new Stop TB Strategy launched in March 2006.
- WHO is disseminating MDR-TB guidelines for national TB control programme managers published in May 2006 to help countries establish effective programmes to combat drug-resistant TB.
- WHO Stop TB and HIV departments are coordinating an international response through a WHO Global Task Force on XDR-TB which met for the first time in October 2006.

References:
1. WHO 2006 WHO/HTM/STR/factsheet/2006.1
Bird Flu (Avian Influenza)

- Avian influenza is an infectious disease of birds caused by type A strain of the influenza virus. The disease occurs worldwide.

- Influenza viruses are normally highly species-specific, meaning that viruses that infect an individual species (humans, certain species of birds, pigs, horses, and seals) stay "true" to that species, and only rarely spill over to cause infection in other species.

- Of all influenza viruses H5N1 virus is of greatest present concern for human health since it has caused the greatest number of human cases and deaths.

- A second implication for human health, of far greater concern, is the risk that the H5N1 virus- if given enough opportunities-will develop the characteristics needed to start influenza pandemic.

- The virus can improve its transmissibility among human via two principal mechanisms:
  (a) Exchange of genetic material between human and avian viruses during co-infection of a human or pig (reassortment)
  and by (b) more gradual process of adaptive mutation, whereby the capability of the virus to bind to human cells increases during subsequent infections of humans.

- The incubation period for H5N1 avian influenza may be longer than that for normal seasonal influenza, which is around two to three days.

- The disease caused by the H5N1 virus follows an unusually aggressive clinical course, with rapid deterioration and high fatality.

- Initial symptoms include high fever, usually with a temperature higher that 38°C, and influenza-like symptoms. Diarrhea, vomiting, abdominal pain, chest pain, and bleeding from the nose and gums have also been reported as early symptoms in some patients.

- Some antiviral drugs, notably oseltamivir (commercially known as Tamiflu), can reduce the duration of viral replication and improve prospects of survival, provided they are administered within 48 hours following onset of symptoms.

- The recommended dose of oseltamivir for the treatment of influenza, in adults and adolescents >13 years is 75 mg twice a day for five days. Oseltamivir is not indicated for the treatment of children younger than one year of age.

- The possibility of impaired drug absorption among patients who have severe gastrointestinal symptoms should be kept in mind during management of Avian Flu.

References:
- www.who.int/medicentre
- www.who.int/csr/disease/avian_influenza/en/
The Tuberculosis Association of India is a voluntary organization. It was set up in February 1939 as a registered society by incorporating the King Emperor's Anti-Tuberculosis Fund and King George Thanks-giving (Anti-Tuberculosis) Fund.

The Aims and Objective of the Association are Prevention, Control, Treatment and Relief of tuberculosis. It encourages and assists the states in establishing State Associations having objectives similar to those of the Association.

It helps institutions in undertaking of the Research and Investigation on subjects concerning tuberculosis and allied chest diseases. The Association publishes Indian Journal of Tuberculosis every quarter.

Its members are the State Affiliates who nominate their representatives to its Central Committee and the Annual General Meeting.

It provides quality diagnostic and treatment services through the New Delhi TB Centre. It also helps in supplementing Revised National Tuberculosis Control Program (RNTCP) of Government of India.

The Association prints TB Seals not only for fund raising purposes but also spreading a message on the control of TB. The TB Seals printed by the Association has won 'First Prize of TB Seal Designs' at the International level at Paris, during the years 2006 and 2007.

In order to boost the IEC activities, the Association produced a film on Tuberculosis and distributed to various TB Institutions and State TB Associations for their health education activities.

The Association is publishing a Souvenir every year on occasion of the inauguration of the TB Seal Campaign, which is inaugurated by H.E. the President of India (Patron of Association) on 2nd October (Gandhi Jayanti) at Rashtrapati Bhawan.