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P1

EPIDEMIOLOGY OF TB IN THE ASIA PACIFIC REGION

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Introduction

TB remains a major public health problem in East Asia and the Pacific. In 2005, the latest year for which data is available, there were an estimated 3.6 million prevalent cases of TB (206 per 100 000 population), of which almost 1.9 million were new cases (110 per 100 000 population). Three countries (China, the Philippines and Viet Nam) accounted for about 90% of the total estimated new cases in the Region. China accounted for 68% of estimated incident TB cases in the Region.

Case finding

The case detection rate in the Region in 2005 was 78% for new smear-positive cases and 63% for all forms of TB. In other words, the 671 719 notified new smear-positive cases represented 78% of the estimated 0.9 million new smear-positive cases, and the 1.3 million notified cases (all forms) represented 63% of the 1.9 million estimated cases (all forms). The case detection rate for new smear-positive cases in areas with directly observed treatment, short-course (DOTS) has been steadily increasing in the Region since 2002. The 111% increase in case detection in the Region from 2002 to 2005 is primarily due to a dramatic 196% increase in case detection in China.

Treatment outcomes

In DOTS areas, the cure and treatment success rates were 87% and 91%, respectively, for the cohort of 566 237 new pulmonary smear-positive TB cases registered for treatment in 2004. Among the countries in the Region with a high burden of TB, only Papua New Guinea has a treatment success rate below the 85% regional target.

MDR-TB and TB-HIV co-infection

Resistance to anti-TB drugs was found in all settings surveyed in the Region. Prevalence of MDR-TB in previously untreated cases varied widely across settings in the Region, ranging from 0% to 7.8%. TB associated with HIV infection is a growing concern in the Region, particularly in Papua New Guinea and Viet Nam, where estimated prevalence of HIV among TB patients is about 9.7% and 3%, respectively. The prevalence of HIV among TB cases is still high in Cambodia at 9.9%, but has shown a significant decline from 11.8% in 2003.

Conclusion

With a case detection rate of 78% and treatment success rate of 91% in 2005 the Region has reached the global TB targets set for 2005. While much progress was made in many of the countries with a high burden of TB, substantial challenges remain. The emerging spread of drug-resistant TB and TB-HIV co-infection are cause for concern. Strong commitment by national governments and their partners is needed to sustain and further strengthen the current TB control efforts. Across the Region, the focus should be on reducing the morbidity and mortality due to TB by half by 2010. Only then the prospect of a Region where TB is no longer a public health problem can become a reality.

S1-1

HIV-TB IN THE WESTERN PACIFIC REGION

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The HIV-TB co-epidemic is affecting several countries of the Western Pacific Region. Cambodia and Papua New Guinea have generalized HIV epidemics. In Cambodia, two surveys of HIV prevalence in all TB patients showed a decline from 11.8% in 2003 to 9.9% in 2005. The prevalence of HIV in TB in Papua New Guinea was estimated to be 9.7% in 2005. The HIV epidemic is at the concentrated stage in China and Viet Nam. In China, data indicate a concentrated spread of infections among injecting drug users and no significant spread to the general population. In Malaysia, surveillance data showed a 7% HIV prevalence among newly notified TB cases in 2005, suggesting that TB and HIV cases share a number of risk factors. Case fatality rates greater than 20% are reported in several countries. The overall estimated HIV prevalence among new adult TB cases was 1.0% in the Western Pacific Region. However, due to the uncertainty surrounding estimates, more detailed data on TB-HIV co-infection are needed. Depending on the country's situation, data could be collected through routine surveillance and/or HIV seroprevalence surveys among TB patients.

To address high case fatality rates, it is urgent to rapidly step-up the implementation of: provider-initiated HIV testing, systematic detection of TB in HIV-infected individuals, including diagnosis of the smear negative forms of TB, infection control in AIDS care settings, and adequate treatment and support of dually infected individuals, including anti-retroviral therapy during the course of TB treatment.

S1-2

CHALLENGES IN THE TREATMENT OF HIV RELATED TUBERCULOSIS

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TB is the most common opportunistic infection and a leading cause of death in persons with HIV infection. Unlike other opportunistic infections, TB can occur in persons with early-stage HIV infection when the CD4 count is still reasonably high, with clinical presentation of TB similar to that in healthy hosts with reactivation disease. In patients with advanced HIV disease, TB may present atypically and extrapulmonary TB is more common. Diagnosis of TB In patients with HIV infection requires special consideration especially in assessing results of tuberculin skin test. Diagnostic evaluation for TB should be undertaken in all patients who have clinical features compatible with TB, regardless of the results of the tuberculin skin test. Rapid tests such as polymerase chain reactions and gene probes may be required in getting the diagnosis. Management of patient with HIV related TB needs physician with extensive experience in the care of patients with TB and HIV disease as to reduce the treatment complications. risk of drug-resistant TB and treatment failure, diminish the adverse effects of TB on HIV replication, and help avoid potential drug interactions in HIV-infected patients receiving concurrent highly active antiretroviral therapy. DOT should be considered in all HIV-infected patients to decrease the risk of increase mortality. The most important factor in the treatment of HIV-related tuberculosis is adherence to the treatment regimen. Modification of treatment may be necessary, as antituberculosis drugs may interact adversely with medications commonly used by HIV-infected individuals. Understanding these drug-

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drug interactions can prevent drug toxicity and possible treatment failures. Inappropriate use of broad-spectrum antibiotics before TB is confirmed may also lead to drug resistance, treatment delay and death of patients because of prolonged symptoms. The treatment of HIV-related tuberculosis requires close monitoring especially on initiation of TB treatment to detect paradoxical reactions. Almost a third of HIV patients, who were taking antiretroviral agents, developed a paradoxical worsening of their clinical and/or radiographic condition after beginning antituberculosis treatment. Although most studies reported recurrence rates of 5% or less among HIV-infected cases, there are those that reported rates close to 10%. Near to 25% of HIV-seropositive patients with tuberculosis underwent a change in therapy because of adverse drug reactions with Rifampin as the drug most commonly implicated. Antituberculosis drug-induced hepatotoxicity is common among HIV-infected patients. Frequent monitoring of liver function tests during tuberculosis treatment may be indicated. Anti viral agent also can give rise to adverse reaction. It can be challenging to determine which medication is the offending drug. In the setting of tuberculosis, challenging followed by desensitization are done to determine which medication caused the problem. Although this approach works quite well with tuberculosis medications, in the case of HIV infection, sequential addition of antiretroviral drugs is not advisable because of the risk of developing antiretroviral resistance.

S1-3

LATENT TB INFECTION IN HIV: TO TREAT OR NOT TO TREAT ?

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HIV positive persons who are infected with *Mycobacterium tuberculosis (Mtb)* have a 5-8 % annual risk and a 30 % lifetime risk of developing active tuberculosis (TB). Effectiveness of latent tuberculosis infection (LTBI) in people infected with HIV may be confounded by: 1) suboptimal drug absorption, 2) drug interactions, and 3) adherence to treatment. These factors may thus increase the likelihood of further development of multidrug-resistant tuberculosis.

From the Cochrane Database of Systematic Reviews 2004, HIV positive adults without active tuberculosis who received LTBI treatment were associated with a lower incidence of active tuberculosis (RR 0.64, 95% CI 0.51-0.81). This benefit was more pronounce in those with a positive tuberculin skin test (RR 0.38, 95% CI 0.25-0.57). Protective effect may decline over a few years. Efficacy was similar for various regimens, however, isoniazid monotherapy was more likely to have good compliance. Overall, there was no evidence for reduction in all-cause mortality (RR 0.95, 95% CI 0.85-1.06).

Study in South African children with HIV was more promising. Mortality was lower when isoniazid was given with co-trimoxazole (RR 0.46, 95% CI 0.22-0.95, p = 0.015). The incidence of active tuberculosis was also lower (RR 0.28, 95% CI 0.10-0.78, p = 0.005). Possible mechanisms of isoniazid efficacy are: 1) enhancing host immune response, 2) prevent rapid deterioration of immune dysfunction from co-infection with *Mtb* and HIV, and 3) additive antimicrobial effect. The safety and tolerability was excellent even in subgroup receiving HAART.

S2-1

ASTHMA MANAGEMENT TODAY: EXPECTATIONS VS REALITY

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The latest Global Initiative for Asthma (GINA) guideline made an important change in the approach to asthma treatment in that it simplifies our view of asthma control into whether the patient is controlled, partly controlled, uncontrolled or in exacerbation. The aim is to seek as full a control as possible by upward adjustment or addition of therapy. The approach is based on the promise that total control is realistic and achievable with our existing modern treatments. However, these expectations have often fallen short of reality because optimal control of the disease is not dependant on the availability of drugs and treatment approaches alone, but on many other factors such as patients' compliance to treatment, patient-doctor relationship and trust, medicinal cost, healthcare delivery system and cultural beliefs. The extent to which these factors contribute in the lack of asthma control in our patients varies from country to country, but the awareness of their existence and correctly tackling them is a necessary step in addressing this chronic problem. The reality is that doctors alone may not be a sufficient force to overcome the wide array of such issues, and that the healthcare systems and the socio-economic-cultural settings of the people and place may need to be fundamentally changed with the concerted help of all relevant personnel in order that problem of asthma morbidity can be realistically addressed. This lecture explores some of these issues and suggests ways of overcoming them.

S3-1

AGING OF TB EPIDEMIC, CASE OF JAPAN

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In a country where tuberculosis has been rapidly decreasing, the proporiton of tuberculosis cases among older age group is high. Intermediate burden countries in East Asia are good example of these and four among the top ten countries with high proportion of those with aged older than 65 among smear positive pulmonary tuberculosis cases in WHO are APR countries, that is, Japan, Hong Kong SAR, Singapore and South Korea and probably Taiwan will be with the same proportion. In low burden countries like Australia and New Zealand, tuberculosis cases among older generation are already few. But in intermediate burden countries, tuberculosis is still prevalent among older generation and less prevalent among younger generation, due to the cohort effect of tuberculosis infection. Even among high burden countries, the case detection per population among older generation is much higher than younger generation if tuberculosis has decreased. But in these countries, the proportion of older generation in population pyramid is smaller and the proportion of older cases among all is small. As older generation survives, even though age specific tuberculosis incidence has decreased, the overall incidence of tuberculosis has not decreased so rapidly and that is one of the reason of stagnation of tuberculosis reduction. However, older tuberculosis cases are less infectious, the risk of infection can be reduced even if the overall incidence has not decreased so rapidly. The case fatality rate of older tuberculosis cases is high and WHO target of 85% cure is very difficult to achieve.

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S4-1

TRADITIONAL AND NOVEL DIAGNOSTIC TESTS FOR TB INFECTION

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The diagnosis of tuberculosis (TB) infection is important both in high- and low-prevalence settings for epidemiological surveillance and research, indication for treatment of latent TB infection, an adjunct for diagnosis of active TB, etc. With its high sensitivity and logistical convenience, the tuberculin skin test (TST) has been almost the only diagnostic test for TB infection for over 100 years since the days of Koch. However, the recent discovery of specific antigens, such as ESAT-6 and CFP-10, coupled with a technology to determine interferon-gamma, is now replacing this conventional technique. The new technology, called Interferon-gamma release assay (IGRA), has been tested extensively, and it seems that it is practically as sensitive as TST and far exceeds its specificity. Other aspects of its performance, including influence of immunocompromizing factors, effects of treatment (both in active disease and latent TB infection), and cost-effectiveness have gradually been clarified. I will discuss these topics based on the recent achievements, looking into the future perspectives of IGRA and related challenges and research needs, remembering that TST opened the way to the modern epidemiology of TB decades ago.

S4-2

ROLE OF LIQUID MEDIA IN DIAGNOSIS AND DRUG SUSCEPTIBILITY TESTING OF MYCOBACTERIA

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Due to MDR strains have been emerging and between 450,000 people worldwide suffer from them both in high and low income countries. The early diagnosis and determine MDR of TB is critical in the appropriate management of case, lowing the overall medical cost of treatment and preventing its spread. A rapid culture method is therefore essential to hasten the detection of *M. tuberculosis* from clinical specimens. The liquid culture media, MGIT, has shortened by 6 – 10 days the isolation time of *M. tuberculosis* from clinical specimen instead of 3 – 8 weeks by the conventional LJ media. The DST results were obtain in 8 days an average (range 4 – 12 days) with automate liquid media system after isolated. The fully automated Bactec MGIT 960 system are acculate, rapid and labor-saving detection system for detection and DST of *M. tuberculosis*. In the new emerging of MDRTB especially XRDTB, laboratory diagnosis by use liquid culture both isolation and DST will be benefit for control of this extreme drug resistance bacilli.

S5-1

BURDEN OF COPD IN THE ASIA PACIFIC REGION

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Chronic Obstructive Pulmonary Disease (COPD) had been projected by the WHO to rise from the 7th to the 5th position by the year 2020[1]. As such therefore health care resources will be challenge in many countries especially these part of the world. The burden of COPD will also carry with it the economic and social aspect of the affected areas. It is only with the recent projected prevalence that a worldwide attention is being given to COPD. It is therefore the objective of this discussion to show awareness that COPD in the Asia-Pacific is an emerging problem.

COPD in many regions in the Asia-Pacific had not been fully appreciated, due mainly to poor recognition of the disease. The definition by the Global Initiative for Chronic Obstructive Pulmonary Disease (GOLD) had given a uniform criteria by which COPD could be recognized as a specific entity.

Due to the lack of prevalence studies in many areas in the region, the COPD Round Table Group in the Asia Pacific[2] took the initiative of determining the prevalence of 12 areas. This was based on the population and smoking prevalence in the 12 areas using the COPD Prevalence Estimation model,[3] a software program, that estimates the COPD in a region, base on the most common risk factor, which is smoking. The prevalence of smoking had been shown to he high in males reaching 70% in (Vietnam). The total prevalence rate of COPD in the 12 areas of the region is 6.3%, which ranges from 3.5% in HongKong and Singapore to 6.7% in Vietnam.

Mortality and Morbidity could not easily be determined per each country due to problem of poor reporting and misdiagnosis. In areas like Korea, the recorded over all death from COPD in year 2000 is 6.7/100,000, which is an increase from 0.4/100,000, 2 decades earlier[4]. The WHO estimate that mortality was highest in the Western Pacific Region (79.8/1000,000) compared to the Africa[5]. Japan mortality rate in 1999 was 10.4/100,000.[6] In HongKong where COPD ranked as the 5th most common cause of death is 31.1/100,000. Similarly the hospitalization and use of intensive care services had been shown to be increasing. More standard protocols are now available, such as the Burden of Obstructive Lung Disease (BOLD) initiative to verify the prevalence of COPD.

Overall, epidemiological studies in the Asia-Pacific region should continue, to maintain awareness of physician and other health care practitioners on the rising menace of COPD. It will be an instrument to assist government programs and strategies to identify risk factors, diagnosis and appropriate treatment.

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S6-1

THE SINGAPORE TB ELIMINATION PROGRAM (STEP)

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STEP was launched by the Ministry of Health in 1997 to address the decade-long stagnation in the country's TB incidence rate, at 49 to 56 / 100,000 resident population.

Key interventions of STEP have been the utilization of directly-observed therapy (DOT) at the public primary healthcare clinics nation-wide, a national treatment surveillance registry to monitor the treatment progress and outcome of all TB cases in the country, and a national policy of preventive therapy for infected close contacts of infectious TB cases. Other STEP activities have included the re-vamping of the national TB notification registry, the discontinuation of BCG re-vaccination for schoolchildren, the tightening up of defaulter tracing activities, and the education of the medical community and public.

The decade following the launch of STEP saw a sustained decline of Singapore's TB incidence rate, from 57 / 100,000 in 1998, to 35 / 100,000 in 2006. Continued political will and commitment, and strong support of the medical community and public will be vital in our on-going TB control efforts in the face of the global challenges of HIV and MDR / XDRTB.

S7-1

THE ROLE OF MANAGEMENT IN SUCCESSFUL TUBERCULOSIS CONTROL PROGRAMMES

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Background

The success of organized health programmes like tuberculosis control depends upon effective management. However, National Tuberculosis Programmes (NTPs) universally face a critical lack of competent management at different levels. Recent global initiatives such as the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) have harnessed enormous resources for tuberculosis control and yet the most common observations heard around discussions on the potential impact of these new resources relate to 'poor absorptive capacity' and or 'limited infrastructure to utilize these funds'. A fundamental barrier to these new resources reaching programmes which need them appears to be the lack of competent management at all levels.

Management is simply a process that is used to accomplish organizational goals. Programme managers often miss the direct link between the lack of "hard" management skills within their programmes and poor programme outcomes. Infrastructure is not just an organogram; it is not simply a collection of manuals and guidelines, job descriptions, computers and computer networks, budgets and supply chains. Infrastructure is about people. An effective infrastructure is the right people, in the right places, at the right time and doing the right things. Today's reality is that most often NTPs have an acute shortage of people who have and use the managerial competencies that match their responsibilities.

It is important to note that lack of competent management within national programmes encourages 'verticality'; NTPs end up being narrowly targeted, centrally planned and controlled for maximum accountability for resources and results. Weak management also creates an atmosphere where there is a lack of confidence and discourages decentralization of thought and action, program integration, local participation and initiative.

Management challenges in tuberculosis control

There are a host of issues that occupy the mind of programme managers – these include alignment with the Global Plan to Stop TB, the Stop TB strategy, the expanded framework for effective TB control, multiple funding sources, multiple donor initiatives, health sector reform, integration of public health programmes into a common platform, decentralized management of health in many countries, public-private partnerships, multi-drug resistant and extensively drug resistant tuberculosis, and so on. These need to be coordinated against a background of limited human resources, inadequate capacity and HIV.

The Union's initiative in management training courses

Recognizing this need for management capacity in public health programs, The Union with support from various donors, has implemented a package of management training programs with the aim of strengthening TB control programmes across the world. The objective of The Union's Management Education Programme (MEP) is to address management challenges hampering the implementation of tuberculosis control programs. Over the last two years, The Union has successfully conducted several international educational courses that have focused on improving management, finance and logistics skills of managers working in public health control programs. Management principles remain the same, whether they are applied in TB control, HIV or Malaria control programmes. These courses strengthen both the individual management competencies of program managers as well as management systems within public health control programmes.

The Union advocates that human resources for public health services must be identified as an area of investment in its own right and efforts must be made to improve capacity for operational planning and budgeting within Ministries of health to support coherent strategies that are costed in alignment with national budgets. Management development and human resources development need to become a strong component of this effort. The Union's management assistance program addresses both management development and human resource development.

The results of the management courses conducted so far have been very promising. Over 200 professionals from 30 countries have been trained on management, finance and logistics for TB control. The Union has completed country specific management education training to improve budget and financial management skills of over 40 TB program personnel in China.

S7-2

FIXED- DOSE COMBINATIONS REVISIT

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Recent emerging of extensively drug resistance tuberculosis (XDR-TB) fuels to the existing multi-drug resistance (MDR-TB) problem.. WHO reports 1% of new smear positive tuberculosis in the world was MDR-TB and 7% of previously treated tuberculosis patients were MDR-TB. Drug resistance problem will gradually increasing in the near future.There are many reasons responsible for resistant problems. One important reason is non-compliance of patients. DOTS is universal recommendation to prevent the resistant . Fixed-dose combinations drug (FDC's) is another method designed to prevent monotherapy and induce resistance. Advantages of FDC's are preventing monotherapy, reduce number of pills (may improve compliance), easily stock management and preventing

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use of rifampicin for other diseases. Some drawbacks of FDC's are wide range dosage of each drugs when consider regarding to patient's body weight and cost. Several bioequivalence studies demonstrated poor serum level with FDC's from local companies. Even the efficacy of FDC's was proved but evidence of improving compliance was an arguement. Hitherto FDC's is another tool to improve quality of care and prevent resistance.

S7-3

IS DOTS STILL VALID? THE INDONESIAN EXPERIENCE

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More than 10 years after the DOTS Strategy was implemented by the Indonesian National TB Program (NTP) a remarkable progress has been achieved as shown by current Case Detection Rate (CDR) increased from 66% in 2005 to 75.5% in 2006 and treatment success rate (SR) reached 86%. Currently Indonesia is the first country in Southern Asian region which already reach the WHO target for TB control program to achieve over 75% of CDR and over 85% success rate in 2006 resulted in prevalence fell by 3% per year from 1960 to 2004.
Thanks to the global movement under the direction of WHO which formed the Stop TB Partnership in 2000 to accelerate social and political action to the spread of TB around the world
Globally by 2004, more than 20 million patients had been treated in DOTS program worldwide and more than 16 million of them had been cured.
However most of the success story in larger part due to the contribution of Primary Health Care (PHC) which covered country wide health services by implementing DOTS strategy. Studies showed that primary health centers performed much better than hospital performance particularly in term of drop out rate of only 5% compared to 25% respectively. Further data show that only 492 (37%) out of total 1316 hospital through out the country implementing DOTS and practically none of private practicing physicians engaged with DOTS program
To overcome this shortcoming the Indonesian NTP has set DOTS strategic plan expansion among other by involving all public and private care providers through scaling up TB case management in public-private sectors as well as hospital DOTS linkaged.
International Standard for TB Care (ISTC) which have been based on a wide global consensus of appropriate practices in TB diagnosis and treatment has been adopted and endorsed by professional organizations under the umbrella of Indonesian Medical Association as a complimentary to existing programs thus it can be used as a tool to unify private mix services in providing high-quality care for TB.

S8-2

MANAGEMENT OF SLEEP-DISORDERED BREATHING- RECENT DEVELOPMENTS

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Sleep-disordered breathing (SDB) corresponds to a continuous clinical spectrum from snoring, upper airway resistance episodes, to obstructive hypopnoeas and apnoeas according to the degree of upper airway collapsibility. Obstructive Sleep Apnoea (OSA), the commonest disorder, is characterized by repetitive episodes of upper airway obstruction that occur during sleep, and is associated with snoring, reduction in blood oxygen saturation and recurrent arousals in sleep.
The gold-standard method of diagnosing OSA is the nocturnal polysomnography. Polysomnography must be interpreted in the context of signs and symptoms, before the diagnosis of OSA can be considered certain. OSA is best defined as the combination of daytime sleepiness or two other major symptoms, usually impaired concentration, unrefreshing sleep or nocturia with at least 5 apnoeas or hypopnoeas per hour of sleep. OSA can be diagnosed in many patients by simplified recordings performed in the home setting, and in recent years more and more such studies have been performed due to limited in-hospital resources.
Treatment aims to improve symptoms, normalize abnormal respiratory events during sleep and to reverse specific quality of life alterations. Management of OSA starts with conservative measures that include weight loss, relief of nasal obstruction, and abstinence from alcohol and other sedatives, and training patients to sleep on their sides rather than supine.
Oral appliances are a reasonable alternative to CPAP in mild cases. In the field of surgery, the most recent development has been tissue reduction using radiofrequency energy, which has been shown to be effective and minimally invasive in selected patients. Bariatriac surgery, or weight-loss surgery, has shown promising results in morbidly obese patients.
There is now unequivocal evidence that CPAP is an effective form of therapy for symptoms, sleepiness, sleep, cognitive function, quality of life, mood, driving performance and blood pressure. Hence, CPAP therapy remains the gold standard for treatment of patients with OSA. However, the low long-term compliance rates of 60-70% have to be regarded as a major challenge warranting further effort for improvement. A recent development in CPAP therapy is the use of computerized adjustable CPAP equipment, which can vary the treatment pressure continuously during chronic home use.

S9-1

TB-HIV TREATMENT IN A PRISON SETTING

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In 1993, WHO presented their guidelines on HIV infection and AIDS in prisons and the 1st guiding principle in that article quoted was that "All prisoners have the right to receive health care, including preventive measures, equivalent to that available in the community without discrimination, in particular with respect to their legal status or nationality." In reality, many prisons around the world including here in Malaysia find this ideal still elusive. There are many reasons for this.
Many prisons within the region already experience problems of overcrowding and poor hygiene. Prison staffs often complain of poor wages, lack of recognition for their services which at times does put them in dangerous situations and often lack of manpower and training. Prisons and government-run drug detention centers are under purview of the Home Security Ministry and understandably the priority is primarily maintaining the security of inmates.
Within this setting, there is also a much higher concentration of patients with HIV/AIDS. Many prisoners come from marginalized communities where health is not a priority. By the time they present in prison, many would have had HIV for many years and are at an advanced stage of their infection thus necessitating intensive and experienced care. Unfortunately, doctor patient ratio in prisons is frequently less than ideal and serving

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the prisons appears is an unattractive option to many if not all doctors and paramedics. Healthcare workers who serve clinics may not have the chance to be fully trained in staging, triaging and treating HIV and the many opportunistic infections associated with HIV. Hospitals, emergency departments and clinics are also culpable of not being supportive or sympathetic enough toward the plight of prisons.

Among prison authorities, there is frequently apathy when it comes to providing health services within prisons. Security is quoted as a conflicting priority as any movement out of prison for prisoners seeking healthcare poses security issues that require heightened vigilance and more manpower. Prisoners are viewed suspiciously and healthcare complaints are viewed as either an excuse to breakaway from the tedium of a cell or worse still an attempt to escape or smuggle in illegal substances. One does have to recognize that there is an element of truth in that concern. It is thus a great challenge for the prison staff and doctor to separate prisoners who maybe genuinely ill from those who are not.

Delivery of medications (especially long term medications eg. anti TB drugs and HAART) also presents challenges. Supply of essential or expensive drugs sometimes run low and treatment is interrupted, switched or dosages changed leading to deleterious consequences especially for infectious diseases like HIV and TB. Delivery of medications is done by prison staff who may not be properly trained. Even fellow inmates or cell leaders are sometimes used as runners to deliver medications when faced with staff shortages.

Obviously, more comprehensive programs with audit tools and stronger concerted efforts by Health and Home Ministries addressing HIV care in prisons are long overdue in helping us achieve what was spelt out some 14 years ago in Geneva.

S9-2

VIETNAM TB/HIV CONTROL IN CLOSED SETTING

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TB control in closed setting is very important because of unpredicted potential transmission of tuberculosis among people who stay in prisons, 05/06 camps (correctional institutions) and social sponsored centers. These patients will be an infectious source for these institution's staff and community if they do not be treated and cured from TB. Moreover, these infectious sources are very dangerous due to high rate of TB resistance and HIV(+). In other word, the TB control program will not be successful without effectively implementing activities in the closed setting.

This presentation wishes to share experiences in term of situation analysis, model and preliminary results of TB/HIV control in above mentioned closed settings of Vietnam.

In prisons: 10-13% out of prisoners has been diagnosed with TB but 70% of them not yet been treated correctly before they were sent to the prisons. MDR TB rate among the patients is quite high (11.9 – 17.8%).

In correctional institutions: Most of learners are IDUs and sex workers with very high rate of HIV infected people. Prevalence rate HIV(+) 15.4% (11.8 – 32%), TB among HIV(+) 6.59%, HIV(+) among TB Pts 45.97%.

In the social sponsored centers: they are patients with chronic mental illness, older helpless people, HIV infected children. Burden of TB and HIV among these people found high through some surveys.

Models for implementation of TB control that fit the fact of individual setting: a model of "a district TB unit-like" for institutions that have 50 or more patients AFB(+) annually, the others will be similar to commune health posts, e.g. referring TB suspects to district TB units for diagnosis and treatment indication, and then implementing DOT for TB treatment management.

Nevertheless, these models can not work effectively without co-operation of National TB control Program with National HIV/AIDS control Program, Ministry of Health, Ministry of Labor, War Invalids and Social Welfare and Ministry of Public Security. Therefore, we have established a coordinating committee and issued coordination mechanism that enable the model functioning well.

Activities were implemented: training for all related health workers, IEC for all staff and learners on TB, HIV and relationship between TB and HIV and prevention, strengthening case finding such as periodic active TB detection for HIV(+) people, screening TB for prisoners before they are entered into prisons, DOTS for treatment and implementing referral mechanism for cases who transferred to other institutions or go back to community.

Results showed effectiveness of these activities: number of patients diagnosed was increased significantly (2648, 3602 and 4313 TB patients in 2004, 2005 and 2006 respectively), treatment outcome was improved (cure rate 75 – 85%).

Difficulties need to be addressed: lack of staff (retired and turnover), TB DOTS and HIV treatment and care need to be integrated, referral procedures not yet correctly performed, infection control not yet well performed due to poor infrastructure.

Next steps: Sustain political commitment for these models, making and training guideline for implementing TB control in closed setting and guideline for TB-HIV collaboration activities, advocacy for improving incentive for staff, planning investment of infrastructure for TB/HIV unit in the settings, scaling up these models nation-wide and strengthening monitoring and supervision.

Keyword: TB, HIV, closed setting, model

S10-1

MDR-TB: DISEASE BURDEN IN THE WESTERN PACIFIC REGION

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WHO Western Pacific Region

Multi drug-resistant tuberculosis (MDR-TB) is posing a threat to tuberculosis control in several countries of the Western Pacific Region. In 1994, the Global Project on Anti-tuberculosis Drug Resistance Surveillance was launched by WHO, the International Union Against Tuberculosis and Lung Disease and other partners. The project operated on three main principles: (1) surveillance must be based on a sample of TB patients representative of all cases in the geographical setting under evaluation; (2) drug resistance must be clearly distinguished according to the treatment history of the patient; and (3) optimal laboratory performance must be attained through participation in a quality assurance programme.

Drug resistance was found in all settings surveyed, with a wide variation of prevalence. Extensively drug resistant TB has also been reported in the Region. To date, it is difficult to interpret trends in high MDR prevalence settings with any certainty. No area reaching MDR prevalence of ≥ 6.5% has dropped below 6.5% in subsequent surveys, suggesting that, when a critical threshold of transmission has been reached within a population, it may take a considerable amount of time to reduce the prevalence of MDR-TB. The results of improved TB control interventions under DOTS, and targeted interventions such as the programmatic management of drug resistant tuberculosis, may not

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be as rapidly evident in these settings as they might be in a population with a lower prevalence of resistance. Such interventions are already being implemented in the Philippines and in Mongolia, and are starting in two provinces of China.

S10-2

DRUG SUSCEPTIBILITY TESTS FOR FIRST & SECOND LINE DRUGS IN DIAGNOSIS OF MDR & XDR TUBERCULOSIS

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Patients with Multi Drug Resistance MDR tuberculosis are i) becoming increasingly more difficult to treat, ii) remain infectious for longer periods, iii) pose public health hazards and iv) far more likely to die. New drugs, better vaccines and new diagnostics are desperately needed to turn the tide of infection. The Global XDR TB task force redefined XDR to include isolates that are resistant to isoniazid, rifampicin plus any of the fluoroquinolones plus at least one of the three injectable second line drugs (amikacin, kanamycin, capreomycin).Thus, as the diagnosis of XDR is essentially based on drug susceptibility tests (DST) there is an urgent need to strengthen capacity for prompt and accurate laboratory based diagnosis of tuberculosis and detection of drug resistance .

DST encompasses 4 methods :

1.Growth observation on the Solid conventional agar or egg based media.

These phenotypic methods employ methods as Absolute MIC , Resistance Ratio and the Proportion method. In the latter method the proportion of resistant bacilli is calculated . Two bacillary dilutions (high and low),are inoculated on drug containing and drug free media. The ratio of number of colonies on drug containing medium to that on drug free medium indicates proportion of resistant bacilli in the strain. Below a certain proportion the strain is classified as sensitive. Among the conventional methods, the proportion method is the preferred choice, but the Absolute MIC is also used on account of its technical simpilicity for inoculum preparation and reading of results.

The Nitrate Reductase Assay on Lowenstein Jensen media with antibiotics is a novel cheap, inexpensive method based on the ability of *M. tuberculosis* to reduce nitrate to nitrite.

The Liquid methods include newer methods the Microscopic Observation Drug Susceptibility (MODS) assays in which broth cultures are examined microscopically to detect characteristic growth. *M. tuberculosis* grows much more quickly in liquid broth medium than on solid medium culture plates. On growth in broth, *M tuberculosis* develops specific “cord” formations that distinguish it from other mycobacteria – these cords can be seen under the microscope long before colonies growing on solid medium can be seen with the naked eye.Anti tubercular drugs can be added to the MODS broth to detect drug resistance quickly – if growth occurs in the presence of drug, it is resistant. The MODS method uses a 24-well culture plate format. Patient sputum samples are placed in wells with culture broth, and in wells with broth to which anti tuberculosis drugs have been added. If mycobacteria grow in broth alone, but not in drug-containing wells, the diagnosis of drug-sensitive *M tuberculosis* is made.

2. Detection of Metabolic activity. In order to reduce the time for susceptibility and make it more convenient for case management , numerous new techniques have appeared, aiming to detect growth inhibition as early as possible. Most tests in this category include automated broth tests that have an improved Turn Around Time (TAT) ranging from 4-10 days. BACTEC 460 TB is a variant of the proportion methods and detects carbon dioxide production by viable mycobacteria. In this method if 1% of total test population is resistant ,i.e. if one out of every 100 bacilli being tested is able to grow above a certain concentration of the drug in the growing medium, the strain is considered as resistant. The non radiometric methods include MGIT 960, ESP Myco and MB/ BacT.

There are other methods that employ oxidation reduction indicators as resaurin or tetrazolium bromide. Most automated methods are standardized and reproducible for first line drugs as streptomycin, isoniazid, rifampicin and ethambutol .

In vitro testing of pyrazinamide is technically difficult because the drug is only active in an acidic pH. However ,most strains of *M tuberculosis* grow poorly under such acidic conditions. Also,pyrazinamide should only be tested against *M. tuberculosis* as it is inactive against all other slowly growing mycobacteria. Methods that are available today for testing pyrazinamide include a modified proportion method that uses a low pH and a modified BACTEC / MGIT proportion method that uses a low pH broth.

Second line testing : The demand for reliable DST increases with an expansion of anti tuberculosis drug resistance surveillance.The therapeutic index for a given drug is the difference between in vitro MICs and drug levels obtained in the blood . This index is high for isoniazid and rifampicin giving a good safety margin but low for second line drugs as ethionamide, cycloserine and PAS.The classical second line and newer drugs for *in vitro* susceptibility testing include amikacin , capreomycin, ethionamide, ofloxacin ,moxifloxacin, rifabutin, linezolid etc.,

The critical concentration is the concentration that inhibits the growth of most of the wild strains without affecting resistant mutants and is considered the concentration that results in the least number of discrepant results upon testing of a large number of susceptible and resistant cultures.Different media and different systems may have different critical concentrations as it is a well known fact that the MIC of a drug may vary due to many factors such as medium components, pH and inoculum size. It is recommended to determine in vitro criteria which could be used to predict clinical resistance and susceptibility with acceptable accuracy by testing representative clinical strains. The DST methods should be calibrated by comparing the MIC of probable susceptible (from never treated patients with the MIC of probably resistant strains (from patients who apparently have failed treatment with regimens containing the corresponding drug).

Data on critical concentrations for classical second line drugs till recently was somewhat fragmentary. Validation with a large number of strains including both drug susceptible and resistant along with reproducibility at several sites is essential for all laboratories performing second line testing.

It is important to note that second line DST is unnecessary in first line drug susceptible cases and for clinical purposes the utilization of second line drugs or new drugs is not justified without bacteriological confirmation of resistance to first line drugs.

3.Newer Molecular tests

Reliable **Direct** rapid susceptibility testing directly from smear positive specimens is the need of the hour .

Hain Test : A commercially available line probe assay (Hain MTBDR) is used for detection of Mycobacterium tuberculosis directly in acid-fast smear positive clinical specimens. Compared to other commercially available line probe assays as InnoLipa , the Hain MTBDR has the advantage of being able to detect resistance to both isoniazid and rifampicin.

Molecular beacon assays are based on a stem–and-loop structure with

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the probe in the loop. One stem contains a fluorophore and the other stem contains a quencher. When the target is not present, the fluorophore and the quencher are in proximity and no light is emitted. When the target is present, it specifically reacts with the probe. When the target and probe hybridize,(and the fluorophore and quencher are physically separate), light is emitted, and a beacon is visualized. Real-time PCR is needed to detect fluorecence. While this system sounds complicated, it is highly sensitive and specific.This assay can also be performed from smear positive specimens.
Other rapid methods include phage assays , bioluminescence for ATP, fluorescence,luciferase, PCR single strand conformation polymorphism and differential light scattering .

S10-3

NEW DRUGS AND DRUG REGIMENS IN THE TREATMENT OF CHRONIC AND MDR-TB

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Multidrug-resistant tuberculosis (MDR-TB) is a worldwide disease. Its rising prevalence is a threat to global tuberculosis control. Management of this formidable condition starts with implementation of Directly Observed Therapy, Short-course (DOTS), based on a sound infrastructure of the National Tuberculosis Programme, in order to prevent disease development. With established MDR-TB, rapid diagnosis of disease and treatment using well-supplied second-line reserve drugs, through guidance of rapid drug susceptibility testing, is essential. Implementation of such activity on a programme basis is often referred to as DOTS-Plus. Among different second-line drugs, the fluoroquinolones possibly provides a pivotal role regarding the efficacy of the second-line regimen. The recent recognition of extensively or extremely drug-resistant tuberculosis (XDR-TB) which denotes MDR-TB with additional bacillary resistance to fluoroquinolones and at least one of the aminoglycosides / capreomycin, calls for urgent attention and response, including strengthening of DOTS and DOTS-Plus programmes, infection control, and information sharing to enable local and global control. Development of new drugs is a mandatory focus of activity too.

S11-1

MANAGEMENT OF ACUTE PULMONARY EMBOLISM

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Pulmonary embolism represents a major public healthcare problem and it also imposes frequent clinical diagnostic issues. Imaging remains the mainstay for its diagnosis. Computed tomography pulmonary angiography (CTPA) is now the most widely used diagnostic test and its utility has been well validated in a large number of trials. For patients at moderate-to-high risk, helical (spiral) CT provides a rapid and noninvasive diagnostic tool. Spiral CT can visualize main, lobar, and segmental pulmonary emboli with a reported sensitivity of greater than 90%. The spiral CT scan can detect emboli as small as 2 mm that are affecting up to the seventh border division of the pulmonary artery. The only problem with spiral CT is that small subsegmental emboli may not be detected. An added benefit is an alternate diagnosis may be suggested in up to 57% of the patients.
Several other imaging studies are also available including ventilation/perfusion (V/Q) scan, magnetic resonance imaging, and pulmonary arteriography. Echocardiography can also provide valuable prognostic information. Nuclear medicine techniques, which are also well established, are now used significantly less frequently. Magnetic resonance pulmonary angiography is developing as an alternative to CTPA in patients who have contraindications to iodinated contrast media. Catheter pulmonary angiography remains the gold standard, although it is being used increasingly less frequently.
Several biomarkers including the d-dimers, troponins, and natriuretic peptides may provide additional information. The D-dimer test misses 10% of patients with PE, while only 30% of patients with positive D-dimer findings have a confirmatory diagnosis of PE. Therefore, the D-dimer test alone is not routinely recommended at present for aiding in a definitive diagnosis or in guiding the initiation of treatment in patients suspected to have PE. A quantitative D-dimer assay is reported to have high negative predictive value and may be effective for excluding the need for pulmonary CT angiography in selected cases.
The cornerstone of treatment includes anticoagulation. Thrombolytic therapy should be considered for patients who are hemodynamically unstable, patients who have right-heart strain, and high-risk patients with underlying poor cardiopulmonary reserve. Low molecular weight heparins (LMWHs) have many advantages over unfractionated heparin , having a greater bioavailability, can be administered by subcutaneous injections, and have a longer duration of anticoagulant effect. Trials comparing LMWH to unfractionated heparin have shown that LMWH is at least as effective and as safe as unfractionated heparin. Inferior vena caval (IVC) filters are mainly used where anticoagulation is contraindicated or unsuccessful in preventing recurrence of PE from continuing DVT. For patients with massive or submassive PE, thrombolysis and embolectomy should be considered.
The standard duration of oral anticoagulation is 4–6 weeks for temporary risk factors, 3-6 months for first idiopathic, and at least 6 months for other; the risk of bleeding should be balanced with that of further VTE. Warfarin treatment for longer than 6 months is indicated in patients with recurrent venous thromboembolism or in those in whom a continuing risk factor for venous thromboembolism exists, including malignancy, immobilization, or morbid obesity. Patients who have PE and preexisting irreversible risk factors, such as deficiency of antithrombin III, protein S and C, factor V Leiden mutation, or the presence of antiphospholipid antibodies, should be placed on long-term anticoagulation.
The prognosis of patients with PE depends the underlying disease state and appropriate diagnosis and treatment.

S11-2

DIAGNOSIS AND TREATMENT OF IPAH

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Idiopathic pulmonary arterial hypertension (IPAH) was previously called primary pulmonary hypertension. It is a relatively rare condition (estimated incidence 1-2/million population/year), affecting more women than men (1.7:1). It carries a generally poor prognosis, with a median survival time of 2.8 years from diagnosis.
The classification of pulmonary hypertension (PH) has evolved with the Evian classification in 1998 followed by the Venice classification of 2003. The latest classification broadly divides pulmonary hypertension

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into 5 major groups, i.e. 1) pulmonary arterial hypertension, 2) PH due to left heart disease, 3) PH due to hypoxemia or lung disease, 4) PH due to thrombo-embolic disease, and 5) miscellaneous conditions. The classification is useful to guide workup for diagnostic purposes, and a patient who has none of these associated conditions would be considered to have IPAH.

The pathophysiology of IPAH is believed to be a result of a combination of genetic susceptibility triggered by environmental factors. Endothelial dysfunction and vascular wall remodeling play important roles in the disease process. Histologically, IPAH is characterized by endothelial and smooth muscle cell proliferation, medial hypertrophy, and thrombosis in situ. Molecular mediators involved include an imbalance between locally produced vasodilators (NO, prostacyclin) and vasoconstrictors (endothelin) leading to predominant vasoconstriction, vascular remodeling and progressive increase in pulmonary vascular resistance. This leads ultimately to symptoms, RV failure and death.

The diagnostic approach to PH involves the following:

1. PH detection: This is based on clinical examination and basic investigations like ECG, CXR and echo. Symptoms and signs of PH are often subtle and nonspecific, leading to significant delay in diagnosis. Echocardiography with Doppler flow enables a good estimate of systolic PA pressure from TR gradient. Echo also gives info on RV function, RA dilatation. It is useful to assess left heart morphology & function and the presence of any congenital heart disease
2. PH etiology: ruling out secondary causes. Depending on the clinical presentation and suspicion of underlying etiology, the following investigations are useful:
   - Blood tests including LFT, thyroid function test. Connective tissue screen (ANA, anti centromere antibody, anti SCL 70 and RNP) and HIV test.
   - Abdomen ultrasound, to look for liver cirrhosis and portal hypertension.
   - Lung function test & arterial blood gases (ABG)
   - Sleep study may be required if obstructive sleep apnea is suspected.
   - High Resolution CT of the lungs
   - Ventilation / perfusion (V/Q) scan. This has high sensitivity for detecting chronic thromboembolic pulmonary hypertension (CTEPH).
   - Contrast enhanced Spiral CT, to detect pulmonary emboli and if present pulmonary angiography, to confirm CTEPH and assess operability.
   - Lung biopsy is rarely required.
3. PAH evaluation: assessment of severity, functional impairment and hemodynamics. This is useful to guide further treatment. The tests include:
   - Blood tests like uric acid level, Troponin, BNP.
   - Exercise tolerance by:
     a. 6 min walk test.
     b. Cardiopulmonary exercise testing including Peak VO2.
   - Right heart catheterization to confirm PAH, assess hemodynamics and vasoreactivity. Acute vasoreactivity testing is done using short acting vasodilators. A positive response is defined as a drop in mean PA by >10mmHg to < 40 mmHg with an increased or unchanged cardiac output. This predicts a likelihood of response to calcium antagonists.

Following the diagnostic workup, the diagnosis of PAH should be confirmed, the category of PAH identified and the severity and prognosis of the patient clarified.

The management of IPAH has the following goals:

1. To provide vasodilation of the pulmonary arteries
2. Treat right ventricular failure
3. Improve functional capacity and quality of life
4. Improve survival, if possible.

Non pharmacological treatments include regular physical activity, maintenance of ideal body weight, prevention of infection, avoidance of pregnancy, maintaining an adequate hemoglobin and psychological assistance.

Conventional medical therapy include warfarin for prevention of pulmonary thrombosis and thromboembolism, supplemental oxygen which is useful for patients with hypoxaemia, diuretics and digoxin for RV failure with fluid retention.

Calcium Antagonists have a limited role as few patients demonstrate a positive acute vasodilator response. However in some of these patients who are long term responders, their 5 year survival may be as high as 94%. High doses may be required e.g. nifedipine 240 mg/day or diltiazem 720 mg/day

Recent developments in the last 2 decades have established new therapies for this condition. The pathogenesis of IPAH is due to a relative deficiency of prostaglandin and nitric oxide and an excess of thromboxane. Prostaglandins and nitric oxide are potent vasodilators and also have antiplatelet aggregatory effects. There is also excess endothelin, which is a vasoconstrictor, growth promoter, and pro-inflammatory agent. These mechanisms lead to vasoconstriction, in situ thromboses and vascular remodeling.

Hence treatment with prostaglandins, drugs that increase nitric oxide and endothelin antagonists have all been shown to be beneficial in IPAH. The prostaglandins can be given by a continuous intravenous infusion (epoprostenol), sub cutaneously (treprostinil), by inhalation (iloprost) or orally (beraprost).

The endothelin receptor antagonist, bosentan, has also been shown to improve exercise capacity, WHO functional class, and increased time to clinical worsening. Studies have also shown benefit with sitaxsentan.

Phosphodiesterase 5 inhibitors like sildenafil, increase levels of cGMP leading to vasodilatation and have also been shown to be beneficial.

There appear to be additional benefit when these drugs are given in combination. Studies have shown the benefit of combination therapy with a prostanoid combined with bosentan or with sildenafil.

Surgical therapies may be needed in patients who do not respond to medical therapy. These include atrial septostomy which is a palliative therapy to off load the RV in an attempt to relieve RV failure. Finally lung transplantation is an option for those patients with severe IPAH refractory to medical therapy.

S12-1

PROGRESS OF TB/HIV COINFECTION CONTROL IN CHINA

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Aim:

To expand gradually the activities of TB/HIV coinfection control strategy nationwide in China.

Design:

To analyze the recent situation of TB and HIV, to develop the framework, strategy, guideline and technical measures. Firstly pilot of TB/HIV coinfection control was carried out in 4 counties of 3 provinces from September of 2006 to February of 2007. Then expansion plan was

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implemented in 67 counties of 14 provinces.

Methods:

Establish TB/HIV leading groups and expert groups in all levels. Develop advocacy materials (brochures and videos) to raise awareness among policy makers at all levels of the important link between TB and HIV. Develop BCC materials on TB/HIV for the general population and specific high-risk groups (radio and TV programs) to be distributed through the mass media.

Develop and publish guidelines and working manual for implementing TB/HIV collaborative activities. Establish HIV counseling and testing service within TB services and/or referral mechanism to HIV programme for such testing.Provide HIV counseling and testing to all TB patients. TB screening among PLWHA at diagnosis and at every contact with the health service at all levels. Refer all HIV-positive TB patients to HIV services for assessment of eligibility for ART. Based on weekly joint conferences between HIV and TB care providers, PLWHA who have TB will be start ART according to national guidelines. Provision of fixed dose combination (FDC) antituberculous drugs in high HIV prevalence populations.

Results:

1. Pilot results

According to the pilot survey , the rates of PTB cases among the HIV positive was 10.83% and range from 4.55% to 27.91%. the rate of HIV positive among TB cases was 3.20% and range from 0 to 4.74%.

2. Expansion results

According to the expansion survey , the rates of active PTB cases among the HIV positive was 4.97% and range from 0 to 15.79%; the rates of smear positive PTB cases among the HIV positive was 1.49% and range from 0 to 6.67%. The rate of HIV positive among PTB cases was 0.81% and range from 0 to 5.66%.

3. Treatment for TB and HIV coinfection cases

There are not treatment results in the pilot and expansion areas, because we just start the project.

Conclusions:

The epidemic of TB/HIV coinfection is variety in different areas. The implementation of pilot and expansion in some areas will provide some experiences for TB/HIV coinfection control nationwide in China.

Keywords: TB, HIV, coinfection, control

S12-2

TUBERCULOSIS (TB)- HUMAN IMMUNODEFICIENCY VIRUS (HIV) SCREENING PROGRAMME IN CLOSED SETTINGS

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In Malaysia, all new inmates of prisons and government run drug rehabilitation centers are required to undergo mandatory HIV screening on admission to these facilities and those detected to be HIV+ are subsequently to be screened for TB through sputum smear examination and chest x-ray. Administratively, these prisons and the drug rehabilitation centers come under the purview of the Ministry of Home Affairs. These institutions do not have their own comprehensive health services for their inmates with most of them having a single doctor/ medical assistant with minimal diagnostic and laboratory support. Apart from the rapid HIV test assay, all other investigations such as sputum smear screening and chest x-ray were performed in the nearby government health facilities. Inmates requiring further diagnostic investigations or in-patient treatment are reviewed or admitted to government health facilities with attending escorts.

In Selangor state for 2006, 38 310 new inmates (96%) from these closed settings (2 prisons & 3 drug rehabilitation centers) were screened for HIV of which 1485 (4%) were found to be HIV+. Of those new inmates who were HIV+, 442 (30%) were screened for TB and 32% (140) were detected to have TB-HIV co-infection. It is noted from these data that although official TB-HIV screening policies were in place, only the HIV screening programme has been well implemented while the TB screening programme has been lagging behind.

The main reasons for the low TB screening rate include the lack of laboratory support to perform sputum smear examination in the prisons/ drug rehabilitation centers and the logistic challenges of transporting these inmates from the prisons to the government health facilities for chest x-ray screening. Apart from these factors, the possible lack of awareness and urgency of the public health impact of TB-HIV co-infection among the prison officials might also be a factor for the lack of emphasis on TB screening.

Current interim measures implemented to address this situation include sending sputum specimens collected from prisons/ drug rehabilitation centers to government health facilities to be read and a structured schedule for HIV+ inmates to undergo chest x-ray screening in government health facilities. There are also plans to install mobile chest x-ray machines in bigger prisons to overcome the current logistic challenges of escorting these inmates to government health facilities for chest x-rays. The possible introduction of new TB screening & diagnostic kits in the future could enable TB diagnosis to be made much easier at these institutions.

In the long-term, the Ministry of Home Affairs, will have to consider the establishment of a comprehensive health service for these institutions under their care (e.g. Prison Health Care Service). This can be modeled after the the services provided by the Ministry of Armed Forces who have established their own core of hospitals, doctors, diagnostic and support services to support their staff.

Key words: TB-HIV, closed settings, prison health