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**Prevention and Control of Chronic Respiratory Diseases
in low and middle-income African countries:
a preliminary report.**

**based on the Meetings in
Montpellier, France,
27-28 July 2002
and Paris, France,
10 June 2003**



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Chronic Respiratory Diseases and Arthritis

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Abbreviations

ARIA: Allergic Rhinitis and its Impact on Asthma
COPD: chronic obstructive pulmonary disease
CRD: chronic respiratory diseases
IUATLD: International Union Against Tuberculosis and Lung Diseases
NCD: noncommunicable diseases
CD: communicable diseases
PAL: Practical Approach to Lung Health
PHC: Primary Health Care
TB: Tuberculosis
WHA: World Health Assembly
WTO: World Trade Organization

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1. Background

The Fifty-Third World Health Assembly (WHA, May 2000) has recognised enormous human suffering caused by Chronic Respiratory Diseases (CRD) and requested the Director General to continue giving priority to the prevention and control of CRD with special emphasis on developing countries and other deprived populations (WHA 53.17). In response to the WHA resolution a meeting of experts was held in Geneva 11-13 January 2001 (1) with the mission of "WHO consultation on the development of a comprehensive approach for the prevention and control of CRD" .

The 53rd World Health Assembly (WHA, May 2000) has recognised enormous human suffering caused by CRD and requested the Director General to continue giving priority to the prevention and control of CRD with special emphasis on developing countries and other deprived populations (WHA 53.17).

One of the conclusions from the Geneva Consultation was: "Chronic respiratory diseases are a major cause of death and disability for all age groups and regions in the world. In the absence of effective interventions, risk factors such as smoking, air pollution, allergen exposure, severe childhood respiratory infection and tuberculosis (TB) are expected to cause a

further rise in the magnitude of these health problems in the coming years, particularly in developing countries. Evidence also indicates that in many countries people with common CRD have no access to acceptable standards of health care; health systems may also provide inappropriate care due to misdiagnosis arising from respiratory symptoms which are often common for acute and chronic illnesses." (1). As a result of this consultation, a "WHO Strategy for prevention and control of CRD" (2) was developed to support Member States in their efforts to reduce the toll of morbidity, disability and premature mortality related to CRD with the following objectives:

1. Better surveillance to map the magnitude of CRD and analyze their determinants with particular reference to poor and disadvantaged populations and to monitor future trends;
2. Primary prevention to reduce the level of exposure of individuals and populations to risk factors.
3. Secondary and tertiary prevention (management of CRD) to strengthen health care for people with CRD by identifying cost-effective interventions, and upgrading standards and accessibility of health care at different levels of the health care system.

WHO strategy addresses the rising trend of CRD in developing countries through:

- 1) better surveillance of magnitude and causes of CRDs*
- 2) primary prevention to reduce exposure to risk factors*
- 3) strengthening health care*

This report originates from an expert consultation organized by the WHO Collaborating Center, Service des Maladies Respiratoires, Hôpital Arnaud de Villeneuve, in Montpellier (France) on 27-28 July 2002. This brainstorming meeting was aimed simply at acquiring information on the current major public health problems of CRD in Africa. Priorities for an intervention to fight these problems have been further identified during the Symposium on "Allergy and Asthma in the Developing World" organized by IUATLD, ARIA and WHO at the XXII Congress of EAACI in Paris on 10 June 2003. This report will therefore provide the basis for a more extensive consultation targeted at the creation of a comprehensive program on the prevention and control of CRD in low and middle-income countries.

2. Factors contributing to CRD increase and their poor control in LIC/MIC

Low-Income and to some extent middle-income Countries (LIC/MIC) are characterized by social and economic vulnerability inducing cultural barriers to CRD prevention and management (3,4).

2.1 Poverty and poor nutrition:

- There are several generic barriers among which heavy debts and poverty represent major problems. Poverty is widespread, affecting at least half the African populations living in rural and urban areas. This vulnerability is going to bring about an important disparity in the different methods of financing health care.

Poverty effects on asthma and other CRD (5)

1. *As an etiologic factor*
2. *As a factor contributing to exacerbations*
3. *As a determinant of the quality of care*
4. *As a contributor to aggravating psychosocial behaviour*
5. *As a component in the labelling of the conditions*

- Other barriers include poor education or, in many subjects, illiteracy, lack of sanitation, and poor infrastructure.
- Patient's barriers, including multiplicity of languages, as well as religious and cultural beliefs are also of major importance
- Poor nutrition is common in sub-Saharan Africa and worldwide malnutrition is the number one risk factor for morbidity and mortality, accounting for 22% of years of life lost (6). On the other hand, obesity and overweight are increasing in Middle Income Countries and urban areas of Low Income Countries.

2.2 Air quality:

- Tobacco smoking is a common environmental barrier throughout the world, and particularly so in some parts of sub-Saharan Africa. In many countries, anti-tobacco smoking legislation has rapidly been countered by success in advertising and by the sale of tobacco in these countries. The tobacco multinationals, aware of their economic weight and importance, have reinforced their promotional policies in these countries. Tobacco is promoted to represent modernity, liberation and well-being in Low Income Countries. The Food and Agriculture Organisation estimates that the level of consumption in Africa will be one of the highest in the world if nothing is done to stop this rate of growth. The group unanimously felt that there should be a commitment from the governments receiving aids for CRD to implement anti-tobacco campaigns.

Air quality:

1. *Tobacco smoking*
2. *Air Pollution*

- Pollution is a major problem in developing countries. Indoor air pollution generated by stoves and indoor fuel cooking due to firewood and crop residues contributes greatly to the development of CRD in Africa, especially in children. The effects of indoor pollution are worsened by poor living conditions and poor ventilation. Indeed, more than one billion people breathe in unhealthy air, and three million people die each year from air pollution — two thirds of them are poor people, mostly women and children, who die from indoor pollution caused by burning wood and dung. (7,8).

2.3 Drug and device availability and accessibility:

- Systematic studies investigating the distribution of facilities and devices for diagnosis of CRD at country level in Africa are not available. However, a lack of resources for the diagnosis of CRD is believed to be the rule, rather than an exception. In Ghana, for example, spirometers and peak flows meters can be found in only a few centers and doctor's offices in major urban centers and are rare or completely absent in many rural areas.
- There is still poor accessibility of drugs despite the Bamako Initiative launched over 15 years ago to make PHC accessible to all by supplying essential drugs and medicines in peripheral structures where they are sold above their cost price (9). The lack of drugs most needed for healthcare and disease control in sub-Saharan Africa has been found to be due not only to insufficient funds but also to the use of the limited funds on expensive drugs that have little bearing on the disease pattern (10). In Low Income Countries such as Sénégal and Ghana, all drugs used for the control of CRD may be available in urban areas, but their cost is so high that very few patients can afford them. In rural areas, very few drugs are available. Oral corticosteroids and theophylline can be found in many places (11). Inhaled β_2 agonists and corticosteroids are not available in most places of Low Income Countries. It is therefore important to provide low cost generic drugs for the treatment of CRD. However, the quality of generic drugs should be controlled to avoid risk of administering ineffective or toxic drugs of poor quality. For

- *Spirometers are rarely available in low-income countries as Ghana.*
- *In Senegal, the cost of inhaled corticosteroid and beta-2 agonists are extremely high and very few patients can afford them on a regular basis.*

such programs to be effective, producers of high-quality generics will need to be identified, medications added to national lists of essential drugs and included in procurement procedures (12).

Poor accessibility to drugs:

- 1. Insufficient funds and poor allocation of limited resources.***
- 2. Relative lack of inexpensive and generic drugs of high and controlled quality.***
- 3. Poor drug distribution.***

- 1. It is extremely important to make available spirometers and other diagnostic devices at low cost.***
- 2. producers of high-quality generics will need to be identified, medications added to national lists of essential drugs and included in procurement***

2.4 Traditional medicine:

- In sub-Saharan Africa, parallel medicine is extremely important with many traditional healers (13). In many countries such as Sénégal and Ghana, traditional and modern medicine have tended to work in concert or parallel.
- This is usually the first step in the management of diseases due to beliefs of patients and taboos, the inaccessibility to health care and drug costs. In Senegal, for example, the extensive use of traditional medicine appears to delay the onset of effective treatments, and this is particularly true for the treatment of TB.

Research should be promoted to critically assess the potential role of traditional medicine in the management of CRD in Low and Middle Income Countries
- On the other hand, due to the high cost of drugs, in the Fifty-Fifth World Health Assembly, traditional medicine was promoted (14). However, there are no large controlled studies on the efficacy of traditional remedies in CRD. The evidence is therefore lacking to promote traditional medicine alone for the treatment of CRD and in particular asthma.
- Thus, while improper use of traditional medicine must be discouraged, research should be done:
 - to assess which traditional approaches may be useful to treat asthma, alone or in combination with effective drugs,
 - if efficacy is demonstrated, cost-effectiveness studies are critical and should be initiated.

2.5 Gaps, relevance and the integration of different guidelines in developing countries:

- Lack of national guidelines, for prevention and control of CRD contributes to poor care of these conditions. On the other hand, dissemination and implementation of international guidelines in developing countries is difficult to assess and differs largely depending on the countries.
- In particular, in sub-Saharan Africa, CRD guidelines (15-17) are difficult to be applied for the majority of the population. They therefore need to be adapted to the local conditions. For example, asthma management for developing countries was proposed in the IUATLD asthma guide (18). It considered affordability and availability of drugs and local needs. Based on the same principles, a strategy for COPD management in Africa has been recently proposed by IUATLD (12).

International guidelines for prevention, diagnosis and management of COPD and Asthma are very difficult to be applied for the majority of the population in Middle and Low income countries. They are not adapted to the local conditions.

3. CRD in Africa

For the next 10-20 years, communicable diseases will remain a predominant health problem for the populations in Low Income Countries, even for adults. At the same time, the non-communicable diseases (NCD) including CRD are emerging as a serious problem in Low Income Countries at intermediate stages of the epidemiological transition and are already quite evident in Middle Income Countries such as Tunisia and Cape Verde. Non-communicable diseases will undoubtedly represent tomorrow's pandemics in developing countries (19). There is already evidence that the prevalence of certain NCD, such as diabetes, asthma, COPD, epilepsy and hypertension, is increasing rapidly in some parts of sub-Saharan Africa (20,21).

There are major economic consequences of NCD. The Commission for Macroeconomics and Health recently launched the strong and clear message that the “central task is raising the health of the poor” (22). This commission was established to assess the place of health to promote global economic development, especially for the world’s poorest countries. Although this report (22) targeted Low-Income Countries, where communicable diseases are the most important cause of death and disability, it was proposed that the message has also a significant importance for NCD.

In both Middle and Low Income countries, CRD represent a challenge to public health because of their frequency, severity, projected trends, and economic impact. Health care planners are faced with a dramatic increase in tobacco use and must establish priorities for the allocation of limited resources.

CRD are major public health problems in all countries of the world but their prevalence differs between developed and developing countries and depending on the income level of the country (Figure 1).

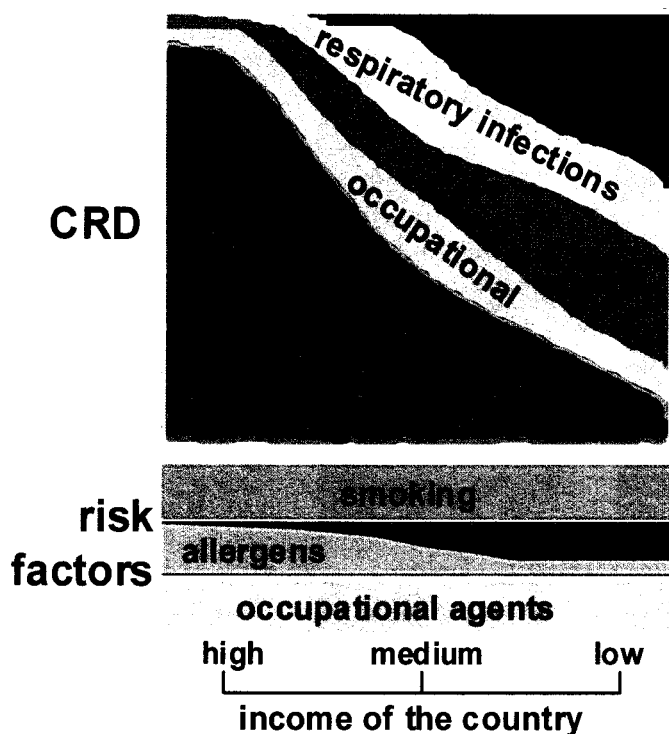


Figure 1: Risk factors and CRD depending on the economic situation of the country

A systematic review of the current scenario of CRD in Africa is not available. Nevertheless, a list of facts around CRD as they relate to Africa emerged from the discussion within the four African experts participating at the Montpellier meeting, coming from Tunisia, Cape Verde, Ghana and Senegal, respectively. These comments were assembled on the basis of the disease taken into account. Although the arguments are sparse, they may contribute to a first, very rough evaluation of the CRD scenario in this continent.

3.1 Chronic Obstructive Pulmonary Disease

In Middle Income Countries such as Tunisia (23) and Cape Verde, Chronic Obstructive Pulmonary Disease (COPD) is primarily associated with tobacco smoking. Many sub-Saharan African countries have anti-tobacco legislations. This is particularly the case in Cape Verde (24).

By contrast, in Low Income Countries, such as Ghana, there is a paucity of data, but COPD seems to be mostly associated with occupational exposure. COPD represents the first cause of consultation in the outpatient Respiratory Department of the Reference Centre of Sénégal (Hôpital Fan de Dakar).

3.2 Asthma

Asthma is considered to be common in Middle Income Countries. It is often associated with allergy in Middle Income countries such as Cape Verde (25-27) and Tunisia. Asthma is a growing but neglected public health problem in sub-Saharan Africa. Urbanization was shown to increase asthma prevalence (for review see (4)). In developing countries, asthma and allergy may be associated with the adoption of an urbanised "western" lifestyle as suggested by a study carried out in southwest Ethiopia (28). In sub-Saharan Africa, aeroallergens have been identified (29,30) but the exposure differs between developed countries and sub-Saharan Africa (31). As everywhere in the world, asthma can be fatal and deaths from asthma have been recorded in sub-Saharan Africa (32). In addition, severe asthma similar to "inner city" asthma (33,34) may be present in the urban and suburban areas of Middle and Low Income Countries. The reason of this trend is unknown. Although the links between atopy, infections and asthma are starting to be understood at the epidemiologic level in developed countries (35), where most people with asthma are atopic. The links between atopy, asthma and infections are therefore likely to differ in developing and developed countries (36). Indeed, wheezing appears to be associated mainly with atopy in developed countries and with infections in developing countries. Thus, research comparing the epidemiology and risk factors for asthma and wheezing in developed and developing countries is of great importance to better understand the primary factors underlying the development of atopy, asthma and severe asthma.

3.3 Occupational lung diseases

For several years, miners and foundry workers in westernized countries have been known to suffer from pneumoconiosis, often associated with TB and tobacco smoking and the same is found also in African countries (37-40). In addition, asthma, COPD, chronic cough and/or rhinitis induced by occupational exposure have been identified in developing countries (41-44). The pattern of etiologic agents found in developed and developing countries is similar. Thus, exposure to occupational hazards represent a major risk factor for occupational lung diseases in Africa. In particular, in the world's poorest countries, harmful technologies, which are obsolete or banned in industrialized countries, are still extensively used.

An additional negative fact is that occupational asthma and COPD are often not adequately recognized as a problem in Low-Income Countries, with major economic consequences. In many developing countries, occupational lung diseases are not compensated so that patients continue to work with lung diseases of increasing severity. Thus, patients excluded from work are skilled individuals needed by the country for its economic development.

3.4 Sequels of respiratory infections in childhood

Consequences of respiratory infections are common in Low Income Countries, but they are not often reported (45) and no true prevalence can be obtained. Post inflammatory bronchiectasis remains very common in the developing countries as a sequel to whooping cough, and severe measles (among other causes) (46). In Gambia, pneumonia and wheezing are significantly more common in children after Respiratory Syncytial Virus (RSV)-associated lower respiratory tract disease than in control subjects (47).

Mass-vaccination programs may help reducing the burden of sequels of infectious diseases on lung function. For example, a reduction in measles mortality and morbidity can be achieved in low and middle-income countries, in countries that split their vaccination campaigns by geographical area or by age-group of the target population, and where initial routine measles vaccination coverage among infants was <90%, even when prevalence of HIV/AIDS was extremely high (48). A very large vaccination program has now been started in Africa (49).

3.5 Chronic respiratory sequelae of TB (post-TB CRD)

Sequellae resulting from TB include bronchiectasis, pachypleuritis, aspergillosis and/or fibrothorax (50-53). In SubSaharan Africa, the poorest people have the highest prevalence of TB. It seems that a high proportion of TB deaths are due to post-TB CRD, but data are lacking to support this assertion. A high proportion of patients with TB report late. Due to limited health care facilities, limited money, and lack of transportation, diagnosis and treatment of TB is also delayed by 4 to 8 weeks in Ghana and Sénégal which likely leads to an increase in post-TB CRD. In sub-Saharan Africa, HIV infection represents a very important risk factor for recurrence of TB and the control of TB needs to be reinforced (54).

The impact of tuberculosis control measures on tuberculosis mortality and transmission has been widely studied. Treatment of smear-positive tuberculosis using the WHO Directly Observed Treatment, Short-course (DOTS) strategy (55) has by far the highest impact (59). On the other hand, while BCG immunization reduces childhood tuberculosis mortality, its impact on tuberculosis transmission is probably minimal (56).

Most infants of the majority of SubSaharan African countries should receive BCG at birth, but this does not appear to be the case. BCG vaccination coverage is usually between 60 and 70% of the population (57). BCG does not prevent the increased prevalence of TB but reduces the severity of TB. The role of chemoprophylaxis to prevent post-TB CRD needs to be better assessed in developing countries (58-60).

3.6 Pulmonary involvement in schistosomiasis

Schistosomiasis is another infectious disease with relevant sequels for lung health and it contributes to CRD in Africa, while it is rare in Westernized countries. The acute form of lung involvement in schistosomiasis usually occurs about 6 weeks after the infection (Katayama syndrome) and seems to be due to an allergic manifestation to the presence of worms or eggs. The chronic form of lung involvement in schistosomiasis presents as pulmonary hypertension with cor pulmonale, pulmonary granulomatous schistosomiasis, and pulmonary arteriovenous fistulas (61). These chronic pulmonary complications usually occur in less than 5% of infections but some limited data suggest a prevalence of up to 25% of infected subjects.

4. Improving collaboration on CRD in Africa

The CRD program should be applied alongside with other health programs such as those for control of TB, air quality and health, and against tobacco.

The CRD program should be applied alongside with other health programs. There is need for concerted efforts on the part of African governments, health administrators and health workers to ensure that necessary attention is given to multidisciplinary research on the subject so that meaningful control measures can be formulated, thereby ensuring clean air for the people to breathe. As an example, several recent

initiatives by non-governmental organizations (NGOs) and the WHO have highlighted the need for concerted approaches to lung health that require addressing major threats such as TB and tobacco smoking.

Improved surveillance of all diseases within sub-Saharan Africa is needed in order to place CRD properly within the context of the overall burden of disease. Research is needed to guide improvements in the clinical outcome and cost effectiveness of resources currently committed to the care of patients with NCD, particularly so with CRD, and to direct and evaluate preventive measures. All the health structures of the country should be involved in the implementation of the CRD program.

Education and training of healthcare workers is an essential part of the program (62). Current knowledge in both diagnosis and management is lacking in many regions. There should be an active cooperation between developed and developing countries, but also between Middle and Low Income Countries to optimally implement the CRD program. The experience gained worldwide in the field of development cooperation has probably produced a sufficient amount of knowledge able to optimize the financial and human resources made available by International Organizations, Governments and other public and private donors, but unfortunately stable and consolidated results are not easily obtained particularly when a structural, long term intervention is started.

There should be an active co-operation between developed and developing countries in general, but also and specifically between Middle and Low Income African Countries to optimally implement the CRD program.

5. Priorities for action

The WHO document on a Global Strategy against CRD already outlined priorities for action at world wide level. The following paragraphs focus on priorities specific of developing countries and in particular of Africa.

- Due to the limited resources and the importance of CD and NCD in Africa assistance should be provided to National decision makers to prioritize public health issues.
- It is clear that tobacco control is a high priority in all countries. The group unanimously felt that there should be a commitment from the governments receiving aids for CRD to implement anti-tobacco campaigns.

Resources are limited, then priorities must be identified

- In keeping with conclusions reached by the 55th WHA, another high priority will be “helping poor people to reduce their exposure to unsafe and dirty household fuels (particularly to reduce respiratory diseases and other health effects of traditional cooking and heating practices), and to breathe better quality air, whether inside or outside their homes (contributing to avoid, for example, the consequences of lead-containing exhaust fumes)”.

PRIORITIES

- 1. Tobacco control***
- 2. Reduction dirty household fuels***
- 3. Fight to infectious diseases***
- 4. Low-cost, safe, effective drugs***
- 5. Prevention of occupational lung diseases***
- 6. Education of health care workers***

- The management of infectious diseases associated with CRD is a priority.
- The management of asthma using low cost, safe and effective generic drugs, and peak flows is also a priority.
- The prevention of occupational diseases is equally important since it also has an economic benefit. However, this may be a higher priority for Middle Income Countries.
- For COPD, besides tobacco and indoor pollution control, prevention of COPD exacerbations, exercise training programs and symptomatic treatment are vital.
- The education of health care workers should be an essential part of the program .

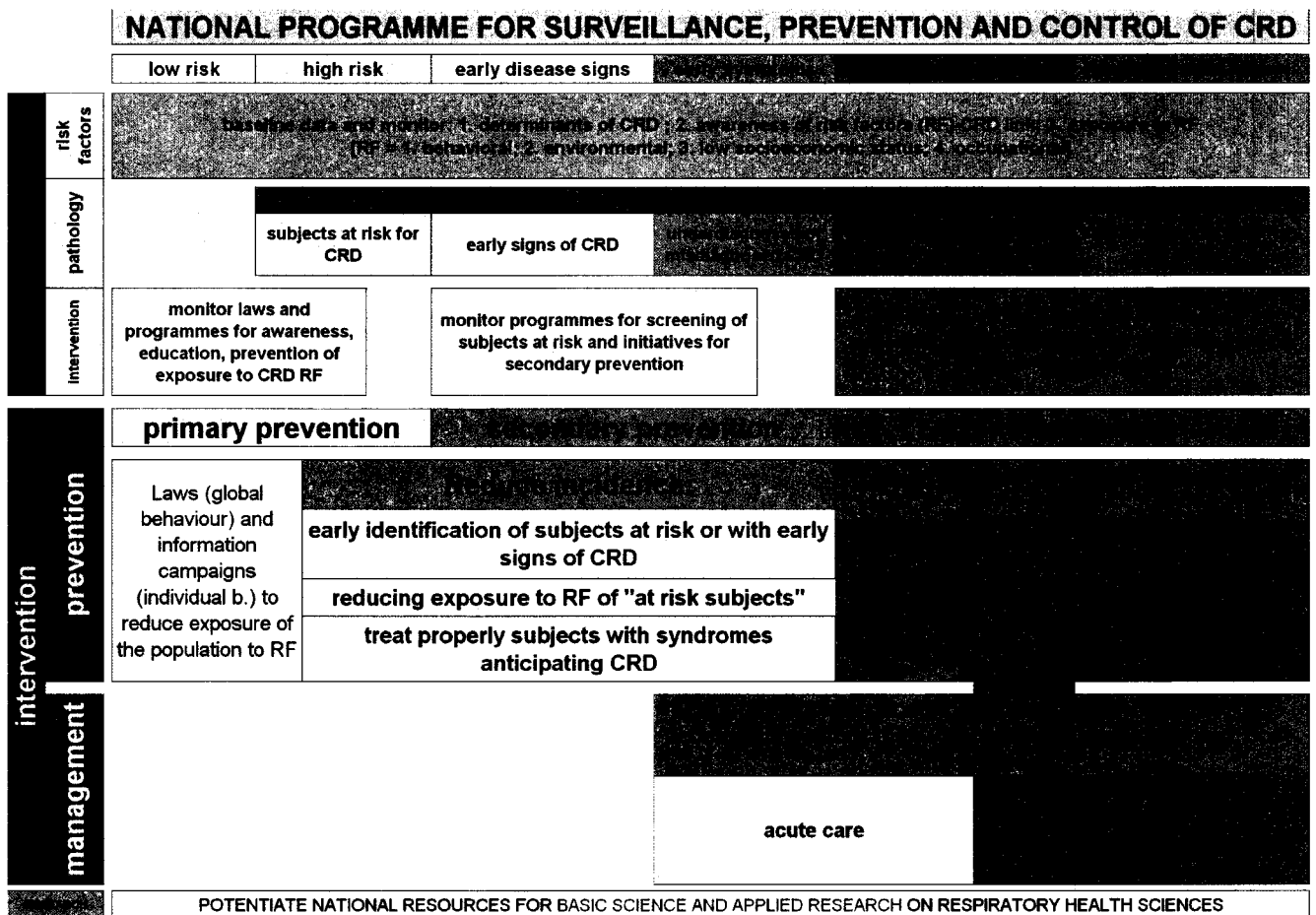
5.1 Development of a national program for the surveillance, prevention and control of CRD or on lung health

A generic plan has been developed for the application of the CRD program in Low, Middle and High income countries (Figure 2). A global comprehensive plan should be developed as a common framework. This plan must be adapted to each country (or even different areas within a country), with a specific target on Middle and Low Income Countries, taking into particular account the following items:

- a) In developed countries, guidelines for the management of CRD exist and can be directly applied. However, these should be adapted to be applied in Middle Income Countries. They are more difficult or even impossible to be used in Low Income Countries.

- b) CRD guidelines are mainly targeted to improve medical care of CRD but they only represent one of the components of the surveillance, control and prevention of CRD. There is no guideline for post-infectious CRD though it represents a major problem of rural areas in sub-Saharan Africa.
- c) In developed countries there are poor areas with lack of sanitation where asthma is particularly common, severe, and poorly controlled (e.g. inner city asthma in the US or UK cities). Public Health programs already in progress in these areas may be useful to address asthma in urban and suburban areas in Middle and Low Income Countries.
- d) The program should also include monitoring of the efficacy and effectiveness of the interventions.

Figure 2: Generic plan for the application of the CRD program



5.2 Initial program objectives at individual and community levels

The group of experts felt that intermediate objectives for surveillance, prevention and control of CRD should be listed. In the present document the objectives will be proposed for four countries: two African Middle Income Countries (Cape Verde and Tunisia), and two Low Income Countries (Ghana and Sénégal). The items are not organized in coherent action plan, but they form the basis for further discussion aimed at creating a comprehensive CRD Programme for LIC and MIC.

WHO will initiate programs for CRD Surveillance, Prevention and Control in four African countries: Tunisia, Senegal, Cape Verde and Ghana (2003-2004)

5.2.1 Surveillance

- For surveillance, it is recommended to use the STEP approach (Stepwise Approach to Risk Factor surveillance) which comprises the Minimal, Standard and Optimal set of data for NCD risk factors surveillance (63). Demographic characteristic, smoking, physical activity, alcohol, weight and height are currently being collected by WHO as they pertain to CVD (64) and Diabetes (65).

The WHO-STEP approach to surveillance :

Step 1 – minimal tools

Step 2 – standard tools

Step 3 – optimal tools

- Step 1 limited to questionnaire-based assessment
- Step 2 includes questionnaire, physical assessment and simple objective measures such as peak flow for asthma
- Step 3 includes questionnaire, physical assessment, simple objective measures such as peak flow for asthma and more sophisticated tests such as methacholine challenge for asthma or skin prick tests and the measurement of allergen-specific IgE in serum for allergy (26, 66)
- Existing data should be used to report on the prevalence and burden of CRD in these four countries. The following diseases should be specially monitored:
 - asthma
 - COPD
 - occupational lung diseases
 - post-infectious CRD.

Monitor : asthma, COPD, occupational lung diseases, post-infectious CRD

- Then, the prevalence, risk factors and burden of CRD should be surveyed in these four countries using appropriate and existing tools which may be adapted for local use. The same diseases will be monitored.

Monitor the prevalence of risk factors for CRD

At the same time, information about the local health care systems of each of the countries should be completed to obtain information, collaboration and support. Finally, there should be an investigation of whether these countries can be used as a model for other countries of the region.

5.2.2 Prevention

The following interventions were proposed:

- Tobacco smoking cessation: It is essential to assess the legislation of tobacco control and to determine how it is to be strengthened and enforced. Exposure to secondhand smoke should also be curtailed by legislation (67).
Improve legislation against tobacco smoke
- Policies should be developed to reduce exposure to toxic household fuels (traditional cooking and heating practices). Use of alternative, cleaner fuels should be considered with improved stove/ventilation design.
- Occupational lung diseases monitoring and prevention: Occupational lung diseases represent, in both developed and developing countries, a public health problem with economic implications. Early recognition of occupational asthma is an essential step in preventing the onset of severe persistent asthma which could progress even after the occupational agent has been removed.
Prevent occupational lung diseases.
- Optimal and early treatment of infectious diseases:
 - Vaccination against TB and childhood respiratory infections reduce the prevalence or severity of the disease. It is likely that vaccination will prevent the onset and severity of post-infectious CRD.
 - Early treatment of parasitic and infectious diseases is likely to reduce the onset of CRD.
 - Recommendations should be made to optimize vaccination programs, and to recognize and treat early infectious or parasitic diseases as well as to monitor their long-term treatment.
Vaccination programs against respiratory infections and early diagnosis and treatment of parasitoses.
 - Assessment of TB chemoprophylaxis in the development of post-TB CRD is needed.
- Assessment of existing legislation for reduced exposure to harmful airborne matter, and how they are enforced.

5.2.3 Control of the disease

- General measures:
Assess current practice, the role of traditional medicine, accessibility and affordability of drugs and devices.
 - Assess the current practice at different levels.
 - Assess the role (positive and negative) played by traditional medicine in the control of CRD.
 - Assess the availability and affordability of drugs and devices.
Obtain at country level low cost but effective drugs.
 - Attempt to obtain at the country level low cost but effective drugs.
 - Control the distribution of the drugs.
Improve communication between different levels of health care system to ensure continuity of care for CRD patients
 - Self-management and continuity of care.

- In low and middle income countries, the WHO PAL-plus (Practical Approach to Lung Health) program, currently under revision, will be a useful tool for management of Respiratory Diseases at the Primary Health Care level as soon as it is available (68).

- Asthma:

Implement the WHO-Practical Approach to Lung Health initiative (WHO-PAL+)

- Use of peak flows for the diagnosis and the assessment of severity of the disease
- Use of inexpensive but high quality inhaled relievers (e.g. salbutamol) to control acute episodes
- Use of inexpensive but high quality inhaled corticosteroids to control the disease
- Adopt appropriate management protocols for the acute and chronic treatment of asthma with a special attention to local adaptation
- Educate health care workers at the different levels to diagnose asthma, assess severity, give an appropriate treatment and, if possible, train the patient in using an inhaler and adhering to long term treatment.

- COPD:

Educate patients about best practice regimens to be prepared to act on their own behalf.

- Monitor pulmonary function
- Avoid risk factors including tobacco smoking, indoor air pollution and occupational exposure
- Adopt appropriate treatment protocols (e.g. use of bronchodilators, and whenever possible oxygen)
- When possible treatment of co-morbidity
- When possible, use of anti-influenza vaccination. Anti-pneumococcal vaccination may be of benefit, but it has not been firmly demonstrated in COPD.
- Assess the existence and quality of rehabilitation programs.

- Occupational lung diseases:

- Review, optimize and reinforce the legislation of the country,
- When possible, identify occupational hazards and monitor levels of exposure
- When possible, attempt to reduce the level of exposure
- Attempt to diagnose cases early, using pulmonary function tests and chest radiographs
- When possible, encourage movement of workers with occupational lung diseases to stations free from exposure to toxins. However, this measure should be associated with patient's compensation.
- Give an appropriate treatment to control the disease
- Identify high risk groups (late onset of treatment, smokers)
- Assess insurance coverage and improve it
- Educate employees, health care workers supervising the workers and eventually employers

- Post-TB CRD:

Encourage early diagnosis and proper treatment of TB and other respiratory infections to improve control of CRD

- Encourage early diagnosis and treatment of TB
- Evaluate the damage induced by TB infection
- Encourage long term treatment
- Monitor patients with anti-TB treatment using pulmonary function tests and chest radiographs
- Identify high risk groups (late onset of treatment, smokers)
- In patients with recurrent symptoms, assess whether there is a need for antibiotics (recurrence of TB infection or onset of post-TB CRD).

- Post infectious CRD in children:
 - Encourage vaccination against pertussis and measles
 - Reduce malnutrition
 - Encourage breast-feeding
 - Reduce exposure to secondhand smoke (67)
 - Improve the recognition of CRD in schistosomiasis

5.2.4 Managing Chronic Respiratory Diseases : shifting from a model of cure to a model of care.

Since the majority of CRD patients are seen at the primary health care level, delivery of care is still evolved around the concept of infectious disease and acute care (“model of cure”): diagnosis is made, treatment given, patients return home without follow-up until the next episode.

Better integration and synergistic linkages need to be created between health care systems and communities for patients well-being.

Symptom driven integrated guidelines, appropriate diagnostic tools and correct treatment options adapted for local services should be available for primary health care providers.

Introduction of the new model of chronic care is vital for effective CRD management in Africa.

Motivated and informed patient is a key factor in improvement of adherence to long-term care of CRD.

5.3 Educational and training activities for health care workers, patients, relatives, patient support groups

The use of appropriate methods will be applicable only if appropriate training initiatives are undertaken. A series of items have been considered as relevant :

- Assess the training programs and training patients in self-management
- Assess the existing education programs that exist in these countries for health care workers and patients
- Define who delivers care (nurses, MDs, others)
- Assess the level of training of caregivers
- Use of trained laypersons or expert patients for patients with the same chronic conditions
- Assess tools used for smoking cessation and tobacco control. Assess legislation and how it is enforced
- Provide education in schools
- Assess information campaigns for media
- Use of group appointments/teaching
- Investigate in occupational settings the information of the health care workers and employees to detect early onset of occupational lung disease
- Participation of the country to the World No Tobacco Day, World Asthma day, World COPD day and similar WHO or international initiatives.

5.4 Role of PHC, other governmental organizations and NGO in the proper delivery of prevention and care for CRD.

At country level, a series of initiatives should be undertaken to adopt a national CRD programme:

- Identify a (national) coordinator
- Set up a steering committee for each country
- Identify priorities within the area and propose objectives which are realistic
- The program should be largely disseminated at the country level to all people involved
- The program should be monitored and reports should be published at regular intervals to assess the progress of the program.
- Consider other existing programs which are complementary to the CRD program (CD or NCD)
- Include the CRD program within the framework of the other national priorities (CD or NCD).

References

1. WHO consultation on the development of a comprehensive approach for the prevention and control of chronic respiratory diseases. Geneva, WHO. January 11-13, 2001. Management of Non-Communicable Diseases Department. Chronic Respiratory Diseases and Arthritis. WHO/NMH/CRA/01.1. 2001.
2. WHO strategy for prevention and control of chronic respiratory diseases. WHO/MNC/CRA/02.1. 2002.
3. Enarson DA, Ait-Khaled N. Cultural barriers to asthma management. *Pediatr Pulmonol* 1999;28:297-300.
4. Bousquet J, Ndiaye M, Ait-Khaled N, Annesi-Maesano I, Vignola A. Management of chronic respiratory and allergic diseases in developing countries. Focus on Sub-Saharan Africa. *Allergy* 2003;in press.
5. Rona RJ. Asthma and poverty. *Thorax* 2000;55:239-244.
6. Murray CJL, Lopez AD (eds). *The Global Burden of Disease. A comprehensive assessment of mortality and disability from disease, injury and risk factors in 1990 and projected to 2020.* World Health Organization, Geneva. 1996.
7. Addressing the impact of household energy and indoor air pollution on the health of the poor: implications for policy action and intervention measures. Working Paper prepared for the Commission on Macroeconomics and Health. WHO/HDE/HID/02.9. 2002
8. Addressing the Links Between Indoor Air Pollution, Household Energy, and Human Health. WHO/HDE/HID/02.10. 2002.
7. Murray CJL, Lopez AD (eds). *The Global Burden of Disease. A comprehensive assessment of mortality and disability from disease, injury and risk factors in 1990 and projected to 2020.* World Health Organization, Geneva. 1996.
9. Chabot J. The Bamako initiative. *Lancet* 1988;2:1366-7.
10. Ait-Khaled N, Auregan G, Bencharif N, Camara LM, Dagli E, Djankine K, et al. Affordability of inhaled corticosteroids as a potential barrier to treatment of asthma in some developing countries. *Int J Tuberc Lung Dis* 2000;4:268-71.
11. Unwin N, Mugusi F, Aspray T, Whiting D, Edwards R, Mbanya JC, et al. Tackling the emerging pandemic of non-communicable diseases in sub-Saharan Africa: the essential NCD health intervention project. *Public Health* 1999;113:141-6.
12. Ait-Khaled N, Enarson D, Bousquet J. Chronic respiratory diseases in developing countries: the burden and strategies for prevention and management. *Bull World Health Organ* 2001;79:971-9.
13. Kale R. Traditional healers in South Africa: a parallel health care system. *BMJ* 1995;310:1182-5.
14. WHO Traditional medicine strategy 2002-2005. WHO/EDM/TRM/2002.1. 2002.
15. Global strategy for asthma management and prevention. WHO/NHLBI workshop report. National Institutes of Health, National Heart, Lung and Blood Institute, Publication Number 95-3659 1995.
16. Pauwels RA, Buist AS, Calverley PM, Jenkins CR, Hurd SS. Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease. NHLBI/WHO Global Initiative for Chronic Obstructive Lung Disease (GOLD) Workshop summary. *Am J Respir Crit Care Med* 2001;163:1256-76.
17. Bousquet J, Van Cauwenberge P, Khaltaev N. Allergic rhinitis and its impact on asthma. *J Allergy Clin Immunol* 2001;108:S147-334.
18. Ait-Khaled N, Enarson D. Management of asthma guidelines. Guide for Low Income Countries. IUATLD. Frankfurt am Main, Moskau, Senwald, Wien: pmi-Verl.Gruppe; 1996.
19. Alberti G. Noncommunicable diseases: tomorrow's pandemics. *Bull World Health Organ* 2001;79:907.
20. Unwin N, Setel P, Rashid S, Mugusi F, Mbanya JC, Kitange H, et al. Noncommunicable diseases in sub-Saharan Africa: where do they feature in the health research agenda? *Bull World Health Organ* 2001;79:947-53.
21. Gill GV, Scott B, Beeching NJ, Wilkinson D, Ismail AA. Enumeration of non-communicable disease in rural South Africa by electronic data linkage and capture-recapture techniques. *Trop Med Int Health* 2001;6:435-41.

22. Macroeconomics and Health: investing in health for economic development. Report of the commission for Macroeconomics and Health. WHO, Geneva, 20 December 2001.
23. Maalej M, Bouacha H, Ben-Miled T, Ben-Khedher A, El-Gharbi T, El-Gharbi B, et al. La bronchite chronique en Tunisie. Aspect épidémiologique. *Tunise Med* 1986;64:457-60.
24. Ministério da Educação e Desporto, República de Cabo Verde, Lei nº 119/IV/95 de 13 de Março, Boletim Oficial, 1995, I Série, número 8, 1995.
25. de Almeida MM, Pinto JR. Bronchial asthma in children: clinical and epidemiologic approach in different Portuguese speaking countries. *Pediatr Pulmonol Suppl* 1999;18:49-53.
26. Nogueira JM, Pinto PL, de Almeida MM, Tavares C, Lopes D, Loureiro V, et al. ALATOP-RIA in the screening of atopy in a non Caucasian population. *Allerg Immunol (Paris)* 1997;29:274-8.
27. Morais de Almeida M, Gaspar A, Rosado Pinto J. Epidemiology of asthma in Portugal, Cape Verde, and Macao. *Pediatr Pulmonol* 2001;Suppl:35-7.
28. Yemaneberhan H, Bekele Z, Venn A, Lewis S, Parry E, Britton J. Prevalence of wheeze and asthma and relation to atopy in urban and rural Ethiopia. *Lancet* 1997;350:85-90.
29. Kambarami RA, Marechera F, Sibanda EN, Chitiyo ME. Aero-allergen sensitisation patterns amongst atopic Zimbabwean children. *Cent Afr J Med* 1999;45:144-7.
30. Cadman A, Prescott R, Potter PC. Year-round housedust mite levels on the Highveld. *S Afr Med J* 1998;88:1580-2.
31. Woodcock A, Addo-Yobo EO, Taggart SC, Craven M, Custovic A. Pet allergen levels in homes in Ghana and the United Kingdom. *J Allergy Clin Immunol* 2001;108:463-5.
32. Bandeje EO. A ten-year review of asthma deaths at the Lagos University Teaching Hospital. *Afr J Med Med Sci* 1996;25:389-92.
33. Kattan M, Mitchell H, Eggleston P, Gergen P, Crain E, Redline S, et al. Characteristics of inner-city children with asthma: the National Cooperative Inner-City Asthma Study. *Pediatr Pulmonol* 1997;24:253-62.
34. Mitchell H, Senturia Y, Gergen P, Baker D, Joseph C, McNiff-Mortimer K, et al. Design and methods of the National Cooperative Inner-City Asthma Study. *Pediatr Pulmonol* 1997;24:237-52.
35. Matricardi PM, Ronchetti R. Are infections protecting from atopy? *Curr Opin Allergy Clin Immunol* 2001;1:413-9.
36. Yazdanbakhsh M, van den Biggelaar A, Maizels RM. Th2 responses without atopy: immunoregulation in chronic helminth infections and reduced allergic disease. *Trends Immunol* 2001;22:372-7.
37. van Sprundel MP. Pneumoconioses: the situation in developing countries. *Exp Lung Res* 1990;16:5-13.
38. Rees D, Weiner R. Dust and pneumoconiosis in the South African foundry industry. *S Afr Med J* 1994;84:851-5.
39. Loewenson R. Assessment of the health impact of occupational risk in Africa: current situation and methodological issues. *Epidemiology* 1999;10:632-9.
40. Davies JC. Silicosis and tuberculosis among South African goldminers--an overview of recent studies and current issues. *S Afr Med J* 2001;91:562-6.
41. Yach D, Myers J, Bradshaw D, Benatar SR. A respiratory epidemiologic survey of grain mill workers in Cape Town, South Africa. *Am Rev Respir Dis* 1985;131:505-10.
42. Ige OM, Onadoko OB. Respiratory symptoms and ventilatory function of the sawmillers in Ibadan, Nigeria. *Afr J Med Med Sci* 2000;29:101-4.
43. Hnizdo E, Esterhuizen TM, Rees D, Lalloo UG. Occupational asthma as identified by the Surveillance of Work-related and Occupational Respiratory Diseases program in South Africa. *Clin Exp Allergy* 2001;31:32-9.
44. Osim EE, Musabayane CT, Mufunda J. Lung function of Zimbabwean farm workers exposed to flue curing and stacking of tobacco leaves. *S Afr Med J* 1998;88:1127-31.
45. Wesley AG. Prolonged after-effects of pneumonia in children. *S Afr Med J* 1991;79:73-6.
46. Sethi GR, Batra V. Bronchiectasis: causes and management. *Indian J Pediatr* 2000;67:133-9.
47. Weber MW, Milligan P, Giadom B, Pate MA, Kwara A, Sadiq AD, et al. Respiratory illness after severe respiratory syncytial virus disease in infancy in The Gambia. *J Pediatr* 1999;135:683-8.

48. Biellik R, Madema S, Taole A, Kutsulukuta A, Allies E, Eggers R, et al. First 5 years of measles elimination in southern Africa: 1996-2000. *Lancet* 2002;359:1564-8.
49. Siringi S. Largest ever measles vaccination programme launched in Africa. *Lancet* 2002;359:2175.
50. Tiendrebeogo H, Sangare SI, Roudaut M, Schmidt D, Assale N. [One hundred and one cases of pulmonary aspergillosis in Ivory Coast (author's transl)]. *Med Trop (Mars)* 1982;42:47-52.
51. Mushegera CK, Mbuyi-Muamba JM, Kabemba MJ. Indications and results of pleuropulmonary decortications in the university hospital of Kinshasa. *Acta Chir Belg* 1996;96:217-22.
52. Souilamas R, Riquet M, Barthes FP, Chehab A, Capuani A, Faure E. Surgical treatment of active and sequelar forms of pulmonary tuberculosis. *Ann Thorac Surg* 2001;71:443-7.
53. Harries AD. Tuberculosis in Africa: clinical presentation and management. *Pharmacol Ther* 1997;73:1-50.
54. Tuberculosis control in the era of the HIV epidemic: risk of tuberculosis infection in Tanzania, 1983-1998. *Int J Tuberc Lung Dis* 2001;5:103-12.
55. Pio A, Luelmo F, Kumaresan J, Spinaci S. National tuberculosis programme review: experience over the period 1990-95. *Bull World Health Organ* 1997;75:569-81.
56. Borgdorff MW, Floyd K, Broekmans JF. Interventions to reduce tuberculosis mortality and transmission in low- and middle-income countries. *Bull World Health Organ* 2002;80:217-27.
57. Edmunds WJ, Gay NJ, Henao Restrepo AM, Olive JM, Bele O. Measles vaccination in Africa: by how much could routine coverage be improved? *Vaccine* 2001;20:16-8.
58. Anglaret X, Taelman H, Ladner J, Batungwanayo J, Dabis F. Tuberculosis and chemoprophylaxis in Africa. *Lancet* 1995;345:867-8.
59. Beyers N, Gie RP, Schaaf HS, Van Zyl S, Talent JM, Nel ED, et al. A prospective evaluation of children under the age of 5 years living in the same household as adults with recently diagnosed pulmonary tuberculosis. *Int J Tuberc Lung Dis* 1997;1:38-43.
60. Lambert ML. Tuberculosis chemoprophylaxis for infants and teenagers. *Lancet* 1999;354:160-1.
61. Morris W, Knauer CM. Cardiopulmonary manifestations of schistosomiasis. *Semin Respir Infect* 1997;12:159-70.
62. Hesse IF. Knowledge of asthma and its management in newly qualified doctors in Accra, Ghana. *Respir Med* 1995;89:35-9.
63. Summary, Surveillance of risk factors for noncommunicable diseases. The WHO STEPwise approach. WHO/NMH/01.01, Geneva, WHO 2001.
64. Truelsen T, Bonita R, Jamrozik K. Surveillance of stroke: a global perspective. *Int J Epidemiol* 2001;30 Suppl 1:S11-6.
65. Cardiovascular risk profile assessment in glucose-intolerant Asian individuals--an evaluation of the World Health Organization two-step strategy: the DECODA Study (Diabetes Epidemiology: Collaborative Analysis of Diagnostic Criteria in Asia). *Diabet Med* 2002;19:549-57.
66. Burney PG, Luczynska C, Chinn S, Jarvis D. The European Community Respiratory Health Survey. *Eur Respir J* 1994;7:954-60.
67. International Consultation on Environmental Tobacco Smoke (ETS) and Child Health 11-14 January 1999, Geneva, Switzerland. 1999;WHO/NCD/TFI/99.10.
68. WHO Report of the First International Review Meeting Practical Approach to Lung Health (PAL) Strategy. Rabat, Morocco, WHO/CDS/TB/2003.324, Geneva, WHO 2003.

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