Non-communicable diseases (NCDs) are responsible for increasing morbidity and mortality in the whole world. It is estimated that by the year 2020, about 73% deaths and 60% of global disease burden would be accounted for by the NCDs. The increasing burden of NCDs, particularly in developing countries, threatens to overwhelm already stretched health services. The factors underlying the major NCDs (heart disease, stroke, diabetes, cancer, and respiratory conditions) are well documented, however, over the past few years the Council has targeted early identification and diversification of its activities to address factors contributing to the burden of chronic diseases. The Council’s Institute of Cytology and Preventive Oncology (ICPO) at NOIDA continued to study various aspects of cancer of cervix and breast.

**ONCOLOGY**

Cancer Registries under the Council continue to provide valuable data on cancer incidence as well as cancer care patterns. A project on cancer atlas tried to assess the magnitude of problem through a large number of pathology laboratories in India. An operational research project on screening for common cancers is also being undertaken. Understanding the pathogenesis of oral cancers was addressed through different task force studies.

**NATIONAL CANCER REGISTRY PROGRAMME**

The National Cancer Registry Programme (NCRP) was initiated in 1981-82, with the objectives of collection of authentic data on cancer occurrence, undertaking epidemiological studies, and developing human resources in cancer epidemiology and registration. The current network of NCRP consists of seven urban population based cancer registries (at Mumbai, Chennai, Bangalore, Bhopal, Delhi, Silchar and Kolkata); two rural population based cancer registries (Barshi, (Maharashtra) and Ahmedabad); five urban-cum-rural population based registries (at Dibrugarh and Kamrup districts (Assam), West Imphal district (Manipur), Mizoram and Sikkim and five hospital based cancer registries (at Dibrugarh, Thiruvananthapuram, Bangalore, Mumbai and Chennai). The monitoring and evaluation of the programme with 14 population based and 5 hospital based cancer registries is being undertaken by the coordinating unit with the help of a steering committee. The data till the year 2000 is available. The crude incidence rate of cancer for 1999-2000, in different urban population based cancer registry areas varied between 63.2 and 94.6 per 100,000 males; and between 65.5 and 105.7 per 100,000 females. The crude incidence rate in the rural registry at Barshi (Maharashtra) was 38.8 per 100,000 males.
and 45.8 per 100,000 females. The data from hospital based cancer registries revealed that microscopic diagnosis was carried out on 85 to 96% male cases and on 91 to 97% female cases. Loco-regional cancers accounted for about two-third of cancers among males and about three-fourth cancers among females. Radiotherapy was the commonest modality of treatment.

**CERVICAL CANCER**

*Polymorphism of Tumor Necrosis Factor Gene in Cervical Cancer*

The persistent human papillomavirus (HPV) infection with oncogenic HPV types leads to the development of high-grade cervical intraepithelial neoplasia (CIN) that progresses to invasive carcinoma. Factors that contribute to viral persistence have not been elucidated. The host immune responses may be one of the most important factors in the natural history of HPV infection. The ICPO has initiated a study on polymorphism in immunomodulatory genes specially on tumor necrosis factor α (TNFα), a cytokine to have a potent immunomodulatory function in cervical cancer (Fig. 1).

**Role of Genetic Polymorphism of Cell Cycle Components in Cervical Cancer**

The ICPO initiated a study to evaluate the role of single nucleotide polymorphisms (SNPs) in CyclinD1 (CCND1) gene, a major regulatory protein in different stages of cell cycle, in cervical carcinogenesis. Preliminary analysis of clinical samples showed that CCND1 A870G is more polymorphic as compared to the controls.

**Biological Behaviour and Transcriptional Regulation of HPV Infection**

Dysregulation of specific NF-kB members has been implicated with the development of many cancers including cervical cancer. By study of expression and DNA-binding activity of NF-kB during the development of cervical precancer, cancer and control tissues with or without HPV infection, the ICPO showed a significant level of constitutive activation of NF-kB in squamous-cell carcinomas and no or negligible NF-kB binding activity in normal controls or precancerous lesions (Fig. 2). There was a gradual increase in binding activity of NF-kB and differential expression pattern of NF-kB family of proteins from low-grade squamous intraepithelial lesions (LSIL) to high-grade squamous intraepithelial lesion (HSIL) and to invasive squamous cell carcinoma. This is indicative of its role in cervical carcinoma.

**Management of Precancerous Lesions in Uterine Cervix**

Studies at ICPO showed that about 10% of women with negative Pap smear
ICMR

Molecular Markers for Detection and Progression of Cervical Cancer

Study was initiated to analyze the expression of selective markers of HPV mediated carcinogenesis. They included apoptosis related proteins; transcription factors (NF-kB, and AP-1); cell cycle regulator (p53), and cyclinD1. Cervical tissue specimens (121) of different grades (64 invasive cancers, 31 high and low grade lesions and 26 controls) were

have inflammation and are positive for high-risk HPV types 16/18 while about 15% of them harbor squamous intra-epithelial lesions.

Role of Genetic Polymorphism of GSTM1 & GSTT1 including HLA in Cervical Cancer

Glutathione S-transferase (GST) is a family of enzymes involved in xenobiotic detoxification and protection against carcinogens, mutagens and genotoxic compounds. The study was performed to determine the association of polymorphisms at GSTM1 and GSTT1 gene loci in cervical cancer development. Significant difference was found between the cases and controls in the distribution of null genotype of GSTM1 in individuals aged above 45 yr. but these genotypes do not influence the susceptibility to cervical cancer (Fig. 3).

Fig. 2. Gel shift analysis using nuclear extracts from different grades of cervical biopsy tissues. Increasing NF-kB binding activity was observed as the severity of cervical lesions progressed from normal to invasive cancer in both figures A and B.

Fig. 3. Multiplex PCR to detect GSTM1 and GSTT1 deletion polymorphisms

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MAJOR ICMR RESEARCH PROJECT IN NON-COMMUNICABLE DISEASES
obtained from Lok Nayak Hospital, New Delhi and HPV detection was done on DNA isolated from these samples. Sixty six samples were positive for HPV16 and 2 for HPV18. Immunohistochemical analysis of these samples showed that proteins of the NF-kB family (p65 and p50), AP-1 family (c-fos and c-jun) and p53 were over-expressed in cervical cancer, but Fra-1 was down-regulated in comparison to precancerous and normal tissue sample. Bcl2 analysis, however, did not show any significant over or low expression in cancerous lesions when compared to precancerous normal lesion.

**Development of HPV Diagnostics for Early Detection of Cervical Cancer**

User friendly, cost effective and dry collection of cervical scrape / biopsy imprint specimens as paper smears has been developed by ICPO and submitted for US patent. This technique coupled with a single tube multiplex PCR procedure is being validated in a multicentric national project. The multiplex PCR assay is being developed using HPV L1 consensus as well as HPV type-specific primers for diagnosis of high risk (HPV16/18) and other HPV infections in DNA isolated from cervical scrapes. DNA was extracted using ‘Paper smear’ method from 80 samples of which 57% were found positive for HPV infection by L1 consensus, out of these, 30 cases were HPV16 positive whereas high risk HPV-18 was not detected in any of these samples.

**BREAST CANCER**

**Multidisciplinary Study**

The ICPO identified involvement of Her-2/neu oncogene amplification and over expression in significant proportion of breast cancer patients in India. Clinico-epidemiological studies coupled with molecular analysis of more than 125 sporadic and 40 familial breast cancer cases revealed only a few novel mutations in breast cancer susceptibility genes, BRCA1 and BRCA2 and in p53 tumor suppressor gene but the frequency is certainly not significant enough to suggest that these gene mutations play a major role in developing breast cancer in Indian women.

**Study of BRCA1 & BRCA2 Gene Expression in Human Breast Cancer Cells**

The ICPO has identified novel germline mutations in breast cancer susceptibility genes BRCA1, BRCA2 and p53 in breast cancer patients from India (Fig. 4). One mutation in exon 16 and two

\[
\begin{align*}
\text{AGAGT} & \quad \text{CCAGC} \\
200 & \\
\end{align*}
\]

(A). Normal BRCA1 exon 16 sequence

\[
\begin{align*}
\text{AG} & \quad \text{GA} \quad \text{GG} \quad \text{T} \quad \text{C} \quad \text{C} \quad \text{C} \quad \text{AG} \\
250 & \\
\end{align*}
\]

(B). Mutant BRCA1 exon 16 sequence showing 4956insG (arrow)

Fig. 4. Sequence electropherogram of a normal subject and a familial breast cancer patient
in exon 7 of BRCA1, one mutation in exon 2 of BRCA2 and p53 genes, two mutations in exon 5 and one in exon 4 of P53 gene were discovered.

STOMACH / ORAL CANCER

Oesophageal Cancer in Northeast India

The study was initiated to analyze the p53 codon 72 polymorphism and GSTM1 and GSTT1 polymorphisms in oesophageal cancer patients. DNA was extracted and HPV status was checked by PCR. Polymorphism of codon 72 (Pro -> Arg) of p53 was checked by DNA sequencing. Twenty samples showed common heterozygous (Pro/Arg) genotype, whereas one sample each showed rare Pro/Pro and Arg/Arg homozygous genotype.

Risk factors for Stomach Cancer with reference to Dietary Practices and Habits in Mizoram

Stomach cancer in Mizoram was studied at RMRC, Dibrugarh through hospital based case-control study. Smoking in all forms was found to be a risk factor for stomach cancer. Relatively higher risk was seen for meiziol (a local cigarette) smokers. Tuibur, the unique smokeless tobacco, was a risk factor for stomach cancer with significant dose-response effect. Significant risk was observed for the combined habit of tobacco chewing, smoking and tuibur consumption. Smoke dried fish and smoke dried meat were also found to be risk factors for stomach cancer. Risk increases when fish and meat is salted in dose-dependent manner.

Oral Cancer

A study was carried out for identification of chromosomal markers specific to oral cancers in India at primary tumour site and metastatic lymph node using comparative genomic hybridization and molecular cytogenetic techniques. The most frequently observed chromosomal changes included the regional gains on 8q, 7p, 3q, 11q 12-14 and 9q. The regional losses are on 3p, 8p, 18q and 11q14-qter in contrast to the most frequent changes observed in Western population i.e. losses on chromosome 3p and 9p and gains on 3q in more than 80-85% of tumor samples. A marked reduction in the lymphocyte proliferative response was observed in the patients with leukoplakia and submucous fibrosis (SMF). Lymphocyte proliferative response in patients with leukoplakia and SMF was comparable with that observed in oral cancer patients (stage T1/T2). Significant decrease in the IFNγ: IL10 in leukoplakia and SMF patients was observed. Further, a marked increase in the intracellular calcium content was observed in peripheral blood lymphocytes of patients as compared to healthy individuals.

ATLAS OF CANCER IN INDIA

The ICMR-WHO study for the development of an atlas of cancer in India was initiated in 2001 and 2002. The data on minimum crude incidence rates (all sites) in either sex show that some of the districts in the country have higher cancer incidence rates than the established population based cancer registries.
CARDIOVASCULAR DISEASES

Cardiovascular diseases (CVD) account for a large portion of mortalities due to NCDs. In 2002, India had the highest number of deaths in the world due to coronary heart disease. Coronary artery disease (CAD) prevalence in urban populations of India has increased from 1% in 1960s to 11% in 2000s. In rural areas, a double fold increase has been seen. The excess risk of CAD appears at younger ages of life in Indians. Risk factors of CVD start early in life and prevention of these diseases requires an integrated life course approach.

Jai Vigyan Mission Mode Project on Community Control of RF/RHD

The ICMR initiated a study titled “Jai Vigyan Mission Mode Project on Community Control of RF/RHD” in the year 2000. Various components of the project, including the epidemiology, typing of rheumatogenic strains, RF/RHD registries and development of a vaccine against streptococci were developed to provide strategic methodology for control and prevention of rheumatic fever (RF) and rheumatic heart diseases (RHD) in the country. A model of surveillance provided by hospital and community-based registry’s assessment of burden of disease will be replicated in other parts of the country. An economically and technically effective strategy for prevention of these diseases may be provided by critical evaluation of primary and secondary prophylaxis measures. Various strategies for development of an indigenous vaccine against group A streptococci (GAS) will be evaluated by taking into account the GAS strains circulating in the community.

During the cross sectional survey of about 4000 school children conducted at Kaniyambadi block by Vellore Centre and at Raipur Rani block, Haryana by Chandigarh Centre, the prevalence of β-hemolytic streptococci (BHS) and group A streptococci (GAS) was 26.5 % and 8.8 % respectively, whereas that of GAS was 11.1 % and 2.5 % respectively. A higher prevalence of GAS caused skin lesions in Vellore. The active surveillance in 25,000 school children under registry component has shown a RF/RHD prevalence of 1.04 per thousand in Roop Nagar district (Punjab) by Chandigarh centre, 1.43 / 1000 for RHD in Kaniyambadi block by Vellore Centre and 0.36 per 1000 of RF/RHD in Ernakulam district by Kochi centre. The number of cases reported to the RF/RHD registry at Chandigarh, Vellore and Kochi centre are 464, 368 (out of 1793 suspected cases) and 209 (out of 415 suspected cases) respectively. In the northern parts of India, emm typing of GAS strains revealed M77-1 strain as the predominant one (27% of isolated strains). On the other hand, Vellore registered a greater heterogeneity among GAS strains on the basis of emm typing. In order to evaluate the N-terminal peptides of M protein of these strains as potential vaccine components, immunological response to 17 amino terminal sequences of the M protein (first 20 amino acids) from different emm type strains was evaluated.

Epidemiology of Essential Hypertension in Arid Population of Rajasthan

A cross-sectional survey has been undertaken in Gachipura village for identifying the risk factors of hypertension. In 623 people examined, the
prevalence of hypertension was found to be 23.3%. Only 64.1% of hypertensives knew that they had hypertension. Only 29.0% of those knowing about their hypertension were taking antihypertensive treatment. The dietary survey and biochemical investigations will help in understanding the association of risk factors with hypertension.

**RESPIRATORY DISEASES**

**ASTHMA**

Asthma is a common chronic inflammatory disorder characterized by airway hyperresponsiveness to a variety of stimuli and results from complex interactions among inflammatory cells, mediators and airways. Many predisposing genes also contribute towards its multifactorial aetiology. Ethnic variations may play a role in its occurrence as well as in differential effect of drugs for treatment of asthma.

Under a four-centre study on prevalence of asthma, data was collected from 73,605 individuals. Respiratory symptoms were present in 3 to 11% subjects (9-11% at Kanpur and Bangalore, and 4-7% at Chandigarh and Delhi). However, based on the stringent questionnaire, asthma was diagnosed in 2.28% at Chandigarh, 1.69% at Delhi, 2.05% at Kanpur and 3.47% at Bangalore. The prevalence was higher when items such as history of ever asthma, use of inhalers, etc. were employed. Atopy assessed from the presence of dermatological, nasal or eye symptoms was present in 2.8% to 13.5% individuals and was more common among women. Subjects with history of atopy had a markedly high prevalence of asthma at all centres in both urban and rural areas.

A study for evaluating the association between BCG immunization and prevalence of atopic disorders particularly asthma in 10,028 school children between the ages of 10-15 yr in Chandigarh showed that 5.3% children had history of atopy and 3.3% of asthma. BCG scar status of all children was noted. Based on Mantoux test and BCG scar, children with history of asthma were divided in four categories and cytokine measurements were carried out. Prevalence of asthma was observed to be 3.3% in BCG positive group as compared to 3.5% in BCG negative group, providing a small risk due to BCG negativity.

A study was carried out on role of fungi (collected indoor and outdoor air samples of houses) in asthmatic children to know the predominant fungal types and their seasonal variations. The aerobiological survey revealed a total of 60 fungal types. Peak season of different fungi varied and the colony concentration showed a considerable variability and seasonality both indoors and outdoors. Nineteen percent children showed skin reactivity to *Aspergillus fumigatus*, *Penicillium citrinum* and *A. alternate*. House dust mite was found to be potent sensitizer in 16% children with *Cynodon dactylon* pollen showing sensitivity in 35% children followed by *Holoptelia integrifolia* pollens in 30%. Patients showing significant positive reaction to fungi were found to have much higher IgE titre as compared to those showing negative or low skin reactivity. Pollen antigen reactivity also showed similar patterns.

A project on identification of food allergy based on history and immunological parameters showed that 1,158 out of 2,000 (57.9%) persons gave history of allergy to one or more food
items. Allergy to both vegetarian and non-vegetarian food was observed. Majority of the patients were suffering from both asthma and rhinitis. A large number of patients took >4 hours for the symptoms to start. Major food items implicated in allergy included, curd, rice and pulses (black gram, lentil, green gram, frenchbean, etc.). Regarding fruits, most patients complained of allergy to citrus fruits, followed by banana. Altogether 353 out of 470 patients showed markedly positive skin test. Out of 184 patients with positive history of allergy to food items, skin prick test was positive in 68 cases while oral food challenge test was positive in 85 cases. High levels of IgE were also detected among these patients.

Another study aims at identification of genetic polymorphism in candidate genes, (IL4 and IFN-γ) in association with atopic asthma. A total of 1035 samples from 212 families have been collected. A CA repeat in the second intron of the IL-4 gene has been found to be polymorphic. In addition, various single nucleotide polymorphisms (SNPs) in the IL4 gene have been identified. The CA repeat in the first intron of IFN-γ gene has been found to be associated with asthma. In addition, four single nucleotide polymorphisms (SNPs) in the IFN-γ gene have been identified.

NEUROLOGICAL DISORDERS

Neuroepidemiology

A neuro-epidemiological study was undertaken in Kolkata to find the prevalence, nature and distribution of major neurological disorders and to study the incidence of stroke and epilepsy. In study sample of 52,373, the prevalence rates per thousand of major neurological disorders were found as follows: epilepsy: 5.57; stroke: 4.87; tremors: 4.41; dementia: 0.88; Parkinson’s disease: 0.46; dystonia: 0.53 and cerebral palsy: 0.28. Incidence rate of stroke was found to be 1.45 per thousand. The annual incidence rate of epilepsy was 0.61 per thousand. The prevalence of stroke in this study was higher than that reported from earlier studies in India indicating an increase in the prevalence of stroke.

Neuro-cysticercosis

Neuro-cysticercosis is a major cause of seizure disorders in our country. However, community based data on prevalence of disease or its contribution to the occurrence of seizure is not available. A task force project was undertaken to quantify the contribution of neuro-cysticercosis to the etiology of seizure disorder in the community. The interim results indicate the prevalence of ‘ever seizure’ in rural areas to be 13.44 per thousand while the prevalence of ‘active seizure’ was found to be 3.67 per thousand. The types of seizure in active seizure patients were as follows: generalized (59%), secondary generalization (30.5%), complex partial (2.9%) and partial (7.6%). The CT scan data is being analysed but a preliminary evaluation suggests that approximately 30% of patients with active seizure have evidence of neuro-cysticercosis.

DISABILITY AND REHABILITATION

Avoidable disability is a major socio-economic and public health problem in
India. A task force project was undertaken to develop and strengthen strategies for prevention of disability among pre-school children. Interventions have been made in the form of IEC activities, development of referral services and rehabilitation. Home based rehabilitation was found to be an effective way for delivery of rehabilitation services.

Camps were also organized from time to time for management of disabled children in the study area. This was found to be the most effective method as referrals did not work in majority of cases. Motivation of parents for taking children to hospitals was low as they did not perceive apparent benefit from the few visits they made to the crowded hospitals. Rehabilitation requires persuasive and continuing efforts in the community. Rehabilitation units were set up at anganwadi in the project area. The anganwadi workers were given training and each centre was provided simple items for different types of disabilities demonstrating that basic rehabilitation units can be set up at anganwadi centres at low cost.

Mental Health

India is pioneer in the concept of primary health care. Mental health care has been an integral part of the general health services. Mental health problems affect the productivity and quality of life of millions in urban areas. Hence, studies were undertaken to assess the mental health problems in urban areas.

Urban Mental Health Problems and their Service Needs

One of the most prevalent and disabling mental health problems is depression in urban areas. A study is being carried out at Delhi, Chennai and Lucknow to assess the mental health problems and service needs and to gain an understanding of the various aspects of the mental health situation in these urban settings. The findings of the pilot study indicate that the distribution and availability of services is not uniform and evenly distributed in Chennai, Delhi and Lucknow. The availability of beds is higher in Chennai and Lucknow as compared to Delhi. There is deficit in the number of clinical psychologists, psychiatric social workers and nurses. In Chennai and Delhi, the government sector carries approximately two thirds of this service load. Government sector in the PHC carries a relatively small proportion of service load in Chennai and Delhi. The non-formal sector at the primary care level carries a sizeable proportion of the service load in Chennai and Delhi. The NGO sector seems to carry a small service load at this level of health services. The absolute mental health service gap is large in each of the three cities. The information available from Delhi and Lucknow indicates that between one third to one half of the patients reaching the treatment centres do so for common mental disorders such as depression, anxiety, stress and alcohol and drug abuse. The major barriers to access are financial and transport related problems. The service providers and community opine about the
overall lack of mental health services. The service providers in most agencies perceive lack of professionals or human response deficit as an important issue. Delhi and Lucknow centres have imparted training in mental health to general practitioners.

Mental Health Service Needs and Service Delivery Models in the Disaster (Earthquake) affected Population in Gujarat

Large number of people were affected in a devastating earthquake in Gujarat on the morning of 26th January, 2001. The worst affected area was Kutch with maximum impact and damage to property and life. The pilot study highlighted the definitive need to focus on emotional and psychological needs of the disaster affected populations. Three levels of psychological disturbance have occurred and are expected to occur overtime i.e. (1) mild to moderate psychological transient disturbance of emotions and/or thoughts, (2) moderate to severe disturbances, sub-syndromal psychiatric problems and acute stress related disorders and (3) diagnosable psychiatric disorders, mostly related to stress, which may begin to occur any time after 2-3 months of the disaster and will require specialized mental health services. It was observed that communities and populations can and do take care of their emotional and psychological needs with their own resources. Qualitative research methods have been finalized. Tools/instruments like GHQ-12 (Gujarati), SCL-90, ICD-10 have been tested and finalized. The overall goal of main study is to study the mental health service needs of and to study various service delivery models for the earthquake affected population of Gujarat.

CAUSES OF DEATH BY VERBAL AUTOPSY

Reliable mortality information is an essential component for health care management and proper allocation of resources. The routine system of death data collections in the rural and urban areas has serious limitations and has not been able to provide the appropriate mortality estimates. A task force project on developing and testing the feasibility of utilizing the verbal autopsy technique to identify the underlying cause/s of death was initiated in Jan 2001. The long term objective was to demonstrate the utility of verbal autopsy in improving the system of cause specific mortality reporting in the country and its integration with the existing systems. In the pilot phase the verbal autopsy schedules were developed, validated and field tested in Rajasthan and Tamil Nadu by Institute for Research in Medical Statistics (IRMS), New Delhi and National Institute of Epidemiology (NIE), Chennai. Trained field staff of IRMS, Delhi conducted field testing in Bharatpur. The Chennai centre, on the other hand, validated the schedules on 250 hospital deaths. At the end of two years the pilot phase tested verbal autopsy instruments for all age groups. To demonstrate the use of these instruments to determine the mortality estimates at a regional level, the project was expanded to cover 5 states viz. Assam, Bihar, Maharashtra, Rajasthan and Tamil Nadu representing five geographical regions of the country. IRMS, Delhi covered Bihar and Rajasthan while NIE, Chennai covered
Tamil Nadu. Maharashtra was covered by NIRRH, Mumbai while Assam was covered by RMRC, Dibrugarh.

Two six monthly rounds are over in all the states. Information on more than 7000 deaths have been obtained from five states during this period. The preliminary data analysis shows that CVD is most leading cause of adult deaths in all the centres comprising 16-36% of all deaths. Cancer is ranked as the second major killer followed by accidents. Pulmonary tuberculosis has also resulted in a substantial number of deaths in some centres. The survey is expected to be completed by December 2005.

GASTROENTEROLOGY

Chronic hepatitis C is an important cause of cirrhosis of liver and hepatocellular carcinoma. Due to high costs of interferon and high rates of non-response the study of viral and host factors responsible for outcome of treatment become important in identifying predictors of response. With this aim, a task force on non-response to interferon therapy in patients with hepatitis C is ongoing since 2001.

Of the 195 HCV patients tested for genotype, the most prevalent genotype was type 3 in 77.08%. In further analysis, 3a/3b was found to be prevalent in 53.47%. Genotype 3a was found in 17.01%, 3b in 3.13% and 3c in 0.69% patients. The second most common genotype was genotype 1, which was found in 13.89% patients. Genotype 1b was detected in 7.64% and genotype 1a in 4.17% patients and 1a/1b in 0.35% patients. From the enrolled patients, characterized as responders, relapsers or non-responders, 91 patients were taken for amplification of the NS5A region. Thirty four samples infected with genotype 3 were amplified and ISDR and PKR binding domains were sequenced. Both the regions were found to be highly conserved and the frequency of mutations was not found to be different between responders and non-responders to therapy. Among the VDR alleles, both Bsm 1 BB, bb and Taq 1 TT and tt correlated significantly with the severity of liver disease. Bsm1 bb, Taq 1 TT and Tt were significantly more common in patients with milder disease. On the other hand, Bsm1 BB and Taq 1 tt were more often associated with more severe hepatitis. The CCR5d32 mutation was not found to influence the susceptibility and severity of liver disease in chronic hepatitis C patients. The frequency of TNF-α-308 genotype between chronic HCV infected individuals and a healthy control was comparable. In contrast, there was a significant difference in the frequency of TNF β A/A alleles between chronic HCV infected patients and healthy controls. The data also suggest significant association of TNF-β A/A with severity of liver disease.

NON-COMMUNICABLE DISEASE SURVEILLANCE

NCDs are chronic and have an insidious onset, thus resulting in a large gap between exposure and action. Two studies on risk factor surveillance initiated in 2002 were continued during the year. Development of Sentinel Health Monitoring Centres in India

In response to the national needs, a WHO supported multicentric study to
develop sentinel sites for NCD risk factor surveillance in the country was initiated in 2002. The centres were located at Ballabgarh (Haryana), Chennai (Tamil Nadu), Dibrugarh (Assam), Nagpur (Maharashtra) and Thiruvananthapuram (Kerala). The main objectives of the study were to develop modules of NCD risk factor surveillance (behavioral and physical). The risk factors studied were alcohol and tobacco use, dietary habits, physical activity, weight, height, blood pressure and waist circumference. The study sample was stratified into urban, rural and slum populations, and within each of these, 250 men and women aged between 15-64 yr were studied. Thus, each centre had a proposed sample size of 7500 subjects. The data management and analysis was done at each centre respectively for its own population. At ICMR, the collated data report was prepared and along with the centre specific reports, was submitted to WHO and Ministry of Health and Family Welfare. At no stage attempts to compare data across centres or within different populations in the same State have been done.

At the end of the study, 39,437 subjects were studied across all centres and populations, of which 49.2% were men and 50.8% women. At all centres a minimum of 250 subjects of each age and sex group were covered. History of current use of smoking in men was present in all age categories and accounted for 1/3rd to 1/4th of the subjects, while frequency in women was negligible, except in Ballabgarh (2.8-18%). Men, who were currently smoking, it started at the mean age range of 18.7 to 23.2 yr, while women initiated it in the third decade of life. Consumption of smokeless tobacco was present in higher proportion of men than women but more women consumed smokeless products. In Thiruvananthapuram, the consumption of smokeless tobacco was lowest in all populations in comparison to other centres. Higher proportion (1/4th to 1/3rd) of men reported ever consumption of alcohol at all centres, with a higher frequency in the slum/peri-urban area population. Amongst women from rural and slum areas of Dibrugarh and peri-urban areas of Thiruvananthapuram, highest consumption frequency of alcohol (28-50%) was reported. Consumption of fruits and vegetables was low at all centres. Up to 1/4th men and 1/3rd women were reported to be inactive in all populations.