

Addressing Non Communicable Diseases (NCDs) among the poorest in the current health care scenario

Background note for the Annual meet of Medico Friend Circle (MFC)

I. The definition, nominal confusion

The phrase on communicable diseases (NCDs) is a negative term for a heterogeneous group of illnesses that are not transmitted from one to the other through infectious organisms, even though they some of them may be caused by infectious agents. Most of these illnesses develop over a long period, months if not years. However, symptoms often are not observable in many affected people go around without any symptoms and most people require treatment for several years if not life-long. Thus, most of the NCDs are chronic illnesses. If we add the management of tuberculosis, HIV and leprosy among the infectious illnesses to these NCDs, most chronic illnesses would be covered.

However, as Dr Anurag Bhargava, a public health expert, had so eloquently elaborated in an earlier communication in the Medico Friend Circle (MFC), these binaries of acute vs chronic or communicable vs non communicable are neither perfect nor always valid. Thus, we should accept the conventional division of human ailments into broad categories such as maternal and child health problems, infectious illnesses, NCDs and injuries only as loose groups with some overlap.

The term NCDs is only 30 odd years old. When it was coined, the implication of grouping these illnesses together was, first, that these illnesses were results of risk factors that operated at an individual level (like tobacco use or sedentary lifestyle) rather than at the community level (like dearth of supply of safe drinking water or failure of mosquito-control). Second, it was assumed for some reasons, that these were not related to deprivation, but perhaps to an excess of some resources or imbalance of it, and thus were broadly not related to poverty.

The reasons for such an assumption are not clear. It could be because the first four risk factors postulated for these NCDs were excess of bodyweight, blood glucose, body lipids or blood pressure, which were seemingly opposed to conventional risk factors seen among the poor, such as undernourishment, lack of sanitation, crowding leading to infections like diarrhea, pneumonia and tuberculosis. So were maternal and child health problems, which were also more common among the poor or those existing under poor health systems.

How these associations of NCD with affluence or deprivation evolved over last 30 years is an interesting revealing story. It is likely that health workers who worked among poor communities observed possibly a higher number of those conventional NCDs than among the affluent. Or it may have been observed even in organised surveys of Burden of Disease in certain populations that showed equal or almost equal prevalence of NCDs across the socioeconomic gradient. However, we still need to settle this question of the distribution of the burden of NCDs across the socioeconomic gradient better. It is well established that 'illnesses are biological embodiments of deprivation'. However, during the last 50 years or so probably a deeper socio-economic causation is at work because of which there is epidemic of 'modern diseases' among both the poor and the non-poor. On one hand there is deprivation, under-consumption among the unorganised toilers whereas on the other, there is overconsumption and disease-prone life-style among the middle-class and the rich, but which has also spread to the working class to a certain extent. This new epidemic arises out of model of socio-economic development which is based on consumerism where the rich and middle classes respond to the alienated and stressful life with cut-throat competition in the race to earn more money, finds solace in excess consumption.

For the poor there exists deprivation from healthy food, lack of good living conditions, long working hours, and a structural push towards indulgence in cheap unhealthy food, addictive substances, They suffer from double burden of diseases - it suffers from traditional diseases of infections and undernourishment born out of development, deprivation as well from the new epidemic born out of lopsided development.

How and when did the poor experience the epidemiological transition to double burden of diseases – the continued suffering from the communicable diseases and additional burden of the non-communicable diseases? Is this transition a product of the increased socio-economic disparities brought about by the post-1991 neoliberalism or pre-dates it? It may be interesting to look at the historical data, if available to understand the inter-relationship of NCDs and poverty.

It also brings to the fore an issue for the MFC members involved in the community health projects for last few/several decades to ponder over. At the core of the MFC's or primary health care project work and its design is the understanding of the local health care needs, or undertaking community diagnosis. For long the discourse in the MFC has revolved around the communicable diseases and/or on the resurgence of communicable diseases post-1991, with not so significant mention of the rise of the NCDs till recently giving an "impression"

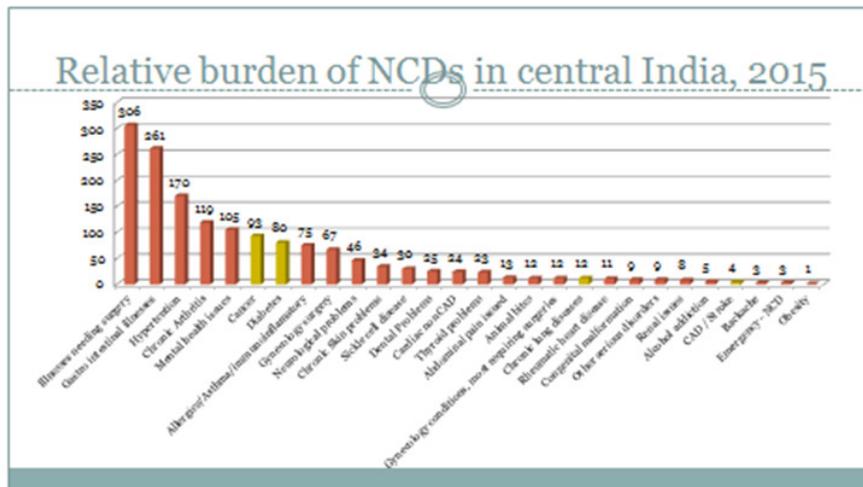
that the NCDs among the poor are being captured only recently in the community diagnosis. This “impression” needs to be verified and validated. We need to understand whether we had in the past missed the importance of the NCDs among the poor because of our bias in assuming that NCDs are the diseases of rich or urban people.

2. Burden and pattern of NCDs

The confusion about this relative distribution may have appeared because of this clubbing of disparate illnesses. We need to unpack these illnesses to see their individual association with deprivation or otherwise. The big 4 NCDs are themselves large groups such as 1. Diabetes, 2. Cardiovascular diseases, 3. Chronic lung diseases and 4. Cancers. These are supposed to account for over 80% of all NCDs in the world. Diabetes is a heterogeneous illness umbrella under which comes type 1 diabetes which has a low and almost constant rate across populations, and type 2, which is associated with obesity and insulin resistance in over 80% in the Western Hemisphere, and there is a large not- easily-classifiable group of diabetes patients who have associated undernutrition and occur among very poor people in Asia and Africa. And information about their burden is patchy, as information from poor areas of the world suffers disproportionately from lack of completeness. Similarly, heart diseases are a rather heterogeneous group of illnesses. Some researchers based in the west, and in urban and peri-urban areas of poor countries such as India have mistakenly drawn generalisations from their small studies that over 75% of the heart diseases are of coronary artery and atherosclerosis related. Since data from poor areas are patchy and often not of very good quality, contrary observations on cardiovascular disease profile don't seem to affect sweeping generalization such as that most cardiac disease burden all over the world is of ischemic origin. There are some data sets that show that only as few as 20% of heart diseases in, say central Indian and sub Saharan African villages are of coronary artery disease origin and rheumatic diseases still account for over 40% of all heart diseases. Third, cancers could be infection related such as those of uterine cervix in women and many lymphomas and others may be related to use of tobacco or other toxins, exposure to which is often more in the poor. Thus relative distribution of cancers also needs to be unpacked for differential distribution among different socioeconomic classes too. Finally, chronic lung diseases could be obstructive most commonly related to tobacco smoke or indoor air pollution (likely to be more common among the poor) and post infectious such as destroyed after a bad tuberculosis or bronchiectasis after a bad pneumonia or after silica dust exposure. All these are likely to be more common in the poorer income quintiles.

We need to also question whether in developing countries, these big 4 NCDs really do account for the majority of all NCDs (over 80%). We see a large spectrum of problems such as mental health problems, chronic arthritis, blood disorders especially hemoglobinopathies, chronic skin disorders, epilepsy (two thirds of these presently go untreated) and strokes, illnesses that require surgery for its treatment and many others that produce a heady mix of these illnesses, so much so that it becomes almost immoral to make the earlier statement that NCDs afflict the affluent alone.

In a small study of looking at the diagnosis of all new patients who presented to the outpatients at Jan Swasthya Sahyog (JSS) hospital in Central India, it was found that NCDs constituted 57 % of all diagnosis, and a very wide spectrum of illnesses within the NCD basket(see figure 1).



We need to document the pattern of these NCDs among the poor communities. Our attempt to get state level data in Chhattisgarh has presently met with disappointment as the data is so incomplete as to make no sense. This is same situation at the national level too. And we know that since many of these illnesses have a significant proportion of asymptomatic people, a true estimate of the burden depends heavily on good screening methods as well as on well-functioning and responsive- to-the-needs health systems which can enthruse people to access them for care.

In some African countries, where such burden of disease documentation is being attempted, they call it the long tail of NCDs, implying that diseases other than the big 4 NCDs are of several types even though they are about 30% of the total NCDs. These diseases there include entities such as rheumatic heart disease and cardiomyopathies, Burkitt's lymphoma

and cervical cancer, asthma and bronchiectasis, type 1 and malnutrition-associated diabetes, appendicitis and peptic ulcer disease, hemoglobinopathies, post-infectious glomerulonephritis, epilepsy and suicide, burns and drowning. This data seems incomplete, and we have to wait and watch whether the tail will wag the dog or the other way around.

The phenotypes of illnesses such as diabetes, hypertension and its complications, chronic arthritis or mental health illnesses need to be studied as it is seen in the poor communities. It is highly likely that these disease manifestations and outcomes are likely to be different in the poor due to deprivation. And these need to be taken cognisance of in any planning of health systems for the poor communities. We need to study the pattern of heart disease in the marginalised communities. Similarly, we need to study the outcomes of epilepsy among the poor.

Simultaneous with the delineation of the burden and pattern of illnesses, we need to study the risk factors that result in these illnesses. As pointed out in an earlier communication presented at the last mid annual meet of the MFC 2015, the proportion of adverse cardiovascular events accounted for by conventional risk factors such as dyslipidemia, hypertension, diabetes, strong family history and smoking was only about 50% even though the *'Interheart'* study suggested that traditional risk factors accounted for ~90% of MI risk . A closer look suggests that psychosocial factors accounted for an Odds Ratio of 2.67 and a Population Attributable Risk of 32.5%, almost the same as that of smoking.

We need to go beyond individual risk factors and explore the social-cultural structures which have arisen which have led to the high prevalence of these risk-factors. Atomization, dearth of community life, paucity of social mechanisms for sharing of stress arising out of economic and social insecurity, etc. need to be explored.

3. NCDs and Gender

The need to move “beyond individual risk factors” and for gendered analyses of the risk factors of NCDs and access to care is critical. Findings from a recently published study¹ point to women, particularly from socio-economically disadvantaged backgrounds in India being disproportionately affected by NCDs. The study analysed data from the NSSO (71st Round, 2014) survey and concludes that the prevalence is higher among women (63) as compared to men (47), in a context where the overall prevalence is (55) per thousand persons. In a departure from prevalent understanding about NCDs, the study also indicates that rural

women had a higher risk of NCDs (86) as compared with rural men (64) and in comparison with women in urban areas (53).

Public health discourse on health globally has mostly perceived women's health within the limited contours of their reproductive capacities. This overwhelming focus on "maternal health" while extremely critical, reflects a bias that obscures women's varied social identities and wider health needs and vulnerabilities to other NCDs. As a result, current policy, program implementation, diagnosis and treatment for NCDs amongst women is negligible or may be affected as compared with men. For instance, programs or services may not ask women relevant questions, fewer tests may be conducted for NCDs² that may result in delayed treatment resulting in disability and other poor health outcomes. Women are also likely to experience NCDs differently from men given that they form a large majority of those living in poverty, experience poor nutrition, due to their lack of control over or access to economic resources, information, decision making, control over mobility, and experiences of stigma that may impact their access to quality diagnosis, treatment and care.

In the forest fringe and forest villages of central India, Jan Swasthya Sahyog (JSS), found that hypertension is seen two times more commonly among women than men. Similarly, because of cancer of cervix and breast being almost exclusively seen in women, over two thirds of cancers are in women in these marginalized areas. Third, rheumatic Heart diseases are seen two times more commonly among women than men, a fact not otherwise well established or documented. Women have a two times a higher risk of Depression in all studies done globally.³ The differential burden of NCDs among women and men needs to be documented better.

Further, care giving is extremely gendered in most societies and invariably women assume the role of caregivers in families and communities for those with NCDs, often in the long term and in the absence of provision of such services / care by healthcare systems. This may add to their 'informal' work burden and may even restrict their participation in formal economic activities or even continuing education for younger women.

Further, NCDs continue to be discussed mostly in the context of the "big 4r"; this excludes addressing of health consequences of gender violence, mental ill-health, etc. for example, which are experienced disproportionately by women. Although gender based violence is not a 'disease' and necessitates response that is beyond medical care, its prevalent character and long term physical and psychological implications for the health of girls and women are

well established which would benefit from being integrated within the wide spectrum of NCDs.

"Disease causality operates at three levels – cellular/biophysical, socio-cultural and economico-political and hence the remedy will also be at three levels. Disease-causality at cellular/biophysical level (pathogenic germs or chemical-derangements -deficiency or excess of certain biochemical etc. etc.) is addressed by the science of clinical medicine. Disease-causality at social level (deficient sanitation/water supply at community level or wide-spread alcoholism or unsafe transport conditions or sedentary, stressful life-style at social, community level etc. etc.) will addressed by the science of epidemiology and community medicine. For example, it explains why in a community so many people get diarrheas or get alcoholic cirrhosis or get fatal head injuries; something which cannot be explained by clinical medicine. Disease-causality at economico-political level (capitalist path of development, especially its monopoly phase which generates pathogenic model of development, or the paradigm of growth for the sake of growth in degenerated state socialism) is explained by economic-political analysis. It explains why social pathology continues to reproduce itself, something which cannot be explained by epidemiology."

How do we limit potential risk factors such as those mentioned above as the only cardiovascular risk factors to be considered? How does one start increasing the pool of risk factors such as say chronic stress, or income poverty, or lower birth weights, or not having enough food, or just extreme sadness due to an event? I wonder whether people have proved that oral tobacco use is not a CV risk factor. I think we need to unbundle the word 'chronic stress', but at no rate should we dismiss it as being unimportant. . It is well known that even the biochemistry of stress is very different in responses to diverse physically/pathologically/socially/economically/politically stressful situations. Hence different NCDs may respond very differently to different kinds of stress. We need to have careful studies that study association with less known or unproved risk factors of these NCDs.

When there is adequate evidence based preventive measures and strategies to minimise morbidity as well as case management technologies, non-implementation of those steps must be highlighted and force the policy planners and implementers to take remedial measures. For example in Silicosis, stopping dry pulverization of rocks and mined pellets, installing motors and dripping sets for wet processes, setting up of dust enclosures, exhaust ventilation for closed buildings and yards, ensuring free distribution and wearing of personal protection masks and respirators, compulsory periodical check-ups for workers and medical

treatment of affected workers etcetera has to be enforced strictly by the owners of mining sites and factories.

Similarly in Fluorosis, the responsibility of department of rural water supply and drinking water mission in mitigating the chronic suffering of poor must be reinforced periodically.

While there is government sponsored behaviour change campaign for reduction of stress, promotion of physical exercise, avoidance of tobacco, alcohol etc, there exists, hypocritical government involvement of generating revenue through licensing of production and sale of alcohol.

Historically in the context of communicable diseases and its prevention dimension the role of the state was considered critical and hence interventions related to them came to be regarded as "public health" and were granted public goods status by economists. As healthcare development took place this dimension faded away and health and healthcare increasingly was being regarded an individual's responsibility and this got consolidated with the emergence of private health insurance in the USA. Now in an era of NCD domination this perspective of health being an individual problem and being characterised as a life-style issue is gaining momentum. Countries which have achieved universal access to healthcare, including developed capitalist countries have evolved healthcare systems in which health and healthcare in its entirety are regarded as public goods and hence public resources to the maximum are committed in the budgets of these countries, even though often service delivery may be under a regulated contract with private providers. USA is the only exception amongst developed capitalist countries and a few developing countries like India and Philippines seem to be unfortunately following that track.

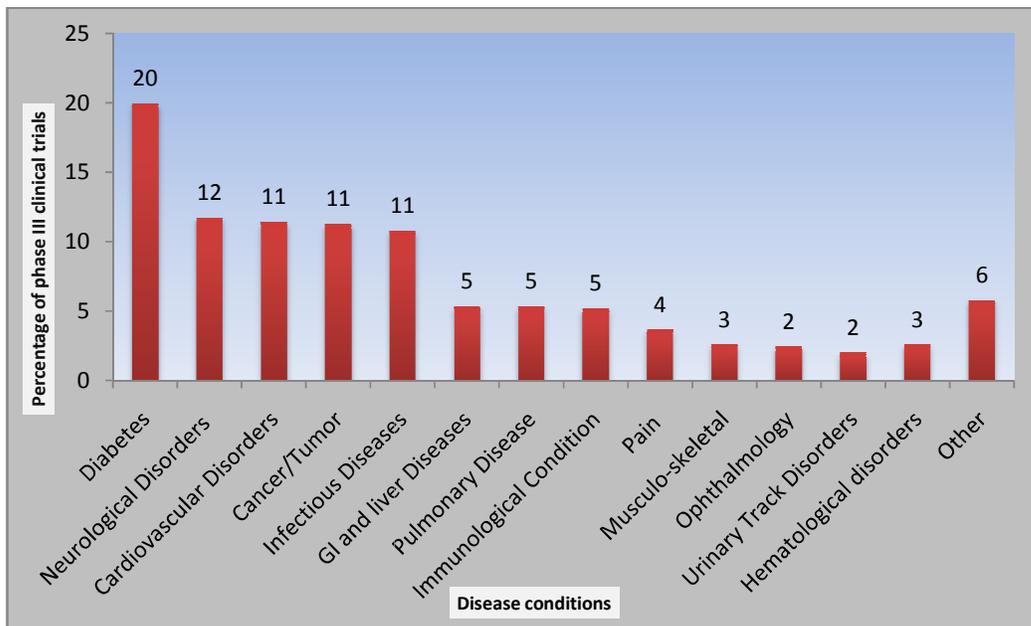
4. R & D and the role of pharmaceutical industry

Sales estimates in 'growing markets' (such as Brazil, Russia, India and China) indicate huge growths of up to US\$300 billion annually by 2020.⁴Further, the pharmaceutical industry contributes to the medicalised approach by creating increasing illness categories and conditions, such as "pre-diabetes" "pre-hypertension", and broadening these boundaries so that more patients are diagnosed and prescribed drugs for NCDs.⁵Clinical trials by Indian pharmaceutical companies in the period 2005-2015 were also found to focus on NCD related drugs.⁶(Mandal; Abrol. 2015). Interestingly, the Global Health Watch (GHW) 4 report explains the role of Big pharma in the context of NCDs. The major pharmaceutical companies such as Bristol-Myers Squibb, Eli Lilly & Company, Merck, Novo Nordisk and

Sanofi support the NCD Alliance, which claims to “combat the NCD epidemic by putting health at the centre of all policies.”⁷

Sama’s study found that 657 phase III clinical trials were conducted for 307 drugs during 2005-2010. Of the 130 sponsors of the trials, 58 per cent were multinational pharmaceutical companies such as Sanofi Aventis, Boehringer Ingelheim, Novartis, Bristol-Myers Squibb, Glaxo Smith Kline, and Pfizer and AstraZeneca that conducted 73 per cent of the trials⁸. (Sama 2016). The disease focus of the trials pointed to a maximum number of phase III trials conducted for diabetes, followed by neurological disorders, cardiovascular, cancer and others. A stark observation from the entire list of 657 trials, only four phase III trials were conducted for HIV (1), Tuberculosis TB (1) and Malaria (2) Refer Figures 2 and 3 (Sama 2016)

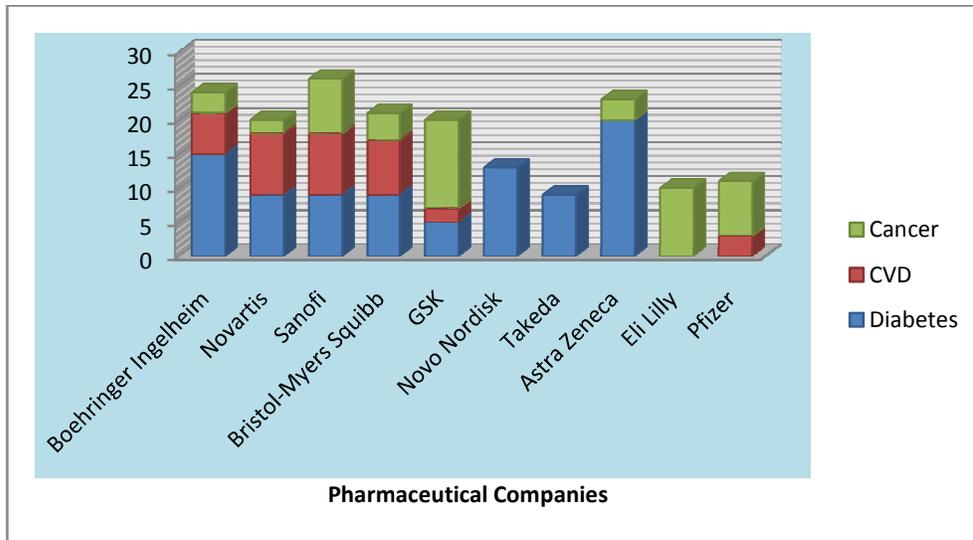
Figure 2: Clinical Trials focusing on disease conditions



(Source: Sama. (2016). Circle of Medicines: Development to Access)

Note: ‘Infectious Diseases’ category includes several diseases for which trials were conducted in India during 2005-2010, including TB, Malaria, HIV, etc.

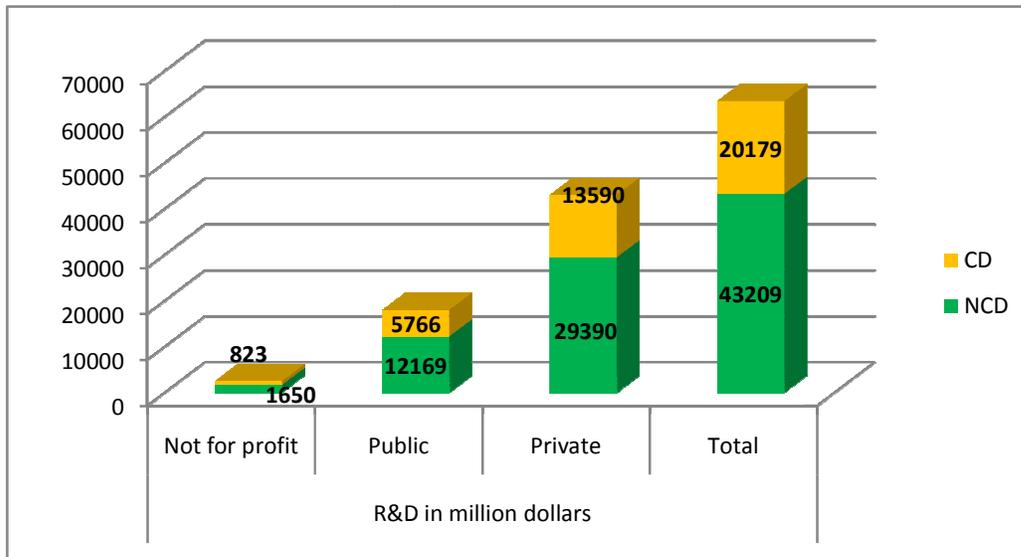
Figure 3: Leading Sponsors of NCD Trials



The number of clinical trials of drugs for cardiovascular diseases, cancer and diabetes increased progressively from 2005, with diabetes accounting for 20% of the clinical trials, cardiovascular diseases 12%, and cancer 11% of the clinical trials conducted in India. Similarly, the study also analysed that the sales revenue for a company is not only dependent upon the number of products in the market but also on the disease category that they target. For example, it was seen that diabetes medications contributed the most to the sales figures of companies like Sanofi and Merck.

Globally, R&D investments of pharmaceutical companies are influenced by various factors including prevalence of the disease condition, market share, profitability associated with a drug etc. The focus of R&D is for drugs for conditions like cancer, diabetes, cardiovascular conditions etc., among the non-communicable diseases (NCD) whereas HIV/AIDS is a principal area of focus among communicable diseases (CD). A WHO expert working group report exploring the R&D investment in the pharmaceutical sector showed that irrespective of whether in the private, public or not for profit sector, investments for NCD and CD were in the range of 68% and 32% respectively (Feletto M, Matlin SA, 2009)⁹. The following figure indicates the investment in health R&D in different sectors in different disease categories.

Figure 4



Adapted from: Feletto M, Matlin SA (2009)

Overall, it also needs to be noted that the global system for pharmaceutical research focuses on areas which affect patients in the High Income Countries and thus where profits can be maximised given the much higher purchasing capacity of patients (or insurance coverage) in High Income Countries. In contrast there is very little investment on diseases which affect the poor in Low and Middle income countries as neither public nor private (individual out of pocket funds) are available to service the high profit margins demanded by innovator pharmaceutical countries. Thus diseases such as TB, Malaria, Kala Azar receive scant attention and neither does the entire array of new antibiotic development as these target infectious diseases that are largely prevalent in Low and Middle Income countries. Creation of demarcated hierarchies between NCDs and other diseases are deleterious for any public health system and people's access to healthcare.¹⁰ India accounts for 21 per cent of the global burden of disease. The burden of communicable diseases—e.g., TB, Malaria, HIV, and, waterborne and vector-borne diseases—in the country is very high, especially among children and mothers, which poses serious health problems. The burden of communicable diseases such as TB and vector-borne diseases is also very high. Out of 1,00,000 people, 176 people in India are suffering from TB. Despite that very few clinical trials have been conducted on them.¹¹

It is by now well established that any approach to address NCDs cannot be "individualistic" given that root causes contributing to NCDs include structural factors including poverty, exclusion, gender, food insecurity, trade, global political economy amongst other. When, for

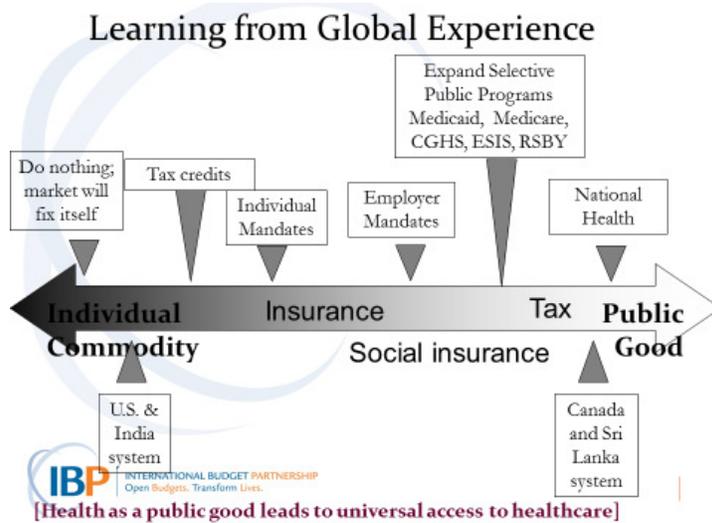
instance, obesity is medicalized, the general approach of its diagnosis and treatment tend to see the condition as an individual problem rather than locating the larger social, political and economic determinants of health.¹²

While development of drugs to treat non-communicable disease is of relevance to the population, there is also an urgent need for R&D for communicable diseases. Another extremely relevant concern emerges from the conflict of interests of the powerful pharma conglomerate; many of them are known to have worked towards contributing to the current discourse and are likely to use it towards expansion of their markets and profits.

While clinical trials / R&D for NCDs are important and all efforts initiated to ensure affordability of drugs for NCDs, this overwhelming focus must not obliterate local health concerns and priorities.

5. UHC agenda-far from reality

Since universal healthcare coverage is on the agenda of the government we need to emphasize the public good dimension of all health and healthcare and advocate for its status as a public good and get the state to commit at least 2.5% of GDP for healthcare through which we can take the first steps in universal access to healthcare for all with equity. With this approach all healthcare whether preventive, promotive or curative and whether communicable or non-communicable will get come within a comprehensive approach. (See Figure below)



We need to even look at the risk factors that affect outcomes too. For example, even for a genetic illness like Sickle cell disease, the outcomes in the tribals is poorer than among those who come in the OBC (lower and middling classes in India) group. *Like in other illness groups, it is not the biological agent causing the disease that is most important; the host characteristics are the ones that determine the severity and the outcomes most.* And I think this operates in the NCDs too. *In perhaps no other illness group do the quality of the public health systems affect the outcomes and course of illnesses as in NCDs.*

The quality of service delivery in public health systems is tested more in the secondary and tertiary management of complications of NCDs. Management of congestive and ischaemic failure in congenital or rheumatic heart disease, cor pulmonale, stroke complications, repeated dialysis for chronic renal failure,, haemolytic crisis in Sickle cell, complications of haemophilia etc needs best use of technologies for repeated episodes for long periods. Quality drugs and diagnostics and strict adherence to evidence based management protocols are a must in public health institutions.

6. Addressing NCDs: A major challenge

Drugs and hospitals are important components of management at an individual level, particularly if someone presents with an acute complication. We are aware that for acute and /or severe presentations of any illnesses, communicable or non- communicable: a hospital is justifiably important, and if the management strategy could be communitized, it could go to a health worker too outside of a hospital. For example, for an acute illness like falciparum malaria, we are looking towards an ASHA to perform a rapid kit test and administer prompt treatment, or to prevent serious haemorrhage after birth, she is being expected to offer the woman 3 tablets of misoprostol. Other examples are of home based care of a newborn, or Integrated Management of Childhood Illnesses, among others.

But for chronic/continuous illnesses, there are only some models available at a large scale, like delivery of blister packs for leprosy and tuberculosis drugs or DOTS. Similar strategies for bipolar diseases, epilepsy and other mental illnesses could be explored. Hospitals are inadequate for their optimal care. There are some NCD Clinics in cities and in rural public health facilities dispensing of medicines is done over few days. It is a challenge to keep people motivated to continue medications for years and public health strategies need to be devised to address this.

There must be a focus on identifying the right delivery platforms to address NCDs. Well-functioning health systems for care of NCDs is as much a need if not more, in comparison to MCH and infectious disease care. These health systems have to provide comprehensive, affordable and appropriate care. Good data recording systems and surveillance systems must be put in place along with a focus on sufficiently communitizing them for expanding their reach. Supportive supervision for all community functionaries has to be built in upfront.

Further, we need new ways too. We have to learn from the models of disease based patient groups, like the way People Living with HIV have done or Alcoholics Anonymous have done. At Jan Swasthya Sahyog, there was an attempt to address this issue over the last two years, and their early results are promising. Similarly, in rural Rwanda and Mozambique some strategies have focused on formation of disease patient groups and use of trained mid-level health workers have been strategies to address these. The Community based Palliative Care model for Cancer, Stroke and severely disabled persons in Kerala is worth expanding in other states. Many Gram Panchayats and local self-governments in Kerala have owned up and find resources for their Palliative Care programme and run it successfully with minimal required technical back up from specialists. But a lot more needs to be done. The point is – we desperately need effective models for managing chronic diseases, not just preventive strategies.

This is not to say that there is no need for preventive strategies to address risk factors. Controlling intake of salt and sugar is important. There is a need to see the impact of our public distribution systems on causing imbalance of food constituents, such as making our diets even more predominant on cereals and their carbohydrates with very little pulses, oilseeds and animal foods, and institute remedial measures. In terms of diet, controlling intake of salt and sugar is an important public health message to disseminate. If birth weights determine occurrence of adult illnesses decades later, there is merit in instituting and strengthening preventive nutritional measures during pregnancy and pre pregnancy periods. Once we know the contribution of chronic stress in causation of NCDs, how to handle chronic stress is a challenge that we will have to confront.

In a context where public spending on health is dismal and that health care priorities compete for finances, it is indeed necessary to reinvigorate campaigns for universal health coverage. It can only be a stop-gap arrangement that in the absence of universal health care, prioritisation of illnesses to address must be based on robust and reliable data.

In late 2015, The Lancet has set up a commission to address the problems of NCDs in the poorest billion in the world, the largest proportion of them are in India and selected sub-Saharan African countries. Essentially as an academic coalition, the concerns they plan to address include settling the burden and pattern of NCDs among the poor as opposed to the non-poor, and then to suggest best delivery platforms, and to make a case for correct financing of NCDs focusing on the concerns of the poorest. They would like to learn majorly and specifically from the Indian context. It is highly likely that the commission's meeting is organised in tandem with the MFC's annual meeting. And we could contribute to and learn from the proceedings in the Lancet Commission.

With this background, the papers should focus on the following:

1. Burden of the NCDs among the communities in which the majority are poor. Or data analysis in which burden of diseases is disaggregated according to the socioeconomic status along with case studies.
2. Phenotype of the NCDs
3. Risk factors associated with NCDs of the poor, at all three levels- cellular/biophysical, social or politico-economic.
4. How the NCDs have evolved over time along with modes of production changing and with levels of physical work changing over time, and with the imbalance in our diet which is also linked to the Public distribution schemes etc.
5. Successful models of chronic disease care provision - both micro and larger models
6. Efforts at prevention of chronic diseases - successful efforts within the country or elsewhere.
7. The politics of NCDs, including the role of pharmaceuticals and care programmes for them.

Notes

¹ Patra, S. & Bhise, M.D. 2016. Gender differentials in prevalence of self-reported non-communicable diseases (NCDs) in India: evidence from recent NSSO survey; *J Public Health* (2016) 24: 375. doi:10.1007/s10389-016-0732-9

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 - ⁷ GHW 4, PHM (2015) non-communicable diseases: is big business hijacking the debate?
 - ⁸ Sama (2016) Circle of Medicines: Development to Access.
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 - ¹¹ Sama (2016) Circle of Medicines: Development to Access.
 - ¹² [Jocalyn Clark](#) (2014) Medicalization of global health 3: the medicalization of the non-communicable diseases agenda