Synergizing Efforts in Diabetes Care at the Tertiary Level

Strengthening Policies and Practices around Diabetes Management
National White Paper
3rd Edition

Synergizing Efforts in Diabetes Care at the Tertiary Level

Strengthening Policies and Practices around Diabetes Management

A JOINT INITIATIVE OF

Confederation of India Industry
Ministry of Health and Family Welfare
Government of India

the NCD partnership

KNOWLEDGE PARTNER

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Abbreviations

ACLS : Advanced Cardiac Life Support
ADA : American Diabetes Association
AHA : American Heart Association
AHR&R : Army Hospital Research and Referral
AMI : Acute Myocardial Infarction
BLS : Basic Life Support
CAD : Coronary Artery Disease
CII : Confederation of Indian Industries
CKD : Chronic Kidney Disease
CURES : Chennai Urban Rural Epidemiology Study
CVA : Cerebro Vascular Accident
CVD : Cardiovascular Disease
DM : Diabetes Mellitus
DR : Diabetic Retinopathy
eGFR : Estimated Glomerular Filtration Rate
ESRD : End-Stage Renal Disease
FPG : Fasting Plasma Glucose
GDM : Gestational Diabetes Mellitus
GFR : Glomerular Filtration Rate
HBP : High Blood Pressure
HF : Heart Failure
IADPSG : International Association of the Diabetes in Pregnancy Study Groups
IDF : International Diabetes Federation
IGT : Impaired Glucose Tolerance
IMA : Indian Medical Association
MCGM : Municipal Corporation of Greater Mumbai
MDR : Multidrug-Resistant
MDRD : Modification of Diet in Renal Disease
MICRAL : Microalbuminuria
MoHFW : Ministry of Health and Family Welfare
NCD : Non Communicable Diseases
NPCDCS : National Program for Cancer, Diabetes, Cardiovascular Diseases and Stroke
OGTT : Oral Glucose Tolerance Test
PCI : Percutaneous Coronary Intervention
PHFI : Public Health Foundation of India
PITS : Prevention, Identification, Treatment and Service
PPPs : Public and Private Partnerships
PSEs : Public Sector Enterprises
PSI : Population Services International
RAS : Renin Angiotensin System
RNTCP : Revised National TB Control Programme
RR : Regional Roundtable
TB : Tuberculosis
UTI : Urinary Tract Infection
WHO : World Health Organization
Prelude

Every year, roughly 5.8 million Indians die from heart and lung diseases, stroke, cancer and diabetes. In other words, 1 in 4 Indians risks dying from an NCD before they reach the age of 70. In line with WHO's Global action plan for the prevention and control of NCDs 2013-2020, India is the first country to develop specific national targets and indicators aimed at reducing the number of global premature deaths from NCDs by 25% by 2025.

This NCD Summit in collaboration with CII and Eli Lilly India therefore comes at a very apt time and is trying its best to cater to the same by building up a consensus both at regional and national level where one can learn and share global and national best practices.

This NCD journey by CII and Lilly has entered its 3rd year of existence.

The first NCD summit in 2013 was commissioned to examine the issues and challenges being faced by the National Program for Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) at national and state levels, and to document best practices across the different states. The objective of 2nd NCD Summit in 2014 was to review the health system landscape of Public Sector Enterprises (PSEs) on policies related to diabetes management; setting priorities to strengthen existing policies or formulating new ones. The deliberations were held in five states and this resulted in some key strategies that could alleviate the burden of diabetes in PSEs.

These summits brought together over 600 representatives from Government of India, state governments, public sector undertakings, national & international organizations and shared learning's to prevent and improve care for people with diabetes in India. As a result, two national white papers were developed and disseminated. It is encouraging to see many of the suggested policies being implemented by various stakeholders and white papers becoming a reference policy document for many project implementation organizations.

To further ensure continuum of diabetes care, Lilly, Population Services International (PSI) and Confederation of Indian Industries (CII) are collaborating to hold the third National NCD Summit. This summit is being planned to “Synergize efforts in Diabetes care at tertiary level” to strengthen the policies and practices around diabetes management more at a tertiary level and has sought to bring together Government, public and private sector undertakings operating in this sphere of NCD management in general and diabetes in particular.
Preface

The practical management of diabetes in developing countries like India is difficult due to poor accessibility, lack of effective services and costly treatment compliance, especially, for sub-urban and rural areas. The medical costs incurred by a person with diabetes are two to five fold higher than those incurred by people without diabetes. There is a need to focus on preventive care as well as acute management for us to be able to combat the rising epidemic of NCDs at large and Diabetes in particular.

The National NCD Summit is a forum developed and convened by the Confederation of Indian Industry (CII) in partnership with Eli Lilly and Company where specialists of various disciplines meet and exchange ideas. Theme based workshops enable exchange of ideas, and disseminate treatment protocols among care givers. They help in establishing norms of care in the field and also help policy makers identify bottlenecks and gaps within the policy framework. The need is to integrate services in treatment of diabetes to enable coherent and cohesive management of the patient.

This NCD partnership began in 2013 and in the last two years has focussed on primary and primordial prevention. The 3rd National NCD Summit 2015 aspires to ‘Synergize efforts for Diabetes care at the tertiary care level’.

It is a culmination of 6 regional level multi-stakeholder consultations and thematic workshops around Diabetic Retinopathy; Diabetic Neuropathy/Stroke; Gestational Diabetes Mellitus; Cardio Vascular Disease and Diabetes; Diabetic Nephropathy and Infections in People with Diabetes. Each regional workshop saw engagement of endocrinologists, diabetologists and specialist doctors practicing across the various identified complications.

These regional deliberations helped gather insights into micro and macro vascular complications of diabetes across India and included analysis of current practices, gaps, and recommendations. These have been compiled as recommendations included in this Whitepaper.

This is a much needed platform that discusses concerns related to the rising burden of NCDs in the country as it engages specialists, policy makers, government as well as the private sector to dialogue together towards the larger common opportunity that can be afforded by a healthy population.
India

Total population: 1,240,000,000
Income Group: Lower middle

Age-standardized death rates

Percentage of population living in urban areas: 31.3%
Population proportion between ages 30 and 70 years: 40.1%

Proportional mortality (% of total deaths, all ages, both sexes)

Premature mortality due to NCDs

The probability of dying between ages 30 and 70 years from the 4 main NCDs is 26%.

Adult risk factors

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
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<tbody>
<tr>
<td>Current tobacco smoking (2011)</td>
<td>25%</td>
<td>4%</td>
<td>15%</td>
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<tr>
<td>Total alcohol per capita consumption, in litres of pure alcohol (2010)</td>
<td>8.0</td>
<td>0.5</td>
<td>4.3</td>
</tr>
<tr>
<td>Raised blood pressure (2009)</td>
<td>21.3%</td>
<td>21.0%</td>
<td>21.1%</td>
</tr>
<tr>
<td>Obesity (2008)</td>
<td>1.3%</td>
<td>2.4%</td>
<td>1.9%</td>
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National systems response to NCDs

- Has an operational NCD unit/branch or department within the Ministry of Health, or equivalent: Yes
- Has an operational multisectoral national policy, strategy or action plan that integrates several NCDs and shared risk factors: No
- Has an operational policy, strategy or action plan to reduce the harmful use of alcohol: Yes
- Has an operational policy, strategy or action plan to reduce physical inactivity and/or promote physical activity: Yes
- Has an operational policy, strategy or action plan to reduce the burden of tobacco use: Yes
- Has an operational policy, strategy or action plan to reduce unhealthy diet and/or promote healthy diets: Yes
- Has evidence-based national guidelines/protocol/standards for the management of major NCDs through a primary care approach: No
- Has an NCD surveillance and monitoring system in place to enable reporting against the nine global NCD targets: No
- Has a national, population-based cancer registry: No

* The mortality estimates for this country have a high degree of uncertainty because they are not based on any national NCD mortality data (see Explanatory Notes).

India at present is undergoing an epidemiological transition, thanks to the rising socio-economic status. What this means in terms of the health scenario is that the prevalence of communicable diseases is on the decline and that of non-communicable diseases is rising sharply. Indeed 60% of all deaths in India are now due to non-communicable diseases (NCDs)\(^1\). Among the NCD’s, diabetes is one of the most common and most easily measurable NCD.

India is currently facing an uncertain future in relation to the potential burden that diabetes may impose upon the country. The risk factors and accordingly complications of the disease contribute significantly to the morbidity and mortality in the country. There are 66.8 million people suffering from diabetes in India and is expected to rise by 109 million by 2035 (IDF, 2014). As per the IDF (2014), the national prevalence of diabetes among adults of 20-79 year olds is 8.63% in India; and about 1.3 million people died from diabetes in India in the year 2014.

The asymptomatic nature of diabetes combined with low disease awareness among the population, leads to delayed diagnosis of the disease by several years. As a result, many subjects already have microvascular and/or macrovascular complications at the time of diagnosis of diabetes.

The amount spent on each diabetic patient in India is $95/annum (IDF, 2014). This high economic burden leads to the negligence of health care, especially, among lower-income groups, ultimately, adding to the rise in prevalence of complications.

There is a great potential and opportunity to reduce the rising burden of diabetes and the associated vascular risk through improved detection, prevention and control.

Diabetes care in India is provided by variety of players, both non-government and government at three levels of care, primary, secondary and tertiary care. The National Programme for prevention and control of Diabetes, Cardiovascular diseases and Stroke (NPCDCS) launched by the Government of India offers opportunities for improving care for diabetes and other non-communicable diseases through service provision at primary and secondary levels of care. Despite these efforts, the prevalence of chronic diseases especially diabetes has started rising among the population which has further led to the maximum load of patient care in tertiary care hospitals.

This recent shift in burden of disease is confirmed by several studies. Hence the need to have an in-depth dialogue in India on ‘Synergizing Efforts in Diabetes Care at the Tertiary Level Institutions’ was felt and has led to this National Summit on NCD as a collaborative effort of CII and Lilly with scientific support from PSI.

Executive Summary

As per the International Diabetes Federation (IDF, 2014), the national prevalence of diabetes among adults of 20-79 year olds is 8.63% in India. Various studies in and from India have confirmed the steep rise in the prevalence of diabetes in both urban and rural areas of India. The prevalence of chronic diseases especially diabetes has started rising among the population, which has further led to an ever increasing load of patients at tertiary care hospitals.

Every year, roughly 5.8 million Indians die from heart and lung diseases, stroke, cancer and diabetes. In other words, 1 in 4 Indians risks dying from an NCD before they reach the age of 70. In line with WHO’s Global action plan for the prevention and control of NCDs 2013-2020, India is the first country to develop specific national targets and indicators aimed at reducing the number of global premature deaths from NCDs by 25% by 2025.

This NCD Summit in collaboration with CII and Eli Lilly India therefore comes at a very apt time and is trying its best to cater to the same by building up a consensus both at regional and national level where one can learn and share global and national best practices.

This NCD journey by CII and Lilly has entered its 3rd year of existence.

The previous 2 summits of 2013 and 2014 focused on primordial and primary prevention of NCDs in India in collaboration with state governments and PSEs.

To ensure continuum of diabetes care, this year the need was felt to focus on tertiary care management of NCDs in general and diabetes in particular and hence the 3rd National NCD summit is being conducted as a collaborative venture between CII and Lilly India with scientific support from PSI.

The national summit draws its prelude from six thematic regional roundtables that had focused on Diabetic complications viz. Retinopathy, Neuropathy, Gestational Diabetes Mellitus, stroke, Cardio Vascular Disease, Nephropathy and Infections including TB.

Each regional workshop had participation from endocrinologists and specialists in the identified theme and was supported by Ministry of Health and Family Welfare (MOHFW) and policy makers from key government institutes and organizations from public and private sector.

The diabetic retinopathy (DR) workshop in Hyderabad concluded that every diabetic patient must get their eyes checked once a year. This could come into practice by commemorating a monthly ‘SUGAR day’ to act as a reminder for all diabetic patients to get themselves checked for diabetic complications.

Neuropathy and cerebro-vascular disease due to diabetes was the next complication for which the city of Delhi was the host. Simple tests like monofilament testing and absence of ankle jerk as an evidence of diabetes peripheral neuropathy should be promoted, and physicians and paramedical staff should be trained on these simple procedures. The need for cranial imaging in all patients of CVA within the hyper acute stage of 3 hours could facilitate thrombolysis therapy in stroke and could be an aspect that tertiary care centers need to pay close attention to.

1 SUGAR has been converted into a Pneumonic; its five alphabets define– SPUTUM, URINE, GLUCOSE, ARREST BRAIN and HEART, RETINA. All together they convey that yearly check-up of Sputum, Urine, Body Lipids, Peripheral Reflexes and Quarterly testing of Glucose can prevent a diabetic patient from acquiring complications.
The Chennai experts deliberated on Gestational Diabetes Mellitus (GDM). This group suggested that all pregnant women in India should be screened for GDM in early pregnancy; and at the facility level, blood glucose test should be made mandatory for all ante-natal clinics and para-medical staff especially nurses should be trained on GDM.

Further, cardiovascular disease (CVD) roundtable in Kolkata brought this recommendation that the practice of history taking and general examination including all pulses should be the first and foremost step for assessing a diabetic patient and investigation for any cardiovascular event. The paramedics should be trained on basic life support (BLS) and advanced cardiac life support (ACLS) training courses; and instruments like Trop-T, glucometers, ECG machine etc. should be made available at the primary care level.

The fifth workshop on Diabetic Nephropathy happened in Mumbai. There were strong recommendations in this workshop that recurrent urinary tract infections in diabetic patients should not be overlooked, and presence of proteinuria should warrant further examination by a retina specialist. The role of various drugs in causing nephrotoxicity was stressed upon and early referral to a nephrologist was highlighted.

Guwahati workshop on Infections and tuberculosis in Diabetes came out with strong recommendations regarding mandatory influenza and pneumococcal vaccination in high risk diabetic patients (children, elderly and health care professionals).

The national summit is a composite of all these workshops and it endeavors to put forward these concrete recommendations to all tertiary care centers that operate to address these common complications of diabetes. A follow-up plan would also be devised with interested partners for piloting a few of these recommendations and a follow up national or regional summit is planned later this year to highlight these pilots.
The regional roundtable workshops derived its outcomes from the deliberations made by the expert groups on identified themes. Each regional workshop had participation from endocrinologist and specialists.

The specific objectives of the summit were:

I. Gathering insights into micro and macro vascular complications of diabetes by six regional workshops across India

II. Compilation and analysis of current practices, gaps, and recommendations from these workshops

III. Formulate a white paper and share at the National Summit for final recommendations.

IV. Identify a few centers (10% of the target group) which are ready to adopt specific recommendations from the summit exercise, and follow them up over the next 3-4 months till December 2015 and showcase their performance.
RETINOPATHY
Yearly check-up of Sputum, Urine, Body Lipids, Peripheral Reflexes, Retina & Quarterly testing of Glucose can prevent a diabetic patient from acquiring any complication.
One percent of global blindness can be attributed to diabetes.

387 million people are suffering from diabetes in the world.
4.9 million worldwide deaths were attributed to diabetes in 2014.

India is home to 66.8 million of diabetics in India at present.
About 1.3 million people died from diabetes in India in the year 2014.

DR is one of the most frequent causes of blindness among adults aged 20-74 and in India, one in five people with diabetes suffer from DR.

The number of people with DR will grow from 126.6 million in 2011 to 191.0 million by 2030 if no urgent action is taken.

Only around 27% people with diabetes or hypertension are aware of the DR.

Only 9% people with diabetes or hypertension are aware of the treatment (laser) for DR.

Early detection and treatment can reduce the risk of blindness from DR by 90%.

The prevalence of diabetic retinopathy is 18% in an urban population and 10.3% in rural with diabetes mellitus in India1,2.

Only 7-8% of the ophthalmologists are trained in the management of DR in India.

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This NCD initiative is the need of the hour as we are in a time when every specialist operates in a cocoon with minimal interaction with others. These brainstorming sessions are essential to ensure that we improve the quality of healthcare we provide to the patients.

Diabetic retinopathy, a micro vascular complication of diabetes, is prevalent in 35% of people with diabetes. It is a source of significant morbidity and economic cost for the patients. The problem is enormous in India where there is a change in lifestyle along with lack of awareness among the patients.

Dilated fundus exam by a trained ophthalmologist is an adequate first step. The recent advancement in diagnostics such as ocular coherence tomography, fluorescein angiography has decreased the dependence on the ophthalmologist while increasing the cost. Newer treatment options such as anti VEGFs have altered the face of the otherwise difficult treatment choices. These treatment facilities are now available in most Indian cities but the gaps remain in rural areas.
Diabetic Retinopathy

Diabetic Retinopathy (DR) needs systemic monitoring for coronary artery disease and peripheral vascular disease as their risk is higher as compared to patients without retinopathy.

The regional roundtable on DR at Hyderabad identified the following major gaps and recommendations.

Gaps

- The cost of the treatment, drugs and equipment were amongst the major barriers.
- Lack of awareness amongst Patients as they have low self-risk perception.
- Lack of equipped facilities to cater services especially to the rural population.
- Lack of trained manpower to provide quality treatment and counseling services.
- Unclear guidelines for handling DR.

Recommendations

- Every diabetic patient must get their eyes checked once a year. This could come into practice by commemorating a monthly ‘SUGAR day’¹ to act as a reminder for all diabetic patients to get themselves checked for diabetic complications. These reminders could spread through bulk messaging over mobiles; advertisements across social media and these small initiatives can be taken up by Government, corporates or voluntary organizations.
- It was required to have consistent awareness campaigns on the importance of getting oneself tested for complications if one has diabetes. For example, emphasis needs to be given to post-test counseling, as it is at this point where the issues of compliance were maximum. Social media was identified as a potential vehicle for disseminating awareness. Such messages could be used as one of the reminder message on ‘Diabetes Day’.
- The need was felt for a freely accessible virtual medical record/information system so as to minimize the communication gap between the doctor and patients. The integration of patient records with Aadhar card may be useful in this, and should be explored in detail.

¹ SUGAR has been converted into a Pneumonic; its five alphabets define— SPUTUM, URINE, GLUCOSE, ARREST BRAIN and HEART, RETINA. All together they convey that yearly check-up of Sputum, Urine, Body Lipids, Peripheral Reflexes and Quarterly testing of Glucose can prevent a diabetic patient from acquiring complications.
• Patient education was recommended at all levels of health system
• The need was felt for a well-equipped and suitably staffed regional eye center in each district.
• Technology such as tele-medicine and mhealth could play a larger role in the screening and management of DR, especially in catering to rural areas. This would also reduce the direct and indirect loss of resources (cost, time etc.) to the patients and help reduce the patient load at the secondary and tertiary care institutions.
• Local Optometrists and Opticians should be trained on detection of diabetic retinopathy (DR) as this will help in timely detection and referral of patients with ‘DR’ to secondary/tertiary care institutions.
NEUROPATHY, STROKE
Peripheral neuropathies are the most common neuropathic complication of diabetes mellitus (DM) affecting up to 50% of patients.

More than 60% of diabetic foot ulcers are the result of underlying neuropathy and it is estimated that approximately 40,000 patients undergo amputations each year.

It is estimated that the overall prevalence of Stroke is 1.54 per 1000 population of India.

Diabetes is one of the risk factors leading to Ischemic stroke.

A higher prevalence of stroke is found in patients with both diagnosed and undiagnosed diabetes and glucose intolerance.

Morbidity and Mortality due to stroke is more with hyperglycemia.
Globally, prevalence of NCDs is rising alarmingly. This trend is also observed in developing countries including India. It is estimated that 14.2 million people die prematurely every year from NCDs between 30 and 69 years of age, the productive span of life. The above information on burden of NCDs indicate that gigantic task lies ahead for the country to not only reduce the risk of developing NCDs by risk reduction but also challenge to the health sector is early detection, providing diagnostic services and treatment to those who have NCDs. It calls for strengthening of the health system; both public and private, to respond to the huge burden of NCDs due to its premature mortality, high prevalence and lifelong and high cost of treatment.

NCDs have negative economic impact due to premature deaths and expensive treatment in late stages.

Stroke is the second commonest cause of death in India. According to the ICMR statistics, 1,65,000 strokes occur each year with nearly one stroke every 40 seconds and one stroke death every 4 minutes. The stroke burden is greater in India more so among younger and middle aged people.

Many Indian hospitals lack the necessary infrastructure and organizations required to triage and treat patients with stroke quickly and efficiently and do not deliver adequate stroke care. The clinical stroke services across the country, especially in public sector hospitals are deficient in many aspects.

The following are the existing Treatment Gaps in India:

1. Use of thrombolysis for stroke (a dismal 0.5% of all strokes receive thrombolysis);
2. Use of stroke care maps and implementation of stroke care pathways;
3. Presence of a stroke unit
4. A stroke team including round-the-clock availability of stroke physicians and Interventional radiologists
5. Sufficient community awareness program which are essential key elements necessary to provide optimal stroke care to the community.
6. Efficient public emergency ambulance system.

These above limitations can at least be partially met with the addition of “Stroke Program” in the already existing CCUs designed and functional in the districts adopted under the NPCDCS.
Diabetic Neuropathy (DN) and stroke were one of the most common late complications of diabetes mellitus and the high prevalence of stroke in patients with both diagnosed and undiagnosed diabetes and glucose intolerance called for attention to these complications.

The regional roundtable on DN at Delhi identified the following major gaps and recommendations.

Gaps

- Awareness on risk factors of diabetes such as alcohol and tobacco consumption, unhealthy diet and lack of physical activity, obesity is on the rise, equally among both men and women.
- Simple investigating techniques - ‘monofilament’ and ‘ankle jerk testing’ were neglected in identifying peripheral neuropathy.
- The necessary foot care is abysmally low in DN patients.
- The availability of appropriate footwear is a challenge in India.
- The inadvertent use of glucose drip (in rural areas especially) to every patient without knowing their diagnosis should be stopped, as this could prove fatal in case of stroke patients.

Recommendations

- Screening of complications should be done at the time of diagnosis of the diabetes itself.
- Uniform screening protocols for complications in the form of checklists should be developed to ensure that all kinds of testing procedures have been done in a diabetic patient.
- Training of doctors on diabetes complications and pain, lifestyle management, as well as on testing methods such as monofilament testing.
- Simple tests like monofilament and ankle jerk for diabetes peripheral neuropathy should be promoted and there is tremendous need and scope of training paramedical staff including staff nurses working at all levels of health care on these two procedures.
- Standard training modules should be developed for all cadres of health care providers in local languages so as to ensure uniformity in processes and procedures followed across the country.
- There should be a managing check (as follow-up) of all the complications on yearly basis. In line with the same, centralized database should be maintained for all identified patients and information should be updated for every follow-up.
• Secondary level of health facilities to be equipped to diagnose and manage cases of neuropathy such as provision of nerve conduction testing services, etc.
• Importance of foot care to be emphasized; affordable customizable footwear to be made accessible for patients of peripheral neuropathy.
• Awareness should be created on the importance of ‘adherence to treatment protocol’ and ‘timely management’ for prevention of complications.
• Recognizing the signs and early treatment can save patients of Stroke

F = Facial weakness
A = Arm weakness
S = Speech difficulty
T = Time to act fast
GESTATIONAL DIABETES MELLITUS
Gestational Diabetes Mellitus (GDM) affects up to 15% pregnant women worldwide and in India, an estimated 4 million women suffer from the condition. (IDF 2014)

Depending on the population studied and the diagnostic test employed, prevalence of GDM may range from 2.4 to 21 per cent of all pregnancies. (Indian J Med Res 137, April 2013, pp 728-733)

Six million births are affected by some form of hyperglycaemia in pregnancy in India alone, of which 90% are due to GDM.

GDM is a severe and neglected threat to maternal and child health.

GDM has long-term health impact, with more than 50% of women with GDM going on to develop type-2 diabetes within 5-10 years of delivery.

Babies born to mothers with GDM also have a higher lifetime risk of obesity and developing type-2 diabetes.

Research indicates that GDM diagnosed by 26 weeks may increase an infant’s risk for autism spectrum disorders, suggesting a need for earlier diabetes screenings among pregnant women.

Several studies have confirmed that awareness and knowledge about GDM is very poor even among health care professionals.

Unfortunately half of all women with GDM in India live in rural areas where appropriate healthcare is often not available”; this highlights the problem of the inadequacy of our health system.
India at present is undergoing an epidemiological transition, thanks to the rising socio economic status. What this means in terms of the health scenario is that the prevalence of communicable diseases is on the decline and that of non-communicable diseases is rising sharply. Among the NCD’s, diabetes is one of the most common and most easily measurable NCD. The prevalence of Gestational Diabetes Mellitus (GDM) is increasing very rapidly in India. Even in villages where GDM was unheard of, the prevalence is now in the range of 10% to 15%.

The Round Table on GDM held at Chennai on 19th June discussed the various barriers and the challenges in the screening and management of GDM. The panel recommended the International Association of the Diabetes and Pregnancy Study Groups (IADPSG) criteria for diagnosis and management of GDM. Wherever this is not possible, local practices should be adopted but this should not compromise the sensitivity or specificity of the screening.

In addition, massive awareness programs about GDM also have to be done. The physicians and obstetricians have to be trained in early recognition and correct management of GDM as this will help improve the outcomes for the mother and the offspring. In addition, GDM provides a golden window of opportunity to prevent type 2 diabetes in the future, as between 50% to 70% of all women with gestational diabetes in India will go on to develop type 2 diabetes within 5 to 10 years.
Gestational Diabetes Mellitus (GDM) usually develops during mid to late pregnancy; however if screening is delayed then there are chances that pre-existing diabetes may be missed. Besides, although GDM has found space in national guidelines but its implementation in routine is far from reality.

The regional roundtable on GDM at Chennai identified the following major gaps and recommendations.

**Gaps**

- No standardized methodology/regulatory board or testing guidelines and recommendations for GDM; different labs follow different reference range for GDM
- Women are traditionally non-health seekers, hence identifying and motivating them to reduce the chances of Diabetes is a critical challenge.
- The issues in managing diabetes in pregnancy include maintaining good glycemic control, counseling & support, fetal surveillance and prenatal diagnosis.
- Myths and mis-conceptions among patients and care givers such as pregnant (ANC) women should not do physical exercise.
- Administering insulin in pregnant women was a challenge.
- Lack of effective follow-up and tracking mechanism with GDM patients.
- The primary care health centers are not equipped to diagnose and manage GDM as they are often not fully equipped with glucometer, glucose strips; and at places trained manpower is not available to conduct these tests.

**Recommendations**

The International Association of Diabetes in Pregnancy Study Groups (IADPSG) criteria is better for screening for GDM in India despite a few challenges in its implementations.

- All pregnant women in India should be screened for GDM in early pregnancy
- At the facility level, blood glucose test should be made mandatory for all ante-natal clinics and para-medical staff especially nurses should be trained on GDM.
• Wherever possible a fasting oral glucose tolerance test (OGTT) should be done using IADPSG criteria. Where this is not possible, a single step procedure i.e., 75 g oral glucose load irrespective of whether she is in the fasting or non-fasting state and without regard to the time of the last meal be done.
• The existing workforce of ASHA’s and Anganwadi workers could be used for follow-up and tracking of GDM patients.
  • As part of the preventive efforts, opportunistic screening of women for DM and HBP could be done at paediatric clinics at the time of immunization.
  • All health professionals running ANC clinics must be trained on GDM diagnosis and management. Autonomous bodies like Indian medical association (IMA), FOGSI and related bodies can play an important role in ensuring this.
  • Increase awareness on GDM busting myths and misconceptions among patients and caregivers.
  • Life style management should be made part of the curriculum of schools and colleges.
CARDIOVASCULAR DISEASES
WHO states that 50 percent of people with diabetes die of cardiovascular disease (CVD), primarily heart disease and stroke.

South Asians may account for between 40-60% of global CVD burden within the next 10-15 years although they comprise less than 20% of the world’s population.

India stands out as an anomaly with 30-39% of CAD patients reporting known diabetes in national and international prospective registries. Moreover, in Indians, CAD occurs prematurely, i.e., one to two decades earlier than in the West.

The cause of heart attacks and strokes are usually the presence of a combination of risk factors, such as tobacco use, unhealthy diet and obesity, physical inactivity and harmful use of alcohol, hypertension, diabetes and hyperlipidaemia.

In India, more than 60% patients with coronary heart disease have diabetes or glucose intolerance, and more than 70% patients of type 2 diabetes die of coronary heart disease.

Diabetes as a whole increases CVD risk 2-4 fold times as compared with the non-diabetic general population.

Premenopausal women who have diabetes have an increased risk of heart disease because diabetes cancels out the protective effects of Oestrogen.

High blood pressure (HBP) is more than twice as common in people with diabetes as in people with normal blood glucose levels.

Improved control of risk factors and therapeutic lifestyle modification (including dietary modification, exercise, and smoking cessation) is an excellent strategy for primary prevention of CAD.
Non-communicable diseases (NCD) now outstrip communicable diseases as cause of mortality in India; based on data from the Million Death Study, NCDs accounted for 63% mortality in 2008 and projected to increase to 76% in 2030. This is contributed to a significant extent by diabetes and cardiovascular diseases (CVD); WHO data indicate at least 50% of deaths in diabetes result from CVD, primarily coronary artery disease (CAD) and stroke.

CAD in diabetes presents some unique features, more so in Indians: it tends to present at younger age, be more severe, cause more heart failure, carry higher chances of death; additionally individuals with diabetes may present with painless heart attacks, thus delaying diagnosis.

While hyperglycaemia (high blood glucose) itself could promote atherosclerosis, underlying insulin resistance in Type 2 diabetes probably plays equal or, more important role in the significantly (2-3 times) higher risk of CAD in diabetes. Current understanding is that control of hyperglycaemia is most effective, at least in reducing cardiovascular events and mortality, if implemented early on in the course of the disease. However, it is also felt that hypoglycaemia (too low blood glucose), sometimes an inextricable fall-out of efforts to tighten glucose control, could increase these same events. It is possible that anti-diabetic medications may have differential effects on CAD and its complications like heart failure. So correct choice of medications is important.

It is also well understood that control of high blood pressure and abnormal lipid levels in blood are more effective measures in reducing burden of CAD than controlling hyperglycaemia in diabetes. That apart, avoidance of tobacco and judicious use of blood-thinner like aspirin need strong emphasis. A healthy lifestyle including intake of plenty of vegetables and fruits, regular physical exercise and adequate rest and relaxation is obviously important. Normal body weight and body fat distribution also contribute to cardiovascular health. All these mean that treatment of diabetes should not be gluco-centric, but holistic, especially in the context of CAD.

Diabetes subjects are known to have a two to four times increased coronary artery disease (CAD) risk. Diabetic patients have increased mortality following acute myocardial infarction (AMI) right from the pre-CCU era to modern day percutaneous coronary intervention (PCI) era. PCI for symptom control may be considered as an alternative to CABG in patients with DM and less complex multivessel CAD in need of revascularization.

Therapeutic lifestyle interventions such as smoking cessation; diet changes; exercise; and reduced alcohol intake play a vital role in prevention of CAD and its complications in the setting of diabetes. Beyond lifestyle, lipid management, blood pressure control, glucose management and aspirin therapy are key factors in prevention of CAD in diabetes.

However, the most cost-effective strategy, for all non-communicable diseases including diabetes at the national level. Inclusion of relevant information in this regard in the school curriculum and appropriate training of teachers to impart such knowledge to students would be the right step in this direction.
Numerous studies have demonstrated that diabetes is a major risk factor for heart failure. People with impaired glucose tolerance (IGT) (considered “pre-diabetes”) who do not have chronic hyperglycaemia have a twofold increase in the risk of cardiovascular disease (CVD) compared to normal subjects. Many individuals with type-2 diabetes are not diagnosed until they have experienced a cardiovascular event and they have a threefold increased risk of CVD.

The regional roundtable on CVD at Kolkata identified the following major gaps and recommendations.

**Gaps**

- The lack of Indian guidelines for management of CVDs in diabetes stood out to be the major gap.
- Lack of proper infrastructure, trained manpower, lack of awareness among the patients and their caregivers regarding the disease and its management were other noticeable gaps.
- Less focus on education pertaining to diabetes and its complication management amongst the doctor fraternity.
- The capacity building initiatives have been marred by lack of funds and manpower.

**Recommendations**

- Realistic India specific guidelines at all three levels of care for CVD management in diabetes should be developed.
- Practice of history taking and general examination including all pulses is the first and foremost step for assessing a diabetic patient and investigating for any cardiovascular event.
- Instruments like Trop-T, glucometers, ECG machine etc. should be made available at the primary care level.
- The paramedics should be trained on basic life support (BLS) and advanced cardiac life support (ACLS) training courses.
- Fully-equipped ambulances linked with a dedicated hotline number such as 911 should be made into a reality.
- All three levels of care should be streamlined with each other for smooth referrals and optimum utilization of services.
- Awareness workshops on “Diabetes and Role of Lifestyle in it” should start from the school level itself so as to inculcate health care as a part of their life and also to apprise them of the rising risk of DM among school children.
• The under graduated and post graduate curriculum of doctors, nurses and other paramedics should include a chapter on basics of diabetes, its complications and management.
• Other modes of diabetes education programs should be initiated such as certified online courses, distance education programs, integrated workshops.
• Moreover, the courses should be standardized across the country; four weeks of classroom training and four week of hands on training should be made mandatory for the resident doctors and other trainees. General physicians and paramedics should be encouraged to enroll in these learning programs as part of their CME credits.

Tackling CAD forms a very important component of management of diabetes. Strategy may be focused at 5 different levels:

1. Physician: More stress on diabetes right from MBBS level and also at MD/MS and DM/MCh levels Short CME programmes, supplemented by practical training in selected centers of excellence across the country at periodic intervals eg., every 5y for practicing physicians especially, those in rural health service; some of these could even be online programmes Scope for tele-consultation with specialists by physicians posted in periphery with scope to electronically transmit essential information like ECG Building of integrated care teams, with seamless link to higher centers of referral

2. Paramedical personnel (nurse, dietitian etc): Appropriate practical periodic training in diabetes and its complications, highlighting holistic care; need to build up cadre of Diabetes Educators or, NCD Counselors across the country

3. Individuals with diabetes: Easy access to care, including medications and investigations Holistic treatment with control of glucose, BP, lipids, aspirin (when indicated), avoidance of tobacco

4. People at large: Raise awareness of NCD including diabetes, hypertension and dyslipidaemia through public awareness programmes utilizing print and electronic media 'Catch them young' – introduce in school curriculum

5. Infrastructure: Availability of functioning BP instrument, glucometer with strips, ECG, facility for bedside measurement of Troponin T or, related substance at all rural hospitals Equipped ambulance with trained manpower at all rural hospitals ‘Hotline’ with referral hospital for hassle-free transfer of patient, when needed Development of at least one affordable comprehensive cardiac care hospital in each district
NEPHROPATHY
Diabetic nephropathy is the leading cause of End-Stage Renal Disease (ESRD) worldwide, and it is estimated that 20% of type 2 diabetic patients reach ESRD during their lifetime. The incidence of ESRD is **150-200 per million** population in India.

About one in four people with diabetes will develop some stage of kidney disease during their lifetime with the condition with nearly **one in five** developing overt kidney disease, which may need treatment.

**Microalbuminuria** is the earliest clinically detectable stage of diabetic kidney disease at which appropriate interventions can retard, or reverse, the progress of the disease.

As per WHO, Kidney disease accounts for **11%** of deaths in Type 2 diabetes.

The approximate prevalence of chronic kidney disease (CKD) is **800 per million** population in India and the most common cause of CKD in population-based studies is found to be diabetic nephropathy.

About **20%** of the people who need dialysis (artificial kidney treatment) or kidney transplantation in India usually have diabetic nephropathy.
Diabetes is a chronic lifestyle disease which requires continual monitoring & treatment. Considering the rising stress levels & changing lifestyle, it is necessary to put in an integrated approach at primary, secondary & tertiary care level to identify patients at pre-diabetic stage and ensure good compliance to avoid complications. It is most important for NCD programmes to focus on primary prevention.

Multiple evidences are present world over, like in Finland, Canada, etc where the lowering of prevalence of hypertension and heart disease was possible over 20 years but required strong policies for controlling levels of salt, sugar and Trans fat in food items, massive awareness campaigns and surveillance system for the same. These are under consideration by Govt of India.

Till that time, create awareness, provide supportive environment, counselling, do pro-active screening of complications and refer, which is the need of the hour.
Diabetic nephropathy is the leading cause of end-stage renal disease (ESRD) worldwide. As per the Chronic Kidney Disease (CKD) registry analysis, every fourth patient with CKD is a diabetic and that it is the burden exclusively for type – 2 diabetics. Besides, Kidney is the only organ that can be kept alive for a long time.

The regional roundtable on Nephropathy at Mumbai identified the following major gaps and recommendations.

**Gaps**

- Most health care professionals do not follow any guidelines. Thus, urine routine test is not recommended as a routine test. Besides, there were logistical issues related to collection of urine samples such as common toilets, which lead to perpetual UTIs.
- The Modification of Diet in Renal Disease (MDRD) and staging patients at Estimated Glomerular Filtration Rate (eGFR) requires standardization; and this should be made mandatory for all doctors and laboratories.
- Lack of awareness on when to recommend Microalbuminuria (MICRAL) and Proteinuria tests.
- The quality of reporting in the laboratory is not uniform.
- Abundance of non-certified and non-trained diabetologists, which is actually causing more harm than good.
- Non-availability of Nephrologist and nephrology department.
- Antihypertensive drugs were not as cheaper as aspirin.
- Dietary and medical nutrition therapy is often overlooked in CKD and Diabetic Nephropathy management.
- The work up of a diabetic nephropathy patient in terms of his cardiovascular status is not usually done.
- Amongst patients and caregivers, there is lack of awareness; poor control of blood glucose; poor control of hypertension; fear of insulin and poor lifestyle.

**Recommendations**

- The primary care for NCDs can/should perform the basic functions of creating awareness, counseling, pro-active screening of complications such as nephropathy and referral.
- Linkages should be established between NPCDCS and other National Health Programs including RNTCP for early detection of co-morbidities in patients.
- Antihypertensive drugs should be made as cheaper as Aspirin.
- Standardized reporting by all the Labs.
- Create awareness of eGFR formulas.
• Self-monitoring of blood glucose and blood pressure
• Intervention in schools to prevent obesity
• Highlighting the importance of diet management and therefore the role of dieticians becomes crucial
• Conducting free camps for early detection of HBP and blood glucose
• Ensure referral set up for nephrology
• Careful investigations in all patients for renal arterial stenosis (RAS) important before inhibiting the RAS system
• High creatinine levels in an individual need to be further investigated
• Recurrent urinary tract infection in diabetic is an alarm signal

**Interesting facts about Diabetes and Nephropathy**

**Type 1 Diabetic**
• 25 - 45% will develop diabetic nephropathy
• 80 - 90% with microalbuminuria will progress to overt diabetic nephropathy in 5 - 10 years
• nearly 100% with gross proteinuria will progress to ESRD in 7 - 10 yrs

**Type 2 Diabetic**
• 50% will have microalbuminuria at the time of presentation probably secondary to HTN
• 10-20% with microalbuminuria will progress to overt nephropathy
• minority populations have a 2 to 20-fold higher incidence of diabetic nephropathy
DIABETES AND INFECTION, TUBERCULOSIS, DIABETIC FOOT
Infections in People with Diabetes

Facts & Figures

1. Several studies report that infections account for 46.5% of the deaths - the largest contributing factor for mortality.

2. Urinary tract infection (UTI) is common in diabetics; about 25% of diabetic women have asymptomatic bacteria (four times the frequency in non-diabetic women).

3. Persons with DM are six times more likely to need hospitalization during influenza epidemics than non-diabetic patients.

4. Acute bacterial pyelonephritis is 4–5 times more common in individuals with DM.

5. Infections involving the skin, nails and subcutaneous tissues such as Necrotizing fasciitis, Fournier’s gangrene and foot ulcers are common in diabetics in a setting of poor glycemic control. The association of candidal infections and diabetes is also well recognized.

6. Malaria is a common parasitic infection, which can often occur in patients with diabetes. One of the Indian studies reported that amongst their patients with falciparum malaria, 14.7% were known diabetics.

7. Tuberculosis in diabetics is 2–5 times more common than in individuals without DM.

References:
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3354930/
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3938870/
Diabetes increases the risk of active TB by about three times. TB with diabetes may have atypical presentations, such as lower lobe involvement; smear negative TB etc., which may lead to delay in diagnosis, although there are reports which do not support these observations.

People with TB who have Diabetes may have a poorer response to treatment and are at higher risk of treatment failure, deaths and relapses after cure; some studies have documented that TB patients with diabetes may have more chances of MDR-TB.

There is a felt need for joint collaboration between National Program for Cancer, Diabetes, Cardiovascular and Stroke (NPCDCS) and Revised National TB control programme (RNTCP) in India for cross referral and opportunistic screening. Thus, all case of TB will be screened for DM. Even reverse screening of diabetic patients for TB can also be helpful. Public private partnership can go a long way in this regard since they are already involved in early diagnosis and treatment of TB and MDR-TB cases under the national TB control Programme and NCD Programme.
Several studies report that infections account for 46.5% of the deaths among diabetic subjects - the largest contributing factor for mortality.

The regional roundtable on ‘Diabetes and infections’ at Guwahati identified the following major gaps and recommendations.

**Gaps**

- Lack of awareness amongst patients as ignoring a micro ulcer or a crack could prove fatal for the DM patient.
- Poor lifestyle including poor control of blood glucose and hypertension along with the fear of insulin.
- No existing guidelines for diagnosis of a diabetic patient and management of infections.
- Lack of proper infrastructure, such as lack of laboratory facilities for testing infections especially in primary care setup and; inadequate culture facilities even in secondary care set ups.
- Lack of trained paramedical staff, microbiologists, pathologists, which delay the diagnosis and detection of a problem.
- No compulsory use of vaccinations is mentioned in the national vaccination schedule.
- Lack of training among health care professionals around early detection of infections due to diabetes and absence of diagnostic tools for infections;
- Huge cost of treatment as prolonged infections lead to hospitalization, which further lead to economic loss to the family.

**Recommendations**

- Mandatory use of influenza and pneumococcal vaccination in Diabetic patients and in high risk groups like children, elderly and health care professionals is recommended.
- Importance of patient education by doctor, paramedic needs emphasis: For e.g., in order to detect the infections in diabetic patients,
- Good sanitation and hygiene facilities should be provided at Laboratories
- Enhancing the health care facilities by means of insurance policies, free medicines and insulin which can be implemented through collaboration of government, public and private partnerships (PPPs).
- Separate guidelines and management should be followed for each of the infections of diabetes.
- IMA should role out CMEs for both public and private health professionals
- Price control of life saving drugs thus making them affordable should be considered by the Government.
- Bilateral screening for diabetes and T.B
- Integration of NPCDCS and various Govt. schemes such as RNTCP should be done.
Summary of Recommendations

Everyone prefers to stay healthy and avoid being sick. The demand for health care is in part an expression of this preference. Improving access, affordability and availability of health services is all about getting supply and demand in equilibrium and what is needed to make it more efficient. In this paper recommendations of regional chapters is translated into Supply, Demand, and Guidelines/policies that is required to maintain equilibrium within the scope of NCDs in general and diabetes in particular.

### Supply

- The primary care health centers should be fully equipped with glucometer, glucose strips, Trop-T, glucometers; ECG machine etc.
- There is lack of trained manpower to treat diabetes and its complications
- Antihypertensive drugs should be as cheaper as aspirin.
- There is lack of trained paramedical staff, microbiologists, pathologists, which delay the diagnosis and detection of a problem.
- Simple instruments such as ‘mono filaments’ should be made widely available especially at PHC’s for detecting diabetes peripheral neuropathy.
- Affordable customizable footwear to be made accessible for patients of peripheral neuropathy.
- Local Optometrists and Opticians should be trained on detection of diabetic retinopathy (DR) as this will help in timely detection and referral of patients with ‘DR’ to secondary/tertiary care institutions.

### Demand

**Awareness**

- Awareness on risk factors of diabetes such as alcohol and tobacco consumption, unhealthy diet and lack of physical activity.
- Awareness to increase self-risk perception.
- Creating awareness amongst physicians about eGFR formulas.
- A confluence of school principals should be done to prevent obesity among school children. The message should be developing healthy food choices, importance of exercise and avoiding junk food.
- Removing fear of insulin and thereby ensuring compliance amongst the general population. Self-monitoring of blood glucose and blood pressure
- Highlighting the importance of diet management, importance of foot care
- Recognizing the following signs and early treatment can save patients of Stroke :
  - F = Facial weakness
  - A = Arm weakness
  - S = Speech difficulty
  - T = Time to act fast
## Summary of Recommendations

### Investigation & Treatment

- Every diabetic patient must get their eyes checked once a year. This could come into practice by commemorating a monthly 'SUGAR day' to act as a reminder for all diabetic patients to get themselves checked for diabetic complications. These reminders could spread through bulk messaging over mobiles; advertisements across social media and these small initiatives can be taken up by Government, corporates or voluntary organizations.

- Proper infrastructure, such as laboratory facilities for testing infections especially in primary care setup and; adequate culture facilities in secondary care set ups

- There is need to have equipped facilities to cater services especially to the rural population

- Affordable cost of the treatment, drugs and equipment.

- Enhancing the health care facilities by means of insurance policies, free medicines and insulin which can be implemented through collaboration of government, public and private partnerships (PPPs).

- Technology such as tele-medicine and mhealth could play a larger role in the screening and management of DR, especially in catering to rural areas. This would also reduce the direct and indirect loss of resources (cost, time etc.) to the patients and help reduce the patient load at the secondary and tertiary care institutions.

- The paramedics should be trained to screen for diabetes and its complication and on basic life support (BLS) and advanced cardiac life support (ACLS) training courses.

- Fully-equipped ambulances linked with a dedicated hotline number such as 911 should be made into a reality.

### Technology

- Technology such as tele-medicine and mhealth could play a larger role in the screening and management of DR, especially in catering to rural areas. This would also reduce the direct and indirect loss of resources (cost, time etc.) to the patients and help reduce the patient load at the secondary and tertiary care institutions.

### Training

### Guideline

- Uniform screening protocols for complications in the form of checklists should be developed to ensure that all kinds of testing procedures have been done in a diabetic patient.

- Mandatory screening of complications at the time of diagnosis of the diabetes itself.

- Integration of NPCDCS and variousGovt. schemes such as RNTCP should be done as this will ensure bilateral screening for diabetes and tuberculosis.

- All pregnant women in India should be screened for GDM in early pregnancy.

- At the facility level, blood glucose test should be made mandatory for all ante-natal clinics and para-medical staff especially nurses should be trained on GDM.

- The practice of history taking and general examination including all pulses should become the first and foremost step for assessing a diabetic patient and investigating for any cardiovascular event.

- Recurrent urinary tract infection in a diabetic patient is an alarm signal and this should become part of the checklist/guideline.

- Mandatory use of influenza and pneumococcal vaccination in high risk diabetic patients such as children, elderly and health care professionals is recommended.

- The inadvertent use of glucose drip (in rural areas especially) to every patient without knowing their diagnosis should be stopped, as this could prove fatal in case of stroke patients.

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1 SUGAR has been converted into a Pneumonic; its five alphabets define— SPITUM, URINE, GLUCOSE, ARREST BRAIN and HEART, RETINA. All together they convey that yearly check-up of Sputum, Urine, Body Lipids, Peripheral Reflexes and Quarterly testing of Glucose can prevent a diabetic patient from acquiring complications.
Uday

A comprehensive Diabetes Prevention and Management Program in India (2012-2017)

In India, the prevalence of type-2 diabetes mellitus (DM) has been rising rapidly with 68 million people with diabetes in 2014 (International Diabetes Federation) that is projected to further increase to 109 million by the year 2035. High blood pressure (HBP) or hypertension often precedes and predicts the onset of clinical diabetes by several years. However, despite availability of proven and effective treatments, detection and control rates of these diseases are abysmally low in India.

A consortium of partners: Public Health Foundation of India (PHFI), Population Services International/India, & Project Hope initiated a comprehensive Diabetes Prevention and Management Program (UDAY) with support from Eli –Lilly and Company under the NCD partnership, with the objective of improving detection and management of these diseases.

Program Goal
The overall goal is to prevent, detect, reduce the risk of diabetes and HBP and to improve the treatment and management of individuals with either conditions by implementing a comprehensive cost-effective operational research program.

Program area: Two geographically and culturally distinct area, one district in North, Sonipat (Haryana) and one district in south, Vishakhapatnam (Andhra Pradesh)

Population covered: Adults aged ≥30 years in urban and rural sub-sites, each with a population of approximately 1,00,000 people, yielding a total population of 4,00,000

Program Interventions
There is a set of five synergistic ecosystem interventions. We hypothesize that education of the public on diabetes and its risks will lead to increased self-referral and prevention, while education of the healthcare providers will promote opportunistic screening for diabetes and its risks, and purposeful implementation of evidence based diagnostic (to screen, stratify by risk) and management guidelines (to initiate appropriate therapy).
**Program framework: overview**

Process flow (Screening)

- **Public education on diabetes and hypertension through social marketing campaigns**

- **Screening of ≥30 year olds by trained health workers using diabetes risk score and glucometers**
  - (Unique ID assigned)

  - **Low risk**
    - Provide health education materials + lifestyle advice
  
  - **High risk**
    - Refer to healthcare system

  - **Program trained healthcare providers**

- **Patient education and engagement in patient networks by health workers in the health facility/community**
  + Guideline based management
  + Follow-up, adherence tracking using m-Health tools
आपको भी डायबिटिज़ या बीपी हो सकता है

1. अब आपकी उम्र तीन साल के ऊपर है
2. आप तला हुआ नहीं जाते हैं
3. बिना वजह थक जाते हैं

स्वस्थ आदतें अपनाओ।
Non-communicable diseases (NCDs), mainly cardiovascular diseases (CVD), cancers, diabetes, obesity and chronic respiratory diseases, are a leading threat to human health and development in today's world. These five NCDs are the world's leading causes of death and kill an estimated 38 million people each year, out which 28 million deaths occur in low and middle-income countries. Cardiovascular diseases account for most NCD deaths followed by cancer, respiratory diseases and diabetes. Individuals with diabetes are two to four times more likely to develop cardiovascular disease than people without diabetes, making CVD the leading cause of mortality in people with diabetes.

Development of NCDs is related to the interaction of various genetic, environmental and lifestyle factors, which include unhealthy diet, physical inactivity, tobacco and alcohol use. Unhealthy lifestyles result in high prevalence of risk factors such as raised blood pressure, increased blood glucose, elevated blood lipids, and obesity.

According to a WHO report NCDs are estimated to have accounted for 60% of the deaths in India in 2014. As a result of industrialization, socio-economic development, urbanization, changing age-structure, changing lifestyles, India is facing a growing burden of non-communicable diseases. India, already the diabetes capital of the world, is heading towards a diabetes explosion, with more than 60 million people already affected in 2015. These numbers surely indicate the need to focus on NCDs as they are not only a huge economic burden but a social burden as well. NCDs/Diabetes are impacting the productivity of the youth as the onset of these diseases is seen at a younger age now.

The NCD initiative is a step taken in the right direction because India has to develop strategies to combat the "emerging menace" of chronic diseases. No single strategy can deal with the burgeoning epidemic of NCD's; hence a multi-pronged approach is required at different levels. The 'upstream' strategy for this is prevention. Prevention of NCDs like diabetes requires management of maternal nutrition, prevention of childhood obesity, and better management of risk factors in adults. The use of information technology (mobile phones, internet) can be helpful in achieving better results by considerably increasing the reach of educational information and messaging. The 'downstream' strategy would be to provide facilities and medical care to individuals already suffering from the disease. For this purpose, empowerment of patients is essential- this facilitates self management practices and better control, thereby preventing or reducing complications. Since diabetes involves multiple organ systems, a team effort is needed for optimum management. Such specialized care is available in only a few institutions in our country and falls far short of requirements. The goal of this year's summit is to propose standards of 'tertiary' care for diabetes so that these can be made available to a much wider range of centers. The summit aims to facilitate partnership between government, industry and health professionals to achieve these goals.
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Lilly is a global healthcare leader that unites caring with discovery to make life better for people around the world. We were founded more than a century ago by a man committed to creating high-quality medicines that meet real needs, and today we remain true to that mission in all our work. Across the globe, Lilly employees work to discover and bring life-changing medicines to those who need them, improve the understanding and management of disease, and give back to communities through philanthropy and volunteerism. To learn more about Lilly, please visit us at www.lilly.com

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In 1988, PSI began a small operation in India and currently has more than 2000 staff members across 20 states. PSI’s mission is to empower the people of India to lead healthy lives by addressing priority public health challenges in India using social marketing, social franchising, behavior change communication and market facilitation techniques.
The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering industry, Government, and civil society, through advisory and consultative processes.

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CII charts change by working closely with Government on policy issues, interfacing with thought leaders, and enhancing efficiency, competitiveness and business opportunities for industry through a range of specialized services and strategic global linkages. It also provides a platform for consensus-building and networking on key issues.

Extending its agenda beyond business, CII assists industry to identify and execute corporate citizenship programmes. Partnerships with civil society organizations carry forward corporate initiatives for integrated and inclusive development across diverse domains including affirmative action, healthcare, education, livelihood, diversity management, skill development, empowerment of women, and water, to name a few.

In its 120th year of service to the nation, the CII theme of Build India - Invest in Development: A Shared Responsibility, reiterates Industry’s role and responsibility as a partner in national development. The focus is on four key enablers: Facilitating Growth and Competitiveness, Promoting Infrastructure Investments, Developing Human Capital, and Encouraging Social Development.

With 66 offices, including 9 Centres of Excellence, in India, and 8 overseas offices in Australia, Bahrain, China, Egypt, France, Singapore, UK, and USA, as well as institutional partnerships with 312 counterpart organizations in 106 countries, CII serves as a reference point for Indian industry and the international business community.
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All the recommendations received from the regional roundtables were analyzed and documented in consultation with the experts and participants. The views represented herein are those of the experts and not of PSI or any other summit partner. We believe the manuscript represents valid work. Neither this manuscript nor one with substantially similar content under our authorship has been published or is being considered for publication elsewhere.

We have taken every caution to ensure the accuracy of the content, however in case of any discrepancy, error etc.; the same may please be brought to the notice of the authors for appropriate corrections.

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* This white paper shall in no way be considered a substitute to any personalized advice of medical practitioners on the respective disease, condition of an individual.
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